PRINCE WILLIAM COUNTY

PUBLIC SAFETY TRAINING CENTER

HG ARCHITECTS

2019 MASTER PLAN UPDATE

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CHAPTER ONE

INTRODUCTION

(opposite page)
The Prince William County Public Safety Training Center is located in the western portion of the County.

1.1 Purpose and Need

The 2019 Prince William County Public Safety Training Center Master Plan (2019 PSTC Master Plan) is an update to a similar document developed in 2014. This report documents the area requirements and site development direction for the continued development of the training campus used by the Prince William County Police and Fire Departments, based on recent changes to the stakeholders, users, and available land. The programs and services offered through the training center are intended to equip Prince William County public safety professionals with the skills, knowledge, and abilities needed to carry out their critical mission. The evolution of the local and national security environment has placed greater demands on law enforcement professionals across the country. This Master Plan lays the groundwork for phased improvements to the existing campus to ensure that it keeps pace with the needs of the County. Planning objectives for the 2019 PSTC Master Plan include the following:

- Update the requirements found in the 2014 Master Plan
- Address current facility deficiencies in classroom space, staff space, and personnel support areas
- Accommodate projected growth in programs
- Expand firearms training capacity and programs
- Provide facilities that support scenario based training for both Police and Fire personnel
- Provide adequate recreational and physical training facilities
- Provide facilities to support concurrent Basic Training of new recruits and on-going In-Service Training of current personnel
- Provide a standalone facility for Buildings & Grounds
- Address community concerns regarding Carriage Ford Road appearance and noise
- Develop probable costs for phased development

1.2 Project Overview

The Public Safety Training Center is the centralized venue for training the County's Police, and Fire/Rescue personnel. The Criminal Justice Academy is responsible for all basic, in-service and leadership criminal justice training for the Prince William County Police Department and the Prince William County Sheriff's Office. It has been a Commission on Accreditation for Law Enforcement Agencies, Inc. (CALEA)-accredited public safety training academy since 2009.

The Public Safety Training Center (PSTC) trains career and volunteer firefighters, emergency medical technicians (EMTs) and paramedics in one of the most progressive combination fire departments in the country. The training is based on the National Fire Protection Association's (NFPA's) professional qualification standards and is Pro Board Accredited by the National Board on Fire Service Professional Qualifications (NBFSPQ).

A draft Master Plan was completed by Moseley Architects, PC in December 2005 in order to respond to significant staff increases for the Police Department as well as for Fire and Rescue. An update to the 2005 plan was developed in 2014 by HGA, and included pertinent information from the earlier Master Plan, provided updated facilities area requirements based on the latest training projections to provide a guide for continued incremental development of the PSTC campus over 5 to 20 years. It also reflected facilities requirements supporting a Memorandum of Agreement between the FBI WFO and the PWC Board of Supervisors executed in October 2012.

In March 2018 HG Architectcs was engaged to update the 2014 document to reflect two significant changes to the parameters used for the 2014 Master Plan. First, the FBI WFO elected to pursue training opportunities elsewhere, and as such is no longer a stakeholder in the PWC PSTC. Second, in April 2018 PWC acquired three adjacent parcels to the south, totalling 148 acres of land, for the express purpose of expanding the PSTC. These two events necessitated a revised approach to the Master Plan, documented by this report.

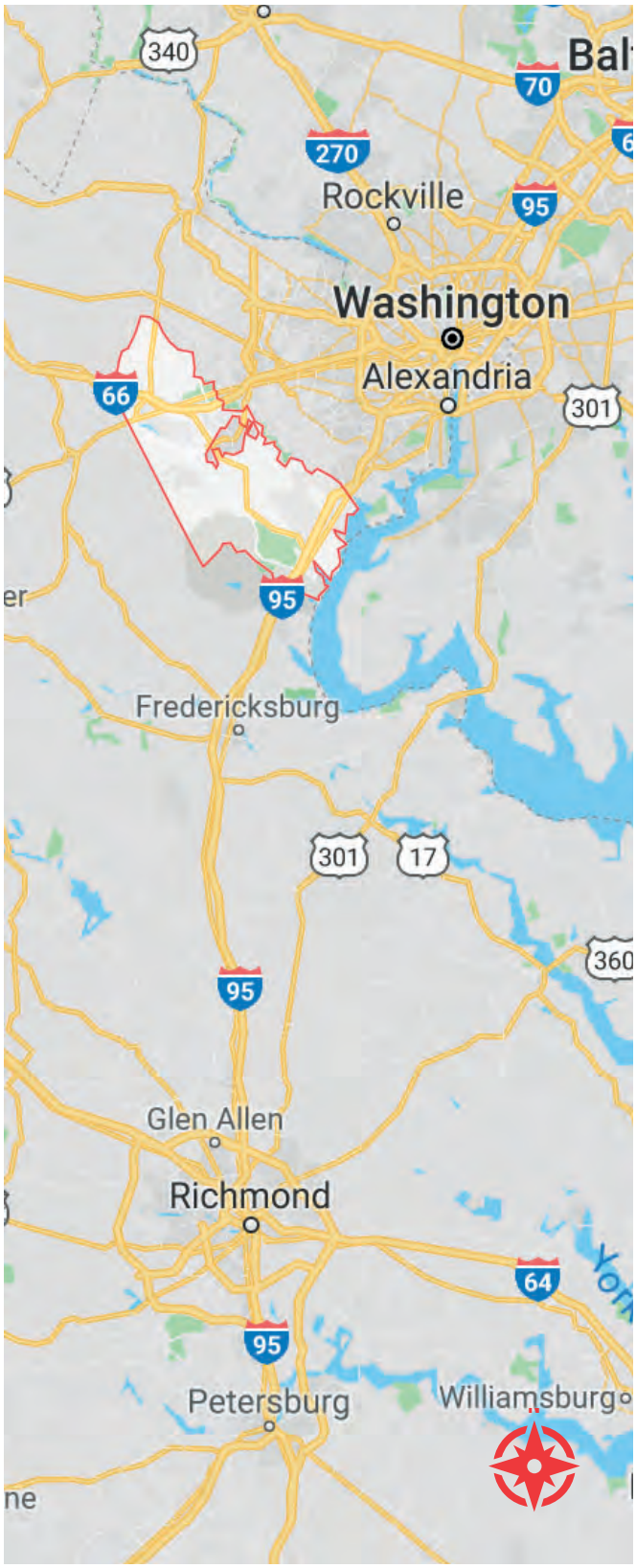

figure 1-1 | Regional Context

figure 1-2 | Project Location

1.3 Site Overview

REGIONAL CONTEXT

The Public Safety Training Center is approximately 45 miles from Washington DC and 85 miles from Richmond, VA. It is located in western Prince William County, as shown in Figure 1-1 Regional Context.

LOCAL CONTEXT

The PSTC is located on approximately 45 acres of County-owned land in the western portion of Prince William County, Virginia. The PSTC is bordered on the north and west by approximately 93 acres owned by the Northern Virginia Criminal Justice Training Academy (NVCJTA), a regional organization of which Prince William County is a member. The NVCJTA operates the Emergency Vehicle Operation Center (EVOC) on this property. Users include outside agencies from around the region.

In April 2018 Prince William County acquired three adjacent parcels to the south, totalling 148 acres, with the intent of expanding the PSTC. Two of the parcels include a residence, the third parcel is largely agricultural land.

Located at 13101 Public Safety Drive near Nokesville, Virginia, the site is approximately 18 miles west of the County Government Center, at the intersection of Warrenton Road (Route 606) and Carriage Ford Road (Route 607), near Nokesville, VA. The main access to the PSTC is located off of Carriage Ford Road. The closest concentration of commercial development is to the northeast, in Nokesville. The closest public transportation stop is approximately 6 miles away from the campus entry. The location of the PSTC is illustrated in Figure 1-2 Project Location.

1.4 Master Plan Process and Methodology

The 2005 Master Plan provided baseline information and framework for data collection to support projected need for the next 20 years. The 2014 HGA Master Plan focused on the agreement between PWC and the FBI, and addressed the expansion of the firearms training programs to be shared by both agencies as the primary need for the facility. The outcome was an understanding of how much additional land would be required to meet the programmatic elements identified at that time.

As the agreement between the agencies has since been disolved, and PWC finalized the purchase of additional land, the focus of the 2019 update to the Master Plan by HG Architects has been more holistic in nature, reviewing all facilities and user needs for the property, projected growth of each department, and assembling those needs into a program document used as a basis for three conceptual Master Plans. Over the course of four months, HG Architects met with PWC Police, Fire and Rescue, and Buildings and Ground to understand current use, facility shortcomings, and future space needs as determined by growth, staff, and changes in training methodology. Growth is determined by each department's long term planning models for personnel and associated in-service training as the departments grow. Program spreadsheets were developed for each user agency as well as opportunities for shared spaces. The process identified areas of deficiency considered priorities for the Master Plan; these include:

- Classroom Space
- Staff Areas
- Firearms Training
- Burn Building
- Buildings and Grounds Facilities

To promote efficient use of the facilities, opportunities for consolidation of space between Police and Fire have been identified based on the following considerations:

- Non-specialty spaces: Classrooms, administrative spaces such as conference rooms, break areas, physical fitness training spaces, locker rooms, restrooms, and an auditorium can all be shared between both user groups
- Practical training, enclosed space: The existing high bay space is used by both FIre and Police; an

figure 1-3 | Master Plan Option 1

expansion of the area is needed to continue this type of use.

- Practical training, exterior: Police and Fire use the campus for scenario based training, pavilions for shelter and outdoor 'classroom' space benefit both groups
- Practical training 'alley': Police in particular are shifting training to more scenario and situational based exercises. Both Fire and Police expressed a desire for a mock town that can be used for a variety of training purposes
- Reuse of Existing Facilities: The existing structures on the campus are expected to be reused for a period of time, while new facilities are constructed. The exception to this is the modular Practical Training facility which was not intended as a permanent structure and currently poses use challenges due to mold.

Buildings and Grounds (B&G) operates the PWC Western District Hub out of the PSTC. The hub is the central location responsible for maintaining and supporting approximately 26 county owned and leased facilities located in the western portion of the County. Staff are dispatched from the PSTC on a daily basis. B&G currently occupies a 600sf office and has no shop space in which to perform repair and maintence of equipment. Addressing the immediate needs of B&G is a priority for this Master Plan.

The total indoor area requirement over the next twenty years was calculated at approximately 222,500 gross square feet (GSF). The concepts utilize existing buildings to the extent of their expected usefulness, with all structures eventually being demolished across the twenty years. Additionally, there are substantial outdoor facility requirements, including 35 acres for the training 'alley'.

Once the area requirements for the PSTC were determined, site development alternatives were prepared and presented to the County representatives. Several concepts were developed and discussed, with three final concepts identified, each of which addressed the overall goals and objectives in differeing ways (figure 1-3, 1-4, 1-5).

The 2014 PSTC Master Plan report consists of five chapters plus an Appendix. This Chapter 1 | Introduction,

figure 1-4 | Master Plan Option 2s

explains the project, its background, and the process by which information was collected and incorporated into the proposed Master Plan. Chapter 2 | Existing Conditions, analyzes the history, physical condition, land use, and natural features of the PSTC site. Chapter 3 | Planning Considerations communicates the general Master Plan objectives regarding campus layout, parking, infrastructure, and water quality management. Chapter 4 | Program Requirements summarizes program area requirements for the police, fire and rescue training programs, for their shared training facilities, expanded firearms training, and Buildings and Grounds facilities. Chapter 5 | PSTC Master Plan Implementation, discusses the planned phasing of development and provides an estimate of probable costs. Finally, Chapter 6 | Appendix provides additional background information used in the planning process.

1.5 Community Involvement

In June 2018 representatives of PWC Public Works and the PSTC met with the community to provide an update on the status of the Master Plan process and to understand concerns the community may have regarding the existing campus. Items the community would like to be addressed by the new Master Plan include:

- Noise mitigation, specifically from the firing range
- Provision for enhanced buffer along Carriage Ford Road
- Concerns regarding the heavy vehicles on Carriage Ford Road; lane crowding and safety
- On campus fitness facilities to allow personnel to stay on campus

figure 1-5 | Master Plan Options 3

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CHAPTER TWO

EXISTING CONDITIONS

figure 2-1 | Existing Conditions

2.0 Overview

In 1987, the Northern Virginia Criminal Justice Training Academy (NVCJTA) purchased 139 acres of land in Nokesville and planned to relocate to the site. Instead, they relocated to Ashburn. They sold a portion of the property to Prince William County in 1991 for the construction of Prince William County's Public Safety Training Center (PSTC). The PSTC was always planned for phased development. The first phase, constructed in 1993, included the Joint Training Facility for Police and Fire and Rescue, the Burn Building, the Well House, the Range Building, and the Firing Range. Subsequent phases of construction on the PSTC site included the Shoot House, the Burn Pad, the modular Training Building, and the Trench Simulator. The Emergency Vehicle Training Center (EVOC) was constructed in 2010 on property retained by NVCJTA adjacent to the PSTC site to serve as a joint training facility between NVCJTA and PWC. An aerial view of the existing site development, including the April 2018 purchase, is shown in Figure 2-1, Existing Conditions.

2.1 Existing Site Development

The PSTC is a low-density campus used for specialized training by the Prince William County Police and Fire & Rescue departments. Facilities are spread out across the campus and include space for administrative support, classroom training, physical training, firearms training, scenario based exercises, and other specialized training functions; canine training and driver training are located on the adjacent NVCJTA site.

CAMPUS ACCESS

There is a single point of entry to the campus via Public Safety Drive at the eastern end of the campus from Carriage Ford Road, near the intersection with Warrenton Road (Route 606). Carriage Ford Road is a two lane road that is not classified by the Virginia Department of Transportation (VDOT), however it is classified as a Rural Road by PWC DOT. The campus entrance serves both PSTC and the adjacent NVCJTA site including canine training and driver training facilities (EVOC).

INTERNAL CIRCULATION

Roads: Internal roads consist of Public Safety Drive, which extends from Carriage Ford Road west where it terminates at the EVOC facility, and two accessory roads. The main classroom and administration building is accessed by a loop through the parking lot to the south, accessed at 250' and 700' into the property on Public Safety Drive. Aproximately 500' into the property a service road branches north, providing access to the burn building and fire training pad areas. The limited roads, single point of entry, and crossover from south to north all pose challenges for training and safety of personnel and equipment on campus.

Sidewalks and Paths: The system of sidewalks is currently limited to those adjacent to buildings and parking on the PSTC campus. In fair weather, employees and trainees generally walk to get from one area of campus to another along the internal roads or along paths that have been worn in some unpaved areas between buildings. The volume of internal traffic on campus is reported to be low enough that sidewalks along the internal roads are not thought to be needed.

Parking: The PSTC is currently served by approximately 275 on-site parking spaces including 60 adjacent to the EVOC Training Facility and the unmarked fleet parking area (for approximately 40 vehicles) located behind that building. Parking is provided in several surface parking lots located near existing buildings. Demand often exceeds the available parking spaces and users park along the shoulder of Public Safety Drive or in the grass, neither of which are desirable.

INFRASTRUCTURE

This section provides a concise description of existing utilities. Additional detail is provided in Chapter 3.0 Planning Considerations in which existing utilities are considered relative to their adequacy for the proposed development under the 2019 PSTC Master Plan Update.

Sanitary Sewer System: The on-site sanitary sewer system has four sections flowing to an existing lift station on site near the existing Joint Training Facility building. According to plans of record, the lift station pumps the wastewater through a 3" force main approximately 9,690 feet north down Carriage Ford Road and Aden Road to an existing manhole on the Nokesville Sewage Treatment Works collection system.

Supply Water: The existing water system is operated and maintained by Prince William County and is not maintained by the Prince William County Service Authority (PWCSA). Performance data obtained from the Virginia Department of Health describes the system configuration as two on-site wells that have well houses and hypochlorination systems. Well No. 1 is located at the northeast corner of the site near the intersection of Warrenton Road and Carriage Ford Road. Well No 2. Is located at the southeast corner of the property off of Carriage Ford Road. There is an elevated tank west of the existing pistol range that has a nominal volume of 300,000 gallons fed from the onsite distribution system. A flow test was conducted in September 2013 on the existing hydrant along Public Safety Drive between the Joint Training Facility and the existing shooting range. The fire hydrant at the existing shooting range was used as the static hydrant during the flow test. The information collected indicated that the system is adequate to support the existing and proposed campus development.

Gas and Electricity: An existing overhead high voltage transmission line crosses the site beginning at the northeast

corner running southwest towards the southern property boundary where it crosses the property line and exits the site (see figure 2-2) The overhead transmission line crosses the EVOC portion of the property and continues south-southeast through the property owned by Prince William County. The overhead transmission line continues onto the adjacent property to the south. The overhead transmission lines are within an existing 240' wide easement owned by Dominion Virginia Power (DVP). These transmission facilities are used to transmit power throughout the region and are not available to provide power directly to the site. In addition, terms of the easement state that while surface paving is allowed within the 240' width, structures are not. The location of the easement impacts future site development. The current uses on the site are served by a variety of underground and overhead electric lines operated by Dominion Virginia Power which are being fed from an existing overhead power line near the intersection of Warrenton Road and Carriage Ford Road and running along Public Safety Drive. A natural gas transmission line in a 30' gas easement runs parallel to the overhead electric transmission lines on the western side overlapping the electric transmission easement. The natural gas transmission line is a high pressure pipeline which is available to commercial use and cannot be used to provide natural gas to the site. There is an existing propane tank farm on site just southwest of the existing modular building. The existing propane tanks serve the temporary modular building. The major natural gas suppliers for the area are Columbia Gas and Washington Gas.

Storm Water Management. The site is in the Cedar Run watershed. Based on a field survey and aerial survey, the existing site appears to have three stormwater management/ BMP ponds, a BMP grassed swale, four other stormwater management ponds, some conservation areas and a large unofficial pond.

NATURAL FEATURES

Grading and Topography: The existing topography is rolling with forested areas, built-out portions along Public

figure 2-2 | High Voltage Transmission Lines

figure 2-3 | Farm Pond

Safety Drive and grass areas. The site contains some wetlands, ponds, streams and a large farm pond. The campus slopes generally from west to southeast, rolling toward the existing streams and farm pond at the southern boundary of the site (see figure 2-3). Carriage Road is fairly flat along the parcel frontages. The campus varies in elevation by about 64 feet from the highest point to the lowest point. See Figure 2-6 Topography.

Threatened and Endangered Species: In April 2018 ECS conducted a review of the Threatened & Endangered Species databases for the newly acquired parcel to the south of the existing PWC PSTC. The reveiw determened that there are no confirmed presences of endangered species within a two mile radius of the site. In addition, database review determined that two species have potential to occur at the project site:

- Federally-threatened northern long-eared bat (*Myotis septentrionalis*)
- Federally-endangered Harperella (Ptilimnium nodosum)

As there are no documented occurences of known hibernacula within the project area it is expected that time of year restrictions for construction or habitat surveys will be required for *M. septentrionalis*. The ECS report also states that it does not appear that suitable habitat for Harperella is present on the project site. The full ECS report is located in the Appendix.

In June 2018 Wetland Studies and Solutions Inc. (WSSI) performed a small whorled pogonia (*Isotria medeoloides*) habitat evaluation and search. The study determined that the entire site area possesses "low-quality" habitat for the species. Based upon the habitat evaluation, no "high-" or "medium-quality" habitat is present, and no small whorled pogonias were found. The full WSSI report is located in the Appendix.

Environmental Features: ECS performed a Phase I Environmental Site Assessment in August, 2018 to determine previous conditions that could potentially impact the environmental condition of the subject property. The assessment revealed no evidence of Recognized Environmental Conditions (RECs) in connection with the property except for a single closed Pollution Complaint (PC) on the existing PSTC property, and three above surface storage tanks located on the newly acquired parcel near the residences (see figure 2-5). While these each constitute a REC for the project site, the PC was an isolated incident several years ago consisting of a minor spill, and none of the tanks exhibited secondary contamination that would require mitigation. The ECS report is located in the Appendix.

Wetlands: Based on a site visit conducted in June 2018, the onsite streams should be classified as ephemeral and intermittent. It appears none of the onsite streams should be classified as perennial; thus, no Resource Protection Area (RPA) buffers should be located onsite. Per Prince William County GIS, there is RPA on the site; thus, RPA delineation will be required to demonstrate there is no RPA on the site. Wetlands onsite consist of palustrine emergent (PEM), palustrine forested (PFO) and palustrine open water (POW).

figure 2-4 | Hydrology 2014 Master Plan; north of Public Safety Drive (*image credit HGA*)

The 2014 Master Plan delineated and approximated wetlands are shown in Figure 2-4 Hydrology 2014 Master Plan. The delineated and approximated wetlands and streams on the recently acquired parcels are shown in Figure 2-56Hydrology.

figure 2-5 | Above-surface tank locations

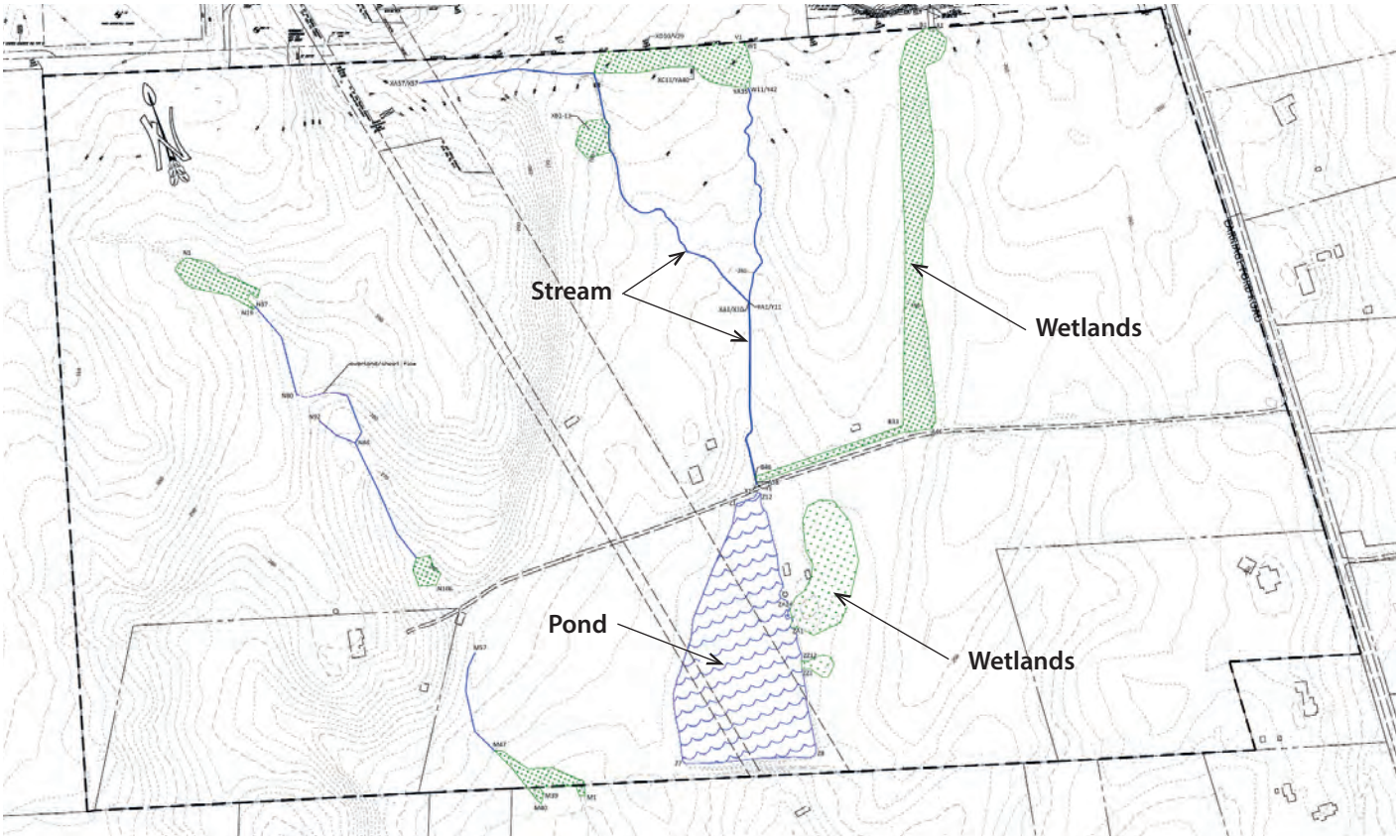

figure 2-6 | Hydrology; 2018 acquired parcels

figure 2-7 | Topography

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CHAPTERHREEO

PLANNING CONSIDERATIONS

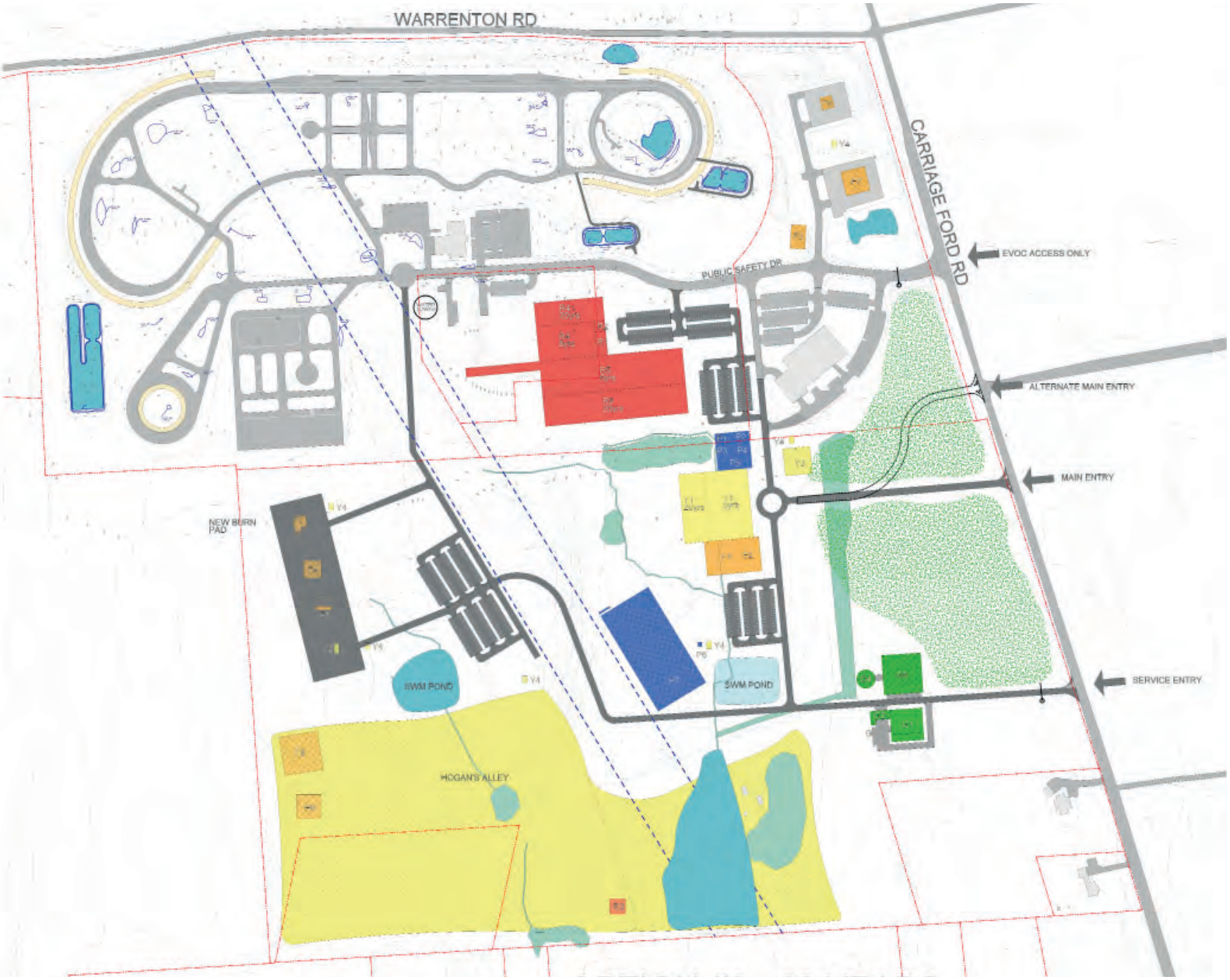

figure 3-1 | 2019 Master Plan

3.0 Overview

The planning considerations included in this section communicate the requirements used to develop the 2019 PSTC Master Plan Update. They address the proposed campus layout, the campus environment and landscape, access and circulation to and within the campus, parking, infrastructure, and stormwater management. The planning considerations help set the framework for design of future projects at PSTC over the next 5 to 20 years. Prince William County has identified several broad planning objectives for the 2019 PSTC Master Plan Update.

- Accommodate growth, as well as it can be predicted, for the next 20 years
- Address deficiencies in firearms training, including number of range points, types of weapons, and support spaces
- Provide facilities that support effective law enforcement training practice, including arms, tactical, situational, and classroom training
- Develop a mock city area similar to 'Hogan's Alley', located at Quantico, for use by both Fire and Police in joint and department specific practical training
- Provide adequate physical fitness and recreational facilities;
- Address deficiencies and limitations in the burn building and other fire training props
- Provide a auditorium
- Address site security concerns
- Provide adequate space for Buildings and Grounds
- Address parking and site vehicle circulation concerns

3.1 Program Development

HG Architects met regularly with the PSTC agencies and PWC Public Works to discuss strategies to address the deficiencies noted above. In some areas the needs of both Police and Fire could be addressed through a joint or shared solution. In other areas needs unique to the user agency required a specific solution. Shared facilities are incorporated into the 2019 Master Plan Update to the greatest extent possible. The 2019 PSTC Master Plan Update addresses the following planning requirements and objectives, categorized by user group.

POLICE

Police staffing plans currently add thirteen officers and two civilians per year for the next five years. The impact of this additional personnel on the training and in-service components is addressed in the Master Plan Program in all areas, including administrative offices and support spaces.

Firearms training space is severely limited; the PSTC currently has a twleve point 50 yard range and a shoot house. The number of points on the range limits the number of students that can use the range on a daily basis. The range is typically booked a year in advance. Firearms needs are as follows:

- Pistol Range: The existing outdoor 12-point 50 yard pistol range is inadequate in size and support spaces. The exterior facility poses limitations that an enclosed interior facility would address. The 5 year plan calls for an additional 12-points, ideally all 24-points would be enclosed in a new facility.
- Rifle Range: Currently all rifle training, including in-service, is completed at an off-site rented facility. Rifles are the preferred weapon in active shooter situations, as such the Police Chief has stated that more officers, including Student Resource Officers (SROs) are to be certified on the weapon. An 18-point, 200 yard rifle range with a 6-lane 300 yard sniper range is included in the five year plan, with expansion at 20 years.
- Shoothouse / Simunitions: The existing simunitions facility is adequate and replacement is a lower priority than range space. A new simnuitions facitliy is envisioned for the 'Training Alley' compnent of the 2019 Master Plan.
- Support space: Offices, locker rooms, staff break and shower rooms, firearms cleaning, gear and target storage, and classroom space are addressed in the program. Spaces provided align with the additional range space and anticipated number of users.

Police specific training needs addressed in the 2019 Master Plan Update include additional Defensive Tactics training space, a new K-9 unit training facility and associated support space, and exterior space for Unmanned Vehicle Training.

FIRE

Fire Department recruit class sizes vary from 20-40, depending on the number of openings in the department at the time. Fire department needs include additional office space and associated support, however priority has been placed an addressing the burn buildng deficiencies, the high bay training area, fire props, and fire EVOC course training and testing.

The configuration of the burn building pad limits flexibility and concurrent use. The building is used for high-rescue training, and as such it cannot be used for live-burn training at the same time. Similarly, there is a maze on the upper level of the burn building that limits overall use of the facility when it is being used for training. The storage buildings to the east and south of the burn building have limited use during live-fire training.

The burn building has been assessed (independant of this Master Plan) and there is approximately 15 years of use left in the facility. The current location adjacent to Carriage Ford Road poses challenges with the community; visible smoke during live burn training is not well-received. The 2019

Master Plan envisions a new fire training area in the western portion of the site, remote from the site entry and adjacent neighbors. The existing burn building will remain in place as a training prop for SWAT and Technical Rescue.

The high bay training space, located within the main building, is currenlty used by both Fire and Police. This use has necessitated the relocation of training apparatus to the exterior during training exercises. An apparatus storage building is being considered separate from this Master Plan, and is shown as existing on the concept plans.

Fire executes training 'response' from the high bay to the burn building. The apparatus crosses Public Safety Drive and often creates conflicts (vehicular as well as auditory) for other training scenarios on campus specifically along the response route. The route also poses conflicts with vehicles accessing the NVCJTA EVOC training facility at the end of Public Safety Drive. The 2019 Master Plan Update envisions limiting or eliminating these conflicts through the introduction of a campus road network.

The EVOC at the northwest end of campus is jointly owned by NVCJTA and PWC; however fire is not allowed to use the course. Fire currently sets up their EVOC on one of the streets on campus, which creates an obstacle for other users and is a safety issue for all. A roadway that is not a through way is needed for the fire EVOC course.

Additional specific Fire Rescue training needs include a non-burn training building, and an EMS training suite consisting of a classroom, laboratory space with cadaver storage, and a minimum of three training props: ambulance box, hospital room, and a reconfigurable residence. .

SHARED FACILITIES

Police and Fire identified areas where similar needs would allow for shared spaces, identified as follows:

Classrooms: Classroom space was identified as the highest priority shared need by both Police and Fire. There are nine classrooms on campus, accommodating 36-40 people at training tables. There is a smaller 'unofficial' classroom that accommodates around 20. In addition, there are seven satellite classrooms, however there is a movement in the DCJS to limit this to only one satellite classroom. Recruit classes for Fire are anywhere from 20-40, depending on openings. Police recruit classes are typically 25-35 people. There is a need for not only additional classroom space, but flexible space. Tier seating, demountable partitions, and various sized rooms are all desirable. More classrooms are needed to serve recruit classes as well as in-service and outside user agencies. The program adds classrooms at each phase of the Master Plan, reflecting expected needs based on recruit class size and increasing in-service requirements.

Support: Second in priority to classroom space for shared facilities is associated support for staff, recruits, and other user groups. This includes male and female locker rooms for recruits, and separate male and female locker rooms for staff and instructors. Also needed are break/lunch rooms for recruits and staff. The recruit break room needs to accommodate 50 people and provide adequate refrigeration. A Cafeteria style break room was discussed, with food being provided by an outside vendor. It was determined that a vendor would not likely be successful without patrons beyond the PSTC, which is unlikely.

Training Alley: The FBI training facility at Quantico, known as 'Hogan's Alley', is a mock city that allows for scenario-based training. Scenario-based training is a trend in law enforcement training; PWC PSTC utilizes scenario-based training as much as possible on campus, in the high-bay, in the shoot house, and in the woods and on the streets. Active shooter in-service is now a requirement that is currently being met by renting and using locations such movie theatres, malls,

and schools in the middle of the night. Both Fire and Police would benefit from a 'Hogan's Alley' on campus Possible uses include:

- Fire EVOC course
- Drone training
- In-service training (variety of uses)
- Recruit training
- Outside agency use

Additional training that is not adequately addressed at the PSTC includes a climbing tower for technical rescue, a collapse pad, confined space, hazmat, and heavy vehicle, all of which could be incorporated into a Training Alley.

Physical Training: Physical training occurs daily for the recruits. This should take place in a conditioned space; currently the weight room is not large enough to accommodate a recruit class, so the classes do strength training in shifts. A makeshift cross-fit type 'gym' is located on the training pad of the burn building, with equipment stored in a sea container. A field house would be beneficial for physical training, as well as to accommodate the required DCJS obstacle course (currently located in the woods). The programmed Field House includes space for strength training, open areas for functional fitness exercises, obstacle course, a basketball gym, and a track. Police will administer fitness tests at this location; Fire will continue to administer the CPAT at another PWC facility.

Site Faciltities: A significant portion of training happens outside on the grounds of the PSTC. Both Police and Fire would benefit from open pavilions located strategically on the campus. These would act as 'outdoor classrooms', fitted with benches and white boards. Some pavilions would also have restrooms, based on the distance to the next building.

Auditorium: Graduation and special events (promotion ceremonies, guest speakers, management seminars) are typically held off site as there is not adequate space on campus. Currently PSTC rents space for major training, graduation (4-6 per year), outside lecture series, active shooter training, promotion ceremonies, health/wellness seminars, leadership seminars, and other similar large-scale events. An auditorium is a desirable addition to the campus to accommodate these functions as well as provide space for training (scenario based) and additional large group space. It would not be used for outside rentals. Planned capacity is 500 people; as a secondary need this space is included in the 10-year plan.

PSTC Identity: The PWC PSTC is an important part of the public safety community. This 2019 Master Plan Update provides the opportunity to re-evaluate the overall campus and public interface. Space has been included for a joint lobby that would include display opoortunities, memorials to LODD, and a Public Safety Museum.

BUILDINGS AND GROUNDS

The PWC PSTC is the location of the Western District Hub for Buildings and Grounds (B&G); there are a total of five hubs in the County. The hub is the central location responsible for maintaining and/or supporting approximately 26 County owned and leased facilities in the western portion of the County. B&G Staff are dispatched from the PSTC on a daily basis. Staff are responsible for the repair, replacement, and maintenance of complex systems, equipment, and buildings. Currently staff occupies about 600 sf of space at the PSTC; this office is the extent of space available. There is no maintenance shop or vehicle storage. A standalone B&G facility is included in the 2019 Masteer Plan update; this is intended to be located away from the main area of campus and should have a separate, controlled access point from Carriage Ford Road.

Staff: Staff space needs include administrative offices, a small conference room, break room, and locker rooms. During extended weather events staff often stage out of the PSTC; provision for cot storage would be beneficial.

Maintenance Shop: A maintenance shop with tools and a large supply storage area is needed to allow staff to properly repair equipment as needed for each of the builldings in the

hub.

Vehicle Storage: A covered area for the B&G vehicles is planned to accomodate a variety of vehicles including gators, lifts, pick-ups, vans, and a bucket truck.

Other: A salt dome is planned for the future, to address changes in the agreement with VDOT. Also needed is a fuel facility; this would be used by B&G vehicles and police and fire training vehicles. It is not envisioned as a fuelling location for the County.

In addtiion to the space needed for the Western Hub, a custodial area consisting of a small office and supply storage closet is included in each building identified in the 2019 Master Plan.

MASTER PLAN

The Master Plan developed addresses the considerations enumerated above. The plan is described in detail in Chapter 5.

figure 3-2 | 2019 Master Plan

figure 3-3 | Joint Training Building

figure 3-4 | Firearms Building

3.2 Architectural Character

The architectural form and materials of the Joint Training Building, completed in 1993, can inspire direction for the future at PSTC to achieve coherent architectural and environmental development campus-wide over the long-term phased design and construction of the proposed buildings. Commonly used architectural features include:

- Decorative masonry exterior skin;
- Dark green color metal, including standing seam metal roofs, windows, gutters, and downspouts.

It should also be taken into consideration that at the time of the final build of the 20-year 2019 Master Plan the Joint Training Building (see figure 3-4) will be approximately 50 years old and most likely slated for demolition. A new campus identity, possibly rooted in the above materials, can be defined by the initial five year buildings, establishing a new architectural language moving forward.

Insofar as possible, existing tree cover should be maintained for aesthetic and environmental reasons and additional planting should be undertaken where feasible.

3.3 Zoning

All of the parcels on the site are zoned A-1, Agricultural District, and are located in an area identified by PWC as a Rural Crescent. The entire public safety campus is comprised of seven parcels. Of the original four parcels GPIN 7492-26-7762, 7492-36-3923, and 7492-46-2248 are owned by Prince William County. GPIN 7492-26-5034 is owned by the Northern Virginia Criminal Justice Training Academy and is the location of the EVOC. The existing water tower, pistol range, and shooting house are located on GPIN 7492-26-7762. The existing joint training facility, burn building, trench simulator, modular building, and burn pad are located on GPIN 7492-46-2248 No zoning difficulties with the proposed development and use are identified at this time. The three parcels acquired in July 2018 are GPIN 7492-25-8724, 7492-34-8902, and 7492-14-6564. Public facilities are permitted within any zoning district, subject to a 2232 public review. There is a required building setback along street frontage of 35 feet. The rear building setback is 25 feet, and the side setback is 15 feet. The maximum building height for a building owned by a public use is 60 feet, provided that all required setbacks be increased by one foot for each foot in height over 35 feet.

3.4 Grading and Topography

The existing topography is rolling with forested areas, built-out portions along Public Safety Drive and grass areas. The site contains some wetlands, ponds, streams and a large farm pond. The campus slopes generally from west to southeast, rolling toward the existing streams and farm pond at the southern boundary of the site. Carriage Road is fairly flat along the parcel frontages.

The campus varies in elevation by about 64 feet from the highest point to the lowest point. This will create a grading challenge. Retaining walls and berms may be required to create flatter areas for training and parking, while offsetting and balancing significant cut and fill and avoiding wetlands and streams. Winding interior roads, that follow grade as closely as possible, will also create more of an earthwork balance.

3.5 Site Access and Traffic Analysis

The existing portion of the campus has one vehicular access off Carriage Ford Road, which is Public Safety Drive. Another one or two entrances off Carriage Ford Road will be needed to further expand the campus. If a new entrance off Carriage Ford Road is located near the existing Lemaster Drive, it is recommended to line it up with Lemaster Drive.

Carriage Ford Road is an existing two lane road that is not classified by the Virginia Department of Transportation (VDOT) however it is considered a Rural Road by PWC DOT. When the project site was originally developed in 1992, a left turn lane warrant analysis was completed for the site entrance using the ultimate built out condition that was anticipated at the time. This warrant analysis was updated in 2008 when the EVOC site was developed; it shares the Public Safety Drive entry from Carriage Ford Road with PSTC. In both the 1992 and 2008 analyses, it was concluded that a left turn lane was not warranted on Carriage Ford Road for entry into the site. The VDOT traffic data for Carriage Ford Road was updated in 2010 at 560 vehicles per day (VPD) as reported in the 2012 VDOT Traffic Volume Estimates.

A traffic analysis was prepared in June 2018; the full report and diagrams are located in the Appendix. The Traffic Analysis was prepared to identify potential future needs with regards to access to Carriage Ford Road for the PSTC. Currently, the site features an employment base of 271. By the design year of 2039, a total of 583 personnel could be assigned to the facility. The Master Plan Options consider two potential access scenarios for the facility which include: 1] maintaining the existing access point and developing a secondary service access to the south (Option 1) and 2] relocating the main access to a point south while keeping Public Safety Drive as a dedicated access for EVOC on site (Options 2 and 3). A separate service access is also proposed in conjunction with all three options.

Carriage Ford Road is generally a north/south roadway traveling from Route 646 (Aden Road) for a distance of approximately 2.5 miles to a dead-end south of Belmont Grove Road. Near Public Safety Drive, Carriage Ford Road features one travel lane in each direction. There are no pavement markings to delineate the northbound and southbound lanes. Overhead utility lines are present on the east side of the roadway.

Near its intersection with Public Safety Drive, Carriage Ford Road widens to facilitate a deceleration lane in the southbound direction (see figure 3-5). The deceleration lane extends for a distance of approximately 450 feet. No additional striping is provided in conjunction with the deceleration lane. The total pavement width near the site on the north side of the intersection is approximately 42 feet. On the southside of the roadway, while the corner radius facilitates right turns for larger vehicles, there is no acceleration lane. The pavement width on the southside of Public Safety Drive is approximately 20 feet.

Public Safety Drive features stop-control at its intersection with Carriage Ford Road. There is a median dividing the inbound and outbound lanes. The median is short and

extends for a distance of only approximately 85 feet. The width of Public Safety Drive allows for both right turns and left turns on to Public Safety Drive to occur simultaneously, though there are no formal pavement markings Intersection turning movement counts were collected on June 12, 2018, while public school was in session for a full day at the intersection of Carriage Ford Road and Public Safety Drive. The count period extended from 6 AM to 7 PM. Morning and afternoon peak periods were identified as 7 to 8 AM and 3:45 to 4:45 PM based on the highest traffic volumes observed passing through the intersection. Figure 3-7 provides a summary of the existing peak hour traffic volumes.

A 48-hour speed study was also undertaken in conjunction with the turning movement counts. The posted speed limit along Carriage Ford Road is 45 mph. As shown in Figure 7, the measured 85th percentile speed for both northbound and southbound traffic is 45 mph, which should be used as a design value for sight distance at any new intersections for this facility. Complete data on the turning movement counts and speed study can be found in Appendix A of the Traffic Report, locted in the Appendix.

This study accounts for a 2039 design year. As a result, traffic along Carriage Ford Road was increased at a conservative 2% annual value to arrive at 2039 conditions. Figure 3-8 shows the increase volumes along the roadway. Combining the traffic increase with the existing peak hour traffic volumes results in the 2039 background peak hour traffic volumes as shown in Figure 3-9.

The projected future trip generation for this site was computed based on the known number of personnel currently assigned to the facility. There was a total of 70 AM peak hour trips and 136 PM peak hour trips which corresponds to a trip rate of 0.26 trips per person during the morning peak period and 0.51 trips per person during the afternoon peak period. It is important to recognize that while this rate accounts for trips that occurred during a single hour only; trips do occur both before and after the peak period as not all employees arrive or leave the site during the same hour.

The established rates were utilized to calculate the future trip generation for the site. As shown in Figure 3-11, the trips are projected to increase by 80 during the morning peak period and 157 during the evening peak period.

The trip assignment for both Master Plan Options was considered separately based on anticipated future demand. Option 1 maintains Public Safety Drive as the main point of access to the Public Safety Training Center. A secondary service access is proposed to the south which will feature access to a maintenance area. Virtually all peak hour trips are assigned to Public Safety Drive.

Options 2 and 3 relocate the main site access to a point south of Public Safety Drive. Public Safety Drive is maintained as an access point to EVOC only, with some type of access control device. It is estimated that 15% of site trips will be associated with the EVOC access. A third point of access is proposed south of the main access which will serve as service access only. Similar to Option 1, limited trips are assigned to this access point during the peak hours. Figures 3-12 and 3-13 show the 2039 future peak hour traffic volumes for Option 1 and Options 2 and 3, respectively

Highway Capacity Manual (HCM) Methodology was utilized to review the existing and projected future Levels of Service for the intersections considered within this analysis. The results of the intersection capacity analysis are summarized in Figure 3-10. Complete capacity worksheets can be found in Appendix B of the Traffic Report, locted in the Appendix.

Highway Capacity Manual provides Level of Service based on the average Minor Street delay. It is important to recognize this analysis considers no auxiliary lanes along Carriage Ford Road because of the lack of striping. The single lane approach accounts for the most conservative analysis. From a capacity standpoint, additional lanes are not required

figure 3-5 | Public Safety Drive at Carriage Ford Road

figure 3-6 | Carriage Ford Road at Aden Road

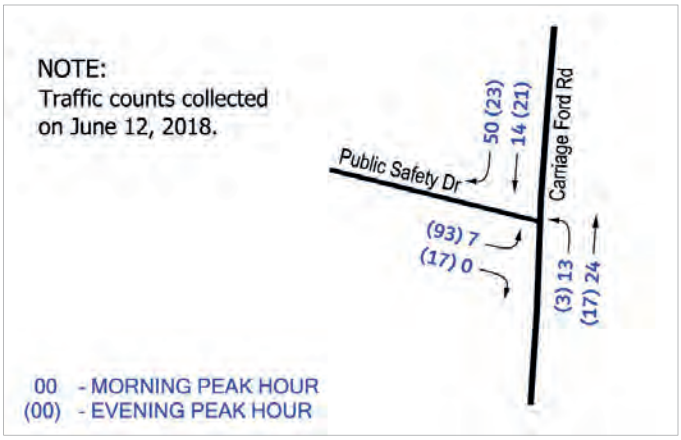

figure 3-7 | Existing Peak Hour Traffic Volume

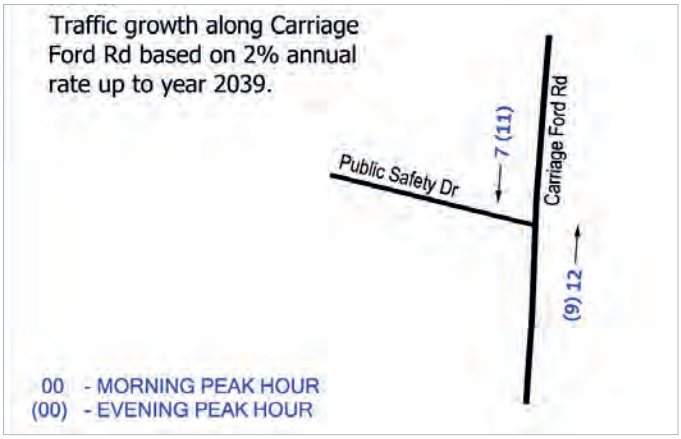

figure 3-8 | Projected Traffic Volume Increase

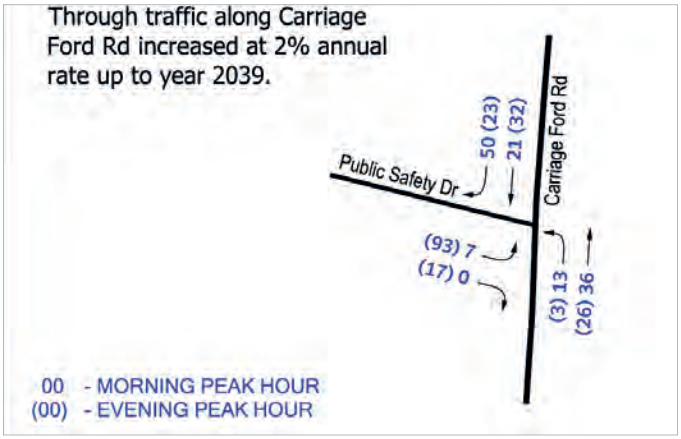

figure 3-9 | Background Traffic Volume

to provide adequate Levels of Service in the future.

It is anticipated that the subject site will generate more than 100 peak hour trips in the future. As a result, Prince William County will likely require a Traffic Impact Analysis (TIA). The limits of the TIA will be determined in consultation with staff during a Scoping Meeting. However, the study area will include, at a minimum, site access driveways and other major facilities near the area.

Carriage Ford Road is accessed from Aden Road, also a two lane road but classified by VDOT as a Rural Major Collector. At the intersection of Carriage Ford Road and Aden Road, Aden Road carries 4,000 VPD according to 2012 VDOT Traffic Count Data. Traffic turning onto Carriage Ford Road from Aden Road crosses an existing narrow two lane bridge to cross an existing stream (see figure 3-6). The County recognizes the inadequacy of the existing intersection and bridge and the need for a separate Capital Improvement Project to improve this intersection. An analysis will need to be completed on Aden Road and Carriage Ford Road in order to determine turn lane requirements at the intersection and the impacts to the existing bridge. Improvements associated with this intersection and the existing bridge should be part of a separate Capital Improvement Project through Prince William County.

3.6 Internal Roads and Parking

The internal roads and turning areas should be reviewed for whether heavy duty pavement is needed. Speed control is recommended throughout the site where there are longer stretches of straight interior travel ways. Speed control should not include speed humps due to truck traffic. Separate access from Carriage Ford Road to the adjacent southwest 10-acre parcel should be considered or maintained. Roundabouts are a safe alternative to stop sign intersections and should be utilized where possible, such as near the vehicular main site entrance. However, truck turning movement should be considered at all intersections, turn-around areas and along winding travel ways.

The main roadways throughout the PSTC appear to be designed with a typical road section of 1.5 inches of surface course, 5 inch base course, and 6 inches of subbase aggregate on top of 6" of lime stabilized soil. During the final site plan design the geotechnical engineer can perform testing to determine the appropriate depth of pavement for the roadways depending on the anticipated traffic level and types of vehicles; for example, heavy duty pavement is needed in areas used by fire apparatus or other heavy equipment.

The closest parking category use in the Design and Construction Standards Manual (DCSM) seems to be: School of special instruction, business or trade; which has a parking requirement of one (1) space per 200 net square feet of building area. If the interior building area is planned to be approximately 222,500 square feet, then 222,500 / 200 = 1,112 parking spaces would be required. Parking should be provided in a combination of surface lots and structured parking based on personnel density and/or avoidance of other site features. A structured parking facility is recommended in the campus core, for use by the main training buildling and the firearms training complex. Surface lots are shown throughout the rest of the campus as appropriate to the type of training and anticipated number of users.

The existing uses in the Public Training Facility Complex were developed with the required parking at the time of development. The proposed master plan development will meet the requirements of the DCSM for onsite parking by providing a minimum of 1 space per each 200 net square feet of building.

UTILITIES

3.7 Sanitary Sewer System.

Wastewater is serviced from the existing buildings to the existing sanitary sewer system via force main and pumps. Per record documents, there are four grinder pumps (one each at the pistol range, EVOC facility, Burn Building, and Modular Building) and associated force mains to the lift station near the Joint Training Facility. Wastewater is then pumped

Minor Approach LOS/Delay (seconds), HCM 6th Edition			
	Existing	Year 2039 Background	Year 2039 Total
MORNING PEAK HOUR TRAFFIC			
Option #1			
Carriage Ford Dr & Public Safety Dr	A/9.1	A/9.2	A/9.6
Carriage Ford Dr & Service Access	n/a	n/a	A/8.7
Option #2			
Carriage Ford Dr & Public Safety Dr	A/9.1	A/9.2	A/9.6
Carriage Ford Dr & Main Access	n/a	n/a	A/9.4
Carriage Ford Dr & Service Access	n/a	n/a	A/8.7
EVENING PEAK HOUR TRAFFIC			
Option #1			
Carriage Ford Dr & Public Safety Dr	A/9.6	A/9.8	B/11.4
Carriage Ford Dr & Service Access	n/a	n/a	A/8.9
Option #2			
Carriage Ford Dr & Public Safety Dr	A/9.6	A/9.8	B/11.3
Carriage Ford Dr & Main Access	n/a	n/a	B/10.3
Carriage Ford Dr & Service Access	n/a	n/a	A/8.9

NOTE:
1. Background Traffic is derived from combining Existing Traffic and regional growth.
2. Total Traffic is derived from combining Background Traffic and traffic to be generated by site.

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figure 3-10 | Intersection Capacity Analysis

Trip Rates / Formulae				In/Out %		
Existing Trip Generation (271 personnel)						
AM Peak Hour Trips = 0.258 x Personnel				90/10		
PM Peak Hour Trips = 0.512 x Personnel				19/81		
TRIP TOTALS	**MORNING PEAK HOUR**			**EVENING PEAK HOUR**		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Trip Generation for Proposed Expansion						
312 Personnel	72	8	80	30	127	157

figure 3-11 | Future Trip Generation

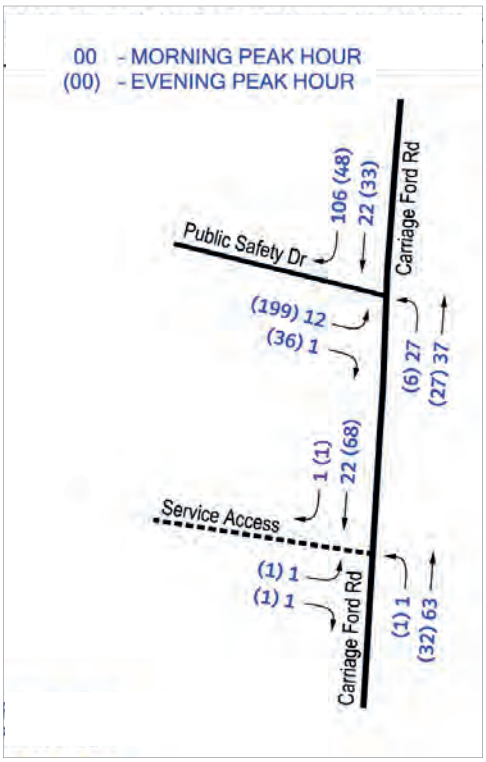


figure 3-12 | Option 1 Peak Hour Traffic Volume

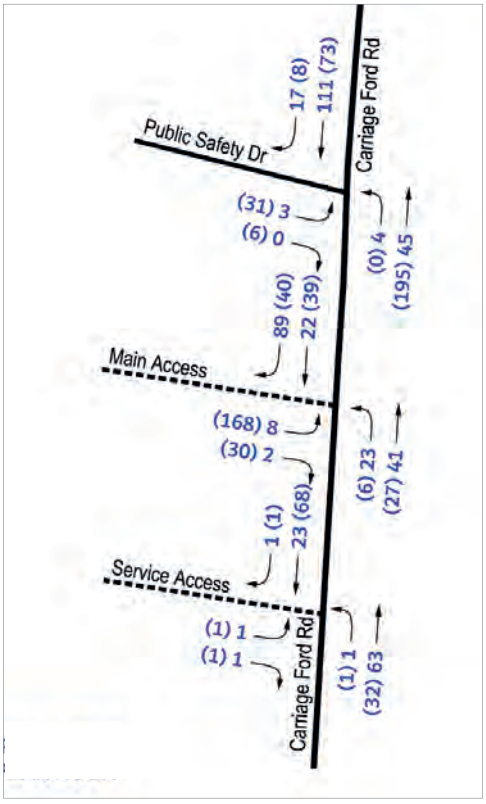


figure 3-13 | Option 2, 3 Peak Hour Traffic Volume

through a 3-inch force main approximately 9,690 feet north down Carriage Ford Road and Aden Road to a manhole of a gravity sewer system. The lift station is believed to consist of two pumps, each rated at 42 GPM at 75 feet.

Per County provided information: the Provisional Certificate to Operate states the site has been designed for an average flow of 0.01266 million gallons per day (MGD) and a peak flow of 0.0506 MGD, based on a peaking factor of 4. The original projected sewage flows were for 777 people served at 15 gallons per day (GPD) and 200 seats served at 5 GPD for a total of 0.01266 MGD. The Virginia Code requirement has since increased from 15 to 16 GPD for schools with showers and cafeteria.

If the anticipated personnel are 583 in twenty years, then the average daily flow would be 583 x 16 GPD = 0.00933 MGD; which is well within the average flow of 0.01266 MGD used to design the lift station at the Joint Training Facility. Based on the anticipated personnel and assuming the lift station was designed per the provided information, the existing lift station appears to have adequate capacity for the ultimate use. However, prior to development, the pumps should be field verified to review any changes or functionality. As development occurs, the existing grinder pumps at each existing building should be analyzed as well. New buildings will need new sanitary sewer, pumps and/or force mains to connect to the existing lift station.

3.8 Water System.

The existing water system is operated and maintained by Prince William County, not by Prince William County Service Authority (PWCSA).

Per County provided information: Performance data obtained from the Virginia Department of Health (Engineering Description Sheet dated June 1, 1993) describes the system configuration as follows:

- The existing source of water supply is two on-site wells that are identified as Well No. 1 and Well No. 2. Both wells have well houses and hypochlorination systems.
- Well No. 1 is located at the northeast corner of the site near the intersection of Warrenton Road and Carriage Ford Road. The well is 245 feet deep and is cased with a 6-inch diameter steel casing to a depth of 65 feet. The well was tested for 48 hours starting on June 5, 1989 and produced a yield of 210 GPM at 99.5 feet below the surface. The static water level was 49 feet below the surface. The submersible pump has a capacity of 130 GPM at 315 feet in total dynamic head.
- Well No 2. Is located approximately 1,420 feet south of Well No. 1 near the intersection of Carriage Ford Road and Lemaster Drive. Well No. 2 is also 245 feet deep and is cased with a 6-inch diameter steel casing to a depth of 60 feet. The well was tested for 48 hours starting on June 5, 1989 and produced a yield of 68 GPM at 139 feet below the surface. The static water level was 47 feet below the surface. The submersible pump has a capacity of 55 GPM at 360 feet in total dynamic head.

- The total well source yield is 278 GPM, which provides a total source yield of 222,400 GPD.
  278 GPM @ 0.5 GPM/Equivalent Residential Connection (ERC) = 556 ERC
  556 ERC @ 400 GPD/ERC = 222,400 GPD
- The total well pump capacity is 185 GPM, which produces a total pumping capacity of 148,000 GPD.
  185 GPM @ 0.5 GPM/Equivalent Residential Connection (ERC) = 370 ERC
  370 ERC @ 400 GPD/ERC = 148,000 GPD

- The operation permit for the site was issued for a design capacity of 148,000 GPD.
- The elevated tank adjacent to the shoot house has a nominal volume of 300,000 gallons fed from the onsite distribution system. Based on computations provided on the Virginia Department of Health Engineering Description Sheet for the water system dated June 1, 1993, the effective volume of the storage tank is 600,000 GPD.

Water supply can be supplemented from the elevated tank if there is more demand than 148,000 GPD. If the anticipated personnel are 583 in twenty years, then the average daily water demand would be 583 x 16 GPD = 9,328 GPD. The peak demand would be 9,328 GPD x 1.6 (per Prince William County Utility Standards Manual) = 14,925 GPD, which is less than 148,000 GPD. However, this does not consider training activities that require water.

Per County provided information: Training activities at the burn building occur about 30 days per year and Driver/ Pump Operator (DPO) training classes occur approximately 60 days of the year. Burn Building training activities typically use less than 2,000 gallons per minute, and DPO training typically uses 500 to 1,000 gallons per minute but can use up to 2,000 gallons per minute in training. DPO training does not exceed more than 2 hours on any given day. Conservatively assuming DPO training uses 2,000 gallons per minute for 2 hours, up to 240,000 gallons of water may be required in addition to the daily water demand. The current average daily demand on days when training occurs is higher than the design capacity of the well pumps; however, since the tank on site can provide water in addition to the water that is pumped from the wells, the water demand is met. Since training does not occur daily, the water used from the tank can be replenished. At the request of Prince William County, PWCSA performed a fire flow test on two existing fire hydrants within the Public Safety Training facility complex in order to measure the performance data of the existing water system. The flow test was conducted in September 2013 on the existing hydrant along Public Safety Drive between the Joint Training Facility and the existing shooting range. The fire hydrant at the existing shooting range was used as the static hydrant during the flow test. The following information was provided from the fire flow test:

STATIC HYDRANT INFO	FLOW HYDRANT INFO
Static Pressure: 72 psi	Pitot: 60
Residual Pressure: 70 psi	Flow: 1,300 gpm

The maximum operating discharge of the system (in GPM) at the minimum pressure of 20 psi can be calculated as follows:

Flow * (Static Pressure – 20 psi)^0.54/(Residual Pressure-Static Pressure)^0.54 1,300* (72-20) ^ 0.54 / (72-70) ^ 0.54] = 7,552 GPM @ 20 psi

The results of the September 2013 flow test suggest that the system is adequate to support the existing campus development.

Based on the anticipated personnel and assuming the training demand does not increase from the provided information, the water tower and wells in combination appear to have adequate capacity for the ultimate use. However, prior to development, the wells should be field verified to review any changes or functionality.

Gas and Electricity. An existing, overhead high voltage transmission power line in a 240-foot VEPCO easement goes through the middle of the campus from the middle of the southern property line toward the northwest corner of the site. The transmission power line is not available to provide power to the site. The current power is provided via underground and overhead electric lines operated by Dominion Virginia Power, fed from an existing overhead power line near the intersection of Warrenton Road and Carriage Ford Road.

Parallel to the VEPCO easement is a natural gas transmission pipeline in a 30-foot easement. This high-

pressure pipeline and cannot be used to service the site. There are existing propane tanks adjacent to and serving the Modular Building. Washington Gas services Prince William County.

Telecommunications. Telecommunications for the site are connected to the County's system. Underground conduit, mostly along Public Safety Drive, routes communications lines to the existing facilities.

STORMWATER MANAGEMENT

The site is in the Cedar Run watershed. The existing site appears to have three stormwater management/BMP ponds, a BMP grassed swale, four other stormwater management ponds, some conservation areas and a large unofficial pond. The pond south of the Burn Building appears to have room to grow.

The ultimate development will increase the impervious area and disturb acres of land. Stormwater management design for quality and quantity control and permitting will be required. BMP design shall be based on the Virginia Runoff Reduction Method, which uses average annual rainfall and pre-developed and post-developed land cover conditions to determine the phosphorus load generated by development. In order to achieve the required phosphorus removal, new BMP facilities that are Virginia State approved will be required; such as bio-retention areas, extended detention ponds, grass channels, constructed wetlands or wet ponds. However, it is often more cost-effective to utilize practices that also provide runoff reduction to require less ultimate quantity control; such as bioretention areas, extended detention ponds, dry swales and rooftop disconnection. Permeable pavement is a common runoff reduction practice, but it is not recommended due to the types of vehicles and programming on the site. Note that it is not recommended to upgrade the existing large farm pond to meet current stormwater management requirements, particularly due to cost.

The 2-year and 10-year storm peak flows from the site should be managed via stormwater detention onsite. A detention facility can be a quality/quantity control combined facility; such as a pond. The post-developed runoff volumes should consider any runoff reduction BMP practices utilized. The volume of water to be detained and the allowable release rate will be determined with final engineering.

CHAPTER FOUR

PROGRAM REQUIREMENTS

4.0 | PROGRAM REQUIREMENTS

4.1 Overview

The PSTC will serve as the primary location for Prince William County Police and Fire & Rescue In-Service and Basic Training for the foreseeable future. It is anticipated that the number of students served will continue to increase during the next 5 to 20 years. Continued development of the PSTC campus will support projected growth and expanded training offerings. The Police Department operates two recruit classes per year, with 50 recruits per class. The Fire Department operates three recruit classes per year, with three recruits per class. As classes do overlap, there can be as many as 150 recruits on campus at one time. The program spreadsheets use these numbers as basis for development of area requirements.

4.2 Mission and Organization

POLICE DEPARTMENT

The mission of the Prince William County Police Department is to enhance the quality of life by providing police services through shared responsibility with the public. The Criminal Justice Academy conducts all basic and in-service training for police officer candidates and police officers, as well as leadership training for Police Department personnel. It also coordinates citizen training such as the Citizen Police Academy. The training of PWC police personnel takes place within the Support Services Division under the leadership of the Criminal Justice Academy Director. The three police training sections include:

- Basic Training
- Range Training
- In-Service Training

In 2012, the latest available, reported annual training totals were as follows: 54,051 hours (recruit training); 39,703 hours (annual in-service training); and 8,794 hours (firearms training).

FIRE AND RESCUE DEPARTMENT

The mission of Prince William County Fire and Rescue is to protect lives, property and the environment through timely, professional, humanitarian services essential to the health, safety and well-being of the community [Classes offered at PSTC] are primarily offered for career development purposes, to meet regulatory requirements, and to help ensure departmental compliance.2 The training of Fire and Rescue personnel takes place within the Human Resources-Training of the Support Services Section. The three primary training programs are:

- Basic Training
- Advanced Training
- Emergency Medical Services (EMS) Training

Others include: CPR, Administration, Leadership Development, and Digital Photography

AREA REQUIREMENTS SUMMARY

	CURRENT (FY 19)			PHASE 1 0-5 Years (FY 24)			PHASE 2 5-10 Years (FY 29)			PHASE 3 10-20 years (FY 39)		
PERSONNEL REQUIREMENTS												
	PWC FT/PT Personnel	**Total Outside/ Cadre Instructors**	**TOTAL PERSONNEL**	**PWC FT/PT Personnel**	**Total Outside/ Cadre Instructors**	**TOTAL PERSONNEL**	**PWC FT/PT Personnel**	**Total Outside/ Cadre Instructors**	**TOTAL PERSONNEL**	**PWC FT/PT Personnel**	**Total Outside/ Cadre Instructors**	**TOTAL PERSONNEL**
Police General Training Staff and Support	18	90	108	53	90	143	56	90	146	72	90	162
Fire and Rescue General Training Staff and Support	30	4	34	38	4	42	49	6	55	58	6	64
Police and Fire Department Shared Training and Support	0	0	0	0	0	0	0	0	0	0	0	0
Police Firearms Training Staff and Support	5	37	42	18	42	60	18	47	65	19	52	71
Buildings and Grounds Staff and Support	7		7	16		16	22		22	36		36
Anticipated Recruit class size — Fire (3 classes/year)			40			150			150			150
Police (2 classes/year)			40			100			100			100
TOTAL PERSONNEL			**271**			**511**			**538**			**583**
AREA REQUIREMENTS												
INDOOR AREA REQUIREMENTS	**AREA (NSF)**	**USABLE TO GROSS**	**TOTAL AREA (GSF)**	**AREA (NSF)**	**USABLE TO GROSS (25%)**	**TOTAL AREA (GSF)**	**AREA (NSF)**	**USABLE TO GROSS (25%)**	**TOTAL AREA (GSF)**	**AREA (NSF)**	**USABLE TO GROSS (25%)**	**TOTAL AREA (GSF)**
Police General Training Staff and Support Space	8,775	878	9,653	15,338	3,835	19,173	17,555	4,389	21,944	19,236	4,809	24,045
Fire and Rescue General Training Staff and Support Space	16,086	804	16,890	20,247	5,062	25,309	29,324	7,331	36,655	30,740	7,685	38,425
Police and Fire Department Shared Training and Support	27,797	1,390	29,187	47,536	11,884	59,420	66,096	16,524	82,620	79,296	19,824	99,120
Police Firearms Training Staff and Support Space	2,323	232	2,555	16,996	4,249	21,245	17,554	4,389	21,943	31,944	7,986	39,930
Buildings and Grounds Staff and Support Space	650	65	715	8970	2,242	11,212	9466	2,367	11,833	16746	4,187	20,933
Subtotal Indoor Required Building Area	55,631	3,369		109,087	27,272		139,995	34,999		177,962	44,491	
Total Building Area Requirement			**59,000**			**136,358**			**174,994**			**222,453**
Total Existing Building Area (GSF)												
Existing Administration Building			31,600			31,600			31,600			31,600
Existing High Bay Training			8,750			8,750			8,750			8,750
Existing Modular Building			14,000			14,000			14,000			14,000
Existing Range Building			3,460			3,460			3,460			3,460
Total Existing Building Area			**57,810**			**57,810**			**57,810**			**57,810**
TOTAL AREA REQUIRED: INDOOR SPACE			**1,190**			**78,548**			**117,184**			**164,643**
OUTDOOR AREA REQUIREMENTS	**OPEN SPACE**	**COVERED AREA**	**TOTAL**	**OPEN SPACE**	**COVERED AREA**	**TOTAL**	**OPEN SPACE**	**COVERED AREA**	**TOTAL**	**OPEN SPACE**	**COVERED AREA**	**TOTAL**
Police General Training	0		0	101,841		101,841	101,841		101,841	101,841		101,841
Fire and Rescue General Training	20,315		20,315	36,075		36,075	78,575		78,575	78,575		78,575
Police and Fire Department Shared Training	320		320	58,120		58,120	103,320		103,320	112,320		112,320
Training 'village'	0		0	0		0	TBD		TBD	TBD		TBD
Police Firearms Training (Outdoor Range)	17,660		17,660	132,140		132,140	136,140		136,140	250,220		250,220
Buildings and Grounds	200		200	7,080		7,080	32,280		32,280	36,480		36,480
TOTAL AREA REQUIRED: OUTDOOR SPACE (SF)			**38,495**			**335,256**			**452,156**			**579,436**
TOTAL AREA REQUIRED: OUTDOOR SPACE (ACRES)			**0.88**			**7.70**			**10.38**			**13.30**
Parking Spaces — Covered			0			0			0			0
Open			298			682			875			1,112
TOTAL PARKING			**298**			**682**			**875**			**1,112**

PUBLIC SAFETY TRAINING CENTER MASTER PLAN

POLICE GENERAL TRAINING

STAFF AND SUPPORT AREA REQUIREMENTS

Description	Space Standard (where applicable)	CURRENT (FY 19) Personnel	CURRENT (FY 19) Spaces	CURRENT (FY 19) Area (NSF) Actual	PHASE 1 0-5 Years (FY 24) Personnel	PHASE 1 0-5 Years (FY 24) Spaces	PHASE 1 0-5 Years (FY 24) Area (NSF) Required	PHASE 2 5-10 Years (FY 29) Personnel	PHASE 2 5-10 Years (FY 29) Spaces	PHASE 2 5-10 Years (FY 29) Area (NSF) Required	PHASE 3 10-20 years (FY 39) Personnel	PHASE 3 10-20 years (FY 39) Spaces	PHASE 3 10-20 years (FY 39) Area (NSF) Required
STAFF													
Academy Administration													
Major	200	0	0	0	0	0	0	0	0	0	1	1	200
Captain	200	1	1	152	1	1	200	1	1	200	1	1	200
Lieutenant	175	1	1	148	1	1	175	1	1	175	1	1	175
Admin. Support	65	1	1	162	2	2	130	2	2	130	2	2	130
Civilian Training Coordinator	110	0	0	0	0	0	0	1	1	110	1	1	110
Accreditation Manager	110	0	0	0	1	1	110	1	1	110	1	1	110
In-Service Training													
Lieutenant	175	0	0	0	0	0	0	1	1	175	1	1	175
1st Sergeant	120	1	1	162	1	1	120	1	1	120	1	1	120
Police Sergeant (Controlled Tactics Unit)	110	1	0	0	1	1	110	1	1	110	2	2	220
Admin. Support	65	1	1	162	1	1	65	1	1	65	2	2	130
Civilian Training Coordinator	65	1	1	162	2	2	130	1	1	65	2	2	130
Outside Instructors	45	75	2	324	75	2	90	75	2	90	75	2	90
ADC Officer (Member Agency)	65	0	0	0	1	1	65	2	2	130	4	4	260
Sheriff Deputy	65	1	1	162	2	2	130	2	2	130	4	4	260
Defensive Tactics Instructor	65	0	0	0	4	4	260	1	1	65	1	1	65
Detail	45	0	0	0	1	1	45	1	1	45	1	1	45
Basic Training													
Lieutenant	175	1	1	175	1	1	175	1	1	175	1	1	175
1st Sergeant	120	1	1	162	2	2	240	2	2	240	3	3	360
Sergeant	110	1	1	162	2	2	220	2	2	220	2	2	220
Police Officer	65	11	11	?	11	11	715	12	12	780	15	15	975
Curriculum Manager	110	1	1	160	1	1	110	1	1	110	2	2	220
Police Officer (Member Agency)	65	0	0	0	1	1	65	2	2	130	4	4	260
ADC Staff	65	0	0	0	0	0	0	2	2	130	4	4	260
SUPPORT SPACES													
Wellness & Resiliency Unit													
Lieutenant	120		1	120		1	120		1	120		1	120
Physical Therapist	65		1	65		1	65		1	65		1	65
Peer Fitness Coordinator (applicants, recruits)	65		0	0		0	0		1	65		1	65
Peer Fitness Coordinator (in-service)	65		0	0		1	65		1	65		1	65
Employee Wellness Coordinator	65		0	0		1	65		1	65		1	65
Administrativve Support Coordinator	65		0	0		0	0		1	65		1	65
Storage	25		1	25		1	25		1	25		1	25
Lateral File	15		1	15		2	30		3	45		4	60
Printer	6		1	6		1	6		1	6		1	6
Copy/fax	50		1	50		1	50		1	50		1	50
Shredder	10		1	10		1	10		1	10		1	10
Examination Room (Physical Therapist)	250		1	250		1	250		1	250		1	250
Physical Ability Testing Area	3600		0	0		1	3600		1	3600		1	3600
Conference Room	25	10	2	500	10	2	500	10	2	500	10	2	500
Administrative Support													
Shredder	120		1	0		1	120		3	360		4	480
Simulation Training Room	600		1	583		1	600		2	1200		2	1200
Storeroom	150		1	107		1	150		2	300		2	300
Office (in modular building)			2	255		?	?		?	?		?	?
Storage	400		1	355		1	400		2	800		2	800
Mail Sort Area	65		1	0		2	130		2	130		2	130

Description	Space Standard (where applicable)	CURRENT (FY 19) Personnel	Spaces	Area (NSF) Actual	PHASE 1 0-5 Years (FY 24) Personnel	Spaces	Area (NSF) Required	PHASE 2 5-10 Years (FY 29) Personnel	Spaces	Area (NSF) Required	PHASE 3 10-20 years (FY 39) Personnel	Spaces	Area (NSF) Required
Display Case	50		0	0		1	50		2	100		3	150
Fax Machine	6		1	0		1	6		2	12		2	12
Printer	6		5	0		6	36		7	42		8	48
Copy room - multi-function device	120		1	39		2	240		2	240		3	360
Copy Storage	75		1	67		1	75		1	75		2	150
Secure File Room - Police records	160		2	308		1	160		2	320		2	320
Open Office Files													
Lateral File	15		12	0		16	240		20	300		24	360
Vertical File	10		5	0		7	70		9	90		11	110
Shelf	6		15	0		20	120		25	150		30	180
TRAINING FACILITIES - INDOOR													
Classrooms - see Police / FR shared table													
Defensive Tactics Room			1	3017		1	4000		1	4000		1	4000
Defensive Tactics Equipment Storage			2	912		1	1000		1	1000		1	1000
K-9 Unit													
Training Facility													
Workstations	65		0	0	2	1	130	2	1	130	2	1	130
Conferemce Room	25		0	0	20	1	500	20	1	500	20	1	500
Staff bathrooms, shower: female	200		0	0		1	200		1	200		1	200
Staff bathrooms, shower: male	200		0	0		1	200		1	200		1	200
Equipment Lockers	10		0	0	20	1	200	20	1	200	20	1	200
Laundry	200		0	0		1	200		1	200		1	200
Storage: bite suit	30		0	0		1	30		1	30		1	30
Storage: narcotics	25		0	0		1	25		1	25		1	25
Dog wash area	100		0	0		1	100		1	100		1	100
Exterior explosives container	16		0	0		1	16		1	16		1	16
NET INTERIOR AREA:				**8775**			**15338**			**17555**			**19236**
EXTERIOR FACILITIES													
Unmanned Aerial Vehicle Training													
Take-off / Landing pad (6'c 6')	36		0	0		1	36		1	36		1	36
Pavilion (20' x 10')	200		0	0		1	200		1	200		1	200
windsock	5		0	0		1	5		1	5		1	5
K-9 Unit													
Fenced in training area (450' x 225') with 10' x 20'	101250		1	0		1	101250		1	101250		1	101250
Covered parking for 2 vehicles	350		0	0		1	350		1	350		1	350
NET EXTERIOR AREA:				**0**			**101841**			**101841**			**101841**
EVOC BUILDING													
Emergency Vehicle Operations Training													
EVOC Sergeant	110	0	0	0	1	1	110	1	1	110	2	2	220
Driver Training Coordinator	110	0	0	0	1	1	110	1	1	110	1	1	110
Driver Training Instructor	65	1	1	65	3	3	195	4	4	260	5	5	325
EVOC Admin Support	65	1	1	65	1	1	65	1	1	65	1	1	65
EVOC Outside Instructors	65	15	4	260	15	4	260	15	4	260	15	4	260
NET INTERIOR AREA EVOC BUILDING:				**390**			**740**			**805**			**980**
Total PWC Personnel		18			53			56			72		
Total Outside Personnel		90			90			90			90		
TOTAL PERSONNEL		108			143			146			162		
[illegible]													

UPDATE PUBLIC SAFETY TRAINING CENTER MASTER PLAN

FIRE AND RESCUE GENERAL TRAINING

STAFF AND SUPPORT AREA REQUIREMENTS

Description	Space Standard (where applicable)	CURRENT (FY 19) Personnel	CURRENT (FY 19) Spaces	CURRENT (FY 19) Area (NSF) Actual	PHASE 1 0-5 Years (FY 24) Personnel	PHASE 1 0-5 Years (FY 24) Spaces	PHASE 1 0-5 Years (FY 24) Area (NSF) Required	PHASE 2 5-10 Years (FY 29) Personnel	PHASE 2 5-10 Years (FY 29) Spaces	PHASE 2 5-10 Years (FY 29) Area (NSF) Required	PHASE 3 10-20 years (FY 39) Personnel	PHASE 3 10-20 years (FY 39) Spaces	PHASE 3 10-20 years (FY 39) Area (NSF) Required
STAFF													
Academy Administration													
Office													
Battalion Chief	200	1	1	145	1	1	200	2	2	400	2	2	400
Captain	175	3	3	262	3	3	525	4	4	700	5	5	875
Clerical			1	375									
Instructor Office			1	486									
Office (modular building)			2	312									
ALS Training Coordinator	120	1	1	79	2	2	240	2	2	240	2	2	240
Curriculum Development Coordinator	120	1	1	79	2	2	240	3	3	360	3	3	360
Workstation													
Lieutenant	65	8	8	542	9	9	585	11	11	715	14	14	910
Technician II	65	12	12	948	12	12	780	16	16	1040	20	20	1300
ASC II	65	2	1	158	2	1	65	2	1	65	2	2	130
ASA III	65	1	1	79	1	2	130	2	2	130	2	2	130
Distance Learning Coordinator	65	1	1	79	1	1	65	2	2	130	3	3	195
Shared Workstation - detail	65	0	0	0	5	5	325	5	5	325	5	5	325
Outside Instructors	45	4	4	316	4	4	180	6	6	270	6	6	270
SUPPORT SPACES													
Shredder	120		1	0		2	240		3	360		4	480
EMS Storage	500		2	438		1	500		1	500		1	500
Records	250		1	153		1	250		1	250		2	500
Mail Sort Area	65		1	0		2	130		2	130		2	130
Display Case	50		0	0		1	50		2	100		3	150
Fax Machine	6		1	0		1	6		2	12		2	12
Printer	6		5	0		6	36		7	42		8	48
Copier - multi-function device	120		1	0		2	240		2	240		3	360
Secure File Room	160		1	0		1	160		2	320		2	320
Open Office Files													
Lateral File	15		12	0		16	240		20	300		24	360
Vertical File	10		5	0		7	70		9	90		11	110
Shelf	6		15	0		20	120		25	150		30	180
Storeroom	200		1	128		1	200		1	200		1	200
Copy/Storage	200		1	66		1	200		1	200		1	200
Storage and maintenance	350		1	253		1	350		1	350		1	350
Apparatus Storage and Maintenance	600		1	539		1	600		1	600		1	600

Description	Space Standard (where applicable)	CURRENT (FY 19) Personnel	Spaces	Area (NSF) Actual	PHASE 1 0-5 Years (FY 24) Personnel	Spaces	Area (NSF) Required	PHASE 2 5-10 Years (FY 29) Personnel	Spaces	Area (NSF) Required	PHASE 3 10-20 years (FY 39) Personnel	Spaces	Area (NSF) Required
TRAINING FACILITIES - INDOOR													
Classrooms - see Police / FR shared table													
Indoor high bay space (not incl. training mockup)	5765		1	5765		1	5765		2	11530		2	11530
High bay support spaces													
DPO / Misc Storage	350		1	355		1	350		2	700		2	700
Workshop / Equipment Storage	650		2	646		1	650		2	1300		2	1300
Laundry / Equipment Store Room	350		1	330		1	350		2	700		2	700
Compressor Room	120		1	118		1	120		2	240		2	240
SCBA / Advanced Storage	350		1	350		1	350		2	700		2	700
Training mock-up (within high bay)	3085		1	3085		1	3085		1	3085		1	3085
EMS Training													
Classroom	30		0	0	30	1	900	30	1	900	30	1	900
Lab Space	40		0	0	30	1	1200	30	1	1200	30	1	1200
cadaver storage (refrigeration)	150		0	0		1	150		1	150		1	150
Props													
Ambulance Box	200		0	0		1	200		1	200		1	200
Hospital Room	200		0	0		1	200		1	200		1	200
Residential (reconfigurable)	200		0	0		1	200		1	200		1	200
Confined space (interior)													
NET INTERIOR AREA:				**16086**			**20247**			**29324**			**30740**
EXTERIOR FACILITIES													
Apparatus storage Building - 6 bay min @ 16' x 60'	960		0	0		6	5760		6	5760		6	5760
Burn Building	8315		1	8315		1	8315		1	8315		1	8315
Class B Burn building	5000		0	0		0	0		1	5000		1	5000
Flashover Simuator	1000		1	1000		1	1000		1	1000		1	1000
Confined Space prop	1000		1	1000		1	1000		1	1000		1	1000
Training Pad	10000		1	10000		1	10000		1	10000		1	10000
Collapse Pad 100' x 100'	10000		0	0		1	10000		1	10000		1	10000
Train yard	25000		0	0		0	0		1	25000		1	25000
High Angle rescue prop / tower	2500		0	0		0	0		1	2500		1	2500
Heavy vehicle rescue pad	10000		0	0		0	0		1	10000		1	10000
Fire behavior prop			0	0									
NET EXTERIOR AREA:				20315			36075			78575			78575
Total PWC Personnel		30			38			49			58		
Total Outside Personnel		4			4			6			6		
TOTAL PERSONNEL		34			42			55			64		
TOTAL NET INTERIOR AREA:				**16086**			**20247**			**29324**			**30740**
NET EXTERIOR AREA:				**20315**			**36075**			**78575**			**78575**

Description	Space Standard (where applicable)	CURRENT (FY 19) Personnel	Spaces	Area (NSF) Actual	PHASE 1 0-5 Years (FY 24) Personnel	Spaces	Area (ASF) Required	PHASE 2 5-10 Years (FY 24) Personnel	Spaces	Area (ASF) Required	PHASE 3 10-20 years (FY 39) Personnel	Spaces	Area (ASF) Required
INDOOR SHARED SPACES													
General													
Lobby	600		1	280		1	600		1	600		1	600
Lobby Display Case	50		1	10		2	100		2	100		2	100
Public Safety Museum and LODD memorial	250		1	10		2	500		2	500		4	1000
Security Office	100		1	0		1	100		1	100		1	100
Library / Conference Rm	25		1	642	10	1	250	10	1	250	10	2	500
Physical Training (strength, cardio)	2500		1	1803		1	2500		1	2500		2	5000
Athletic Trainer / physical therapy	400		1	371		1	400		1	400		2	800
Training													
Auditorium	12		0	0		0	0	500	1	6000	500	1	6000
Classroom	30		10	11624	50	11	16500	50	14	21000	50	16	24000
Classroom (tiered)	35		0	0	50	2	3500	50	4	7000	50	6	10500
Classroom Storage	300		1	379		2	600		4	1200		8	2400
Computer Resource Room	1400		1	0		2	2800		2	2800		2	2800
High Bay Area	2500		1	5705		2	5000		2	5000		2	5000
Break Rooms													
Recruit Break/Lunch Area Seating	20	40	1	703	55	1	1100	55	1	1100	55	1	1100
Vending Machines	24		3	0		8	192		8	192		8	192
Refrigerator	24		3	0		4	96		5	120		6	144
Microwave/Sink/Coffee Counter	200		3	600		2	400		2	400		2	400
Inservice Break/Lunch Area	20		0	0			0	50	1	1000	50	1	1000
Staff Kitchen	200		1	168		1	200		1	200		1	200
Staff Break Area	20		1	391	30	1	600	30	1	600	30	1	600
Administration													
Conference Room: 12 person	25		0	0	12	1	300	12	1	300	12	2	600
Conference Room: 20 person	25	20	1	533	20	1	500	20	1	500	20	2	1000
Locker Rooms													
Recruit Lockers Male	12	40	2	1984	80	1	960	100	2	1200	100	2	1200
Showers, dressing	650		0	0		2	1300		2	1300		2	1300
Toilets, lavatories	650		0	0		2	1300		2	1300		2	1300
Recruit Lockers Female	12	24	2	1132	40	1	480	60	2	720	60	2	720
Showers, dressing	500		0	0		2	1000		2	1000		2	1000
Toilets, lavatories	500		0	0		2	1000		2	1000		2	1000
Staff Lockers Male	12	32	2	797	120	1	1435	128	1	1537	143	1	1716
Showers, dressing	650		0	0	1	1	650		2	1300		2	1300
Toilets, lavatories	650		0	0	1	1	650		2	1300		2	1300
Staff Lockers Female	12		0	0	64	1	773	69	1	827	77	1	924
Showers, dressing	500		0	0		1	500		2	1000		2	1000
Toilets, lavatories	500		0	0		1	500		2	1000		2	1000
Support													
Laundry Room	500		1	483		1	500		1	500		2	1000
Storage	150		1	37		1	150		1	150		2	300
IT Room	100		1	145		1	100		1	100		2	200
NET INTERIOR AREA:				27797			47536			66096			79296
[illegible]													

PUBLIC SAFETY TRAINING CENTER MASTER PLAN

POLICE FIREARMS TRAINING

STAFF AND PROGRAM AREA REQUIREMENTS

Description	Space Standard (where applicable)	CURRENT (FY 19) Personnel	Spaces	Area (NSF) Actual	PHASE 1 0-5 Years (FY 24) Personnel	Spaces	Area (ASF) Required	PHASE 2 5-10 Years (FY 29) Personnel	Spaces	Area (ASF) Required	PHASE 3 10-20 years (FY 39) Personnel	Spaces	Area (ASF) Required
PWC Police Firearms Training Staff													
1st Sergeant	120	1	1	0	2	2	240	2	2	240	2	2	240
Sergeant	120			0	1	1	120	1	1	120	2	2	240
Range Instructor workstation (1 per 3 points)	65	4	4	0	15	15	975	15	15	975	15	15	975
Cadre Instructor/Member Agency workstation	65	37	4	0	42	4	260	47	4	260	52	4	260
PWC Police Firearms Training: Pistol Range													
Range - 12 point x 50 yard	14400	24	1	14400	24	1	14400	24	1	14400	24	1	14400
Range - new 12 point x 50 yard	14400		0	0	24	1	14400	24	1	14400	24	1	14400
Range - new 24 point x 50 yard	28800		0	0		0	0		0	0	48	1	28800
Armory	600		1	0		1	600		1	600		1	600
Ammunition Storage	675		1	100		1	675		1	675		1	675
Gun Cleaning Room	35	24	1	384	48	1	1680	48	1	1680	96	2	3360
Fire Arms Maintenance	250		1	185		1	250		1	250		2	500
Restroom													
female	180		1	72		1	180		1	180		2	360
male	180		1	72		1	180		1	180		2	360
Range Control Room	100		1	210		2	200		2	200		2	200
Administrator	120		1	109		1	120		1	120		2	240
Office	120		1	196		1	120		1	120		2	240
Classroom	30		1	745	96	4	2880	96	4	2880	192	8	5760
Range Storage/Supply Room	100		1	0		2	200		2	200		2	200
PWC Police Firearms Training: Rifle Range													
Range - 24 point (18 x 200yd, 6 x 300yd)	100080			0	48	1	100080	48	1	100080	48	1	100080
Range - 24 point x 200 yard	89280			0			0			0	48	1	89280
Armory	600			0		1	600		2	1200		2	1200
Gun Cleaning Room	50			0	48	1	2400	48	1	2400	96	1	4800
Range Control Room	100			0		1	100		2	200		2	200
Range Storage/Supply Room	100			0		1	100		2	200		2	200
Shoot house													
Simunition Building - existing	3260		1	3260		1	3260		1	3260		1	3260
Simunition Building - new - at 'Hogan's Alley'	4000		0	0		0	0		1	4000		1	4000
PWC Police Firearms Training Support Space													
Lobby	200		1	0		1	200		1	200		1	200
Display Case	50		1	0		2	100		2	100		2	100
Classroom - existing	750		1	0		1	750		1	750		1	750
Classroom Storage	100		0	0		4	400		4	400		4	400
Firearms Work Area - gunsmith	250		1	250		1	250		2	500		2	500
Ammunition Bunker	500			0		1	500		1	500		2	1000
Target Storage	100			0		1	100		1	100		1	100
Student/Instructor Gear Storage	300			0		1	300		1	300		2	600
File Area	12		10	0		10	120		15	180		20	240
Copy/Fax Area	50		1	0		2	100		2	100		2	100
IT Room	100			0		1	100		1	100		2	200
Staff Lockers - M/F Instructor	12			0	24	2	576	24	2	24	24	2	24
Showers, dressing	500			0		1	500		1	500		2	1000
Toilets, lavatories	500			0		1	500		1	500		2	1000
Instructor Laundry	120			0		1	120		1	120		1	120
Instructor Breakroom	500			0		1	500		1	500		2	1000
Total Training Personnel		42			60			65			71		
Total Range points		12			48			48			96		
TOTAL NET EXTERIOR AREA:	(Range, Simunition)			17660			132140			136140			250220
TOTAL NET INTERIOR AREA:				2323			16996			17554			31944
TOTAL NET AREA:				**19983**			**149136**			**153694**			**282164**

PUBLIC SAFETY TRAINING CENTER MASTER PLAN

BUILDINGS AND GROUNDS

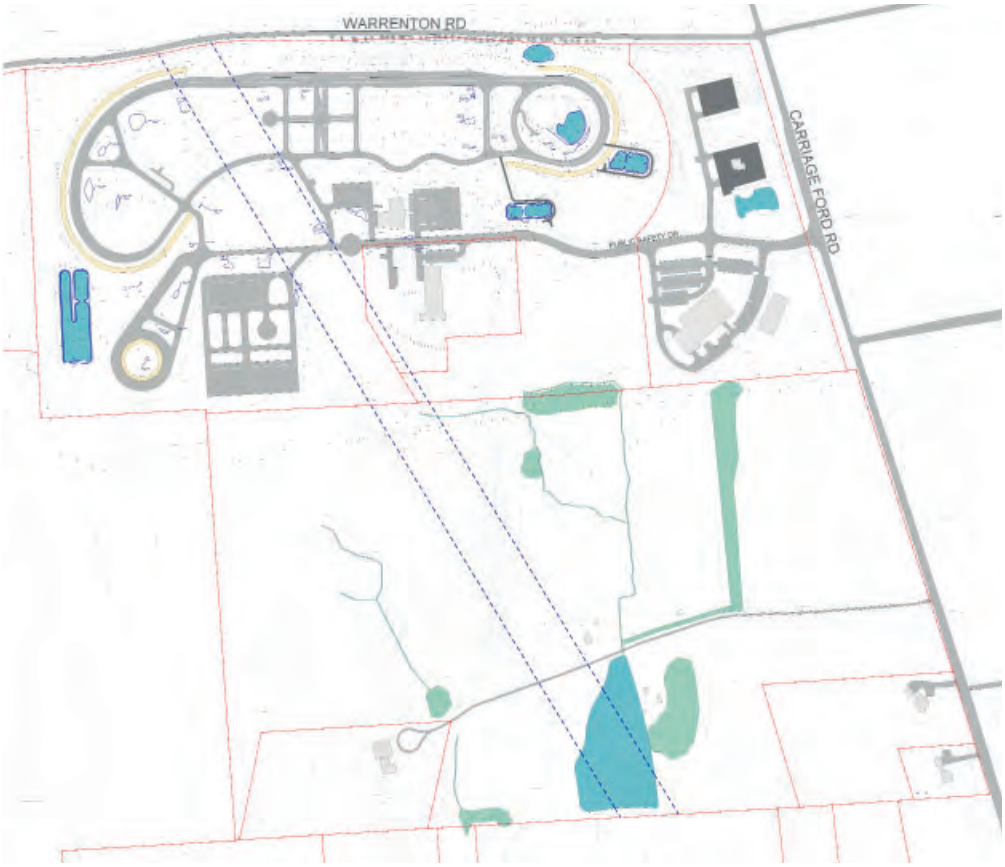
STAFF AND PROGRAM AREA REQUIREMENTS

Description	Space Standard (where applicable)	CURRENT (FY 19) Personnel	CURRENT (FY 19) Spaces	CURRENT (FY 19) Area (NSF) Actual	PHASE 1 0-5 Years (FY 24) Personnel	PHASE 1 0-5 Years (FY 24) Spaces	PHASE 1 0-5 Years (FY 24) Area (ASF) Required	PHASE 2 5-10 Years (FY 29) Personnel	PHASE 2 5-10 Years (FY 29) Spaces	PHASE 2 5-10 Years (FY 29) Area (ASF) Required	PHASE 3 10-20 years (FY 39) Personnel	PHASE 3 10-20 years (FY 39) Spaces	PHASE 3 10-20 years (FY 39) Area (ASF) Required
INDOOR FACILITIES													
Office space: B&G													
Maintenance staff	100	6	1	250	6	6	600	8	1	800	12	2	1200
Custodial staff	100	1	1	50	2	2	200	3	1	300	6	1	600
File storage	400		1	200		1	400		1	400		2	800
Plan room	300		1	100		1	300		1	300		1	300
Break room with kitchenette	500		0		8	1	500	11	1	500	18	2	1000
Locker rooms with showers													
Male	400		0			1	400		1	400		1	400
Female	400		0			1	400		1	400		1	400
Janitorial Closet (one per 15,000sf of building)	75		1	50		9	695		12	891		15	1096
Maintenance shop	2000		0	0		1	2000		1	2000		2	4000
Maintenance storage - supplies	2000		0	0		1	2000		1	2000		2	4000
Custodial storage (paper, cleaning supplies,	300		0	0		1	300		1	300		2	600
High-low loading dock	275		0	0		1	275		1	275		2	550
Shipping/receiving staging area	500		0	0		1	500		1	500		2	1000
Shipping/receiving support	400		0	0		1	400		1	400		2	800
OUTDOOR FACILITIES													
Covered Maintenance Vehicle Storage: 6 bays 12' x 40' each	2880		0	0		1	2880		1	2880		1	2880
Fueling Station (1 ea. Diesel and gasoline pump, 10,000 gal. tank ea.)	25200		0	0		0	0		1	25200		1	25200
Storage sheds	100		2	200		2	200		2	200		4	400
Salt Dome 75' diam (3,000 ton / 2,778 cu.yd. capacity)	4000		0	0		1	4000		1	4000		2	8000
Total Personnel		7			16			22			36		
TOTAL NET INTERIOR AREA:				650			8970			9466			16746
TOTAL NET EXTERIOR AREA:				200			7080			32280			36480
TOTAL NET AREA:				**850**			**16050**			**41746**			**53226**

5

CHAPTER FIVE

CONCEPT OPTIONS



For reference, on the following pages the existing conditions are rendered in light gray as depicted in the image on the left. Where planned for demolition, buildings are shown with dashed outlines.

figure 5-1 | Existing Considtions

Program areas identified in the spreadsheets in Chapter 4 are translated into a 2D graphic used for conceptual planning purposes. The above is a legend to be used in conjunction wtih the phased plans on the following pages.

figure 5-2 | Legend

5.1 Overview

In August 2019, upon completion and approval of the program spreadsheets, HG Architects began the process of developing conceptual level Master Plans reflecting the newly acquired properties and revised Goals and Objectives of the PSTC. Specific items identified by the PSTC stakeholders as site development priorities include the following:

- Vehicle circulation on site. The location of the EVOC at the rear of the site presents both a safety concern and a distraction for training on Public Safety Drive. While the location of the EVOC cannot be changed, the idea of allowing for multiple ways to access the EVOC as well as addressing where training takes place is a goal for the site concepts.
- Designated 'zones' of training. This would assist in traffic control, specifically for outside agency and in-service users
- A new vehicle entry to the property
- A location for a standalone Buildings & Grounds complex that is accessible from Carriage Ford Road without creating additional traffic on the main campus road

5.2 Concepts

Multiple concepts were developed; after evaluation and discussion one concept was determined to best address the goals and objectives of the project. This concept was developed to address the needs as established by the Program in three phases; the diagrams are depicted on the following pages. Spaces are represented by the color blocks in the legend to the left, demolition is represented by dashed lines. Space (buildings) and roads built in previous phases are shown in a lighter version of the color, allowing work related to the phase to read more clearly.

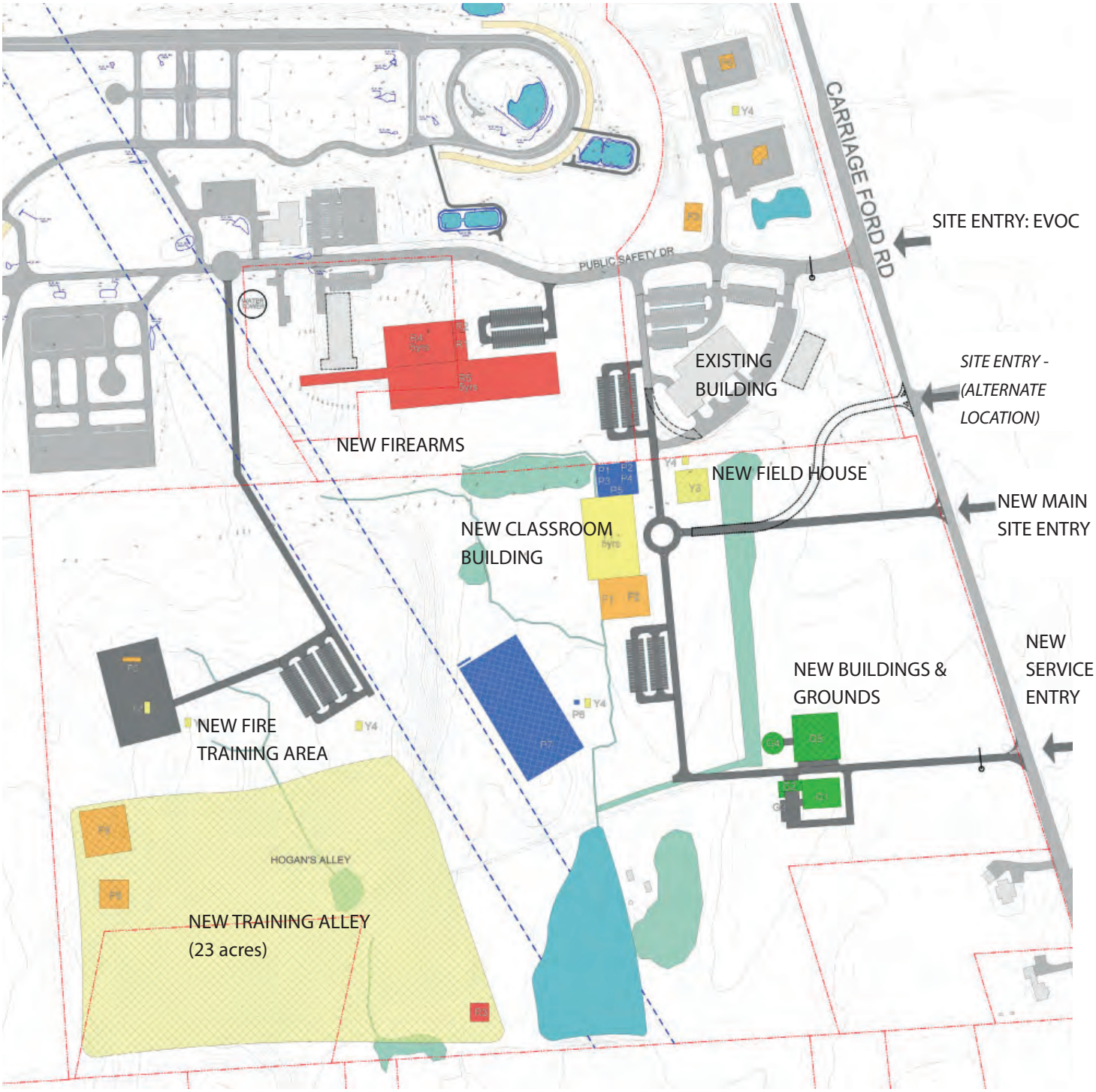


*figure 5-3*S

Master Plan | Phase 1

Phase I of the Master Plan directly addresses the current on-site vehicular conflcts at the training center. A new site entry further south along Carriage Ford Road provides a dedicated PSTC entry point, leaving the existing site entry as a controlled access for the EVOC facility. Buildings and Grounds is accessed by a new site service entry which allows for separation of users from the main campus roads.

Centered on the new entry drive, a new main building is located at a roundabout, providing a focal point and new identity for the PSTC. A new Field House is located opposite the classroom building. Firearms is developed to the east of the existing pistol range oriented east-west. A fire training complex, accessed by a new road, is centrally located on the western edge of the parcel. Adjacent to the new fire training area is the new 23 acre training alley in the southwestern quadrant, allowing for shared parking and greater opportunity wtih training scenarios. The training alley incorporates the existing residence in the southwest corner.

*figure 5-4*S

Master Plan | Phase 2

Phase 2 focuses on a minor addition to the main classroom building, to accommodate projected growth at ten years. Additional infrastructure support is provided through additional parking and a connecting road, creating a 'loop' road on campus which allows for greater flexibility in vehicular site circulation.

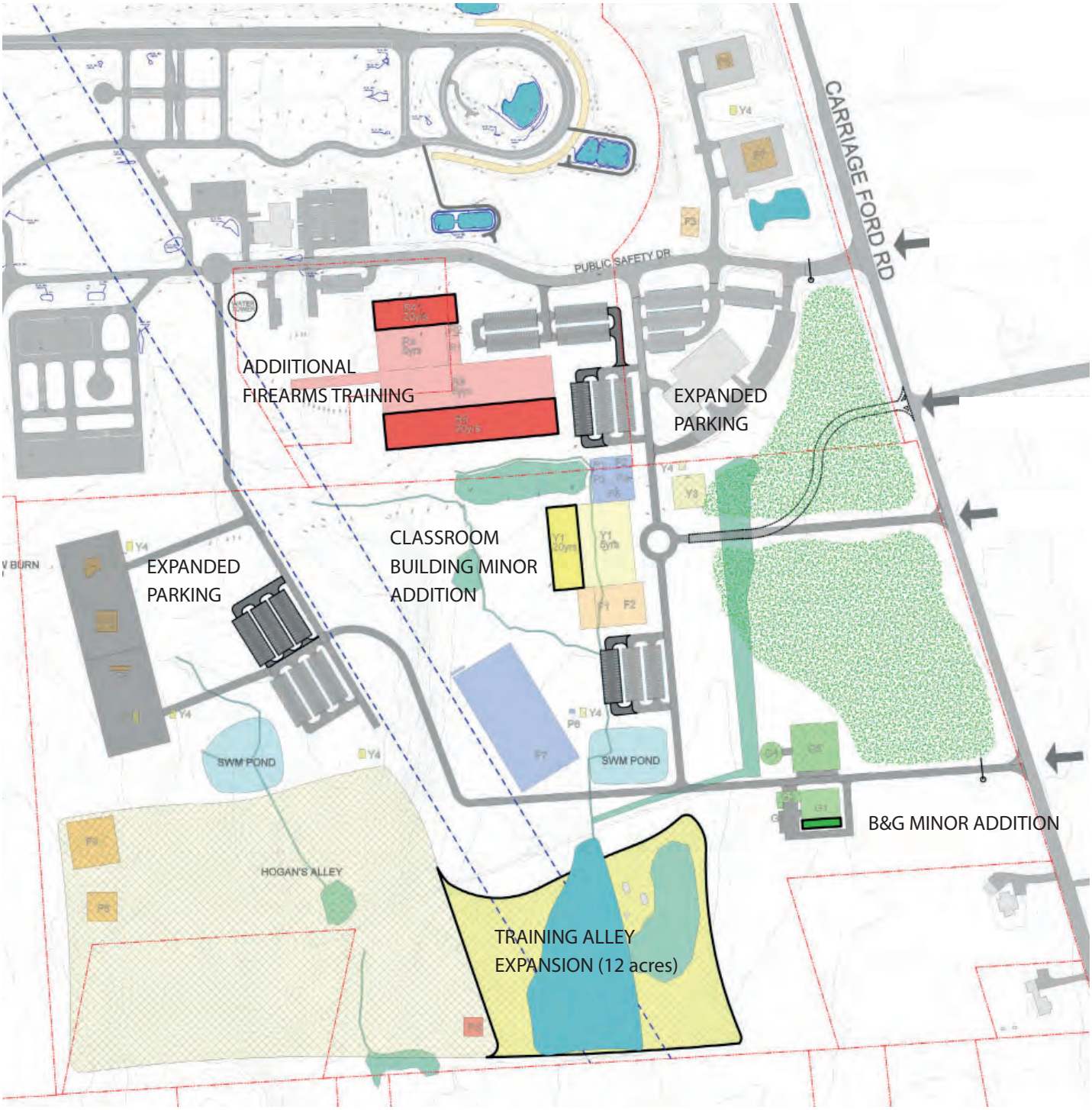


*figure 5-5*S

Master Plan | Phase 3

Phase 3 of the Master Plan continues to address projected growth at the training center with additional classroom spaces and parking, as well as an expansion of both the 50 and 200 yard ranges and associated support space. The open training alley area is formally expanded to 35 acres, incorporating the existing farm pond. A minor addition to the Buildings and Grounds complex is also expected to be necessary.

At the completion of this phase it is anticipated that the existing Joint Training Administration building (current main clasroom building) will either require extensive renovation work or will be demolished to provide space for future growth and new programs.

5.3 Estimated Cost

The costs summarized below are based on the documentation in this report and historical cost data of similar buildings. Detailed cost information is provided by phase on the following page.

or the purpose of this report, construction cost is defined as the cost labor and materials necessary to construct the facility, including general contractor overhead and profit. Also included in the construction cost is escalation to the approximate year of construction.

Soft costs are defined as:

- Land acquisition
- Architectural and Engineering fees
- Testing services
- Geotechnical studies
- Offsite road improvements
- Utility connection fees
- IT systems (includes voice, data)
- Inspection and Construction Management Services
- Contingency
- Furniture and Equipment
- Secuirty Systems Equipment
- Attorney fees

PHASE	ESTIMATED CONSTRUCTION COST	ESTIMATED SOFT COST (25%)	TOTAL COST
PHASE | 1: 0-5 years	$44,647,985	$11,161,996	$55,809,981
PHASE 2 | 5-10 years	$18,722,290	$4,680,572	$23,402,862
PHASE 3 | 10-20 years	$31,812,349	$7,953,087	39,765,436
SUBTOTAL	$95,182,624	$23,795,655	
		TOTAL ESTIMATED PROJECT COST:	$118,978,279

PHASE 1 | 0-5 years

DESCRIPTION	QUANTITY		UNIT COST	COST
Police General Training Staff & Support	6,563.00	SF	$235	$1,542,305
Fire & Rescue General Training Staff & Support	4,188.00	SF	$235	$984,180
Police & Fire Shared Training Staff & Support (2 Story Building)	19,739.00	SF	$230	$4,539,970
Police Firearms Training Staff & Support	14,000.00	SF	$222	$3,108,000
Buildings & Ground Staff Support	9,000.00	SF	$220	$1,980,000
Associated Sitework- SWM, utilities, excavation, retaining walls, fences	1.00	LS	$4,790,000	$4,790,000
Roadways	1.00	LS	$2,276,000	$2,276,000
Outdoor Police General Training (Take-off Landing Pad)	36.00	SF	$72	$2,592
Outdoor Police General Training (Pavillion)	0.00	SF	$65	$0
Outdoor Police General Training (Fenced in training area)	101,250.00	SF	$2	$202,500
Outdoor Fire & Rescue General Training (Apparatus Storage Building)	5,760.00	SF	$242	$1,393,200
Outdoor Fire & Rescue General Training (Burn Building)	0.00	SF	$180	$0
Outdoor Fire & Rescue General Training (Flashover simulator)	0.00	EA	$810,000	$0
Outdoor Fire & Rescue General Training (Rescue prop tower)	2,500.00	SF	$95	$237,500
Outdoor Fire & Rescue General Training (Heavy vehicle rescue pad)	0.00	SF	$12	$0
Outdoor Fire & Rescue General Training (Collapse Pad)	10,000.00	SF	$12	$120,000
Outdoor Fire & Rescue General Training (Training Yard)	0.00	SF	$17	$0
Outdoor Police & Fire & Rescue General Training (Training Alley)	24,000.00	SF	$80	$1,920,000
Outdoor Police & Fire & Rescue General Training (Fieldhouse)	12,000.00	SF	$220	$2,640,000
Outdoor Police & Fire & Rescue General Training	1,800.00	SF	$65	$117,000
Police Firearms Training (Pistol Range) - includes demo of existing	24.00	PT	$198,000	$4,752,000
Police Firearms Training (Rifle Range)	24.00	PT	$235,000	$5,640,000
Outdoor Buildings & Ground Staff Support (Shed)	0.00	SF	$45	$0
Outdoor Buildings & Ground Staff Support (Covered Vehicle Storage)	2,880.00	SF	$110	$316,800
Outdoor Buildings & Ground Staff Support (Salt Dome)	4,000.00	SF	$90	$360,000
Subtotal				$36,922,047
Escalation to 2024	20.93%			$7,725,938
				$44,647,985

PHASE 2 | 5-10 years

DESCRIPTION	QUANTITY		UNIT COST	COST
Police General Training Staff & Support	2,217.00	SF	$245	$543,165
Fire & Rescue General Training Staff & Support	9,077.00	SF	$245	$2,223,865
Police & Fire Shared Training Staff & Support	18,560.00	SF	$240	$4,454,400
Police Firearms Training Staff & Support	500.00	SF	$298	$149,000
Buildings & Ground Staff Support	500.00	SF	$220	$110,000
Associated Sitework - SWM, utilities, excav, hardscapes, streetscapes	1.00	LS	$924,000	$924,000
Roadways	1.00	LS	$679,230	$679,230
Police Training Simulation building	4,000.00	SF	$120	$480,000
Outdoor Fire & Rescue General Training (Burn Building)	5,000.00	SF	$180	$900,000
Outdoor Fire & Rescue General Training (Training Yard)	25,000.00	SF	$14	$350,000
Outdoor Fire & Rescue General Training (Rescue prop tower)	2,500.00	SF	$95	$237,500
Outdoor Fire & Rescue General Training (Heavy vehicle rescue pad)	10,000.00	SF	$12	$120,000
Outdoor Police & Fire & Rescue General Training (Training Alley)	24,000.00	SF	$80	$1,920,000
Outdoor Police & Fire & Rescue General Training (Pavillion)	1,200.00	SF	$60	$72,000
Outdoor Buildings & Ground Staff Support (10,000 gallon Tank Fueling Station)	1.00	EA	$913,750	$913,750
Subtotal				$14,076,910
Escalation to 2029	33.00%			$4,645,380
				$18,722,290

PHASE 3 | 10-20 years

DESCRIPTION	QUANTITY		UNIT COST	COST
Police General Training Staff & Support	1,681.00	SF	$245	$411,845
Fire & Rescue General Training Staff & Support	1,416.00	SF	$245	$346,920
Police & Fire Shared Training Staff & Support	13,200.00	SF	$240	$3,168,000
Police Firearms Training Staff & Support	10,390.00	SF	$298	$3,096,220
Buildings & Ground Staff Support	7,280.00	SF	$230	$1,674,400
Associated Sitework - SWM, utilities, excav, hardscapes, streetscapes	1.00	LS	$630,000	$630,000
Roadways	1.00	LS	$695,000	$695,000
Outdoor Police General Training	0.00	SF	$14	$0
Outdoor Fire & Rescue General Training	0.00	SF	$180	$0
Outdoor Police & Fire & Rescue Staff Support (Gas house 8x40 conex box)	0.00	EA	$6,500	$0
Outdoor Police & Fire & Rescue General Training (Pavillion)	0.00	SF	$60	$0
Outdoor Police & Fire & Rescue General Training (Training Alley)	0.00	SF	$80	$0
Police Firearms Training (Pistol Range)	24.00	PT	$198,000	$4,752,000
Police Firearms Training (Rifle Range)	24.00	PT	$235,000	$5,640,000
Outdoor Buildings & Ground Staff Support (Shed)	400.00	SF	$45	$18,000
Outdoor Buildings & Ground Staff Support (Salt Dome)	4,000.00	SF	$90	$360,000
Subtotal				$20,792,385
Escalation to 2039	53.00%			$11,019,964
Total Phase 1				***$31,812,349***

6

CHAPTER SIX

APPENDIX

April 10, 2018

Ms. Lynn Reda
Hughes Group Architects
22630 Davis Drive, Suite 175
Sterling, Virginia 20164
Via E-Mail: lreda@hgaarch.com

ECS Project No. 47:5856

Reference: Threatened & Endangered Species Database Review Summary Letter, Prince William County Public Safety Training Center, Nokesville, Virginia

Dear Ms. Lynn:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide Hughes Group Architects with the results of the Threatened & Endangered Species database reviews for the above-referenced project site. Our services were provided in general accordance with ECS Proposal No. 47:7348-EP, dated March 14, 2018.

PROPERTY DESCRIPTION

The subject site is located at approximate physical address 13520 Carriage Ford Road in Nokesville, Virginia. The site is approximately 148-acres in size and is located on Prince William County GPINs 7492-25-8724, 7492-34-8902, and 7492-14-6564. The subject site appears to have one residential structure in the southeastern portion of the site, and the remaining areas are forested or agricultural areas.

DATABASE REVIEW FINDINGS

Virginia Fish and Wildlife Information Service (VAFWIS):
ECS conducted a search of the Virginia Department of Game and Inland Fisheries Fish and Wildlife Information Service (VAFWIS) threatened and endangered species database to review documented occurrences of Federal and/or state listed species within a two-mile radius of the project site (see Appendix I). According to VAFWIS, there are no confirmed presences of these species within this radius.

U.S. Fish and Wildlife Service (USFWS):
ECS conducted a review of the U.S. Fish and Wildlife Service's Information, Planning, and Consulting (IPAC) database to review documented occurrences or potential habitat for Federally listed species within the project boundaries (see Appendix II). According to USFWS, two species are listed as having potential to occur at the project site:

- Federally-threatened northern long-eared bat (*Myotis septentrionalis*).
- Federally-endangered Harperella (*Ptilimnium nodosum*

According to the USFWS' Species Fact Sheet, the male northern long-eared bat (NLEB) prefers large caves and abandoned mines during the winter and summer. Female bats prefer caves and mines during the winter and maternity colonies are located in riparian forests along streams. It is also known that this bat species generally roosts in trees greater than 3 inches dbh that are found on south-facing slopes and have exfoliating bark or snags during the summer months.

The USFWS issued a Final 4(d) rule under the Endangered Species Act (ESA) effective February 16, 2016. The rule specified that for areas of the country impacted by white-nose syndrome (WNS), incidental take is prohibited under the following circumstances:

1. If it occurs within a hibernacula,
2. If it results from tree removal activities and,
   - The activity occurs within ¼-mile of a known, occupied hibernacula; or,
   - The activity cuts or destroys a known, occupied maternity roost tree or other trees within a 150 foot radius from the maternity roost tree during the pup season from June 1 through July 31.

Since there are no documented occurrences within close proximity of the subject site (see attached habitat map), ECS believes time of year restrictions or habitat surveys will not be required by USFWS for *M. septentrionalis*.

According to the USFWS' Species Fact Sheet, no critical habitat rules have been published for the Harperella. This plant species prefers habitat along large, rocky creeks with little to no canopy coverage. The substrate should be stable and seasonally flooded in order for this species to survive. Based on aerial photography and the Prince William County Mapper hydrography layer, we do not believe suitable habitat for this species is present on the subject site. Should great certainty be desired, ECS recommends submitting the project information to the USFWS for their review and concurrence.

Virginia Department of Conservation and Recreation (DCR):
A review of the VA Natural Heritage Data Explorer database showed two natural heritage resources within a two-mile radius of the project site limits (see Appendix III). Carriage Ford (Site ID 876), comprising a total area of 128 acres, and Nokesville Diabase Flatwoods (Site ID 1121), comprising a total area of 903 acres, were identified within this radius. These sites delineate areas that provide habitat and buffer for one or more rare terrestrial plants and animals, or significant natural communities. Based on the distance of these areas from the project site, it is ECS' opinion that these resources may not be adversely impacted by the proposed project; however, if additional certainty on these resources is desired, ECS suggests contacting DCR for a project specific determination as that agency is the sole authority in making adverse impact determinations for these resources.

This completes our scope of service for this project. If you have any questions or comments concerning the contents of the enclosed documents or other related topics, please feel free to contact us at (703) 471-8400.

Respectfully submitted,

ECS MID-ATLANTIC, LLC

Jessica A. Antos
Environmental Project Manager
JAntos@ecslimited.com

Adam M. Meurer, CHMM, PWS
Environmental Principal
AMeurer@ecslimited.com

I:_e-projects\5800-5899\5856 PWC PSTC Environmental\T&E Species\PWC PSTC T&E Species Summary Letter.doc

APPENDIX I

Virginia Fish and Wildlife Information Service (VAFWIS)
Search Results

Site Location

38,40,41.5 -77,35,01.5
is the Search Point

Show Position Rings
(•) Yes ( ) No
1 mile and 1/4 mile at the **Search Point**

Show Search Area
(•) Yes ( ) No
2 Search distance miles radius

Search Point is at map center

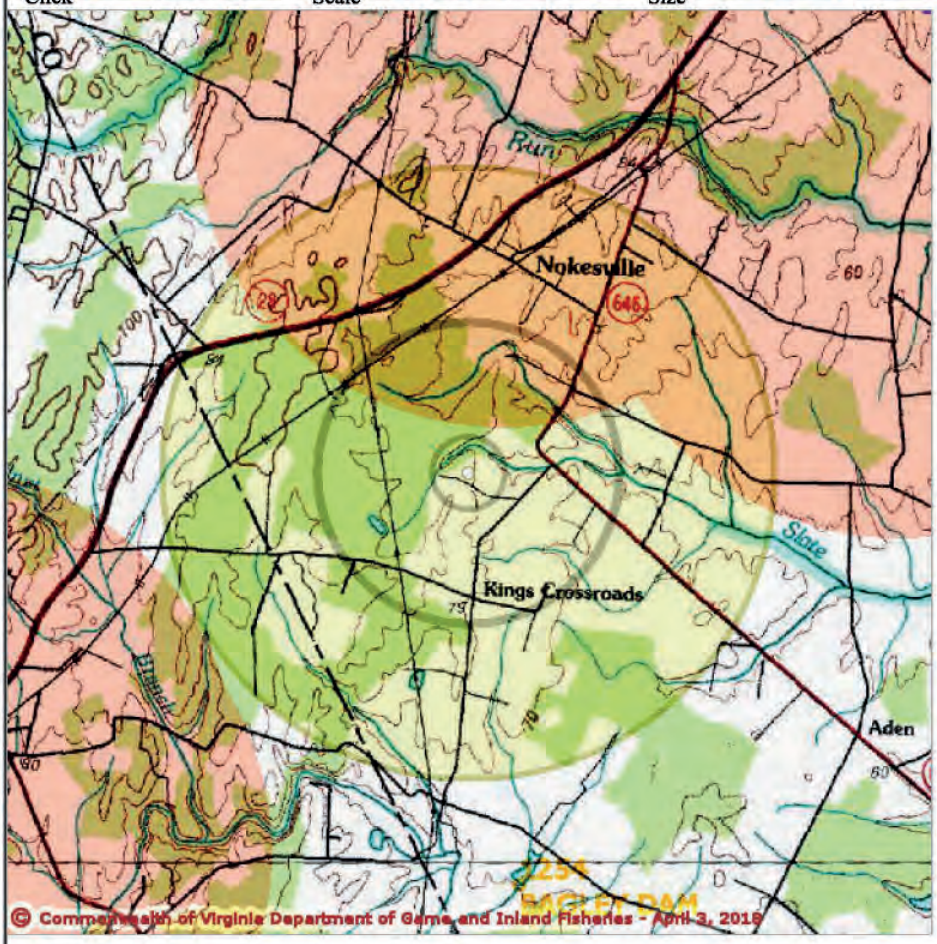
Base Map Choices
Topography

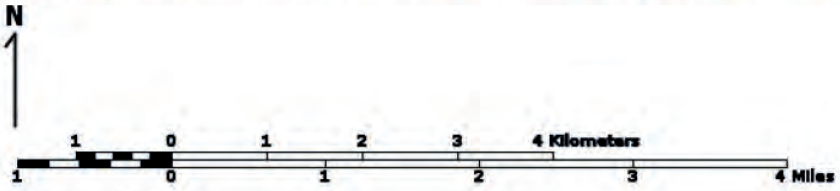
Map Overlay Choices
Current List: Position, Search, BECAR, BAEANests, TEWaters, TierII, Habitat, Trout, Anadromous

Map Overlay Legend

Refresh Browser Page

Map Click: Pan | Id | M Map Scale: In Zoom Out Screen Size: Small Size Big Help





Point of Search 38,40,41.5 -77,35,01.5
Map Location 38,40,41.5 -77,35,01.5

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: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

Map projection is UTM Zone 18 NAD 1983 with left 270444 and top 4289035. Pixel size is 16 meters . Coordinates displayed are Degrees, Minutes, Seconds North and West. Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The

T & E Waters

Federal

State

Predicted Habitat WAP Tier I & II

Aquatic

Terrestrial

Trout Waters

Class I - IV

Class V - VI

Anadromous Fish Reach

Confirmed

Potential

123 Impediment

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

2 mile radius Search Area

Bald Eagle Concentration Areas and Roosts

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 2018-04-03 15:07:51 (qa/qc March 21, 2016 12:20 - tn=896866.0 dist=3218.688 I)
$poi=38.6781944 -77.5837500

| DGIF | Credits | Disclaimer | Contact shirl.dressler@dgif.virginia.gov |Please view our privacy policy |
© 1998-2018 Commonwealth of Virginia Department of Game and Inland Fisheries

VaFWIS Initial Project Assessment Report Compiled on 4/3/2018, 3:06:55 PM

Known or likely to occur within a **2 mile radius around point 38,40,41.5 -77,35,01.5** in **061 Fauquier County, 153 Prince William County, VA**

View Map of Site Location

593 Known or Likely Species ordered by Status Concern for Conservation
(displaying first 26) (26 species with Status* or Tier I** or Tier II**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
060003	FESE	Ia	Wedgemussel, dwarf	Alasmidonta heterodon		BOVA
010032	FESE	Ib	Sturgeon, Atlantic	Acipenser oxyrinchus		BOVA
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis		BOVA
050020	SE	Ia	Bat, little brown	Myotis lucifugus		BOVA
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus		BOVA
060006	SE	Ib	Floater, brook	Alasmidonta varicosa		BOVA,Habitat
040096	ST	Ia	Falcon, peregrine	Falco peregrinus		BOVA
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus		BOVA
040379	ST	Ia	Sparrow, Henslow's	Ammodramus henslowii		BOVA
060081	ST	IIa	Floater, green	Lasmigona subviridis		BOVA
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA
060029	FP	IIa	Lance, yellow	Elliptio lanceolata	Yes	BOVA,SppObs
030063	CC	IIIa	Turtle, spotted	Clemmys guttata		BOVA
030012	CC	IVa	Rattlesnake, timber	Crotalus horridus		BOVA
010077		Ia	Shiner, bridle	Notropis bifrenatus		BOVA
040092		Ia	Eagle, golden	Aquila chrysaetos		BOVA
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera		BOVA
100248		Ia	Fritillary, regal	Speyeria idalia idalia		BOVA
040213		Ic	Owl, northern saw-whet	Aegolius acadicus		BOVA
040052		IIa	Duck, American black	Anas rubripes		BOVA
040036		IIa	Night-heron, yellow-crowned	Nyctanassa violacea violacea		BOVA
040181		IIa	Tern, common	Sterna hirundo		BOVA
040320		IIa	Warbler, cerulean	Setophaga cerulea		BOVA
040140		IIa	Woodcock, American	Scolopax minor		BOVA
040203		IIb	Cuckoo, black-billed	Coccyzus erythropthalmus		BOVA
040105		IIb	Rail, king	Rallus elegans		BOVA

To view **All 593 species** View 593

*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
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 grou

Bat Colonies or Hibernacula: **Not Known**

Anadromous Fish Use Streams

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

N/A

Habitat Predicted for Aquatic WAP Tier I & II Species (1 Reach) View Map Combined Reaches from Below of Habitat Predicted for WAP Tier I & II Aquatic Species

Stream Name	Tier Species						View Map
	Highest TE*	BOVA Code, Status*, Tier**, Common & Scientific Name					
Slate Run (20700102)	SE	060006	SE	Ib	Floater, brook	Alasmidonta varicosa	Yes

Habitat Predicted for Terrestrial WAP Tier I & II Species

N/A

Public Holdings:

N/A

Compiled on 4/3/2018, 3:06:55 PM I896866.0 report=IPA searchType= R dist= 3218.688 pol= 38,40,41.5 -77,35,01.5
PixelSize=64; Anadromous=0.017811; BECAR=0.022289; Bats=0.01899; Buffer=0.099615; County=0.083206; Impediments=0.020527; Init=0.211013; PublicLands=0.024469; SppObs=0.406877; TEWaters=0.024327; TierReaches=0.070242; TierTerrestrial=0.04341; Total=1.881387; Tracking_BOVA=0.897496; Trout=0.027574

| 4/3/2018, 3:06:55 PM | DGIF | Credits | Disclaimer | Please view our privacy policy |
© 1998-2018 Commonwealth of Virginia Department of Game and Inland Fisheries
I 896866

If you have difficulty reading or accessing documents, please Contact Us for assistance.

APPENDIX II

U.S. Fish & Wildlife Service (USFWS)
Search Results

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
http://www.fws.gov/northeast/virginiafield/

In Reply Refer To:
Consultation Code: 05E2VA00-2018-SLI-2601
Event Code: 05E2VA00-2018-E-06242
Project Name: PWC PSTC Environmental

April 06, 2018

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/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

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

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 Consultation Tracking Number 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

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

Consultation Code: 05E2VA00-2018-SLI-2601

Event Code: 05E2VA00-2018-E-06242

Project Name: PWC PSTC Environmental

Project Type: LAND - ACQUISITION

Project Description: Proposed development on approximately 148-acre area in Nokesville, VA

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.66110967501478N77.58979188004254W

Counties: Prince William, VA

Endangered Species Act Species

There is a total of 2 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[1], 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.

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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 *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Flowering Plants

NAME	STATUS
Harperella *Ptilimnium nodosum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3739	Endangered

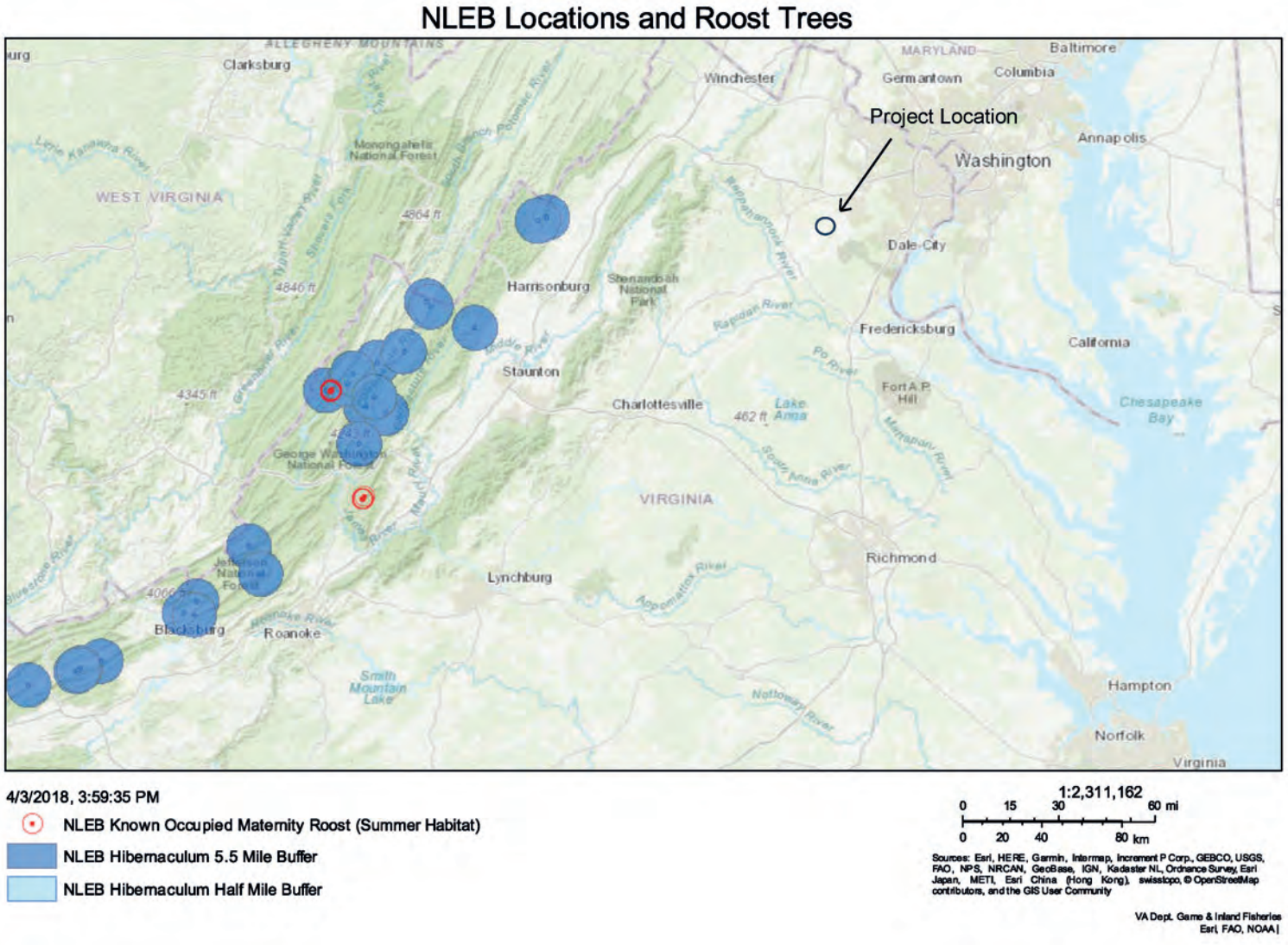
Critical habitats

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

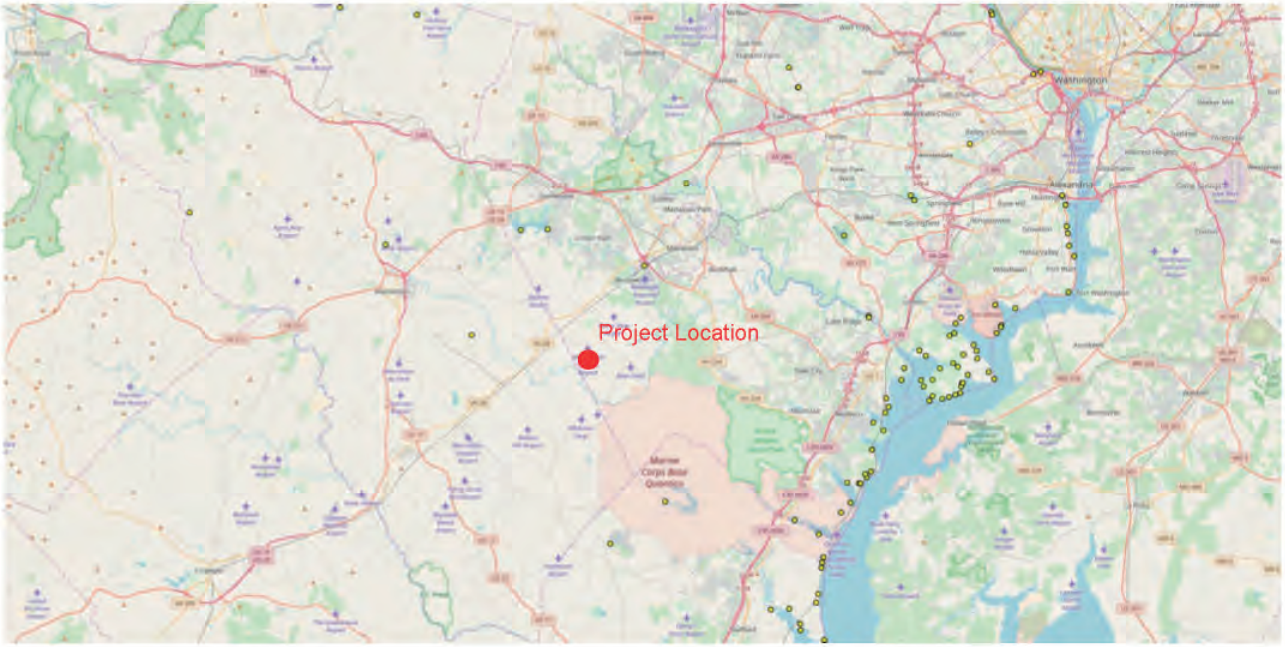
USFWS National Wildlife Refuge Lands And Fish Hatcheries

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.

REFUGE INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.



CCB Mapping Portal



Layers: VA Eagle Nest Locator

Map Center [longitude, latitude]: [-77.5634765625, 38.64449496232183]

Map Link:
http://www.ccbbirds.org/maps/#layer=VA+Eagle+Nest+Locator&zoom=11&lat=38.64449496232183&lng=-77.5634765625&legend=legend_tab_7c321b7e-e523-11e4-aaa0-0e0c41326911&base=Street+Map+%28OSM%29

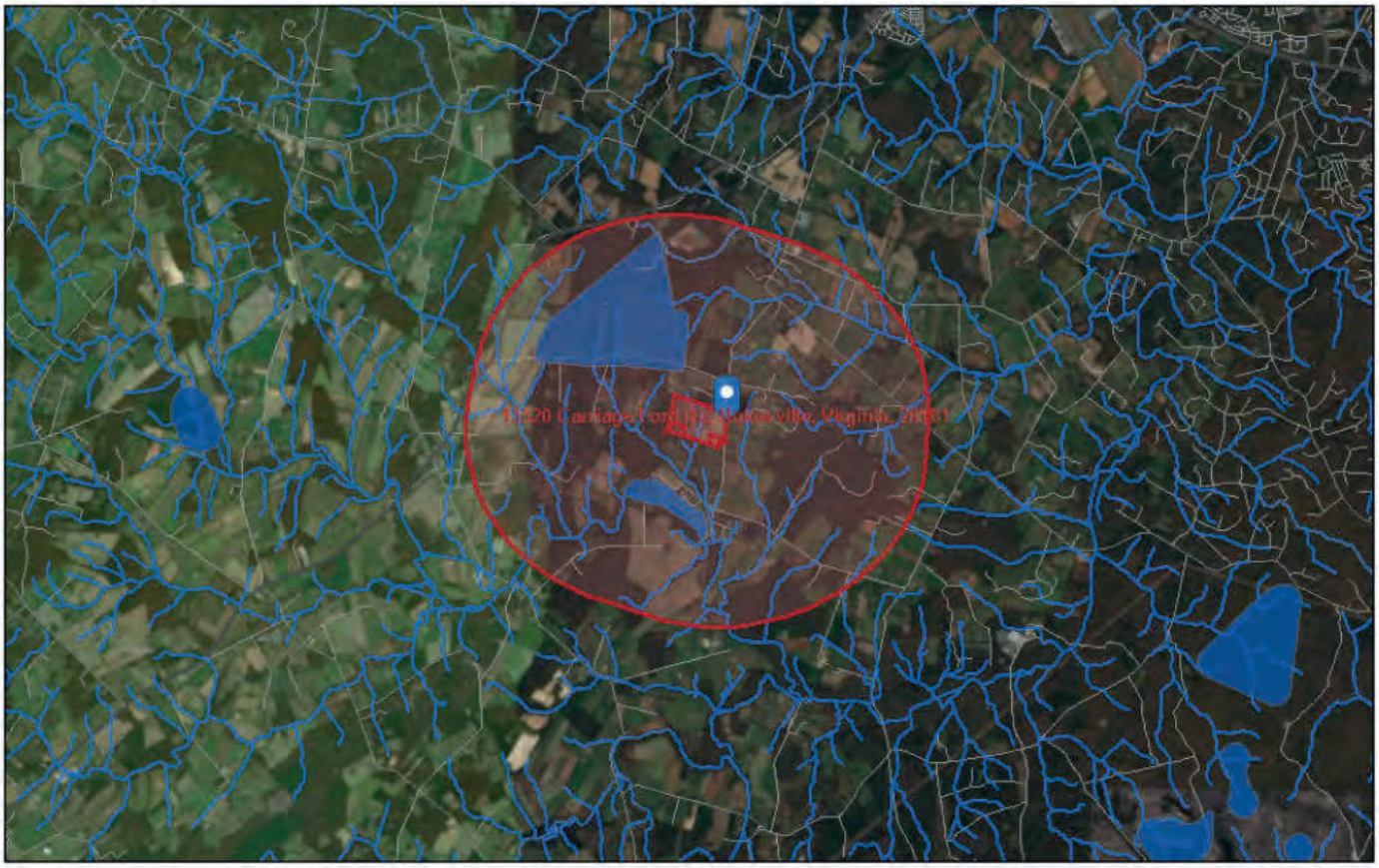
Report Generated On: 04/03/2018

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 or 757-221-7503.

APPENDIX III

Virginia Department of Conservation & Recreation (DCR)
Search Results

PW County Public Safety Training Center



Conservation Site ID	Conservation Site Name	Biodiversity Rank	Legal Status	Acres	Description	Type
876	CARRIAGE FORD	B2	NL	128	Site delineates an area that provides habitat and buffer for one or more rare terrestrial plants or animals, or significant natural communities	Conservation Site

Conservation Site ID	Conservation Site Name	Biodiversity Rank	Legal Status	Acres	Description	Type
1121	NOKESVILLE DIABASE FLATWOODS	B3	NL	903	Site delineates an area that provides habitat and buffer for one or more rare terrestrial plants or animals, or significant natural communities	Conservation Site

Carriage Ford Road

Prince William County, Virginia

WSSI #30250.01

Small Whorled Pogonia (*Isotria medeoloides*) Habitat Evaluation and Search

June 21, 2018

Prepared for:
HG Architects
22630 Davis Drive, Suite 175
Sterling, VA 20164

Prepared by:

Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
Gainesville, Virginia 20155
Tel: 703-679-5600 Email: contactus@wetlandstudies.com
www.wetlandstudies.com

Small Whorled Pogonia (*Isotria medeoloides*) Habitat Evaluation and Search

Carriage Ford Road
Prince William County, Virginia
WSSI #30250.01

Executive Summary

Wetland Studies and Solutions, Inc. (WSSI) has conducted a habitat evaluation and search for the small whorled pogonia (*Isotria medeoloides*) on the Carriage Ford Road site in Prince William County, Virginia. This report addresses the Federal Endangered Species Act general condition for the purposes of Clean Water Act permitting. This report discusses the distribution and habitat associations of the small whorled pogonia, details the methodology of our habitat evaluation and search, and presents our findings and conclusions.

The entire study area possesses "low-quality" habitat for the species. Based upon our habitat evaluation, no "high-quality" or "medium-quality" habitat is present within the study area and no small whorled pogonias were found during the search. Approximate locations of the photographs of the "low-quality" habitat areas are depicted on Attachment I.

General Distribution and Habitat Associations of the Small Whorled Pogonia

The small whorled pogonia has been recorded in at least 23 eastern states, and in Ontario, Canada. Despite the relatively widespread occurrence of this species, it is sparsely dispersed, and most extant sites are represented by few individuals. Due to its rarity, this species was listed as endangered on the federal level in 1982 (U.S. Fish and Wildlife Service, 1982). Increased efforts to locate this species following its listing led to the discovery of a number of additional sites, increasing the number of known extant sites from 34 in 1985 to 104 (in 15 states) in 1993. In 1993, known sites occupied by the small whorled pogonia numbered 66 in New England, 18 in the southern Appalachians, 13 in the Piedmont and Coastal Plain of Virginia, Delaware, and New Jersey, and seven in other scattered locations (U.S. Fish and Wildlife Service, 1993). The small whorled pogonia was downlisted to threatened status on the federal level in 1994 (U.S. Fish and Wildlife Service, 1994). The Fish and Wildlife Service 5-Year Review (2008) for this species increased the number of extant sites to 150.

Due to the apparent rarity of the small whorled pogonia in Virginia, this species was listed as state-endangered in 1985 (Terwilliger, 1991). In 1991, extant colonies were known only from Caroline, Gloucester, James City, Stafford, and Prince William counties. Increased survey effort in the last decade has led to the discovery of additional colonies, including some in new areas such as Spotsylvania and Madison counties. In 2008, the U.S. Fish and Wildlife Service had recorded the small whorled pogonia in 21 Counties and Cities in Virginia (U.S. Fish and Wildlife Service, 2008). In Virginia, most known colonies occur in the Piedmont and Coastal Plain regions (Harvill *et al.*, 1992); with single additional colonies known from the Big Stone Gap area straddling the Lee/Wise County line in the southwestern part of the state, from Shenandoah National Park in Madison County, and from the Blue Ridge Mountains in Bedford County (Van Alstine *et al.*, 1996; NatureServe, 2006). WSSI also located a small whorled pogonia in southeastern Fairfax County during the 2005 survey

season. Nevertheless, in areas where the small whorled pogonia is currently known to exist, it occurs only in a few colonies represented by small numbers of individuals (Ware, 1991).

As of July 2005, there were 10 sites for small whorled pogonia in Prince William County (N. Van Alstine, pers. comm.). Most known colonies of the small whorled pogonia in Prince William County occur on the Quantico Marine Corps Base and in Prince William Forest Park, in the southeastern part of the county. Prior to the search of the site, WSSI was aware of the locations of at least five additional colonies in Prince William County.

The small whorled pogonia has been recorded in a variety of forest types (U.S. Fish and Wildlife Service, 1992). As a result, the factors limiting the distribution and abundance of this species, in particular its rarity and sparse distribution throughout its fairly broad range, are not well understood. However, several characteristics are common to most occupied sites, enabling the summary of general habitat associations of the species. Most occupied sites occur in third-growth upland hardwood forest, usually dominated by oaks (*Quercus* spp.) approximately 40 to 80 years old (Ware, 1995). Tree canopy species often present at occupied sites in Virginia include white oak (*Quercus alba*), American beech (*Fagus grandifolia*), tulip tree (*Liriodendron tulipifera*), and hickories (*Carya* spp.), with black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea*), and/or northern red oak (*Quercus rubra*) occasionally present in large numbers as well (Ware, 1995)[1].

Most occupied sites have a relatively open understory and sparse herbaceous ground cover. According to Ware (1995), understory shrubs and trees with which the small whorled pogonia is often found include flowering dogwood (*Cornus florida*), American holly (*Ilex opaca*), red maple (*Acer rubrum*), and sometimes mountain laurel (*Kalmia latifolia*). Herbaceous associates most commonly occurring with the small whorled pogonia in Virginia include striped wintergreen (*Chimaphila maculata*), partridge berry (*Mitchella repens*), sassafras (*Sassafras albidum*) seedlings, naked-flowered tick-trefoil (*Desmodium nudiflorum*), Indian cucumber root (*Medeola virginiana*), lowbush blueberry (*Vaccinium pallidum*), American strawberry bush (*Euonymus americanus*), Solomon's seal (*Polygonatum biflorum*), false Solomon's seal (*Maianthemum racemosum*), Virginia creeper (*Parthenocissus quinquefolia*), catbrier (*Smilax glauca*), and the common whorled pogonia (*Isotria verticillata*). Occasionally it is found with New York fern (*Thelypteris noveboracensis*) and Christmas fern (*Polystichum acrostichoides*) (Ware, 1995). However, some small whorled pogonia sites are practically devoid of associate species (Ware, 2001).

Although local stands of ericaceous shrubs, such as dangleberry (*Gaylussacia frondosa*), lowbush blueberry, and sometimes mountain laurel (*Kalmia latifolia*) are often present, the small whorled pogonia generally is not able to tolerate the resource competition from dense stands of shrubs, saplings, or thickets of mixed types of vegetation. The common whorled pogonia, which often grows in association with the small whorled pogonia, does not share this trait, and is often found in the midst of relatively heavy shrub cover (Ware 1987b; 2001).

Although the small whorled pogonia occasionally occurs on slopes that are steep or that face the south, southeast, or northwest, it is generally found on gentle to moderate slopes with northern or eastern exposure (Ware, 1987a; 1991; 2001; Van Alstine *et al.*, 1996). This species usually occurs where the forest floor is amply flecked with sunlight, and it is often found near small forest openings (Mehrhoff, 1989). Ware (2001) reports that small whorled

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[1] *Nomenclature used in this Report follows the Integrated Taxonomic Information System (ITIS): URL at: <www.itis.gov>. Last Updated: Thursday, 07-Jun-2007 13:54:22 MDT*

pogonia is often found adjacent to some type of perennial canopy break such as a stream corridor, a logging road, or a dead standing snag or windfall.

The common soil factor at most small whorled pogonia sites is the "highly-acidic (pH is between 4.3 and 5.5), nutrient-poor quality of the soil, particularly sandy loams" (Mehrhoff, 1989; Rawinski, 1986). Although there are several reports elsewhere of small whorled pogonias from calcareous or nutrient-rich soils (Correll, 1950; Steyermark, 1963), no small whorled pogonia populations in rich soils (Ware, 1987a; Belden, pers. comm.[2]) or in areas with nutrient-demanding vegetation (Ludwig, 2000) are known from Virginia. Soil moisture levels in "high quality" habitat are generally moist to slightly dry (Ware, 1987a). Ware (1994) reports a Stafford County small whorled pogonia site where the soils are described as being a clay or silt loam of the Nason-Elioak-Manor soil association in an area with alternating bands of sedimentary rock (*e.g.*, shale, siltstone), igneous intrusive (*e.g.*, basalt and diabase), and thermally-metamorphosed rock (*e.g.*, hornfels). Therefore, areas with predominantly silt loam soils in areas of known highly differentiated geology cannot be completely excluded from searches for small whorled pogonia on the basis of soil parameters alone.

In Ware's (1987a, b) study of Prince William County small whorled pogonia sites, soils were nutrient poor, acidic sandy loams with an average soil pH of 4.3. Soil pH ranged from 4.2 to 4.6 at newly discovered small whorled pogonia sites found by WSSI in Fairfax and Prince William Counties during the 2005 survey season. The textural class was loam at each of these sites. Colonies in Prince William County were found on soils mapped as the Gaila soil series and the Glenelg-Buckhall Complex (soil profile closely matched the Glenelg series profile description) and the individual small whorled pogonia in Fairfax County was found on the Loamy and Gravelly Sediments mapped soil series.

Other environmental factors associated with the occurrence of the small whorled pogonia include the presence of standing dead trunks, decaying woody debris, the presence of leaf litter, and the presence of a fragipan or other impermeable layer beneath the surface (U.S. Fish and Wildlife Service, 1993; Ware, 1987a; 1991; 1995; 2001). Orchids, including the small whorled pogonia, require mycorrhizal fungus in leaf litter for germination and seedling development (U. S. Fish and Wildlife Service, 1992; Jackson and Mason, 1984). As of Fall 2008, the National Park Service was funding the Smithsonian Environmental Research Center to identify the ectomicorrhyzal fungi needed for successful small whorled pogonia germination (U.S. Fish and Wildlife Service, 2008).

Carriage Ford Road Site Description

The Carriage Ford Road site is located on the west side of Carriage Ford Road, about 2,000 feet southwest of the intersection of Warrenton Road and Carriage Ford Road in Prince William County, Virginia. Exhibit 1 is a vicinity map that depicts the approximate location of the study area. The topography of the study area is depicted in Exhibit 2 by the USGS Quad Map – Nokesville, VA 1994, as well as in the background topo in Attachment I. The western portion of the site is a mix of mature hardwood and cedar forest types with a largely southeastern aspect. A large utility easement bisects the eastern portion of the site. The eastern portion of the site is characterized by grassy fields and a pond in the south. General vegetative cover can be seen in the aerial photographs in Exhibit 3 (a March 2013 Natural

[2] *Belden, A. 2005. "Saratoga Hunt SWP Survey," email correspondence to R. Wright (WSSI), July 11, 2005.*

PWC PUBLIC SAFETY TRAINING CENTER 76

Color Image from Pictometry), and Exhibit 4 (a Summer 2016 Natural Color Image from National Agriculture Imagery Program).

Carriage Ford Road Soils

Based on the Prince William County Soil Survey, there are seventeen soil series on the site. Of these, none are expected to provide "high-quality" conditions for the small whorled pogonia, characterized by low nutrient content, sandy loam textures, and very strong to strong acidity (pH = 4.3 to 5.5). Seven are expected to provide "medium-quality" habitat, with low to medium nutrient content, very strong to moderate acidity, and silt loam textures. These series are the Albano silt loam, Arcola silt loam, Bermudian silt loam, Arcola-Nestoria complex, Catlett-Sycoline complex, Meadowville loam, and Panorama silt loam, located in the central, eastern and northwestern portions of the study area. 10 series are expected to provide "low-quality" habitat and satisfy none or only one of the parameters, being strongly acid to nuetral. They are the Dulles silt loam, Haymarket silt loam, Jackland silt loam, Jackland-Haymarket complex, Legore-Oakhill complex (B, C and D), Manassas silt loam, Montalto silt clay loam, and Waxpool silt loam, in the eastern, western and southwestern portions of the study area. All soil series on site are described further in Exhibit 5.

Habitat Evaluation & Search Methodology

The habitat evaluation and search for individual small whorled pogonias was conducted on June 4 and 6, 2018 by Benjamin N. Rosner, PWS, PWD, CT, CE[3,4], Maggie Graham, WPIT, CT[5], and William Neville. Prior to performing the field work at the site, staff members reviewed small whorled pogonias and their habitat to ensure familiarity with the visual appearance and seasonal conditions for local Prince William County small whorled pogonia populations. Variables reviewed included the visual distinctions between it and similar vegetation, and the general habitat associations (including the herbaceous plant associates). The timing of this survey was selected to coincide with the period when the stems and leaves of the small whorled pogonia are most likely to be visible. Based on the literature consulted (*e.g.*, U.S. Fish and Wildlife Service, 1992, 1993) and seasonal observations of small whorled pogonias at a nearby colony, the date of our site survey was appropriately timed for observing the small whorled pogonia if present on the site[6].

Before beginning intensive searches for individual small whorled pogonias on the site, WSSI conducted an evaluation of habitat suitability throughout the site using scaled [1 inch = 200 feet] topographic mapping. This was accomplished by initially assessing the entire site's

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3 *Professional Wetland Scientist #1766, Society of Wetland Scientists Certification Program, Inc.; Virginia Certified Professional Wetland Delineator #3402-000080; Certified Level 1 Taxonomist: All Phyla, Society for Freshwater Science (SFS); Certified Ecologist, Ecological Society of America.*

4 *Ben Rosner is on the U.S. Fish and Wildlife Service's current list of small whorled pogonia survey contacts.*

5 *Wetland Professional in Training, Society of Wetland Scientists Certification Program, Inc. Certified Level 1 Taxonomist: All Phyla, Society for Freshwater Science (SFS).*

6 *U.S. Army Corps of Engineers, based on routine consultation with the U. S. Fish and Wildlife Service, typically recommends that surveys for small whorled pogonia be conducted in northern Virginia between June 1 and July 20. Neither the Corps nor the Service has requested that a small whorled pogonia survey be conducted on the site.*

vegetation, slope, and soil variability through qualitative data compilation using available aerial imagery, topography and soils surveys and preliminarily mapping habitat areas that could potentially support the small whorled pogonia on the site.

In the field, the study area is transected and observers compile field data, including: the maturity level and species composition of the canopy trees, the relative density and species composition of the understory trees and shrubs, the density and species composition of the herbaceous cover (including woody seedlings), slope aspect and steepness, relative soil moisture and soil type, and other parameters such as leaf litter development, degree of canopy openness, and presence of coarse woody debris. These data are compared to the preliminarily mapped data, and, in addition to using landmarks, pacing and slope distance estimates, are used to further refine the approximate boundaries of forested habitat that appeared to be suitable for small whorled pogonia habitat searches. Using these methods, the habitat quality is evaluated and identified as "low-quality", "medium-quality", or "high-quality" as defined below:

1. **"Low-quality"** areas are defined as areas that have little or no potential to support small whorled pogonias due to one or more overriding factors, such as open, treeless areas, woods with an immature forest canopy, very dense shrub/sapling or understory vegetation, overgrown groundcover, or very dry or wet soil conditions. Because it has been documented that small whorled pogonias rarely occur on slopes facing south or west in Virginia, areas sloping in these directions are initially considered "low-quality" unless most other habitat parameters are favorable for the species. Also, because small whorled pogonias are not known to occur in Virginia in areas dominated by chestnut oak (*Quercus prinus*) or southern red oak (*Quercus falcata*) (Ware, 1995; Ware 2001), areas strongly dominated by these species are initially considered "low-quality". Areas dominated overwhelmingly by Virginia pine (*Pinus virginiana*) are considered "low-quality".

2. **"Medium-quality"** habitat areas provide conditions approaching, but differing somewhat from, the "typical" conditions for small whorled pogonias in Virginia, as described in the literature. For example, habitat that is otherwise "high-quality" for the small whorled pogonia is considered "medium-quality" if:

    a. the forest canopy trees are somewhat younger or more closely spaced than in typical habitat;
    b. the canopy includes moderate numbers of trees (such as Virginia pine and chestnut oak) with which the small whorled pogonia is not typically associated;
    c. the understory or ground cover is moderately dense or is composed of species with which the pogonia is not typically associated; and/or,
    d. the slope is fairly steep or faces northwest or southeast.

    "Medium-quality" areas may also include habitat areas that are mostly "low-quality" due to one or more overriding factors (as described above), but have some potential for occurrence of the small whorled pogonia due to the presence of small patches of "medium-" or "high-quality" habitat.

3. **"High-quality"** habitat areas provide conditions similar to those described for typical small whorled pogonia colonies in Virginia (Ware, 1991). Chief among the factors considered as optimal habitat variables are evidence of past agricultural

use, low nutrient, acidic sandy soils, open shrub and herbaceous layer, and canopy openings that allow filtered sunlight to reach the forest floor.

After habitat quality is initially evaluated, field mapped, and thereafter refined, all "high-quality" and "medium-quality" habitat areas on the study area are thoroughly and carefully searched for individual small whorled pogonias. Parallel search transects spaced at approximately 20 feet apart (or less) are walked along the contours of the slope while observers inspect the forest floor closely for small whorled pogonias. Observers walk along these transects, looking both for small whorled pogonias and for patches of better microhabitat. Where this better habitat (*i.e.*, "high-quality" habitat) exists, searches using more closely spaced transects (10 to 15 feet apart) are performed. Areas having concentrations of decaying plant material, near well-lit gaps, and/or supporting concentrations of plants known to grow in association with small whorled pogonia were scrutinized particularly carefully. Any vegetation on the study area having physical similarity to the vegetative form of small whorled pogonia (*i.e.*, Indian cucumber root or common whorled pogonia) is carefully inspected, and positively identified.

The investigators also search for small whorled pogonias in forested areas considered "low-quality", using transects spaced no less than 20 feet apart to ensure adequate survey coverage, and to reduce sampling bias. "'Low-quality" habitat areas such as open fields, residential areas, and wetlands are also transected and casually searched for small whorled pogonias, unless microhabitats with most other habitat parameters favorable for the species are observed (in which case these areas are searched as "medium-quality").

The suitable small whorled pogonia habitat areas, if present, are identified and mapped on a topographic map (Attachment I) into categorical types using "low-quality", "medium-quality" and "high-quality" identifiers. To provide a visual description of the study areas, photographs of representative habitats within the study areas are taken and are included in Exhibit 6. The approximate locations of these photographs are depicted on Attachment I. A list of vascular plant species observed within the study areas is provided in Exhibit 7.

Habitat Evaluation & Search Findings

The entire study area is comprised of unsuitable (i.e., "low-quality") habitat due to one or more overriding factors. The factors that limit habitat quality in these marginal areas are as follows:

- The eastern portion of the study area, and the transmission easement in the central portion, are characterized by open fields dominated by herbaceous vegetation (Photos #1 and #2), and do not provide suitable habitat for the small whorled pogonia.
- The understory of the forested area in the eastern and western portions of the study area is largely dominated by a thick ground cover (Photos #25 and #26).
- The canopy of the forest surrounding the house in the western portion of the study area is comprised of Virginia pine (*Pinus virginiana*) and eastern red cedar (*Juniperus virginiana*), species not typically associated with the small whorled pogonia in Virginia (Photos #15, #16 and #17).
- Ponds, streams and the adjacent wetlands (Photos #5, #8 and #9) provide conditions that are too wet for the small whorled pogonia).
- The canopy of the hardwood forest along the western site boundary and scattered throughout the western portion of the study area is full and does not allow sufficient sunlight to reach the forest floor for the establishment of small whorled pogonia.

Though the hardwood forest in the study area has cover comprised of species associated with small whorled pogonia, it remains "low-quality" habitat. These areas contain fairly mature forest dominated by tulip poplar, white oak, red oak, and red maple, and have an open understory characterized by sweetgum, willow oak, and some flowering dogwood. The herbaceous layer was very dense throughout most of this forest and consisted of pogonia associates such as Virginia creeper, partridge berry, red maple seedlings, and Christmas fern, and non-associates such as jewelweed, Japanese honeysuckle and Japanese stilt-grass. Lesser amounts of multiflora rose, Indian grass, common rush, and other species were also present in the herbaceous layer. Coarse woody debris and decaying stumps were present in moderate numbers. Overall, the thick cover of herbaceous vegetation throughout the site, the paucity of leaf litter in many places, and the lack of sunlight penetrating the canopy preclude the rating of the habitat as even "medium-quality".

All areas on Attachment I are considered unsuitable for the small whorled pogonia for one or more of the above reasons. Nevertheless, due to the fairly wide range of conditions in which the small whorled pogonia occurs over its range and the "atypical" conditions in which the species occurs on rare occasions, transects and spot-checks of some of these ostensibly "low-quality" areas were conducted by WSSI in an attempt to minimize search bias. No small whorled pogonias were detected in these areas.

Conclusions

No small whorled pogonias were found during the survey of the site. "Low-quality" habitat covers the entirety of the study area, with no "medium-quality" or "high-quality" habitat present. Given the poor habitat quality and the systematic nature of the search (*i.e.* transecting all areas of the study area and investigating the highest quality habitat), it is WSSI's opinion that there is a low probability that this species occurs within the study area, based on the negative search results and ubiquitously unfavorable habitat parameters for the small whorled pogonia.

If you should choose to apply for a wetlands permit, a copy of this report can be included as supplemental information to the wetlands permit application to document that adverse impacts to the small whorled pogonia are not anticipated to occur as a result of the development of this site.

Limitations

This study is based on examination of the habitat conditions on the study site at the time of our review and does not address conditions at a given time in the future. Such habitat conditions change over time. In addition, small whorled pogonias may remain dormant for several years, without any visible above-ground stems or leaves, between appearances above-ground. Therefore, our conclusions may vary from future observations.

Our habitat evaluation, small whorled pogonia search, and report have been prepared in accordance with generally accepted guidelines for the conduct of such surveys. Conclusions presented herein are based upon our review of available information, the results of our field studies, and/or professional judgement. We make no other warranties, either expressed or implied, and our report is not a recommendation to buy, sell or develop the property.

We offer no opinion and do not purport to opine on the possible application of various building codes, zoning ordinances, other land use or platting regulations, environmental or

health laws and other similar statutes, laws, ordinances, code and regulations affecting the possible use and occupancy of the Property for the purpose for which it is being used, except as specifically provided above.

The foregoing opinions are based on applicable laws, ordinances, and regulations in effect as of the date hereof and should not be construed to be an opinion as to the matters set out herein should such laws, ordinances or regulations be modified, repealed or amended.

Any reuse or modification of any of this document (whether hard copies or electronic transmittals) prepared by WSSI without written verification or adaptation by WSSI will be at the sole risk of the individual or entity utilizing said document and such use is without the authorization of WSSI. WSSI shall have no legal liability resulting from any and all claims, damages, losses, and expenses, including attorney's fees arising out of the unauthorized reuse or modification of this document. Client shall indemnify WSSI from any claims arising out of unauthorized use or modification of the document whether hard copy or electronic.

WETLAND STUDIES AND SOLUTIONS, INC.

William Neville
Environmental Technician

Benjamin N. Rosner, PWS, PWD, CT, CE
Manager – Environmental Science

Enclosure

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LITERATURE CITED

Correll, D.S. 1950. *Native Orchids of North America North of Mexico*. Stanford University Press, Stanford, CA., 399 pages.

Elder, J. 1989. Soil Survey of Prince William County, Virginia. U. S. Department of Agriculture, Soil Conservation Service, Washington, DC. 245 pages plus plates.

Harvill, A. M., Jr., T. R. Bradley, C. E. Stevens, T. F. Wieboldt, D. M. E. Ware, D. W. Ogle, G. W. Ramsey, and G. P. Fleming. 1992. *Atlas of the Virginia Flora, Edition III*. Virginia Botanical Associates, Burkeville, Virginia.

Jackson, R. M. and P. A. Mason 1984. *Mycorrhiza*. Edward Arnold Ltd., London. 60 pages.

Ludwig, C. J. 2000. Survey for Small Whorled Pogonia (*Isotria medeoloides*) on the Saratoga Hunt Property, Prince William County, Virginia. Letter Report, prepared for Wetland Studies and Solutions, Inc. by the Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. May 23, 2000.

Mehrhoff, L. A. 1989. Reproductive Vigor and Environmental Factors in Populations of an Endangered North American Orchid, *Isotria medeoloides* (Pursh) Rafinesque. *Biological Conservation* 47:281-296.

NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.5. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: June 7, 2006).

Rawinski, T. 1986. Element stewardship abstract for *Isotria medeoloides* (Pursh) Raf. Unpublished Report, Eastern Heritage Task Force, The Nature Conservancy, Boston, MA.16 p.

Steyermark, J. 1963. *Flora of Missouri*. University of Illinois Press. 1725 pages.

Terwilliger, K. (coord.). 1991. *Virginia's Endangered Species: Proceedings of a Symposium.* The McDonald and Woodward Publishing Co., Blacksburg, VA. 672 pages.

U.S. Fish and Wildlife Service. 1982. Endangered and Threatened Wildlife and Plants; Determination of *Isotria medeoloides* (Small Whorled Pogonia) to be an Endangered Species. *Federal Register* 47(176):39827-39831.

U.S. Fish and Wildlife Service. 1992. Small Whorled Pogonia (*Isotria medeoloides*) Recovery Plan. First Revision. Washington, D.C. 67 pages.

U.S. Fish and Wildlife Service. 1993. Endangered and Threatened Wildlife and Plants; Proposed Rule to Reclassify the Plant *Isotria medeoloides* (Small Whorled Pogonia) from Endangered to Threatened. *Federal Register* 58(200):53904-53909.

U.S. Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; Final Rule to Reclassify the Plant *Isotria medeoloides* (Small Whorled Pogonia) From Endangered to Threatened. *Federal Register* 59(193):50852-50857.

U.S. Fish and Wildlife Service, 2008. Small Whorled Pogonia (*Isotria medeoloides*); 5 Year Review: Summary and Evaluation. New England Field Office, Concord, New Hampshire.

Van Alstine, Nancy E., W. H. Moorhead III, A. Belden, Jr., T. J. Rawinski, and J. C. Ludwig 1996. Recently Discovered Populations of Small Whorled Pogonia (*Isotria medeoloides*) in Virginia. *Banisteria* 7: 1-15.

Ware, D. M. E. 1987a. The Small Whorled Pogonia, *Isotria medeoloides* (Pursh) Raf., in Virginia: Searches for New Populations. Unpublished Draft Report, Virginia Department of Agriculture and Consumer Services, Richmond, VA, 22 pages.

Ware, D. M. E. 1987b. Searches for the Small Whorled Pogonia, *Isotria medeloides* (Pursh) Raf., a Federally Endangered Species, Along Proposed Highway Corridors for the Coleman Bridge Expansion . Unpublished Contract Report, Prepared for Resource Applications, Inc.

Ware, D. M. E. 1991. Species Account: Small Whorled Pogonia. Pages 95-97 *in* K. Terwilliger (coord.), *Virginia's Endangered Species: Proceedings of a Symposium.* The McDonald and Woodward Publishing Co., Blacksburg, VA. 672 pages.

Ware, D. M. E. 1994. Searches for the Small Whorled Pogonia (*Isotria medeoloides*) at the Proposed Site for Disney's America at Haymarket, Prince William County, Virginia. Unpublished report, 27 pages.

Ware, D. M. E. 1995. Report on Searches for Small Whorled Pogonia (*Isotria medeoloides*) Habitat on the Arkendale Tract in Stafford County, Virginia, Fall 1995. Unpublished Report for Wetland Studies and Solutions, Inc.

Ware, D. M. E. 2001. Searches for Habitat for the Small Whorled Pogonia (*Isotria medeoloides*) and the Shale Barren Rockcress (*Arabis serotina*) at Bull Run Regional Park, (Western Segment) Fairfax County, Virginia. Appendix F, In: *Bull Run Regional Park Natural Resources Inventory*. Prepared for the Northern Virginia Regional Park Authority by Paciulli, Simmons and Associates, March 2002. [URL:http://www.nvrpa.org/bullrun/appendixc.html], accessed June 7, 2006.

Yahner, R. H. 2000. *Eastern Deciduous Forest: Ecology and Wildlife Conservation*. Second Edition. University of Minnesota Press, Minneapolis, MN, 295 pages.

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Base Map Source: ESRI

Vicinity Map
Carriage Ford Road
Original Scale: 1" = 2000'

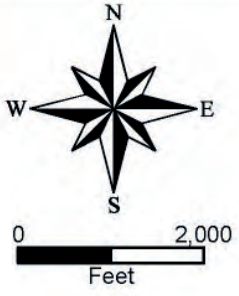

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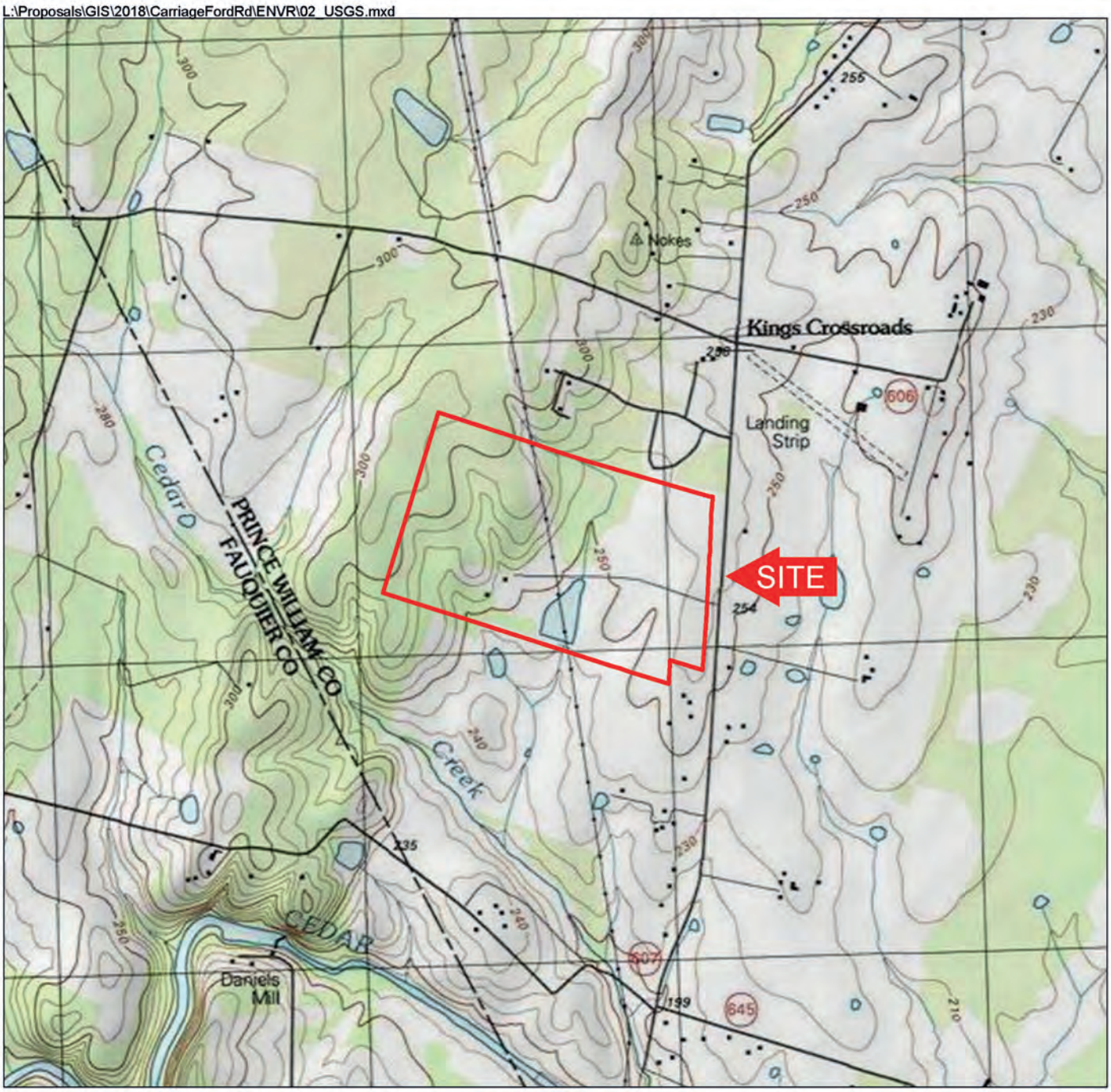
Exhibit 1



USGS Quad Map
Nokesville, VA 1994
Carriage Ford Road
Original Scale: 1" = 2000'

Latitude: 38°39'39" N
Longitude: 77°35'22" W
Hydrologic Unit Code (HUC): 020700100604
Stream Class: III
Name of Watershed: Cedar Run-Walnut Branch
COE Region: Eastern Mountains and Piedmont

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Exhibit 2

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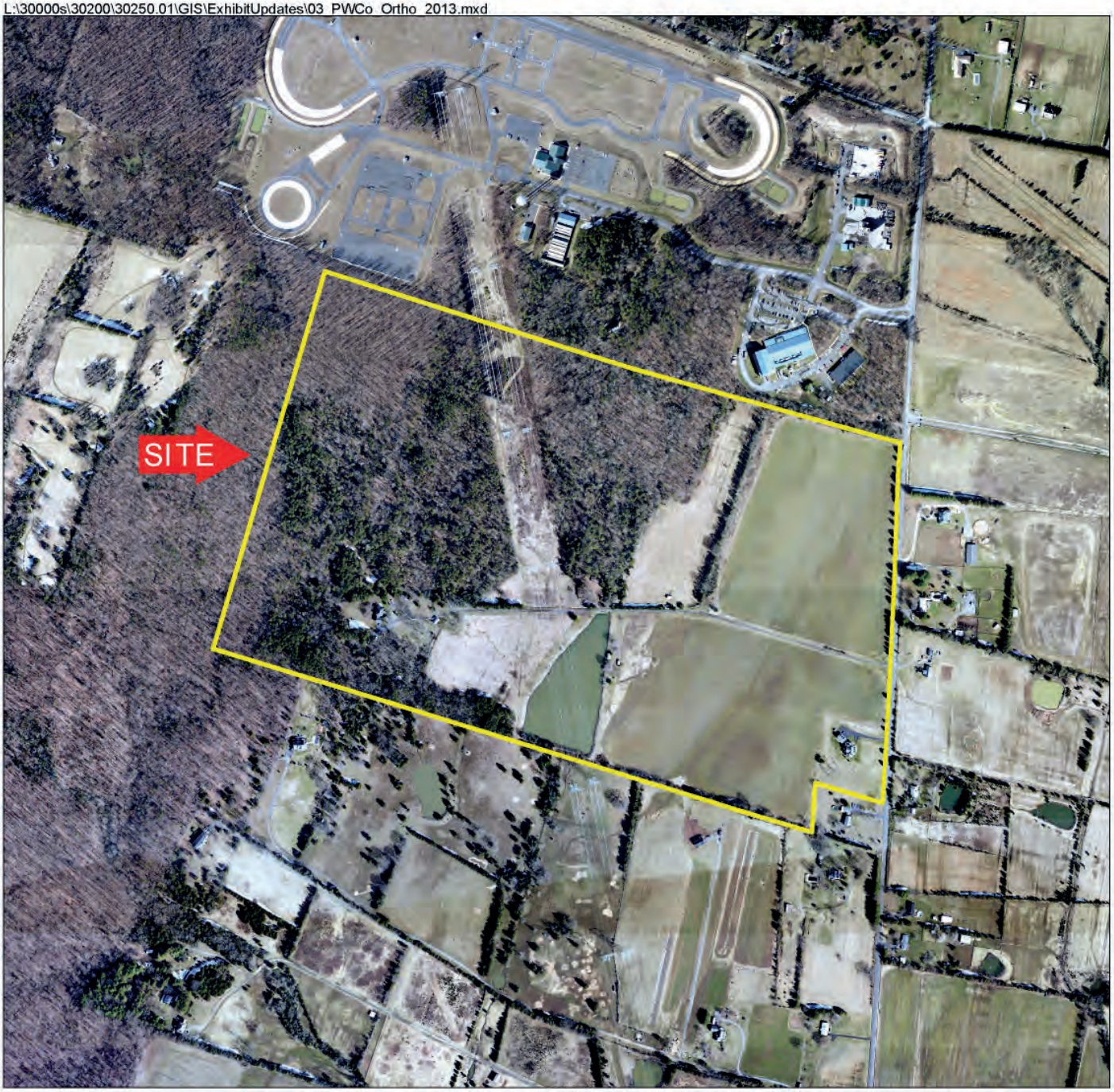

March 2013 Natural Color Imagery
Carriage Ford Road
Original Scale: 1" = 750'

Photo Source: Pictometry®

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Exhibit 3

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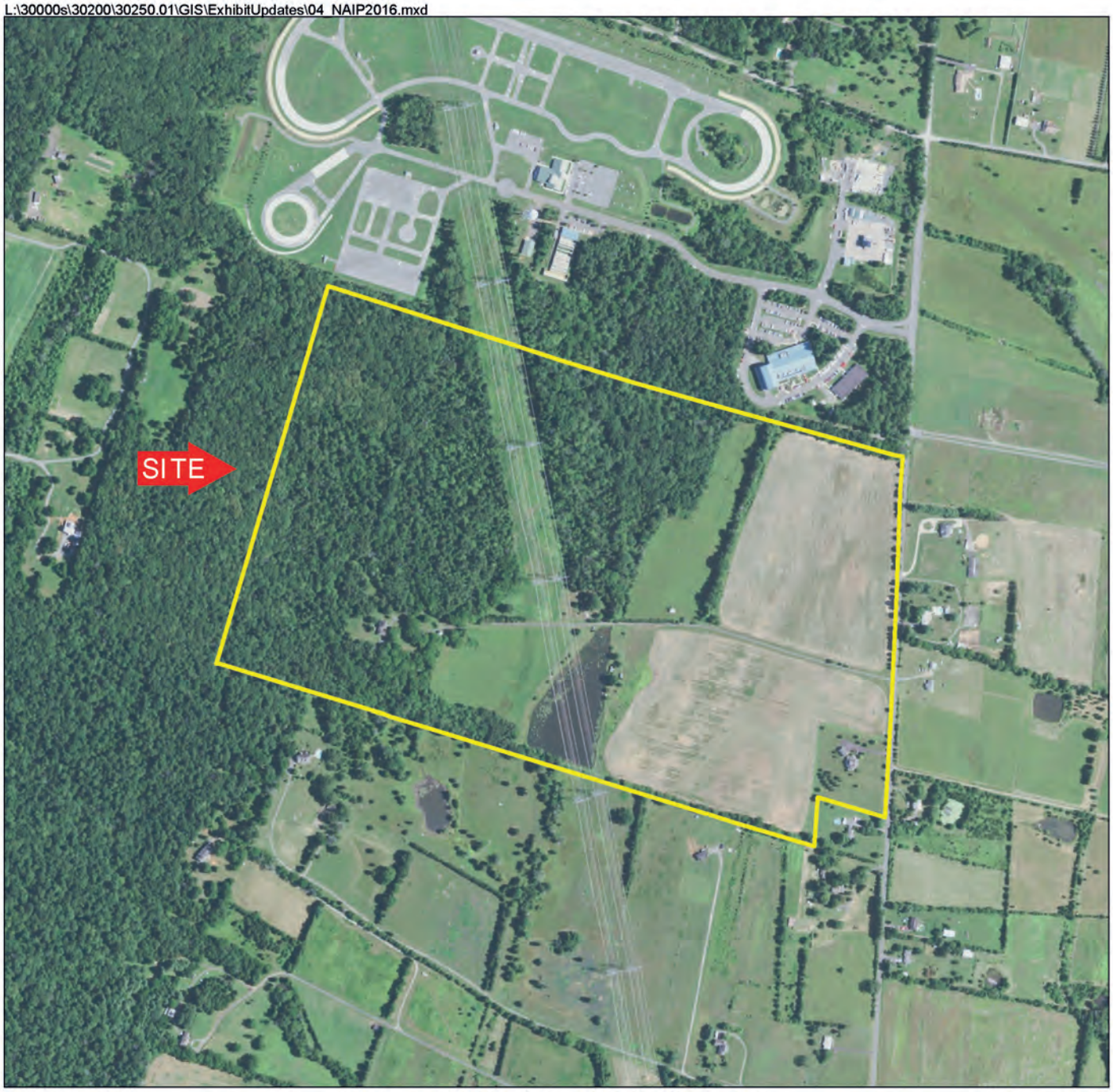

Summer 2016 Natural Color Imagery
Carriage Ford Road
Original Scale: 1" = 750'

Photo Source: National Agricultural Imagery Program

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Exhibit 4

Mapped Soils Report for Carriage Ford Road

Project Number: 30250.01
Applicant / Owner: HG Architects
County: Fairfax, VA

Map Symbol	Map Unit Name	Taxonomy	Drainage Class	Hydric National List	Hydric Local List	Hydric Inclusions
3A	Albano silt loam, 0-4% slopes	Typic Endoaqualfs	poorly	YES	YES	NO
4B	Arcola silt loam, 2-7% slopes	Typic Hapludults	well	NO	NO	ALBANO
5C	Arcola-Nestoria complex, 7-15% slopes	Typic Hapludults	well	NO	NO	ALBANO
7A	Bermudian silt loam, 0-2% slopes	Fluventic Dystrudepts	well	NO	NO	NO
13B	Catlett-Sycoline complex, 2-7% slopes	Ultic Hapludalfs	well	NO	NO	ALBANO
17A	Dulles silt loam, 0-4% slopes	Aquultic Hapludalfs	mod well-smwt poor	NO	NO	ALBANO
28B	Haymarket silt loam, 2-7% slopes	Typic Hapludalfs	well-mod well	NO	NO	NO
30B	Jackland silt loam, 2-7% slopes	Aquic Hapludalfs	mod well-smwt poor	NO	NO	NO
31C	Jackland-Haymarket complex, 7-15% slopes	Aquic Hapludalfs	mod well-smwt poor	NO	NO	NO
33B	Legore-Oakhill complex, 2-7% slopes	Ultic Hapludalfs	well	NO	NO	NO
33C	Legore-Oakhill complex, 7-15% slopes	Ultic Hapludalfs	well	NO	NO	NO
33D	Legore-Oakhill complex, 15-25% slopes	Ultic Hapludalfs	well	NO	NO	NO
35B	Manassas silt loam, 2-7% slopes	Ultic Hapludalfs	well-mod well	NO	NO	ALBANO
38B	Meadowville loam, 0-5% slopes	Typic Hapludults	well-mod well	NO	NO	BAILE

Mapped Soils Report for Carriage Ford Road

Project Number: 30250.01
Applicant / Owner: HG Architects
County: Fairfax, VA

Map Symbol	Map Unit Name	Taxonomy	Drainage Class	Hydric National List	Hydric Local List	Hydric Inclusions
40C	Montalto silty clay loam, 7-15% slopes	Ultic Hapludalfs	well	NO	NO	NO
46B	Panorama silt loam, 2-7% slopes	Ultic Hapludalfs	well	NO	NO	ALBANO
56A	Waxpool silt loam, 0-2% slopes	Aeric Epiaqualfs	poor-smwt poor	YES	YES	NO

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

1. **Looking south at the open field in the eastern portion of the study area. Because the area lacks forest cover, it is not suitable small whorled pogonia (*Isotria medeoloides*) habitat.**

2. **Looking north at the open field in the eastern portion of the study area. Because the area lacks forest cover, it is not suitable small whorled pogonia habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

3. **Looking south at the field just east of the pond in the southern portion of the study area. Because the area lacks forest cover, it is not suitable small whorled pogonia habitat.**

4. **Looking north at the field east of the transmission power easement. Because the area lacks forest cover, it is not suitable small whorled pogonia habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

5. **Looking south at the pond in the southern portion of the study area. This area is too wet to support habitat for the small whorled pogonia.**

6. **Looking west at the open field to the west of the pond. Because the area lacks a forest canopy, it is not suitable small whorled pogonia habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

7. **Looking west at the eastern red cedar (*Juniperus virginiana*) stand in the southern portion of the study area, just west of the pond. This area provides "low-quality" small whorled pogonia habitat due to the dominance of red cedar and Virginia pine.**

8. **Looking northwest at the medium-aged hardwood forest in the southern portion of the study area. Due to high moisture and dense herbaceous ground cover, this area is not suitable small whorled pogonia habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
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9. Looking north (upstream) at the stream in the western portion of the study area. Due to thick herbaceous vegetation and moisture, this area is not suitable habitat.

10. Looking north at the medium-aged hardwood forest in the southwest portion of the study area. This area is not suitable small whorled pogonia habitat due to the herbaceous ground cover.

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

11. Looking southwest at the medium-aged hardwood forest in the southwest portion of the study area. This area is not suitable small whorled pogonia habitat due to the herbaceous ground cover.

12. Looking north at the medium-aged hardwood forest in the southwest portion of the study area. This area is not suitable small whorled pogonia habitat due to the herbaceous ground cover.

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

13. **Looking northwest at the cedar/hardwood forest to the west of the house in the western portion of the study area. Though the herbaceous cover is thinner, the dominance of red cedar qualifies the area as "low-quality" small whorled pogonia habitat.**

14. **Looking south at the hardwood forest bordering the western study area boundary. This area is not suitable small whorled pogonia habitat due to the extent of herbaceous ground cover.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

15. **Looking east at the cedar forest in the western portion of the study area. Because the canopy is comprised of cedar and pine, and because of thick herbaceous ground cover, this area is not suitable habitat for small whorled pogonia.**

16. **Looking southeast at the pine and cedar forest near the western study area boundary. In WSSI's opinion, this area is not suitable small whorled pogonia habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

17. **Looking northwest where the forest cover type changes from pine/cedar to hardwood near the western study area boundary. Due to dense herbaceous vegetation and non-associate canopy types, this area is not suitable habitat.**

18. **Looking northeast at the mixed forest in the western portion of the study area. Due to dense herbaceous vegetation and non-associate canopy types, this area is not suitable habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
WSSI #30250.01

19. **Looking east at the hillslope at the western study area boundary. This area is "low-quality" small whorled pogonia habitat due to the pine/cedar canopy and dense herbaceous ground cover.**

20. **Looking east at the hardwood forest hillslope at the western study area boundary. Due to young stand age and significant herbaceous ground cover, this area is considered "low-quality" habitat for small whorled pogonia.**

EXHIBIT 6
SITE PHOTOGRAPHS
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21. **Looking northeast at the medium-aged hardwood forest in the northwest portion of the study area. Though the canopy contains associate cover species, the thick herbaceous ground cover makes this area "low-quality" habitat.**

22. **Looking southeast at the hardwood forest in the northwest portion of the study area. Though the canopy contains associate cover species, the thick herbaceous ground cover makes this area "low-quality" habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
CARRIAGE FORD ROAD
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23. Looking north at the oak forest west of the power line easement in the western portion of the study area. Though this area allows enough sunlight penetration to the forest floor, the ground cover is too thick for small whorled pogonia.

24. Looking east at the hardwood forest west of the easement in the western portion of the study area. The dense herbaceous cover and heavy large woody debris and woody vine presence make this area "low-quality" habitat for small whorled pogonia.

EXHIBIT 6
SITE PHOTOGRAPHS
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25. **Looking southeast at the hardwood/cedar forest west of the transmission easement in the western portion of the study area. A lack of sunlight penetrating to the forest floor and dense herbaceous ground cover make this area "low-quality" habitat.**

26. **Looking south at the forest between the stream and transmission easement in the western portion of the study area. Though some sunlight is reaching the forest floor, herbaceous ground cover is very thick. This area is considered "low-quality" habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
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WSSI #30250.01

27. **Looking southeast at the mixed forest in the central portion of the study area. Though associate species are present in the canopy, the thick herbaceous ground cover makes this area "low-quality" habitat.**

28. **Looking north at the transmission easement present in the center of the study area. Because the area lacks forest cover, it is not suitable small whorled pogonia habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
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29. **Looking south at the forested hillslope in the northern portion of the study area. Dense herbaceous ground cover and a thick midstory qualify this area as "low-quality" habitat.**

30. **Looking northeast at the hardwood forest present in the eastern portion of the study area. The area is very wet and has dense herbaceous ground cover, making it "low-quality" small whorled pogonia habitat.**

EXHIBIT 6
SITE PHOTOGRAPHS
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31. Looking northeast at the hardwood forest present in the eastern portion of the study area. The area is very wet and has dense herbaceous ground cover, making it "low-quality" small whorled pogonia habitat.

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EXHIBIT 7
CARRIAGE FORD ROAD - SMALL WHORLED POGONIA SEARCH
WSSI #30250.01

VASCULAR PLANTS OBSERVED IN THE STUDY AREA
(Listed Alphabetically by Scientific Name)

Scientific Name	**Common Name**
Acer rubrum	Red Maple
Alisma subcordatum	American Water Plantain
Alliaria petiolata	Garlic Mustard
Allium canadense	Wild Onion
Amphicarpaea bracteata	Hog Peanut
Anthoxanthum odoratum	Sweet Vernal Grass
Apocynum cannabinum	Dogbane
Arctium minus	Lesser Burdock
Arimonia sp.	Agrimony
Arisaema triphyllum	Jack-in-the-pulpit
Asimina triloba	Pawpaw
Asplenium platyneuron	Ebony spleenwort
Berberis thunbergii	Japanese Barberry
Betula nigra	River Birch
Boehmeria cylindrica	False Nettle
Brotychium dissectum	Cutleaf grapefern
Carex frankii	Frank's Sedge
Carex pellita	Wooly Sedge
Carex sp.	Sedge sp.
Carex vulpinoidea	Fox Sedge
Carya tomentosa	Mockernut Hickory
Celtis occidentalis	Hackberry
Cercis canadensis	Eastern Red Bud
Cornus florida	Flowering Dogwood
Cynoglossum virginianum	Wild Comfrey
Dactylis glomerata	Orchard Grass
Desmodium sp.	Tick Trefoil
Dianthus armeria	Deptford Pink
Dichanthelium boscii	Bosc's Panic Grass
Digitaria sanguinalis	Common Crabgrass
Diospyros virginiana	Persimmon
Elymus hystrix	Bottlebrush Grass
Elymus sp.	Rye sp.
Erigeron sp.	Fleabane/Daisy sp.
Eugenia monticola	Birdcherry
Festuca rubra	Red Fescue
Fraxinus pennsylvanica	Green Ash

EXHIBIT 7
CARRIAGE FORD ROAD - SMALL WHORLED POGONIA SEARCH
WSSI #30250.01

VASCULAR PLANTS OBSERVED IN THE STUDY AREA
(Listed Alphabetically by Scientific Name)

Galium asprellum	Rough Bedstraw
Galium circaezans	Wild Licorice
Galium lanceolatum	Lanceleaf Wild Licorice
Galium palustre	Marsh Bedstraw
Houstonia purpurea	Venus' Pridge
Hypericum perforatum	St. John's Wort
Ilex opaca	American Holly
Ilex sp.	Holly sp.
Impatiens capensis	Jewelweed
Juglans nigra	Black Walnut
Juncus Effusus	Common Rush
Juniperus virginiana	Eastern Red Cedar
Lespedeza cuneata	Chinese Lespedeza
Ligustrum sinense	Chinese Privet
Lindera benzoin	Spicebush
Liquidambar styraciflua	American Sweetgum
Lonicera japonica	Japanese Honeysuckle
Lonicera maackii	Amur Honeysuckle
Maianthemum racemosum	False Solomon's Seal
Microstegium Vimineum	Japanese Stiltgrass
Mitchella repens	Patridgeberry
Morus sp.	Mulbery sp.
Nyssa sylvatica	Black Gum
Oenothera fruticosa	Yellow Sundrops
Oxalis stricta	Common Yellow Woodsorrel
Parthenocissus quinquefolia	Virginia Creeper
Persicaria maculosa	Lady's Thumb
Phytolacca americana	Pokeberry
Pimpinella anisum	Anise
Pinus virginiana	Virginia Pine
Plantago major	Broadleaf Plantain
Poa sp.	Meadow-grass sp.
Podophyllum peltatum	Mayapple
Polystichum acrostichoides	Christmas Fern
Potentilla simplex	Common Cinquefoil
Prunus serotina	Black Cherry
Pycnanthemum tenuifolium	Narrow-Leaf Mountain Mint
Pyrus calleryana	Bradford Pear

EXHIBIT 7
CARRIAGE FORD ROAD - SMALL WHORLED POGONIA SEARCH
WSSI #30250.01

VASCULAR PLANTS OBSERVED IN THE STUDY AREA
(Listed Alphabetically by Scientific Name)

Pyrus sp.	Pear sp.
Quercus alba	White Oak
Quercus bicolor	Swamp white oak
Quercus marilandica	Blackjack Oak
Quercus palustris	Pin Oak
Quercus phellos	Willow Oak
Quercus stellata	Post Oak
Ranunculaceae sp.	Buttercup sp.
Rhus aromatica	Fragrant Sumac
Rhus sp. (Rhus glabra?)	Sumac (Smooth Sumac)
Rosa multiflora	Multiflora Rose
Rubus argutus	Sawtooth Blackberry
Rubus occidentalis	Black Raspberry
Rumex crispus	Curly Dock
Rumex sp.	Dock sp.
Salix nigra	Black Willow
Scirpus atrovirens	Green Bulrush
Securigera varia	Crownvetch
Smilax rotundifolia	Greenbrier
Solidago sp.	Goldenrod sp.
Sorghastrum nutans	Indiangrass
Stellaria media	Common Chickweed
Symphoricarpos orbiculatus	Coralberry
Taraxacum officinale	Common Dandelion
Thelypteris noveboracensis	New York Fern
Toxicodendron radicans	Poison Ivy
Trifolium pratense	Red Clover
Trifolium repens	White Clover
Ulmus rubra	Slippery Elm
Viburnum prunifolium	Blackhaw
Vinca minor	Common Periwinkle
Vitis sp.	Grape sp.

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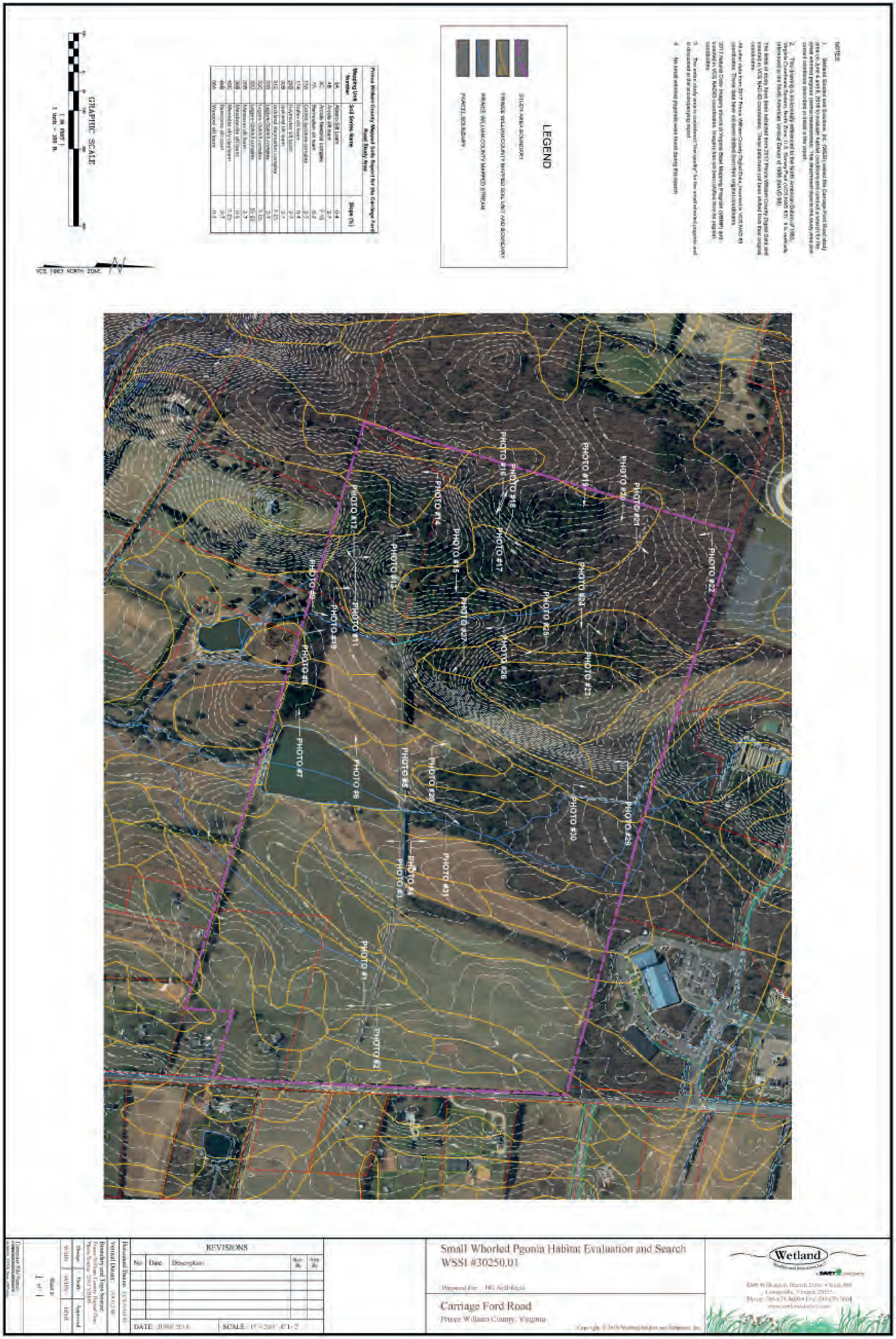
LEGEND
STUDY AREA BOUNDARY
PRINCE WILLIAM COUNTY MAPPED SOIL UNIT AND BOUNDARY
PRINCE WILLIAM COUNTY MAPPED STREAM
PARCEL BOUNDARY
GRAPHIC SCALE
REVISIONS
Small Whorled Pgonia Habitat Evaluation and Search
WSSI #30250.01
Carriage Ford Road
Prince William County, Virginia
Wetland

PHASE I ENVIRONMENTAL SITE ASSESSMENT

PRINCE WILLIAM COUNTY PUBLIC SAFETY TRAINING CENTER

13520-13600 CARRIAGE FORD ROAD
NOKESVILLE, PRINCE WILLIAM COUNTY, VIRGINIA 20181
ECS PROJECT NO. 47:5856

FOR

HUGHES GROUP ARCHITECTS

AUGUST 3, 2018

August 3, 2018

Lynn Reda
Hughes Group Architects
22630 Davis Drive
Suite 175
Sterling, Virginia 20164

ECS Project No. 47:5856

Reference: Phase I Environmental Site Assessment Report, Prince William County Public Safety Training Center, 13520-13600 Carriage Ford Road, Nokesville, Prince William County, Virginia 20181

Dear Mrs. Reda:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide you with the results of our Phase I Environmental Site Assessment (ESA) for the referenced site. ECS services were provided in general accordance with ECS Proposal No. 7348-EP authorized on March 22, 2018 and generally meet the requirements of ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and EPA Standards and Practices for All Appropriate Inquiries contained in 40 CFR Part 312.

If there are questions regarding this report, or a need for further information, please contact the undersigned.

ECS Mid-Atlantic, LLC

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Project Summary

Prince William County Public Safety Training Center
13520-13600 Carriage Ford Road
Nokesville, Virginia 20181

Report Section		No Further Action	REC	CREC	HREC	BER	Comment
4.0	User Provided Information	✔					
5.1	Federal ASTM Databases	✔					
5.2	State ASTM Databases		✔				Nearby LTANKS and LUST listing. Additional investigation recommended.
5.3	Additional Environmental Record Sources	✔					
6.0	Historical Use Information	✔					
7.0	Site and Area Reconnaissance		✔				Three ASTs observed onsite. Removal and further investigation recommended.
8.0	Additional Services	✔					
9.0	Interviews	✔					

ECS Project # 47:5856

ENVIRONMENTAL PROFESSIONAL STATEMENT

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Christopher M. Elliott
Senior Project Manager
August 3, 2018

ECS Project # 47:5856

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1.0 EXECUTIVE SUMMARY

ECS Mid-Atlantic, LLC (ECS) was contracted by Hughes Group Architects to perform an ASTM E1527-13, Phase I Environmental Site Assessment (ESA) of the Prince William County Public Safety Training Center located at 13520-13600 Carriage Ford Road in Nokesville, Prince William County, Virginia (i.e. subject property). This Executive Summary is an integral part of the Phase I ESA report. ECS recommends that the report be read in its entirety.

The subject property is identified by Prince William County as GPINs 7492-25-8724, 7492-34-8902, and 7492-14-6564 and owned by the Board of County Supervisors of Prince William County. The approximately 148-acre subject property is developed with by three residential structures and five outbuildings. The remaining area of the subject property is undeveloped agricultural or forested land. The buildings on the subject property are serviced by well water and septic systems. The buildings are heated with gas or electricity and cooled with electricity. Some of the structures are dilapidated and no longer in use. The residential cottage, located at 13520 Carriage Ford Road, is heated and cooled with electricity. The residential home located at 13540 Carriage Ford Road is heated and cooled with electricity and the water is heated with natural gas. The residential home located at 13600 Carriage Ford Road is heated with natural gas and cooled with electricity. Several outbuildings and sheds were observed to be used for storage and maintenance of farm equipment such as tractors and other vehicles. Several containers less than 5 gallons of cleaning products, gasoline, and paint were observed in the outbuildings.

A pond is located in the south central portion of the subject property. We did not observe a petroleum sheen in the water or staining on the ground surfaces near the pond. Two water supply well structures were observed on the subject property. One well house was located along the driveway to 13540 Carriage Ford Road near the onsite pond. One well house was observed in the backyard at 13600 Carriage Ford Road. A septic tank clean out was observed in the backyard of 13600 Carriage Ford Road. A road affords access to the cottage at 13520 Carriage Ford Road and house at 13540 Carriage Ford Road. Scattered debris consisting of household trash was observed on the subject property behind the house at 13540 Carriage Ford Road. Several pole-mounted transformers were observed at the subject property. The transformers are owned and maintained by Dominion Energy. We did not observe evidence of leakage or staining in the vicinity of the transformers. A right of way is located on the subject property for overhead power transmission lines. Signage for an underground natural gas line is located within the right of way. Three above ground storage tanks (ASTs) were observed onsite. The first AST is located approximately 100 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The second and third ASTs are located approximately 3 yards into the woods to the north of the driveway to 13540 Carriage Ford Road.

The subject property is located in a rural area of Nokesville, Virginia. The subject property is bound on the north by Prince William County Public Safety Training Academy, on the east by Carriage Ford Road, on the south by agricultural and residential properties, and on the west by forested land. We did not identify current occupants or activities on adjoining or nearby properties that are considered a Recognized Environmental Condition (REC) for the subject property.

Based on the records search, site reconnaissance and interviews, it appears that the subject property was developed with two structures from at least 1937 until 1981. From 1981 through 2005,

the subject property was developed with six structures. In 2005, the current improvements were present on the subject property. Historical records prior to the early twentieth century were not reasonably ascertainable for the subject property. Our review of historical information for adjoining or nearby properties identified the area as originally rural that transitioned to rural and residential.

A regulatory database search report was provided by EDR. The database search involves researching a series of Federal, State, Local, and other databases for facilities and properties that are located within specified minimum search distances from the subject property. The report did not identify the subject property on the databases researched. The EDR report identified several off-site properties within the minimum ASTM search distances. EE Wine at 12101 Public Safety Drive, approximately 660 feet northeast and topographically up-gradient from the subject property, was identified on the VA LUST and VA LTANKS databases. PC # 19954182 was opened in February 1995, and was closed in May 1996. Based on the proximity to the subject property, this site is considered a REC for the subject property.

ASTM E1527-13 defines a "data gap" as: "a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information". Data gaps which would be expected to impact our ability to render a professional opinion concerning the subject property were not identified.

We have performed a Phase I Environmental Site Assessment in general conformance with the scope and limitations of ASTM E1527-13 of the Prince William County Public Safety Training Center located at 13520-13600 Carriage Ford Road, in Nokesville, Prince William County, Virginia. Exceptions to, or deletions from, this practice are described in Section 2.6 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except for the following:

- The "E E Wine - PWSCA" site, located at 12101 Public Safety Drive was listed on the Virginia LUST and LTANKS databases. The site is approximately 660 feet northeast and topographically up-gradient from the subject property. This site has one closed Pollution Complaint (PC) listed on the VA LTANKS and LUST Databases. PC # 19954182 was opened in February 1995, and was closed in May 1996. Based on the proximity to the subject property, this site is considered a REC for the subject property.

- Three ASTs were observed onsite. The first AST is located approximately 100 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The first AST is approximately 500-gallons in volume and made of steel. The surface of the AST has holes and is rusted. The AST appeared to be empty, and the former contents of the AST are unknown. Secondary containment was not located around the AST. Staining was not visible on the soil surface near the AST at the time of our assessment. The second and third ASTs are located approximately 3 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The second and third ASTs are approximately 1,000-gallons in capacity and are not located within secondary containment. The second AST reportedly held gasoline and the third AST reportedly held diesel. Staining was not visible on the soil surface near the ASTs at the time of our assessment. The presence of three ASTs is a REC for the subject site due to the corrosion holes evident on the first of the three ASTs and the absence of secondary containment posing a material threat of release..

2.0 INTRODUCTION

2.1 Purpose and Reason for Performing Phase I ESA

The purpose of the ESA was to:

- evaluate the probability of impact to the surface water, groundwater and/or soils within the property boundaries through a review of regulatory information and a reconnaissance of the subject property and vicinity;
- evaluate historical land usage to identify previous conditions that could potentially impact the environmental condition of the subject property;
- conduct all appropriate inquiry as defined by ASTM E1527-13 and 40 CFR Part 312;
- evaluate the potential for on-site and off-site contamination; and,
- provide a professional opinion regarding the potential for environmental impact at the site and a list of Recognized Environmental Conditions (RECs).

The ESA should allow the Users the opportunity to qualify for landowner liability protection under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) provided certain stipulations are met. The landowner liability protections are: an innocent landowner, a contiguous property owner, or a bona fide prospective purchaser. The User must meet the protection stipulations detailed in CERCLA to qualify as well as meet the User Obligations contained within the ASTM E1527- 13 standard.

The reason for conducting this ESA is to perform all appropriate inquiries into the uses and prior ownership of the subject property due to a real estate transaction.

2.2 Scope of Services

The environmental assessment was conducted in general accordance with ASTM E1527-13 and EPA Standards and Practices for All Appropriate Inquiry (40 CFR §312.10). The environmental assessment was conducted under the supervision or responsible charge of an individual that qualifies as an environmental professional, as defined in 40 CFR §312.10.

ECS was contracted by Hughes Group Architects to perform an ASTM E1527-13, Phase I Environmental Site Assessment (ESA) of the Prince William County Public Safety Training Center located at 13520-13600 Carriage Ford Road in Nokesville, Prince William County, Virginia. ECS was not contracted to address non-scope considerations.

2.3 Definitions

ASTM E1527-13 defines a "recognized environmental condition (REC)" as "the presence or likely presence of any hazardous substances or petroleum products in, on or at a property: 1) due to release to the environment, 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment." For the purposes of this practice, "migrate" and "migration" refer to the movement of hazardous substances or petroleum products in any form including solid and liquid at the surface or subsurface and vapor in the subsurface.

ASTM E1527-13 defines a "business environmental risk" (BER) as "a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice". ECS also uses the term "Other Environmental Considerations" to discuss BERs and environmental concerns outside of the ASTM E1527-13 requirements (radon, asbestos, lead, wetlands, etc.). Client-imposed limitations and site condition limitations, if encountered, are detailed in Section 7.1 Methodology and Limiting Conditions.

ASTM E1527-13 defines a "de minimis condition" as a condition that generally does not represent a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. De minimis conditions are not recognized environmental conditions nor controlled recognized environmental conditions.

ASTM E1527-13 defines a "controlled recognized environmental condition (CREC)" as a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example property use restrictions, activity and use limitations, institutional controls, or engineering controls). A condition identified as a controlled recognized environmental condition does not imply that the Environmental Professional has evaluated or confirmed the adequacy, implementation or continued effectiveness of the required control that has been, or is intended to be, implemented.

ASTM E1527-13 defines a "historical recognized environmental condition (HREC)" as a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted residential use criteria established by a regulatory authority, without subjecting the property to any required controls (for example property use restrictions, activity and use limitations, institutional controls, or engineering controls). Before calling the past release a historical recognized environmental condition, the Environmental Professional must determine whether the past release is a recognized environmental condition at the time the Phase I Environmental Site Assessment is conducted (for example, if there has been a change in the regulatory criteria).

2.4 Limitations

The ESA involved a reconnaissance of the subject property and contiguous properties and a review of regulatory and historical information in general accordance with the ASTM standard and EPA regulation referenced herein. No non-scope considerations or additional issues such as asbestos, radon, wetlands or mold were investigated, unless otherwise described in Section 8.0 of this report.

Note: vapor migration in the subsurface is described in Guide E2600 published by ASTM. ECS has not conducted a Vapor Encroachment Screen in accordance with the E2600 guide.

The conclusions and/or recommendations presented within this report are based upon a level of investigation consistent with the standard of care and skill exercised by members of the same

profession currently practicing in the same locality under similar conditions. The intent of this assessment is to identify the potential for recognized environmental conditions in connection with the subject property; however, no environmental site assessment can completely eliminate uncertainty regarding the potential for recognized environmental conditions in connection with the subject property. The findings of this ESA are not intended to serve as an audit for health and safety compliance issues pertaining to improvements or activities at the subject property. ECS is not liable for the discovery or elimination of hazards that may potentially cause damage, accidents or injury.

Observations, conclusions and/or recommendations pertaining to environmental conditions at the subject property are necessarily limited to conditions observed, and or materials reviewed at the time this study was undertaken. It was not the purpose of this study to determine the actual presence, degree or extent of contamination, if any, at this subject property. This could require additional exploratory work, including sampling and laboratory analysis. No warranty, expressed or implied, is made with regard to the conclusions and/or recommendations presented within this report.

This report is provided for the exclusive use of Hughes Group Architects. This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties. The use of this report by any undesignated third party or parties will be at such party's sole risk and ECS disclaims liability for any such third party use or reliance.

2.5 Data Gaps

Data failures (historical data gaps) were identified during the historical research of this subject property. Use of the subject property was generally documented back to 1894. Historical information was missing for various periods. However, due to the present use and the other information that was obtained about the subject property; the historical data gaps are not expected to impact our ability to render a professional opinion regarding the subject property.

2.6 Limiting Conditions/Deviations

ASTM E1527-13 requires that the Environmental Professional identify limiting conditions, deletions, and deviations from the ASTM E1527-13 standard, if any, including client-imposed constraints. The following limiting conditions and/or deviations were encountered during the performance of this Phase I ESA:

- ECS employees were unable to get within 200 yards of the northern property boundary during the site reconnaissance because target practice was occuring to the north. ECS cannot attest to environmental conditions within areas that were not directly observed.

3.0 SUBJECT PROPERTY DESCRIPTION

3.1 Subject Property Location and Legal Description

Site Name	Prince William County Public Safety Training Center
Property Address	13520-13600 Carriage Ford Road
Property City, State	Nokesville, Virginia
Property County	Prince William County
Number of Parcels	Three (3)
Property ID Numbers	GPINs 7492-25-8724, 7492-34-8902, and 7492-14-6564
Property Size	148 Acres
Property Owner of Record	the Board of County Supervisors of Prince William County

3.2 Physical Setting and Hydrogeology

USGS Topographic Map	
Quad Designation	Nokesville, VA
Date	2010
Subject Property Settings	
Average Subject Property Elevation (in ft or meters)	Approximately 250 feet above mean sea level (msl)
General Sloping Direction	Southeast
Bodies of Water	Unnamed pond on southern border of subject property
General Directions of Surface Flow	Southeast
Presumed Direction of Groundwater Flow	Southeast
Geologic Province	Piedmont
Up-gradient Property Direction	Northwest
Nearby Properties' Setting	
General Sloping Direction	South

Bodies of Water	Cedar Creek, approximately 1,700 feet southwest
General Directions of Surface Flow	South
Presumed Direction of Groundwater Flow	South

Regional influences such as tidal changes, karst conditions, impermeable soils, etc may have an impact on groundwater flow. The actual groundwater flow direction cannot be determined without site-specific information obtained through the gauging of groundwater monitoring wells.

3.3 Current Use and Description of the Site

The subject property consists of an approximately 148-acre parcel of land that is currently utilized for residential and agricultural uses. The subject property is improved with two single-family homes, a cottage, two storage sheds, and two garages. The subject property is located in an area that can generally be described as rural.

4.0 USER PROVIDED INFORMATION

The ASTM standard includes disclosure and obligations of the User to help the Environmental Professional identify the potential for Recognized Environmental Conditions associated with the subject property. A User Questionnaire was submitted to Lynn Reda with Hughes Group Architects. ECS did not receive a User Questionnaire prior to issuing this report.

It should be noted by the User of this report that if the User Questionnaire is not completed by the User, the User that is seeking to qualify for an innocent landowner, a contiguous property owner, or a bona fide prospective purchaser liability defense may lose these rights to qualify under CERCLA. If a completed questionnaire is provided following issuance of this report and information contained therein materially changes the outcome of this report, ECS will issue an addendum to this report.

4.1 Title Information

ECS was not provided with title information by the User. If this information is provided following issuance of this report and information contained therein materially changes the outcome of this report, ECS will issue an addendum to this report.

4.2 Environmental Liens or Activity and Use Limitations

ECS was neither contracted to obtain information on environmental liens or activity and use limitations, nor have we been provided with information on environmental liens or activity and use limitations for our review. It should be noted by the User of this report that if the User does not obtain activity and use limitation information, the User that is seeking to qualify for an innocent landowner, a contiguous property owner, or a bona fide prospective purchaser liability defense may lose these rights to qualify under CERCLA. If the activity use information is provided following issuance of this report and information contained therein materially changes the outcome of this report, ECS will issue an addendum to this report.

4.3 Specialized Knowledge

The User did not provide specialized knowledge of the subject property.

4.4 Commonly Known or Reasonably Ascertainable Information

Commonly known information related to the subject property was not provided to ECS.

4.5 Valuation Reduction for Environmental Issues

No information pertaining to the valuation reduction for environmental issues was provided to ECS.

4.6 Owner, Property Manager, and Occupant Information

The User indicated that the Board of County Supervisors of Prince William County bought the property in June 2018.

4.7 Degree of Obviousness

The User did not provide information related to obvious indicators that point to the presence or likely presence of contamination at the subject property.

5.0 RECORDS REVIEW

A regulatory records search of ASTM standard and supplemental databases was conducted for the subject property and is included in Appendix III. The regulatory search report in the appendix includes additional details about the regulatory databases that were reviewed. The regulatory records search involves searching a series of databases for facilities that are located within a specified distance from the subject property. The ASTM standard specifies an approximate minimum search distance from the subject property for each database. Pursuant to ASTM, the approximate minimum search distance may be reduced for each standard environmental record except for Federal NPL site list, and Federal RCRA TSD list. According to ASTM, government information obtained from nongovernmental sources may be considered current if the source updates the information at least every 90 days or, for information that is updated less frequently than quarterly by the government agency, within 90 days of the date the government agency makes the information available to the public. The following table indicates the standard environmental record sources and the approximate minimum search distances for each record.

Standard Environmental Record Sources	Approximate Minimum Search Distance Per ASTM (miles)	Subject Property	Off-Site Properties
Federal NPL	1.0	No	0
Federal Delisted NPL	0.5	No	0
Federal CERCLIS	0.5	No	0
Federal CERCLIS NFRAP	0.5	No	0
Federal RCRA CORRACTS	1.0	No	0
Federal RCRA non-CORRACTS TSD	0.5	No	0
Federal RCRA Generators	Subject Site and Adjoining Properties	No	1
Federal IC/EC	Subject Site Only	No	N/A
Federal ERNS	Subject Site Only	No	N/A
State and Tribal Hazardous Waste Sites (NPL Equivalent)	1.0	No	0
State and Tribal Hazardous Waste Sites (CERCLIS Equivalent)	0.5	No	0
State and Tribal Landfill and/or solid waste disposal sites	0.5	No	0
State and Tribal Leaking Tanks	0.5	No	1

Standard Environmental Record Sources	Approximate Minimum Search Distance Per ASTM (miles)	Subject Property	Off-Site Properties
State and Tribal Registered UST and AST	Subject Site and Adjoining Properties	No	0
State and Tribal IC/EC	Subject Site Only	No	N/A
State and Tribal Voluntary Cleanup (VCP)	0.5	No	0
State and Tribal Brownfield Sites	0.5	No	0

Based on our knowledge of the subject property and the surrounding area, ECS attempts to verify and interpret this data. While this attempt at verification is made with due diligence, ECS cannot guarantee the accuracy of the record(s) search beyond that of information provided by the regulatory report(s). ECS makes no warranty regarding the accuracy of the database report information included within the regulatory report(s).

The regulatory database report from EDR was dated March 23, 2018. The regulatory record search was performed by EDR. ECS did not reduce the minimum ASTM search distances stipulated in the standard. The regulatory databases reviewed by ECS included supplemental databases researched by EDR.

5.1 Federal ASTM Databases

5.1.1 Federal RCRIS - Generators

RCRIS identifies facilities that generate hazardous wastes as defined by the RCRA. Conditionally exempt small quantity generators (CESQGs) generate less than 100 kilograms of hazardous waste, or less than 1 kilogram of acutely hazardous waste, per month. Small quantity generators (SQGs) generate between 100 and 1,000 kilograms of hazardous waste per month. Large quantity generators (LQGs) generate more than 1,000 kilograms of hazardous waste or more than 1 kilogram of acutely hazardous waste per month.

The regulatory database report lists one RCRA-SQG within 0.25 miles of the subject property. The RCRA-SQG site is discussed below.

> **Pennington Firearms Range, 13161 Public Safety Drive** - The "Pennington Firearms Range" site is located approximately 700 feet north on the adjoining property and topographically up-gradient from the subject property. According to information included in the environmental database report, the site has generated ignitable waste, reactive waste, and lead since 2005. No violations were found for the site. Based on the current regulatory status and the nature of the RCRA Generator listings, this listing is not considered to be a recognized environmental condition (REC) for the subject property.

5.2 State ASTM Databases

5.2.1 State Leaking Tanks (LTANKS)

The LTANKS database is a list of all reported leaking underground and aboveground tanks recorded by the state. The regulatory database lists one site on the Virginia LTANKS database.

E E Wine - PWSCA, 12101 Public Safety Drive - The "E E Wine - PWSCA" site is located approximately 660 feet northeast on the adjoining property and topographically up-gradient from the subject property. This site has one closed Pollution Complaint (PC) listed on the VA LTANKS Database. PC # 19954182 was opened in February 1995, and was closed in May 1996. Based on the proximity to the subject property, this site is considered a REC for the subject property.

5.2.2 Leaking Underground Storage Tank (LUST) List

The LUST list is a record of reported leaking underground storage tank incidents. The LUST list may also identify properties that have had soil and/or groundwater contamination associated with documented releases from aboveground storage tanks, surface spills, and other sources. The regulatory database lists one site on the Virginia LUST database.

E E Wine - PWSCA, 12101 Public Safety Drive - The "E E Wine - PWSCA" site is located approximately 660 feet northeast on the adjoining property and topographically up-gradient from the subject property. This site has one closed Pollution Complaint (PC) listed on the VA LUST Database. PC # 19954182 was opened in February 1995, and was closed in May 1996. Based on the proximity to the subject property, this site is considered a REC for the subject property. ECS requested additional information from the Virginia Department of Environmental Quality, which is discussed in Section 6.9 of this report.

5.3 Additional Environmental Record Sources

5.3.1 Additional Non-ASTM Federal Databases

Neither the subject property nor properties within the designated search radii were identified on the federal databases researched for this assessment.

5.3.2 Additional Non-ASTM State Databases

5.3.2.1 Manifest Information (MANIFEST)

The Manifest database contains information pertaining to hazardous waste manifest listings.

One Pennsylvania Manifest was listed on the EDR Report.

Pennington Firearms Range, 13161 Public Safety Drive - The "Pennington Firearms Range" site is located approximately 700 feet north on the adjoining property and topographically up-gradient from the subject property. According to information included in the environmental database report, the site formerly generated lead. Ten manifests worth of hazardous waste were reported and were transported to York, Pennsylvania. No violations were found for the site. Based on the current regulatory status, this listing is not considered to be a REC for

the subject property.

5.3.3 Other Proprietary Databases

Neither the subject property nor properties within the designated search radii were identified on the federal databases researched for this assessment.

5.3.4 Unmapped (Orphan) Facilities and Sites

Several properties were identified on the Orphan Summary List. These facilities are considered as unmappable because the facility information in the database is insufficient and does not report accurate facility location. One property was listed in the EDR Report on the Orphan Summary. ECS did not identify this facility within the vicinity of the subject property.

5.4 Regulatory Review Summary

A regulatory database search report was provided by EDR. The database search involves researching a series of Federal, State, Local, and other databases for facilities and properties that are located within specified minimum search distances from the subject property. The report did not identify the subject property on the databases researched. The EDR report identified several off-site properties within the minimum ASTM search distances. Based on our review of available public records, ECS does not consider the listings to be potential sources of soil, groundwater or vapor impact to the subject property. The following Recognized Environmental Condition (REC) was identified for the subject property:

- The "E E Wine - PWSCA" site, located at 12101 Public Safety Drive was listed on the Virginia LUST and LTANKS databases. The site adjoins the subject property to the northeast and is topographically up-gradient from the subject property. This site has one closed Pollution Complaint (PC) listed on the VA LTANKS and LUST Databases. PC # 19954182 was opened in February 1995, and was closed in May 1996. Based on the proximity to the subject property, this site is considered a REC for the subject property.

6.0 HISTORICAL USE INFORMATION

6.1 Aerial Photograph Review

ECS reviewed aerial photographs of the subject property and immediately surrounding properties for evidence of former usage which may indicate potential environmental issues. The aerial photographs were obtained from EDR. The aerial photographs reviewed were dated 1937, 1954, 1962, 1965, 1972, 1981, 1994, 2005, 2009, and 2011. Aerial photographs dated prior to 1937 were not available for review. The ECS review is dependent on the quality and scale of the photographs. The following is a description of relevant information from the aerial photographs:

Year(s)	Subject Property	Adjoining Properties	REC? (yes or no)
1937	The subject property appears to be mostly vegetated land. A small structure is located on the southern portion of the property. A dirt road leads from the structure to the eastern property border.	Vacant vegetated land surrounds the subject property.	No
1954, 1962, 1965	A small pond is located in the south central portion of the subject property.	No significant changes from the previous aerial photographs.	No
1972, 1981	A portion of the subject property has been cleared for a right of way.	Houses and vacant vegetated land surround the subject property.	No
1994	Power lines run from southeast to northwest across the subject property through the right of way.	New roads and structures are located to the north of the subject property.	No
2005, 2009, 2011	Another structure is located in the southeast corner of the subject property.	More structures and roads are located to the north of the subject property.	No

6.2 Sanborn Fire Insurance Map Review

In an effort to identify past uses, ECS utilized EDR to search for historical Sanborn Fire Insurance Maps (Sanborn) for the subject property and surrounding area. Sanborn maps were not available for this area. The absence of such maps generally indicates that the subject property is located in an area where Sanborn maps were not produced because the area was rural or it was not economically feasible. ECS does not expect the lack of Sanborn maps to impact our ability to render a professional opinion concerning the subject property given the amount of historical information obtained from

our research, the USGS topographic map, aerial photographs, city directories, and other historical records obtained. A copy of the Unmapped Property report is included within Appendix IV.

6.3 Property Tax Files

Property tax files may include records of past ownership, appraisals, maps, sketches, photos or other information kept by the local jurisdiction for property tax assessment purposes. According to the Prince William County tax assessor on-line information, the subject property is owned by the Board of County Supervisors of Prince William County. The subject property is listed as a 148-acre parcel with identification numbers GPINs 7492-25-8724, 7492-34-8902, and 7492-14-6564.

6.4 Recorded Land Title Records

Recorded land title records may include leases, land contracts, and AULs recorded by the local jurisdiction. Land title records may provide only a list of the names of previous owners and may be of limited use; however, they may provide useful information about uses or occupancy of the property when employed in combination with other sources.

ECS was not provided with Land Title Records.

6.5 Historical USGS Topographic Maps

ECS reviewed topographic maps of the subject property and immediately surrounding properties for evidence of former usage which may indicate potential environmental issues. Topographic maps are produced by the United States Geological Survey (USGS) for various time periods. The topographic maps were obtained from EDR. ECS reviewed Historical Topographic Maps depicting the subject property were dated 1894, 1943, 1944, 1953, 1966, 1971, 1983, 1994, and 2013. Topographic Maps dated prior to 1894 were not available for review. The ECS review is dependent on the quality and scale of the maps. The following is a description of relevant information from the topographic maps:

Year(s)	Subject Property	Adjoining Properties	REC? (yes or no)
1894	A stream runs from northwest to southeast across the subject property. Part of the subject property is depicted at an elevation of 250 feet.	A road runs north to south to the east of the subject property.	No
1943, 1944, 1953	Two unpaved roads run from east to west and northwest to south on the subject property. One structure is located near the southern property border.	The county line between Prince William County and Fauquier County is to the southwest of the subject property. Some structures are located on adjoining properties.	No

Year(s)	Subject Property	Adjoining Properties	REC? (yes or no)
1966, 1971, 1983	A pond is located on the south central portion of the subject property. Utility lines run from northwest to southeast across the subject property.	No significant changes from the previous topographic maps.	No
1994	No significant changes from the previous topographic maps.	New roads are located to the north of the subject property. An airplane landing strip is located to the northeast of the subject property.	No
2013	No structures are depicted on the subject property.	No significant changes from the previous topographic maps.	No

6.6 City Directory Review

One of the ASTM standard historical sources to be reviewed for previous subject property uses is local street directories, commonly known as City Directories. The purpose of the directory review is to identify past occupants of the subject property, adjoining properties, or nearby properties. In some rural areas, street directories information is limited. The following is a description of relevant information from the city directories:

Year(s)	Listed Occupants	REC? (yes or no)
13600 Carriage Ford Road		
1977, 1980, 1985, 1992, 1995, 2000	The subject property is not listed.	No
2005, 2010, 2014	Lawrence E Fischer is listed as the subject property occupant.	No
12909 Carriage Ford Road		
1980, 1985	Jason B McGee is listed as the occupant.	No
1992, 1995, 2000, 2005, 2010, 2014	Stoneberger Garage Door	No
13609 Carriage Ford Road		
1977, 1980, 1985,	William D Camp is listed as the occupant.	No
1992	Dominic Femino is listed as the occupant.	No

Year(s)	Listed Occupants	REC? (yes or no)
1995	No listing	No
2000	Dominic Femino and Prince William Lactation Cnslt are listed as the occupants.	No
2005, 2010, 2014	Dominic Femino is listed as the occupant.	No

6.7 Building Department Records

The term building department records means those records of the local government indicating permissions of the local government to construct, alter or demolish improvements on the property. Due to substantial historical coverage gained from other sources, ECS did not review building department records for the purpose of this assessment. Given historical information gained from other sources reviewed in this section, this is not considered to be a significant data gap that would affect our ability to render a professional opinion concerning the property's environmental quality.

6.8 Zoning/Land Use Records

The term zoning/land use records refers to records of the local government indicating the uses permitted by the government in particular zones within its jurisdictions. The subject property is currently zoned for A-1 use. The A-1, Agricultural Zoning District is designed to encourage conservation and proper use of large tracts of real property in order to assure available sources of agricultural products, to assure open spaces within reach of concentrations of population, to conserve natural resources, prevent erosion, and protect the environment; and to assure adequate water supplies. The intent is to encourage private land owners to protect these values and thereby create an environment favorable for the continuation farming and other agricultural pursuits; to preserve prime agricultural land, forest land and/or open space; and to reduce the demand for costly public facilities and services that are inconsistent with the character of the rural areas within Prince William County.

6.9 Other Historical Sources

Other credible historical sources may be reviewed to identify past uses of the subject property. These sources may include websites, county or state road maps, historical society documents, or local library information.

ECS contacted the Virginia Department of Environmental Quality (VDEQ) on June 22, 2018 to determine if they had historical information regarding environmental issues or responses at the subject property. On June 25, 2018, Shelly Huston indicated that the VDEQ does not have any records for the subject property.

ECS contacted the Virginia Department of Environmental Quality (VDEQ) on July 13, 2018 to determine if they had historical information regarding environmental issues or responses at 12101 Public Safety Drive. Clara Towns responded on July 16, 2018 that the Petroleum Tanks/Remediation program has a file for PC #95-4182. The paper file was destroyed in accordance with DEQ's Records

Retention Schedule, but Ms. Towns included screenshots of the PC file. The data given to ECS indicates that the release was reported in February 1995 and that the PC was closed in May 1996. The FOIA request and response documents are included in Appendix II.

ECS contacted the Prince William County Department of Fire and Rescue and the Prince William County Department of Public works on July 12, 2018 to determine if they had historical information regarding environmental issues or responses at the subject property. Amanda Bates with ASA III - PWC Department of Development Services responded on July 20, 2018 that according to Prince William County records, there are no permits for UST's or AST's, or any other items listed in our request.

ECS contacted the Prince William County Department of Health District on July 12, 2018 to determine if they had historical information regarding environmental issues or responses at the subject property. Phontib Giles with the Prince William County Health District responded to the FOIA Request via email on July 18, 2018. He indicated that the Health District did not maintain records related to the storage or disposal of hazardous materials or issue permits for those purposes.

6.10 Previous Reports

We have not been provided with environmental or engineering assessment reports for the subject property completed by others, nor has ECS completed similar studies or prior assessments of the subject property.

6.11 Historical Use Summary

According to historical research, the subject property has been largely undeveloped and the area has developed slowly from primarily rural to rural and residential. No obvious indications of RECs were identified in the historical data review.

7.0 SITE AND AREA RECONNAISSANCE

7.1 Methodology

Abby Conklin, E.I.T. of ECS conducted the field reconnaissance on June 21 and August 1, 2018. The weather at the time of the reconnaissance was 90 degrees Fahrenheit and sunny. Observations were made from a walking reconnaissance around the perimeter, around the buildings, through the buildings where possible and along several transects across the subject property. Access or visibility limitations, if any, are discussed in Section 2.6. Subject property photographs are included in Appendix V.

7.2 On-Site Features

The subject property is an approximate 148 acre tract that is located in Nokesville, VA. The subject property consists of three residential structures, five outbuildings, agricultural land, and wooded areas. The structures currently utilize private water supply wells and septic systems.

Three residential structures and five outbuildings are located throughout the subject property. Some of the structures are dilapidated and no longer in use. The residential cottage, located at 13520 Carriage Ford Road, nearest the power lines is heated and cooled with electricity. The residential home, located at 13540 Carriage Ford Road, on the southwestern portion of the subject property is heated and cooled with electricity, and the water is heated with natural gas. The residential home, located at 13600 Carriage Ford Road, on the southeast portion of the subject property is heated with natural gas and cooled with electricity.

Several outbuildings and sheds were observed to be used for storage and maintenance of farm equipment such as tractors and other vehicles. Several containers less than 5 gallons of cleaning products, gasoline, and paint were observed in the outbuildings.

A pond is located in the south central portion of the subject property. We did not observe a petroleum sheen in the water or staining on the ground surfaces near the pond. Two water supply well structures were observed on the subject property. One well house was located along the driveway to 13540 Carriage Ford Road near the onsite pond. One well house was observed in the backyard of 13600 Carriage Ford Road. A septic tank clean out was observed in the backyard of 13600 Carriage Ford Road. A road affords access to the cottage and house at 13540 Carriage Ford Road. Scattered debris consisting of household trash was observed on the subject property behind the house at 13540 Carriage Ford Road. Several pole-mounted transformers were observed at the subject property. The transformers are owned and maintained by Dominion Energy. We did not observe evidence of leakage or staining in the vicinity of the transformers. A right of way is located on the subject property for overhead power transmission lines. Signage for an underground natural gas line is located within the right of way. Three above ground storage tanks (ASTs) were observed onsite. The first AST is located approximately 100 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The second and third ASTs are located approximately 3 yards into the woods to the north of the driveway to 13540 Carriage Ford Road.

The table below lists pertinent features of interest that were assessed for the subject property. Relevant information regarding pertinent features is discussed further in this section.

Feature	Yes	No
Underground or aboveground storage tanks	✔	
Strong, pungent or noxious odors		✔
Surface waters	✔	
Standing pools of liquid likely containing petroleum or hazardous substances		✔
Drums or containers of petroleum or hazardous substances greater than five-gallons		✔
Drums or containers of petroleum or hazardous substances less than or equal to five-gallons	✔	
Unidentified opened or damaged containers of hazardous substances or petroleum products		✔
Known or suspect PCB-containing equipment (excluding light ballasts)	✔	
Stains or corrosion to floors, walls or ceilings	✔	
Floor drains and sump pumps	✔	
Pits, ponds or lagoons		✔
Stained soil or pavement		✔
Stressed vegetation		✔
Solid waste mounds or non-natural fill materials		✔
Wastewater discharges into drains, ditches or streams		✔
Groundwater wells including potable, monitoring, dry, irrigation, injections and/or abandoned	✔	
Septic systems or cesspools	✔	
Elevators		✔
Dry cleaning		✔
Onsite emergency electrical generators		✔
Specialized industrial equipment (paint booths, bag houses, etc.,) on-site		✔
Hydraulic lifts		✔
Oil-water separators		✔
Compressors on-site		✔
Grease traps		✔

7.2.1 Underground or aboveground storage tanks

Three ASTs were observed onsite. The first AST is located approximately 100 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The first AST is approximately 500-gallons in volume and made of steel. The surface of the AST has holes and is rusted. The AST appeared to be empty, and the former contents of the AST are unknown. Secondary containment was not located around the AST. Staining was not visible on the soil surface near the AST at the time of our assessment. The second and third ASTs are located approximately 3 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The second and third ASTs are approximately 1,000-gallons in capacity and are not located within secondary containment. The second AST reportedly held gasoline and the third AST reportedly held diesel. Staining was not visible on the soil surface near the ASTs at the time of our assessment. The presence of three ASTs is a REC for the subject site due to the corrosion holes evident on the first of the three ASTs and the absence of secondary containment posing a material threat of release.

7.2.2 Surface waters

A pond is located in the south central portion of the subject property. We did not observe staining on the ground surfaces near the pond. ECS did not observe petroleum sheens on the surface water at the time of our assessment.

7.2.3 Drums or containers of petroleum or hazardous substances less than or equal to five-gallons

Several containers of cleaning products, paint, and gasoline were observed in the outbuildings on the subject property. Staining was not observed on the containers and the ground surfaces in the vicinity of the containers.

7.2.4 Known or suspect PCB-containing equipment (excluding light ballasts)

Pole-mounted transformers are located on the subject property along the driveway to 13540 Carriage Ford Road. The transformers are owned and maintained by Dominion Energy. Non-PCB stickers were not observed. Staining, which could be indicative of leakage, was not observed on the transformers or surfaces in the vicinity of the transformers.

7.2.5 Stains or corrosion to floors, walls or ceilings

Staining was observed on the floors, walls, and ceilings in the garage near the cottage and the outbuildings near the pond. The staining is believed to orginate from water damage and small spills of cleaning products or gasoline and is approximately two square feet in area. This staining was considered a *de minimis* condition for the property.

7.2.6 Floor drains and sump pumps

Sump pumps are located in the basements of 13600 and 13540 Carriage Ford Road. It is reported that the floor drains and sump pumps discharge into the septic system.

7.2.7 Groundwater wells including potable, monitoring, dry, irrigation, injections and/or abandoned

We observed two water supply wells associated with the subject property. The water supply wells have a raised concrete cover for protecting the well equipment. Two water supply well structures were observed on the subject property. One well house was located along the driveway to 13540 Carriage Ford Road near the onsite pond. One well house was observed in the backyard of 13600 Carriage Ford Road.

7.2.8 Septic systems or cesspools

The subject property is serviced by septic tanks. A septic tank clean out was observed in the backyard of 13600 Carriage Ford Road. It is assumed that a septic system also services the residential cottage located at 13520 Carriage Ford Road and the residential home located at 13540 Carriage Ford Road. Sinks and toilets reportedly discharge into the septic system.

7.3 Adjoining and Nearby Properties

Contiguous and nearby properties were observed during a walking and vehicular reconnaissance of the subject property boundary and public places. The subject property is located in a rural area of Nokesville, Prince William County, Virginia.

Direction	Description	Relative Gradient	REC
North	The Prince William County Public Safety Training Center.	Up-gradient	No
East	Carriage Ford Road and residential homes beyond.	Cross-gradient	No
South	Agricultural fields and residential homes.	Down-gradient	No
West	Forested land.	Cross-gradient	No

7.4 Site and Area Reconnaissance Summary

According to our site observations and a review of adjoining and nearby properties, the subject property consists of three residential structures, five outbuildings, agricultural land, and wooded areas. The structures currently utilize private water supply wells and septic systems. The subject property is located in a rural area of Nokesville, Virginia. Details pertaining to our on-site and off-site observations are referenced previously. We did not identify RECs associated with the subject property or neighboring properties and businesses during the reconnaissance.

8.0 ADDITIONAL SERVICES

ASTM guidelines identify non-scope issues, which are beyond the scope of this practice. Non-scope issues have the potential to be business environmental risks. Some of these non-scope issues include; asbestos-containing building materials, radon, lead-based paint, lead in drinking water, wetlands and mold.

ECS was not authorized to assess non-scope issues in conjunction with this assessment.

9.0 INTERVIEWS

After the site reconnaissance, Abby Conklin, E.I.T. interviewed Allen Hedgepeth, with the Transportation Department for Prince William County. The the Board of County Supervisors of Prince William County has owned the site for two months, and he has five months of knowledge related to the subject property and associated activities. Mr. Hedgepeth indicated that he is not aware of 1) environmental concerns associated with the subject property; 2) any pending, past, or threatened administrative litigation or administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the subject property; or 3) any government notices regarding any possible violation of environmental laws or possible liability related to hazardous substances or petroleum products.

10.0 FINDINGS AND CONCLUSIONS

ECS Mid-Atlantic, LLC (ECS) was contracted by Hughes Group Architects to perform an ASTM E1527-13, Phase I Environmental Site Assessment (ESA) of the Prince William County Public Safety Training Center located at 13520-13600 Carriage Ford Road in Nokesville, Prince William County, Virginia (i.e. subject property). This Executive Summary is an integral part of the Phase I ESA report. ECS recommends that the report be read in its entirety.

The subject property is identified by Prince William County as GPINs 7492-25-8724, 7492-34-8902, and 7492-14-6564 and owned by the Board of County Supervisors of Prince William County. The approximately 148-acre subject property is developed with by three residential structures and five outbuildings. The remaining area of the subject property is undeveloped agricultural or forested land. The buildings on the subject property are serviced by well water and septic systems. The buildings are heated with gas or electricity and cooled with electricity. Some of the structures are dilapidated and no longer in use. The residential cottage, located at 13520 Carriage Ford Road, is heated and cooled with electricity. The residential home located at 13540 Carriage Ford Road is heated and cooled with electricity and the water is heated with natural gas. The residential home located at 13600 Carriage Ford Road is heated with natural gas and cooled with electricity. Several outbuildings and sheds were observed to be used for storage and maintenance of farm equipment such as tractors and other vehicles. Several containers less than 5 gallons of cleaning products, gasoline, and paint were observed in the outbuildings.

A pond is located in the south central portion of the subject property. We did not observe a petroleum sheen in the water or staining on the ground surfaces near the pond. Two water supply well structures were observed on the subject property. One well house was located along the driveway to 13540 Carriage Ford Road near the onsite pond. One well house was observed in the backyard at 13600 Carriage Ford Road. A septic tank clean out was observed in the backyard of 13600 Carriage Ford Road. A road affords access to the cottage at 13520 Carriage Ford Road and house at 13540 Carriage Ford Road. Scattered debris consisting of household trash was observed on the subject property behind the house at 13540 Carriage Ford Road. Several pole-mounted transformers were observed at the subject property. The transformers are owned and maintained by Dominion Energy. We did not observe evidence of leakage or staining in the vicinity of the transformers. A right of way is located on the subject property for overhead power transmission lines. Signage for an underground natural gas line is located within the right of way. Three above ground storage tanks (ASTs) were observed onsite. The first AST is located approximately 100 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The second and third ASTs are located approximately 3 yards into the woods to the north of the driveway to 13540 Carriage Ford Road.

The subject property is located in a rural area of Nokesville, Virginia. The subject property is bound on the north by Prince William County Public Safety Training Academy, on the east by Carriage Ford Road, on the south by agricultural and residential properties, and on the west by forested land. We did not identify current occupants or activities on adjoining or nearby properties that are considered a Recognized Environmental Condition (REC) for the subject property.

Based on the records search, site reconnaissance and interviews, it appears that the subject property was developed with two structures from at least 1937 until 1981. From 1981 through 2005,

the subject property was developed with six structures. In 2005, the current improvements were present on the subject property. Historical records prior to the early twentieth century were not reasonably ascertainable for the subject property. Our review of historical information for adjoining or nearby properties identified the area as originally rural that transitioned to rural and residential.

A regulatory database search report was provided by EDR. The database search involves researching a series of Federal, State, Local, and other databases for facilities and properties that are located within specified minimum search distances from the subject property. The report did not identify the subject property on the databases researched. The EDR report identified several off-site properties within the minimum ASTM search distances. EE Wine at 12101 Public Safety Drive, approximately 660 feet northeast and topographically up-gradient from the subject property, was identified on the VA LUST and VA LTANKS databases. PC # 19954182 was opened in February 1995, and was closed in May 1996. Based on the proximity to the subject property, this site is considered a REC for the subject property.

ASTM E1527-13 defines a "data gap" as: "a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information". Data gaps which would be expected to impact our ability to render a professional opinion concerning the subject property were not identified.

We have performed a Phase I Environmental Site Assessment in general conformance with the scope and limitations of ASTM E1527-13 of the Prince William County Public Safety Training Center located at 13520-13600 Carriage Ford Road, in Nokesville, Prince William County, Virginia. Exceptions to, or deletions from, this practice are described in Section 2.6 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except for the following:

- The "E E Wine - PWSCA" site, located at 12101 Public Safety Drive was listed on the Virginia LUST and LTANKS databases. The site is approximately 660 feet northeast and topographically up-gradient from the subject property. This site has one closed Pollution Complaint (PC) listed on the VA LTANKS and LUST Databases. PC # 19954182 was opened in February 1995, and was closed in May 1996. Based on the proximity to the subject property, this site is considered a REC for the subject property.

- Three ASTs were observed onsite. The first AST is located approximately 100 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The first AST is approximately 500-gallons in volume and made of steel. The surface of the AST has holes and is rusted. The AST appeared to be empty, and the former contents of the AST are unknown. Secondary containment was not located around the AST. Staining was not visible on the soil surface near the AST at the time of our assessment. The second and third ASTs are located approximately 3 yards into the woods to the north of the driveway to 13540 Carriage Ford Road. The second and third ASTs are approximately 1,000-gallons in capacity and are not located within secondary containment. The second AST reportedly held gasoline and the third AST reportedly held diesel. Staining was not visible on the soil surface near the ASTs at the time of our assessment. The presence of three ASTs is a REC for the subject site due to the corrosion holes evident on the first of the three ASTs and absence of secondary containment posing a material threat of release.

11.0 REFERENCES

ASTM E1527-13. Standard Practice for Environmental Site Assessment, Phase I Environmental Site Assessment Process.

Environmental Data Resources, Inc., The EDR Aerial Photo Decade Package, dated March 23, 2018.

Environmental Data Resources, Inc., The EDR Radius Map Report, dated March 23, 2018.

Environmental Data Resources, Inc., Certified Sanborn Map Report, dated March 23, 2018.

Environmental Data Resources, Inc., EDR City Directory Image Report, dated March 23, 2018.

Environmental Data Resources, Inc., Historical Topo Map Report, dated March 23, 2018.

Prince William County GIS website, accessed on June 21, 2018.

TRAFFIC ANALYSIS

Introduction

This Traffic Analysis has been prepared to identify potential future needs with regard to access to Carriage Ford Road for the Public Safety Training Center. Currently, the site features an employment base of 271. By the design year of 2039, a total of 583 personnel could be assigned to the facility. This analysis considers two potential access scenarios for the facility which include: 1. maintaining the existing access point and developing a secondary service access to the south and 2. relocating the main access to a point south while keeping Public Safety Drive as a dedicated access for EVOC on site. A separate service access is also proposed in conjunction with option two.

Site Information

The Public Safety Training Center is located along Public Safety Drive on the west side of Carriage Ford Road in Prince William County, Virginia. Figure 1 shows a site location map of the general area. An aerial photo of the site is included as Figure 2.

FIGURE 1. SITE LOCATION MAP

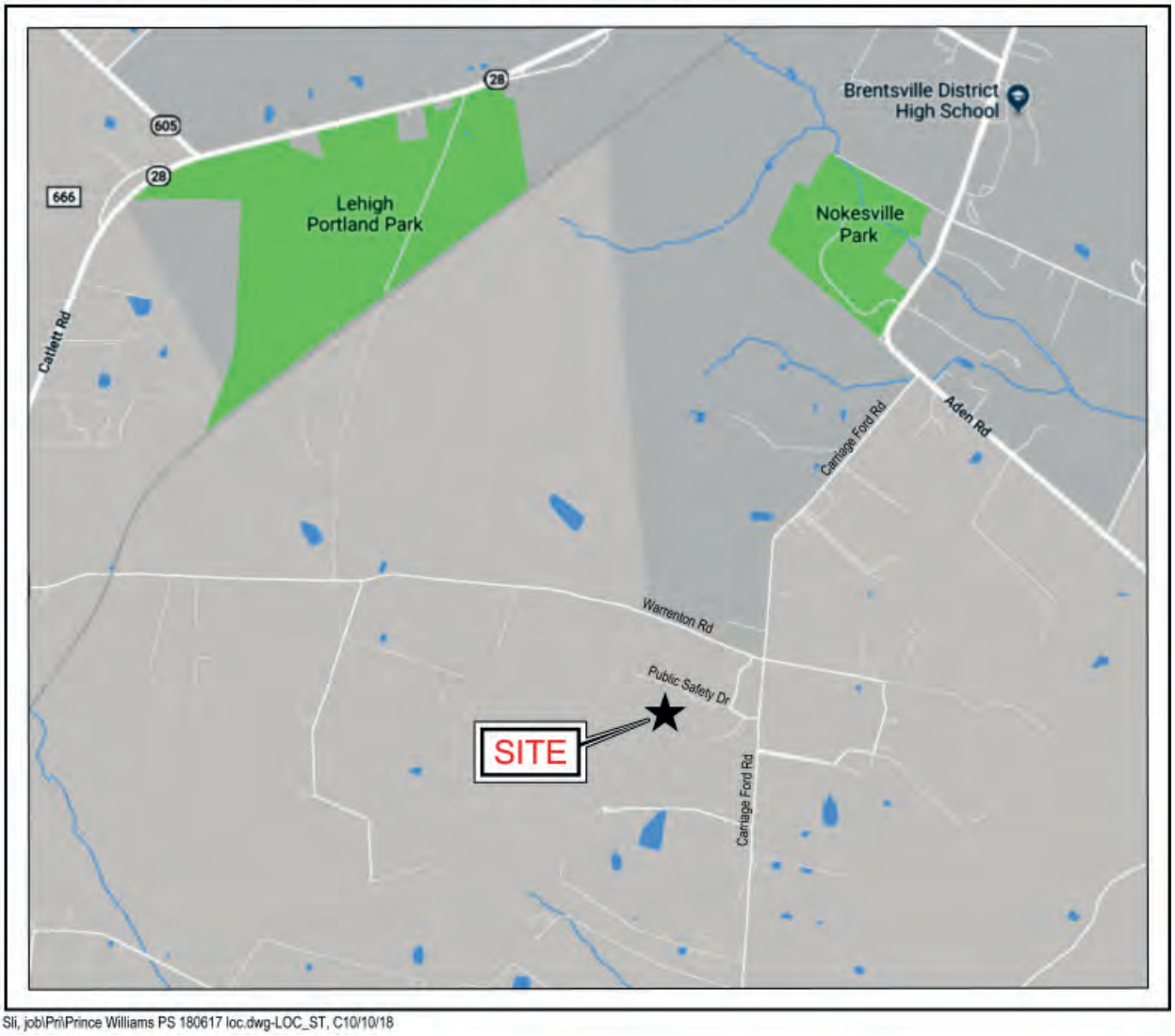

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FIGURE 2. Aerial Photo of SITE

Carriage Ford Road is generally a north/south roadway traveling from Route 646 (Aden Road) for a distance of approximately 2.5 miles to a dead-end south of Belmont Grove Road. Near Public Safety Drive, Carriage Ford Road features one travel lane in each direction. There are no pavement markings to delineate the northbound and southbound lanes. Overhead utility lines are present on the east side of the roadway. Figure 2 provides an aerial photograph of the site.

Carriage Ford Road is not classified through the Virginia Department of Transportation (VDOT) roadways nor is it listed as a thoroughfare with Prince William County.

Near its intersection with Public Safety Drive, Carriage Ford Road widens to facilitate a deceleration lane in the southbound direction. The deceleration lane extends for a distance of approximately 450 feet. No additional striping is provided in conjunction with the deceleration lane. The total pavement width near the site on the north side of the intersection is approximately 42 feet. On the southside of the roadway, while the corner radius facilitates right turns for larger vehicles, there is no acceleration lane. The pavement width on the southside of Public Safety Drive is approximately 20 feet.

Public Safety Drive features stop-control at its intersection with Carriage Ford Road. There is a median dividing the inbound and outbound lanes. The median is short and extends for a distance of only approximately 85 feet. The width of Public Safety Drive allows for both right turns and left turns on to Public Safety Drive to occur simultaneously, though there are no formal pavement markings.

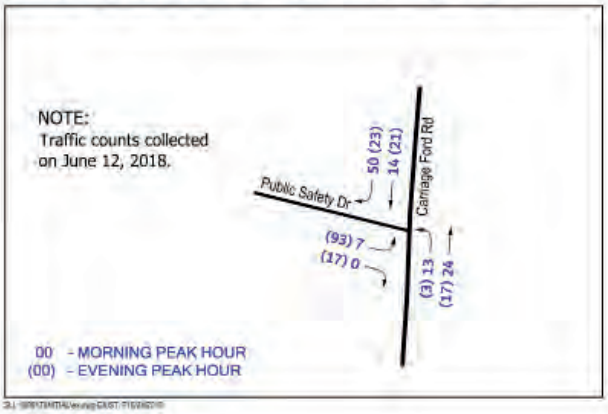
Figures 3 and 4 provide ground level photographs of the northbound and southbound views of the site access points. Figure 5 includes a summary of the existing lane use and traffic control device at the study intersection.

FIGURE 3. Northbound View of Access

FIGURE 4. Southbound View of Access

FIGURE 5. EXISTING LANE USE

FIGURE 6. EXISTING PEAK HOUR TRAFFIC VOLUMES



Traffic Data Collection

Intersection turning movement counts were collected on June 12, 2018, while public school was in session for a full day at the intersection of Carriage Ford Road and Public Safety Drive. The count period extended from 6 AM to 7 PM. Morning and afternoon peak periods were identified as 7 to 8 AM and 3:45 to 4:45 PM based on the highest traffic volumes observed passing through the intersection. Figure 6 provides a summary of the existing peak hour traffic volumes.

A 48-hour speed study was also undertaken in conjunction with the turning movement counts. The posted speed limit along Carriage Ford Road is 45 mph. As shown in Figure 7, the measured 85th percentile speed for both northbound and southbound traffic is 45 mph, which should be used as a design value for sight distance at any new intersections for this facility. Complete data on the turning movement counts and speed study can be found in Appendix A to this report.

FIGURE 7. SPEED STUDY SUMMARY

Carriage Ford Road
Just North of Public Safety Drive
Prince William County, Virginia

The Traffic Group, Inc.
(800) 583-8411
www.trafficgroup.com
Merging Innovation and Excellence

Northbound, Southbound

Start	0	6	11	16	21	26	31	36	41	46	51	56	61	66	71	
Time	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	Total
06/12/18	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
01:00	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
02:00	0	0	0	0	0	0	2	1	0	1	1	0	0	0	0	5
03:00	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	2	2	3	1	0	0	0	0	0	8
05:00	0	0	0	0	2	12	23	7	7	2	1	1	0	0	0	55
06:00	0	0	0	0	0	0	27	16	11	10	4	1	1	0	0	70
07:00	0	0	0	1	1	2	23	30	14	13	11	0	0	0	0	95
08:00	0	0	0	1	0	5	8	14	9	14	1	0	0	0	0	52
09:00	0	0	0	2	0	2	7	17	10	6	3	1	0	0	0	48
10:00	0	0	0	0	0	3	3	11	10	13	3	0	1	0	0	44
11:00	0	0	0	1	2	17	17	12	16	8	0	0	0	0	0	73
12 PM	0	0	0	0	1	10	25	21	14	9	2	0	0	0	0	82
13:00	0	0	0	0	1	8	21	19	18	10	2	0	0	0	0	79
14:00	0	0	0	0	1	10	22	19	12	12	4	0	0	0	0	80
15:00	0	0	0	0	3	14	35	23	16	12	1	0	0	0	0	104
16:00	0	0	0	0	7	30	49	25	5	14	2	3	0	0	0	135
17:00	0	0	0	2	0	8	13	15	14	10	5	0	1	0	0	68
18:00	0	0	0	0	0	1	5	12	24	13	3	0	0	0	0	58
19:00	0	2	0	0	1	1	5	10	17	11	2	2	0	0	0	51
20:00	0	0	0	0	2	8	5	16	6	7	0	0	0	0	0	44
21:00	0	0	0	0	1	4	11	3	7	2	0	0	0	0	0	28
22:00	0	0	0	0	1	7	11	8	5	3	0	0	0	0	0	35
23:00	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	6
Total	0	2	0	7	23	143	314	285	223	175	45	8	3	0	0	1228
06/13/18	0	0	0	0	0	0	1	3	2	2	0	0	0	0	0	8
01:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	3
04:00	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	4
05:00	0	0	0	0	1	9	24	9	6	2	1	0	0	0	0	52
06:00	0	0	0	0	1	5	27	21	18	8	1	1	1	0	0	83
07:00	0	1	1	0	0	5	31	14	17	4	7	1	0	0	0	81
08:00	0	0	0	2	4	11	13	10	19	6	2	0	0	0	0	67
09:00	0	1	4	2	6	5	17	16	10	7	1	1	0	0	0	70
10:00	0	0	0	0	1	10	11	12	9	2	1	1	0	0	0	47
11:00	0	2	0	0	2	9	26	26	14	4	3	0	0	0	0	86
12 PM	0	1	3	1	3	11	36	23	8	3	0	0	0	0	0	89
13:00	0	0	1	0	7	12	29	19	11	5	2	1	0	0	0	87
14:00	0	0	0	0	0	14	24	23	17	4	2	0	0	0	0	84
15:00	0	0	0	0	2	15	35	23	18	11	6	1	1	0	0	112
16:00	0	0	0	0	2	15	37	14	16	7	0	0	0	0	0	91
17:00	0	0	1	1	1	23	39	30	18	17	4	1	0	0	0	135
18:00	0	0	0	0	1	4	12	13	14	12	7	2	0	0	0	65
19:00	0	0	0	0	4	8	15	9	12	6	5	1	0	0	0	60
20:00	0	0	0	0	2	5	9	10	7	3	1	0	0	0	0	37
21:00	0	0	0	0	0	3	12	4	3	2	1	0	0	0	0	25
22:00	0	0	0	0	1	5	11	5	3	1	0	0	0	0	0	26
23:00	0	0	0	0	0	2	2	9	6	2	1	0	0	0	0	22
Total	0	5	10	6	38	173	414	295	228	111	45	10	2	0	0	1337
Grand Total	0	7	10	13	61	316	728	580	451	286	90	18	5	0	0	2565

Stats

15th Percentile:	29 MPH
50th Percentile:	36 MPH
85th Percentile:	45 MPH
95th Percentile:	49 MPH
Mean Speed(Average):	37 MPH
10 MPH Pace Speed:	31-40 MPH
Number in Pace:	1308
Percent in Pace:	51.0%
Number of Vehicles > 45 MPH:	399
Percent of Vehicles > 45 MPH:	15.6%

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Traffic Growth

This study accounts for a 2039 design year. As a result, traffic along Carriage Ford Road was increased at a conservative 2% annual value to arrive at 2039 conditions. Figure 8 shows the increase volumes along the roadway. Combining the traffic increase with the existing peak hour traffic volumes results in the 2039 background peak hour traffic volumes as shown in Figure 9.

Trip Generation

The projected future trip generation for this site was computed based on the known number of personnel currently assigned to the facility. There was a total of 70 AM peak hour trips and 136 PM peak hour trips which corresponds to a trip rate of 0.26 trips per person during the morning peak period and 0.51 trips per person during the afternoon peak period. It is important to recognize that while this rate accounts for trips that occurred during a single hour only; trips do occur both before and after the peak period as not all employees arrive or leave the site during the same hour. Figure 10 includes a summary of the existing trip generation.

The established rates were utilized to calculate the future trip generation for the site. As shown in Figure 10, the trips are projected to increase by 80 during the morning peak period and 157 during the evening peak period.

FIGURE 8. REGIONAL TRAFFIC GROWTH

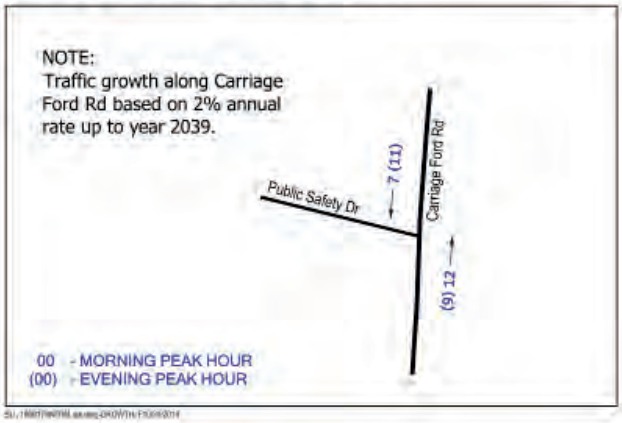


FIGURE 9. 2039 BACKGROUND PEAK HOUR TRAFFIC VOLUMES

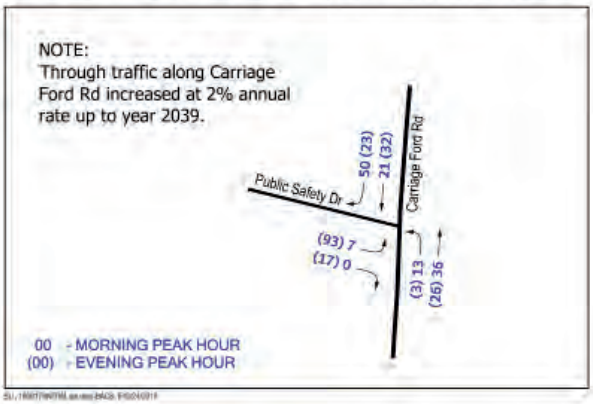


FIGURE 10. TRIP GENERATION FOR FACILITY EXPANSION

Trip Rates / Formulae	In/Out %
Existing Trip Generation (271 personnel)	
AM Peak Hour Trips = 0.258 x Personnel	90/10
PM Peak Hour Trips = 0.512 x Personnel	19/81

TRIP TOTALS	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Trip Generation for Proposed Expansion						
312 Personnel	72	8	80	30	127	157

Future Site Trips

The trip assignment for both options was considered separately based on anticipated future demand. Option 1 maintains Public Safety Drive as the main point of access to the Public Safety Training Center. A secondary service access is proposed to the south which will feature access to a maintenance area. Figure 11 shows the future trip assignment for Option 1. As shown in the exhibit, virtually all peak hour trips are assigned to Public Safety Drive.

FIGURE 11. FUTURE SITE TRIPS (Option #1)

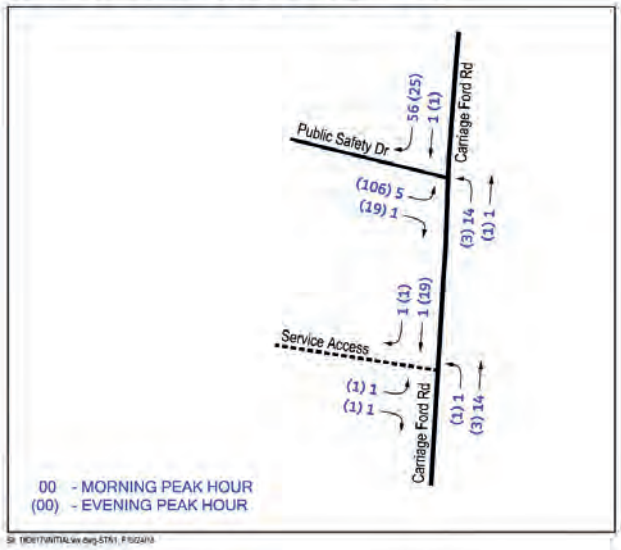
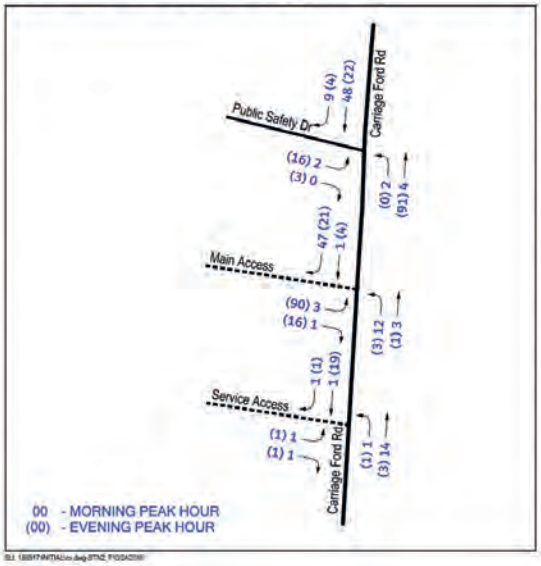


FIGURE 12. FUTURE SITE TRIPS (Option #2)



Option 2 (Figure 12) relocates the main site access to a point south of Public Safety Drive. Public Safety Drive is maintained as an access point to EVOC only. It is estimated that 15% of site trips will be associated with the EVOC access. A third point of access is proposed south of the main access which will serve as service access only. Similar to Option 1, limited trips are assigned to this access point during the peak hours.

To account for the relocation of the main site access point in Option 2, Figure 13 shows a reassignment of existing site traffic to accommodate the future condition.

Figures 14 and 15 show the 2039 future peak hour traffic volumes for Option 1 and Option 2, respectively.

FIGURE 13. REASSIGNED BASE TRAFFIC VOLUMES (Option #2)

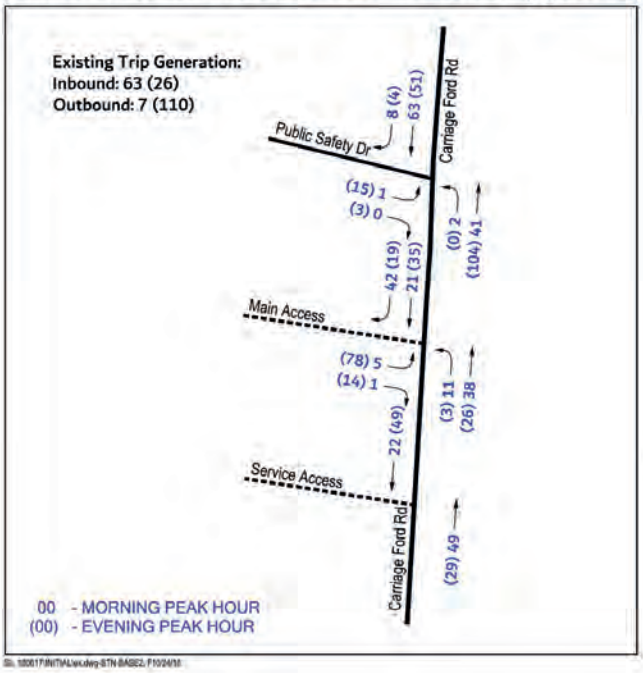


FIGURE 14. 2039 FUTURE PEAK HOUR TRAFFIC VOLUMES (Option #1)

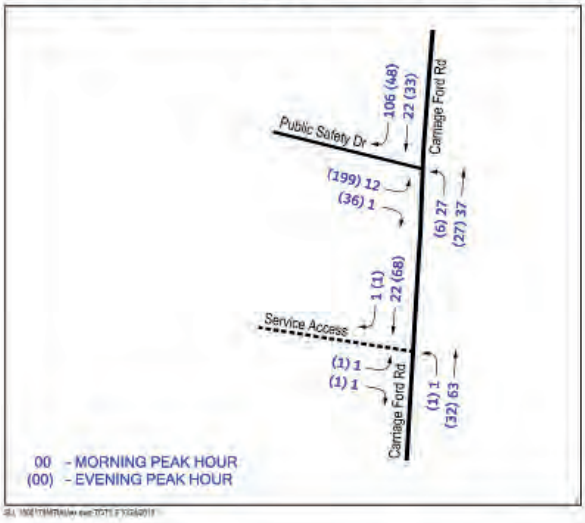
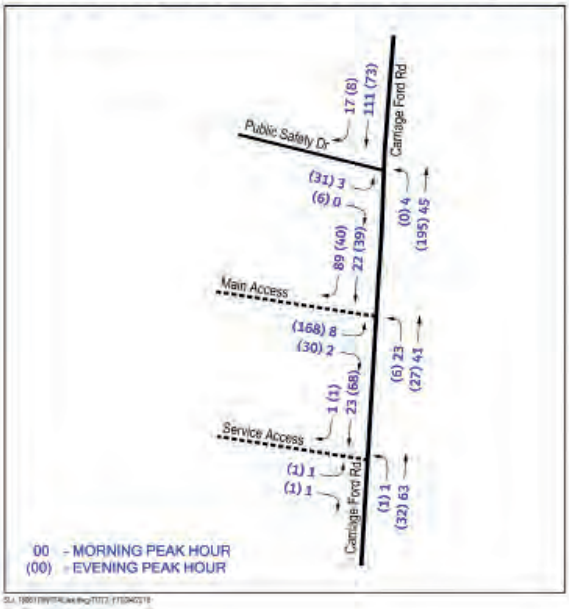


FIGURE 15. 2039 FUTURE PEAK HOUR TRAFFIC VOLUMES (Option #2)



Intersection Capacity Analysis

Highway Capacity Manual (HCM) Methodology was utilized to review the existing and projected future Levels of Service for the intersections considered within this analysis. The results of the intersection capacity analysis are summarized in Figure 16. Complete capacity worksheets can be found in Appendix B.

Highway Capacity Manual provides Level of Service based on the average Minor Street delay. As shown in Figure 16, Level of Service "A" or "B" conditions are expected in the future. It is important to recognize this analysis considers no auxiliary lanes along Carriage Ford Road because of the lack of striping. The single lane approach accounts for the most conservative analysis. From a capacity standpoint, additional lanes are not required to provide adequate Levels of Service in the future.

Future Requirements

It is anticipated that the subject site will generate more than 100 peak hour trips in the future. As a result, Prince William County will likely require a Traffic Impact Analysis (TIA). The limits of the TIA will be determined in consultation with staff during a Scoping Meeting. However, the study area will include, at a minimum, site access driveways and other major facilities near the area.

FIGURE 16. RESULTS OF INTERSECTION CAPACITY ANALYSIS

Minor Approach LOS/Delay (seconds), HCM 6th Edition

	Existing	Year 2039 Background	Year 2039 Total
MORNING PEAK HOUR TRAFFIC			
Option #1			
Carriage Ford Dr & Public Safety Dr	A/9.1	A/9.2	A/9.6
Carriage Ford Dr & Service Access	n/a	n/a	A/8.7
Option #2			
Carriage Ford Dr & Public Safety Dr	A/9.1	A/9.2	A/9.6
Carriage Ford Dr & Main Access	n/a	n/a	A/9.4
Carriage Ford Dr & Service Access	n/a	n/a	A/8.7
EVENING PEAK HOUR TRAFFIC			
Option #1			
Carriage Ford Dr & Public Safety Dr	A/9.6	A/9.8	B/11.4
Carriage Ford Dr & Service Access	n/a	n/a	A/8.9
Option #2			
Carriage Ford Dr & Public Safety Dr	A/9.6	A/9.8	B/11.3
Carriage Ford Dr & Main Access	n/a	n/a	B/10.3
Carriage Ford Dr & Service Access	n/a	n/a	A/8.9

NOTE:

1. Background Traffic is derived from combining Existing Traffic and regional growth.
2. Total Traffic is derived from combining Background Traffic and traffic to be generated by site.

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