

# 3

## AFFECTED ENVIRONMENT

Situated in southeastern Pennsylvania along the Schuylkill River in Chester and Montgomery Counties, Valley Forge NHP encompasses 3,452 acres. The park lies within the Great Valley of the Piedmont physiographic province and is home to a variety of natural and cultural resources. The immediate site of the proposed action comprises 3.55 acres on the southern boundary of the park, located at the point where the Pennsylvania Turnpike crosses Thomas Road (Figure 1).

This chapter describes the existing environmental conditions in and around the site. Organized by resource topic, this chapter describes the resources that potentially could be impacted by the proposed action. Resources examined in detail include natural resources (geologic resources, soil, topography, air quality, and soundscapes); visual resources; cultural resources (archeological resources, historic structures, and cultural landscapes); safety, accessibility, and circulation; park operations; and game animal hunting. Resources dismissed from further consideration were discussed in “Chapter One: Purpose and Need” and include natural resources (vegetation, wildlife and wildlife habitat, surface and ground waters, wetlands, floodplains, prime farmlands, and lightscapes); cultural resources (museum objects and ethnographic resources); visitor use and experience; Indian Trust resources; energy requirements and conservation potential; and environmental justice.

### NATURAL RESOURCES

#### Geologic Resources

Three basic rock types are found in Valley Forge NHP, typically according to topographic location: red beds – sandstones and shales – form a terrace in the northern portion of the park (the Stockton Formation); erosion-resistant quartzite underlies Mounts Misery and Joy (Chickies, Antietam and Harpers Formations); and dolomite fills the valley areas (Ledger Formation) (NPS 2005). The project area is characterized by one geologic formation, the Ledger.

One fault occurs in the dolomite valley, extending eastward from the area south of the General Wayne Statue at Mt. Joy toward the Valley Forge interchange of the Pennsylvania Turnpike. (Figure 6) The project site is underlain by this geologic fault;

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See Figure 6.

the up-thrown side is to the north (Commonwealth of Pennsylvania and the Pennsylvania Geological Society 1993; Berg et al. 1980). There is no evidence that the fault is currently active, and the most recent activity along this fault occurred during its formation over 150 million years ago (C. G. Wiswall, personal communication). Bedrock outcrops in a few places and in some places depth to bedrock is more than 10 feet (USDA 1963).

The site is part of the park's extensive karst landscape. Through time, precipitation and ground water drain through cracks and crevices in the carbonate bedrock, slowly dissolving the rock to form an underground network of conduits that often produce karstic features on the surface, such as sinkholes. Two small sinkholes are present in the meadows uphill from the project site.

The five caves known at Valley Forge NHP occur in the dolomite and karst valley. However, none are known to occur or extend into the project site. The closest cave channel is suspected to extend as far south as the National Memorial Arch (Murphy 1987a and 1987b), but an NPS inventory and mapping effort of caves has not been yet conducted at the park.

True and trace fossils are known to occur in the Ledger dolomite and Chickies quartzite at Valley Forge NHP. However, no true or trace fossils are known to occur at the project site.

## **Soil**

Soils in the park are predominantly moderately well-drained silt loams derived from weathered limestone, schist, gneiss, and quartzite. The immediate project site is dominated by one soil type, Urban Land Hagerstown complex with 0-8% slopes (Chester County soil code, "UphB"). The land uphill of the immediate project site on which low berms would be constructed is dominated by Hagerstown soils and has a slope of 3-8%. All Hagerstown soils are moderately permeable, have moderate available moisture capacity, and are productive. The surface layer is dark-brown silt loam. The subsoil, a strong-brown silty clay loam, has a few fragments of limestone scattered through it. The subsoil has a blocky and somewhat prismatic structure. It is underlain by yellowish-red silty clay loam that contains many partially weathered fragments of quartz and limestone. These soils are deep, well-drained and underlain by limestone. Well-drained soils remove water from the surface, avoiding excessive runoff and providing a secure base for physical development. This promotes dryer, more stable conditions for soil stability, vegetative growth, and physical development (USDA 1963).

## **Topography**

Valley Forge NHP is located in the Piedmont physiographic province. The topography of the park is flat to rolling with elevations ranging from 80 feet near the Schuylkill River to approximately 530 feet on Mount Misery. Mount Misery is the eastern terminus of a several-mile long ridge that forms the northern rim of Pennsylvania's Great Valley. To the east of these hills, the "Grand Parade" is a broad valley edged by prominent

ridgelines. From a historical perspective, the hills and ridgelines found at Valley Forge NHP were critical to George Washington's selection of the site for the encampment, as they provided excellent defensive position for the Continental Army (NPS 2005).

The project site is located at the southern boundary of the park. The general topography of the project site is slightly concave and slopes from west to east. There is a pronounced swale at the center of the immediate project site that is likely associated with the geologic fault (see above).

### **Air Quality**

The fundamental mission of the NPS Organic Act, "...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations..." includes the mandate to protect air quality in all units of the National Park System (NPS 2005).

The Commonwealth of Pennsylvania has operated an acid deposition monitor in the park for over 20 years, and a mercury deposition monitor since 1999. Representative data from outside the park also can be used to describe park air quality. The most comprehensive monitoring facility in the area is located at the state armory in Norristown, Pennsylvania. This facility monitors five criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>), and particulate matter. Another ozone monitor is located at the New Garden Airport in Chester County (NPS 2005).

Both Chester and Montgomery Counties have been identified by the EPA as non-attainment areas for one-hour and eight-hour concentrations of ozone. These counties are within attainment for other criteria pollutants. In 2003, these conditions resulted in 181 days when air quality was considered "good" in Chester County (air quality was measured 264 days in 2003). Of the remaining 83 days, only six days were considered unhealthy. The pollutant recorded at the highest level within the county was most commonly ozone (176 of 264 days) (NPS 2005).

In Montgomery County, air quality was considered "good" 296 out of 365 days in 2003. Of the remaining 69 days, six were considered unhealthy. The highest recorded pollutants throughout the year were ozone and particulate matter (NPS 2005). Both counties' concentrations of eight-hour ozone concentrations are classified as "moderate" by the EPA. Mitigation efforts are designed to improve eight-hour concentrations by 0.138 to 0.160 parts per million (ppm). Both counties' concentrations of one-hour ozone concentrations have been classified as "severe 15." This designation implies that the area must reach attainment within 15 years, an effort that requires mitigation efforts to be designed to improve conditions by 0.180 to 0.190 ppm (NPS 2005).

Valley Forge NHP is located in the Environmental Protection Agency's Philadelphia-Wilmington-Trenton Severe Ozone Non-Attainment Area. In addition, the proximity of the

Pennsylvania Turnpike and current traffic levels in the project site vicinity contribute to local air quality conditions.

## **Soundscape**

Valley Forge NHP has no natural soundscape, by definition, because human-caused sound is always present in the park and no area of the park is farther than 2000 feet from a road or railroad (NPS 2005). The project site is bounded to the south by the Pennsylvania Turnpike, which is currently a four-lane highway with an average total daily traffic volume of 46,000 vehicles. Recent noise monitoring has been conducted according to Federal Highway Administration criteria along the stretch of the turnpike that is immediately adjacent to the southern park boundary; all of the receptors along the park boundary detected noise levels ranging from 55 to 63 dBA (STV Incorporated 2005).

The project site is bounded to the west and north by park lands maintained as tall grass meadow. The closest roadway in these directions is Outer Line Drive. During August 2001 and March 2003 noise monitoring was conducted within the park. The southern portion of the park was characterized as having noise levels from 53 to 54 dBA, primarily attributed to the closeness of the Pennsylvania Turnpike (NPS 2005).

## **VISUAL RESOURCES**

Visual resources are based on vantage points: what park visitors north of the site, Glen Hardie neighbors, and passers-by on Thomas and Richards Roads see; and what users of the site see when they look beyond the site.

Park visitors north of the site see the hedgerow that borders the David Walker Farmstead. Even in the winter, with no leaves on the trees, the hedgerow is thick enough that the buildings on the site are somewhat screened from view. The Evans buildings and yard are not visible at all from the interior of the park. Glen Hardie neighbors across Thomas Road and passers-by on Thomas Road see the David Walker main house, the driveway and existing parking area, and two sides of the barn. Most of the interior of the site is screened from view by the buildings and plantings. Neighbors and passers-by have a partially screened view of the Evans house, garage and driveway.

Looking out from within the site, users see well kept neighboring residences to the east; the broad meadows of the park to the north; and former pasture to the west. To the south, traffic on the turnpike is visible in the winter from some points within the site. Elimination of the tree screen as a result of proposed turnpike widening will make the highway fully visible from within the site.

## **CULTURAL RESOURCES**

Valley Forge NHP encompasses the site of the 1777-78 encampment of the American Continental Army under General George Washington's command. Although multiple layers of history exist throughout the park, it retains sufficient integrity to convey the stories of its past.

Within the project site, the draft national register nomination (June 2005) proposed two buildings as contributing to the national register significance of Valley Forge NHP. The site may be considered to be significant for its associations with the park's agricultural history. Because of the proposed national register significance, specific cultural resources that may be impacted by the proposed action include archeological resources, historic structures, and cultural landscapes. Cultural resources dismissed from further consideration were discussed in "Chapter 1: Purpose and Need" and include museum objects and ethnographic resources.

### **Archeological Resources**

Archeological resources are those that lie beneath the soil's surface with little or no surface evidence to indicate their presence.

The David Walker Farmstead and the Evans property were part of the larger Abijah Stephens land holding that dates to the 1777-78 Winter Encampment. Archeological resources may be present, as they relate to prehistory and historical periods including the Encampment period.

To determine whether archeological resources exist, to what extent, and to what periods they relate, certain archeological investigations were made. It was through this testing that effects to the archeological resources were determined for the proposed site development.

The project site was archeologically surveyed in April, 2006. All elements of the Phase 1 Archeological survey either met or exceeded both the Secretary of the Interior's guidelines (36 CFR 800), and the Pennsylvania Historical and Museum Commissions standards for archeological survey. The survey consisted of a pedestrian reconnaissance and shovel test pit survey of the project's area of potential effect (APE). 100% of the undisturbed areas of the project's APE was archeologically surveyed. Several areas within the APE were not tested with shovel test pits due to the presence of previous construction disturbance, pavement, houses, outbuildings and trees. The APE was divided into two areas corresponding to the two properties. The Evans site was labeled Area A and the David Walker Farmstead was designated Area B.

No prehistoric artifacts or cultural features were recovered in either Area A or Area B.

The types of artifacts recovered in the shovel test pits reflect a late 18th through 20<sup>th</sup> century domestic occupation of the project area. This fact was documented in other publications (Newman 2005). The distribution of artifacts within the project area suggests that the rear yard of the David Walker House experienced more intensive artifact discard over the preceding 200 years than elsewhere within the project area.

One shovel test pit revealed a deliberately buried soil horizon. This contained historic period artifacts that exhibited such type, diversity and quantity of artifacts that further work in the vicinity was warranted. A Phase II investigation was undertaken.

A late 19<sup>th</sup> to early 20<sup>th</sup> century feature of clay and oyster/clam shell fill was removed. Beneath that feature a hardened earthen floor or work surface was revealed. The artifacts from this deposit were almost entirely related to food preparation and serving from the early to mid 19<sup>th</sup> century.

## **Historic Structures**

The buildings, ruins, monuments, markers, statues, roads, earthworks, and walls in Valley Forge NHP all help to reflect the park's history and contribute to its significance. Within the project site, the David Walker main house and the root cellar are the only historic structures contributing to the park's National Register Nomination. In all alternatives, no undertakings would occur that would affect the exterior character-defining features of the buildings. All other buildings, structures, and objects do not contribute to the National Register Nomination. (Refer to Chapter One, History & Significance of the David Walker Farmstead and Evans property.)

The David Walker main house is a large, stone, 2 ½-story structure built in seven bays across its east façade facing Thomas Road. Although not proven, it could contain a section of a late 18<sup>th</sup> century core. What remains does not project any semblance of 18<sup>th</sup> century architecture, however. The present, five-bay wide, one-room deep, main block dates to the mid-19<sup>th</sup> century, with several, smaller additions dating to the 20<sup>th</sup> century. The house is an amalgam of building campaigns, yet overall it projects the image of the Colonial Revival mode of architecture which was common throughout the eastern United States in the early 20<sup>th</sup> century. The house has been determined to be a contributing building in the draft Valley Forge NHP National Register Nomination Update (2005). The house is in a deteriorated condition.

A stone root cellar is located immediately adjacent to the main house. Its entry is partially above ground, and the cellar itself is a large, vaulted, underground chamber. It appears to relate to the mid-19<sup>th</sup> century construction of the main block of the house. The root cellar possesses integrity as a specialty structure and has been determined to be a contributing feature to the national register significance of the park.

A stone and frame Pennsylvania bank barn is positioned to the west and in back of the main house. Its length runs perpendicular to the house. The first known graphic image of it appears in an 1883 atlas, when the property was owned by David Walker. The barn



has a centered earthen bank leading to the threshing floor on its north elevation. Its size and configuration is typical of mid to late 19<sup>th</sup> century barns in the area. The exception to a typical barn form is that this barn lacks the characteristic frame forebay on its south facade. The barn burned in the late 20<sup>th</sup> century, and this may explain why this feature is missing. While the stone walls of the first floor and gable end are original, the frame superstructure is late 20<sup>th</sup>-century. It has been determined that the barn does not contribute to the national register significance of the park, due to its loss of integrity.

Attached to the barn is a one-story part frame, part concrete block shed formerly used as a stable. Its construction materials are 20<sup>th</sup>-century. The shed does not contribute to the national register significance of the park.

A small one-story frame corn crib is located north of the barn. No documentation has been found to positively date it. It is not considered to contribute to the national register significance of the park.

A two-story frame tenant house is located north-west of the barn. It has been modified from its original appearance by the addition of a screened porch. The siding on the house is not original, nor is its roofing material. It is likely that the house was moved or raised so that a partial basement of concrete block could be constructed beneath it. Due to its lack of integrity, the tenant house is not considered to contribute to the national register significance of the park.

A wagon shed is located north of the main house. It is of frame construction, with the exception of its back wall, which is masonry and part of a wall system enclosing a paved courtyard. The shed is a late 20<sup>th</sup>-century building that is not eligible for consideration in the national register nomination.

A frame shed is located in the southwest pasture. It has a feeding trough along its back wall and is open-ended on the front. It was used by a previous tenant as an alternate shelter for horses. Its materials are 20<sup>th</sup>-century and its dimensional framing suggests late 20<sup>th</sup>-century. It is not eligible for consideration in the national register nomination.

On the Evans site is located a stucco covered, block-wall, split-level house and garage. These structures were built in 1958 and do not contribute to the national register significance of the park.

## **Cultural Landscape**

Cultural landscape features at Valley Forge NHP are associated with four historic periods spanning approximately 250 years, including the early settlement period, the encampment landscape, the post-encampment landscape, and the commemorative period.

The early settlement period begins prior to the American Revolution, circa 1700, with settlement of this part of Tredyffrin Township by European immigrants. Within the project

area, early settlement topography, aspect, and circulation (Thomas Road) exist, and the David Walker main house may contain a core structure that was present prior to the encampment. All other features from this period are gone, however. Therefore, the site lacks integrity for the early settlement period.

The encampment landscape encompasses a relatively short period when the Continental Army wintered at Valley Forge from December 19, 1777 to June 19, 1778. Park-wide, this context includes earthworks, circulation systems, buildings, vistas, and archeological sites. The encampment of the Continental Army was a temporary military overlay on the existing agricultural landscape. There is no known connection of the project site to the encampment. It is not known whether any structures were present on the site at that time, although a section of the David Walker main house may have been extant at the time of the encampment. Of the presumed encampment landscape at the project site, only the elements of topography, aspect, and circulation (Thomas Road) can be considered to retain integrity. Therefore, the site lacks integrity for the encampment period.

The site most strongly represents the post-encampment agricultural landscape, which includes the period of 1778 to 1878. This context is reflected by additions to the David Walker main house, the position of the barn, the arrangement of hedgerows reflecting property lines, the presence of walls encompassing smaller farm yards, and views to the meadows that once were part of the property. Additions to the main house circa 1842, 1912, and post-1933, a complete Colonial Revival updating of the house in the early 20<sup>th</sup> century, and the addition of a tenant house for an estate manager, all are typical of the progression of market farms to gentleman's farms in this area. A stone wall that encloses a yard at the read of the main house is likely early 20<sup>th</sup>-century, and is in poor condition. Assorted fences, a parking lot, and a reproduction carriage shed, all associated with the horse-boarding business of the last tenant, date from the late 20<sup>th</sup>-century.

The planting of a number of large shade trees, including a row of Kentucky Coffee Trees along Thomas Road, also reflects the colonial revival treatment of the property. Ornamental trees in good condition, such as a fern-leaf beech and a large redbud, date from the late 20<sup>th</sup>-century, as do a number of miscellaneous small trees and shrubs in poor condition scattered around the house and yard. Invasive bamboo grows along the fenceline between the 1610 and 1630 Thomas Road properties, as well as adjacent to the David Walker main house.

At the Evans property, the landscape is a typical late 20<sup>th</sup>-century suburban residence, and is not significant.

The fourth context is commemoration and early state park development, defined as a combination of the desire to preserve elements of the encampment and the desire to beautify the site in honor of its importance. The David Walker Farmstead and Evans property were not owned by the commonwealth, and were not developed as part of the

commemorative park. Therefore, the commemorative period is not reflected at the project site.

## **SAFETY, ACCESSIBILITY, AND CIRCULATION**

As part of the park's ongoing general management planning process, the park has worked with PennDOT, the Federal Highways Administration, the Delaware Valley Regional Planning Commission (DVRPC), SEPTA, the Greater Valley Forge Transportation Management Corporation, Chester and Montgomery Counties, and the five townships of which the park is a part to understand traffic in and around the park. Information developed for that larger study is relevant to this proposed action.

Existing daily traffic volumes, obtained from the DVRPC, were collected from traffic counts taken on roads in 2002. Within the park, Gulph Road, a Pennsylvania state road, carried 2,900 vehicles between PA 23 and County Line Road, expressed as average annual daily traffic (AADT). Almost all of this traffic can be assumed to also travel through the Glen Hardie neighborhood on Gulph or Thomas roads.

Thomas Road, a Tredyffrin Township road, provides access to the project site. In October, 2001, the township conducted a traffic count on Thomas Road (Tredyffrin Township, 2001) and recorded an average daily traffic volume of 2,136 vehicles. Neighbors have observed that much of the traffic seems to be commuter "cut-through" traffic, as residents of townships west of the park travel to and from office parks and other facilities south and east of the area.

In response to a resident's request for a stop-sign at Richards and Thomas roads, the township also analyzed existing conditions, including traffic volumes, average speed traveled, sight distances, and accident and citation history. A determination was made that warrants and guidelines under 67 PA Code, Chapter 201 indicated that conditions did not meet standards for installation of a stop sign (Tredyffrin Township, 2001).

The David Walker Farmstead is served by one paved, single-lane entry drive off Thomas Road to the north of the main house. Just past the main house, the entry drive expands into a paved parking area enclosed by a low stone wall. The parking area is bounded on the west by the east façade of the barn. There is a portal in the west, stone courtyard wall with a partially paved track passing by the banked entrance to the barn. The track proceeds west toward the tenant cottage, where it ceases to become a distinct feature.

The Evans property is served by one paved, single-lane entry drive off Thomas Road. The drive proceeds up a slight incline to the garage entrance and the Evans House. It terminates at the front entrance to the house with a two-car width of paving.

There is no vehicular or pedestrian connection between the David Walker Farmstead and the Evans property.

## **PARK OPERATIONS**

After a 25-year use and occupancy lease, the park became responsible for the David Walker buildings and site in 2003. Some urgent actions have been taken, including removal of underground oil and gasoline tanks, removal of asbestos from the main house, and removal of the dangerous and non-functional swimming pool and culvert system. Some hazard trees have been trimmed or removed. The lawn is mown several times each season. No actions to stabilize or rehabilitate the buildings have taken place.

The NPS uses a ranking system to prioritize funding for park buildings. The lack of any necessary operational or visitor services use for these buildings, and the lack of a relationship to the primary significance of the park result in an assignment of a very low priority for repairs to these buildings. Therefore, it is unlikely that federal funds or staff time will be available for their preservation.

The Evans buildings were used for park quarters between 1978 and 2006. In response to the NPS initiative to reduce the number of employee-housing units in national parks to only those that are essential, the Evans house will be removed from the housing program.

## **GAME ANIMAL HUNTING**

Game animal hunting is prohibited within Valley Forge NHP.

Game animal hunting is legal on private properties adjacent to the park, however. Legal hunting of game animals (primarily white-tailed deer but possibly coyotes, raccoons, opossums, small game birds and other mammals) occurs on private properties adjacent to the park and is known to occur on private properties along Thomas Road.

According to Pennsylvania hunting regulations (Pennsylvania Game and Wildlife Code, Title 34 Chapter 25), it is unlawful to hunt for, shoot at, trap, take, chase or disturb animals within the safety zone of an occupied structure, school or playground without the permission of the occupants. Hunting within a safety zone is legal if the occupants of the structure have authorized the hunter and hunting activities. The safety zone for archery hunting and crossbow is defined as within 50 yards of any occupied residence, camp, industrial or commercial building, farm house or farm building. Hunters must acquire the permission of privately-owned property occupants to hunt within safety zones.

The safety zone associated with a school, playground, nursery school, or day-care center is 150 yards. (Figure 7)

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