

## Public Version

September 18, 2023

### **BY HAND DELIVERY**

Mr. Bernard Logan, Clerk  
State Corporation Commission  
c/o Document Control Center  
Tyler Building – First Floor  
1300 East Main Street  
Richmond, Virginia 23219

*Application of Virginia Electric and Power Company To participate in the pilot program for electric power storage batteries pursuant to § 56-585.1:6 of the Code of Virginia and for certification of a proposed battery energy storage system pursuant to § 56-580 D of the Code of Virginia*  
Case No. PUR-2023-00162

Dear Mr. Logan:

Please find enclosed for filing in the above-referenced matter, an original and one (1) copy of the public version of *Virginia Electric and Power Company's Application and Request for Waivers*. A confidential and extraordinarily sensitive version is also being filed under seal under separate cover.

In addition, the Company is contemporaneously filing with the Commission, under separate cover, a Motion for Entry of a Protective Order and Additional Protective Treatment in the above-referenced matter.

Please do not hesitate to contact me if you have any questions regarding the enclosed.

Highest regards,

/s/ Jontille D. Ray

Jontille D. Ray

Enclosures

Cc: William H. Chambliss, Esq.  
C. Meade Browder, Jr., Esq.

September 18, 2023

Page 2

Paul E. Pfeffer, Esq.  
Lisa R. Crabtree, Esq.  
Etahjayne J. Harris, Esq.



**Dominion  
Energy<sup>®</sup>**

**Application Direct Testimony,  
Exhibits and Schedules of  
Virginia Electric and Power  
Company**

Before the State Corporation Commission of  
Virginia

To participate in the pilot program for electric  
power storage batteries pursuant to §  
56-585.1:6 of the Code of Virginia, and for  
certification of a proposed battery energy  
storage system pursuant to § 56-580 D of the  
Code of Virginia

Volume 1 of 1

**PUBLIC VERSION**

Case No. PUR-2023-00162

Filed: September 18, 2023

**Application of Virginia Electric and Power Company, To participate in the pilot program for electric power storage batteries pursuant to § 56-585.1:6 of the Code of Virginia, and for certification of a proposed battery energy storage system pursuant to § 56-580 D of the Code of Virginia**

Case No. PUR-2023-00162

**TABLE OF CONTENTS**

**PUBLIC AND CONFIDENTIAL / EXTRAORDINARILY SENSITIVE VOLUME 1 of 1**

**Application**

**Exhibit 1**

Generation Rules

**Direct Testimony of Brandon E. Martin**

Schedule 1 – Electric Power Storage Battery Pilot Program Proposal Summary for BESS-4  
(contains extraordinarily sensitive information)

**Direct Testimony of Sean Stevens**

Schedule 1 – Electric Power Storage Battery Pilot Program Proposal Summary for BESS-5  
(contains confidential and extraordinarily information)

Schedule 2 - Electric Power Storage Battery Pilot Program Proposal Summary for BESS-6  
(contains confidential and extraordinarily information)

**Direct Testimony of Amelia H. Boschen**

Schedule 1 – DEQ Supplement for BESS-4 Pilot Project

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

|                                                        |   |                         |
|--------------------------------------------------------|---|-------------------------|
| APPLICATION OF                                         | ) |                         |
|                                                        | ) |                         |
| VIRGINIA ELECTRIC AND POWER COMPANY                    | ) |                         |
|                                                        | ) | Case No. PUR-2023-00162 |
| To participate in the pilot program for electric power | ) |                         |
| storage batteries pursuant to § 56-585.1:6             | ) |                         |
| of the Code of Virginia, and for certification of      | ) |                         |
| a proposed battery energy storage system pursuant to   | ) |                         |
| § 56-580 D of the Code of Virginia                     | ) |                         |

**VIRGINIA ELECTRIC AND POWER COMPANY'S**  
**APPLICATION AND REQUEST FOR WAIVERS**

Pursuant to § 56-585.1:6 of the Code of Virginia (“Va. Code” or “Code”), Rule 80 A of the Rules of Practice and Procedure of the State Corporation Commission of Virginia (the “Commission”), 5 VAC 5-20-80 A, and the Commission’s Guidelines Regarding Electric Power Storage Battery Pilot Programs (the “Guidelines”), Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”), by counsel, hereby files its second application (“Application”) to participate in the pilot program for electric power storage batteries (the “Pilot Program”). Through this Application, the Company presents three projects for deployment of battery energy storage systems (“BESS”) as part of the Pilot Program: BESS-4: Evaluation of Two Co-Located Nonlithium-Ion Technologies; BESS-5: Outage Mitigation and Grid Support Through a Microgrid Capable BESS; and BESS-6: Long Duration Energy Storage in a Behind-the-Meter Application.

In addition, to the extent required by the Commission, and pursuant to Va. Code § 56-580 D and the Commission’s Filing Requirements in Support of Applications for Authority to Construct and Operate an Electric Generating Facility (the “Generation Rules”), 20 VAC 5-302-10 *et seq*, the Company requests a certificate of public convenience and necessity (“CPCN”) to

construct and operate BESS-4 at the Company's Darbytown Power Station. To facilitate this request, the Company has provided information required by the Generation Rules, but requests waivers of certain of the Generation Rules pursuant to Rule 40, 20 VAC 5-302-40. Specifically, the Company requests a waiver of Rule 25(6)(b) (topographical map), and Rule 35 (need), and a limited waiver of Rule 25(4) with respect to filing more than one copy of its 2022 Form 10-K.

In support of this Application, the Company states as follows:

### **GENERAL INFORMATION**

1. Dominion Energy Virginia is a public service corporation organized under the laws of the Commonwealth of Virginia furnishing electric service to the public within its certificated service territory. The Company also supplies electric service to non-jurisdictional customers in Virginia and to the public in portions of North Carolina. The Company is engaged in the business of generating, transmitting, distributing, and selling electric power and energy to the public for compensation. The Company also is a public utility under the Federal Power Act, and certain of its operations are subject to the jurisdiction of the Federal Energy Regulatory Commission. The Company is an operating subsidiary of Dominion Energy, Inc.

2. The Company's name and post office address are:

Virginia Electric and Power Company  
120 Tredegar Street  
Richmond, Virginia 23219

3. The names, addresses, and telephone numbers of the attorneys for the Company are:

Paul E. Pfeffer  
Lisa R. Crabtree  
Dominion Energy Services, Inc.  
120 Tredegar Street  
Richmond, Virginia 23219  
(804) 787-5607 (PEP)

(804) 819-2612 (LRC)

Jontille D. Ray  
Etahjayne J. Harris  
McGuireWoods LLP  
Gateway Plaza  
800 East Canal Street  
Richmond, Virginia 23219-3916  
(804) 775-1173 (JDR)  
(804) 775-1463 (EJH)

### **STATUTORY AUTHORITY**

4. As part of the Grid Transformation and Security Act of 2018 (the “GTSA”), the General Assembly directed the Commission to establish the Pilot Program, a program under which the Company must submit a proposal or proposals to deploy electric power storage batteries.<sup>1</sup> The legislation established the permissible objectives of the Pilot Program; set a maximum size for and duration of the Pilot Program; and addressed cost recovery for BESS deployed under the Pilot Program:

A proposal shall provide for the deployment of batteries pursuant to a pilot program that accomplishes at least one of the following: (i) improve reliability of electrical transmission or distribution systems; (ii) improve integration of different types of renewable resources; (iii) deferred investment in generation, transmission, or distribution of electricity; (iv) reduced need for additional generation of electricity during times of peak demand; or (v) connection to the facilities of a customer receiving generation, transmission, and distribution service from the utility. A Phase I Utility may install batteries with up to 10 megawatts of capacity. A Phase II Utility may install batteries with up to 30 megawatts of capacity. Each pilot program shall have a duration of five years. The pilot program shall provide for the recovery of all reasonable and prudent costs incurred under the pilot program through the electric utility’s base rates on a nondiscriminatory basis.<sup>2</sup>

---

<sup>1</sup> Va. Code § 56-585.1:6 A.

<sup>2</sup> *Id.*

5. The legislation declared the Pilot Program to be in the public interest: “Any pilot program proposed by a Phase I Utility or Phase II Utility that satisfies the requirements of this subsection is in the public interest.”<sup>3</sup>

6. The legislation also directed the Commission to establish guidelines for the general administration of the Pilot Program. The Commission issued the Guidelines in November 2018.<sup>4</sup> The Guidelines allow each utility to “file with the Commission one or more applications to participate in the Pilot Program at different times,” and set forth the content for such filings.<sup>5</sup>

7. Va. Code § 56-580 D requires a CPCN for electrical generating facilities:

The Commission shall permit the construction and operation of electrical generating facilities in Virginia upon a finding that such generating facility and associated facilities (i) will have no material adverse effect upon reliability of electric service provided by any regulated public utility, (ii) are required by the public convenience and necessity, if a petition for such permit is filed after July 1, 2007, and if they are to be constructed and operated by any regulated utility whose rates are regulated pursuant to § 56-585.1, and (iii) are not otherwise contrary to the public interest. In review of a petition for a certificate to construct and operate a generating facility described in this subsection, the Commission shall give consideration to the effect of the facility and associated facilities on the environment and establish such conditions as may be desirable or necessary to minimize adverse environmental impact as provided in § 56-46.1.

8. The Generation Rules apply generally to the construction of electric generating facilities with rated capacities of more than 5 megawatts (“MW”). For facilities with rated

---

<sup>3</sup> *Id.*

<sup>4</sup> *See Commonwealth of Virginia, ex rel. State Corporation Commission, Ex Parte: In the matter concerning the implementation by Virginia Electric and Power Company d/b/a Dominion Energy Virginia of a pilot program for the deployment of electric power storage batteries pursuant to Enactment Clause Nos. 9 and 10 of Senate Bill 966, Case No. PUR-2018-00060, Order Establishing Guidelines at 4 (Nov. 26, 2018).*

<sup>5</sup> Guidelines at Section D, E.

capacities of 50 MW or less but greater than 5 MW, Rule 25 applies, 20 VAC 5-302-25.

### **APPLICATION TO PARTICIPATE IN PILOT PROGRAM**

9. In this Application, the Company presents three projects for deployment: BESS-4: Evaluation of Two Co-Located Nonlithium-Ion Technologies; BESS-5: Outage Mitigation and Grid Support Through a Microgrid Capable BESS; and BESS-6: Long Duration Energy Storage in a Behind-the-Meter Application.

10. Through BESS-4, the Company proposes to install an 8.94 MW BESS-4 pilot facility comprised of two nonlithium-ion technologies. The Form Energy Iron-Air BESS is a 4.94 MW / 494 megawatt-hour (“MWh”) alternating current (“AC”) multi-day system and the Eos Energy Zinc Hybrid BESS is a 4 MW / 16 MWh AC system. BESS-4 seeks to accomplish the following statutory objectives: (ii) improve integration of renewable resources; and (iv) reduce the need for additional generation during times of peak demand. The projected cost for BESS-4 is approximately \$70.6 million, with a projected commercial operation date of August 1, 2026, based upon Commission approval on or before March 31, 2024.

11. Through BESS-5, the Company proposes to install a 1.9 MW / 3.8 MWh AC-coupled BESS. BESS-5 seeks to accomplish the following statutory objectives: (i) improved reliability of electrical transmission or distribution systems; (ii) improved integration of different types of renewable resources; (iii) deferred investment in generation, transmission, or distribution of electricity; and (iv) reduced need for additional generation of electricity during times of peak demand. The projected cost for BESS-5 is approximately \$6 million, with a projected commercial operation date by third quarter 2025, based upon Commission approval on or before March 31, 2024.

12. Through BESS-6, the Company proposes to install a 1.5 MW / 15 MWh AC-coupled BESS. BESS-6 seeks to accomplish the following statutory objectives: (i) improved reliability of electrical transmission or distribution systems; (iv) reduced need for additional generation of electricity during times of peak demand; and (v) connection to the facilities of a customer receiving distribution service from the utility. The projected cost for BESS-6 is approximately \$14.4 million, with a projected commercial operation date of December 31, 2027, based upon Commission approval on or before March 31, 2024.

13. The detailed information on each BESS required by the Guidelines is provided in the direct testimony and schedules of the Company's witnesses. Specifically, the pre-filed Direct Testimony of Company Witness Brandon E. Martin provides details on BESS-4. Details regarding BESS-5 and BESS-6 are addressed in the pre-filed Direct Testimony of Company Witness Sean Stevens.

14. The Company requests Commission approval for BESS-4, BESS-5, and BESS-6 to participate in the Pilot Program. The three projects seek to accomplish various legislative objectives for BESS deployed through the Pilot Program as described above. Consistent with Va. Code § 56-585.1:6, the Company will include the costs of BESS-4, BESS-5, and BESS-6 in its base rate cost of service for recovery through its rates for generation and distribution services.

15. The Commission has already approved three BESS facilities under the Pilot Program totaling 16 MW in Case No. PUR-2019-00124. This Application will bring the aggregate capacity of all Pilot Program projects approved by the Commission for the utility to 28.34 MW.

16. To support the projected commercial operation dates for BESS-4, BESS-5, and BESS-6, the Company respectfully requests an order granting permission to participate in the Pilot Program by March 31, 2024.

#### **CPCN FOR BESS-4**

17. The Company seeks to use BESS-4 as a generation asset. Accordingly, to the extent required by the Commission, the Company requests a CPCN pursuant to Va. Code § 56-580 D and the Generation Rules.

18. BESS-4 will store energy from the grid from both renewable and traditional energy sources.

19. In addition to the information on BESS-4 provided in the pre-filed Direct Testimony of Company Witness Brandon E. Martin, details on BESS-4 required by statute and the Generation Rules are attached to this Application as Exhibit 1, subject to the waiver requests outlined below.

#### **REQUESTS FOR WAIVERS**

20. Pursuant to Rule 40 and for good cause shown, the Company requests a waiver of Rule 25(6)(b), and Rule 35, and requests a limited waiver of Rule 25(4).<sup>6</sup>

21. The Company requests a waiver of the requirement in Rule 25(6)(b) to provide “a

---

<sup>6</sup> Similar waiver requests were granted in the Company’s previous Pilot Program filing. *See Application of Virginia Electric and Power Company, To participate in the pilot program for electric power storage batteries pursuant to § 56-585.1:6 of the Code of Virginia, and for certification of a proposed battery energy storage system pursuant to § 56-580 D of the Code of Virginia*, Case No. PUR-2019-00124, Order for Notice and Hearing at 5 (Aug. 16, 2019). Additionally, two of the waiver requests are similar to waivers granted by the Commission in Case No. PUR-2019-00105. *Petition of Virginia Electric and Power Company, For approval and certification for the proposed US-4 Solar Project pursuant to §§ 56-580 D and 56-46.1 of the Code of Virginia, and approval of a rate adjustment clause, designated Rider US-4, under § 56-585.1 A 6 of the Code of Virginia*, Case No. PUR-2019-00105, Order for Notice and Hearing at 21, Ordering Paragraphs (22) and (24) (Jul. 31, 2019).

depiction on topographic maps of the proposed site” because a topographic map is not available for the site.

22. The Company requests a waiver of Rule 35, which requires specific information on “the need for the proposed facility.” The General Assembly has declared participation in the Pilot Program to be in the public interest. Therefore, the traditional requirements to justify the “need” for electric generating facilities should be found to not be applicable in this circumstance.

23. Finally, the Company requests a partial waiver of Rule 25(4) to the extent it requires multiple copies of the Company’s publicly available 2022 Form 10-K. Rule 25(4) requires “[f]inancial information for the applicant.” “If the applicant . . . is a public company, financial information should include the entity’s most recent stockholder report and most recent Securities and Exchange Commission Form 10-K.” The Company’s financial information is filed publicly with the Securities and Exchange Commission and is available on the Company’s website. The Company is filing one copy of its 2022 Form 10-K with the Clerk and providing website links to the publicly available documents in Exhibit 1. For purposes of judicial economy and environmental consciousness, the Company respectfully requests partial waiver of filing additional copies of its publicly available 2022 Form 10-K.

**WHEREFORE**, the Company respectfully requests that the Commission: (i) direct that notice of the Application be given; (ii) grant the Company’s requested waivers; (iii) issue an order by March 31, 2024 allowing BESS-4, BESS-5, and BESS-6 to participate in the Pilot Program established under Va. Code § 56-585.1:6; and (iv) grant such other relief as deemed appropriate and necessary.

Respectfully submitted,

**VIRGINIA ELECTRIC AND POWER COMPANY**

By: /s/ Jontille D. Ray  
Counsel

Paul E. Pfeffer  
Lisa R. Crabtree  
Dominion Energy Services, Inc.  
120 Tredegar Street  
Richmond, Virginia 23219  
(804) 787-5607 (PEP)  
(804) 819-2612 (LRC)  
*paul.e.pfeffer@dominionenergy.com*  
*lisa.r.crabtree@dominionenergy.com*

Jontille D. Ray  
Etahjayne J. Harris  
McGuireWoods LLP  
Gateway Plaza  
800 East Canal Street  
Richmond, Virginia 23219-3916  
(804) 775-1173 (JDR)  
(804) 775-1463 (EJH)  
*jray@mcguirewoods.com*  
*eharris@mcguirewoods.com*

*Counsel for Virginia Electric and Power Company*

September 18, 2023

**Legal and Trade Names and Description of Authorized Business Structure  
of Virginia Electric and Power Company  
20 VAC 5-302-25(1) and (2)**

Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”) is a public service corporation, which was incorporated in Virginia in 1909. The Company’s current legal name is Virginia Electric and Power Company, and it uses the following trade names: Virginia Power, Dominion Energy Virginia, Dominion Virginia Power, Dominion Virginia, Dominion Energy North Carolina, Dominion North Carolina, Dominion North Carolina Power, North Carolina Power, Dominion Generation, and West Virginia Power.

**Principal Corporate Officers / Directors of Virginia Electric and Power Company  
20 VAC 5-302-25(3)**

Robert M. Blue  
Director, Chairman and Chief Executive Officer  
120 Tredegar Street  
Richmond, VA 23219

Edward H. Baine  
Director and President  
120 Tredegar Street  
Richmond, VA 23219

Diane Leopold  
Director, Executive Vice President and Chief Operating Officer  
120 Tredegar Street  
Richmond, VA 23219

Carlos M. Brown  
Senior Vice President and General Counsel  
120 Tredegar Street  
Richmond, VA 23219

Carter M. Reid  
Executive Vice President, Chief of Staff, and Corporate Secretary  
120 Tredegar Street  
Richmond, VA 23219

Darius A. Johnson  
Vice President and Treasurer  
120 Tredegar Street  
Richmond, VA 23219

Dr. Cedric F. Green  
Senior Vice President – Generation  
600 E. Canal Street  
Richmond, VA 23219

Robert H. Locke  
Senior Vice President – Electric Distribution  
600 E. Canal Street  
Richmond, VA 23219

Eric Carr  
President – Nuclear Operations and Chief Nuclear Officer  
5000 Dominion Boulevard  
Glen Allen, VA 23060

Douglas C. Lawrence  
Senior Vice President – Nuclear Operations & Fleet Performance  
5000 Dominion Boulevard  
Glen Allen, VA 23060

William L. Murray  
Senior Vice President – Corporate Affairs & Communications  
120 Tredegar Street  
Richmond, VA 23219

Corynne S. Arnett  
Senior Vice President – Regulatory Affairs and Customer Experience  
120 Tredegar Street  
Richmond, VA 23219

Michele L. Cardiff  
Senior Vice President, Controller and Chief Accounting Officer  
120 Tredegar Street  
Richmond, VA 23219

**Virginia Electric and Power Company Financial Information  
and Qualifications to Construct and Operate the Proposed Facilities  
20 VAC 5-302-25(4) and (5); 20 VAC 5-302-10, Par. 1 (ii)**

One copy of the most recent Form 10-K for Virginia Electric and Power Company has been filed with the Clerk (20 VAC 5-302-25(4)). The 2022 Form 10-K filed on February 21, 2023, with the U.S. Securities and Exchange Commission is publicly available at the following website: <https://investors.dominionenergy.com/financials-and-reports/sec-filings/sec-filings-details/default.aspx?FilingId=16418073>.

See pages 49 to 51 of the Form 10-K for a list of other generation facilities developed or owned and operated by the Company as of December 31, 2022 (20 VAC 5- 302-25(5)(a)). A description of the Company's organization structure is provided on page 11 and in Exhibit 21 of the Form 10-K.

Virginia Electric and Power Company is an incumbent electric utility as defined in Va. Code § 56-576 (20 VAC 5-302-25(5)(b)).

**Specific Site Information for the Proposed Facility  
20 VAC 5-302-25(6)**

The proposed BESS-4 will be installed at the Company's Darbytown Power Station located in Henrico County, Virginia, on Company-owned property, on a site of approximately 10 acres within a 51.36-acre parcel. This location was chosen because of the space available within the site to locate the three BESS technologies and its proximity to a direct connection at the Varina 34.5kV substation. This location is optimal to demonstrate and monitor each battery's performance at one location. The Varina substation also has sufficient space available to connect the BESS-4 without requiring expansion of the existing facility. See the Direct Testimony of Company Witness Brandon E. Martin, Schedule 1 for a map identifying the location of BESS-4.

**General Description of the Proposed Facility  
20 VAC 5-302-25(7); 20 VAC 5-302-10, Par. 1 (i)**

The Company proposes to install an 8.94 MW BESS-4 pilot facility comprised of two nonlithium-ion technologies. The Form Energy Iron-Air BESS is a 4.94 MW / 494 megawatt-hour ("MWh") alternating current ("AC") multi-day system and the Eos Energy Zinc Hybrid BESS is a 4 MW / 16 MWh AC system. Each of the BESS-4 pilot technologies is a standalone system.

**General Description of the Fuel Supply Arrangement for the Proposed Facility  
20 VAC 5-302-25 (8)**

The proposed BESS-4 will store energy from the grid from both renewable and traditional energy sources. To the extent the fuel source for the proposed BESS-4 is from renewable energy, this fuel-related requirement is not applicable.

To the extent the fuel source for the proposed BESS-4 is from a traditional source fueled by natural gas or oil, the Company employs a disciplined natural gas procurement plan to ensure a reliable supply of natural gas at competitive prices. Through periodic solicitations and the open market, the Company serves its gas-fired fleet using a combination of day-ahead, monthly, seasonal, and multiyear physical gas supply purchases. In addition to managing its natural gas supply portfolio, the Company evaluates and reconfigures as appropriate its diverse portfolio of pipeline transportation and storage contracts to provide the most reliable and economical

delivered fuel options for each power station. This portfolio of natural gas transportation contracts, all with various term expirations, provides access to multiple natural gas supply and trading points from the Marcellus region to the Southeast region. Further, the Company actively participates in short-term, interstate pipeline capacity markets, buying capacity (when available) during times of need or selling capacity during low generation periods or power station outages.<sup>1</sup>

The Company purchases its No. 2 fuel oil and No. 6 fuel oil requirements on the spot market and optimizes its inventory, storage, and transportation to ensure reliable supply to its power generating facilities. Trucks, vessels, barges, and pipelines are employed to transport oil to the Company's stations and third-party storage locations, ensuring a reliable supply of oil and mitigating the price risk associated with potentially volatile prices for these products.<sup>2</sup>

**Economic Development Impacts of the Proposed Facility  
20 VAC 5-302-25(9); 20 VAC 5-302-10, Par. 1 (iii)**

During development and construction, the proposed BESS-4 will provide direct and indirect economic benefits to the Commonwealth. Additionally, local and state tax revenues will incrementally increase as a result of the proposed BESS.

**Other Agency Requirements  
20 VAC 5-302-25(10)**

The Company may need the local and environmental permits discussed in detail in Schedule 1 to the Direct Testimony of Company Witness Amelia H. Boschen.

**Environmental Impacts of the Proposed Facility  
Va. Code § 56-580 D; 20 VAC 5-302-25 (11); 20 VAC 5-302-10, Par. 1 (iii)**

See Schedule 1 to the Direct Testimony of Company Witness Amelia H. Boschen.

**Transmission Reliability Impacts of the Proposed Facility  
Va. Code § 56-580 D (i); 20 VAC 5-302-25(12); 20 VAC 5-302-10, Par. 1 (iv)**

BESS-4 should have no impact on transmission reliability. See Schedule 1 to the Direct Testimony of Company Witness Brandon E. Martin discussing the specific objectives and potential impacts of the proposed BESS-4.

**Public Interest of the Proposed Facility  
Va. Code § 56-580 D (iii); 20 VAC 5-302-25(13); 20 VAC 5-302-10, Par. 1 (v)**

The proposed BESS-4 is declared by statute to be in the public interest because it satisfies the requirements of Va. Code § 56-585.1:6 A.

---

<sup>1</sup> See *Application of Virginia Electric and Power Company To revise its fuel factor pursuant to Va. Code § 56-249.6*, Case No. PUR-2023-00067, Direct Testimony of Dale E. Hinson at 7-8 (filed May 1, 2023).

<sup>2</sup> *Id.* at 12.

## **WITNESS DIRECT TESTIMONY SUMMARY**

Witness: Brandon E. Martin

Title: Manager, Business Development

Summary:

Company Witness Brandon E. Martin supports the proposed battery energy storage system (“BESS”), BESS-4. The Company proposes to install BESS-4 at the Darbytown Power Station to study improved integration of different types of renewable resources and reduced need for additional generation of electricity during times of peak demand. Company Witness Martin describes BESS-4 and provides details regarding the location, installation, scale, and pilot objectives for BESS-4.

**DIRECT TESTIMONY  
OF  
BRANDON E. MARTIN  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUR-2023-00162**

1   **Q.   Please state your name, position, and business address.**

2   A.   My name is Brandon E. Martin, and I am Manager of Business Development for  
3       Dominion Energy Virginia, testifying on behalf of Virginia Electric and Power Company  
4       (“Dominion Energy Virginia” or the “Company”). My business address is 600 East  
5       Canal Street, Richmond, Virginia, 23219. A statement of my qualifications and  
6       background is provided as Appendix A.

7   **Q.   Please describe your areas of responsibility with the Company.**

8   A.   I lead the Energy Storage, Reliability and Resiliency team whose focus is on the  
9       development of energy storage and dispatchable generation. This function includes the  
10      development or acquisition of energy storage projects and due diligence on energy  
11      storage technologies to be deployed in the Commonwealth.

12  **Q.   What is the purpose of your testimony in this proceeding?**

13  A.   I am testifying in support of the Company’s application (“Application”) (i) for approval  
14      to deploy three battery energy storage systems (“BESS”)—designated BESS-4, BESS-5,  
15      and BESS-6—as part of the pilot program for electric power storage batteries (the “Pilot  
16      Program”) and (ii) to the extent required by the Commission, for a certificate of public  
17      convenience and necessity (“CPCN”) to construct and operate BESS-4 at the Company’s  
18      Darbytown Power Station. Specifically, I support the proposed BESS-4 project for the

1 evaluation of two co-located nonlithium-ion BESS technologies for operability,  
2 reliability, and scalability.

3 **Q. During the course of your testimony, will you introduce an exhibit?**

4 A. Yes. Company Exhibit No. \_\_, BEM, consisting of Extraordinarily Sensitive Schedule 1,  
5 was prepared under my supervision and direction and is accurate and complete to the best  
6 of my knowledge and belief. Schedule 1 is the Electric Power Storage Battery Pilot  
7 Program Proposal Summary (“Proposal Summary”) for BESS-4.

8 **Q. Please describe the proposed BESS-4.**

9 A. The Company sees the need to diversify energy storage technologies to meet the needs of  
10 grid of the future. The Company proposes to install an 8.94 MW BESS-4 pilot facility  
11 comprised of two nonlithium-ion technologies: the Form Energy Iron-Air BESS is a 4.94  
12 MW / 494 megawatt-hour (“MWh”) alternating current (“AC”) multi-day system and the  
13 Eos Energy Zinc Hybrid BESS is a 4 MW / 16 MWh AC system. These technologies are  
14 expected to have lower thermal runaway risks than lithium-ion energy storage currently  
15 presents. Additionally, recent history has shown significant pricing volatility and supply  
16 chain constraints for lithium-ion battery materials that could cause limits to the energy  
17 storage build out plans. Additionally, competition for raw materials with the electric  
18 vehicle market (which is expected to primarily use lithium-ion battery technology)  
19 subjects customers to being price takers and subsequently increases volatility. Lastly, the  
20 need for long duration energy storage resources will be critical to the future of the electric  
21 grid where there will be increased intermittent renewable generation. This pilot seeks to  
22 evaluate whether these technologies can be deployed to the grid reliably and alleviate the  
23 risks noted above.

1 Each of the BESS-4 pilot technologies is a standalone system. BESS-4 will be classified  
2 as a generation asset.

3 The proposed BESS-4 seeks to accomplish the following objectives: (ii) improve  
4 integration of renewable resources; and (iv) reduce the need for additional generation  
5 during times of peak demand. Each BESS will function to: (i) balance the grid by  
6 reducing utility load (especially during critical peak events); (ii) analyze market value to  
7 reduce utility costs; and (iii) provide resiliency through voltage support and congestion  
8 management.

9 The total cost for BESS-4 is expected to be approximately \$70.6 million (excluding  
10 financing costs). The Company anticipates that the proposed BESS will be in service by  
11 August 1, 2026, based upon Commission approval on or before March 31, 2024. More  
12 details regarding BESS-4, including the initial metrics and performance data to be  
13 evaluated, are included in my Schedule 1.

14 **Q. What is the location of BESS-4?**

15 A. The proposed BESS-4 will be installed at the Darbytown Power Station on Company-  
16 owned property located at 6001 Fergus Blvd., Richmond, Virginia 23231. A more  
17 detailed map of the location is attached to my Schedule 1.

1 **Q. Please provide a basic description of what will be required for the installation of the**  
2 **proposed BESS-4 and the estimated physical scale of BESS-4.**

3 A. The proposed BESS-4 site will contain two containerized non-lithium BESS facilities  
4 The first BESS facility is an Iron-Air system comprised of approximately 128, 37-foot  
5 containers. The second BESS facility is a Zinc Hybrid system comprised of  
6 approximately 39, 17-foot containers. Approximately 10 inverters and 2 transformers  
7 will be co-located to facilitate connecting the BESS-4 systems. The BESS-4 battery  
8 containers will be placed on concrete pads, or piers, depending on final engineering,  
9 procurement, and construction (“EPC”) scope. Gravel will be used around the concrete  
10 pads or piers, where applicable to surround the entire area of the BESS-4 facility. The  
11 entire BESS-4 facility, including auxiliary equipment will cover approximately 435,600  
12 square feet (~10 acres) at the Darbytown Power Station.

13 The exact design of the proposed BESS-4 is subject to final engineering.

14 **Q. Virginia Code §§ 10.1-1186.21B and 56-46.1 G require the Commission and the**  
15 **Virginia Department of Environmental Quality (“DEQ”) to coordinate an**  
16 **environmental review of proposed generating plants and associated facilities. Has**  
17 **the Company submitted information for this environmental review?**

18 A. Yes. The Company has prepared a DEQ Supplement for this Application which is  
19 sponsored by Company Witness Amelia H. Boschen as Schedule 1 to her pre-filed direct  
20 testimony.

1   **Q.    Has the Company assessed environmental justice (EJ) considerations in the**  
2       **development of the BESS-4 project?**

3    A.    Yes. The Company has conducted an EJ review of the Darbytown project. The  
4       population residing within a 1-mile radius of Darbytown appears to be a community of  
5       color as defined in the Virginia Environmental Justice Act, Va. Code § 2.2-234.  
6       However, the project is co-located with an existing Company-owned facility and the units  
7       are proposed to be set back and not visible from Darbytown Road. Based on our analysis  
8       of the project, we do not anticipate disproportionately high or adverse impacts to the  
9       surrounding community and any environmental justice populations located within the  
10      area reviewed.

11   **Q.    Does this conclude your pre-filed direct testimony?**

12   A.    Yes, it does.

**BACKGROUND AND QUALIFICATIONS  
OF  
BRANDON E. MARTIN**

Brandon E. Martin is a Manager of Business Development at Dominion Energy. He is responsible for leading the regulated Energy Storage, Reliability, and Resiliency team, which includes the development or acquisition of battery energy storage systems, emerging technology evaluations, development of dispatchable generation, hydrogen, and carbon capture technologies.

Mr. Martin joined Dominion as an intern in 2005, working in electric transmission system protection. He joined the Company full time in 2007, scheduling shipper natural gas flows on the interstate pipeline. In 2010, Mr. Martin joined the interstate Marketing and Business Development, which focused on supporting natural gas contracts and supporting the new construction of pipelines across the northeast states. In 2019, Mr. Martin lead the commercial team which focused on delivering liquified natural gas to customers who were facing supply constraints.

Beginning in 2020, Mr. Martin joined the renewable power generation team leading the acquisition of solar projects across the Commonwealth of Virginia in support of the Virginia Clean Economy Act. This includes securing land control, assessing site characteristics for environmental and construction considerations, managing local permitting, leading due diligence activities, and evaluating project financials.

Mr. Martin holds a Bachelor of Science degree in Business Management from Virginia Tech and a master's degree in business administration from Liberty University.

**Electric Power Storage Battery Pilot Program**  
**Proposal Summary**

**Proposal: BESS 4 - For the evaluation of two co-located nonlithium-ion BESS technologies for operability, reliability, and scalability. One BESS is a multi-day, long duration nonlithium system. The other BESS is a four-hour non-lithium system (collectively the “BESS-4”).**

The Company sees a need for non-lithium storage technologies to ensure safe, cost effective, reliable energy supply as well as the need for long duration energy storage to be able to support multi-day weather events for Virginia customers.

Lithium-ion batteries face several critical challenges that support the need for developing alternative energy storage options. First, the need for viable alternatives to lithium-ion based energy storage systems is driven by safety risk associated with the potential for thermal runaway. Second, the availability and costs of lithium-ion batteries is significantly influenced by the global demand for lithium-ion, which may expose customers to significant pricing volatility. Lastly, the scalability of lithium-ion above 4-hours has been economically challenged.

These non-lithium alternatives present several opportunities for the future of energy storage deployment on the electric grid. First, these energy storage technologies are not expected to have the capability for thermal runaway risks mentioned above. Additionally, capital costs are expected to be much lower than lithium-ion, by using more commonly available materials. Lastly, the need for long duration and multi-day energy storage will be critical to providing grid reliability during intermittent renewable generation.

**I. Location. The utility shall provide the location where the utility proposes to install the BESS. If the utility proposes to install a BESS at a customer premises, the utility shall provide the name and address of the customer, a description of the arrangement with the customer allowing collocation on the customer's property, and a description of the proposed ownership of the BESS.**

The proposed BESS-4 will be installed at the Company’s Darbytown Power Station located in Henrico County, Virginia, on Company-owned property. This location was chosen because of the space available within the site to locate the two BESS technologies and its proximity to a direct connection at the Varina 34.5kV substation. This location is optimal to demonstrate and monitor each battery’s performance at one location. The Varina substation also has sufficient space available to connect the BESS-4 without requiring expansion of the existing facility. See Attachment 1 for a map identifying the location of BESS-4.

**II. Capacity. The utility shall provide the capacity of the proposed BESS and the aggregate capacity of all proposals approved by the Commission under the Pilot Program for the utility.**

The Company proposes to install an 8.94 MW BESS-4 pilot facility comprised of two nonlithium-ion technologies. The Form Energy Iron-Air BESS is a 4.94 MW / 494 megawatt-hour (“MWh”) alternating current (“AC”) multi-day system and the Eos Energy Zinc Hybrid BESS is a 4 MW / 16 MWh AC system. Each of the BESS-4 pilot technologies is a standalone system.

The Commission has already approved three BESS facilities under the Pilot Program totaling 16 MW in Case No. PUR-2019-00124.

**III. Technology. The utility shall specify the proposed BESS technology and the manner in which the BESS will be or has been procured.**

The proposed BESS-4 Pilot will utilize two nonlithium-ion technologies.

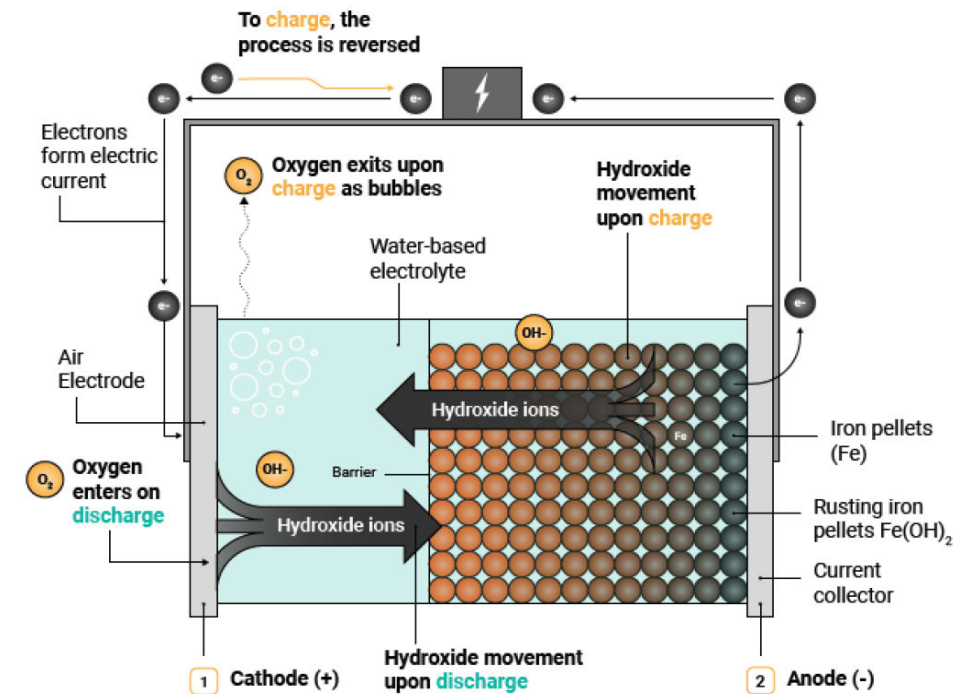
The Company conducted initial diligence with a third-party engineering firm, evaluating the most promising technologies which could be deployed at scale to serve customers in the Commonwealth. The initial screening evaluated over 30 companies. Final selection of the two battery technologies described below was based on several factors including, path to commercial viability, safety, supply chain, technology readiness level, efficiency, and level of investor support. All these factored into the viability of a technology to be deployed at grid scale and to be considered for pilot demonstrations.

**The Form Energy BESS is a 100-hour discharge multi-day (long duration) Iron-Air system.**

Form Energy is an American energy storage technology and manufacturing company that is developing and commercializing an innovative iron-air battery capable of cost-effectively storing electricity for 100-hours. To operate the grid reliably and affordably, the Iron-Air system provides a new cost-effective technology capable of storing electricity for multiple days during renewable energy lulls. Iron-air batteries provide an electrochemical solution to balance the multi-day variability of renewable energy due to their low cost, safety, durability, and global scalability. This technology has the potential to store renewable energy and make it available when and where it is needed, even during multiple days of extreme weather, grid outages, or periods of low renewable generation.

The active components of Form Energy’s iron-air battery are low-cost iron, water, and air. The basic principle of operation is reversible rusting (See Figure 1) - while discharging, the battery breathes in oxygen from the air and converts iron metal to rust; while charging, the application of an electrical current converts the rust back to iron and the battery breathes out oxygen.

**Figure 1: Iron Air Technology**



*Courtesy of Form Energy*

**The Eos Energy BESS is a four-hour discharge Zinc Hybrid system.**

Eos Energy Storage (Eos) designs, manufactures, and markets zinc-based energy storage solutions for utility, commercial and industrial, and microgrid markets. Eos's zinc-powered chemistry delivers significant operational advantages in 3 to 12-hour discharge configurations.

Some of these advantages and differentiators are:

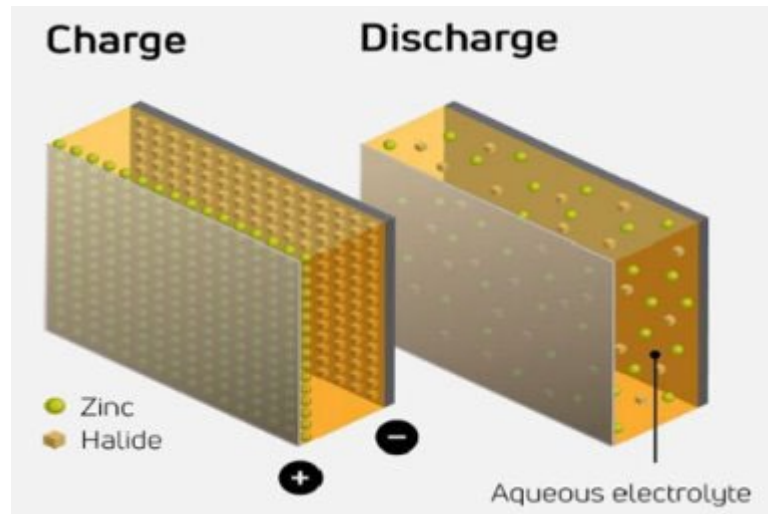
- Simple fully sealed battery: Each Z3 battery module is a self-contained unit, a closed-system design with no moving or delicate parts, making them more cost-effective to maintain.
- Non-flammable and safe: With a water-based electrolyte and flame-retardant polymer framing, there is no risk of thermal runaway.
- Low Degradation and flexible: The Z3 battery retains >90% of its initial capacity and can be utilized in a variety of applications during its life. Once retired, the battery can be fully recycled using standard recycling processes.

Inspired by zinc plating baths, Z3 battery modules store electrical energy through zinc deposition (See Figure 2). The aqueous electrolyte is held within the individual cells, creating a pool that provides dynamic separation of the electrodes. During charge and

discharge, ions move through the electrolyte to their respective electrode to donate or accept electrons, creating a current flow through the bipolar stack.

**Figure 2: Eos Energy Zinc Hybrid Technology**

*Courtesy of Eos Energy*



### **Benefits of non-Lithium BESS solutions**

The Company anticipates the benefits of using these non-lithium BESS will mirror many of the benefits of using lithium-ion BESS. However, the additional benefit derived from using these technologies is that they provide a virtually non-flammable solution. Each BESS will complete United Laboratory (UL) testing and certification prior to installation. The certification evaluates thermal runaway characteristics of the BESS, which are not expected for the Darbytown technologies given their chemical makeup. These technologies significantly reduce, if not eliminate, the risk of thermal runaway, one of the largest risks for the deployment of lithium-ion storage systems. Lastly, each of the piloted BESS is designed, built, and manufactured in the USA and uses materials that are also sourced and manufactured in the USA.

All the BESS-4 Pilot technologies are being procured using a competitive bidding, request for proposal ("RFP") process that requires a fixed price engineering, procurement, and construction ("EPC") contract. The Company used the same RFP process for the previous pilot projects. Five (5) vendors were invited to submit proposals, of which three (3) provided responses. Each proposal was then reviewed for conformity with the technical and business requirements of the RFP. Final selection of EPC was through a competitive process.

**IV. In-Service Date.** The utility shall provide the expected date on which the proposed BESS will be placed into service. The in-service date shall serve as the start date for the BESS as part of the Pilot Program. The proposed BESS will be in service for five years unless the utility has provided notice to repurpose or retire the BESS. Each proposal shall include an explanation by the utility for any proposed use of the BESS beyond the five-year duration of the Pilot Program.

The Company anticipates that the proposed BESS-4 will be in service by August 1, 2026, based upon Commission approval on or before March 31, 2024.

The Company will determine the best use of the BESS-4 after the five-year duration of the Pilot Program based on the performance of the BESS and the information learned from the BESS during the course of the Pilot Program. At this time, the Company anticipates that it will continue to use the BESS-4 beyond five years.

**V. Useful Life and Decommissioning.** The utility shall provide the projected useful life of the proposed BESS, including known or projected performance degradation and proposed plan for decommissioning at the end of its useful life.

The projected useful life of the proposed BESS-4 Iron-Air technology is ten (10) years, while the projected useful life of the proposed BESS-4 Zinc Hybrid technology is twenty (20 years). The Iron-Air and Zinc Hybrid systems each have an annual degradation profile of 0.5%.

All batteries will experience some degradation over the course of their lives based on time in service, usage profile (*i.e.*, how frequently it is used, and for what duration), and aggregate energy discharged. The EPC contractor will guarantee equipment capacity according to the degradation curves provided by the original equipment manufacturers (“OEM”).

Decommissioning of the proposed BESS will take place once the system has reached the end of its useful life (“EOL”). The EOL decommissioning will be performed by trained and qualified technical resources to reduce the risk of electrical or chemical hazards. The decommissioning costs have been included in the projected costs.

Nonlithium-ion battery elements include metals such as copper, aluminum, iron, and other materials like plastics, and aqueous electrolyte solutions. The following is a list of steps and considerations that will be performed to prepare and implement a decommissioning plan that complies with applicable laws, regulations, and other site-specific conditions:

- Identify system components to be decommissioned (*e.g.*, battery system, power control system (“PCS”), transformer, thermal management HVAC unit, fans, etc.).
- Where possible, discharge batteries to the lowest state of charge (“SOC”) possible before disconnection, transportation, recycling, and disposal.
- Where possible, drain and properly dispose of electrolyte solutions.

- Procure tools and equipment necessary to support decommissioning of the system (*e.g.*, fork-lift rental for removal of batteries and racks).
- Remove and package battery racks or battery modules with appropriate hazardous material labels for shipment.
- Use certified carrier to transport batteries to vendor for disposal.
- Recycle batteries with authorized recyclers, who will provide certificates of recycling and disposal, including any recycling of other miscellaneous materials.

**VI. Cost. The utility shall provide the projected installation cost of the proposed BESS and a detailed analysis of the projected operation and maintenance ("O&M") cost associated with the proposed BESS. This shall include an appropriate cost metric for evaluation based on the proposed objective(s) of the BESS.**

The total cost for BESS-4 is expected to be approximately \$70.6 million (excluding financing costs), as detailed in Figure 4 below. This equates to \$7,897/kW or \$137/kWh. Annual O&M costs are shown in Figure 3 below. These costs also include projected costs for monitoring, analytics, and reporting.

**Figure 3: BESS-4 Cost Breakdown**

**[EXTRAORDINARILY SENSITIVE  
INFORMATION REDACTED]**

| <b>Description</b> | <b>Cost<br/>(1,000s)</b> |
|--------------------|--------------------------|
| BESS Equipment     |                          |
| Engineering        |                          |
| EPC/Construction   |                          |
| Balance of Plant   |                          |
| Equipment          |                          |
| Project Management |                          |
| <b>Subtotal</b>    |                          |
| Contingency        |                          |
| <b>Total</b>       | <b>\$ 70,565</b>         |

|                 |  |
|-----------------|--|
| Decommissioning |  |
| Annual O&M      |  |

**VII. Asset Classification.** The utility shall indicate its preferred classification of the proposed BESS as a generation, transmission, or distribution asset.

BESS-4 will be classified as a generation asset.

**VIII. Objective.** The utility shall specify the objective(s) that the specific proposal will seek to accomplish, including a description of how the specific proposal will accomplish the stated objective(s). Permissible objectives, as listed in Enactment Clause No. 9, include: (i) improved reliability of electrical transmission or distribution systems; (ii) improved integration of different types of renewable resources; (iii) deferred investment in generation, transmission, or distribution of electricity; (iv) reduced need for additional generation of electricity during times of peak demand; or (v) connection to the facilities of a customer receiving generation, transmission, and distribution service from the utility.

The proposed BESS-4 seeks to accomplish the following objectives: (ii) improve integration of renewable resources; and (iv) reduce the need for additional generation during times of peak demand.

Initially, the Pilot Project will operate “behind the meter” and will function as a load reducer. The choice to operate these facilities behind the meter is required due to the timing mismatch created by the PJM Interconnection LLC’s Queue Reform and the project’s construction timing. Operating these facilities behind the meter will allow the Company time to evaluate the operability, reliability, scalability of each BESS technology and to better optimize each facility’s performance after the Pilot Period.

Each BESS will function as a behind the meter resource to:

1. Balance the grid by reducing utility load (especially during critical peak events),
2. Analyze market value to reduce utility costs, and
3. Provide resiliency through voltage support and congestion management.

During the pilot period, the Company will evaluate the decision to pursue a PJM Wholesale Market Participant Agreement (WMPA) which would allow the facilities to become “front of the meter” resources. Becoming a front of the meter resource will allow each BESS facility to participate in the PJM wholesale markets as a generation resource. Direct participation in PJM markets will enable the BESS facilities to be paid market rates for the optimization of its energy and capacity output. For example, by storing energy directly from the power grid during periods when production prices are lower and discharging energy during periods when production prices are higher, the facility can be compensated for the difference in pricing. Also, the facility would be able to charge during periods of excess renewable energy and discharge when renewables may not be available, such as after sunset, thus reducing the need for dispatching non-renewable energy and capacity generation during times of peak demand. Front of the meter market participation will also enable the facility to capture additional value by providing ancillary services to the PJM grid.

Whether the BESS 4 operates in front of the meter or behind the meter, each BESS will be optimized to provide stored energy during peak load periods or during periods of intermittent renewable production (due to variations in weather) (“Peak Shifting”).

Throughout the operation of these resources, Dominion Energy Virginia will continue to evaluate the potential for additional integration of these technologies to serve critical purposes as additional intermittent and other renewable resources are integrated onto the system. The lessons learned from this pilot will allow the Company to continue to deploy energy storage safely and successfully, as well as provide the opportunity to diversify the energy storage portfolio with lithium-ion alternatives and longer duration storage resources.

**IX. Metrics and Performance Data.** The utility shall provide the initial metrics that will be used to determine if the proposed BESS is meeting the objective(s) that the proposal seeks to accomplish. Initial metrics may include performance and operational safety metrics.

The following metrics will be used to evaluate the performance of the BESS:

**Discharge/charge efficiency** - Each of the BESS facilities will store energy from the grid (renewable and traditional energy) and shift it to correlate with peak demand needs. The ability to perform this Peak Shifting function will be measured and reported to confirm reliable and repeatable operations.

**Round-trip efficiency** - All battery storage systems experience losses. These can result from inefficiencies in the conversion of AC to DC or vice versa, heating/cooling systems needed to keep the BESS within the proper temperature range, and from losses incurred by electronics used to monitor and manage the battery cells. Efficiency can be calculated by comparing the amount of energy released by the BESS to that which it consumes during charging. In addition, the efficiency can be monitored over time to examine if it changes significantly as the BESS ages.

**Durability** - The storage capacity of batteries declines with use. This degradation is a function of multiple factors, including the services that the BESS provides, how often it charges/discharges, depth of charge, etc. Degradation will be monitored and reported over time to determine if it is consistent with expected operations.

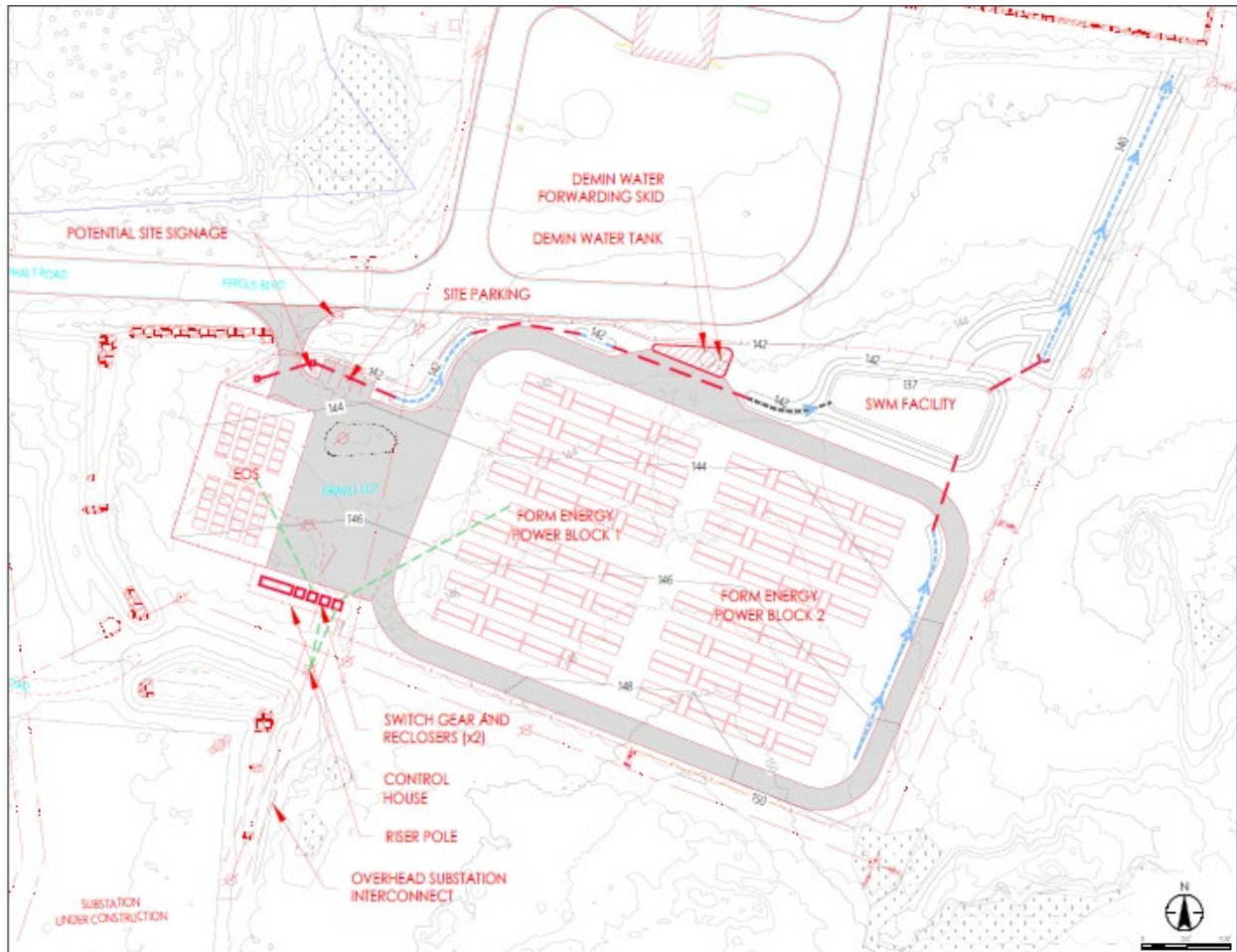
**Availability** - Availability of the BESS will be measured by comparing the amount of time that the BESS is available for operations to the total amount of time in the study period, which will be compared to industry expectations.

**Capacitance** – The ability to hold a charge over time will be evaluated to understand how to optimize the BESS cycling.

Additional metrics will include: MWh reduction in peak demand and PJM capacity obligations, cost and benefit data of peak shifting, as well as assessing additional use cases once in operation.

**Multi-Day Duration Specific** - In addition to these metrics, the long duration energy storage system will monitor continuous charging/discharging, frequency of full discharge over longer periods of time when compared to non-continuous charging, economic charging/discharging metrics, cycling times/durations, as well as long term dispatch planning to account for seasonal and multi-day weather events.

**Attachment 1**



## **WITNESS DIRECT TESTIMONY SUMMARY**

Witness: Sean Stevens

Title: Director, Electric Distribution Grid Solutions

Summary:

Company Witness Sean Stevens supports the proposed battery energy storage systems (“BESS”), BESS-5: Outage Mitigation and Grid support through a Microgrid Capable BESS and BESS-6: Long Duration Energy Storage in a Behind-the-Meter Application. Company Witness Stevens describes both proposed BESS and provides details regarding the pilot objectives, location, installation, and scale of BESS-5 and BESS-6.

**DIRECT TESTIMONY  
OF  
SEAN STEVENS.  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUR-2023-00162**

1   **Q.    Please state your name, position of employment, and business address.**

2    A.    My name is Sean Stevens, and I am Director, Electric Distribution Grid Solutions for  
3           Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”).  
4           My business address is 600 E. Canal St., Richmond, VA. A statement of my background  
5           and qualifications is attached as Appendix A.

6   **Q.    Please describe your areas of responsibility with the Company.**

7    A.    I am responsible for distribution initiatives related to distributed energy resource  
8           (“DER”) deployment and integration, including potential non-wires alternatives  
9           (“NWAs”), battery energy storage system (“BESS”) pilot projects and the development  
10          and implementation of our DER management system (“DERMS”).

11   **Q.    What is the purpose of your testimony in this proceeding?**

12   A.    I am testifying in support of the Company’s application (“Application”) (i) for approval  
13          to deploy three of the battery energy storage systems (“BESS”)—designated BESS-4,  
14          BESS-5, and BESS-6—as part of the pilot program for electric power storage batteries  
15          (the “Pilot Program”) and (ii) for a certificate of public convenience and necessity  
16          (“CPCN”) to construct and operate BESS-4 at the Company’s Darbytown Power Station,  
17          to the extent required by the Commission. Specifically, I support the BESS-5: Outage

Mitigation and Grid Support through a Microgrid Capable BESS (“BESS-5”), and BESS-6: Long Duration Energy Storage in a Behind-the-Meter Application (“BESS-6”).

**Q. During the course of your testimony, will you introduce an exhibit?**

A. Yes. Company Exhibit No. \_\_\_SS, consisting of Extraordinarily Sensitive Schedule 1 and Confidential/Extraordinarily Sensitive Schedule 2, was prepared under my supervision and direction and is accurate and complete to the best of my knowledge and belief. Schedule 1 is the Electric Power Storage Battery Pilot Program Proposal Summary (“Proposal Summary”) for BESS-5. Schedule 2 is the Proposal Summary for BESS-6.

**Q. Please describe the proposed BESS-5.**

A. BESS-5 will utilize lithium-ion technology and is a 1.9 MW / 3.8 megawatt-hour (“MWh”) alternating current (“AC”)-coupled BESS. BESS-5 will be classified as a distribution asset with four applications: (i) grid forming outage mitigation; (ii) demand response; (iii) voltage support; and (iv) electric vehicle charging station integration. The total cost for BESS-5 is expected to be approximately \$6 million (excluding financing costs). The Company anticipates that the proposed BESS will be in service by third quarter 2025, based upon Commission approval on or before March 31, 2024. More details regarding BESS-5, including the initial metrics and performance data to be evaluated, are included in my Schedule 1.

**Q. Where will BESS-5 be located?**

A. The proposed BESS will be installed in Chesterfield County at the Company’s Electric Distribution Safety & Training facility located. Specifically, this site is located at 11501

1 Old Stage Road, Chesterfield VA 23836. This property is owned by Dominion Energy  
2 Virginia. The location was chosen because it will provide the opportunity to pilot the  
3 BESS in a grid-forming environment, pair electric vehicle (“EV”) Charging integration  
4 with a BESS, and provide access to our Electric Distribution training program for use in  
5 training technicians on BESS operations and maintenance. The location for BESS-5 is  
6 identified as “Battery Park Location” on the map in my Schedule 1.

7 **Q. Please provide a basic description of what will be required for the installation of the**  
8 **proposed BESS-5 and the estimated physical scale of BESS-5.**

9 A. BESS-5 will be housed in a single enclosure. This 28.8 foot by 5.41 foot by 9.2 foot  
10 enclosure will include all batteries and the inverter. The BESS and a 2.5 megavolt  
11 ampere (“MVA”) pad mounted transformer will sit on separate concrete slab foundations.  
12 Applicable conduit, control cable, and appropriate circuit interconnection equipment will  
13 be installed to connect the BESS to the grid and provide monitoring and control of the  
14 system. The exact design of BESS-5 is subject to final engineering.

15 **Q. Please describe the proposed BESS-6.**

16 A. BESS-6 will utilize non-lithium-ion technology, utilizing a nickel-hydrogen chemistry,  
17 and is a 1.5 MW / 15 megawatt-hour (“MWh”) alternating current (“AC”)-coupled BESS.  
18 BESS-6 will be classified as a distribution asset with five applications: (i) behind-the  
19 meter non-lithium ion BESS long duration energy storage; (ii) outage mitigation with  
20 grid-forming inverter; (iii) demand response; (iv) voltage support; and (v) integration  
21 with back-up diesel generator. The total cost for BESS-6 is expected to be approximately  
22 \$14.4 million (excluding financing costs). **[BEGIN CONFIDENTIAL**

23 **INFORMATION].** [REDACTED]

1 [REDACTED]

2 [REDACTED] [END CONFIDENTIAL

3 INFORMATION]. The Company anticipates that this proposed BESS will be in service  
4 by December 31, 2027, based upon Commission approval on or before March 31, 2024.  
5 More details regarding BESS-6, including the initial metrics and performance data to be  
6 evaluated, are included in my Schedule 2.

7 **Q. What is the location of BESS-6?**

8 A. The proposed BESS will be installed at [BEGIN CONFIDENTIAL] [REDACTED]

9 [REDACTED]

10 [REDACTED] [END

11 CONFIDENTIAL]. This location was chosen because it will provide the opportunity to  
12 pilot behind-the-meter integration with a BESS for outage mitigation and customer  
13 facility load reduction. A map identifying the location is provided in my Schedule 2.  
14 The location for BESS-6 is marked as Location B on the map.

15 **Q. Please provide a basic description of what will be required for the installation of the**  
16 **proposed BESS-6 and the estimated physical scale of BESS-6.**

17 A. All equipment associated with BESS-6 will be housed in a 160 foot by 200-foot property  
18 provided by the customer. The proposed BESS-6 will be housed in multiple 7 foot by 8-  
19 foot containers that will be mounted on multiple stands, each requiring a concrete  
20 foundation. The inverter and a 2 MVA pad mounted transformer will be housed  
21 separately from the BESS containers and each requires a concrete foundation of their  
22 own. Applicable conduit, control cable, and bus work will be installed to connect the

1 BESS to the grid and provide adequate monitoring and control of the system. The exact  
2 design of BESS-6 is subject to final engineering.

3 **Q. Are BESS-5 and BESS-6 distribution assets representing ordinary extensions or**  
4 **improvements in the usual course of business?**

5 A. Yes, these projects are distribution assets and represent ordinary extensions or  
6 improvements in the usual course of business. This is consistent with the Commission's  
7 findings in Case No. PUR-2019-00124 regarding BESS-1 and -2, which were of similar  
8 size and function.

9 **Q. Has the Company assessed environmental justice considerations in the development**  
10 **of these projects?**

11 A. Yes. Assessing potential impacts from a project on disadvantaged communities often  
12 involves analysis of demographic data from geographic areas, like census block groups.  
13 However, potential adverse environmental effects from small battery energy storage sites  
14 like the one being proposed here are typically limited in severity and distance, such that,  
15 the majority of residents within the surrounding census block group area(s) would not be  
16 affected.

17 Information on the Environmental Justice evaluation for BESS-5 and BESS-6 are  
18 included in my Schedules 1 and 2, respectively.

19 **Q. Does this conclude your pre-filed direct testimony?**

20 A. Yes, it does.

**BACKGROUND AND QUALIFICATIONS  
OF  
SEAN STEVENS**

Sean Stevens is Director of Electric Distribution Grid Solutions for Dominion Energy Virginia's Power Delivery Group. He is responsible for distribution initiatives related to distributed energy resource deployment, integration, and operations. Mr. Stevens joined Dominion Energy Virginia in 2005 as an Associate Project Designer in Distribution Design and has held various roles in Design, Project Management, Distribution Construction, and Grid Solutions. Mr. Stevens holds a Bachelor of Political Science from Greensboro College.

**Electric Power Storage Battery Pilot Program**  
**Proposal Summary**

**Proposal: BESS-5 – Outage Mitigation and Grid Support through a Microgrid Capable BESS**

- I. Location. The utility shall provide the location where the utility proposes to install the BESS. If the utility proposes to install a BESS at a customer premises, the utility shall provide the name and address of the customer, a description of the arrangement with the customer allowing collocation on the customer’s property, and a description of the proposed ownership of the BESS.**

The proposed BESS will be installed in Chesterfield County at the Company’s Electric Distribution Safety & Training facility located at 11501 Old Stage Road, Chesterfield VA 23836. The property is owned by Dominion Energy Virginia. The location was chosen because it will provide the opportunity to pilot the BESS in a grid-forming environment, pair electric vehicle (“EV”) charging with a BESS, and provide access to the Company’s Electric Distribution training program for use in training technicians on BESS operations and maintenance. See Attachment 1 for a map identifying the location of BESS-5. The location for BESS-5 is identified as the “Proposed Battery Yard” on the map.

- II. Capacity. The utility shall provide the capacity of the proposed BESS and the aggregate capacity of all proposals approved by the Commission under the Pilot Program for the utility.**

The Company proposes to install a 1.9 MW / 3.8 megawatt-hour (“MWh”) alternating current (“AC”)-coupled BESS.

To-date, the Commission has approved 16 MW aggregate capacity under the Pilot Program for the utility in Case No. PUR-2019-00124.

- III. Technology. The utility shall specify the proposed BESS technology and the manner in which the BESS will be or has been procured.**

The proposed BESS will utilize lithium-ion technology. Lithium-ion batteries have high energy density, low self-discharge, and high round-trip efficiency, which make them good candidates for grid-connected stationary storage.

The BESS is being procured using a competitive request for proposal (“RFP”) process that includes a fixed price contract for the purchase of the BESS. The RFP specified that the BESS technology shall meet all requirements of UL 1973 – Standard for Safety Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications and UL 9540 - Standard for Energy Storage Systems and Equipment. In addition, the RFP specified that the bidder shall also submit the test reports for the proposed battery technology consistent with UL

9540a - Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems. Six vendors were invited to submit proposals, of which four (4) provided responses. Each proposal was then reviewed for conformity with the technical and business requirements of the RFP. The selected technology was the Tesla Megapack II XL, which provided the lowest cost option and met all safety standards for the Company.

**IV. In-Service Date. The utility shall provide the expected date on which the proposed BESS will be placed into service. The in-service date shall serve as the start date for the BESS as part of the Pilot Program. The proposed BESS will be in service for five years unless the utility has provided notice to repurpose or retire the BESS. Each proposal shall include an explanation by the utility for any proposed use of the BESS beyond the five-year duration of the Pilot Program.**

The Company anticipates that the proposed BESS will be in service by third quarter 2025, based upon Commission approval on or before March 31, 2024.

The Company will determine the best use of the BESS after the five-year duration of the Pilot Program based on the performance of the BESS and the information learned from the BESS during the course of the Pilot Program. At this time, the Company anticipates that it will continue to use the BESS for microgrid services, assuming that it remains physically capable of further operation. The Company plans to continue to utilize the BESS for training purposes after the five-year pilot concludes. The Company may also explore other uses, such as voltage regulation, peak shaving, phase balancing, and harmonics mitigation depending on the BESS's capabilities at the end of the Pilot Program.

**V. Useful Life and Decommissioning. The utility shall provide the projected useful life of the proposed BESS, including known or projected performance degradation and proposed plan for decommissioning at the end of its useful life.**

The projected useful life of the proposed BESS is fifteen (15) years.

All batteries will experience some degradation over the course of their lives based on time in service, usage profile (i.e., how frequently it is used, and for what duration), and aggregate energy discharged.

Decommissioning of the proposed BESS will take place once the system has reached the end of its useful life ("EOL"). The EOL decommissioning will be performed by trained and qualified technical resources to reduce the risk of electrical or chemical hazards. The decommissioning costs have been included in the projected costs.

Lithium-ion battery elements include metals such as copper, aluminum, iron, and lithium. The following is a list of steps and considerations that will be performed to prepare and implement a decommissioning plan that complies with applicable laws, regulations, and other site-specific conditions:

- Identify system components to be decommissioned (e.g., battery system, power control system ("PCS"), transformer, thermal management HVAC unit).

- Where possible, discharge batteries to the lowest state of charge (“SOC”) possible before disconnection, transportation, recycling, and disposal.
- Procure tools and equipment necessary to support decommissioning of the system (e.g., fork-lift rental for removal of batteries and racks).
- Remove and package battery racks or battery modules with appropriate dangerous goods (hazardous material) labels for shipment.
- Use certified carrier to transport batteries to vendor for disposal.
- Recycle batteries with authorized recyclers, who will provide certificates of recycling and disposal, including any recycling of other miscellaneous materials.

**VI. Cost. The utility shall provide the projected installation cost of the proposed BESS and a detailed analysis of the projected operation and maintenance (“O&M”) cost associated with the proposed BESS. This shall include an appropriate cost metric for evaluation based on the proposed objective(s) of the BESS.**

The total cost for BESS-5 is expected to be approximately \$6 million (excluding financing costs), as detailed in Figure 1 below. This equates to \$3,175/kW or \$1,587/kWh. Annual O&M costs are shown in Figure 1 below. These costs also include projected costs for monitoring, analytics, and reporting.

**Figure 1: BESS-5 Cost Breakdown**

**[EXTRAORDINARILY SENSITIVE INFORMATION REDACTED]**

| <b>Description</b>          | <b>Cost (1,000s)</b> |
|-----------------------------|----------------------|
| BESS Equipment              |                      |
| Design/Engineering          |                      |
| Site work/Construction*     |                      |
| <b>Subtotal</b>             |                      |
| Contingency (4%)            |                      |
| <b>Total</b>                | <b>\$5,994</b>       |
| Decommissioning/recycling** |                      |
| Annual O&M                  |                      |

\* This includes auxiliary equipment needed to install the BESS, which is being provided by the Company.

\*\* Decommissioning is included in the purchase price of the BESS; however, the additional costs shown here reflect the Company's responsibility for paying shipping and handling costs to transport the system back to the vendor at end of life.

**VII. Asset Classification. The utility shall indicate its preferred classification of the proposed BESS as a generation, transmission, or distribution asset.**

BESS-5 will be classified as a distribution asset.

**VIII. Objective. The utility shall specify the objective(s) that the specific proposal will seek to accomplish, including a description of how the specific proposal will accomplish the stated objective(s). Permissible objectives, as listed in Enactment Clause No. 9, include: (i) improved reliability of electrical transmission or distribution systems; (ii) improved integration of different types of renewable resources; (iii) deferred investment in generation, transmission, or distribution of electricity; (iv) reduced need for additional generation of electricity during times of peak demand; or (v) connection to the facilities of a customer receiving generation, transmission, and distribution service from the utility.**

The BESS-5 seeks to build on previous pilot projects by showing benefits of battery energy storage as an outage mitigation option, by being the primary back-up power source in the event of a grid outage. By monitoring the grid with an energy controller, the BESS can detect when an outage event occurs and it can activate its inverter grid forming capability, while being isolated from the grid, and provide back-up power for multiple hours to several buildings, if needed. The project will also show "value stacking" abilities by utilizing its inverter grid following capability to provide on-site demand response and reducing peak load times that correlate to decreasing stress on grid equipment and extending the operational life of devices. The BESS will also provide voltage support as a secondary application.

Additionally, the BESS-5 pilot will also be utilized in development of a technician training program to provide training to Company employees on operations and maintenance functions to support the Companies future fleet of BESS deployments. This training program will allow the Company to perform preventative maintenance and system troubleshooting internally, reducing the need for future annual O&M agreements with BESS manufacturers. This program will provide future savings to the Company by developing a trained workforce that can support multiple systems and eliminating the per system costs for annual maintenance. Previous systems have resulted in costs of \$25k to \$250k per year for O&M services on each individual project. Moreover, O&M services from BESS manufacturers and authorized service contractors cause delay in troubleshooting and recovering the equipment during forced outages due to schedule conflicts and the insufficient workforce. Ultimately the Company looks to reduce or eliminate those costs through the training program that will be developed utilizing the BESS-5 pilot.

The proposed BESS-5 seeks to accomplish the following objectives: (i) improved reliability of electrical transmission or distribution systems; (ii) improved integration of different types of

renewable resources; (iii) deferred investment in generation, transmission, or distribution of electricity; and, (iv) reduced need for additional generation of electricity during times of peak demand.

These objectives will be accomplished by the implementation of the following applications:

**1. Primary Application: Grid forming Outage Mitigation**

The BESS will provide back-up power to multiple buildings in the main campus of the DSTC by identifying when an outage has occurred and providing constant voltage and frequency. The BESS will be capable of picking up the load of the campus buildings for multiple hours until the utility power has been restored. By exploring this front of the meter grid-forming application, this project will enhance understanding of microgrid technologies and its impact on the current grid infrastructure.

**2. Secondary Application: Demand Response**

The BESS site controller will be able to receive a signal from The Company's Regional Operations Center (ROC) and be able to drop the buildings connection to the grid and be picked up by the battery. In this manner, system loading relief can be provided without having to decrease customer electricity demand. Also, as a grid following application, a load reduction mode could also be activated where power from the grid is not shut off, but the battery can operate to reduce the power consumption of the buildings and EV chargers, therefore, reducing load stress from the grid and delaying equipment upgrades.

**3. Tertiary Application: Voltage Support**

As a grid following application, the BESS will also use in-house programming to inject or absorb reactive power to/from the distribution grid. When the BESS is operating in this control mode, over-voltage or under-voltage issues will be mitigated. This additional support can improve the overall system reliability by correcting voltage fluctuations at a faster rate than the traditional voltage control equipment that have extended time delays. A by-product of the BESS voltage support will be less operations of traditional voltage control devices, therefore, extending the operational life of the equipment and deferring potential upgrades.

**4. Quaternary Application: Electric Vehicle Charging Station Integration**

When using a grid following mode, BESS-5 will be integrated with the EV charging stations to avoid additional generation of electricity to support peak EV charging demand. The BESS will have a site controller that will receive the aggregate load measurements from EV charging stations. This controller will also monitor the load conditions and will dispatch the BESS, by providing active power injection, to reduce peak load and decrease the power needed from the grid to feed the site based on load conditions. This will reduce the stress on the equipment on the main circuit and up to the substation; therefore, it will showcase the ability to reduce the net load on the circuit and substation transformer.

**IX. Metrics and Performance Data. The utility shall provide the initial metrics that will be used to determine if the proposed BESS is meeting the objective(s) that the proposal seeks to accomplish. Initial metrics may include performance and operational safety metrics.**

The following metrics will be used to evaluate the performance of the BESS-5:

**Round-trip efficiency** - All battery storage systems experience losses. These can result from inefficiencies in the conversion of AC to direct current (“DC”) or vice-versa, heating/cooling systems needed to keep the BESS within the proper temperature range, and from losses incurred by electronics used to monitor and manage the battery cells. Efficiency can be calculated by comparing the amount of energy released by the BESS to that which it consumes during charging. In addition, the efficiency can be monitored over time to examine if it changes significantly as the BESS ages.

**Durability** - The storage capacity of batteries declines with use. This degradation is a function of multiple factors, including the services that the BESS provides, how often it charges/discharges, depth of charge, etc. Degradation will be monitored and reported over time to determine if it is consistent with expected operations.

**Availability** - Availability of the BESS will be measured by comparing the amount of time that the BESS is available for operations to the total amount of time in the study period, which will be compared to industry expected levels of approximately 98%.

**Reliability** - Reliability of the building(s) the BESS system serves will be monitored. SAIDI minutes will be used to capture the number of interruptions on the circuit the building is fed from and will then be compared to how often the BESS system goes into microgrid mode during each event. For each SAIDI recordable event, the BESS system will output power, for at least 12 hours with a potential to reach a maximum of 30 hours, to prevent a service interruption.

**Active Power Contribution** – The on-site load will be monitored for both the buildings and the EV charging. When in grid following mode, the BESS will provide active power when it gets local or remote demand response signals. The local signal will be received when the EV charging reaches peak demand, which will trigger the BESS to provide power to reduce the consumption from the grid. The BESS will also provide power to alleviate high load conditions on the circuit/transformer when the ROC sends a remote signal. For both cases, the local power contribution from the grid will be measured and then compared with the potential grid contribution if the battery was not supplying power.

**X. Environmental Justice**

Assessing potential impacts from a project on disadvantaged communities often involves analysis of demographic data from geographic areas, like census block groups. However, potential adverse environmental effects from small battery energy storage sites like the one being proposed here are typically limited in severity and distance, such that, the majority of residents within the surrounding census block group area(s) would not be affected. Additionally, the

BESS-5 project has been sited on company-owned land adjacent to an existing training center in a state and county designated industrial area with only industrial neighbors. Therefore, potentially affected communities would be limited to Company employees and visitors to the training center, and any employees of nearby businesses.

**Attachment 1**

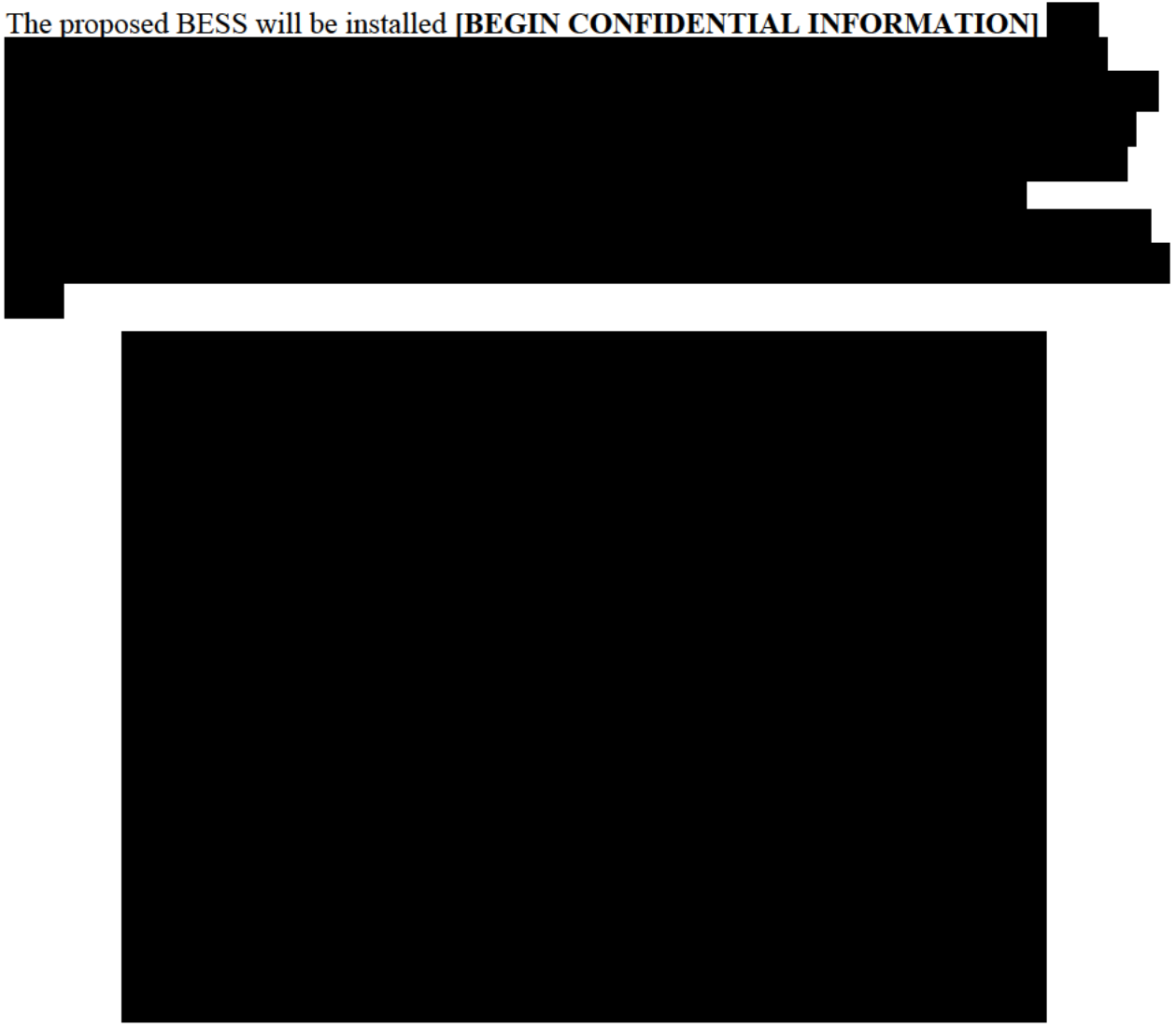


**Electric Power Storage Battery Pilot Program**  
**Proposal Summary**

**Proposal: BESS-6 – Long Duration Energy Storage in a Behind-the-Meter Application**

- I. **Location.** The utility shall provide the location where the utility proposes to install the BESS. If the utility proposes to install a BESS at a customer premises, the utility shall provide the name and address of the customer, a description of the arrangement with the customer allowing collocation on the customer's property, and a description of the proposed ownership of the BESS.

The proposed BESS will be installed [BEGIN CONFIDENTIAL INFORMATION]



[END CONFIDENTIAL INFORMATION]

**II. Capacity. The utility shall provide the capacity of the proposed BESS and the aggregate capacity of all proposals approved by the Commission under the Pilot Program for the utility.**

The Company proposes to install a 1.5 MW / 15 megawatt-hour (“MWh”) alternating current (“AC”)-coupled BESS. To-date, the Commission has approved 16 MW aggregate capacity under the Pilot Program for the utility in Case No. PUR-2019-00124.

**III. Technology. The utility shall specify the proposed BESS technology and the manner in which the BESS will be or has been procured.**

The proposed BESS will utilize non-lithium ion technology. Lithium-ion batteries have high energy density, low self-discharge, and high round-trip efficiency, which make them good candidates for grid-connected stationary storage. However, like any form of technology, it would be ideal to utilize multiple different forms of battery storage. As a result, it is imperative to explore different, emerging chemistries to be utilized in a grid-scale battery.

The proposed BESS will be procured through a contract with the manufacturer, EnerVenue. In selecting the technology for this pilot, Dominion Energy Virginia partnered with the Electric Power Research Institute, Inc (“EPRI”) to evaluate nine (9) different non-lithium ion BESS technologies. EPRI was brought in as part of the evaluation due to their extensive reach into the electric utility industry that can provide valuable insight into how emerging BESS technologies work. The evaluation process included a review of safety qualifications, estimated costs, physical footprint for space requirements, technology chemistry, self-discharge rates and cycle rates. The EnerVenue system provided the unique capability to be cycled multiple times per day when necessary while also maintaining a low self-discharge rate when idle for long periods of time to be available for backup power support. Additionally, the promising results from initial safety testing for the EnerVenue system indicated a potential ability to site the system on customer property with a lower safety equipment footprint. These factors helped the Company select EnerVenue as the BESS manufacturer for this project.

EnerVenue utilizes a nickel-hydrogen chemistry for their batteries. This chemistry has shown to be a proven technology, with over 50 years being deployed by NASA as a long-duration battery. The battery chemistry has a unique ability to showcase a high safety profile, with no thermal runaway or fire propagation risk being displayed during an open-flame test. These observations are validated by UL 9540A testing and cell-level testing that has been completed. This higher safety profile is in contrast with other battery technologies, which historical experience shows have a higher risk profile that require more expansive safety equipment to mitigate. This makes EnerVenue’s BESS a unique fit for a customer-sited battery storage solution.

**IV. In-Service Date.** The utility shall provide the expected date on which the proposed BESS will be placed into service. The in-service date shall serve as the start date for the BESS as part of the Pilot Program. The proposed BESS will be in service for five years unless the utility has provided notice to repurpose or retire the BESS. Each proposal shall include an explanation by the utility for any proposed use of the BESS beyond the five-year duration of the Pilot Program.

The Company anticipates that the proposed BESS will be in service by December 31, 2027, based upon Commission approval on or before March 31, 2024.

The Company will determine the best use of the BESS after the five-year duration of the Pilot Program based on the performance of the BESS and the information learned from the BESS during the course of the Pilot Program. At this time, the Company anticipates that it will continue to use the BESS for outage support beyond the five-year pilot duration. The Company may also explore other uses, such as voltage regulation, peak shaving, phase balancing, and harmonics mitigation depending on the BESS's capabilities at the end of the Pilot Program.

**V. Useful Life and Decommissioning.** The utility shall provide the projected useful life of the proposed BESS, including known or projected performance degradation and proposed plan for decommissioning at the end of its useful life.

The projected useful life of the proposed BESS is thirty (30) years.

All batteries will experience some degradation over the course of their lives based on time in service, usage profile (i.e., how frequently it is used, and for what duration), and aggregate energy discharged.

Decommissioning of the proposed BESS will take place once the system has reached the end of its useful life ("EOL"). The EOL decommissioning will be performed by trained and qualified technical resources to reduce the risk of electrical or chemical hazards. The decommissioning costs have been included in the projected costs.

Nickel-hydrogen battery elements include multiple different types of metals. The following is a list of steps and considerations that will be performed to prepare and implement a decommissioning plan that complies with applicable laws, regulations, and other site-specific conditions:

- Identify system components to be decommissioned (e.g., battery system, power control system ("PCS"), transformer).
- Where possible, discharge batteries to the lowest state of charge ("SOC") possible before disconnection, transportation, recycling, and disposal.
- Procure tools and equipment necessary to support decommissioning of the system (e.g., fork-lift rental for removal of batteries and racks).
- Remove and package battery racks or battery modules with appropriate dangerous goods (hazardous material) labels for shipment.
- Use certified carrier to transport batteries to vendor for disposal.

- Recycle batteries with authorized recyclers, who will provide certificates of recycling and disposal, including any recycling of other miscellaneous materials.

**VI. Cost. The utility shall provide the projected installation cost of the proposed BESS and a detailed analysis of the projected operation and maintenance (“O&M”) cost associated with the proposed BESS. This shall include an appropriate cost metric for evaluation based on the proposed objective(s) of the BESS.**

The total cost for BESS-6 is expected to be approximately \$14.4 million (excluding financing costs), as detailed in Figure 1 below. This equates to \$9,610/kW or \$961/kWh. Annual O&M costs are shown in Figure 1 below. These costs also include projected costs for monitoring, analytics, and reporting.

**Figure 1: BESS-6 Cost Breakdown**

**[EXTRAORDINARILY SENSITIVE INFORMATION HIGHLIGHTED IN GREEN]**

| <b>Description</b>                          | <b>Cost (1,000s)</b> |
|---------------------------------------------|----------------------|
| BESS Equipment                              |                      |
| Design/Engineering                          |                      |
| Site work/Construction*                     |                      |
| Technology Integration Support and Analysis |                      |
| <b>Subtotal</b>                             |                      |
| Contingency (4%)                            |                      |
| <b>Total</b>                                | <b>14,415</b>        |

|                             |  |
|-----------------------------|--|
| Decommissioning/recycling** |  |
| Annual O&M***               |  |

\* This includes auxiliary equipment needed to install the BESS, which are being provided by the Company.

\*\* Decommissioning is included in the purchase price of the BESS; however, the Company is responsible for paying shipping and handling costs to transport the system back to the vendor at end of life.

\*\*\* Annual O&M begins year 4. O&M costs for years 1-3 included with the equipment purchase.

**VII. IIJA Participation.**

**[BEGIN CONFIDENTIAL INFORMATION]**

[REDACTED]

[REDACTED]

[REDACTED]

**[END CONFIDENTIAL INFORMATION]**

The DOE selected the project for a full evaluation and “selection interview” in July of this year and final awards notifications are expected in Q3 2023.

**VIII. Asset Classification. The utility shall indicate its preferred classification of the proposed BESS as a generation, transmission, or distribution asset.**

The BESS will be classified as a distribution asset.

**IX. Objective.** The utility shall specify the objective(s) that the specific proposal will seek to accomplish, including a description of how the specific proposal will accomplish the stated objective(s). Permissible objectives, as listed in Enactment Clause No. 9, include: (i) improved reliability of electrical transmission or distribution systems; (ii) improved integration of different types of renewable resources; (iii) deferred investment in generation, transmission, or distribution of electricity; (iv) reduced need for additional generation of electricity during times of peak demand; or (v) connection to the facilities of a customer receiving generation, transmission, and distribution service from the utility.

The proposed Campus Energy Solutions project looks to expand upon previous pilot projects by displaying the benefits of long-duration, non-lithium-ion battery storage as a source of emergency backup power. By serving as a backup power source, the long-duration energy storage (“LDES”) system will improve reliability for the Multipurpose Center by discharging its stored energy during times when the utility feed is lost. Furthermore, the LDES system will have the ability to be dispatched at times when peak time consumption is identified, thereby decreasing the amount of real power drawn from the grid necessary to meet demand. The benefit of reducing demand goes far beyond local load relief. The project will show “value stacking” abilities by reducing peak load times that correlate to decreasing stress on grid equipment and potentially extending the operational life of devices.

In addition to tangible grid support benefits, the proposed project will also increase community engagement by showcasing emerging technologies to the students at the university. This will provide a unique opportunity to generate interest in clean energy technologies for students at the start of their career journey and enhance their desire to become directly involved in the country’s transition to a clean energy grid.

The proposed project seeks to accomplish the following objectives: (i) improved reliability of electrical transmission or distribution systems; (iv) reduced need for additional generation of electricity during times of peak demand; and (v) connection to the facilities of a customer receiving distribution service from the utility.

The objectives will be accomplished by the implementation of the following applications:

**1. Primary Application: Behind-the-meter Non-Lithium Ion BESS Long Duration Energy Storage**

Utilizing a non-lithium ion BESS enhances understanding and integration of new energy storage technology. By utilizing a nickel hydrogen battery as the chosen battery chemistry, more options for battery storage technology will be explored for potential future mass deployment. Furthermore, by exploring long duration energy storage as opposed to standard duration, reliability can be improved for the site during longer duration unplanned outages (such as during major storms). Success of this application will potentially allow exploration of providing a long duration, clean energy power source for critical customers in the future.

## **2. Secondary Application: Outage Mitigation with Grid-Forming Inverter**

The BESS site controller will detect a loss of the main utility feed and once detected, isolate the campus building from the grid and form a small microgrid. This will allow for reliable and stable power to continue to be provided to the building during an outage. By exploring a grid-forming application, this project will enhance understanding of microgrid technologies and allow for deployment of microgrids in the future to increase grid reliability at other sites.

## **3. Tertiary Application: Demand Response**

The BESS site controller will be able to receive a signal from the Company's Regional Operations Center (ROC) and be able to drop the building's connection to the grid and be picked up by the battery. In this manner, system loading relief will be provided without having to decrease customer electricity demand. Also, as a grid following application, a load reduction mode could be activated where power from the grid is not shut off, but the battery can operate to reduce the power consumption of the building. This will decrease load stress from the grid and delay equipment upgrades.

## **4. Quaternary Application: Voltage Support**

As a grid following application, the BESS will Inject or absorb reactive power to/from the distribution grid. When the BESS is operating in this control mode, over-voltage or under-voltage issues will be mitigated. This additional reactive power support can improve the overall system reliability by correcting voltage fluctuations at a faster rate than the traditional voltage control equipment that have extended time delays. A by-product of the BESS voltage support will be less operations of traditional voltage control devices, therefore, extending the operational life of the equipment and deferring potential upgrades.

## **5. Quinary Application: Integration with Back-Up Diesel Generator**

The BESS shall interact with an existing diesel generator by prioritizing the stored energy of the BESS over the generator in grid-forming mode. When the BESS isolates from the grid and forms a microgrid, it will provide the power necessary to serve the microgrid. Only if/when the BESS runs out of stored energy would the existing diesel generator be used. In this way, a source of clean energy will be utilized to serve the building instead of a more carbon-intensive diesel generator.

**X. Metrics and Performance Data. The utility shall provide the initial metrics that will be used to determine if the proposed BESS is meeting the objective(s) that the proposal seeks to accomplish. Initial metrics may include performance and operational safety metrics.**

The following metrics will be used to evaluate the performance of the BESS:

**Round-trip efficiency** - All battery storage systems experience losses. These can result from inefficiencies in the conversion of AC to direct current ("DC") or vice-versa, heating/cooling systems needed to keep the BESS within the proper temperature range, and from losses incurred by electronics used to monitor and manage the battery cells. Efficiency can be calculated by comparing the amount of energy released by the BESS to that which it consumes

during charging. In addition, the efficiency can be monitored over time to examine if it changes significantly as the BESS ages.

**Durability** - The storage capacity of batteries declines with use. This degradation is a function of multiple factors, including the services that the BESS provides, how often it charges/discharges, depth of charge, etc. Degradation will be monitored and reported over time to determine if it is consistent with expected operations.

**Availability** - Availability of the BESS will be measured by comparing the amount of time that the BESS is available for operations to the total amount of time in the study period, which will be compared to industry expected levels of approximately 98%.

**Reliability** - Reliability of the building the BESS serves will be monitored. SAIDI minutes will be used to capture the number of interruptions on the main circuit the building is fed from and will then be compared to how often the BESS system goes into microgrid mode during each event. For each SAIDI recordable event, the BESS system will output power for at least 10 hours to prevent a service interruption for the building it serves.

**Backup Generator Uses** - The site is currently equipped with an on-site backup diesel generator to mitigate outages. With the proposed BESS being designed to provide backup power, the number of uses for the backup generator should decrease after the proposed system is online, ideally to zero uses each year.

## **XI. Environmental Justice**

Assessing potential impacts from a project on disadvantaged communities often involves analysis of demographic data from geographic areas, like census block groups. However, potential adverse environmental effects from small, long-duration energy storage (LDES) facilities like the one being proposed here are typically limited in severity and distance, such that, most residents within the surrounding census block group area(s) would not be affected. Additionally, the projects will be sited on **[BEGIN CONFIDENTIAL INFORMATION]**

[REDACTED]

[REDACTED]

[REDACTED]

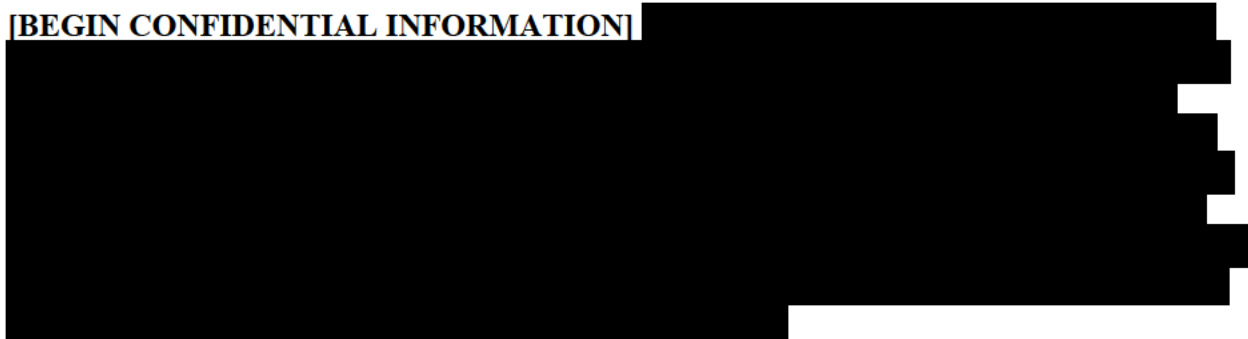
**END**

**CONFIDENTIAL INFORMATION]**. It is situated alongside an existing parking lot for the building; the nearest residential buildings are more than 200 feet away on the opposite side of a 4-lane road with a treed median. The facility will be surrounded by a wall style fence that, along

with the existing vegetation, will screen the equipment from view while still showcasing the technology through signage and displays. [

Overall, there is no expectation of significant adverse environmental impacts to any surrounding community or EJ community from an LDES facility. However, temporary construction and traffic along with permanent and minor viewshed and noise impacts are possible. Noise from storage sites is described as a low hum, well below a typical backup generator volume.

**[BEGIN CONFIDENTIAL INFORMATION]**



**[END CONFIDENTIAL INFORMATION]**

### **WITNESS DIRECT TESTIMONY SUMMARY**

Witness: Amelia H. Boschen

Title: Manager, Environmental

Summary:

Company Witness Amelia H. Boschen supports the environmental impact analysis performed by the Company related to the proposed BESS-4 pilot project. Specifically, she sponsors the Virginia Department of Environmental Quality ("DEQ") Supplement for BESS- 4 included with the Application. Additionally, she explains that because BESS-5 and BESS-6 are distribution assets and ordinary extensions or improvements in the usual course of business, DEQ Supplements are not required for these projects. However, the Company will comply with all relevant environmental laws and regulations in the construction of these projects and will obtain all necessary permits from the appropriate agencies.

**DIRECT TESTIMONY  
OF  
AMELIA H. BOSCHEN  
ON BEHALF OF  
VIRGINIA ELECTRIC AND POWER COMPANY  
BEFORE THE  
STATE CORPORATION COMMISSION OF VIRGINIA  
CASE NO. PUR-2023-00162**

1   **Q.   Please state your name, position of employment, and business address.**

2   A.   My name is Amelia H. Boschen and I am Manager, Environmental for Dominion Energy  
3       Environmental and Sustainability, testifying on behalf of Virginia Electric and Power  
4       Company (“Dominion Energy Virginia” or the “Company”). My business address is 120  
5       Tredegar Street, Richmond, Virginia, 23219. A statement of my background and  
6       qualifications is attached as Appendix A.

7   **Q.   Please describe your areas of responsibility with the Company.**

8   A.   I am responsible for corporate support in environmental studies, permitting, and  
9       compliance for energy storage projects.

10  **Q.   What is the purpose of your testimony in this proceeding?**

11  A.   I am testifying in support of the Company’s application (“Application”) (i) for approval  
12       to deploy three battery energy storage systems (“BESS”)—designated BESS-4, BESS-5,  
13       and BESS-6—as part of the pilot program for electric power storage batteries (the “Pilot  
14       Program”) and (ii) for a certificate of public convenience and necessity (“CPCN”) to  
15       construct and operate BESS-4 at the Company’s Darbytown Power Station, to the extent  
16       required by the Commission. Specifically, I sponsor the Virginia Department of  
17       Environmental Quality (“DEQ”) Supplement for the BESS-4 project included with this  
18       Application.

1   **Q.    Virginia Code §§ 10.1-1186.21B and 56-46.1 G requires the Commission and DEQ**  
2       **to coordinate an environmental review of proposed generating plants and associated**  
3       **facilities. Has the Company submitted information for this environmental review?**

4    A.    Yes. The Company has prepared and submitted a DEQ Supplement for the BESS-4 pilot  
5       project with this Application, which is Schedule 1 to my testimony.

6   **Q.    Has the Company prepared DEQ Supplements for the BESS-5 and BESS-6 pilot**  
7       **projects?**

8    A.    No. As explained by Company Witness Sean Stevens, these projects are distribution  
9       assets and represent ordinary extensions or improvements in the usual course of  
10       business. This is consistent with the Commission's findings in Case No. PUR-2019-  
11       00124 regarding BESS-1 and -2, which were of similar size and function. As a result, the  
12       traditional DEQ Supplements are not required for these projects. That said, the Company  
13       will comply with all relevant environmental laws and regulations in the construction of  
14       these projects and will obtain all necessary permits from the appropriate agencies.

15   **Q.    Does this conclude your pre-filed direct testimony?**

16   A.    Yes, it does.

**BACKGROUND AND QUALIFICATIONS  
OF  
AMELIA H. BOSCHEN**

Amelia H. Boschen is a Manager, Environmental for Dominion Energy Environmental Services. In her current role, she supervises the Company's corporate team responsible for environmental planning, permitting, and compliance for the Company's solar, energy storage, and electric distribution construction projects.

In 2009, Ms. Boschen joined the Company as an environmental compliance coordinator at one of the Company's largest coal- and gas-fired power generating facilities. In 2014 she moved to a role as a technical expert providing water permitting and compliance support to the Power Generation business unit. Ms. Boschen became Supervisor, Environmental Regulations in 2018 and began her current role in 2022.

Ms. Boschen received her bachelor's degree and master's degree in environmental studies from Virginia Commonwealth University.

**Before the  
State Corporation Commission  
of Virginia**

**Application of  
Virginia Electric and Power Company  
for Approval and Certification of Electric Facilities**

**Darbytown GTSA BESS Pilot**

**DEQ Supplement**

**Case No. PUR-2023-00162**

## Table of Contents

|                                                                                 |    |
|---------------------------------------------------------------------------------|----|
| 1. Project Description .....                                                    | 2  |
| 2. Environmental Analysis (20 VAC 5-302-25(11)) .....                           | 2  |
| A. Air Quality .....                                                            | 2  |
| B. Water Source .....                                                           | 3  |
| C. Discharge of Water .....                                                     | 3  |
| D. Tidal and Non-Tidal Wetlands .....                                           | 4  |
| E. Solid and Hazardous Waste .....                                              | 4  |
| F. Natural Heritage Resources, Threatened, and Endangered Species .....         | 5  |
| G. Erosion and Sediment Control .....                                           | 6  |
| H. Archaeological, Historic, Scenic, Cultural, or Architectural Resources ..... | 7  |
| Archaeological Resources .....                                                  | 7  |
| Architectural Resources .....                                                   | 7  |
| Scenic Resources .....                                                          | 7  |
| I. Chesapeake Bay Preservation Areas .....                                      | 8  |
| J. Wildlife Resources .....                                                     | 8  |
| K. Recreation, Agricultural, and Forest Resources .....                         | 8  |
| L. Use of Pesticides and Herbicides .....                                       | 10 |
| M. Geology and Mineral Resources .....                                          | 11 |
| N. Transportation Infrastructure .....                                          | 11 |

## List of Attachments

|                    |                                                    |
|--------------------|----------------------------------------------------|
| Attachment 1 ..... | Site Location Map                                  |
| Attachment 2 ..... | Site Plan                                          |
| Attachment 3 ..... | Jurisdictional Determination                       |
| Attachment 4 ..... | Protected Species Supporting Documentation         |
| Attachment 5 ..... | Cultural Resources Supporting Documentation        |
| Attachment 6 ..... | Ecological Core and Forest Conservation Value Maps |

Pursuant to Virginia Administrative Code (“VAC”) 20 VAC 5-302-25, Virginia Electric and Power Company (the “Company”) has developed this Department of Environmental Quality (“DEQ”) Supplement for submission to the State Corporation Commission of Virginia to facilitate environmental agency review and analysis of the Company’s proposed 8.94 megawatt (“MW”) utility-scale energy storage system (“Darbytown GTSA Battery Energy Storage System” or the “Project”) that will be connected at a 34.5 kilovolt distribution level.

This Project is in Henrico County on a site of approximately 10 acres within a 51.36-acre parcel. The parcel is south of Dominion’s Darbytown Power Station on the east and west sides of Fergus Boulevard, approximately 2,500 feet north of Darbytown Road. All proposed site improvements would occur east of Fergus Boulevard. This site is well-suited for the proposed Project based upon recent studies completed by the Company that demonstrate that the new facility will have minimal environmental impacts.

## **1. Project Description**

The Darbytown GTSA Battery Energy Storage System (“BESS-4”) will consist of two nonlithium-ion battery storage systems: Form Energy Iron-Air BESS will be 4.94 MW and Eos Energy Zinc Hybrid BESS will be 4.0 MW collectively referred to as “BESS-4”. The major components for a nonlithium-ion battery storage system include the nonlithium-ion batteries, battery management system, ventilation and air management systems, fire protection monitoring systems, power conversion equipment, metering, and associated wiring. The Project is planned pursuant to the guidelines established by the State Corporation Commission under the Grid Transformation and Security Act of 2018 for pilot programs for electric power storage batteries. Subject to receiving all necessary regulatory approvals and permits, commercial operation is anticipated to commence in the 3<sup>rd</sup> quarter of 2026. This site is well-suited for the Project based on studies completed by the Company which demonstrate that minimal environmental impacts are anticipated by the construction and operation of the Project.

A key component in the selection of the site was the ability to minimize overall environmental impacts. This site was chosen and conceptually designed to avoid impacts to the land, water, and air resources of the area and surrounding region to the greatest extent practicable. The goal of reducing the overall environmental impact of the Project has been given a high priority throughout the preliminary design of the Project. As detailed design of the Project continues, minimizing environmental impacts will continue to be a primary focus for the Project. Consequently, impacts to environmental resources, natural resources, historic resources, and scenic assets from the Project will be avoided.

Site location maps indicating the location and conceptual layout of the proposed battery electric storage facility are included as Attachments 1 and 2.

## **2. Environmental Analysis (20 VAC 5-302-25(11))**

### **A. Air Quality**

Significant impacts to air quality are not expected from Project construction or operation.

Battery energy storage does not result in the burning or off-gassing of fossil fuels during normal operations. Energy storage projects enable intermittent energy generation facilities, such as wind and solar, to be more dispatchable and flexible. Over time, Project operation will reduce the need for fossil fuel energy generation facilities that have deleterious effects on ambient air quality by providing storage capacity for solar and wind energy.

Periodic maintenance and repair during Project operation will result in limited air emissions from vehicle and equipment exhaust. Additionally, the facility will have an emergency generator to provide emergency power in the event the site is without

power. The purpose of this power source is to provide a redundant, independent power source for the battery fire and safety systems to maintain the site in a safe and stable state (*e.g.*, to maintain a safe battery temperature). This equipment will run only for maintenance and emergency events. No major source air construction permits, emission offsets, or allowances will be required.

During Project construction, equipment and vehicles powered by gasoline or diesel motors will be used for transportation and construction activities, resulting in air emissions from motor exhaust. In addition, ground disturbing activities, materials handling, and equipment use on unpaved surfaces will result in airborne particulates during dry weather conditions. The production of airborne particulates will be reduced through Project design that minimizes grading, as well as construction practices that include keeping vehicle speeds to a minimum and mitigating dust from traffic on interior roads by spraying or wetting down road surfaces as needed. Erosion and sedimentation control is addressed in Section 2.G of this Supplement.

## **B. Water Source**

During construction, water is utilized for activities such as pad compaction, earthen structure compaction, boring, hydroseeding, and dust control. Sources of water vary but due to the limited area of disturbance and projected construction schedule, water may be brought to the site in water trucks or obtained onsite by recycling stormwater held in sediment basins. If ground water or surface water is used, the Company will comply with all relevant state regulations and local ordinances.

During operation, it is expected that water requirements for the facility will be minimal. Additionally, normal rainfall will be adequate to sustain on-site vegetation such as ground cover and buffer plantings, therefore no water will be needed or utilized for irrigation purposes.

## **C. Discharge of Water**

Stormwater discharges during the construction of the Project will be addressed through the implementation of both an Erosion and Sediment (“E&S”) Control Plan and a Stormwater Pollution Prevention Plan (“SWPPP”) in compliance with DEQ regulations and approved by Henrico County. Stormwater runoff generated during operation of the Project will not qualify as industrial stormwater and will be controlled in accordance with local regulations using approved stormwater best management practices.

During operation, non-stormwater discharges may be present at the Project that do not require coverage under a National Pollutant Discharge Elimination System permit because they do not discharge process wastewaters or do not discharge stormwater associated with industrial activities. Because the Project will have heating, ventilation, and air conditioning systems to maintain a stable temperature

of the energy storage system, condensate will be produced particularly during the warmer and humid times of the year. The Company has developed internal guidance for effective practices for management of de minimis non-point source, non-stormwater discharges that will ensure operational discharges do not result in pollutants entering adjacent surface waters.

**D. Tidal and Non-Tidal Wetlands**

The U.S. Army Corps of Engineers (“USACE”), Southern Virginia Regulatory Section, issued a Preliminary Jurisdictional Determination (NAO-2020-00493) for the Project on July 7, 2022 ([Attachment 3](#)). The basis for the delineation included the State Water Control Law, Virginia Water Protection (“VWP”) Regulation, USACE 1987 Wetland Delineation Manual (“Manual”) and Regional Supplement to the Manual: Atlantic and Gulf Coastal Plain (Version 2.0). The delineation verified the presence of 499 linear feet of intermittent stream channel and 93 linear feet of ephemeral stream channel. Additionally, the study area contains 0.27 acre of forested wetlands, 0.25 acre of scrub/shrub wetlands, 0.06 acre of emergent wetlands, and 0.33 acres of freshwater pond.

The Company will be able to reliably use this information in the design process to avoid and or minimize impacts to state and/or federal jurisdictional waters and/or wetlands (“Waters”). The current conceptual design (Attachment 2) has been developed to avoid all impacts to Waters. If the final design results in activities that discharge fill to, dredge, drain or otherwise cause significant alteration or degradation of Waters, the Project may require a USACE permit and authorization by state and local authorities including a 401 Water Quality Certification in the form of a VWP Permit from the DEQ, a permit from the Virginia Marine Resources Commission (“VMRC”) and a permit from the local wetlands board. If unavoidable impacts are required to meet the purpose and need of the Project, the Company will utilize the Joint Permit Application (“JPA”) process to ensure that all relevant agencies have an opportunity to review the Project and issue permits according to their respective regulatory programs.

The Company will prepare and implement an E&S Control Plan approved by Pittsylvania County and a SWPPP approved by DEQ during proposed construction activities to avoid and minimize impacts to Waters.

**E. Solid and Hazardous Waste**

Any solid and/or hazardous wastes generated by the Project will be minimized and reduced at the source and re-used or recycled to the extent possible. Construction equipment will be operated and maintained to prevent any fuel or oil spills in accordance with the SWPPP and the Spill Prevention, Control, and Countermeasures Plan. Any waste created by the construction crews will be

disposed of in an environmentally responsible manner and recycled where appropriate. In the unlikely event that subsurface waste, hazardous waste, or abandoned petroleum tanks are encountered during excavation, the DEQ Regional Office and the Department of Emergency Services will be contacted immediately.

Construction activities may result in the production of minor amounts of solid wastes; however, all solid or hazardous wastes will be handled in accordance with applicable environmental regulations. Accordingly, no impacts to land, local flora and fauna, or local water resources are expected.

No Environmental Site Assessment was conducted for the Project. The Company has owned the property and operated the existing 340 MW natural gas and #2 oil electrical generation plant since 1990. Based on a review of the DEQ Pollution Response & Preparedness (PRP) Incident Lookup Tool, the only pollution response incident for the Project Site or adjacent parcels was a fire at the East End Landfill in 2019 on the parcel northwest of the Project Site.<sup>1</sup>

#### **F. Natural Heritage Resources, Threatened, and Endangered Species**

The Project is not expected to result in adverse impacts to Natural Heritage Resources (“NHRs”), which are defined under § 10.1-209 of the Code of Virginia as the habitat of rare, threatened, or endangered plant and animal species, rare or state significant natural communities or geologic sites, and similar features of scientific interest benefiting the welfare of the citizens of the Commonwealth. Desktop reviews and supplemental reports can be found in Attachment 4. The results from the desktop reviews indicate the following:

- According to the United States Fish and Wildlife (“USFWS”) Information for Planning and Consultation results, the federally and state endangered northern long-eared bat (“NLEB”) (*Myotis septentrionalis*) and the proposed endangered tri-colored bat (“TCB”) (*Perimyotis subflavus*) have the potential to occur on the Project site. The NLEB has been reclassified as a federally endangered species effective March 31, 2023. Based upon a review of available information, in particular the Virginia Department of Wildlife Resources (“DWR”) NLEB Winter Habitat and Roost Tree Locator, there are no known maternity roosts or hibernacula located within 5.5 miles of the Project. Therefore, the Company will rely upon the results of the acoustic survey conducted between May 16, 2023, and May 21, 2023, which did not document the presence of the NLEB or TCB and are therefore presumed to be absent on the site.

---

<sup>1</sup> Virginia DEQ Pollution Response Program. 2023. PRP Report Search. Available online at [PRP - PREP \(virginia.gov\)](#) and [Pollution Incident Report \(PREP\) Lookup Tool \(arcgis.com\)](#). Accessed August 2023.

- A review of the Virginia Department of Conservation and Recreation (“DCR”) indicates that no NHRs are present within the Project site or within a 100-foot buffer area around the Project boundary. In addition, the Project site does not intersect any of the predictive models identifying potential habitat for natural heritage resources.
- A review of the DWR Virginia Fish and Wildlife Information Service and Wildlife Environmental Review Map Service did not identify any confirmed the state and federally listed species within the Project. An email issued by Lee Brann under ESSLog# 44302 in response to the Company’s environmental review package submitted to DWR on July 14, 2023, concurred that DWR does not currently list any wildlife or designated resources under DWR’s jurisdiction for the Project (Attachment 4).

The Company will adhere to the project design, site development, and appropriate operational procedures. Additionally, the design will incorporate and implement general recommendations made by DWR to the greatest extent possible as well as implement all applicable regulatory requirements. The Company will avoid and minimize impacts to undisturbed forest, wetlands, and streams to the fullest extent practicable.

- According to the DWR Little Brown Bat and Tri-colored Bat Winter Habitat and Roosts Locator, there are no known winter habitat or roosts for the little brown bat (*Myotis lucifugus*) and TCB within 5.5 miles of the Project.
- According to the Center for Conservation Biology Virginia Eagle Nest Locator, there are no bald eagle (*Haliaeetus leucocephalus*) nests within 660 feet of the Project.

The Company will coordinate with the USFWS, DWR, and DCR as needed regarding the management and protection of species within the Project site; however, it is unlikely that the proposed development will adversely impact state or federally listed species.

## **G. Erosion and Sediment Control**

The Company will submit a stormwater construction general permit registration statement to the Virginia DEQ (Virginia Stormwater Management Program authority) for review and approval. An application for a land-disturbing permit that includes an E&S plan and stormwater management will also be submitted to Henrico County. The E&S plan and Stormwater Management Plan will be prepared in accordance with state requirements. A SWPPP will also be completed in accordance with DEQ regulations. These specifications will be provided to the Company’s contractors for compliance and will be in place prior to the start of construction.

## **H. Archaeological, Historic, Scenic, Cultural, or Architectural Resources**

Archaeological, historic, scenic, cultural, or architectural resources are not expected to be impacted by construction or operation of the Project. As described below, the Virginia Department of Historic Resources (DHR) in a letter dated March 30, 2022, recommended no further study, consultation, or mitigation for this Project (Attachment 5). The Company will continue to coordinate with DHR if new information becomes available that warrants further evaluation.

### ***Archaeological Resources***

Dutton and Associates, Inc. (D+A) provided a desktop review of previous archaeological surveys of the site in a report dated January 27, 2022. Historic aerial photos indicate that the site has been disturbed in the past by gravel mining. Part of the site was surveyed in 2020 for the Varina Substation Project (2020-4149), which resulted in the discovery of the potential archaeological site 44HE1235. Site 44HE1235 was recommended as not eligible for inclusion to the National Register of Historic Places during the review of project 2020-4149. D+A recommended no further archaeological fieldwork due to previous disturbance. DHR concurred that no further archaeological work is necessary in the concurrence letter dated March 30, 2022.

### ***Architectural Resources***

D+A found that the Project site is within the boundaries of two Civil War battlefields, the Darbytown-New Market Roads Battlefield (DHR File #043-5071) and the Chaffin's Farm Battlefield (DHR File #043-0307). In both cases, the project area is not located in the core area of the battlefield or within the area considered by the American Battlefield Protection Program (ABPP) of the National Park Service to be potentially eligible for Virginia Landmarks Register (VLR) and National Register of Historic Places (NRHP) listing. No other previously recorded architectural resources are within 0.5 mile of the Project site. D+A found that #043-5071 and #043-0307 will not be adversely impacted by the proposed Project and DHR concurred.

### ***Scenic Resources***

The Project is not adjacent to and does not cross any Virginia scenic byways or scenic rivers.<sup>2, 3</sup> Virginia Route 5 (New Market Road), 1.7 miles east of the site, is

---

<sup>2, 2</sup> Virginia DCR. 2019. Virginia Outdoors Plan Mapper. Layers: Scenic Rivers, VDOT Scenic Byways. Available at: [Virginia Outdoors Plan Mapper \(arcgis.com\)](https://arcgis.com/virginia-outdoors-plan-mapper). Accessed July 2023.

<sup>3</sup> Virginia DCR. 2022. Virginia Natural Heritage Data Explorer Reference Layer: Scenic Rivers. Available at: [Map | Virginia Natural Heritage Data Explorer \(vanhde.org\)](https://vanhde.org/). Accessed July 2023.

a VDOT Virginia Scenic Byway.

## **I. Chesapeake Bay Preservation Areas**

Henrico County is in the Tidewater Virginia area as established by the Code of Virginia Article 2.5, § 62.1-44.15:68. The Company will avoid impacts to jurisdictional waters defined in Attachment 3, including resource protection areas (“RPAs”) as required by the Chesapeake Bay Preservation Act (“CBPA”). RPAs are corridors of environmentally sensitive lands within Tidewater Virginia that lie alongside or near the shorelines of streams, rivers, and other waterways, including tidal wetlands, tidal shores, perennial streams, non-tidal wetlands (associated with perennial streams), and a 100-foot-wide buffer area adjacent to and landward of these RPA features. A study by Geosyntec Consultants Inc. dated March 8, 2022, found no RPAs within the Project Site. Additionally, the Henrico County Department of Public Works agreed with Geosyntec’s finding of an intermittent determination for streams within the Project in a letter dated April 26, 2022 (Attachment 3).

## **J. Wildlife Resources**

The Project will be fenced to prevent access by wildlife. Minimization of impacts to wildlife resources and habitat was considered throughout the preliminary design of the Project, and wildlife corridors will be retained to the extent possible. As detailed design of the Project continues, minimizing impacts to wildlife resources will continue to be a prime focus.

## **K. Recreation, Agricultural, and Forest Resources**

The Company reviewed available online data from DCR,<sup>4, 5</sup> Virginia Outdoors Foundation (“VOF”),<sup>6</sup> and the Virginia Department of Forestry (“DOF”).<sup>7</sup> The Project site does not cross any federal, state, or local trails. No parks are within 2 miles of the Project. A Henrico County Park (Midway Park) and a conservation easement held by the Capital Region Land Conservancy are located about 1.7 miles and 1.9 miles southeast of the Project, respectively. Virginia Route 5 (New Market Road), 1.7 miles southeast of the Project site, includes a parallel, paved trail that is

---

<sup>4</sup> Virginia DCR. 2022. Virginia Natural Heritage Data Explorer. Layers: Managed Conservation Lands, ConserveVirginia, Conservation Planning. Available at: [Map | Virginia Natural Heritage Data Explorer \(vanhde.org\)](https://vanhde.org). Accessed July 2023.

<sup>5</sup> Virginia DCR. 2019. Virginia Outdoor Plan Mapper. Layers: Virginia Trailheads, Existing Statewide Trails, Managed Trails, DWR Maintained Access, Water Access Points, Blueways, Local Parks Inventories, Public Access Lands. Available at: [Virginia Outdoors Plan Mapper \(arcgis.com\)](https://arcgis.com). Accessed July 2023.

<sup>6</sup> VOF. 2022. VOF Conservation Land. Available at: [VOF Conservation Land \(arcgis.com\)](https://arcgis.com). Accessed July 2023.

<sup>7</sup> Virginia DOF. 2021. Forest Conservation Value v2020. Available at: [Forest Conservation Value v 2020 - Overview \(arcgis.com\)](https://arcgis.com). Accessed July 2023.

part of the East Coast Greenway, a walking and biking route connecting 15 states from Maine to Florida.<sup>8</sup>

The DCR's Agricultural Model, last updated in 2015, classifies agricultural land on a five point scale, from lowest (I) to highest (V) suitability for agriculture, based primarily on soil suitability, but also accounting for current land cover as well as travel time between agricultural producers and consumers.<sup>9</sup> Another DCR program, ConserveVirginia, identifies top land conservation targets for agriculture and forestry.<sup>10</sup> The site is not identified by the Agricultural Model as suitable for agriculture and is not identified by the ConserveVirginia program as priority land conservation area for agriculture or forestry. Tracts of land 0.3 miles north of the site are included in the Agricultural Model as Class I (low suitability) and land areas 0.8 miles south are classified as Class IV (moderately high suitability.)

DCR's Virginia Natural Landscape Assessment identifies Ecological Cores as a tool to assess fragmentation and ecological integrity of forests. Ecological Cores ("Cores") are areas of at least 100 acres of continuous interior, natural cover that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists. Cores also provide the natural, economic, and quality of life benefits of open space, recreation, thermal moderation, water quality, and air quality. DCR ranks ecological cores using five categories of ecological integrity: C1 - Outstanding; C2 - Very High; C3 - High; C4 - Moderate; and C5 - General. Ecological cores have been mapped for the entire Commonwealth of Virginia and a 20-mile buffer around the state. Over fifty attributes were assigned to the ecological cores providing information about rare species and habitats, environmental diversity, species diversity, patch characteristics, patch context, and water quality benefits. To assist in identifying highly significant ecological cores, DCR selected nine ecological attributes and used them in a principal components analysis to develop ranking by ecological integrity (*e.g.*, C1, C2, C3, C4, and C5).

One Core is identified within the limits of disturbance (LOD) inside the Project site (either wholly or partially). Core 58971 (319 acres) is identified as having an Ecological Integrity of C4. Each of the Core map units identified on the Project site are depicted in Attachment 6. Dominion has designed the LOD to maximize the potential for clean energy production, based on current site conditions, while reasonably minimizing impacts to ecological cores. Because DCR's model does not account for the configuration of parcels or ownership of lands within the defined

---

<sup>8</sup> East Coast Greenway. 2023. East Coast Greenway Mapping Tool. Available at: <https://www.greenway.org/route-map>. Accessed July 2023.

<sup>9</sup> Virginia DCR. 2021. Agricultural Model. Available at: <https://www.dcr.virginia.gov/natural-heritage/vaconvisagric>. Accessed July 2023.

<sup>10</sup> Virginia DCR. 2021. Conserve Virginia 3.0: Virginia's Land Conservation Strategy. Available at: <https://www.dcr.virginia.gov/conservevirginia/>. Accessed July 2023.

Core areas, it is not always possible to fully avoid impacts to Core interiors; however, the Company will develop the Project to maintain wide landscape/wildlife corridors to prevent fragmentation and isolated patches. These corridors will allow for animal and plant genetic exchange across the landscape, support species richness, and maintain connectivity with adjacent Core areas.

The Virginia DOF's Forest Conservation Value (FCV) model was developed to strategically identify the highest priority forestland for conservation in Virginia.<sup>11</sup> The intent was to maximize the efficiency of limited resources by focusing conservation efforts on the highest quality, most productive, and most vulnerable forestland statewide. To provide a spatial representation of the relative value of Virginia's forests, six key components were identified: Forested Blocks, Forest Management Potential, Connectivity, Watershed Integrity, Threat of Conversion, and Significant Forest Communities and Diminished Tree Species. Model values were classified into five categories of FCV for ease of interpretation: average, moderate, high, very high, and outstanding. Higher forest conservation values are assigned to forest areas that are associated with riparian corridors.

While the Company recognizes FCV as a tool for forest conservation, the components used to rank forestland have similarities to the criteria for identifying Ecological Cores, resulting in overlap between the FCV rankings and Ecological Cores. Additionally, the FCV tool seems to rank forested riparian areas as the areas of highest conservation value and Dominion is voluntarily implementing a minimum of 50-foot buffers on all wetland, stream channels, and waterbodies. This report acknowledges and identifies FCV values but focuses on the Ecological Core rankings to represent the environmental impact of the Project associated with tree clearing. The FCV map units on the Project site are depicted in Attachment 6.

#### **L. Use of Pesticides and Herbicides**

The Company typically utilizes selective, low volume applications of EPA approved, non-restricted use herbicides for landscape maintenance. "Selective" application means the Company sprays only the undesirable plant species (as opposed to broadcast applications). "Low volume" application means the Company uses only the volume of herbicide necessary to remove the selected plant species as recommended by the manufacturer. These herbicides are manually applied according to label directions by certified applicators. The least toxic pesticides are applied to targeted species in accordance with the principles of integrated pest management. Only herbicides approved for aquatic use by the EPA and the USFWS will be used in or around any surface water. A non-petroleum-based surfactant will be used in or around any surface waters.

---

<sup>11</sup> Ibid.

## **M. Geology and Mineral Resources**

The Project is located within the Rolling Coastal Plain ecoregion, a rolling, hilly, portion of the Inner Coastal Plain that is made up of sedimentary material and mostly underlain by unconsolidated Tertiary sand, silt, clay, and gravels of the Bacons Castle Formation and the Chesapeake Group.<sup>12</sup> As part of the continued design of the Project, subsurface geotechnical borings and assessments at strategic locations throughout the facility site will be completed. The results of these geotechnical assessments will be used by the construction contractor to determine appropriate construction methods and techniques.

There are no known caves or sinkholes present on the Project site.<sup>13</sup> The United States Geologic Survey does not indicate the potential for karst or pseudokarst development within the Project site.<sup>14</sup>

A review of the Virginia Department of Energy database identifies the potential for sand and gravel resources within the Project site and on neighboring sites.<sup>15</sup> Abandoned sand and gravel mine sites were identified in 2012 within the vicinity of the site and 0.3 mile to the north of the site.<sup>16</sup> Project development will require limited excavation or disturbance at depth. If marketable deposits of mineral resources are located on the Project site, these deposits will not be disturbed by the Project. Following decommissioning of the Project, access to these resources will be available.

## **N. Transportation Infrastructure**

Access to the Project will be provided via a proposed driveway access from Fergus Boulevard, a two-lane, paved road with a posted speed limit of 35 miles per hour that provides access from Darbytown Road and terminates at Dominion's Darbytown Power Station. Darbytown Road is a two-lane county road with a posted speed limit of 45 miles per hour. Darbytown Road intersects Route 60 (Williamsburg Road) two miles to the north of Fergus Boulevard. Access to Route 895 (Pocahontas Parkway toll road) is 3.5 miles to the south of Fergus Boulevard

---

<sup>12</sup> EPA. 2003. Level III and IV Ecoregions of EPA Region 3. Available online at: <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-3#pane-36>. Accessed July 2023.

<sup>13</sup> Virginia DCR. 2023. Virginia Natural Heritage Data Explorer. Layer: Sinkholes. Available at: <https://vanhde.org/content/map>. Accessed June 2023.

<sup>14</sup> United States Geological Survey. 2014. KML US Karst Map. Available at: [https://pubs.usgs.gov/of/2014/1156/downloads/KML\\_USKarstMap.zip](https://pubs.usgs.gov/of/2014/1156/downloads/KML_USKarstMap.zip). Accessed July 2023.

<sup>15</sup> Virginia Department of Energy. 2022. Geology and Mineral Resources Webmap. Available at: <https://energy.virginia.gov/webmaps/GeologyMineralResources/>. Accessed July 2023.

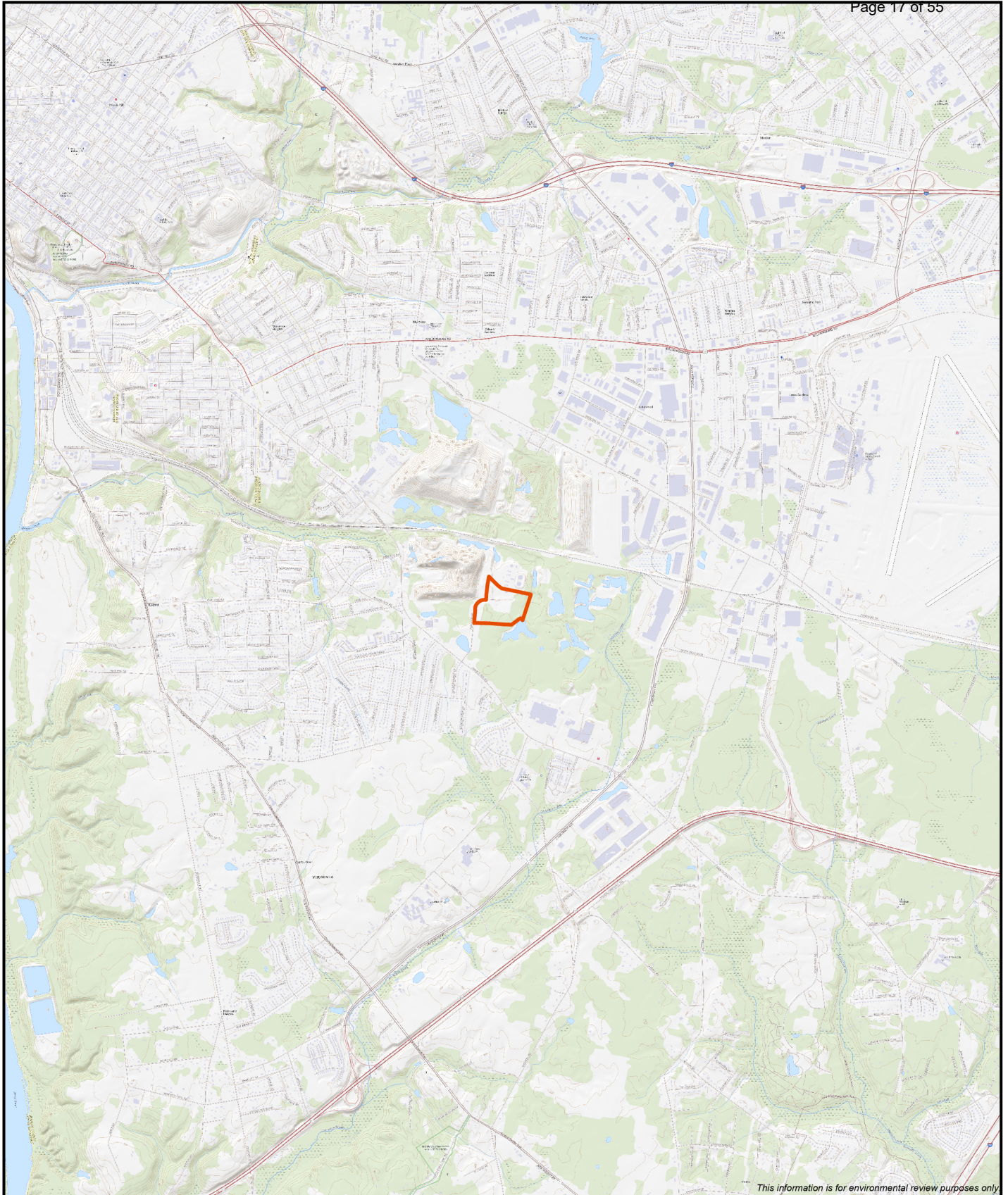
<sup>16</sup> Virginia Department of Energy. 2022. Virginia Mineral Mining Map. Available at: <https://energy.virginia.gov/webmaps/MineralMining/>. Accessed July 2023.

via Darbytown Road and S. Laburnum Parkway.

## **ATTACHMENTS**

**Attachments provided to Virginia Department of Environmental Quality under separate cover**

# ATTACHMENT 1



This information is for environmental review purposes only



 Project Boundary

0 3,000  
Feet

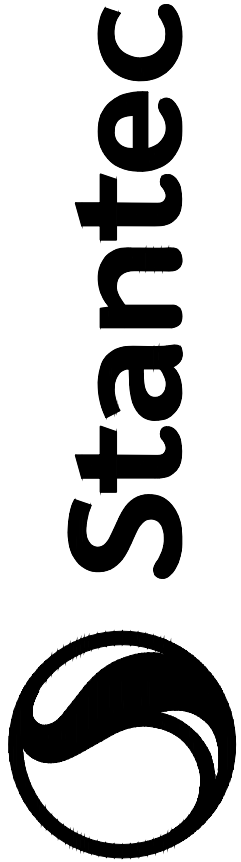
1:48,000



**Darbytown  
Site Overview**  
Dominion Virginia Power  
Henrico County, Virginia



## ATTACHMENT 2



Copyright Reserved

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing.  
The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing.  
The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing.

Consultant

Notes

Revision

By

Appd

YYYYMMDD

Issued

By

Appd

YYYYMMDD

The Name: Darbytown BESS

222

222

20220507

YYYYMMDD

Permit/Seal

PRELIMINARY  
NOT FOR  
CONSTRUCTION

Not for permits, pricing or other official  
purposes. This document has not been  
completed or checked and is for  
general information or comment only.

Client/Project Logo

Client/Project

Dominion Energy

Darbytown BESS

Henrico County, VA

Title

Civil Scoping Layout

Project No.

202499000

Scale

1" = 50'

Revision

Sheet

Drawing No.

1

SUBSTATION  
UNDER CONSTRUCTION

SWITCH GEAR AND  
RECLOSERS (x2)

CONTROL  
HOUSE

RISER POLE

OVERHEAD SUBSTATION  
INTERCONNECT

FORM ENERGY  
POWER BLOCK 1

FORM ENERGY  
POWER BLOCK 2

SWM FACILITY

DEMIN WATER  
FORWARDING SKID

DEMIN WATER TANK

SITE PARKING

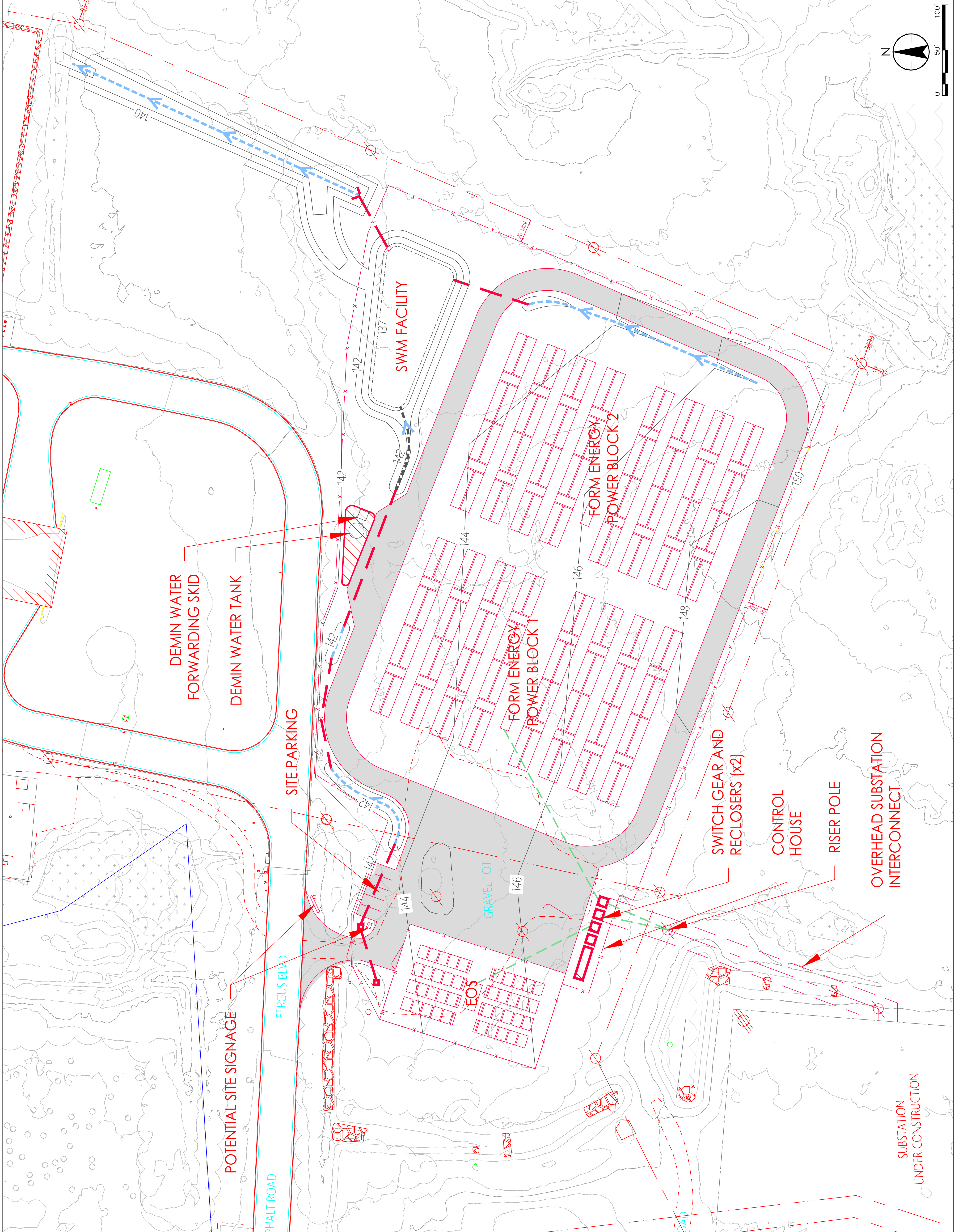
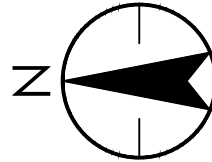
POTENTIAL SITE SIGNAGE

FERGUS BLVD

PHALT ROAD

EOS

GRAVEL LOT



## ATTACHMENT 3



COMMONWEALTH OF VIRGINIA  
**COUNTY OF HENRICO**

**TERRELL C. HUGHES, P.E.**  
**DIRECTOR OF PUBLIC WORKS**  
**COUNTY ENGINEER**  
**(804) 501-4393**

April 26, 2022

Mr. Paul Leeger  
Dominion Energy Services, Inc.  
120 Tredegar St.,  
Richmond, VA 23219

**Re: 6001 Fergus Blvd.; Darbytown Battery Energy Storage System Project**  
**Resource Protection Area Confirmation**

Dear Mr. Leeger:

In response to your request, I have reviewed the Perennial Flow and Resource Protection Area Determination report submitted on April 11, 2022 and performed an onsite assessment. I agree with your findings of the intermittent determination of SA and SB and the absence of a Resource Protection Area within the study area. If you have any questions regarding these findings, please call me at (804) 205-2512.

Sincerely,

Matthew Batdorf  
Water Quality Research Analyst

## DEQ – Office of Wetland and Stream Protection (OWSP) Wetland Impacts Consultation Information

Dominion Electric and Power Company (hereafter, Dominion) proposes to construct and operate two battery energy storage systems (BESS) totaling approximately 8.94 MW under the 2018 Grid Transformation and Security Act (“GTSA”) pilot program for electric power storage batteries (Project).

| Project            | Size (MW)                                                                                    | Locality (County) | Interconnection       | COD     |
|--------------------|----------------------------------------------------------------------------------------------|-------------------|-----------------------|---------|
| GTSA BESS Project  |                                                                                              |                   |                       |         |
| Darbytown (BESS-4) | Form Energy Iron-Air BESS: 4.94 MW / 494 MWh<br>Eos Energy Zinc Hybrid BESS: 4.0 MW / 16 MWh | Henrico           | Transmission, 34.5 kV | Q2 2025 |

This letter report quantifies the potential impacts to Waters of the United States, including wetlands (WOTUS) within the BESS Project listed above and also discusses avoidance, minimization, and alternatives to be consider once a detailed design is complete for each Project. The potential impact acreages (ac), square feet (sqft), and linear feet (lf) listed in this document are based on conceptual designs.

The U.S. Army Corps of Engineers (“USACE”), Southern Virginia Regulatory Section, issued a Preliminary Jurisdictional Determination (NAO-2020-00493) for the Project on July 07, 2022. This project contains 499 linear feet of Intermittent stream channel and 93 linear feet of ephemeral stream channel. Additionally, the Project contains 0.27 acre of Palustrine Forested wetlands, 0.25 acre of Palustrine Scrub/Shrub wetlands, 0.06 acre of Palustrine emergent wetlands, and 0.33 acres of freshwater pond.

### Darbytown BESS Conceptual Wetland and Stream Impacts

| Impact #                               | Impact Type | Reason for impact |
|----------------------------------------|-------------|-------------------|
| No impacts based on conceptual design. | NA          | NA                |

### Summary

Current design plans for the Darbytown BESS Project are in the conceptual phase and will likely change to some extent during final design. Therefore, wetland and stream impacts of the Project may change accordingly. Dominion plans avoid stream and wetland impacts within the Project to the extent practicable. Dominion plans to implement the following wetland and stream avoidance and minimization efforts, where practical, during the construction of the Project (1) using existing roads, (2) reducing the width of access roads or use pull outs if needed, (3) using

horizontal directional drilling (HDD), (4) maintaining buffers along either side of streams, (5) using removable mats in wetland areas to reduce compaction and rutting (6) avoiding grading by incorporating natural topography into the site design, (7) crossing wetlands at their narrowest point, (8) sizing culverts correctly for best hydrologic connectivity, and (9) converting permanent impacts such as access roads to temporary impacts where feasible.



DEPARTMENT OF THE ARMY  
US ARMY CORPS OF ENGINEERS  
NORFOLK DISTRICT  
FORT NORFOLK  
803 FRONT STREET  
NORFOLK VA 23510-1011

Company Exhibit No. \_\_\_\_  
Witness: AHB  
Schedule 1  
Page 24 of 55

July 7, 2022

**PRELIMINARY JURISDICTIONAL DETERMINATION**

Southern Virginia Regulatory Section  
NAO-2020-00493 (Cornelius Creek)

Mr. Paul Leeger  
Dominion Energy Environmental Services  
120 Tredegar Street  
Richmond, VA 23219

Dear Mr. Leeger:

This letter is in regard to your request for a preliminary jurisdictional determination of the aquatic resources (e.g., wetlands, streams, and ponds), on an approximately 51.27-acre property located at on the east and west side of Fergus Boulevard, known as Dominion Darbytown BEES, in Henrico County, Virginia (tax map parcel #812-705-4885, 809-706-4427, 808-706-6679, 809-707-1585) hereinafter referred to as project area.

The map entitled "WOTUS Delineation Darbytown BEES", by Geosyntec dated June 2022 and received by the U.S. Army Corps of Engineers (Corps) on June 27, 2022 (copy enclosed) provides the locations of the aquatic resources within the project area referenced above. This letter is not confirming the Cowardin classifications of these aquatic resources.

These aquatic resources exhibit wetland criteria as defined in the 1987 Corps of Engineers Wetland Delineation Manual, and the Atlantic and Gulf Coastal Plain Regional Supplement. This site also contains aquatic resources with an ordinary high-water mark (or high tide line).

This preliminary jurisdictional determination and associated aquatic resource delineation map may be submitted with a permit application.

Please note we are providing information under 1 and 2 below based on the preliminary data you submitted to the us relative to project boundaries and plans. Consequently, these findings and recommendations are subject to change if the project scope changes, new information becomes available, or new species are added.

1. A search of the Virginia Department of Historic Resources data revealed that:

- ☐ No known historic properties are located on the property.
  - ☐ Tribal consultation may be required.
  - ☒ The following known architectural resources are located on the property: **043-0307 – Battle of Chaffin’s Farm, 043-5071 - Darbytown and New Market Roads Battlefield**
  - ☒ The following known archaeological resources are located on the property: **44HE1235 - Domestic**
  - ☐ The following known historic resources are located in the vicinity of the property (potential for effects to these resources from future development):
2. A search of the data supplied by the U.S. Fish & Wildlife Service, the Virginia Department of Conservation and Recreation and the Virginia Department of Wildlife Resources revealed that:
- ☐ No known populations of threatened or endangered species are located on or within the vicinity of the subject property.
  - ☒ The following federally-listed species may occur within the vicinity of the subject property: **Northern Long-eared bat**
  - ☐ The following state-listed (or other) species may occur within the vicinity of the subject property:

Please be aware that you may be required to obtain a Corps permit for any discharge of dredged and/or fill material, either temporary or permanent, into a water of the U.S. In addition, you may be required to obtain a Corps permit for certain activities occurring within, under, or over a navigable water of the U.S. subject to the Section 10 of the Rivers and Harbors Act. Furthermore, you may be required to obtain state and local authorizations, including a Virginia Water Protection Permit from the Virginia Department of Environmental Quality (DEQ), a permit from the Virginia Marine Resources Commission (VMRC), and/or a permit from your local wetlands board.

This delineation and preliminary jurisdictional determination may not be valid for the Wetland Conservation Provisions of the Food Security Act of 1985, as amended. Therefore, if you or your tenant are US Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should discuss the applicability of a certified wetland determination with the local USDA service center, prior to starting work.

The Norfolk District has relied on the information and data provided by the requestor or agent to make this preliminary determination. If it is determined such information and data are materially false or materially incomplete, a new preliminary determination would be necessary.

This is a preliminary jurisdictional determination and is not a legally binding determination regarding whether Corps jurisdiction applies to the aquatic resources in question. To determine Corps' jurisdiction, you may request and obtain an approved jurisdictional determination.

This delineation of aquatic resources can be relied upon for no more than five years from the date of this letter. New information may warrant revision. Enclosed is a copy of the "Preliminary Jurisdictional Determination Form". Please review the document, sign, and return one copy to the Corps by email at [julie.s.hamilton@usace.army.mil](mailto:julie.s.hamilton@usace.army.mil).

If you have any questions, please contact the office either by telephone at (804) 436-4725 or by email at [julie.s.hamilton@usace.army.mil](mailto:julie.s.hamilton@usace.army.mil).

Sincerely,

A handwritten signature in cursive script that reads "Julie S. Hamilton".

Julie S. Hamilton  
Environmental Scientist  
Southern Virginia Regulatory Section

Enclosure(s):

cc: Geosyntec  
VDEQ-Piedmont  
Henrico County

## ATTACHMENT 4

Travis A. Voyles  
Secretary of Natural and Historic Resources

Matthew S. Wells  
Director

Andrew W. Smith  
Chief Deputy Director



**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

Company Exhibit No. \_\_\_\_  
Witness: AHB  
Schedule 1  
Frank M. Stevill  
Page 28 of 55  
Deputy Director  
for Operations

Darryl Glover  
Deputy Director for  
Dam Safety,  
Floodplain Management and  
Soil and Water Conservation

Laura Ellis  
Deputy Director for  
Administration and Finance

July 26, 2023

Kathlynn Lewis  
Environmental Resources Management, Inc.  
919 E. Main Street, Suite 1701  
Richmond, VA 23219

Re: 0689259, Darbytown BESS

Dear Ms. Lewis:

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 Biotics, natural heritage resources have not been documented within the submitted project boundary including a 100 foot buffer. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources. In addition, the project boundary does not intersect any of the predictive models identifying potential habitat for natural heritage resources.

In addition, the proposed project will impact an Ecological Core (C4) as identified in the Virginia Natural Landscape Assessment (<https://www.dcr.virginia.gov/natural-heritage/vaconvisvnl>). Mapped cores in the project area can be viewed via the Virginia Natural Heritage Data Explorer, available here: <http://vanhde.org/content/map>.

Ecological Cores are areas of at least 100 acres of continuous interior, natural cover that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Interior core areas begin 100 meters inside core edges and continue to the deepest parts of cores. Cores also provide the natural, economic, and quality of life benefits of open space, recreation, thermal moderation, water quality (including drinking water recharge and protection, and erosion prevention), and air quality (including sequestration of carbon, absorption of gaseous pollutants, and production of oxygen). Cores are ranked from C1 to C5 (C5 being the least significant) using nine prioritization criteria, including the habitats of natural heritage resources they contain.

Impacts to cores occur when their natural cover is partially or completely converted permanently to developed land uses. Habitat conversion to development causes reductions in ecosystem processes, native biodiversity, and habitat quality due to habitat loss; less viable plant and animal populations; increased predation; and increased introduction and establishment of invasive species.

600 East Main Street, 24<sup>th</sup> Floor | Richmond, Virginia 23219 | 804-786-6124

*State Parks • Soil and Water Conservation • Outdoor Recreation Planning  
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*

DCR recommends avoidance of impacts to cores. When avoidance cannot be achieved, DCR recommends minimizing the area of impacts overall and concentrating the impacted area at the edges of cores, so that the most interior remains intact.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the 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.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please re-submit a completed order form and project map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

A fee of \$390.00 has been assessed for the service of providing this information. Please find attached an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, DCR Finance, 600 East Main Street, 24<sup>th</sup> Floor, Richmond, VA 23219. Payment is due within thirty days of the invoice date. Please note late payment may result in the suspension of project review service for future projects.

The Virginia Department of Wildlife Resources (VDWR) 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 Amy Martin at (804-367-2211) or [amy.martin@dwr.virginia.gov](mailto:amy.martin@dwr.virginia.gov).

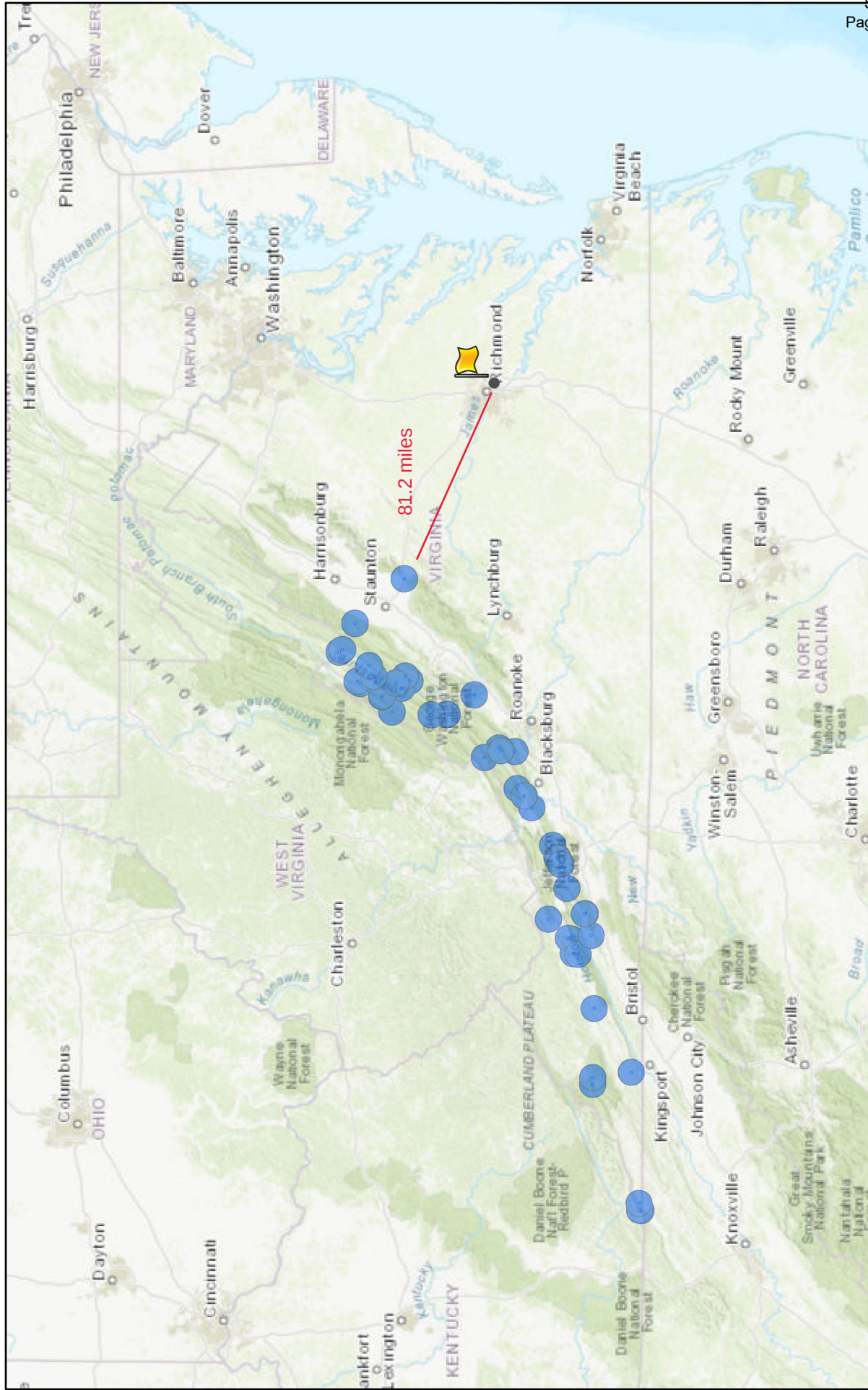
Should you have any questions or concerns, please contact me at 804-225-2429. Thank you for the opportunity to comment on this project.

Sincerely,



Tyler Meader  
Natural Heritage Locality Liaison

# ArcGIS Web Map

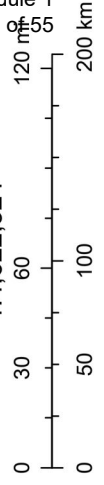


6/30/2023, 1:17:31 PM

Tri-colored and Little Brown Hibernaculum Half Mile Buffer

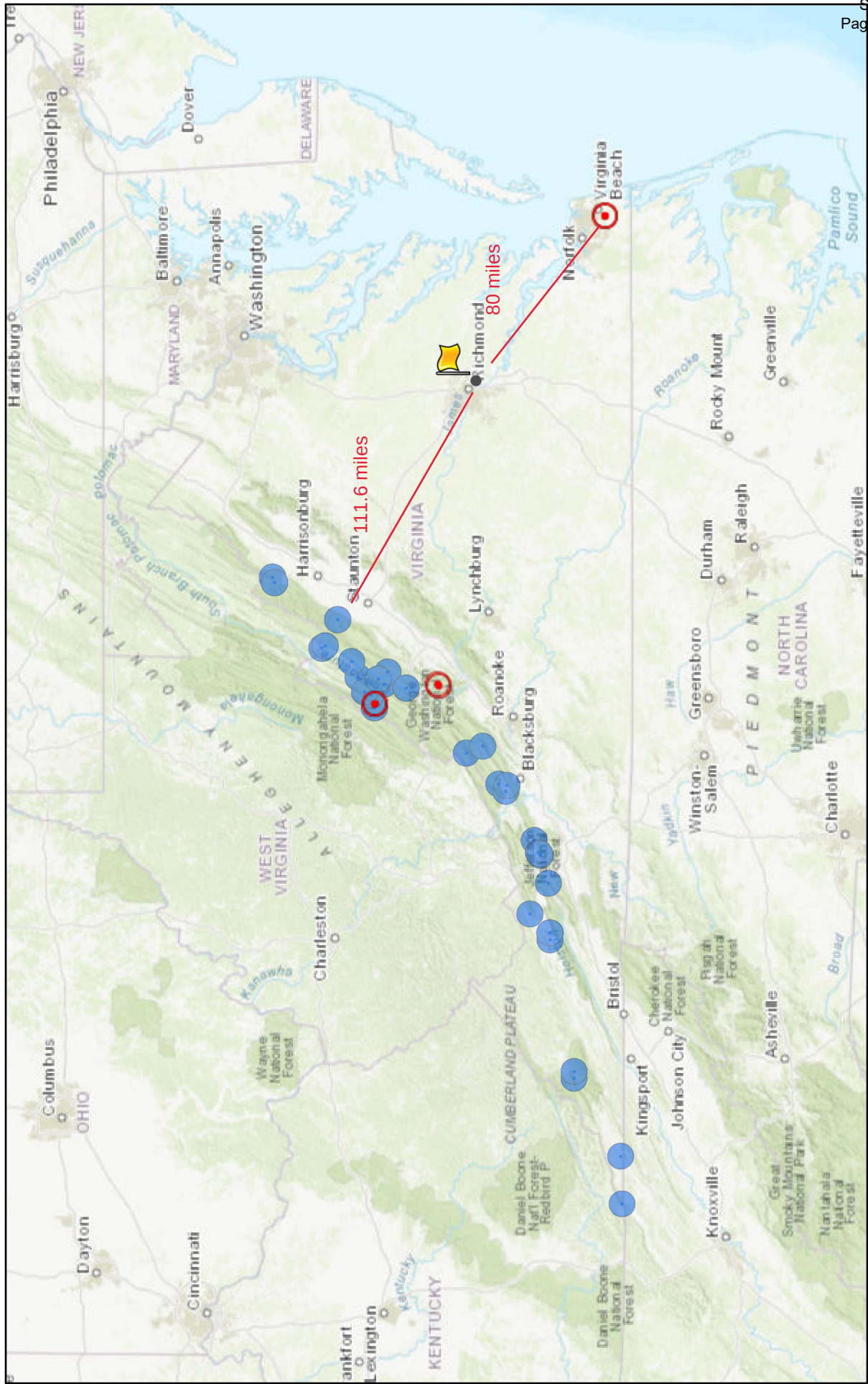
Tri-colored and Little Brown Hibernaculum 5.5 Mile Buffer

1:4,622,324



Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

# NLEB Locations and Roost Trees



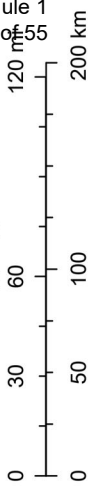
6/30/2023, 1:13:18 PM

● NLEB Known Occupied Maternity Roost (Summer Habitat)

■ NLEB Hibernaculum 5.5 Mile Buffer

■ NLEB Hibernaculum Half Mile Buffer

1:4,622,324



Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

VA Dept. Game & Inland Fisheries  
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

**VaFWIS - Department of Game and Inland Fisheries**

37.49717 -77.36902 is the Search Point

SubmitCancel

**Search Point**  
☒ Change to "clicked" map point  
☐ Fixed at 37.49717 -77.36902

**Show Position Rings**  
☒ Yes ☐ No  
1 mile and 1/4 mile at the Search Point

**Show Search Area**  
☒ Yes ☐ No  
2 Search distance miles buffer

Search Point is at map center

Base Map Choices  
Color Aerial Photography ▾

Map Overlay Choices  
Current List: Search, Position

**Map Overlay Legend**  

 **Position Rings**  
1 mile and 1/4 mile at the Search Point

 **2 mile radius Search Area**

back

Map Click

Pan

Map Scale

In

Zoom

Out

Screen Size

Small

Size

Big

Help





© Commonwealth of Virginia Department of Game and Inland Fisheries - July 13, 2023

N



Point of Search 37.49717 -77.36902

Map Location 37.49717 -77.36902

Select **Coordinate System:** ☐ Degrees,Minutes,Seconds Latitude - Longitude  
☒ Decimal Degrees Latitude - Longitude  
☐ Meters UTM NAD83 East North Zone  
☐ Meters UTM NAD27 East North Zone

Base Map source: Color Aerial Photography 2002 - Virginia Base Mapping Program, Virginia Geographic Information Network

Map projection is UTM Zone 18 NAD 1983 with left 285780 and top 4157464. Pixel size is 11. . Coordinates displayed are decimal Degrees North and West. Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixels. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

Topographic maps and Black and white aerial photography for year 1990+- are from the United States Department of the Interior, United States Geological Survey. Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia Geographic Information Network. Shaded topographic maps are from TOPO! ©2006 National Geographic http://www.national.geographic.com/topo All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries.

map assembled 2023-07-13 11:14:23 (qa/qc March 21, 2016 12:20 - tn=1514008 dist=32181 )  
Spoi=37.4955500 -77.3670200

| [DGIF](#) | [Credits](#) | [Disclaimer](#) | [Contact vafwis\\_support@dgif.virginia.gov](#) | Please view our [privacy policy](#) |

© 1998-2023 Commonwealth of Virginia Department of Game and Inland Fisheries

**VaFWIS Search Report** Compiled on 7/13/2023, 11:15:53 AM

Known or likely to occur within a 2 mile buffer around polygon; center 37.4955500 -77.3670199  
in 087 Henrico County, 760 Richmond City, VA

[View Map of  
Site Location](#)

511 Known or Likely Species ordered by Status Concern for Conservation  
(displaying first 22) (22 species with Status\* or Tier I\*\* or Tier II\*\* )

| BOVA Code | Status* | Tier** | Common Name                                         | Scientific Name                   | Confirmed                 | Database(s)     |
|-----------|---------|--------|-----------------------------------------------------|-----------------------------------|---------------------------|-----------------|
| 050022    | FEST    | Ia     | <a href="#">Bat, northern long-eared</a>            | Myotis septentrionalis            |                           | BOVA            |
| 060017    | FESE    | Ia     | <a href="#">Spiny mussel, James</a>                 | Parvaspina collina                |                           | BOVA            |
| 060003    | FESE    | Ia     | <a href="#">Wedgemussel, dwarf</a>                  | Alasmidonta heterodon             |                           | BOVA            |
| 010032    | FESE    | Ib     | <a href="#">Sturgeon, Atlantic</a>                  | Acipenser oxyrinchus              |                           | BOVA            |
| 060173    | FTST    | Ia     | <a href="#">Pigtoe, Atlantic</a>                    | Fusconaia masoni                  |                           | BOVA            |
| 050020    | SE      | Ia     | <a href="#">Bat, little brown</a>                   | Myotis lucifugus                  |                           | BOVA            |
| 050034    | SE      | Ia     | <a href="#">Bat, Rafinesque's eastern big-eared</a> | Corynorhinus rafinesquii macrotis |                           | HU6             |
| 050027    | FPSE    | Ia     | <a href="#">Bat, tri-colored</a>                    | Perimyotis subflavus              |                           | BOVA            |
| 040096    | ST      | Ia     | <a href="#">Falcon, peregrine</a>                   | Falco peregrinus                  |                           | BOVA            |
| 040293    | ST      | Ia     | <a href="#">Shrike, loggerhead</a>                  | Lanius ludovicianus               |                           | BOVA            |
| 040292    | ST      |        | <a href="#">Shrike, migrant loggerhead</a>          | Lanius ludovicianus migrans       |                           | BOVA            |
| 030063    | CC      | IIIa   | <a href="#">Turtle, spotted</a>                     | Clemmys guttata                   | <a href="#">Yes</a>       | BOVA,SppObs,HU6 |
| 040092    |         | Ia     | <a href="#">Eagle, golden</a>                       | Aquila chrysaetos                 |                           | BOVA            |
| 060084    |         | Ib     | <a href="#">Pigtoe, Virginia</a>                    | Lexingtonia subplana              |                           | BOVA            |
| 020002    |         | IIa    | <a href="#">Treefrog, barking</a>                   | Hyla gratiosa                     |                           | HU6             |
| 040052    |         | IIa    | <a href="#">Duck, American black</a>                | Anas rubripes                     | <a href="#">Potential</a> | BOVA,BBA,HU6    |
| 040029    |         | IIa    | <a href="#">Heron, little blue</a>                  | Egretta caerulea caerulea         |                           | BOVA            |
| 040036    |         | IIa    | <a href="#">Night-heron, yellow-crowned</a>         | Nyctanassa violacea violacea      |                           | BOVA            |
| 040181    |         | IIa    | <a href="#">Tern, common</a>                        | Sterna hirundo                    |                           | HU6             |
| 040320    |         | IIa    | <a href="#">Warbler, cerulean</a>                   | Setophaga cerulea                 |                           | BOVA,HU6        |
| 040140    |         | IIa    | <a href="#">Woodcock, American</a>                  | Scolopax minor                    |                           | BOVA,HU6        |
| 040105    |         | IIb    | <a href="#">Rail, king</a>                          | Rallus elegans                    |                           | BOVA,HU6        |

To view All 511 species [View 511](#)

\*FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; CC=Collection Concern

\*\*I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need  
Virginia Wildlife Action Plan Conservation Opportunity Ranking:

a - On the ground management strategies/actions exist and can be feasibly implemented.; b - On the ground actions or research needs have been identified but cannot feasibly be implemented at this time.;  
c - No on the ground actions or research needs have been identified or all identified conservation opportunities have been exhausted.

[View Map of All Query Results from All  
Observation Tables](#)

Bat Colonies or Hibernacula: **Not Known**

Anadromous Fish Use Streams

N/A

Impediments to Fish Passage

N/A

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters

N/A

Managed Trout Streams

N/A

Bald Eagle Concentration Areas and Roosts

N/A

Bald Eagle Nests ( 2 records )

[View Map of All Query Results  
Bald Eagle Nests](#)

| Nest                   | N Obs | Latest Date | DGIF<br>Nest Status | View Map            |
|------------------------|-------|-------------|---------------------|---------------------|
| <a href="#">HE0501</a> | 7     | Mar 9 2008  | HISTORIC            | <a href="#">Yes</a> |
| <a href="#">HE0802</a> | 2     | Apr 23 2008 | UNKNOWN             | <a href="#">Yes</a> |

Displayed 2 Bald Eagle Nests

Species Observations ( 17 records , 1 Observation with  
Threatened or Endangered species )

[View Map of All Query Results  
Species Observations](#)

| obsID                  | class  | Date Observed | Observer           | N Species         |             |                | View Map            |
|------------------------|--------|---------------|--------------------|-------------------|-------------|----------------|---------------------|
|                        |        |               |                    | Different Species | Highest TE* | Highest Tier** |                     |
| <a href="#">364390</a> | SppObs | Jan 1 1900    |                    | 1                 | CC          | III            | <a href="#">Yes</a> |
| <a href="#">339919</a> | SppObs | May 19 2000   | D. FOWLER, B. MEHL | 4                 |             | III            | <a href="#">Yes</a> |
| <a href="#">339935</a> | SppObs | Apr 13 2000   | D. FOWLER, B. MEHL | 3                 |             | III            | <a href="#">Yes</a> |
| <a href="#">364518</a> | SppObs | Jan 1 1900    |                    | 3                 |             | III            | <a href="#">Yes</a> |

|                        |        |             |                     |    |  |  |                     |
|------------------------|--------|-------------|---------------------|----|--|--|---------------------|
| <a href="#">617683</a> | SppObs | Aug 11 2012 | Megan; Phifer-Rixey | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">339888</a> | SppObs | May 11 2000 | D. FOWLER, B. MEHL  | 11 |  |  | <a href="#">Yes</a> |
| <a href="#">86396</a>  | SppObs | Apr 4 1996  | Keith Cline         | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">26945</a>  | SppObs | Jan 1 1900  | Mitchell, J. C.     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">364500</a> | SppObs | Jan 1 1900  |                     | 2  |  |  | <a href="#">Yes</a> |
| <a href="#">364527</a> | SppObs | Jan 1 1900  |                     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">364519</a> | SppObs | Jan 1 1900  |                     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">364494</a> | SppObs | Jan 1 1900  |                     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">364413</a> | SppObs | Jan 1 1900  |                     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">366958</a> | SppObs | Jan 1 1900  | MITCHELL, J. C.     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">364407</a> | SppObs | Jan 1 1900  |                     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">364548</a> | SppObs | Jan 1 1900  |                     | 1  |  |  | <a href="#">Yes</a> |
| <a href="#">364547</a> | SppObs | Jan 1 1900  |                     | 1  |  |  | <a href="#">Yes</a> |

Displayed 17 Species Observations

#### Habitat Predicted for Aquatic WAP Tier I & II Species

N/A

#### Habitat Predicted for Terrestrial WAP Tier I & II Species

N/A

#### Virginia Breeding Bird Atlas Blocks ( 2 records )

[View Map of All Query Results](#)  
[Virginia Breeding Bird Atlas Blocks](#)

| BBA ID | Atlas Quadrangle Block Name       | Breeding Bird Atlas Species |                         |                            | View Map            |
|--------|-----------------------------------|-----------------------------|-------------------------|----------------------------|---------------------|
|        |                                   | Different Species           | Highest TE <sup>o</sup> | Highest Tier <sup>**</sup> |                     |
| 51082  | <a href="#">Drewrys Bluff, NE</a> | 2                           |                         | III                        | <a href="#">Yes</a> |
| 51096  | <a href="#">Richmond, SE</a>      | 64                          |                         | II                         | <a href="#">Yes</a> |

#### Public Holdings:

N/A

#### Summary of BOVA Species Associated with Cities and Counties of the Commonwealth of Virginia:

| FIPS Code | City and County Name          | Different Species | Highest TE | Highest Tier |
|-----------|-------------------------------|-------------------|------------|--------------|
| 087       | <a href="#">Henrico</a>       | 389               | FESE       | I            |
| 760       | <a href="#">Richmond City</a> | 392               | FESE       | I            |

#### USGS 7.5' Quadrangles:

Drewrys Bluff  
Richmond  
Dutch Gap  
Seven Pines

#### USGS NRCS Watersheds in Virginia:

N/A

#### USGS National 6th Order Watersheds Summary of Wildlife Action Plan Tier I, II, III, and IV Species:

| HU6 Code | USGS 6th Order Hydrologic Unit             | Different Species | Highest TE | Highest Tier |
|----------|--------------------------------------------|-------------------|------------|--------------|
| JL01     | <a href="#">James River-Almond Creek</a>   | 64                | SS         | II           |
| JL03     | <a href="#">James River-Proctors Creek</a> | 64                | SS         | II           |
| JL04     | <a href="#">Fourmile Creek</a>             | 58                | SS         | II           |
| JL21     | <a href="#">White Oak Swamp</a>            | 66                | SE         | I            |

Compiled on 7/13/2023, 11:15:53 A.M. 11510008.0 report=all searchType=P dist=1218 pair=37.4955500 -77.3670199 rdsDD=37.4955550 -77.3670288-37.4956850 -77.3671358-37.4957230 -77.3672088-37.4956850 -77.3673783-37.4952160 -77.3681426-37.4952390 -77.3688426-37.4951500 -77.3704518-37.4953680 -77.3712328-37.4951800 -77.3714634-37.4953920 -77.3717568-37.4953920 -77.3719268-37.4953800 -77.3719668-37.4964360 -77.3718398-37.4965130 -77.3718538-37.4966670 -77.3718398-37.4966650 -77.3718298-37.4967220 -77.3718158-37.4968000 -77.3717798-37.4968630 -77.3717558-37.4969840 -77.3716328-37.4970630 -77.3715258-37.4971130 -77.3714458-37.4971910 -77.3712928-37.4972230 -77.3711818-37.4972400 -77.3710708-37.4972580 -77.3709128-37.4972480 -77.3707208-37.4975670 -77.3705938-37.4976830 -77.3704918-37.4977980 -77.3703798-37.4979230 -77.3702798-37.4980780 -77.3691228-37.4980780 -77.3685668-37.4979720 -77.3679408-37.4978000 -77.3669788-37.4976520 -77.3661438-37.4955550 -77.3670288;  
PixelSize=64; Anadromous=0.020876; BBA=0.034985; BECAR=0.017857; Base=0.017876; Buffer=0.074939; County=0.058975; HU6=0.060387; Impediments=0.01921; Inr=0.111865; PublicLand=0.024841; Quad=0.034472; SppObs=0.255202; TEWaters=0.021162; TierReached=0.021465; TierTerrestrial=0.031596; Total=0.997735; Tracking\_BOVA=0.206062; Trout=0.021153; Inva=0.035777



The CENTER for  
CONSERVATION  
BIOLOGY

# CCB Mapping Portal



**Layers:** VA Eagle Nest Locator, VA Eagle Nest Buffers, Eagle Roosts

**Map Center [longitude, latitude]:** [-77.36782550811768, 37.495205263495045]

**Map Link:**

[https://ccbbirds.org/maps/#layer=VA+Eagle+Nest+Locator&layer=VA+Eagle+Nest+Buffers&layer=Eagle+Roosts&zoom=16&lat=37.495205263495045&lng=-77.36782550811768&legend=legend\\_tab\\_59557df6-c07b-11e5-a485-0e31c9be1b51&base=World+Imagery+%28ESRI%29](https://ccbbirds.org/maps/#layer=VA+Eagle+Nest+Locator&layer=VA+Eagle+Nest+Buffers&layer=Eagle+Roosts&zoom=16&lat=37.495205263495045&lng=-77.36782550811768&legend=legend_tab_59557df6-c07b-11e5-a485-0e31c9be1b51&base=World+Imagery+%28ESRI%29)

**Report Generated On:** 07/25/2023

The Center for Conservation Biology (CCB) provides certain data online as a free service to the public and the regulatory sector. CCB encourages the use of its data sets in wildlife conservation and management applications. These data are protected by intellectual property laws. All users are reminded to view the [Data Use Agreement](#) to ensure compliance with our data use policies. For additional data access questions, view our [Data Distribution Policy](#), or contact our Data Manager, Marie Pitts, at [mlpitts@wm.edu](mailto:mlpitts@wm.edu) or 757-221-7503.

Report generated by [The Center for Conservation Biology Mapping Portal](#).

To learn more about CCB visit [ccbbirds.org](https://ccbbirds.org) or contact us at [info@ccbbirds.org](mailto:info@ccbbirds.org)



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Virginia Ecological Services Field Office  
6669 Short Lane  
Gloucester, VA 23061-4410  
Phone: (804) 693-6694 Fax: (804) 693-9032



In Reply Refer To:  
Project Code: 2023-0108668  
Project Name: Darbytown Battery Energy Storage Solar

July 25, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

### To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

**Migratory Birds:** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <https://www.fws.gov/birds/policies-and-regulations.php>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Project Code in the header of this

---

letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds

## OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Virginia Ecological Services Field Office**

6669 Short Lane

Gloucester, VA 23061-4410

(804) 693-6694

---

## PROJECT SUMMARY

Project Code: 2023-0108668

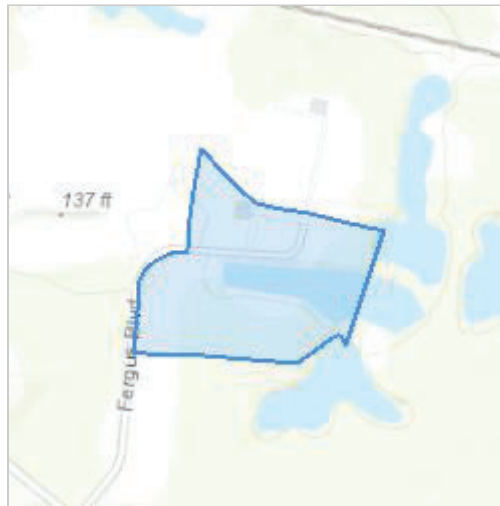
Project Name: Darbytown Batery Energy Storage Solar

Project Type: Power Gen - Solar

Project Description: The project consists of a proposed battery energy storage facility located on approximately 30 acres of private land in Henrico County, Virginia.  
The final footprint will be approximately 10 acres.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@37.4971521,-77.36886373984095,14z>



Counties: Henrico County, Virginia

---

## ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## MAMMALS

| NAME                                                                                                                                                                                                                             | STATUS                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Northern Long-eared Bat <i>Myotis septentrionalis</i><br>No critical habitat has been designated for this species.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a> | Endangered             |
| Tricolored Bat <i>Perimyotis subflavus</i><br>No critical habitat has been designated for this species.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/10515">https://ecos.fws.gov/ecp/species/10515</a>          | Proposed<br>Endangered |

## INSECTS

| NAME                                                                                                                                                                                                                 | STATUS    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Monarch Butterfly <i>Danaus plexippus</i><br>No critical habitat has been designated for this species.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a> | Candidate |

## CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

---

## **USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES**

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

---

## MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

- 
1. The [Migratory Birds Treaty Act](#) of 1918.
  2. The [Bald and Golden Eagle Protection Act](#) of 1940.
  3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

**The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern \(BCC\)](#) list or warrant special attention in your project location.** To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

| NAME                                                                                                                                                                                                                                                                     | BREEDING SEASON         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Bald Eagle <i>Haliaeetus leucocephalus</i></b><br>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. | Breeds Oct 15 to Aug 31 |
| <b>Chimney Swift <i>Chaetura pelagica</i></b><br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.                                                                                                                    | Breeds Mar 15 to Aug 25 |
| <b>Eastern Whip-poor-will <i>Antrostomus vociferus</i></b><br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.                                                                                                       | Breeds May 1 to Aug 20  |

---

| NAME                                                                                                                                                                                                                                                 | BREEDING SEASON         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Lesser Yellowlegs <i>Tringa flavipes</i></b><br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br><a href="https://ecos.fws.gov/ecp/species/9679">https://ecos.fws.gov/ecp/species/9679</a> | Breeds elsewhere        |
| <b>Prothonotary Warbler <i>Protonotaria citrea</i></b><br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.                                                                                       | Breeds Apr 1 to Jul 31  |
| <b>Red-headed Woodpecker <i>Melanerpes erythrocephalus</i></b><br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.                                                                               | Breeds May 10 to Sep 10 |
| <b>Wood Thrush <i>Hylocichla mustelina</i></b><br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.                                                                                               | Breeds May 10 to Aug 31 |

## PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

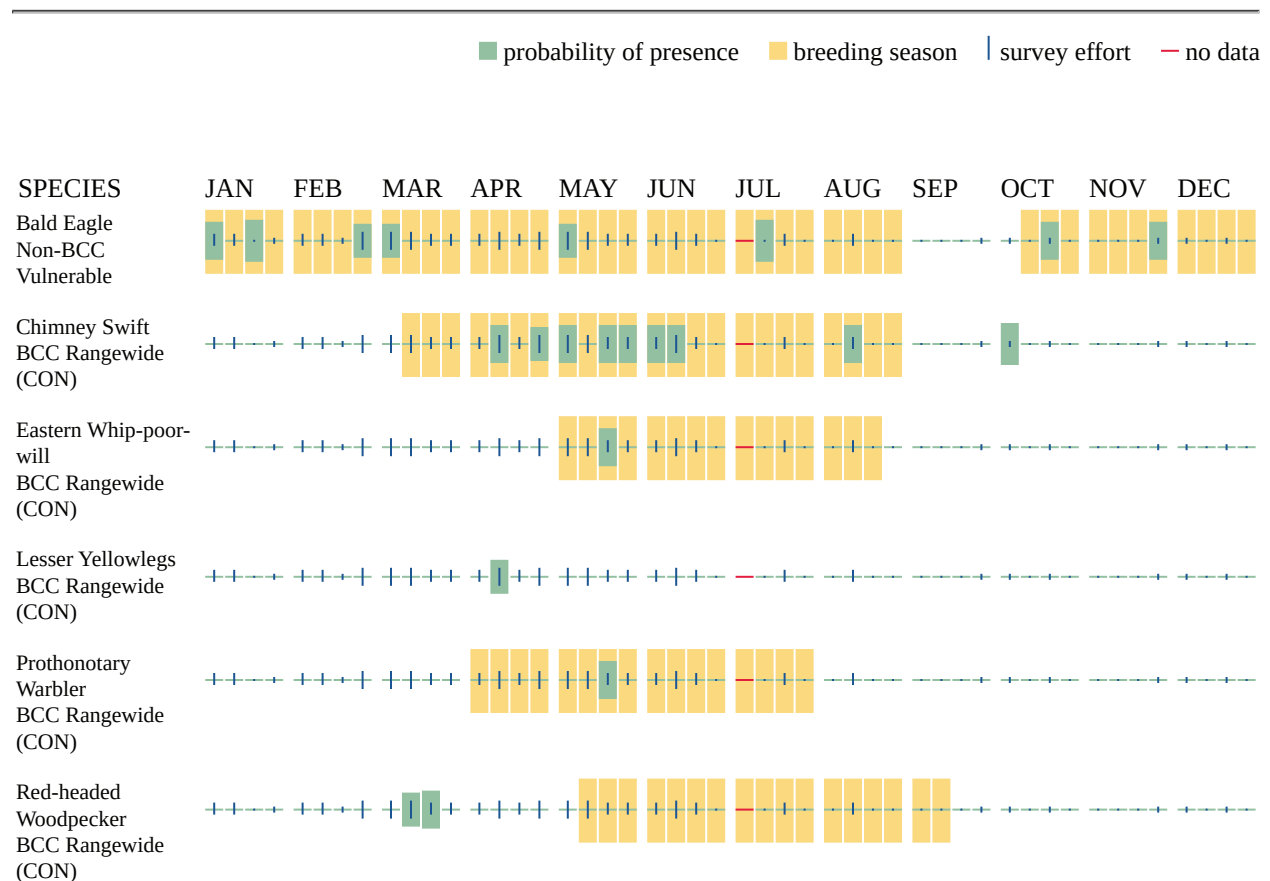
### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .

- Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Wood Thrush  
BCC Rangewide  
(CON)



Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

## MIGRATORY BIRDS FAQ

**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

### **How do I know if a bird is breeding, wintering or migrating in my area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### **What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### **Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

---

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

**What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

---

## IPAC USER CONTACT INFORMATION

Agency: ERM Group  
Name: Kathlynn Lewis  
Address: 919 E. Main St.  
Address Line 2: Suite 1701  
City: Richmond  
State: VA  
Zip: 23219  
Email: kathlynn.lewis@erm.com  
Phone: 8047837556

---

## ATTACHMENT 5



# COMMONWEALTH of VIRGINIA

## Department of Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Travis A. Voyles  
Acting Secretary of Natural and  
Historic Resources

Julie V. Langan  
Director  
Tel: (804) 482-6446  
Fax: (804) 367-2391  
[www.dhr.virginia.gov](http://www.dhr.virginia.gov)

March 30, 2022

Paul Leeger  
Contractor  
Dominion Energy Environment and Sustainability  
Dominion Energy Services, Inc. 120 Tredegar Street Richmond, VA 23219

RE: Darbytown Battery Storage Project Henrico County, Virginia  
Henrico County, Virginia  
DHR File No. 2022-3366

Dear Mr. Leeger:

DHR received for review the letter report entitled *Darbytown Battery Site* dated January 27, 2022, prepared by Dutton + Associates, LLC (D+A) for Dominion Energy Services (Dominion). Our comments are provided as assistance to Dominion in preparing an application to the Virginia State Corporation Commission (SCC) for a Certificate of Public Convenience and Necessity (CPCN).

### Archaeology

Historic aerial photos indicate that the project area of potential effect (APE) has been disturbed in the past by gravel mining. Part of the APE was surveyed in 2020, for the Varina Substation Project (2020-4149), which resulted in the discovery of site 44HE1235. Site 44HE1235 was recommended as not eligible for inclusion to the National Register of Historic Places during the review of project 2020-4149. Dutton and Associates recommend no further archaeological fieldwork due to previous disturbance, DHR **concurs** that no further archaeological work is necessary.

### Architecture

The project area is within the boundaries of two Civil War battlefields, the Darbytown-New Market Roads Battlefield (DHR File #043-5071) and the Chaffin's Farm Battlefield (DHR File #043-0307). In both cases, the project area is not located in the core area of the battlefield or within the area considered by the American Battlefield Protection Program (ABPP) of the National Park Service to be potentially eligible for Virginia Landmarks Register (VLR) and National Register of Historic Places (NRHP) listing. It is DHR's opinion that #043-5071 and #043-0307 will not be adversely impacted by the proposed projects.

Western Region Office  
962 Kime Lane  
Salem, VA 24153  
Tel: (540) 387-5443  
Fax: (540) 387-5446

Northern Region Office  
5357 Main Street  
PO Box 519  
Stephens City, VA 22655  
Tel: (540) 868-7029  
Fax: (540) 868-7033

Eastern Region Office  
2801 Kensington Avenue  
Richmond, VA 23221  
Tel: (804) 367-2323  
Fax: (804) 367-2391

Thank you for consulting with our office for this project. If you have any questions regarding these comments, please contact me at 804-482-8089 or via email, [jonathan.connolly@dhr.virginia.gov](mailto:jonathan.connolly@dhr.virginia.gov).

Sincerely,

A handwritten signature in cursive script that reads "Jonathan D. Connolly".

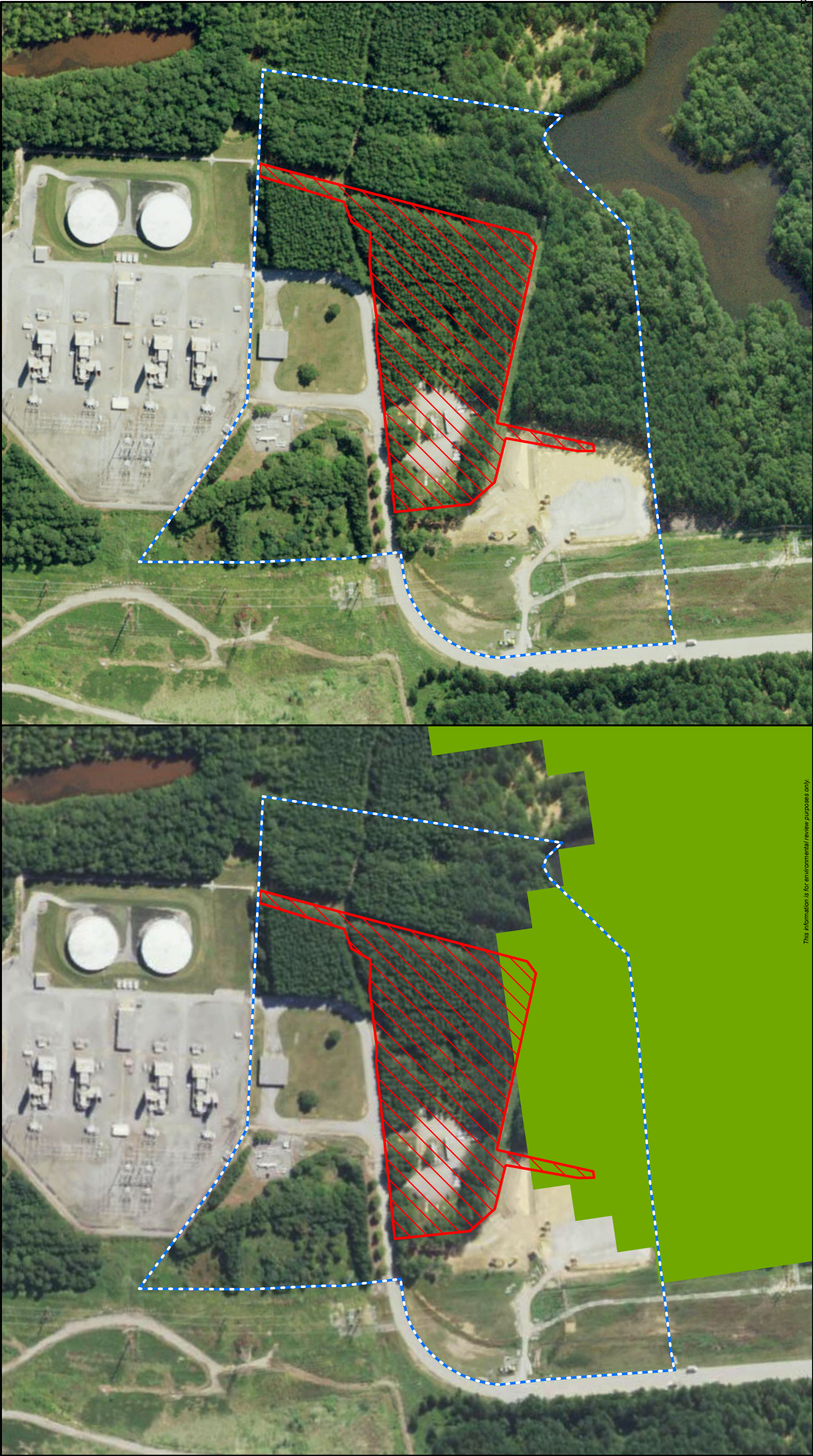
Jonathan D. Connolly, Project Review Archaeologist  
Review and Compliance Division

Western Region Office  
962 Kime Lane  
Salem, VA 24153  
Tel: (540) 387-5443  
Fax: (540) 387-5446

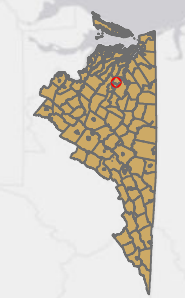
Northern Region Office  
5357 Main Street  
PO Box 519  
Stephens City, VA 22655  
Tel: (540) 868-7029  
Fax: (540) 868-7033

Eastern Region Office  
2801 Kensington Avenue  
Richmond, VA 23221  
Tel: (804) 367-2323  
Fax: (804) 367-2391

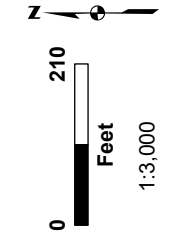
## ATTACHMENT 6



This information is for environmental review purposes only.



- Project Boundary**
- C1: Outstanding
  - C2: Very High
  - C3: High
  - C4: Moderate
  - C5: General
- Limit of Disturbance**



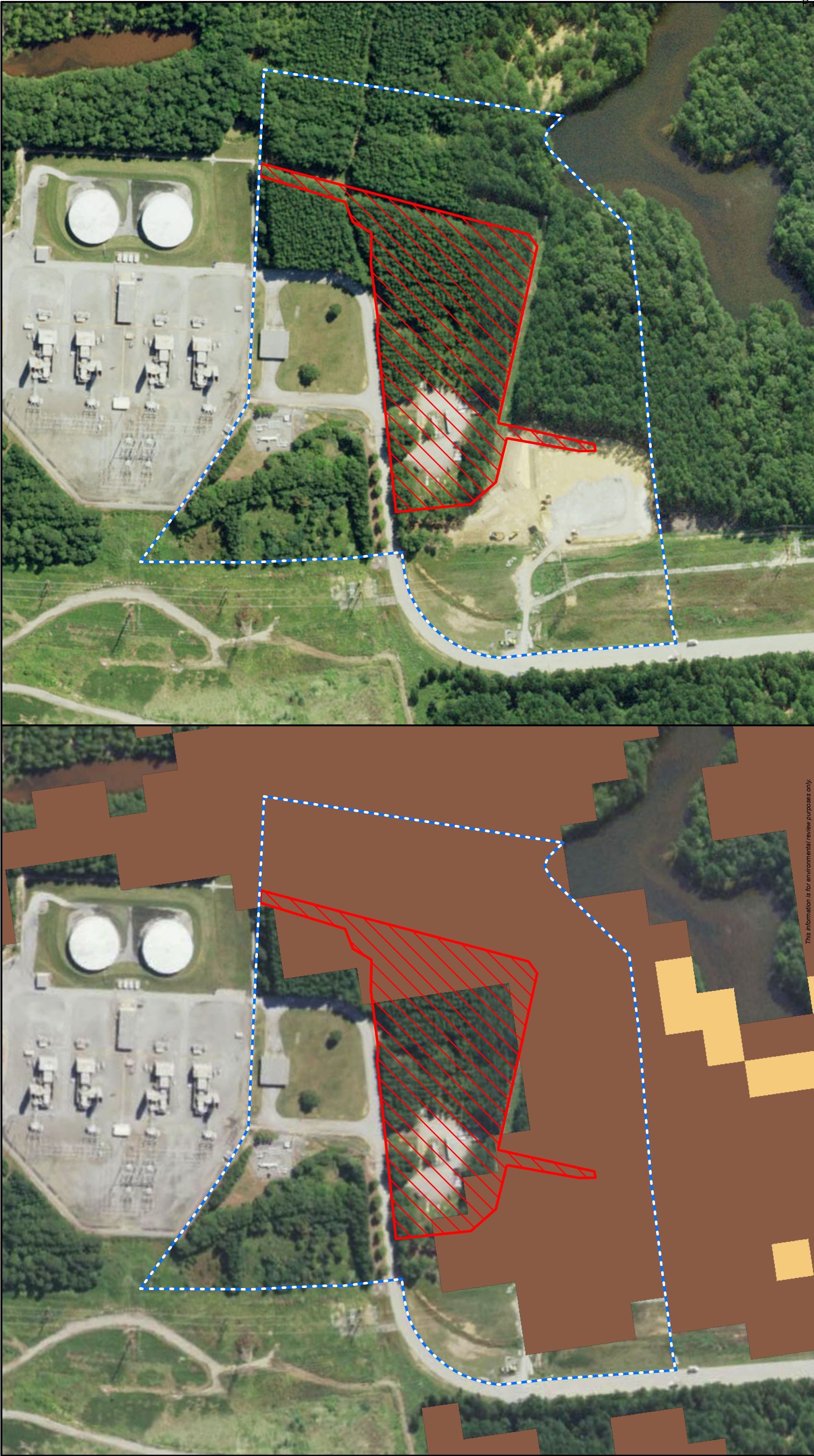
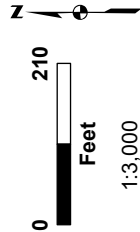
**Darbytown  
Ecological Cores**  
Dominion Virginia Power  
Henrico County, Virginia





DRAWN BY: RL

**Darbytown**  
**Forest Conservation Value**  
**Dominion Virginia Power**  
Henrico County, Virginia



This information is for environmental review purposes only.

- FCV - Outstanding
  - FCV - Very High
  - FCV - High
  - FCV - Moderate
  - FCV - Average
- Project Boundary
- Limit of Disturbance

