



Bureau of Engraving and Printing

Conceptual Site Layouts & Utility Study

Beltsville Agricultural Research Center

Beltsville, Maryland

JANUARY 2020



Bureau of Engraving and Printing Conceptual Site Layouts & Utility Study Beltsville Agricultural Research Center Beltsville, Maryland

Final Submittal – January 2020

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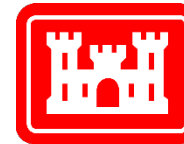
In partnership with
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Crawford Consulting Services

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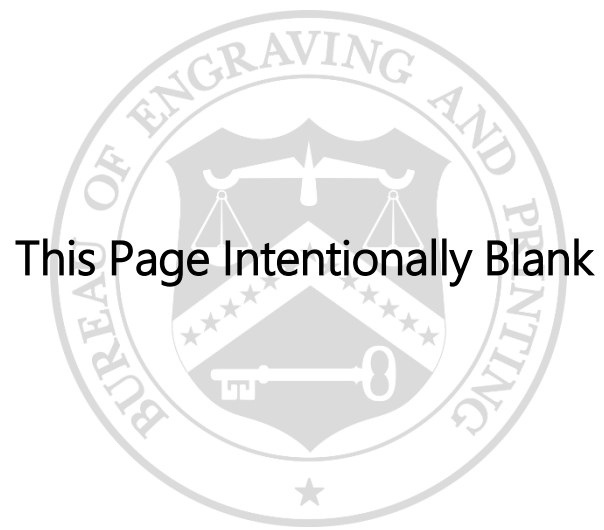
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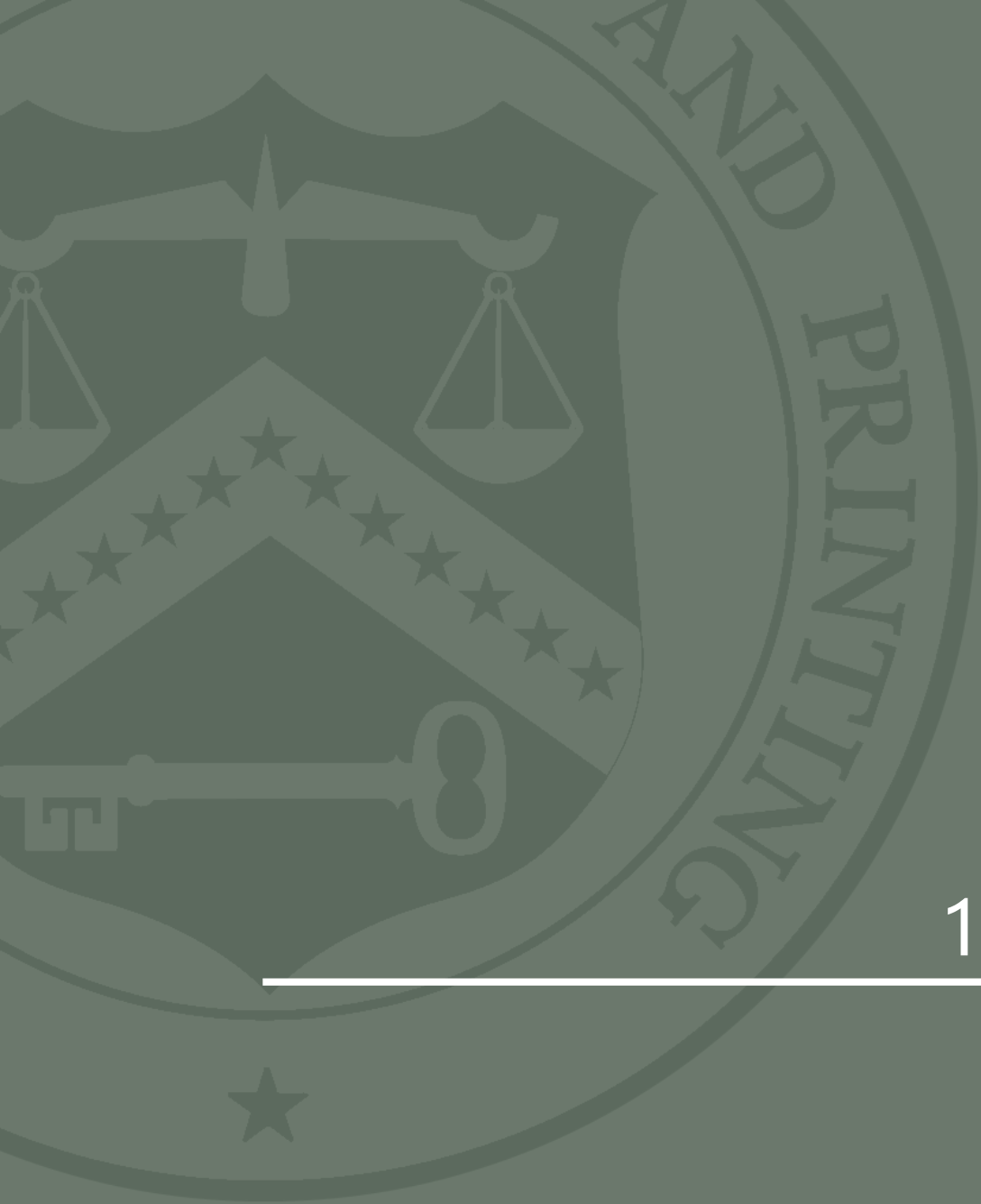
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1 PURPOSE AND OVERVIEW



Purpose and Overview

The Bureau of Engraving and Printing (BEP) is the arm of the United States Department of the Treasury charged with the mission to develop and produce United States currency notes, trusted worldwide. Additionally, the BEP advises other federal agencies on document security standards, processes claims for the redemption of mutilated currency, and performs research and development of production process automation and counterfeit deterrent technologies.

BEP executes its mission in two geographic regions, Washington DC and a Western Currency Facility (WCF) in Fort Worth, TX. The WCF is a relatively new facility, constructed in 1991, while the Washington, DC Facility (DCF) is composed of an aging and obsolete collection of facilities. Due to increased technological requirements of the BEP mission and the DCF production limitations, BEP is considering the development of a new currency production facility in the vicinity of Washington, DC.

Existing DCF Conditions

BEP began operations in 1862 and became the sole producer of United States currency in 1877. The main DCF facility was constructed in 1914 and the annex was constructed in 1938. These facilities, located in the heart of downtown Washington, DC present issues for BEP operations due to obsolete infrastructure support, raw material delivery / vault storage limitations, and safety / security vulnerabilities. Overall, the facilities are not suited for modern-day currency production.

Future Development

A 2013 study provided an alternative assessment for fulfilling facility requirements at DCF and found new construction of a production facility to be the most economical facility solution for the BEP mission. An approximate 105-acre parcel at the Beltsville Agricultural Research Center (BARC) in Beltsville, Maryland is identified for the new production facility and this study serves as a feasibility analysis for the parcel to support the proposed facility requirements.



Photos above: Bureau of Engraving and Printing in Washington, D.C.

Purpose and Overview

Setting

BARC is located approximately 10 miles north east of Washington, DC and 20 miles southwest of Baltimore, MD. BARC is a regional research center comprised of 6,582 acres divided into five farms: North, South, East, Central, and Linkage Farms.

BEP Site

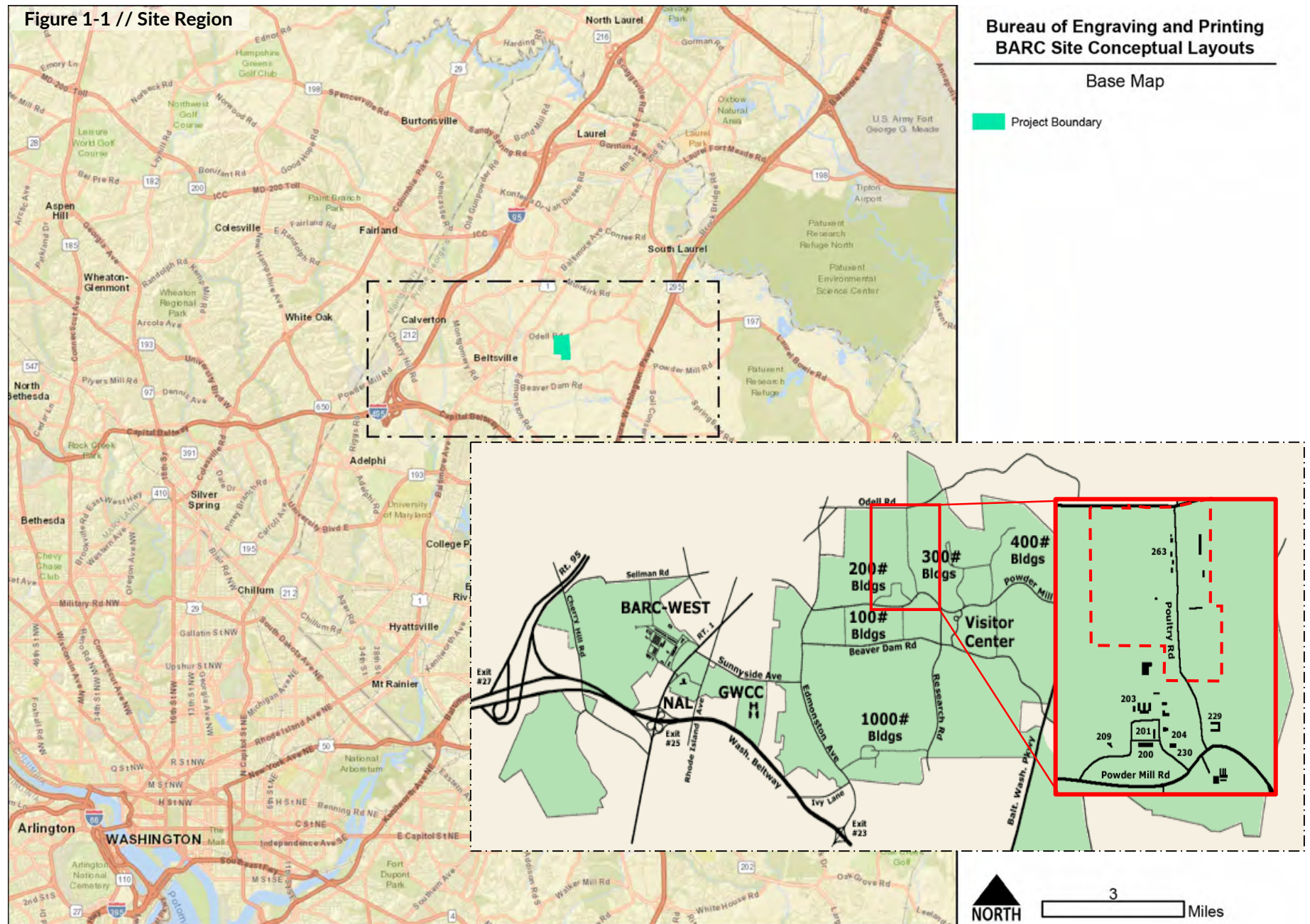
The site is located at the north end of Central Farm, in the 200-area building cluster of BARC. Facilities are currently vacant but were previously used by the Poultry Research Division of the United States Department of Agriculture (USDA) from 1914 to 2012. Figure 1-1 shows the BEP site in relation to the overall BARC campus and the surrounding area.

The site is bounded by Odell Road, residential development, and wooded area to the north, wooded area to the east, Beltsville Human Nutrition Center, and Powder Mill Road to the south, and agricultural fields to the west. The total area of the site is 105 acres.



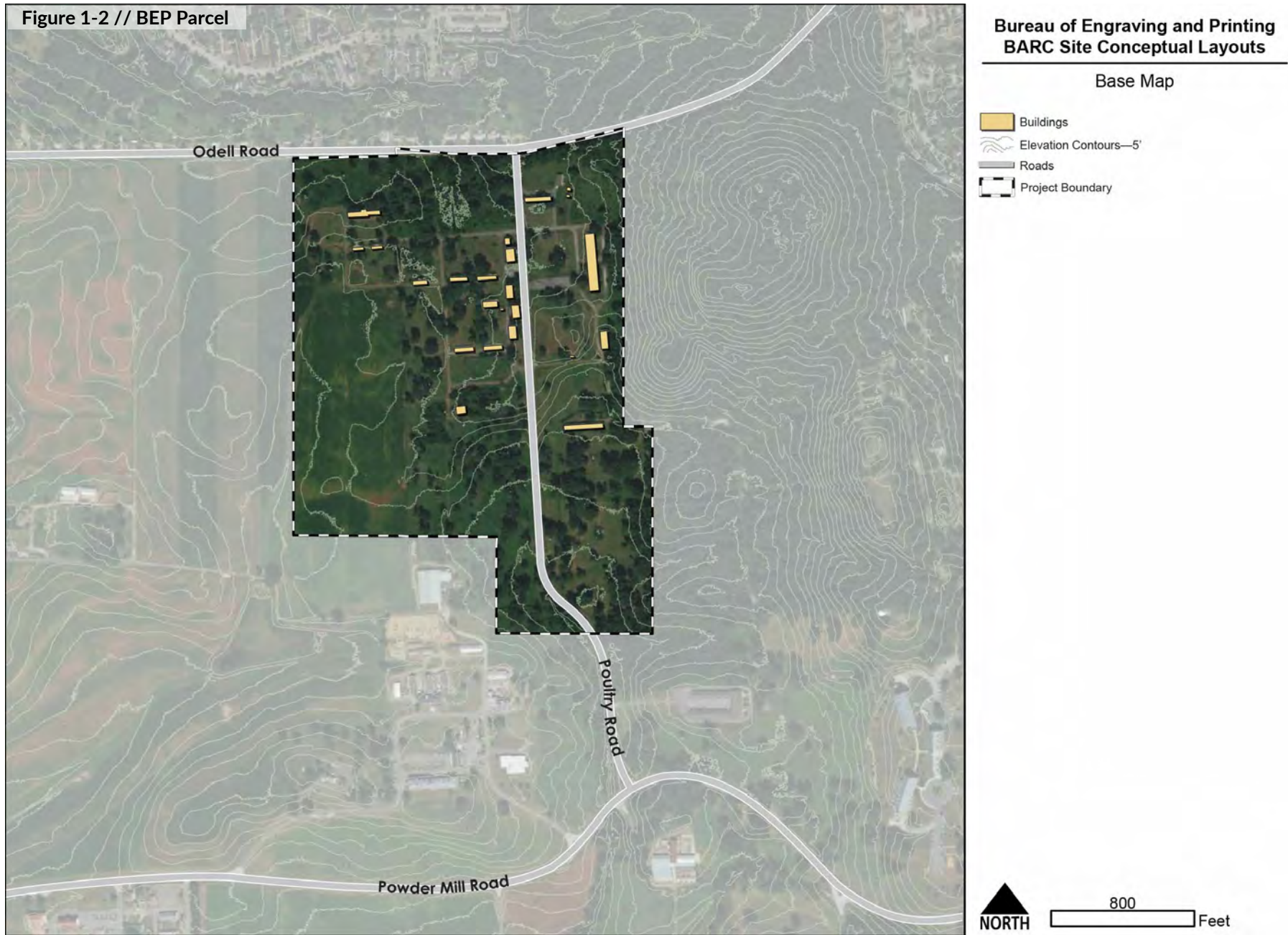
Central Farm at the Beltsville Agricultural Research Center.

Purpose and Overview



BEP Parcel

Figure 1-2 // BEP Parcel



Purpose and Overview

PLANNING PROCESS

This report summarizes the results of a planning process that broadly consists of two stages: data gathering / analysis and an on-site planning workshop. The process is intended to identify and incorporate four sources of input:

- Data that drives analysis of site opportunities and constraints
- Leadership guidance that establishes agency priorities
- Stakeholder input, validation, and buy-in that leverages subject matter expertise, helps de-conflict user priorities, and generates top-to-bottom ownership of the plan
- Technical planning expertise that builds upon requirements, guidance, and stakeholder input to create a feasible and actionable plan

An on-site kickoff meeting with key leaders and stakeholders was held 26-27 August 2019. The purpose of the kickoff meeting was to introduce the planning process and to gather input regarding the planning challenges and priorities of the project. Following the kickoff meeting, a series of discussions with stakeholders was conducted to refine requirements and identify constraints. The consulting team used data gathered from the kickoff meeting and follow-on discussions to develop four alternatives, in order to narrow the focus for the planning workshop.

The on-site planning workshop was held on 21-23 October 2019 and gathered stakeholders from BEP, United States Corps of Engineers (USACE), National Capital Planning Commission (NCPC), and USDA. Day 1 of the workshop began with an inbrief that included an overview of the project and the planning process. The group conducted a thorough review of existing site conditions, utilities, and constraints. The group also proposed visioning goals for development of the site. On Day 2, the group reviewed and critiqued the four development alternatives, noting strengths, weaknesses, possible improvements, and how each alternative address the

visioning goals. The consulting team developed a preferred alternative based on the information gained during the critiquing session. On Day 3, the consulting team briefed the preferred alternative to the group and gathered comments to further refine the plan.



Purpose and Overview





2 SITE AND CONSTRAINTS ANALYSIS



Site and Constraints Analysis

Surface Waters & Wetlands

Surface waters on the site include one seep in the northeastern portion of the site and one in the southern portion of the site. Palustrine wetlands are in the northeastern, central, and southeastern portions of the site. There are two streams flowing from east to west, converging into a ditch along the west side of Poultry Road, at its southern end. Surface waters and wetlands are not considered off-limits for development, but require mitigation and coordination through the Federal / State Joint Permit Application process, with USACE, Baltimore District, Operations Division, Regulatory Branch and Maryland Department of the Environment (MDE) specifically regarding potential permitting actions within Section 404, and/or Section 10 of the Clean Water Act and Rivers and Harbors Act, respectively.

Forest Stands

The eastern portion of the site includes deciduous forest dominated by oak. There are large mature trees scattered throughout much of the site, most of which meet the criteria of specimen trees. Two reforestation areas exist at the north end of the site and should be considered off-limits for any proposed development.

Rare, Threatened, and Endangered Species

Pending results of a survey in June 2019, positive finding of the northern long-eared bat would require coordination with the U.S. Fish and Wildlife Service (USFWS) as Section 7 consultation for required impact mitigation during site clearing and construction.

Areas of Concern

There are three areas of concern (AOC) adjacent to, and east of the site. The Dump of Odell Road, Dump off Poultry Road, and Possible Disposal Area have all been officially assessed and appropriately addressed. None of the sites pose significant human or ecological risk and no further action has been recommended.

Cultural Resources

Approximately 24 facilities, built between 1914 and 1967 are clustered in the central and northern parts of the site along Poultry Road. Facilities have remained vacant and unused since 2012.

The Maryland Historical Trust (MHT), which serves as the State Historic Preservation Office (SHPO), has concurred that the entire BARC facility of 6,582 acres is eligible for the National Register of Historic Places (NRHP). Individual buildings at the site are not eligible for the NRHP, but they are considered as contributing resources to the larger BARC NRHP eligible district. Federal regulations may require additional investigations and mitigation for ultimate demolition, site prep, and construction on the site.

Topography

Topography on the site is moderate with elevations ranging from approximately 120 feet (ft) above mean sea level (AMSL) in the southern portion of the site to approximately 190 ft AMSL along the eastern portion of the site. The site gently slopes to the south.

Soils

A USDA Web Soil Survey identifies four (4) soil series within the proposed site. The soil series are as follows: (1) Christiana-Downer Complex (CcC, CcD, and CcE), (2) Elkton silt loam (EkA), (3) Russett-Christiana Complex (RcA, RcB) and (4) Russett-Christiana-Urban Land Complex (RuB).

Site and Constraints Analysis

Roads and Access

The key transportation route through the site is Poultry Road, which runs north-south. Poultry Road is also the primary access route, intersecting with Odell Road to the north and Powder Mill Road to the south. Odell Road and Powder Mill Road are collector roads running east-west providing access to three arterial roads within a 2-mile radius. Maryland 201/Edmonston Road, US Highway 1, and Baltimore-Washington Parkway all run southwest to northeast and intersect with Interstate Highway 495 south of the site. Powder Mill Road also provides primary access to multiple government tenants of BARC.

There are private homes along the north side of Odell Road across from the site. From the northern boundary of the site, Odell Road runs east-northeast through forested areas and connects to neighborhood developments and government facility complexes.

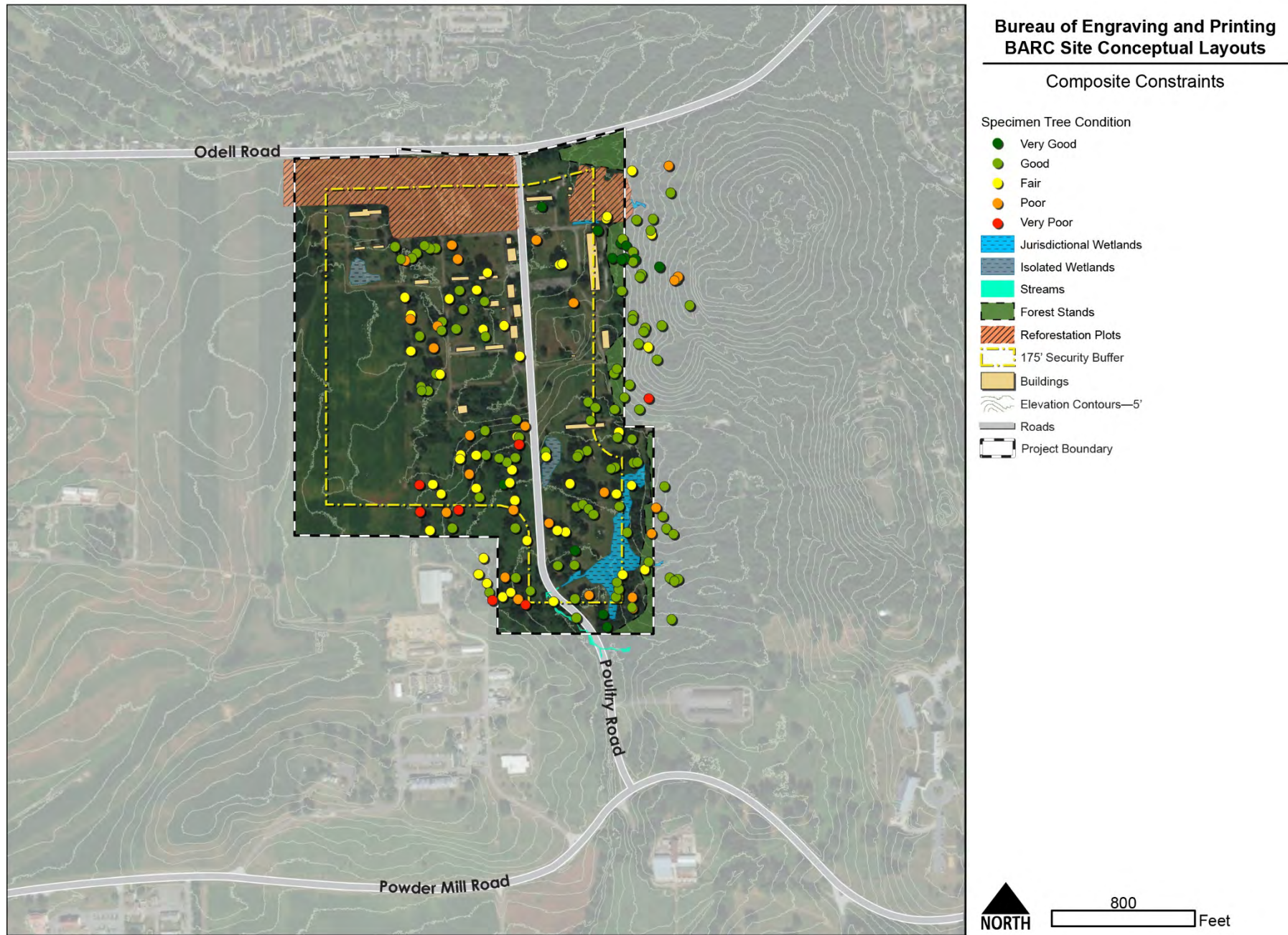


Private residences along Odell Road across from existing gate at north site entrance.



Powder Mill Road runs east-west, at the south end of the BEP site.

Site and Constraints



Site and Constraints Analysis

DEVELOPABLE AREAS

Preliminary developable analysis is summarized in Table 2-1 below and shown in Figure 2-2. A variety of operational and environmental development restrictions exist within the study area—land viewed as unencumbered from operational or environmental/site constraints is categorized as "Developable" and totals approximately 58 percent of the district area.

Isolated wetlands can be mitigated easily and are considered marginally constrained for development while areas featuring jurisdictional wetlands or area within the Interagency Security Committee (ISC) standard security buffer of 175-feet from the perimeter fenceline is considered highly constrained. Development within the highly constrained areas of the study area are not recommended for development as mitigation may be cost prohibitive and/or incompatible with proposed BEP development for the parcel.

It should be noted that the ISC security buffer of 175-feet from the perimeter fenceline is based on a vehicle-borne threat. If it is unreasonable to expect a vehicle to be able to access the perimeter fenceline, the security buffer can be reduced. This condition is met along the western / southwestern fenceline, where the "highly constrained" buffer is reduced to "moderately constrained," as shown in Figure 2-2 and acreage summary is detailed in the table below. Development within the 175-foot ISC buffer should not be pursued without legal guarantee from USDA that future development will not occur in the area immediately west of the BEP site that may enable vehicles to access that portion of the parcel.

Table 2-1: Developable Areas Summary





Land Description	Acreage	% of Parcel Area
Developable	61.3	58%
Moderately Constrained	7.3	7%
Highly Constrained	36.4	35%

Developable Areas



Figure 2-2 // Developable Areas

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BARC Site Conceptual Layouts

Developable Area

-  BEP Boundary
- Developable Area Assessment
 -  Developable—Unconstrained
 -  Moderately Constrained
 -  Highly Constrained



 NORTH  800 Feet

Purpose and Overview



Dilapidated facilities along Poultry Road have been vacant for over 10 years.



Development impact to specimen trees is unavoidable and will require mitigation.

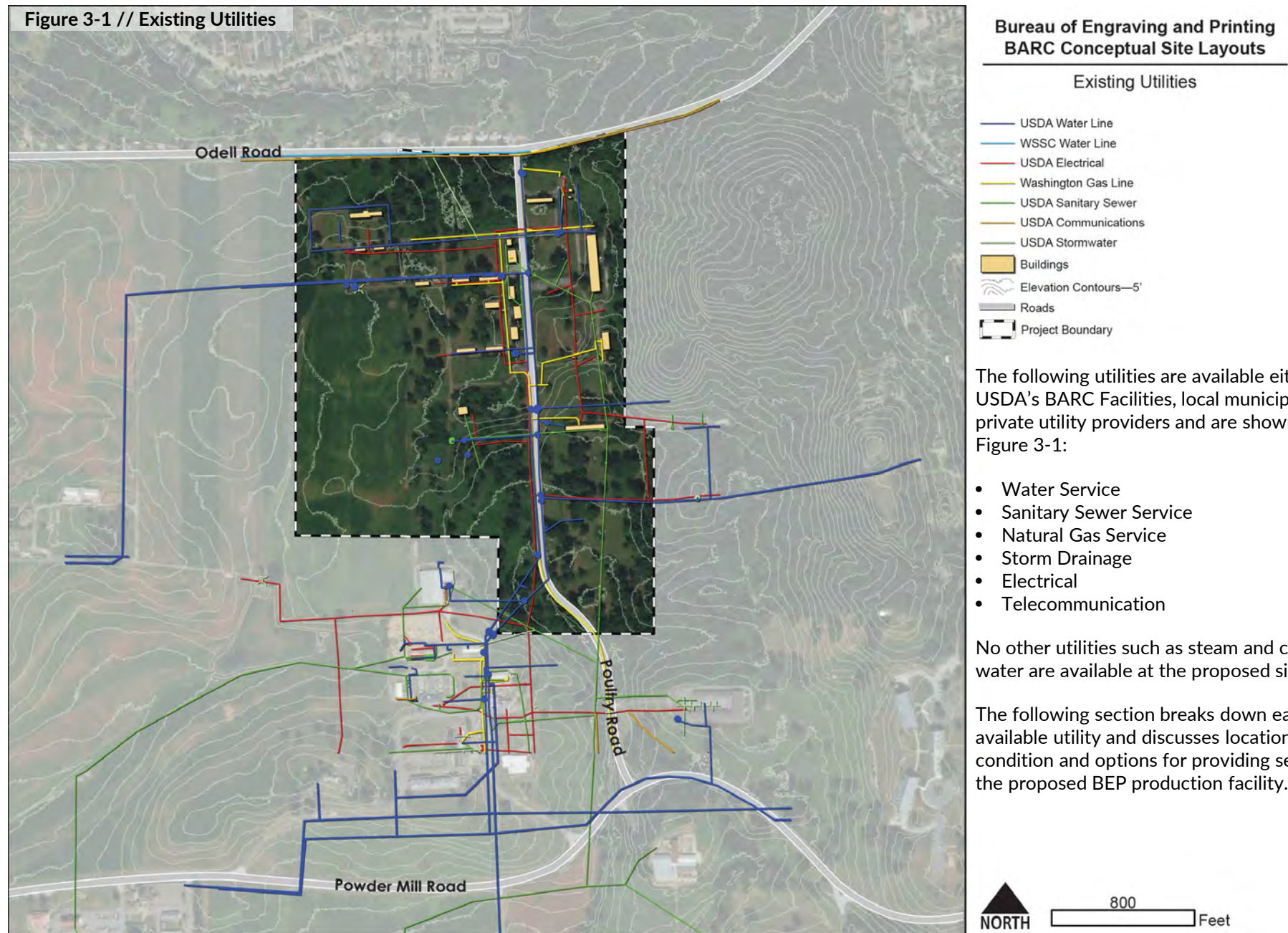


3 UTILITY STUDY



Existing Utilities

Figure 3-1 // Existing Utilities



Water Service

Existing Systems

There are two water systems available to provide domestic and fire protection water service to the proposed facility. One system is owned and operated by the United States Department of Agriculture (USDA) at the Beltsville Agricultural Research Center (BARC). The second system is owned and operated by the Washington Suburban Sanitary Commission (WSSC). This study evaluates the two systems, develops options and makes recommendations for providing water service to the facility.

USDA System

The USDA domestic water system consists of 8 wells, a water treatment plant (WTP) and a distribution system. The wells are located throughout the BARC property and supply raw water to the WTP. The WTP is Building 309 and is located east of the proposed site northeast of the intersection of Center Road and Powder Mill Road. Currently only 3 of the 8 wells are on-line. USDA Facilities Management is performing upgrades and repairs to several of the wells and raw water lines that are off-line. Currently the WTP capacity is 750,000 gpd and it has an average daily output of 500,000 gpd. The USDA has committed to providing an average of 100,000 gpd to the BEP facility. Any more than this may overtax the system as it currently operates due to potential large irrigation demands that are hard to predict.

The existing distribution system consists of various size and type water lines supplying domestic, fire protection and irrigation water to various BARC facilities. Hydrants are also located within the system. There are USDA water lines within the proposed BEP facility site along Poultry Road from a connection along Powder Mill Road to the south. These are over 80 years old and are of various material such as galvanized, lead, and copper. This study assumes all the existing water lines within the proposed BEP facility site will be removed as

part of this development. There are two water mains through the site that will require reconnection on either end to maintain the loop in the existing system. After the old water lines are removed the closest connection to the USDA system will be from a 16-inch Cement Lined Ductile Iron (CLDI) main along Powder Mill Road. During a site visit on August 27, 2019 a fire hydrant flow test was performed from an 8-inch main parallel to the 16-inch main along Powder Mill Road. The result was a static pressure of 75 psi and a residual pressure of 72 psi at 1,000 gpm.

WSSC system

WSSC owns and operates a domestic water system within Prince George's County adjacent to the proposed BEP facility along O'Dell Road to the north. The county has jurisdiction over what areas of the county may be served by the WSSC system. Prince George's County categorizes areas of the county to dictate which areas qualify for water service from WSSC and which do not. The proposed BEP facility site is within two categories. The area west of Poultry Road is within Category 3 which allows WSSC to serve the facility. The area east of Poultry Road is within Category 6 which does not allow WSSC to serve water to the facility. Prince George's County requires the entire property to be within Category 3 before WSSC can provide water to any portion of the facility. However, the County may allow WSSC to serve the full development but will require a waiver request be submitted and accepted to allow the Category 6 area to be served by WSSC. The waiver request will be processed during the design of the facility.

Water Service

Although the site is not entirely within Category 3, Prince George's County has allowed WSSC to review the proposed development and move forward with analysis to determine if water service is available at the required demand of the facility. To do this, WSSC requires a Hydraulic Planning Analysis (HPA) be performed by them. The initial development and submittal of this HPA request is currently underway. This study will be updated as the process advances and more information is obtained by WSSC. This process is estimated to take 2 months.

Based on information from the WSSC website the WSSC water main along O'Dell Road appears to be a 10-inch line and is split between two pressure zones. It also appears both pressure zones dead-end near the proposed site. Until the HPA is complete it is unknown if either of the pressure zones are adequate to provide water to the proposed development or what infrastructure upgrades or extensions are required. The consultant team requested fire flow data at the adjacent fire hydrants in each pressure zone to determine what fire flow is available in this area. This is typically a quicker process than the HPA and will therefore help determine the available demand while the HPA process takes its course. Findings will be provided upon receipt.

Proposed system

For planning purposes, the current BEP production facility operators have determined the new facility will require an average daily demand of 280,000 gpd at 60 psi for production. Sixty percent of this is cooling tower makeup water. The fire flow requirement for this facility is estimated to be 2,000 gpm at 20 psi for 2 hours. This combined flow exceeds the availability of USDA water system (100,000 gpd). The existing USDA facility would require more wells and increase in WTP capacity, requiring the USDA to invest significant time and money to meet the needs of this development. The USACE has directed Burns & McDonnell to consider two options

in providing water to the proposed production facility. Option 1 is to use the USDA system to the maximum available supply of 100,000 gpd and supplement with WSSC water. Option 2 is to use WSSC to provide the full demand to the facility.

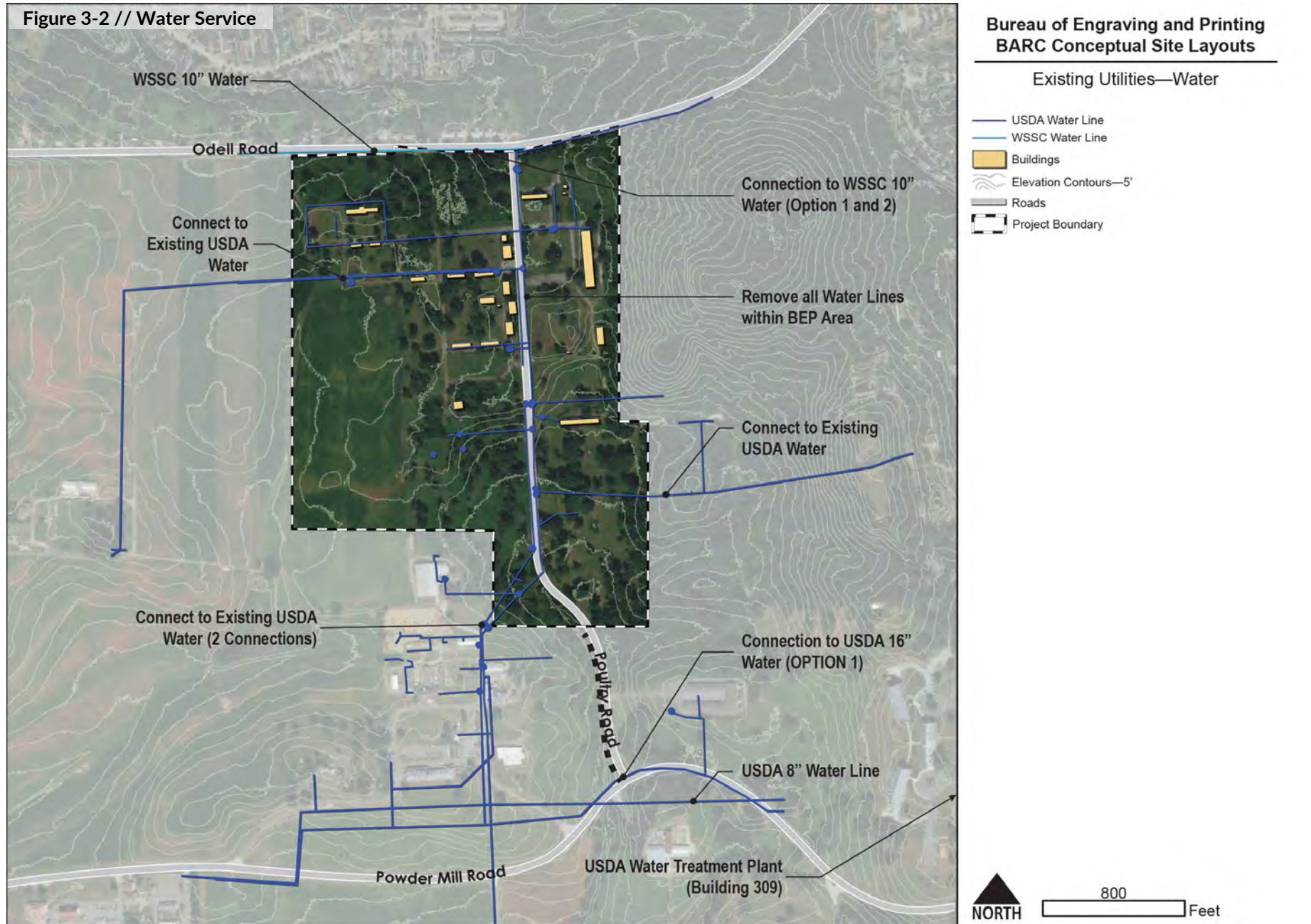
Recommendations

It is recommended that the full demand of the production facility and the associated fire flow be supplied by WSSC and that supplemental external fire protection be provided by the USDA system. As previously mentioned, the USDA system will require a new water line through the proposed facility to reestablish the looped system that would be interrupted by this development. New fire hydrants placed along this new line will provide an additional source of fire flow should it be needed.

These recommendations assume the WSSC water system is adequate or can be made adequate by providing system upgrades and/or extensions to provide the BEP production facility with the required water demand including 280,000 gpd for production and 2,000 gpm for fire flow. A ROM cost estimate is also being developed to determine if these options are economically feasible.

Figure 3-2 illustrates the existing water systems and proposed connections.

Water Service



Sanitary Sewer Service

Existing System

USDA owns and operates a sanitary sewer collection and treatment system at BARC. The system consists of gravity piping, lift stations, and force mains that collect and convey the sewerage to the wastewater treatment plant (WWTP), Building 218. The WWTP is located approximately 4,500-feet south of the site and south of the intersection of Sheep Road and Beaver Dam Road on USDA property. A \$6M renovation project is currently underway that is renovating lift stations and the WWTP, resulting in increased pump capacity. The project also addresses Inflow and Infiltration (I&I) issues and removing combined sewers from the system which will reduce inflows significantly. The WWTP Maryland Department of the Environment (MDE) permit is up for renewal and is currently under review for modification and renewal. Once the modified permit is available it will be provided in this study.

The existing sanitary sewer system within the proposed BEP production facility site is about 80-years old and in a state of disrepair. This study assumes all the sanitary sewer within the proposed BEP production facility site will be removed as part of this development. After the old system is removed, the closest connection to the USDA system will be either Lift Station 194 or the WWTP (Building 218).

Lift Station 194 is approximately 3,500-feet southwest of the proposed site in a field northeast of the intersection of North Dairy Road and Powder Mill Road. Upgrades to this lift station are underway and are scheduled to be complete by October 31, 2019. As-built drawings will be provided in this report once complete to confirm adequate capacity of the lift station and downstream force main to the WWTP. For purposes of this study, it is assumed that the gravity system serving the 200-series buildings and discharges to Lift Station 194 is inadequate and unreliable. The USDA will be performing camera inspections of the downstream force main to determine the condition of the piping. This information will be provided in this report upon receipt.

Proposed System

For planning purposes, the current BEP production facility operators have determined the new facility will produce wastewater at an average daily rate of 120,000 gpd. BEP operators have provided USDA with historic wastewater quality records to inform them of what to expect in the production facility wastewater. The USDA does not anticipate any concerns with treating the wastewater from the facility in regard to flow or treatment capacity to the levels required by the current MDE permit.

The USACE has directed Burns & McDonnell to consider two options in providing wastewater collection from the proposed production facility. Option 1 is to convey and discharge wastewater to Lift Station 194. This option would require a lift station on site and approximately 4,600 linear feet of force main. Option 2 is to convey and discharge wastewater directly to the WWTP. This option would require a lift station on site and approximately 5,600 linear feet of force main. Option 1 would require less force main but may not be feasible if further investigation concludes that Lift Station 194 is inadequate or unreliable.

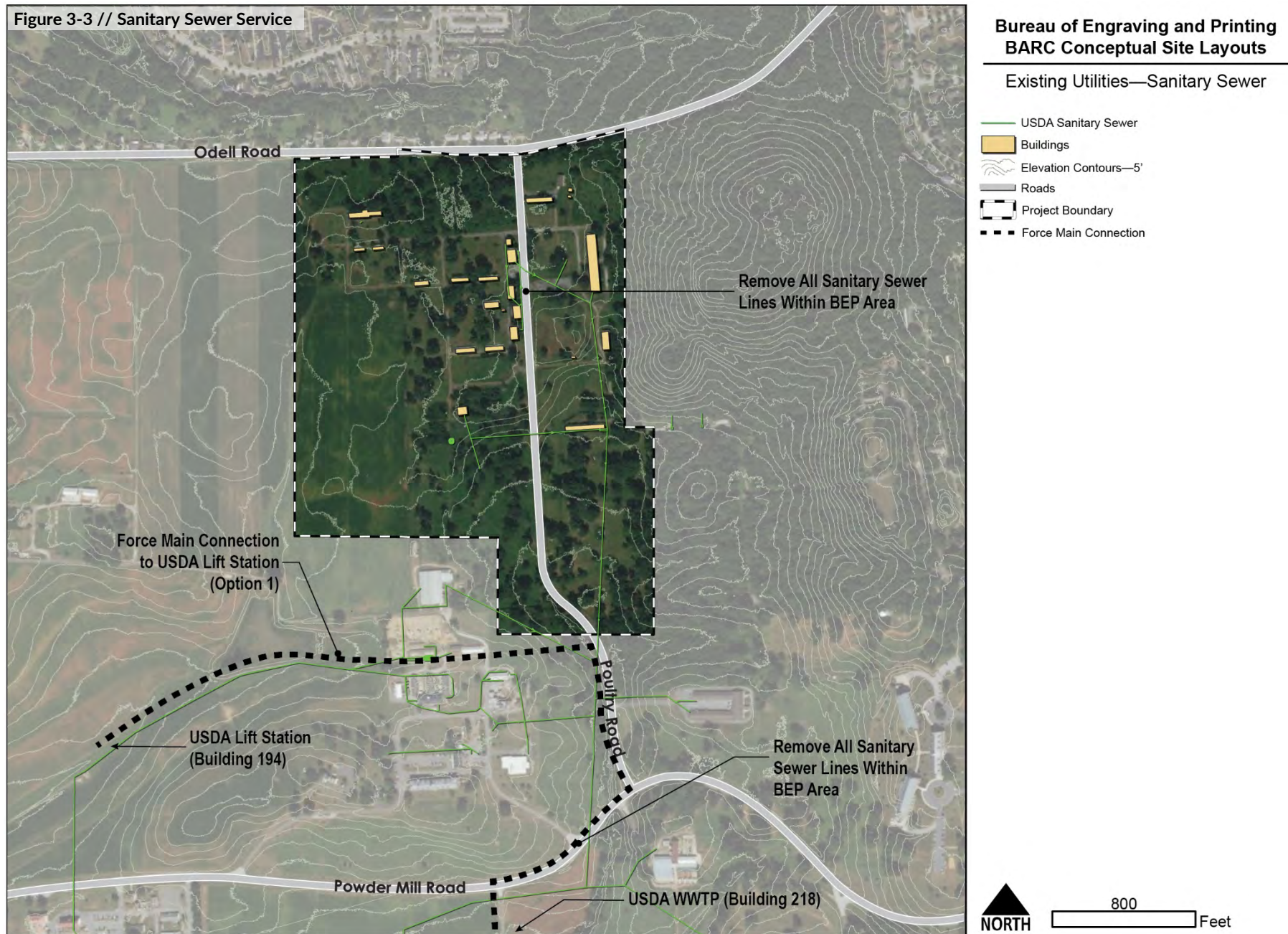
Recommendations

Option 1 would require less force main and would therefore be the least expensive option. However, as stated above, this option may not be feasible if further investigation of Lift Station 194 determines it is inadequate or unreliable. Therefore, Burns & McDonnell recommends for pricing purposes that Option 2 costs be used. However, both options should be developed further for consideration as more information becomes available during the site development process.

Figure 3-3 illustrates the existing sanitary sewer system and proposed connections.

Sanitary Sewer Service

Figure 3-3 // Sanitary Sewer Service



Natural Gas Service

Figure 3-4 // Natural Gas Service



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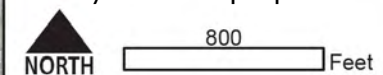
Existing Utilities—Natural Gas

- Washington Gas Line
- Buildings
- Elevation Contours—5'
- Roads
- Project Boundary

Washington Gas is the natural gas provider in this region. An existing natural gas system exists within the proposed BEP production facility site. However, as with all other utilities within the development area, all gas mains and service connections will be removed during the development of this site.

For planning purposes, the current BEP production facility operators have determined the new facility will require 600,000 cubic feet per day at 3 psi. Washington Gas was contacted to discuss availability and it was concluded that they will provide natural gas to the production facility at this demand. The connection point will likely be north of the site along O'Dell Road. An availability letter was provided by Washington Gas and is included herein. Also included is the connection request form that is to be filled out and submitted during design.

Figure 3-4 illustrates the existing Natural Gas system and proposed connection.



Storm Drainage

Figure 3-5 // Storm Drainage



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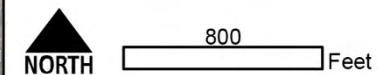
Existing Utilities—Stormwater

- USDA Stormwater
- Buildings
- Elevation Contours—5'
- Roads
- Project Boundary

The storm drain system within the proposed BEP production facility site is obsolete. Most of the pipe is terra cotta and has significant I&I issues. Several portions of the system connect to sanitary sewer and overtax that system. The storm drain system within the proposed development site will be removed during the development of this site.

Development of this site for the BEP production facility will require proper stormwater quantity and quality measures in accordance with the current MS4 permit for the BARC. As discussions with USDA's BARC facility MS4 personnel progresses more information regarding storm drainage and stormwater management will be included in this study.

Figure 3-5 illustrates the existing Storm Drainage system and proposed BMP areas.



Electrical

Electrical distribution to BEP site is provided by several overhead (OH) 13.2kV feeders from an existing sub station located next to the newly-built sub station. The existing site has approximately 23 abandoned buildings. Figure 3-6 illustrates the existing Overhead (OH) electrical lines in the proposed BEP area. The existing site is owned by BARC.

Power to the newly proposed BEP building can be provided by the newly-built substation. The new substation is adjacent to the immediate south of the existing boiler plant Building 309, located north of Powder Mill Rd. and east of Center Rd. The newly-built substation is owned by BARC.

An analysis of the electrical utilities was conducted and determined that the new BARC sub station will have adequate capacity to support the new BEP facility if estimated usage (provided by BEP) at 6.5MW is accurate. This data requires verification.

The new sub station has 1200A spare breakers on each side of the newly built 13.2kV, 1200A, 3 phase, 28KAIC main-tie-main, double-ended switchgear which are available for BEP use.. The switchgear is dual fed from PEPCO circuits 15745 and 15744 respectively. The switchgear is electrically interlocked to prevent the simultaneous closing of both feeder breakers to ensure that both incoming PEPCO utility feeders will not be paralleled.

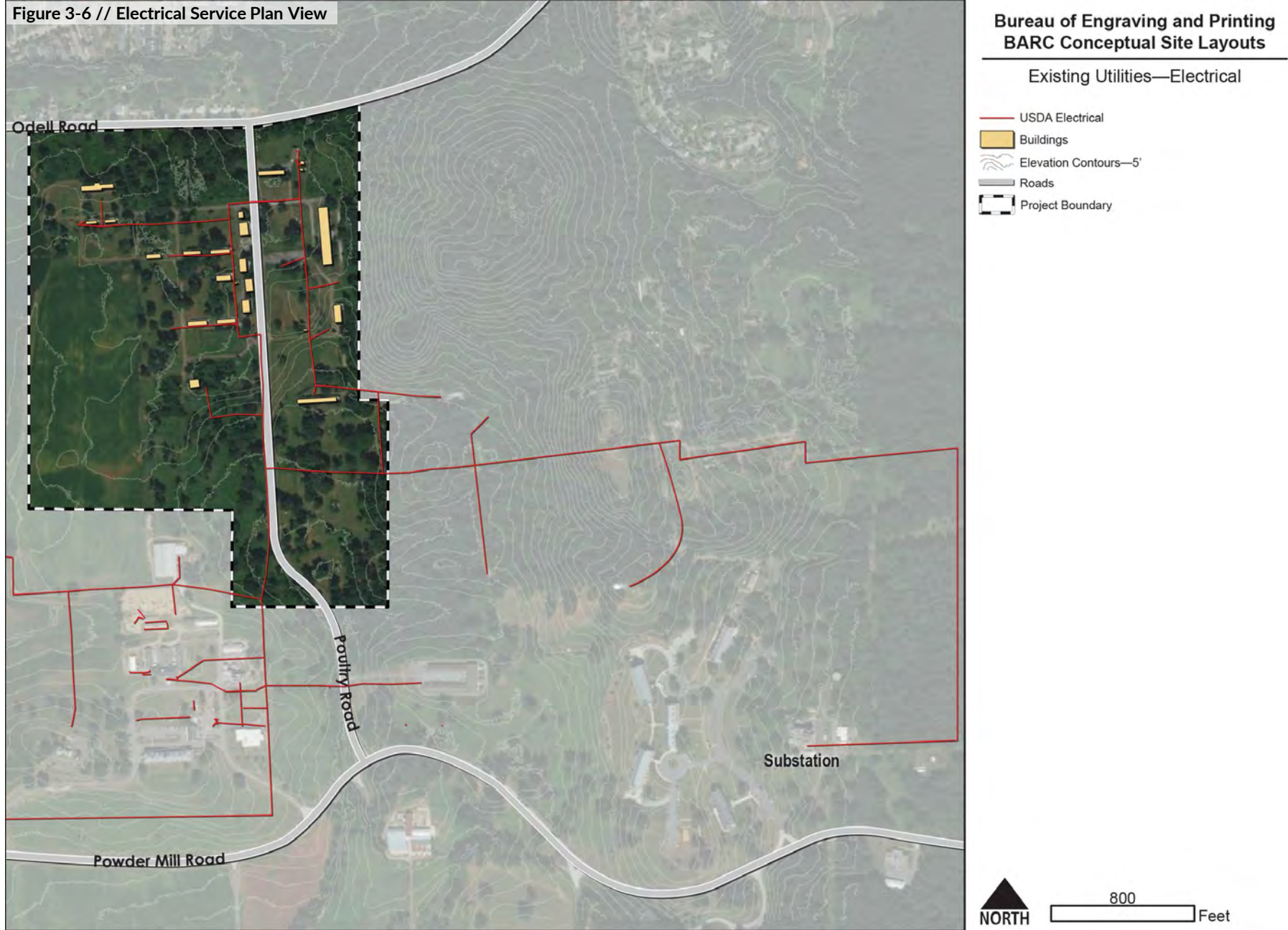
The incoming service will be a 13.2kV, 3-phase, 4-wire system fed into a dual end draw out metal clad switchgear with integral step down 13.2kV to appropriately size transformer for proper and appropriate voltages throughout the BEP facility for subsequent secondary electrical distribution. The power distribution system will provide two (2) utility service entrances, from the new sub station; each utility from opposite sides of the same switchgear. Figure 3-7 illustrates the newly built sub station for the proposed BEP building.

Alternative power sources were identified throughout this planning process if the newly-built BARC substation is insufficient. As per discussion with Potomac Electric Power Company (PEPCO), one of the other options include providing dual express feeders from two separate independent PEPCO-owned substations; Toaping Castle SubStation and Beltsville SubStation. These substations as providers is tentative as the PEPCO Capacity Planning Group would have to verify capacity and availability. The second option would be to provide one singular express feeder from a PEPCO-owned substation with the redundant feeder provided by the newly-built BARC-owned substation. The second option would have to encompass upgrading and modifying the BARC electrical substation infrastructure.

The US Army Corps of Engineers (USACE) sent two applications to PEPCO regarding these other consideration and there has been no response at the time of this report. Additional details and points of contact are included as an appendix to this document.

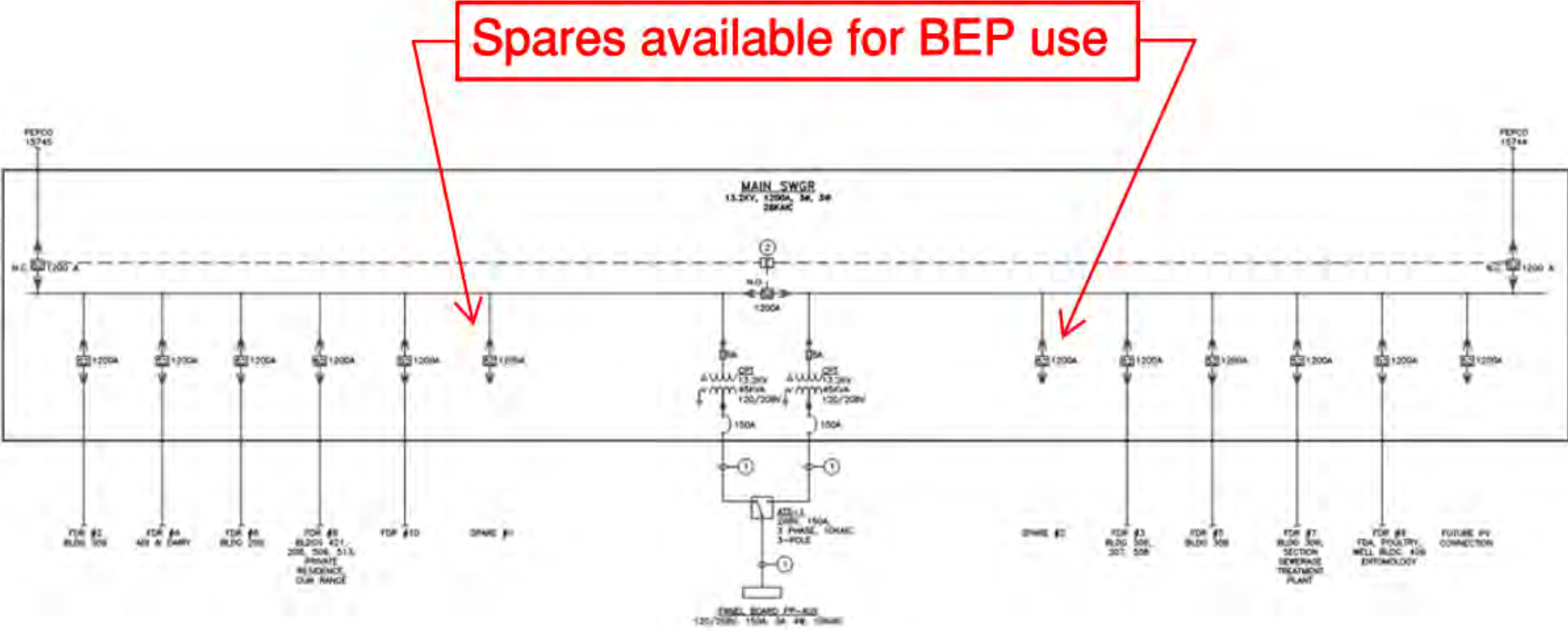
Electrical

Figure 3-6 // Electrical Service Plan View



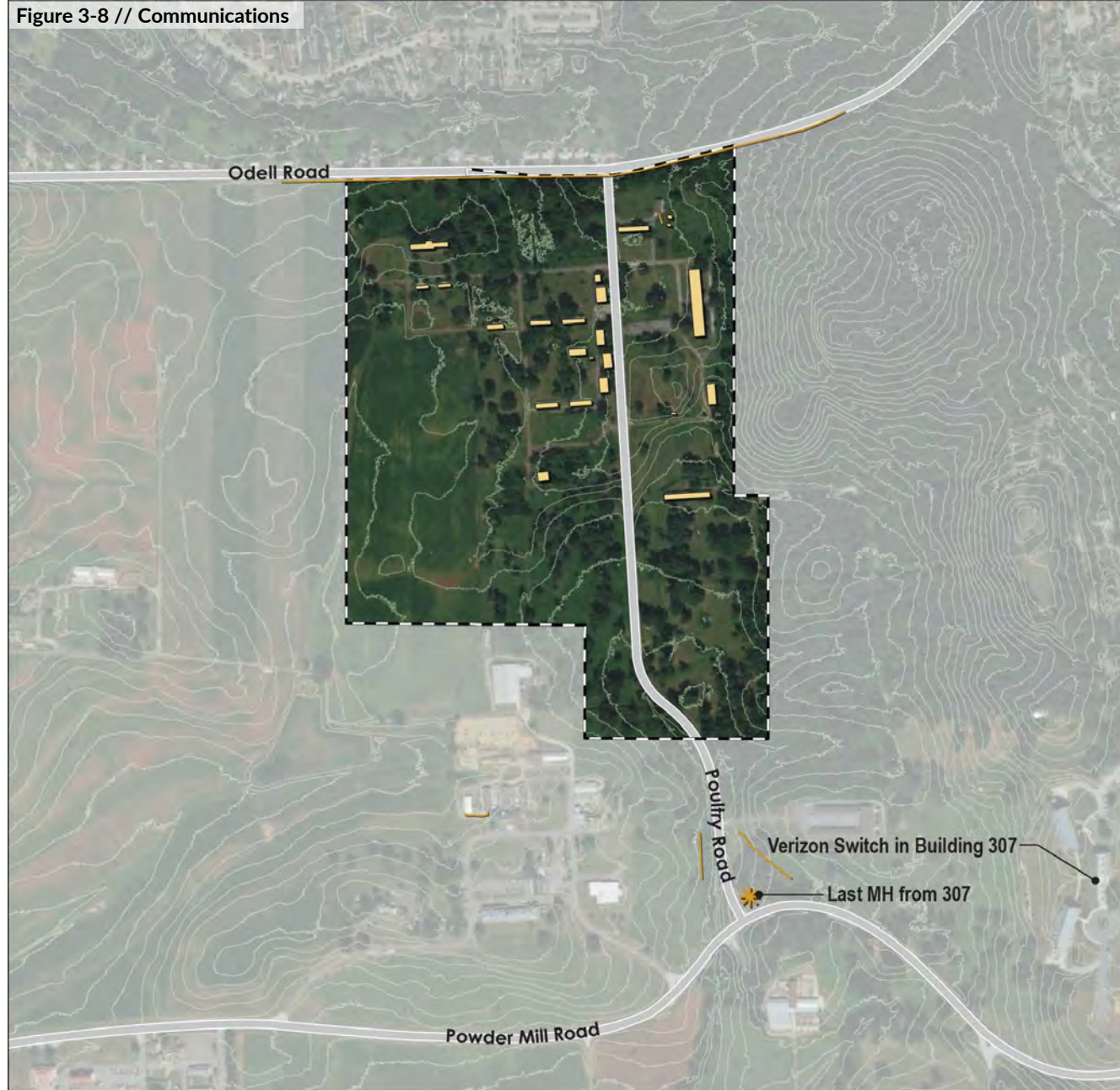
Electrical

Figure 3-7 // Electrical Sub Station One-Line Diagram



Communications

Figure 3-8 // Communications



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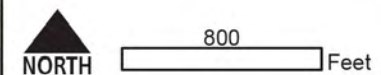
Existing Utilities—Communications

- USDA Communications
- Buildings
- Elevation Contours—5'
- Roads
- Project Boundary

The new proposed BEP will require telecom and has fiber and copper requirements.

Currently, there is an existing and operational telecommunication (telecom) facility, commonly known as the 'Verizon' room in Building 307 that serves as the main telecom service provider to the BARC region to include Secret Service and residential housing. As it stands now, there is existing telecom infrastructure from this facility to a telecom manhole located to the northeast corner of Powder Mill Rd. & Poultry Rd. The infrastructure consists of four (4), 4" conduits where only approximately 1/2 of one conduit is being utilized and the remaining three conduits are empty/spare for future provisions. With this in mind, and the fact that fiber will be used in lieu of copper, there is adequate capacity for future telecom needs for the BEP facility in this existing duct bank. New telecom infrastructure is needed beyond the existing telecom manhole to the new proposed BEP facility.

Figure 3-8 illustrates the existing telecom manhole mentioned above for the proposed BEP area.



Utility Infrastructure Cost Estimate

Cost Estimate Background

The purpose of this project is to bring site utilities to the site boundaries for the proposed new BEP facility. This does not take utilities to the proposed new facility itself but rather to the project boundary. A separate site development plan would then pick up the utility runs and complete them at the new facility.

Construction Schedule

Duration – 12 Months (Start: 03/21, Mid: 09/21, Complete: 03/22)

Estimating Methodology

This cost estimate was prepared in accordance with AACE® International Recommended Practice No. 56R-08: Cost Estimate Classification System – As Applied for the Building and General Construction Industries This estimate is consistent with the best estimating practices of the Government construction industry, FAR 36.203, and are current, accurate, and complete. They reflect the expected opinion of cost to the Government to perform the work by contract and include all reasonable costs which a prudent, experienced, and well-equipped contractor might anticipate and include in their bid.

This cost estimate is consistent with a Class 5 estimate based on the Maturity Level of Project Definition Deliverables as expressed as a percentage of complete definition. The end usage can be used for concept screening and includes capacity factored, parametric models, judgement, and analogy. The expected accuracy range is L: -20% to -

50%; H: +30% - + 100% depending on the construction complexity of the project, appropriate reference information and other risks (after inclusion of an appropriate contingency determination).

Mark-Ups

DIRECT MARK-UPS:

Productivity: 87.5%

Sales Tax: 6%

Costbook Escalation: 7.46%

SUBCONTRACTOR MARK-UPS

Sub Job Overhead: 10%

Sub Home Overhead: 10%

Sub Profit: 10%

PRIME CONTRACTOR MARK-UPS

General Conditions / Onsite Field Personnel: 11.07% Calculated

Prime Home Overhead: 10%

Prime Profit: 6.32%

Bond & Insurance: 3%

Design/Estimating Contingencies: 20%

OWNER MARK-UPS

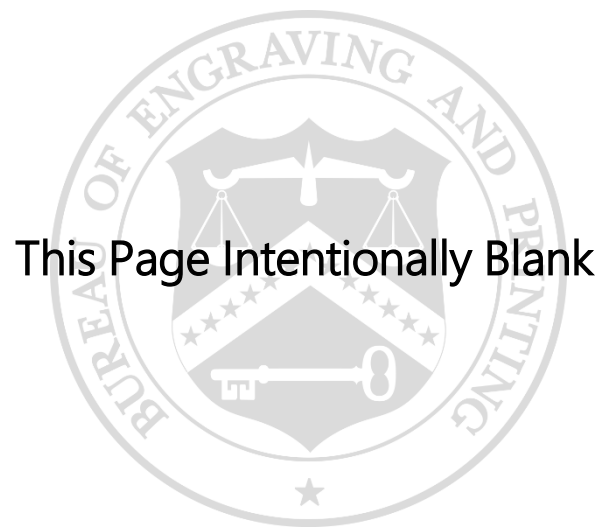
Escalation: 3.79%

Estimate Tracking

The total estimate for all BEP production facility supporting development is: **\$8,367,538**, as shown in the abbreviated summary table below. Full documented backup for the cost estimate is presented in the Appendix.

Table 3-1: Summary Cost Estimate

Description	Contract Cost	Escalation (3.79%)	CCL Equivalent	Contingency (5.00%)	Subtotal	SIOH (5.70%)	Project Cost
BASE BID	\$ 6,883,362	\$ 260,879	\$ 7,144,241	\$ 357,212	\$ 7,501,453	\$ 427,583	\$ 8,367,538
Site Preparations	\$ 1,983,496	\$ 75,174	\$ 2,058,670	\$ 102,934	\$ 2,161,604	\$ 123,211	\$ 2,284,815
Site Civil/Mechanical Utilities	\$ 1,678,390	\$ 63,611	\$ 1,742,000	\$ 87,100	\$ 1,829,101	\$ 104,259	\$ 1,933,359
Site Electrical Utilities	\$ 3,221,477	\$ 122,094	\$ 3,343,571	\$ 167,179	\$ 3,510,749	\$ 200,113	\$ 3,710,862



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4 ALTERNATIVES ANALYSIS



Alternatives Analysis

The consulting team led a visioning exercise to help stakeholders focus on the project, share interests, and level expectations. Visioning goals were established using the Crawford Slip Method, in which stakeholders wrote ideas individually on small slips of paper that were then collected and analyzed. Each slip of paper contained a single idea related to the goals of the overall project. Stakeholders were given time to generate as many ideas for each category as possible. The consulting team then collected the slips, analyzed the proposed ideas, and categorized the ideas by topic. The consulting team drew a diagram depicting the resulting categories, with numbers denoting the number of slips assigned to each category. See Figure 4-1.

After establishing the visioning goals, stakeholders participated in a critiquing exercise of four alternatives, which the consulting team developed prior to the planning charrette. Stakeholders separated into four groups and analyzed one alternative. Each group captured the strengths, weaknesses, and potential improvements for their assigned alternative. Groups also evaluated their assigned alternative against the visioning goals of the project. Each group presented its findings to the other groups. An explanation of the key takeaways from the alternative critiques are found on the following pages.



Left to right: Crawford Slips organized into categories; stakeholders discuss the SWOT-V activity.

Alternatives Analysis

Figure 4-1 // Visioning Goals



Goals and Objectives

Goal 1: Architecture & Viewshed

- Modern facility; state-of-the-art technology
- Blends with landscape; aesthetically pleasing
- Flexible and expandable structure
- Sustainable and energy efficient
- Cost-effective construction

Goal 2: Traffic

- Supports multi-modal access and transportation on site
- Improve roads accessing the site
- Minimal congestion at entry control point
- Separate personal and commercial vehicle traffic

Goal 3: Efficient Operations

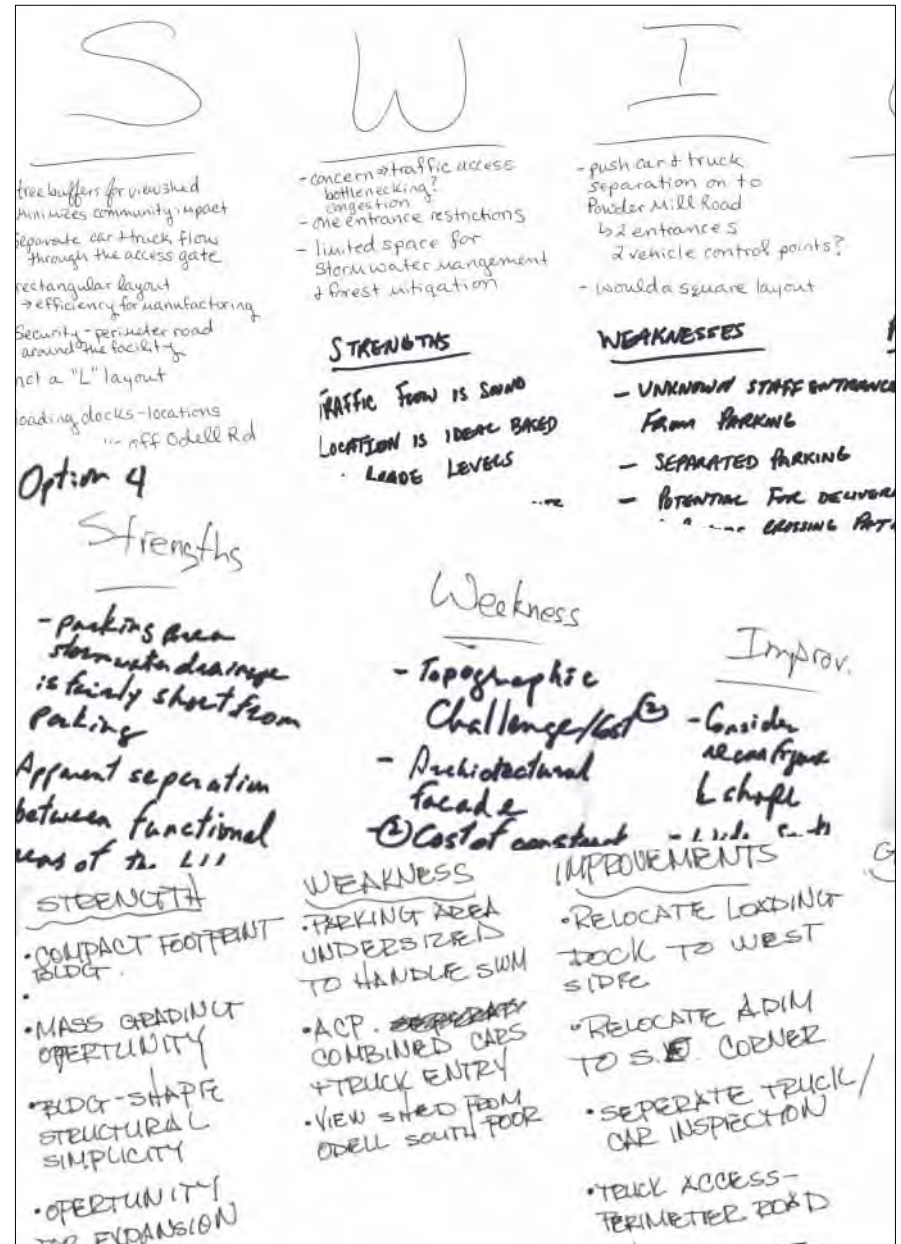
- Campus-like environment for employees, indoors and outdoors
- Optimal layout for functional efficiency
- Separate docks for shipping and receiving

Goal 4: Environmental Compatibility

- Minimal impact to existing environmental features
- Effective use of water resources
- Complies with federal and state regulations

Goal 5: Community

- Good neighbor to adjacent agencies; enhance BARC
- Transparency with local residents



Alternative Concept 1

Figure 4-2 // Alternative Concept 1



Alternative Concept 1—Critique



Alternative Concept 1

Strengths

- Compact building footprint
- Simple site layout, building structure
- Expandable to the west

Weaknesses

- Parking lot undersized for storm water management
- Combines personal and commercial vehicle entry
- Disrupts natural viewshed from Odell Road

Improvements

- Relocate loading dock to west side
- Locate Admin in southeast corner of building
- Separate personal and commercial vehicles at ECP
- Include perimeter road
- Increase median size in parking lots
- Shift entire development to the west; avoid wetlands
- Include reforestation on west side to improve viewshed

Ratings Against Goals

Goal	+	✓	-
Architecture & Viewshed			-
Traffic		✓	
Efficient Operations	+		
Environmental Compatibility			-
Community			-

Alternative Concept 2

Figure 4-3 // Alternative Concept 2



Alternative Concept 2—Critique



Alternative Concept 2

Strengths

- Traffic flow is sound
- Ideal building location based on grade levels
- Loading on opposite end from deliveries

Weaknesses

- Separated parking lots
- Potential conflicts for delivery and pickup traffic
- Single entry/exit for staff and commercial traffic

Improvements

- Include alternative access/egress points
- Add more vehicle inspection lanes
- Consolidate parking in one lot
- Decrease fence line distance from building
- Create site sections

Ratings Against Goals

Goal	+	✓	-
Architecture & Viewshed	+		
Traffic	+		
Efficient Operations	+		
Environmental Compatibility		✓	
Community	+		

Alternative Concept 3

Figure 4-4 // Alternative Concept 3



Alternative Concept 3—Critique



Alternative Concept 3

Strengths

- Tree buffers minimize impact to community viewshed
- Separate personal and commercial traffic at entry gate
- Efficient, rectangular building layout
- Loading dock locations
- Keeps commercial traffic off Odell Road

Weaknesses

- Bottle-necking traffic at one entry/exit point
- Limited space for storm water management and forest mitigation

Improvements

- Move personal and commercial separation to Powder Mill Road; create two entrances
- Include bioretention features in parking lot
- Move parking lot slightly north to create room for storm water management feature in the south
- Include covered pedestrian walkways
- Move entire development west to avoid forest area

Ratings Against Goals

Goal	+	✓	-
Architecture & Viewshed		✓	
Traffic		✓	
Efficient Operations	+		
Environmental Compatibility			-
Community		✓	

Alternative Concept 4

Figure 4-5 // Alternative Concept 4



Alternative Concept 4—Critique



Alternative Concept 4

Strengths

- Stormwater drainage is short distance from parking lot
- Apparent separation of functional areas in building
- Less impact to viewshed from Odell Road

Weaknesses

- Topographically challenging construction on east side; increased cost
- Architectural façade
- Collocated loading docks; potential congestion of commercial traffic
- Separate parking lots
- No turnaround lanes for rejected traffic at entry point

Improvements

- Widen southern leg of building
- Move away from steep topography along east side
- Include two-level parking on south side of building

Ratings Against Goals

Goal	+	✓	-
Architecture & Viewshed			-
Traffic		✓	
Efficient Operations		✓	
Environmental Compatibility			-
Community	+		



5 PREFERRED ALTERNATIVE



Preferred Alternative

Methodology

The purpose of developing a preferred alternative is to consolidate the strengths of previous concepts, avoid or mitigate weaknesses, and incorporate recommended improvements while staying within the parameters of established goals.

As each group briefed the critique of their assigned alternative, the consulting team facilitated discussion. The groups agreed that the following aspects should be reflected in the preferred alternative:

- Building located on west side of site, away from steep slopes
- Separate entry/exit lanes for personal and commercial traffic
- Separate docks for receiving and shipping; can be close together
- One parking lot for personal vehicles
- Perimeter road encompassing the building and parking lot
- Improve traffic control measures along Powder Mill Road

The consulting team then developed a preferred alternative, briefed the plan to the stakeholders, and captured further comments:

- The site can not expand any further west, but may gain usable land to the south by giving up forested land along the east side
- Any non-production function can be collocated in a multi-story configuration, in order to reduce building footprint
- More space is required for receiving docks than the shipping docks
- The site will likely require more stormwater management features than are currently depicted

Upon completion of the planning charrette, the consulting team refined the preferred alternative. The next two pages explain the final preferred alternative.



Above: Stakeholders annotate critiquing comments of a concept alternative.

Preferred Alternative

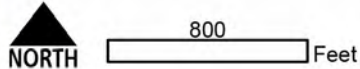
Figure 5-1 // Preferred Alternative



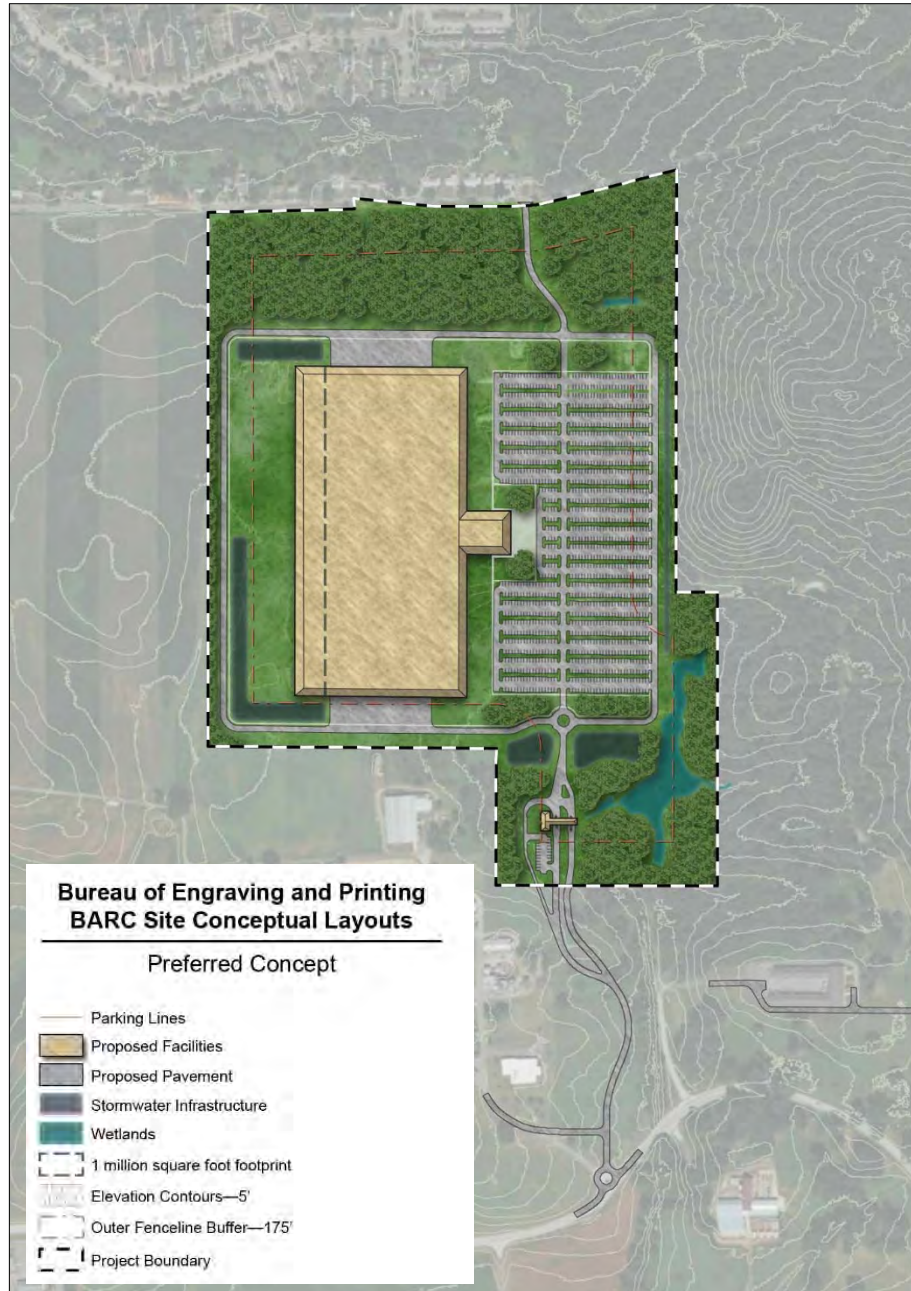
Bureau of Engraving and Printing BARC Site Conceptual Layouts

Preferred Concept

- Parking Lines
- Proposed Facilities
- Proposed Pavement
- Stormwater Infrastructure
- Wetlands
- 850k square foot footprint
- Elevation Contours—5'
- Outer Fenceline Buffer—175'
- Project Boundary



Preferred Alternative



Preferred Alternative

Strengths

- Tree buffers minimize impact to community viewshed
- Separate personal and commercial traffic at entry gate
- Efficient, rectangular building layout
- Loading dock locations
- Keeps commercial traffic off Odell Road
- Jurisdictional wetlands are not impacted by development
- The development plan identifies enough area dedicated to stormwater management to handle stormwater quantity and quality requirements.

Weaknesses

- Bottle-necking traffic at one entry/exit point
- Limited space for storm water management and forest mitigation
- Isolated wetlands and specimen trees are impacted by development

Improvements

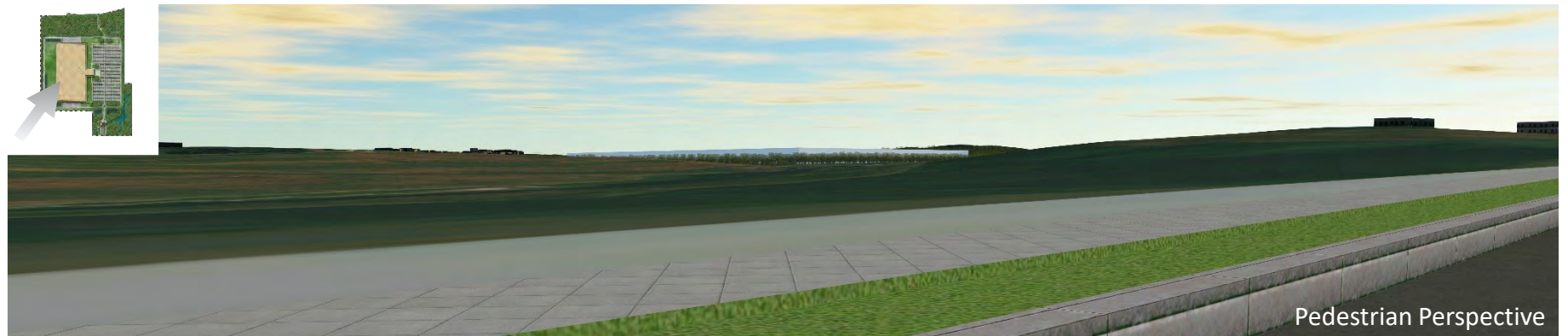
- Move personal and commercial separation to Powder Mill Road; create two entrances
- Include bioretention features in parking lot
- Move parking lot slightly north to create room for storm water management feature in the south
- Include covered pedestrian walkways
- Move entire development west to avoid forest area

Ratings Against Goals

Goal	+	✓	-
Architecture & Viewshed			-
Traffic	+		
Efficient Operations	+		
Environmental Compatibility		✓	
Community	+		

Conceptual Rendering

Figure 5-2 // Conceptual Site Renderings



Conceptual Rendering

Figure 5-3 // Enlarged Site Rendering



Environmental Impact & Mitigation

Environmental Impact of the Preferred Development Plan

While the proposed development pattern avoids hard constraints present at the BEP parcel, the plan does directly infringe upon two isolated wetlands and 63 specimen trees.

Affected Wetlands and Mitigation

Isolated wetlands are defined by landscape position as wetlands with no apparent surface water connection to perennial rivers and streams, estuaries, or the ocean. Isolated wetlands on the site are subject to regulation by the Maryland Department of the Environment (MDE).

See Figure 5-2. Item A is a palustrine forested wetland. Item B represents palustrine emergent, scrub-shrub, and forested wetlands. Both items A and B will be avoided during development.

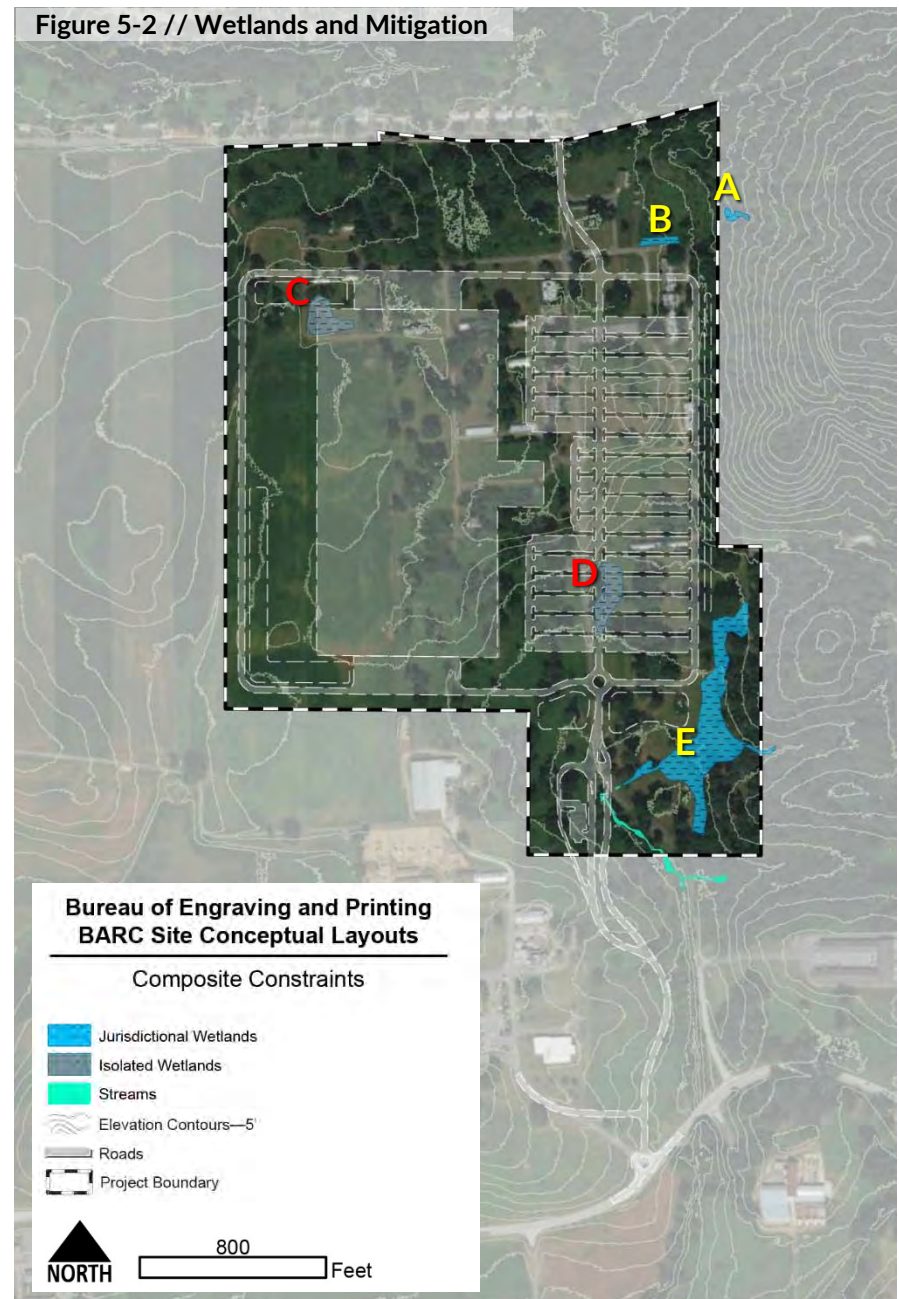
Items C and D are both palustrine emergent wetlands, which cannot be avoided and will be lost due to construction. According to Maryland state law, mitigation is required to compensate for authorized activities which will cause unavoidable losses of nontidal wetlands. New nontidal wetlands must be created at 1:1 ratio to compensate for the loss. There are three options for wetland mitigation:

- 1) Purchase credits from an approved mitigation bank
- 2) Payment into the MDE In-Lieu Fee Program
- 3) Complete a permittee-responsible mitigation project

Jurisdictional wetlands are those that are subject to federal control because they are within the regulatory jurisdiction of federal law. Jurisdictional wetlands on the site are regulated by the U.S. Army Corps of Engineers (USACE).

Item E is a palustrine emergent wetland associated with an intermittent stream. This is a jurisdictional wetland, regulated by USACE. This area will be avoided during development.

Figure 5-2 // Wetlands and Mitigation



Environmental Impact & Mitigation

Maryland Law Pertaining to Specimen Trees

In accordance with Maryland Annotated Code, Natural Resources Article Section 5-1607(c) and Code of Maryland Regulation (COMAR) 08.19.04.03B, the applicant must submit written justification for projects that disturb the priorities for retention and protection under Section 5-1607(c) and COMAR 08.19.04.03E.

Per 5-1607(c)(2), a variance is required for disturbance to:

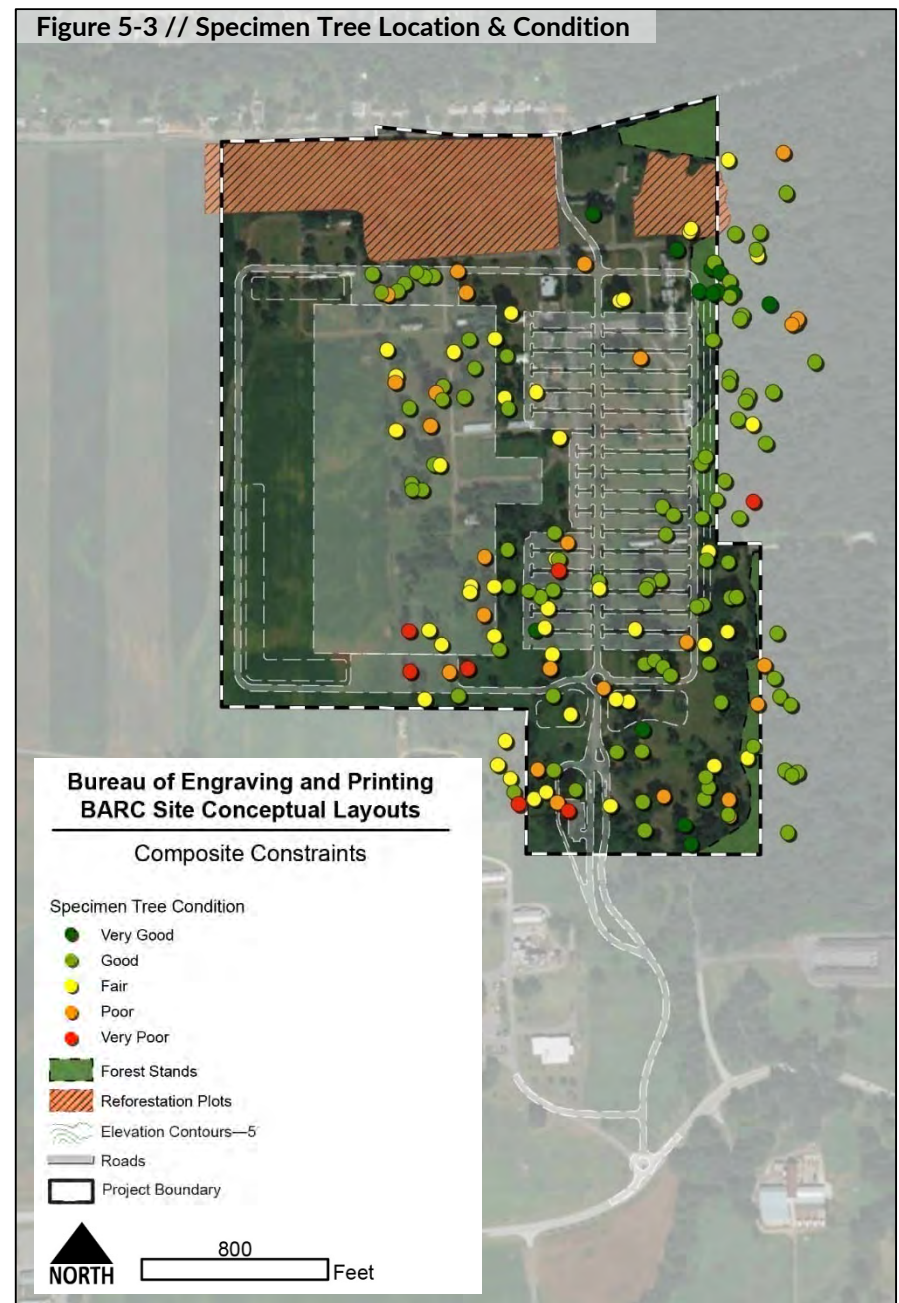
- 1) rare, threatened and endangered tree, shrub or plant species
- 2) trees associated with historic structures or is designated a national state or local Champion Tree, and
- 3) trees with 30 inches diameter at breast height (dbh) (4.5 ft) or 75% of the dbh of the MD State Champion Tree.

The Maryland Forest Conservation Act (FCA) of 1991 defines specimen trees as “trees having a diameter measured at 4.5 feet above the ground of 30 inches or more, or trees having 75% or more of the diameter of the current state champion tree.” In total, 63 specimen trees will be disturbed by construction.

Table 5-1: Specimen Tree Condition

Condition	Quantity
Good	30
Fair	17
Poor	13
Very Poor	3
Total	63

Figure 5-3 // Specimen Tree Location & Condition



Environmental Impact & Mitigation

Specimen Tree Mitigation Requirements

The project development area will exceed 40,000 square feet. Thus, this project is subject to the Maryland FCA, which requires a Forest Stand Delineation (FSD) and Forest Conservation Plan (FCP) prepared by a licensed forester, licensed landscape architect, or other qualified professional. Both forms can be found at the following website:

<https://dnr.maryland.gov/forests/Pages/programapps/FCA-Requirements.aspx>

The FSD should consist of the application, a map of the proposed development, and a summary of pertinent field data.

The FCP includes a map and narrative describing the limits of disturbance for the project and how disturbance or removal of certain specimen trees is unavoidable. It includes an application form and worksheet showing the calculation of forest disturbed and retained and whether replanting trees will be required and a plan for the long-term maintenance or protection of these trees.

An exemption from FSD and FCP submittals can be determined by the State FCA Coordinator. Contact info for the State FCA Coordinator is below:

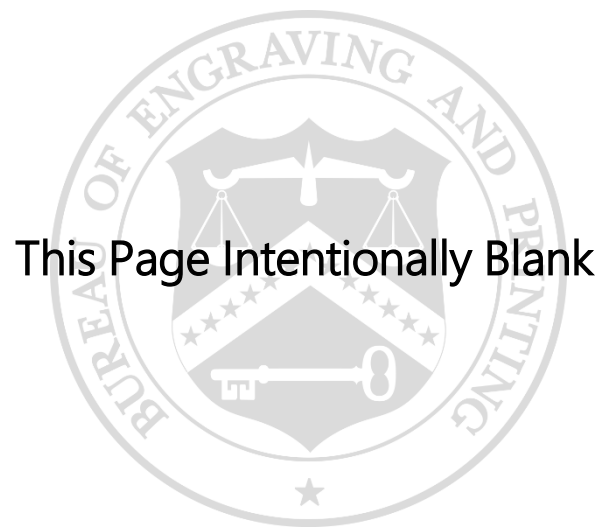
Southern Region (Anne Arundel, Prince George's, Calvert, Charles and St. Mary's Counties)
Southern Region FCA Coordinator
Maryland Department of Natural Resources
Forest Service
580 Taylor Avenue E-1
Annapolis, MD 21401
410-360-9774

Qualified Professional

Individuals who are not licensed foresters or licensed landscape architects may become "Qualified Professionals" capable of conducting forest delineations or writing conservation plans by meeting certain educational and work-experience criteria and completing forest conservation course approved by the Maryland Department of Natural Resources. Requirements for becoming a Qualified Professional can be found at the following website:

<https://dnr.maryland.gov/forests/Pages/programapps/FCA-How-to-Become-a-Qualified-Professional.aspx>

Final approval of Qualified Professional status is determined by the state FCA coordinator upon receipt of the Qualified Professional application and notification of successful course completion.



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6 APPENDIX



Acronyms and Abbreviations

AMSL	Above Mean Sea Level
BARC	Beltsville Agricultural Research Center
BEP	Bureau of Engraving and Printing
CLDI	Cement Lined Ductile Iron
DCF	Washington, DC Facility
FCA	Forest Conservation Act
FCP	Forest Conservation Plan
FSD	Forest Stand Delineation
HPA	Hydraulic Planning Analysis
MDE	Maryland Department of the Environment
MHT	Maryland Historical Trust
NCPC	National Capital Planning Commission
NRHP	National Register of Historic Places
OH	Overhead
ROM	Rough Order of Magnitude
SHPO	State Historic Preservation Office
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WSSC	Washington Suburban Sanitary Commission
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant
WCF	Western Currency Facility

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