

ENVIRONMENTAL ASSESSMENT

**Potomac Interceptor Long-Term Odor Abatement Program
(including improvements to a parking area and
two new comfort stations at the
Chesapeake and Ohio Canal Historical Park)**

Prepared for:

**The National Park Service--Chesapeake & Ohio Canal Historical Park
and the George Washington Memorial Parkway**



Prepared by:

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Metropolitan Washington Council of Governments
and the District of Columbia Water and Sewer Authority**

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**Environmental Assessment for the Potomac Interceptor
Long-Term Odor Abatement Program**

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) provides decision-makers and the public with information and analysis on the proposed Potomac Interceptor (PI) Long-Term Odor Abatement Plan and the recommended improvements at two Chesapeake and Ohio Canal Historical Park (CHOH) access areas. The purpose of this document is to disclose the expected effects to the environment if the recommended approach of implementing four odor control facilities associated with the proposed odor control system is selected, as well as to indicate environmental impacts of the proposed upgrade to the two CHOH access areas. The objectives of the proposed action include:

- Providing long-term control of odors in specific areas of the PI by practical, reliable and effective means;
- Maintaining the integrity of the reinforced concrete sewer pipes by minimizing interference with the design function of the PI vent structures and PI sewer airflow dynamics thereby limiting the formation of corrosive conditions;
- Protect the public health with the adequate conveyance of wastewater in the PI system to the Blue Plains Advanced Wastewater Treatment Plant, by maintaining the satisfactory condition of the PI for many decades to come;
- Providing safe vehicular access to the Site 27 parking area, and to improve the restroom facilities (portable toilets at Site 27) currently located at Site 27 and 1995 for the benefit of CHOH visitors.

The EA presents information on the range of alternatives considered, including the “No Action” alternative (Alternative 1), as required in the guidelines for EAs in the National Environmental Policy Act. The general study area for identifying the environmental issues assessed in the EA encompasses five proposed odor control building sites, which are identified in Alternatives 2 and 3 for construction of the four proposed odor control buildings along the PI. In addition, the EA indicates proposed improvements at two CHOH public access areas, one near Old Anglers Inn and one near Fletchers Boathouse. The overall study area extends south for approximately nine miles from the Old Anglers Inn (location of Site 27) to Fletchers Boathouse (location of Site 1995) within the CHOH. This area includes the Clara Barton Parkway, which is managed by the George Washington Memorial Parkway (GWMP), and the associated landscape that adjoins the CHOH. The proposed active blower treatment units proposed at three of the sites are located adjacent to the Clara Barton Parkway.

Environmental impacts associated with the implementation of the proposed alternatives would generally occur in the immediate vicinity of the proposed sites. The environmental impacts would be directly related to the construction and operation of the odor treatment buildings, parking area improvements near Old Anglers Inn, and two comfort stations. Construction activities include the proposed odor treatment buildings, PI-connecting vent pipe trenches, utilities access, access roads for operations and maintenance activities, materials staging, and construction equipment access. Environmental impacts that were assessed for each alternative included cultural resources, natural resources, threatened and endangered species, socioeconomic environment, visual quality, air quality, public safety, traffic, and recreational activities. Other potential impacts that were considered include building and infrastructure changes, noise, environmental justice, floodplains and wetlands, geology, and the effect of cumulative actions.

For the preferred alternative (Alternative 2), the National Park Service (NPS) would amend the existing right-of-way permit to allow the construction of the four odor treatment units along the PI at Sites 27, 17, 4, and 1995. It was concluded that the preferred alternative did not pose any known threat to endangered species, archeological resources, or public safety in the vicinity of the proposed odor control units. The noise levels generated by the blower would be within the Montgomery County “quiet hour” limits, and air quality would not be impacted. However, the proposed implementation of the four odor treatment units and CHOH public access area improvements at Sites 27 and 1995 would cause minor impacts to the existing cultural and natural resources at the CHOH and the Clara Barton Parkway. There would also be temporary impacts to traffic in the area of each of the proposed construction sites, and temporary impacts to recreational activities at Sites 27 and 1995.

It was recognized early in the project planning that public involvement and support of the proposed long-term odor abatement plan was invaluable, as the existing nuisance odors from the PI affected their enjoyment of the surrounding national historic landscapes. Several public meetings and a site tour have been conducted with the communities of Cabin John, Glen Echo, and Brookmont. Public groups in Loudoun and Fairfax Counties, Virginia, have also been briefed on the impacts of the proposed odor treatment facilities in those areas, which are outside of the jurisdiction of the NPS.

Representatives of the NPS CHOH, GWMP, and the National Capital Regional Office were consulted on several occasions since project efforts began in September 2000. NPS representatives were presented with the PI Odor Study results, odor control options evaluated, and the proposed Long-Term Odor Abatement Plan. NPS representatives were also presented with a detailed overview of the proposed siting of the odor treatment facilities that were technically feasible for adequate odor control along the lower portions of the PI system. Two site walks were conducted with NPS representatives to identify preferred sites. The preferred sites indicated by the NPS are presented in Alternatives 1 and 2, which were indicated by the NPS to be more preferable based on cultural, historic, and scenic factors. Public input was also considered by the NPS in the identification of the preferred locations for the proposed odor treatment facilities. Following the review of the information detailing the long-term plan, the NPS proceeded with authorization for development of this EA.

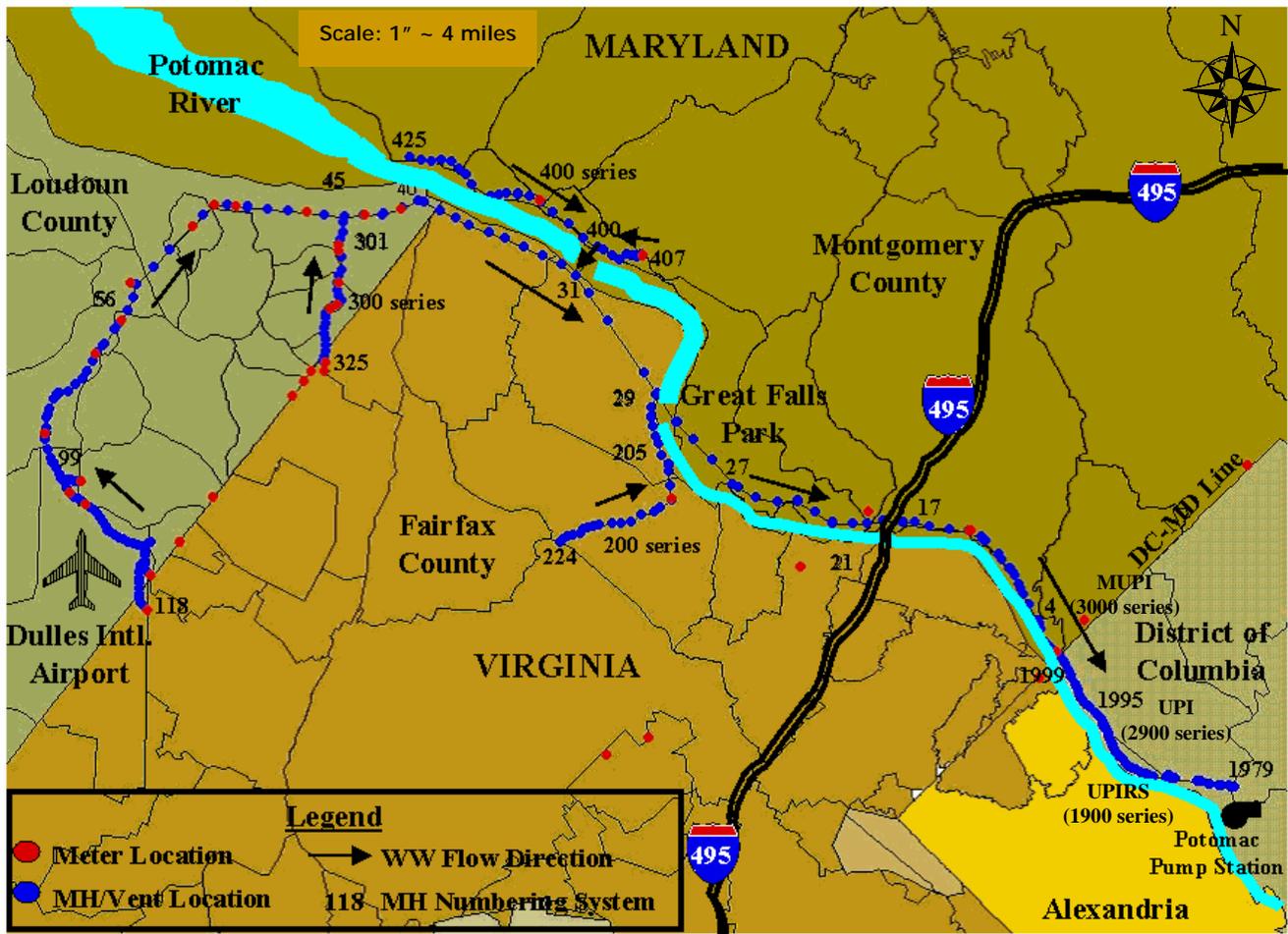
The Maryland and District of Columbia State Historic Preservation Offices were consulted regarding the proposed siting of the odor treatment facilities, and provided guidance regarding the style and appearance of the proposed structures to house the odor treatment units. The Montgomery County Department of Environmental Protection provided input on the proposed project related to sound levels generated by the odor treatment units, and provided support for public involvement efforts. Project coordination and support was provided by the Metropolitan Washington Council of Governments.

1.0 PURPOSE AND NEED FOR ACTION

Background

The Potomac Interceptor (PI) sanitary sewer system currently conveys approximately 50 million gallons per day (MGD) of wastewater by gravity from several service areas starting near the Washington Dulles International Airport (Dulles), along the Potomac River to the Potomac Pumping Station (PS) in Washington, DC (Figure 1). Flows from the Potomac PS are sent to the Blue Plains Advanced Wastewater Treatment Plant (AWTP) in southwestern Washington, DC for treatment before discharge into the Potomac River. Several jurisdictions discharge into the PI system including Loudoun County and Fairfax County in Virginia, Montgomery County in Maryland, and the District of Columbia. The National Park Service (NPS), Metropolitan Washington Airports Authority (Dulles Airport), Town of Herndon, Town of Vienna, and Arlington County also contribute wastewater flows to the PI.

Figure 1. Map of the Potomac Interceptor (PI) Sewer System



The PI was built as a result of the enactment of Public Law 86-515 (the Act), by the 86th Congress, on June 12, 1960 (Appendix A). The Act authorized the District of Columbia to plan, construct, operate, and maintain a sanitary sewer to connect Dulles to the Washington, DC sewer

system. The intent was to safeguard the Potomac River against wastewater discharges from designated sewersheds not already connected to adequate sewage disposal facilities. The Act stipulated that the sewer should be of sufficient capacity to provide service for Dulles and for the expected growth and development in the adjacent areas in Virginia and Maryland.

The PI system consists of four primary interceptor segments including the PI main trunk (PI), the Upper Potomac Interceptor (UPI), the Upper Potomac Interceptor Relief Sewer (UPIRS), and the Maryland Upper Potomac Interceptor (MUPI). As shown on Figure 1, the PI main trunk is located in Maryland and Virginia and includes the Sugarland Run Extension (300 series of interceptor structures), the Difficult Run Extension (200 series), and the Upper Maryland Spur (400 series). The MUPI (3000 series) is located in Montgomery County, Maryland and conveys flows into the UPI at the DC line. The UPI (2900 series) starts at the Maryland/DC border and currently conveys flows from the MUPI and other service connections in Washington, DC to the UPIRS. The UPIRS (1900 series) begins at the DC border and conveys flow from the PI main trunk and other service connections to the Potomac Pump Station in Washington, DC. The District of Columbia Water and Sewer Authority (DCWASA) is charged with the operation and maintenance of the PI system with the exception of the MUPI, which is operated and maintained by the Washington Suburban Sanitary Commission (WSSC).

The PI and UPIRS are the two sewer segments that were the primary focus of odor evaluations and recommended controls. Generally, the pipes comprising the PI and UPIRS vary in size from 30-inch to 96-inch (76-cm to 244-cm) diameter round, reinforced concrete pipe in the main trunk to 13-foot by 7.75-foot (396-cm by 236-cm) rectangular, reinforced concrete pipe in the lower reaches of the sewer system. Both interceptors were designed to include provisions for venting at the manholes and access shafts along most of the sewer system to promote the exhaust of sewer gases or the intake of air to reduce corrosion in the concrete pipes (Burns & McDonnell, 1961). Venting is generally accomplished through ventilated manhole covers or 12-inch diameter cast-iron vent pipes that extend from the manholes. The PI and UPIRS are referred to collectively throughout this document as the “PI”.

Purpose and Need

When the PI was constructed in the 1960’s, the selected alignment was located mainly in undeveloped areas with the exception of the C&O Canal area, which has been used as a recreational resource since the early 1900’s. In subsequent years, encroaching residential developments and recreational areas have occasionally been affected by odorous air exhausting from the PI. In public use areas, such as the Chesapeake & Ohio (C&O) Canal Historical Park and the Clara Barton Parkway (which is administered by the George Washington Memorial Parkway (GWMP)), intermittent odorous air is exhausted from the PI due to several dynamic hydraulic changes in the PI pipe. Sewer odors emitted from the PI have resulted in the completion of an odor study, the implementation of interim odor controls, and the development of the Long-Term Odor Abatement Program for several areas of the PI.

In 1999, Metcalf & Eddy, Inc. (M&E) was contracted by the Metropolitan Washington Council of Governments (MWCOCG) to perform a conditions survey, modeling and metering study of the PI system. The initial conditions survey included an assessment of odors at each structure

inspected (MWCOG, 1999). To further evaluate the odors recognized along the PI, M&E was contracted to perform an Odor Remedy Study. The Odor Remedy Study consisted of a detailed field assessment and data collection phase to define the scope of the odor problems quantitatively and qualitatively, and a feasibility study was conducted to evaluate available odor control options. Data were evaluated to identify which areas of the PI or which specific structures may require odor controls, and to assess the types of remedies that were most suitable for specific venting structures. Other information evaluated included subjective assessments of the odor levels around the structures, the proximity of the structures to human receptors (e.g., residences, recreation areas, roads, other public areas), site access, and access to utilities (M&E, 2000).

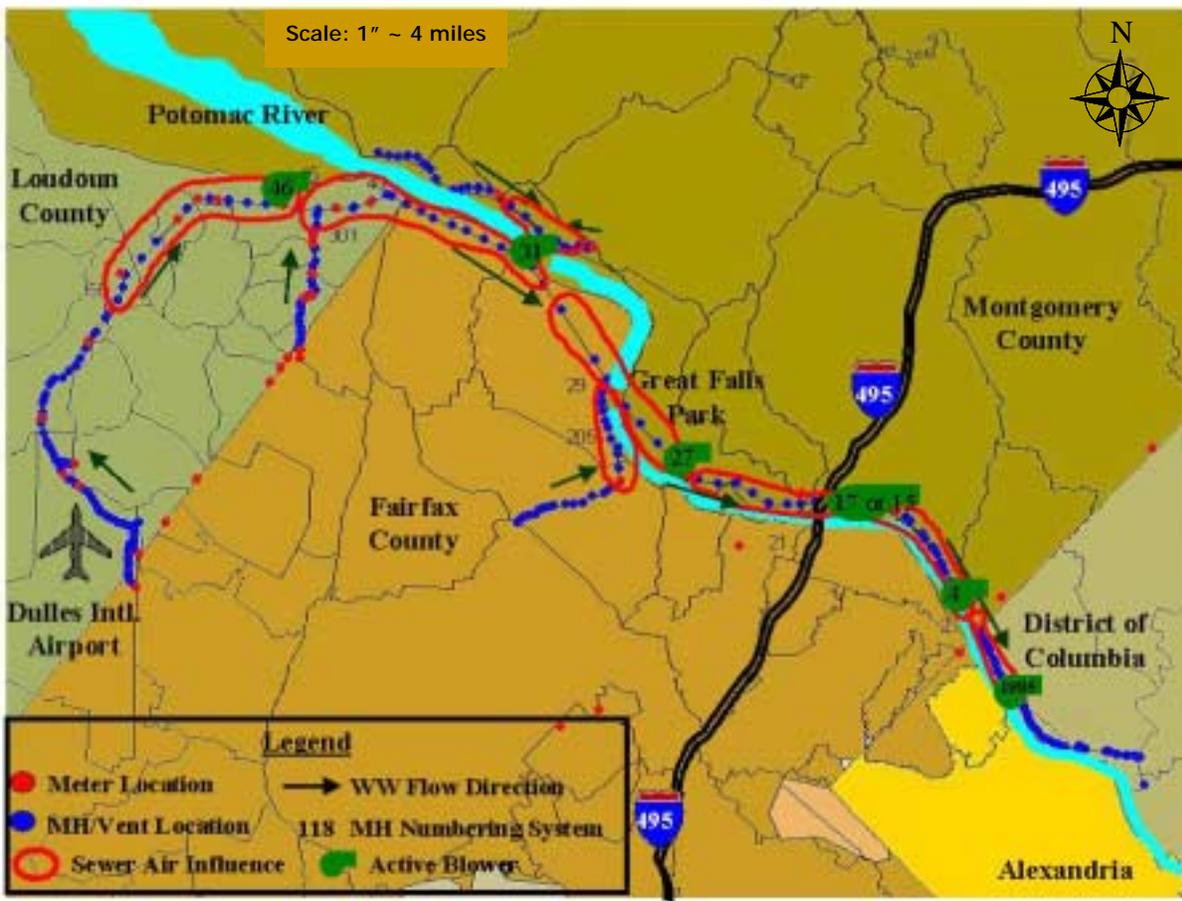
The feasibility study evaluated available odor control technologies to determine which options were most suitable for the potential remedial areas and structures identified during the field assessment. Numerous odor control technologies were evaluated including passive methods (e.g., sealing vents), active methods (e.g., forced air carbon treatment units), and chemical addition systems (e.g., metal salts addition). Within each of the three categories, several specific technologies were compared to determine which were the most effective for odor mitigation along the PI. Viable options were identified and design criteria were developed including equipment requirements, utility requirements, access requirements, size and space requirements, capital costs, and the operation and maintenance program. Since odorous sections of the PI alignment parallel the C&O Canal and the Clara Barton Parkway, implementation concerns include access issues, regulatory permitting, availability of land space, and other site-specific considerations (M&E, 2000).

Ultimately, a combination of passive controls and active (forced-air) carbon treatment was recommended in the feasibility study to control and remove odorous compounds in the exhausting sewer air. This decision was based on a number of considerations including: the need to control odors in specific areas of the PI, the limited site footprint of the proposed carbon treatment units, the perceived unfavorable public, NPS and other park agency views on storing hazardous chemicals on park land and near protected streams (as required with most chemical control options), and the effective reliability of carbon in removing odorous compounds.

The active systems could not be implemented immediately due to the need for a permit to access and build treatment units on NPS administered property. As a federal agency, the NPS is required to analyze impacts of such actions to natural and cultural resources in accordance with the National Environmental Policy Act of 1969. This Environmental Assessment (EA) was prepared to fulfill this requirement and involve the interested and affected public in the planning process. Therefore, the long-term odor abatement program is being conducted in two phases with the implementation of interim odor controls in the first phase, and the design and implementation of a long-term odor abatement program in the second phase. The interim odor controls are non-intrusive measures that were quickly implemented to reduce odors in several areas along the PI. The interim remedies include solid paste-gel neutralizing agents that volatilize to adsorb odorous hydrogen sulfide compounds, and activated carbon filters that are designed to fit into several types of sewer vent structures to control odors. The interim remedies have been installed at various locations and will be continuously maintained until the long-term measures are designed and implemented (M&E, 2001).

The long-term odor abatement plan recommends the use of a combination of active blower treatment units, sealed vents and intake-only vents fitted with passive carbon filters to effectively mitigate odor problems along the PI system. The plan recommends constructing a total of six active blower treatment units at several structures along the PI system (Figure 2). Four of the recommended active blower treatment units would be required along the lower 12-mile segment of the PI along the C&O Canal Historical park (CHOH) and the GWMP's Clara Barton Parkway, which are both units of the National Park Service. These are shown as Sites 1995, 4, 15 or 17, and 27 on Figure 2. The remaining two active blower treatment units (Sites 31 and 46) are recommended in the upstream portions of the PI in Loudoun County and Fairfax County in Virginia, which are not located on NPS lands and are therefore not included in the scope of this analysis. The recommended siting of the four active blower treatment units within NPS lands for the long-term odor abatement strategy is the subject of this EA.

Figure 2. Proposed Odor Treatment Units



In addition to the long-term odor abatement program, this EA also considers improvements to an existing parking area near one of the proposed odor treatment unit sites (Site 27), as well as the proposed construction of comfort stations at Site 27 and Site 1995. These proposed improvements at Sites 27 and 1995, in addition to the proposed odor control units at each site, are included in this EA because they would be completed concurrent with the proposed construction activities associated with the long-term odor abatement program. The CHOH currently maintains a parking area for access to the C&O Canal towpath across from the Old

Anglers Inn (Site 27). The dirt parking area is currently used by many recreationalists, and is often completely full on weekends and during other seasonal periods. There are currently no marked parking spaces for users parking at this access area. Limited traffic controls at this parking area cause confusion to some motorists, and there is a high potential for accidents to occur. CHOH recommends asphalt paving and space marking of this parking area to provide improved access to Park visitors. The improvements would also result in one-way travel lanes through the upper two parking areas, concrete curbing, and a stormwater collection system for the proposed asphalt parking area. CHOH also recommends the construction of a permanent comfort station at the parking area, which would be designed to be integral with the proposed odor treatment building. The permanent comfort station would replace the existing portable toilets at this access area.

The CHOH also recommends the placement of a permanent comfort station at the Fletchers Boathouse access area (Site 1995). The permanent comfort station would replace the existing trailer comfort station at that access area. The CHOH recommended replacing the existing trailer comfort station with a new structure that is styled to be more appropriate to this historic area. The recommended comfort station building at this location would be designed to be integral with the proposed odor treatment building.

This EA provides decision-makers and the public with information and analysis on the proposed Potomac Interceptor Long-Term Odor Abatement Plan and the recommended improvements at the two C&O Canal access areas. The purpose of this document is to disclose the expected effects to the environment if the recommended approach of implementing four odor control facilities associated with the proposed odor control system is selected, as well as to indicate environmental impacts of the proposed upgrade to the two C&O Canal access areas. The need for the proposed long-term odor abatement program is to mitigate the human impacts associated with nuisance odors venting from the PI system. Especially in hot and dry weather, foul odors emitted from the PI can detract from the enjoyment of the surrounding areas.

In September 2000, DCWASA requested permission from the NPS to design and construct the odor control facilities proposed under the long-term odor abatement program. The NPS expressed interest in mitigating the odors venting from the PI, as the intermittent odors may impact recreational use of the historic surroundings. DCWASA provided the NPS with details on the proposed long-term odor abatement program, indicating that four odor control facilities are proposed to be constructed along the PI alignment. The proposed facilities, in combination with other non-intrusive odor controls, would be constructed for the mitigation of odors exhausted from the PI.

Because over 12 miles of the PI system pass through the NPS lands, special permitting and coordination are required during any significant construction project. The long-term odor control program was developed based on shared goals with the NPS and other project stakeholders. Since there has also been strong public interest in this project, many community groups, recreational clubs and environmental interest groups were informed of the proposed project and their input was solicited. A consistent and primary theme related to the odor abatement program is that odors from the PI system should be significantly reduced year round and that the odor problem should be mitigated directly along the PI system.

The objectives of the proposed action include:

- Providing long-term control of odors in specific areas of the PI using practical, reliable and effective means;
- Maintaining the integrity of the reinforced concrete sewer pipes by minimizing interference with the design function of the PI vent structures and PI sewer airflow dynamics thereby limiting the formation of corrosive conditions;
- Protect the public health with the adequate conveyance of wastewater in the PI system to the Blue Plains AWTP by maintaining the satisfactory condition of the PI for many decades to come;
- Providing safe vehicular access to the Site 27 parking area, and to improve the restroom facilities (portable toilets at Site 27) currently located at Site 27 and 1995 for the benefit of Park visitors.

Issues and Impact Topics

The NPS has received information from the applicant (DCWASA), the public, outside agencies and other sources to aid in the determination of issues that need to be addressed within this environmental analysis. As a result, the issues listed below were determined to be significant and were evaluated as part of this document:

- Cultural Resources
 - Historic landscapes and viewsheds
 - Archeological resources
- Natural Resources
 - Botanical resources
 - Wildlife resources
 - Ecosystem health
 - Natural landscapes and viewsheds
 - Wetlands and floodplains
 - Endangered and rare species (State and Federal)
 - Abiotic resources including air, soil, and water
- Visual Quality for the Community and National Park Visitors
- Sound Quality for the Community and National Park Visitors
- Socioeconomic Environment
- Recreation
- Infrastructure Changes
- Environmental Justice
- Cumulative Actions
- Transportation
- Public Safety

2.0 DESCRIPTION OF ALTERNATIVES

This chapter describes the range of alternatives considered, including the “No Action” alternative, as required in the guidelines for environmental assessments in the National Environmental Policy Act (NEPA). In addition to describing a range of alternatives, this section also describes alternatives considered early in the process but later eliminated from further study. The descriptions of alternatives are based on preliminary designs and information available at the time of this writing. Specific distances, areas, and layouts used to describe the alternatives are estimated based on good engineering practice and may change during the actual site design. If changes during any approved site design are not consistent with the intent and effects of the selected alternative, then additional compliance may be required prior to project implementation to ensure that NEPA guidelines are met.

Alternative 1: No Action

Under this alternative, the NPS would not issue a permit to DCWASA for construction of the four active blower treatment units, which are proposed to be sited along the Clara Barton Parkway and the CHOH. The PI system would continue to exhaust sewer air at the vented locations including the exhaust of occasional odorous compounds. Based on the data analyzed by M&E, the continued operation of the PI system as designed without the addition of the active blower treatment units would not significantly impact the current estimated design life of the concrete sewer pipes. DCWASA would continue to operate and maintain the PI system based on current and future standard operating procedures.

Interim odor controls currently in place at 17 structures on the PI system located within the CHOH and along the Clara Barton Parkway and Canal Road would be maintained based on the current maintenance schedule. Carbon filters at three of these locations (i.e., 1990, 1995 and 410) may be recommended for removal and replacement with solid paste-gel neutralizing agents in the future if evidence of increased corrosion of the concrete pipes and structures is identified during periodic inspections of the PI. Evaluation of the effectiveness of the solid paste-gel neutralizing agents may be monitored by DCWASA, possibly resulting in the increase or decrease of solid paste-gel neutralizing units at various PI structures.

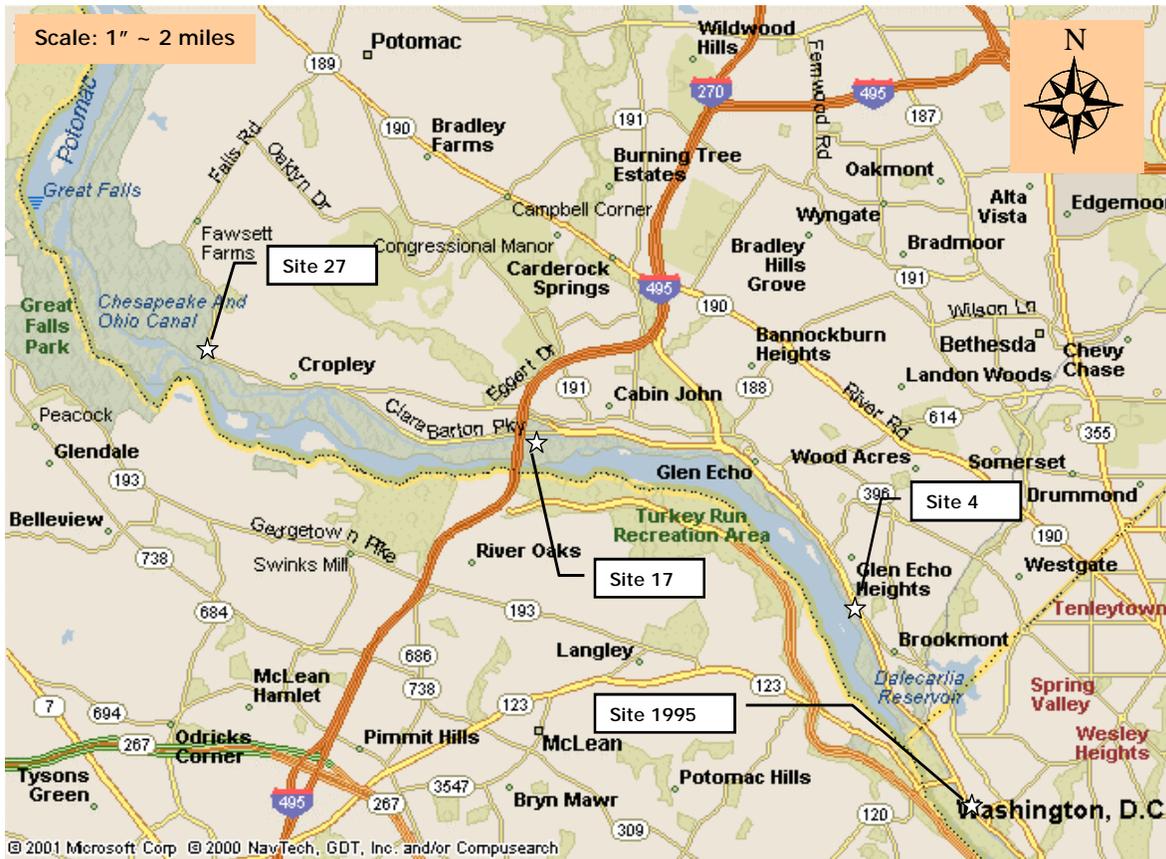
No improvements would be made to the parking area at Site 27, nor would permanent comfort stations be installed at this site or at Site 1995. If this alternative is chosen however, CHOH may choose to continue evaluation of these proposed improvements separately.

Alternative 2: Odor Treatment Units at PI Sites 27, 17, 4, and 1995 (Preferred Alternative)

Under this alternative, the NPS would amend the existing right-of-way permit for DCWASA to allow the construction and operation and maintenance (O&M) of four active blower treatment units along the Potomac Interceptor near Site 27 (near Anglers Inn off of MacArthur Boulevard), Site 17 (slightly east of the I-495 American Legion Bridge to the south of the eastbound Clara Barton Parkway), Site 4 (adjacent to the west side of the Little Falls Raw Water Pumping Station along the eastbound lane of the Clara Barton Parkway), and Site 1995 (located in place of the existing trailer comfort station at the Fletchers Boathouse Recreational Area). The general

locations of these four proposed sites are provided in Figure 3, and presented in more detail in Section 3.0, Affected Environment. Together, these locations are recommended as the preferred alternative based on engineering considerations, acceptance by the NPS C&O Canal and GWMP to further evaluate these sites, public input from members of the nearby Glen Echo and Brookmont communities, and access requirements for O&M activities.

Figure 3. Alternative 2 – Proposed Treatment Units at Sites 27, 17, 4, and 1995



Each of the proposed active blower unit sites would include a carbon vessel for odor removal, an electric blower with soundproofing for sewer air extraction, utility service (electric, water, telephone), and related lighting, controls and gauges. The proposed active blower treatment units would be housed inside concrete and masonry buildings constructed with soundproofing blocks. The design and construction of the roof and the building façade would be determined by the NPS in cooperation with the State Historic Preservation Office (SHPO) for Maryland and Washington, DC. Each proposed building would also have an approximate 4-foot by 4-foot chimney for the exhaust of treated sewer air, which would extend approximately five feet above the mid-roof level. The exhaust chimney would be outfitted with acoustical louvers to further reduce sound levels generated by the moving air, and would also be decorated with an appropriate façade to complement the historic significance of the area.

The proposed buildings at Sites 17 and 4 would be approximately 20-foot by 30-foot in size with an estimated height of 20 feet depending on the style of roof (i.e., slope/pitch). Buildings recommended for location at Sites 27 and 1995 are anticipated to be about 30-foot by 40-foot in size with an approximate height of 20 feet. The larger buildings at Sites 27 and 1995 would include a 10-foot by 30-foot area for restroom facilities. The proposed comfort stations are being included in the proposed alternative at the request of the NPS C&O Canal to provide park users with upgraded restroom facilities at these two designated public-use areas. Currently, portable toilets are in use at the Site 27 area and a trailer comfort facility is provided at the Site 1995 area. Wastewater generated from the comfort stations would be discharged into the PI.

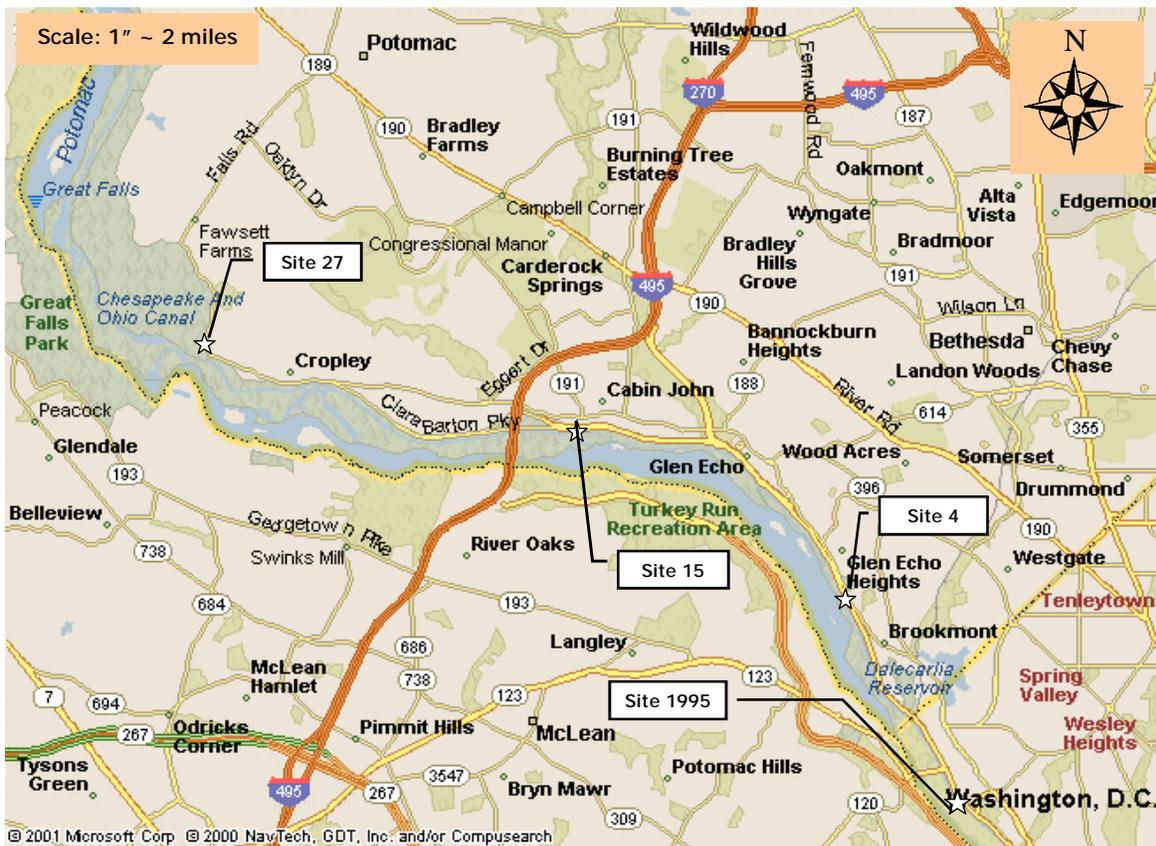
The NPS C&O Canal has also proposed to improve the parking areas near Site 27 at the Anglers Inn public access area, which provides parking for recreational access to the C&O Canal Towpath and Potomac River. Three gravel/dirt parking areas are located to the west of Anglers Inn, which provide an access point for users to enjoy the historic park. The C&O Canal has proposed paving the three parking areas including the construction of curbs, sidewalks, stormwater drainage, and associated safety features for easy and safe access to this heavily-used recreational area. The parking areas would be marked to clearly identify usable parking spaces, thereby limiting congestion and confusion during high-use periods. The C&O Canal has proposed to include a one-way travel lane in the upper two parking areas, as well as traffic signs where appropriate.

Alternative 3: Odor Treatment Units at PI Sites 27, 15, 4, and 1995

Under this alternative, the NPS would amend the existing right-of-way permit to DCWASA for the construction and O&M of four active blower treatment units along the PI Sites 27, 15, 4, and 1995 (Figure 4). For this alternative, the location of one of the active blower treatment units is proposed at Site 15 (located on the west side of the C&O Canal Lock 10 access area) rather than at Site 17 (as proposed in Alternative 2). The proposed blower buildings and improvements indicated in Alternative 2 for each of the other recommended sites would remain the same, with the exception of one of the proposed blower buildings being located at Site 15 instead of Site 17. The CHOH would still propose comfort stations at sites 27 and 1995 and improvements to the parking areas near Site 27 at the Anglers Inn public access area, as indicated in Alternatives 1 and 2.

The proposed building at Site 15 would be approximately 20-foot by 30-foot in size with an estimated height of 20 feet depending on the style of roof (i.e., slope/pitch). The proposed active blower treatment unit would be housed inside of concrete and masonry building constructed with soundproofing blocks. The design and construction of the roof and the building façade would be determined by the NPS in cooperation with the SHPOs of Maryland and Washington, DC. The proposed building would have an approximate 4-foot by 4-foot chimney for the exhaust of treated sewer air, which would extend approximately five feet above the mid-roof level. The proposed exhaust chimney would be outfitted with acoustical louvers to further reduce sound levels generated by the moving air, and would also be decorated with an appropriate facade to complement the historic significance of the area.

Figure 4. Alternative 3 – Proposed Treatment Units at Sites 27, 15, 4, and 1995



Actions Common to Alternatives 2 and 3

The long-term odor abatement plan recommends the use of a combination of active blower units (as described in Alternatives 2 and 3), sealed vents, and intake-only vents fitted with passive carbon filters to effectively control and mitigate odor problems along the lower portion of the PI system in the CHOH, and along the Clara Barton Parkway/Canal Road. Actions common to Alternatives 2 and 3 include the implementation and maintenance of the proposed vent seals and intake-only passive carbon filters for PI vents located in the lower CHOH and along the Clara Barton Parkway/Canal Road, which are not proposed for the placement of active carbon treatment units. Actions common to Alternatives 2 and 3 will result in minimal impacts to existing structures along the PI, which would neither enhance nor degrade the current visual quality.

The intent of the action commonly proposed in Alternatives 2 and 3 is to effectively abate odors emitted from the PI in the areas along the lower C&O Canal. The long-term plan proposes sealing 21 vents and installing intake-only passive carbon filters in 10 vents along the lower 12-mile segment of the PI in the CHOH and along the Clara Barton Parkway/Canal Road. In combination with Alternative 2 or 3, each of the 35 vents (i.e., 21 sealed vents, 10 intake-only

passive carbon filter vents, and four active blower treatment units) in the Lower CHOH and along the Clara Barton Parkway/Canal Road would be modified to control odor releases.

In addition, the proposed Alternatives 2 or 3 would be part of the comprehensive long-term program to control odors in other areas of the PI where odors have been determined to be a nuisance. Proposed active blower treatment units (i.e., structures 31 and 46) in Fairfax and Loudoun Counties, Virginia are recommended for implementation in conjunction with the proposed odor abatement strategies in the CHOH and along the Clara Barton Parkway and Canal Road. Sealing and intake-only carbon filters are also recommended on multiple vents in Loudoun and Fairfax Counties, Virginia, as well as on vent structures in the Upper Maryland Spur of the PI in Montgomery County, Maryland.

The anticipated benefits common to Alternatives 2 and 3 in conjunction with the implementation of the comprehensive long-term odor abatement program would include odor control from the PI in the Great Falls areas of both the CHOH and the GWMP in Virginia and Maryland; the upper C&O Canal area along River Road in Potomac, Maryland; and in several communities located nearby the PI in Loudoun and Fairfax Counties, Virginia, and Montgomery County, Maryland. As previously identified in Figure 2 (refer to page 4), the red lines around the PI in this figure indicate the areas on the PI where nuisance odors would be mitigated upon the implementation of the proposed long-term odor abatement program.

Alternate Sites Considered for Odor Treatment Units but Rejected

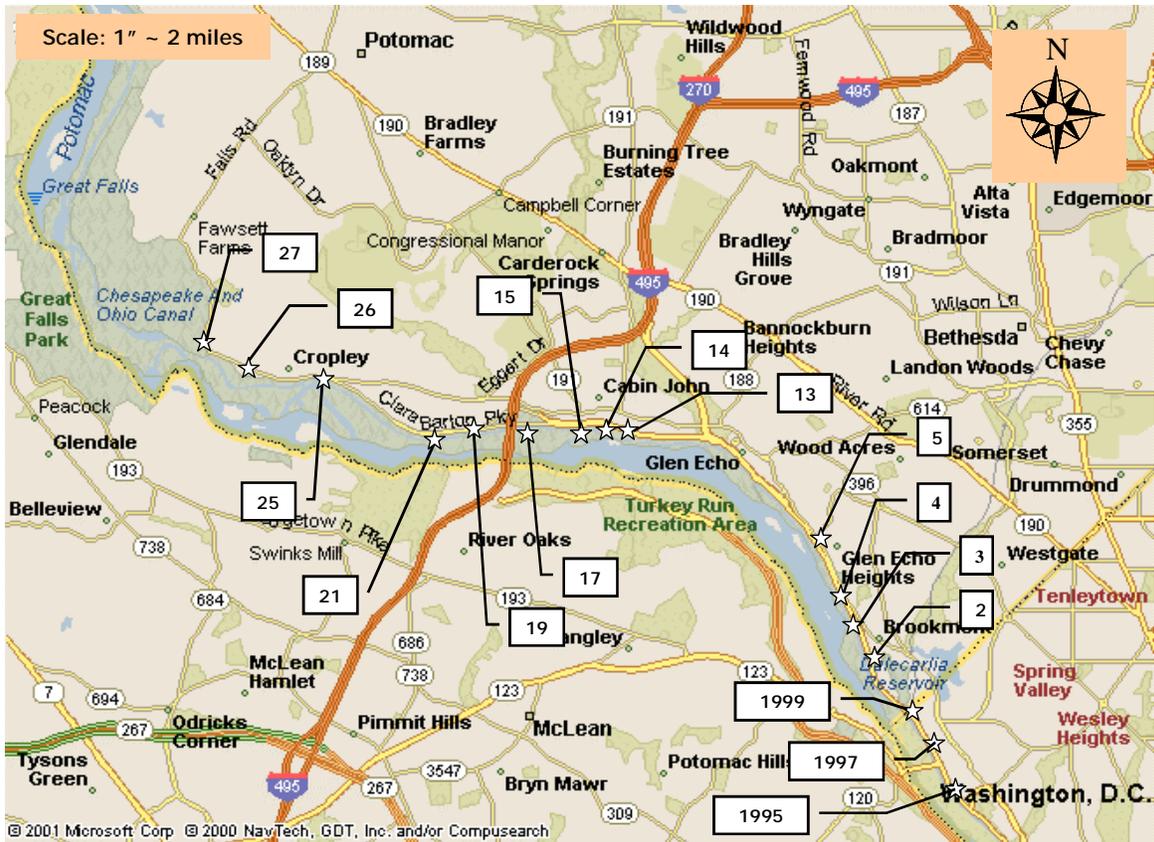
Sixteen sites were initially evaluated. The sites were evaluated for the proposed construction of four odor control units located in the CHOH, and along the Clara Barton Parkway and Canal Road (Figure 5). The four areas were determined based on engineering factors involving the hydraulics and airflow in the PI system. In assessing the siting of the four active blower treatment units that were recommended in this segment of the PI, each site was evaluated with respect to the following criteria: Engineering, Accessibility, NPS Pre-Coordination, and Public Acceptance. Table 1 (refer to page 13) provides comments for each of the criteria considered for the 16 sites evaluated. Engineering and accessibility factors were determined by DCWASA and their technical consultant, while the NPS comments were developed after meetings with representatives of the CHOH, GWMP and the National Capital Regional Office. Public comments were developed after a series of public meetings and site visits with community leaders and citizens from the Cabin John, Glen Echo and Brookmont communities. The selected sites previously identified in the description of Alternatives 2 and 3 are listed in Table 1.

Alternative Odor Control Technologies Considered but Rejected

As identified in Table 2 (refer to page 14), eighteen technologies were considered for controlling odors along selected areas of the PI system. The 18 odor control technologies evaluated were classified into three groups: Passive, Active, and Chemical. Passive (e.g., installed carbon filter) and active (e.g., forced-air carbon treatment unit) odor controls refer to the treatment of odorous compounds in the vapor, or air phase. Chemical odor controls relate to treating potentially odor-causing compounds, primarily dissolved sulfide compounds, in the liquid phase. A more detailed discussion of the odor remedy study performed to identify and evaluate alternative

technologies is provided in Appendix B. Information on the generation of odors, hydraulic characteristics, and airflow dynamics in the PI is also presented in Appendix B.

Figure 5. Sites Evaluated for the Proposed Treatment Units on NPS Lands



Passive odor control options are characterized by relatively simple installation, low maintenance, and low cost. The air stream is either blocked to prevent escape into the atmosphere by obstruction of the vent opening, or the exhaust gas is brought in contact with media that treats or removes the odor-causing compound in the gas stream. The passive odor options include sealing vents, adding carbon filters, and installing gel neutralizers. Of these options, currently carbon filters and gel neutralizers are being used for the interim odor control program. However, the use of carbon filters has been determined to significantly increase the corrosion potential within the PI's concrete pipes, and is not recommended for prolonged use (see Appendix B for more information on corrosion potential). Each of these three options is recommended for use in conjunction with active blower carbon treatment units as part of the overall long-term odor abatement program.

Table 1. Lower C&O Canal Area Active Blower Treatment System Site Matrix Selection Process

Area	ID	Engineering ¹	Accessibility ²	NPS Pre-Coordination ³	Public Acceptance ⁴	Potential Site? ⁵
1	27	Acceptable, located after large, deep tunnel segment and river tunnel crossing.	Good, located off MacArthur Boulevard. Disturbed area on canal side across from Anglers Inn in upper parking area. Limited tree removal.	Feasible, disturbed area used for Canal access. Area of future pull-off area paving/improvements.	Likely, public-use area. Combination comfort station and blower unit. Repaving and improvements to three parking areas at the site.	Yes
	26	Acceptable, similar to 27 but extending further down line, limited upper pipe influence using recommended blower system.	Poor, located behind home on Canal Bridge Court, access may require removal of ~ 30 trees.	Infeasible, difficult access issues and near residences.	Unlikely, very close to nearby homeowners.	No
	25	Not effective, beyond upper pipe influence in tunnel segments with recommended blower.	Not Applicable.	Not Applicable.	Not Applicable.	No
2	21	Not effective, prior to series of three hydraulic bends in pipe which significantly increase WW velocity, turbulence and related sewer air flow.	Not Applicable.	Not Applicable.	Not Applicable.	No
	19	Not effective, after 1st of 3 significant hydraulic bends in pipe. Sewer air velocity increases but prior to other two hydraulic bends.	Not Applicable.	Not Applicable.	Not Applicable.	No
	17	Acceptable, after 2nd of 3 significant hydraulic bends in pipe. Sewer air velocity increases but prior to last hydraulic bend.	Good, near I-495 Bridge, adjacent to Clara Barton Parkway. Minimal access road required. No tree removal required.	Feasible, near I-495 bridge but access road and vegetative screening from Clara Barton Parkway needed.	Likely, near I-495. No homes in vicinity.	Yes
	15	Acceptable, located at last of 3 significant hydraulic bends in pipe which draws faster moving air and excess odors out of system.	Fair, existing unimproved access road. Widening of access road required. Limited tree removal required.	Feasible, unimproved existing access road, but close proximity to public-use area and lock house (Lock 10).	Unlikely, public-use area, near homeowners. Within 50 ft of Clara Barton Pkwy and ~200 ft to closest home (north).	Yes
	14	Acceptable, slower WW velocity hampers faster moving air, but would capture most faster moving air flows.	Poor, significant tree cutting required, 30 ft decline from road elevation.	Infeasible, heavy wooded and located on steep slope near Canal. Large area of disturbance required for access.	Unlikely, nearby homeowners. Within ~200 ft to nearest home (east), ~280 ft to homes (north).	No
	13	Acceptable, slower WW velocity hampers faster moving air. Would capture some faster air flows, but limiting area of blower influence.	Poor, near Lock 8 abandoned lock house, existing access road with limited bridge clearance, 30 ft decline from Clara Barton.	Infeasible, near Lock house and current access road needs rehabilitation.	Unlikely, public-use area but near homeowners. Within ~300 ft to nearest home.	No
3	5	Acceptable, located over 2 miles downstream from last blower (assume Site 17).	Poor, 50 ft decline from road, difficult terrain. Extensive access road and tree cutting required.	Infeasible, heavy wooded and located on steep slope near Canal. Large area of disturbance required for access.	Likely. 300 ft from road, ~600 ft to nearest home.	No
	4	Acceptable, located over 2 miles downstream from last blower (assume Site 17).	Fair, 40 ft decline from road, next to Little Falls Pumping Station, difficult terrain. Limited tree cutting required.	Feasible, abut building to Little Falls Pumping Station gatehouse, give structure similar façade to Little Falls Pumping Station.	Likely. 100 ft to road, ~350 ft to nearest home.	Yes
	3	Acceptable, located about 3 miles down stream from last blower (assume Site 17).	Poor, near Lock 6 house, limited space near MH from Clara Barton. Some tree cutting required.	Infeasible, near pull-off area and in close proximity to gate house and Clara Barton Pkwy.	Unlikely, public-use area but near homeowners. Within 20 ft of Clara Barton Pkwy, C&O Canal 60 ft from road, ~150 ft to nearest home (to north).	No
	2	Acceptable, blower system at furthest recommended distance from upstream blower.	Good, existing access area - gravel base, existing structure with electric/water/sewer connection. No tree cutting required.	Infeasible, disturbed area near existing comfort station NOT available for use. Currently used for Canal access and maintenance.	Unlikely, public-use access area, near homeowners. Within 50 ft of Clara Barton Pkwy, ~190 ft to nearest homes (to north).	No
	1999	Not effective. Blower system beyond furthest recommended distance from next upstream blower.	Not Applicable.	Not Applicable.	Not Applicable.	No
	1997	Not effective. Blower located too far from upstream blower (i.e., 15) and too close to downstream blower (i.e., 1995) to be effective.	Not Applicable.	Not Applicable.	Not Applicable.	No
4	1995	Only acceptable site. Blower needed due to hydraulic siphon at this location. All sewer air is exhausted out of the PI at this point.	Good, in-place of existing bath trailer, limited tree removal to connect active air exhaust system to PI vent.	Feasible, disturbed area at existing trailer comfort station. Currently heavily used by public. Comfort station upgrade with blower building.	Likely, public-use area. Future improvements may be favored (i.e., comfort station). Recreational site, nearest home greater than 500 ft to the north.	Yes

NOTES:

- 1 - Sites which are not technically feasible were not evaluated further.
- 2 - Accessibility is based on the preferred location of the active blower treatment buildings.
- 3 - NPS (C&O Canal, GWMP, and Regional) input was provided to determine the permitting feasibility of an evaluated location.
- 4 - Public input was provided from local communities (Cabin John, Glen Echo, and Brookmont).
- 5 - Selected for further evaluation in the Environmental Assessment.

Table 2. Summary of the Evaluation of Odor Control Technologies for the PI

Odor Control Technology	Description	Cost	Maintenance Requirements	Utilities Required	Access Issues	Selected?
Passive Odor Control						
Sealing Vents	Airtight plug.	Low	None	No	Easy	Yes
Carbon Filter	Install replaceable filters.	Medium	Low	No	Easy	Yes
Gel Neutralizer	Solid paste-gel that neutralize odors.	Low	Low	No	Easy	Yes
Active Odor Control						
Carbon Treatment	Blower system with activated carbon treatment.	Mid-high	Medium	Yes	Difficult	Yes
Biofilter System	Biologically active media consumes odorous compounds.	Mid-high	Medium	Yes	Difficult	No
Wet Scrubber	H ₂ S transferred to solution at high pH.	High	High	Yes	Difficult	No
Mist Systems/ Masking Agents	Physically alter or mask odors.	Medium	Medium	Yes	Difficult	No
Thermal Oxidation	Burn odorous compounds.	High	High	Yes	Difficult	No
Chemical Odor Control						
Oxygen Injection	Increases DO, reduces DS formation.	Medium	Medium	Yes	Difficult	No
Nitrate Addition	Alternate bacterial food source.	High	High	Yes	Difficult	No
Hydrogen Peroxide	Chemically oxidizes sulfides.	High	High	Yes	Difficult	No
Chlorine Compounds	Reacts with DS to reduce levels.	High	High	Yes	Difficult	No
Potassium Permanganate	Oxidizes H ₂ S.	High	High	Yes	Difficult	No
Ozone	Oxidizes H ₂ S to elemental sulfur.	Medium	Medium	Yes	Difficult	No
Ferric Chloride	React with DS to reduce levels.	High	High	Yes	Difficult	No
Sodium Hydroxide (Caustic Slugging)	Increases pH to alter sulfide equilibrium by periodically dosing the wastewater flow in the PI with caustic.	Very High	Low	No	Easy	No
“Thioguard” Mg(OH) ₂	Increases pH to alter sulfide equilibrium.	High	High	Yes	Difficult	No
Enzyme/ Bacterial Addition	Alters microbiology of the slime layer.	High	High	Yes	Difficult	No

Legend

H₂S – Hydrogen Sulfide

DO – Dissolved Oxygen

DS – Dissolved Sulfide

Active odor control measures are similar to passive measures with respect to the air stream that passes through a media to undergo treatment. However, forced-air ventilation is provided with an active system, which brings the odorous air to the treatment unit. Active systems are more complex than passive controls due to the addition of mechanical/electrical components and the corresponding higher maintenance requirements, larger footprints, and utility and accessibility requirements. Active units also have related energy costs in addition to the O&M costs for media replacement. In order to eliminate the need for storage of hazardous chemicals, only carbon treatment and biofilters were selected for further evaluation. Although there are several advantages to biofiltration, active carbon treatment was recommended because of its proven reliability and smaller footprint for the required treatment of the recommended air flows to be withdrawn from the PI. The smaller footprint of the odor control technology was important to reduce potential impacts to cultural and archeological resources on NPS lands, in addition to the limited land space available along the steep banks of the Potomac Gorge.

Chemical odor control technologies entail treating potentially odor-causing compounds in the wastewater or liquid phase, through chemical addition. Typically, a chemical is introduced into the wastewater stream to limit the conversion of dissolved sulfide into gaseous hydrogen sulfide. Limiting the dissolved sulfides would control most of the odors that are caused by sulfur-reducing compounds, but some hydrogen sulfide gas and other inorganic and organic compounds would still be released from the wastewater in the turbulent sections of the PI along the CHOH and Clara Barton Parkway. Generally, the addition of chemicals would not eliminate the odors from the PI vents to non-detectable levels, and some of the chemical options are not very effective due to the dynamics of the PI (e.g., caustic slugging). Further, the chemical control systems would require the construction of chemical feed structures and the need for the storage of chemicals, most of which are listed as hazardous, in areas near the CHOH, Clara Barton Parkway and other memorial/historic roadways, and the Potomac River. Although a proposed chemical control system would have been adequately designed with secondary containment to reduce the accidental release of a hazardous substance, the potentially affected resources in the National Parks and the Potomac River, should a spill occur, could be catastrophic.

3.0 AFFECTED ENVIRONMENT

The general study area for identifying the environmental issues assessed in the EA encompasses the five proposed active blower sites identified in Alternatives 2 and 3 for construction of the proposed odor control buildings along the PI. This area extends south for approximately nine miles from the Old Anglers Inn (location of Site 27) to Fletchers Boathouse (location of Site 1995) within the CHOH. This area includes the Clara Barton Parkway and associated landscape that adjoins the CHOH. The proposed active blower treatment units at Sites 17, 15, and 4 are located adjacent to the Clara Barton Parkway (see Figures 3 and 4 on pages 8 and 10, respectively).

3.1.a Cultural Resources along the Clara Barton Parkway

The Clara Barton Parkway (Parkway) is a portion of the GWMP and it serves to recognize the accomplishments of Clara Barton (Public Law 101-177, November 28, 1989), and to preserve and protect the natural and scenic character of the Gorge of the Potomac River (Public Law 71-284, AKA the Capper-Crampton Act, approved May 29, 1930, as revised). The Parkway is a 2-lane undivided and 4-lane divided highway that runs approximately 6.5 miles along the northern border of the C&O Canal. It extends from approximately one mile south of the Old Angler's Inn to the Chain Bridge (approximately one mile south of Lock 5), and is part of the National Register of Historic Places nomination for the George Washington Memorial Parkway/Parkways of the Capital Region. The Parkway provides a scenic access route to the Clara Barton National Historic Site, Glen Echo Park Historic District, and recreational and historic areas within the CHOH.

The Clara Barton National Historic Site (NHS), located on 5801 Oxford Road in Glen Echo Park, commemorates the life of Clara Barton, the founder of the American Red Cross. The Clara Barton NHS was established as a unit of the NPS in 1975 and is administered by the GWMP. Clara Barton's house at the NHS was constructed in 1891; it served as a warehouse for disaster relief supplies and beginning in 1897, as Clara Barton's home and the headquarters for the American Red Cross. From here, Clara Barton organized and directed American Red Cross relief efforts for victims of natural disasters and war until she resigned as president in 1904. She lived in the house until her death in 1912. The Clara Barton House was made a National Historic Landmark in 1966.

Glen Echo Park is located in the Town of Glen Echo on the east side of the Clara Barton Parkway, approximately 2.25 miles north of the District of Columbia line. The 9.3-acre Glen Echo Park Historic District, which is administered by the GWMP, was entered into the National Register of Historic Places in 1984. Designation of Glen Echo Park as a historic district was based on its significance as a rare surviving regional example of an early 20th century amusement park of architectural significance and as a recreational facility for area residents and visitors. The park is also recognized as a site of the late 19th Century Chautauqua Movement. The historic district consists of nine contributing elements including the individually listed Chautauqua Tower and Dentzel Carousel (NPS, 2001).

Since 1971, the NPS at Glen Echo Park has been offering year-round activities in dance, theater, and the arts for the surrounding communities and for visitors across the country. The park also administers an artist-in-residency program providing the public with an opportunity to see artist's artwork. There are concerts, demonstrations, workshops and festivals during the warm months as a part of the Chautauqua Summer season (NPS, 2001). Glen Echo Park is situated approximately one mile east of Site 15, approximately 1.5 miles east of Site 17, and about one mile northwest of Site 4.

There are numerous documented archeological resources surrounding Glen Echo Park and the Clara Barton Parkway. Due to the potential for archeological resources within the study area, a Phase I Archeological Assessment was conducted in December 2001 at the five proposed odor treatment unit sites, in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. Three of the five proposed odor treatment unit sites are located along the Parkway and described further in this section. Based on the completion of a Phase I Archeological Assessment including shovel test samples at each of the locations and a review of the Maryland SHPO archeological database, the proposed odor treatment unit at Site 4 is near a known documented historic site. However, construction of the proposed odor treatment unit and associated piping at Site 4 would not impact this sensitive archeologic area. There are no known documented sites of archeological significance near the proposed odor treatment units at Sites 15 or 17. However, a known and documented archeological site exists under the entire Maryland I-495 interchange to the northwest of Site 17, which would not be impacted by the proposed odor treatment units or associated piping. The archeological assessments performed for each of the sites did not consider potential impacts during the placement of utilities to the proposed blower sites. However, to the extent possible, utilities will be brought to each of the proposed sites along existing corridors or previously impacted areas (e.g., construction of the Clara Barton Parkway). During the proposed construction of the odor control buildings and utility trenching operations, an archeologist would be onsite to monitor any excavated areas for the presence of historical artifacts.

3.1.b Cultural Resources along the C&O Canal Historical Park

The CHOH is the site of the most intact 19th century canal in the United States. The C&O Historic District was listed as a District of Columbia Landmark in 1964, nominated to the National Register of Historic Places in 1966, and nominated as a National Park in 1971. The C&O Canal project was a national effort to establish a Potomac River water route to the Ohio Valley. It was a modification and expansion of the Patowmack Canal originally envisioned and constructed in the late 1700's by George Washington and his contemporaries.

Constructed between 1828 and 1850, the C&O Canal follows the route of the Potomac River for 184.5 miles from Washington, DC to Cumberland, Maryland where construction was halted. It operated from 1828-1924 as one of the major commercial transportation arteries of the Potomac Valley, primarily hauling coal from western Maryland to the port of Georgetown in Washington, DC. A major flood in 1924 caused the C&O Canal to cease operation, and in 1938 it was acquired by the NPS. Hundreds of original structures including locks, lock houses, and aqueducts, serve as reminders of the role of the canal as a transportation system during the Canal

Era. In addition, the canal's towpath provides a nearly level, continuous recreational trail through the spectacular scenery of the Potomac River Valley.

There are several canal features on the List of Classified Structures within the assessment area, which are mandated for preservation through the NPS' enabling legislation (Public Law-91-664-Chesapeake and Ohio Canal Development Act). Passage of PL 91-664 created the CHOH and placed it under the National Park Service. Listed features within the assessment area include nine miles of the C&O Canal, the canal towpath and 10 locks (numbers 5-14), and the Abner Cloud House.

The Washington Aqueduct is located beneath MacArthur Boulevard and stretches almost 12 miles from the intake at Great Falls to the Georgetown Reservoir. The Aqueduct system, which diverts water from the Potomac River, was built by the Army Corp of Engineers between 1853 and 1863 as the first public water system of the District of Columbia. The system originally included 12 miles of conduit, six bridges, pumping stations, pipelines and the Dalecarlia and Georgetown Reservoirs. Three of the six original bridges remain with Cabin John Bridge (also called Union Arch Bridge) listed individually in 1973 on the National Register of Historical Places. Since its construction, the Aqueduct system has undergone several expansions and modifications and now produces approximately 300 million gallons of filtered water per day for 1.1 million customers. The Aqueduct system currently provides public water to all of Washington, DC; Arlington County, Virginia; and Falls Church, Virginia; 50 square miles of Fairfax County, Virginia; and federal installations including the Pentagon and Ronald Reagan Washington National Airport.

Native Americans previously occupied areas within the CHOH before the existence of the C&O or Patowmack Canals. They engaged in fishing in the Potomac River and obtained other sustenance from the surrounding forest. While archeological investigations have indicated the existence of seasonally occupied campsites and a trade network, the activity zones of these aboriginal peoples are not clearly defined. A review of the MD SHPO archeological database indicated the presence of significant prehistoric resources near the Abner Cloud House and Fletchers Boathouse (area of Site 1995). There are no known documented sites of archeological significance near Site 27.

There are numerous documented archeological resources located within the CHOH. Due to the potential for archeological resources within the study area, a Phase I Archeological Assessment was conducted at the five proposed odor treatment unit sites in the CHOH, in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. Two of the five proposed odor treatment unit sites are located in the CHOH and are described further in this section. These two areas were subjected to archaeological surveys. Based on the completion of a Phase I Archeological Assessment and a review of the MD SHPO and the DC SHPO archeological databases, the proposed odor treatment units at Sites 27 and 1995 would not impact any documented historic site. However, a known and documented archeological site exists near Fletchers Boathouse, but would not be impacted by the proposed odor treatment unit or associated piping at Site 1995.

3.2 *Natural Resources*

The general study area lies within the middle region of the Maryland side of the Potomac River Gorge. The Gorge consists of approximately 13 miles of river valley along the Potomac River preserved by both the GWMP and the C&O Canal, and extends from above Great Falls to near Theodore Roosevelt Island. The Potomac River Gorge straddles the Fall Line between the Atlantic Coastal Plain and the Piedmont Geologic Provinces and is a meeting place for northern and southern flora and fauna species, as well as Coastal Plain and Appalachian species. The diversity of habitats contained in the region includes a major river system with numerous tributaries, mature upland woods, floodplain forests, bedrock floodplains, bedrock terraces, riverside prairie outcrops, several springs and seeps harboring rare fauna, and abundant small wetlands of varied types. This diversity is mainly attributable to the significant natural resources along the Fall Line such as Great Falls, Mather Gorge, and the numerous islands and smaller falls within this section of the Potomac River.

Portions of the Potomac Gorge are heavily forested although many stands of forest represent second growth or formerly disturbed areas. Known old-growth forest stands are located in Great Falls Park, Maryland, which is north of the study area. Upland forests within the Gorge consist primarily of oak, hickory, beech and tulip poplar trees. Sycamore, red maple, box elder, and ash forests are prominent on the floodplain. Wildflowers and other herbaceous plants are plentiful and varied in the Gorge, with numerous occurrences of rare species and communities reported. Many of these occur in the riverside prairie and outcrop communities found along the flooded riverbank.

Mammals within the study area are representative of the eastern hardwood forests, including white-tailed deer, raccoons, bats, flying squirrels, eastern gray squirrels, chipmunks, opossums, rabbits, and red fox. In addition, many species of reptiles and amphibians such as five-lined skinks, black rat snakes, copperhead snakes, garter snakes, box turtles, American toads, and red-backed salamanders are common. A wide variety of invertebrate species such as butterflies and moths also inhabit the area.

Several bird species are common within the general study area along the Potomac River. Available breeding bird count and wildlife observation data from the C&O Canal documents 81 bird species in the Great Falls area in Maryland, of which 45 of these are migratory. Waterfowl, herons, Osprey, and American Bald Eagles can be seen along the Potomac River's edge. There are numerous species of birds that migrate and/or nest within the forest such as warblers, thrushes, and other neotropical migratory species. Common year-round avian species include Carolina Chickadee, Mourning Dove, House Wren, Northern Cardinal, American Crow, and European Starling.

Habitat diversity at the five proposed active blower sites is generally limited to combinations of upland woods and urban landscapes. Areas of natural, undisturbed vegetation in the vicinity of the sites are limited because the locations are near developed and frequently accessed public areas. The stands of forest in the vicinity of the five proposed sites consist almost entirely of secondary growth and areas formerly disturbed by the construction of the PI in the 1960s. Identified species of trees include the Sycamore, Locust, Dogwood and Oak. No historic or

specimen trees were identified by the NPS records reviewed to be within the potentially disturbed areas. In addition, no significant animal communities have been reported by the NPS to be in the immediate vicinity of any of the proposed treatment unit sites.

While comprehensive data regarding the composition of species at the five proposed odor treatment unit sites were not collected, site locations were compared to park species inventory databases for the presence of wetlands, groundwater springs, Forest Interior Dwelling Species (FIDS) (of which birds warrant the most conservation attention), and rare plant species. In addition, quantities of individual plants (not including grass or other groundcover species) and mature trees (i.e., greater than 2-inches in diameter) lying within the potentially disturbed areas of the proposed construction sites were estimated. Findings are summarized as follows:

Site 27 (lightly wooded and sloping area adjacent to parking lots across from Old Anglers Inn):

- **Vegetation** – This proposed site is in the vicinity of a plant site containing 29 state rare, threatened and endangered species, all of which lie outside the immediate location of the proposed site. Approximately 50 individual plants including 10 mature trees fall within the perimeter of the proposed construction area. Mature trees that would fall under the proposed construction include three 2-inch diameter trees, two 3-inch diameter trees, one 5-inch diameter tree, two 12-inch diameter trees, and two 14-inch diameter trees.
- **Wildlife** – Three FIDS (Red-bellied Woodpecker, Blue-gray Gnatcatcher, Acadian Flycatcher) were identified as using the area nearby the site as breeding habitat although no data exist for Site 27 specifically. The Bald Eagle, a federally endangered species, also nests in the area.
- **Wetlands/Springs** – No wetlands are indicated at the proposed site; the closest is the C&O Canal itself. Several springs, including one that supports one species of rare invertebrates, are located south of the site and outside the perimeter of the proposed construction area.

Site 17 (open lawn area east of I-495):

- **Vegetation** – This site is in the vicinity of a rare plant site containing 16 state rare, threatened and endangered species, all of which lie outside the immediate location of the proposed site. Since this site is an open lawn area, only cultivated grass will be disturbed during construction of the proposed odor treatment facility.
- **Wildlife** – Four FIDS (Red-bellied Woodpecker, Hairy Woodpecker, Red-eyed Vireo, Scarlet Tanager) were identified as using the area nearby the sites as breeding habitat although no data exist for the proposed site.
- **Wetlands/Springs** – No wetlands or springs identified at or near this site.

Site 15 (lightly wooded area west of Lock 10):

- **Vegetation** – Located in the vicinity of a rare plant site containing 16 state rare, threatened and endangered species; all of which lie outside the immediate location of the proposed site. Approximately 30 individual plants including two mature trees (both trees are 3-inch diameter) fall within the perimeter of the proposed construction area for this site.
- **Wildlife** – Four FIDS (Red-bellied Woodpecker, Hairy Woodpecker, Red-eyed Vireo, Scarlet Tanager) were identified as using the area nearby the sites as breeding habitat although no data exist for the proposed site.
- **Wetlands/Springs** – No wetlands or springs identified at or near this site.

Site 4 (sloping cleared area adjoining the Little Falls Pumping Station building):

- Vegetation – This site is in the vicinity of a rare plant site containing 83 state rare, threatened and endangered species, all of which lie outside the boundaries of the proposed site. Approximately 20 individual plants and four mature trees fall within the perimeter of the proposed construction area. Mature trees that would fall under the proposed construction include one 2-inch diameter tree, one 3-inch diameter tree, one 5-inch diameter tree, and one 12-inch diameter tree.
- Wildlife – Five FIDS (Red-eyed Vireo, Acadian Flycatcher, Northern Parula Warbler, Prothonotary Warbler, Yellow-throated Vireo) were identified as using the area nearby the proposed site as breeding habitat although no data exist for Site 4 specifically.
- Wetlands/Springs – No wetlands or springs were identified at Site 4; however, there is a spring that supports two species of rare invertebrates located upstream of the site, outside the perimeter of the proposed construction area.

Site 1995 (Public comfort station and lightly wooded path at Fletchers Boathouse):

- Vegetation – This site is in the vicinity of a rare plant site containing 19 state rare, threatened and endangered species, all of which lie outside the immediate location of the proposed site. Approximately 50 individual plants including five mature trees fall within the perimeter of the proposed construction area. Mature trees that would fall under the proposed construction include two 3-inch diameter trees, one 8-inch diameter tree, one 12-inch diameter tree, and one 15-inch diameter tree.
- Wildlife – Five FIDS (Pileated Woodpecker, Blue-gray Gnatcatcher, Northern Parula Warbler, Red-bellied Woodpecker, Yellow-throated Warbler) were identified as using the area nearby the site as breeding habitat although no data exist for Site 1995 specifically.
- Wetlands/Springs – No wetlands or springs were identified at or near Site 1995.

3.3 Threatened and Endangered Species

Threatened or endangered bird species data compiled by GWMP Resource Management staff indicate there are six Maryland state-listed and one federally-listed bird species (Bald Eagle) found within the Great Falls Park area of the C&O Canal (NPS, 2000)(Appendix C). In all seasons of the year, Bald Eagles have been spotted in the Potomac River Gorge. The C&O Canal offers nesting habitat for the Bald Eagle, providing both mature forest canopy and access for fishing in the Potomac River. In Maryland, the Mourning Warbler and the Swainson's Warbler have a state status of endangered and are ranked as critically imperiled for breeding. While no known threatened or endangered species are known to habitat any of the five proposed blower treatment unit sites, it is possible that transient individuals of some species will occasionally be found within their vicinity.

3.4 Socioeconomic Environment

3.4.a Visual Quality for Nearby Communities and National Park Visitors

It was the intent of Congress in 1916 to create the NPS to manage National Park areas, conserve the scenery, and to maintain the unimpaired enjoyment of National Park areas for future

generations to come. The GWMP and CHOH divisions of the NPS were created, in part, to protect the scenic value of the culturally significant areas along the Potomac River. Proposed projects need to be carefully planned and reviewed by the appropriate NPS groups to minimize impacts to the scenic environment along the Clara Barton Parkway and CHOH. The 1999 NPS Management Policies direct park managers to preserve park resources “unimpaired” and qualify impairment to mean reaching a level that violates the NPS Organic Act (see Appendix D for more information).

The anticipated impacts to visual quality by the proposed odor control buildings are provided in Figures 6 – 10. The figures are provided in sets and include detailed site maps of the proposed building locations, view directions of the photograph building renderings, and the building renderings generated using desktop publishing software. Each set includes photographs at each of the proposed sites during the summer (“leaves on”) months and the winter months (“leaves off”). Buildings indicated in the photographic renderings were developed using neutral-colored or white brick (Site 1995) structures with slate roofs. These building materials may not be appropriate at all locations, but are intended to serve as an example for purposes of this analysis. For example, since the Site 4 building is proposed for construction adjacent to the Little Falls PS structure, the building facade would match that of the existing PS structure as evident in the rendering. Appropriate materials will be determined by the NPS and SHPOs in order to minimize visual impacts at each of the sites.

These photographic renderings are provided to present a generalized image of the proposed buildings in each area. View directions portray direct impacts from both the Clara Barton Parkway and the CHOH. For the proposed building site near Anglers Inn (Site 27), no visual impacts could be identified from the C&O Canal Towpath area during the summer months and, therefore, a photographic rendering from the C&O Canal view was not provided. Base photographs for each of the views depicted were collected in September 2001 for “leaves on” conditions and in February 2002 for “leaves off” conditions. Mitigating features to reduce the visual impairments caused by the proposed structures are discussed in Section 4, Environmental Impacts.

Additional drawings are presented in Section 3.4.c, Infrastructure Changes, to show areas of the proposed construction impacts in profile and plan views, based on geographic information system (GIS) data provided by the NPS. The drawings in Section 3.4.c also present topographic data for the areas surrounding the proposed construction sites.

3.4.b Noise

Each of the proposed buildings would contain one forced-air carbon treatment unit to provide the removal of odorous compounds from the sewer air extracted from the PI. Each of the proposed blowers would be sized to extract between 8,000-12,000 cubic feet per minute (cfm) of air from the PI on a continuous basis (M&E, 2001). The proposed blower units would be in operation 24 hours per day and 365 days per year, with the exception of periodic shutdowns for maintenance activities or electrical outages. Considering the blowers would operate on a continuous basis, increased noise levels generated by the blowers are of concern to nearby residents and park users.

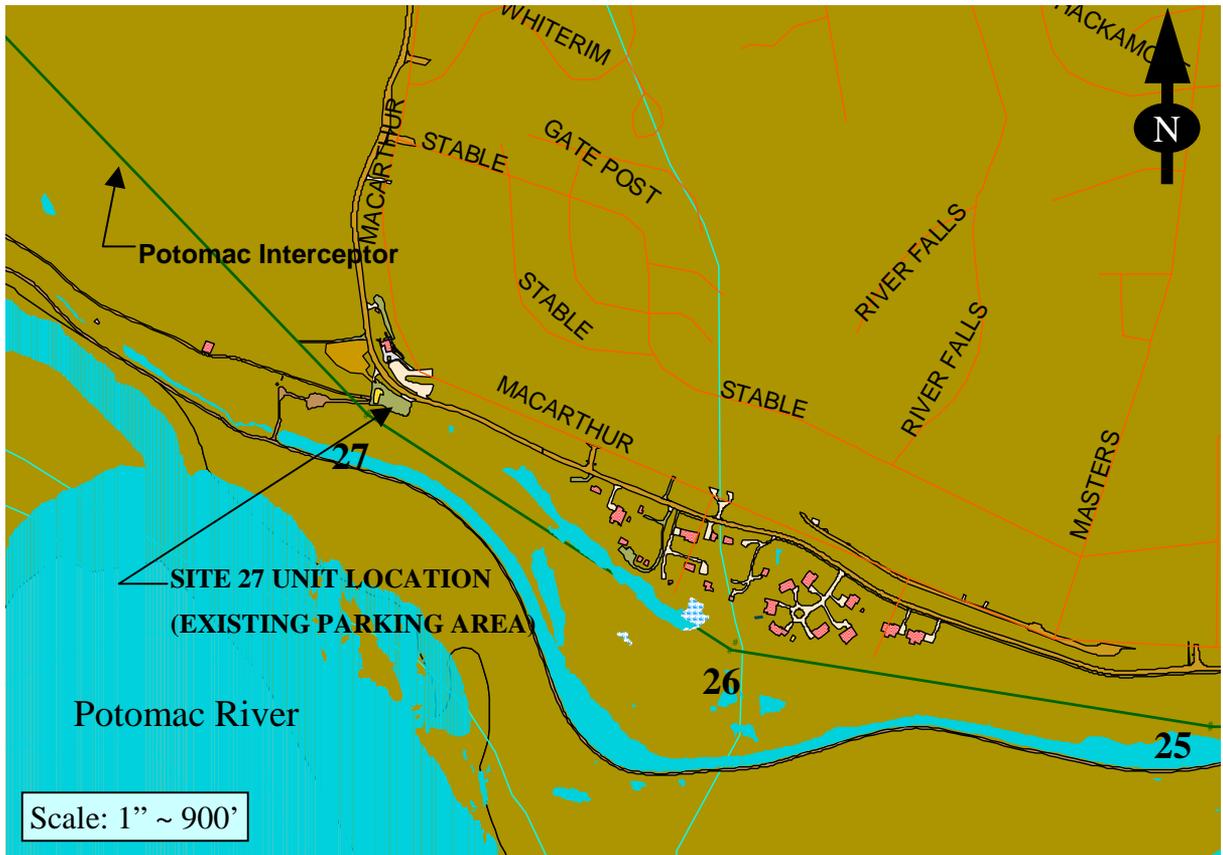


Figure 6a: Site 27 Location Map

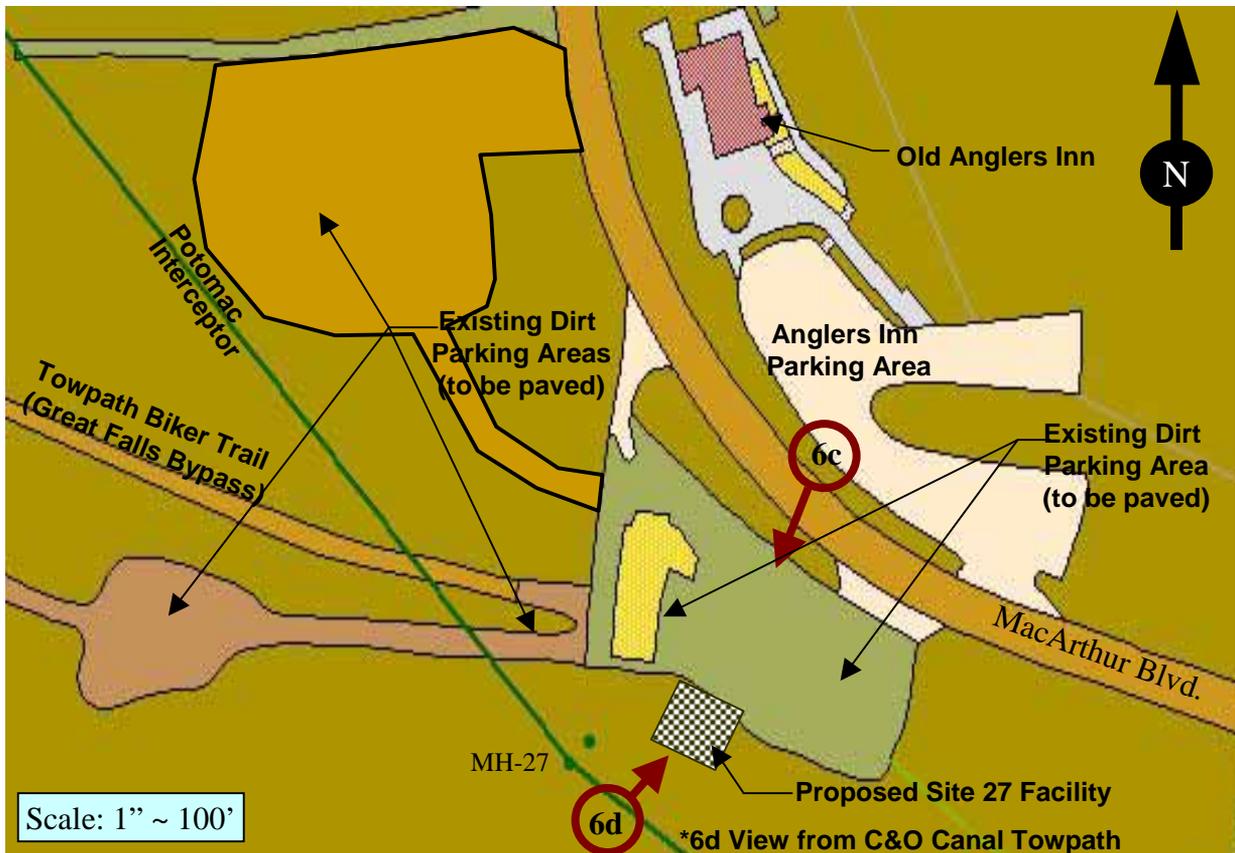


Figure 6b. View Directions 6c and 6d of Building Rendering for Site 27



Figure 6c.1: Existing Summer View 6c at Site 27 from Anglers Inn Parking Area (leaves-on)



Figure 6c.2: Building Rendering at Site 27 from Summer Viewing Direction 6c (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 6c.3: Existing Winter View 6c at Site 27 from Anglers Inn Parking Area (leaves-off)



Figure 6c.4: Building Rendering at Site 27 from Winter Viewing Direction 6c (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 6d.1: Existing Winter View 6d at Site 27 from C&O Canal Towpath (leaves-off)



Figure 6d.2: Building Rendering at Site 27 from Winter Viewing Direction 6d (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)

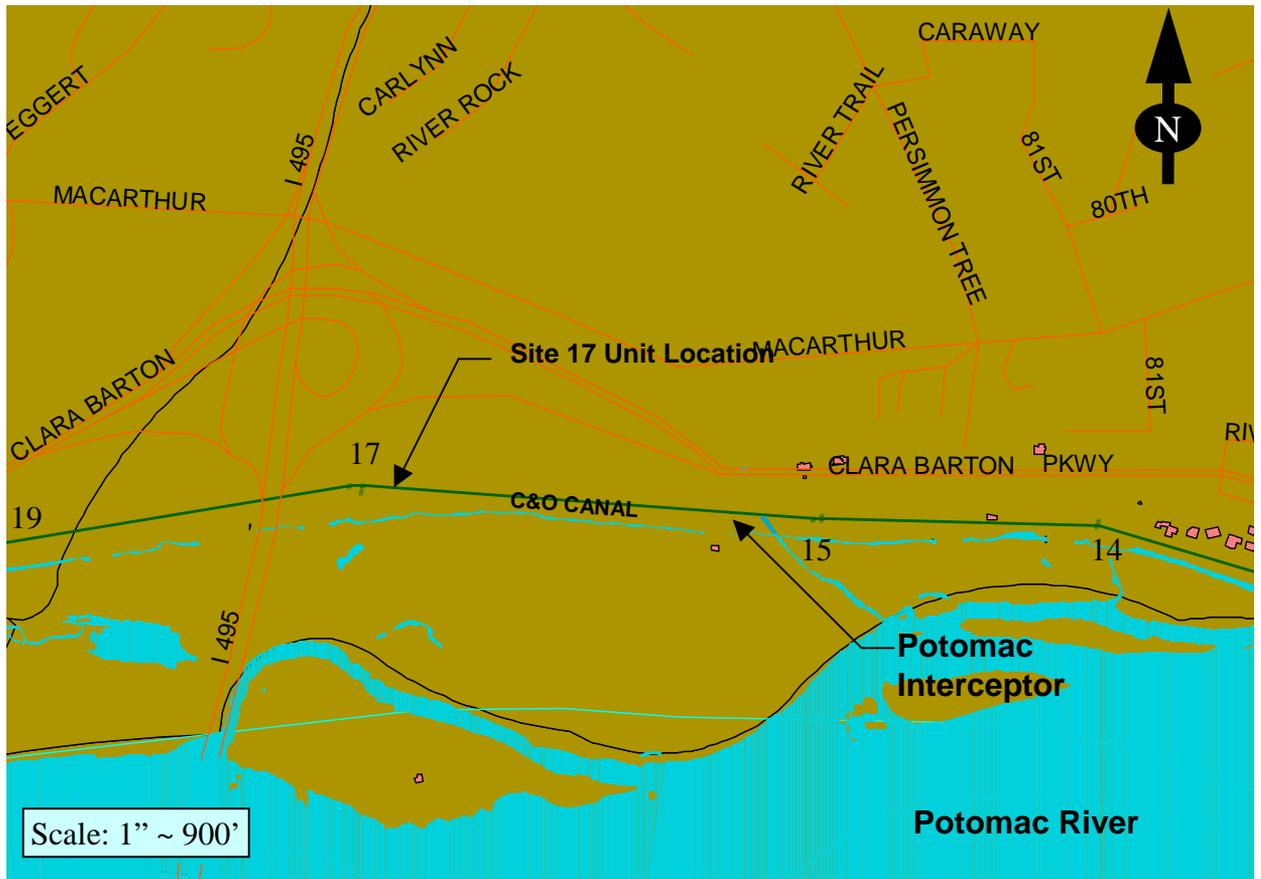


Figure 7a: Site 17 Location Map



Figure 7b: View Directions 7c and 7d of Building Rendering for Site 17



Figure 7c.1: Existing Summer View 7c at Site 17 from Clara Barton Parkway (leaves-on)



Figure 7c.2: Building Rendering at Site 17 from Summer Viewing Direction 7c (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 7c.3: Existing Winter View 7c at Site 17 from Clara Barton Parkway (leaves-off)



Figure 7c.4: Building Rendering at Site 17 from Winter Viewing Direction 7c (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 7d.1: Existing Summer View 7d at Site 17 from C&O Canal Towpath (leaves-on)



Figure 7d.2: Building Rendering at Site 17 from Summer Viewing Direction 7d (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 7d.3: Existing Winter View 7d at Site 17 from C&O Canal Towpath (leaves-off)



Figure 7d.4: Building Rendering at Site 17 from Winter Viewing Direction 7d (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)

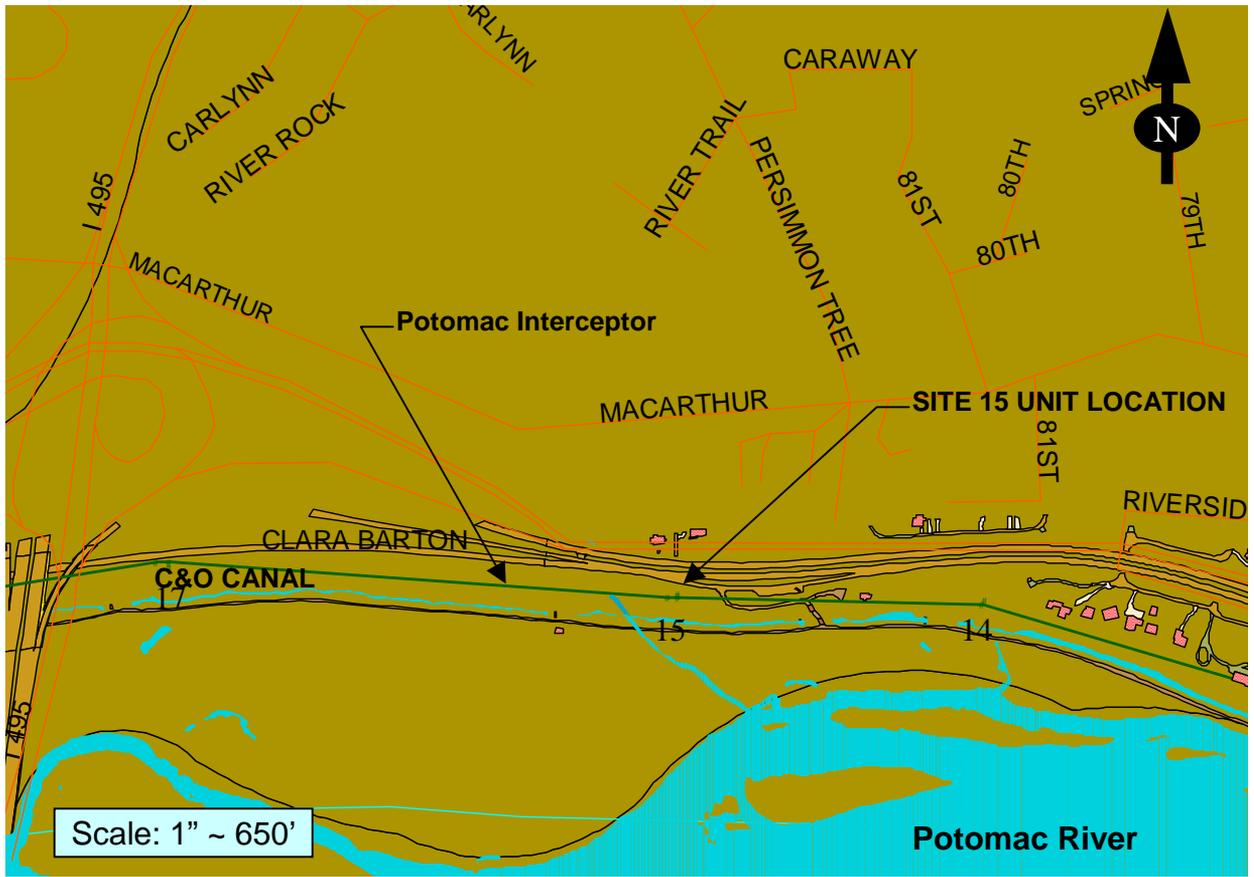


Figure 8a: Site 15 Location Map

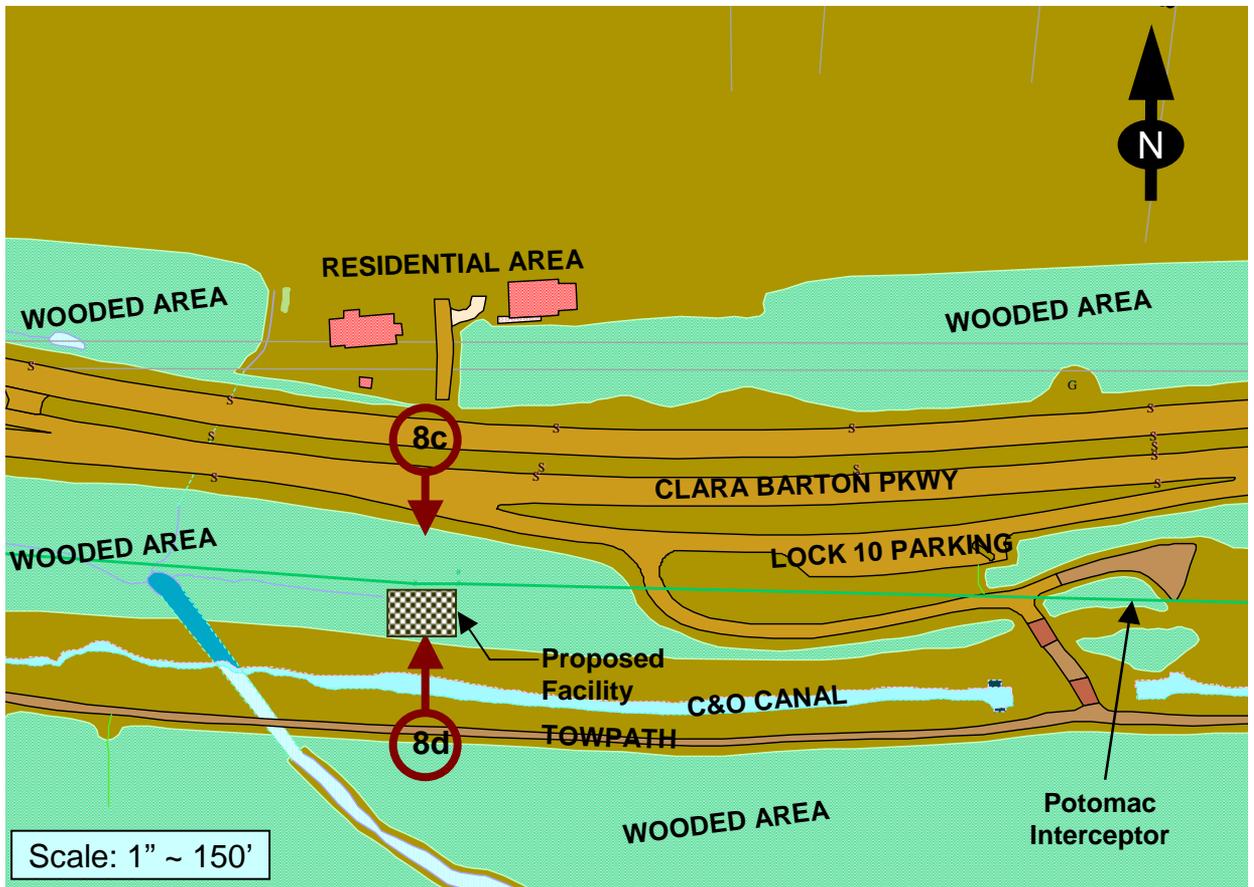


Figure 8b: View Directions 8c and 8d of Building Rendering for Site 15



Figure 8c.1: Existing Summer View 8c at Site 15 from Clara Barton Parkway (leaves-on)



Figure 8c.2: Building Rendering at Site 15 from Summer Viewing Direction 8c (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 8c.3: Existing Winter View 8c at Site 15 from Clara Barton Parkway (leaves-off)



Figure 8c.4: Building Rendering at Site 15 from Winter Viewing Direction 8c (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 8d.1: Existing Summer View 8d at Site 15 from C&O Canal Towpath (leaves-on)



Figure 8d.2: Building Rendering at Site 15 from Summer Viewing Direction 8d (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 8d.3: Existing Winter View 8d at Site 15 from C&O Canal Towpath (leaves-off)



Figure 8d.4: Building Rendering at Site 15 from Winter Viewing Direction 8d (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)

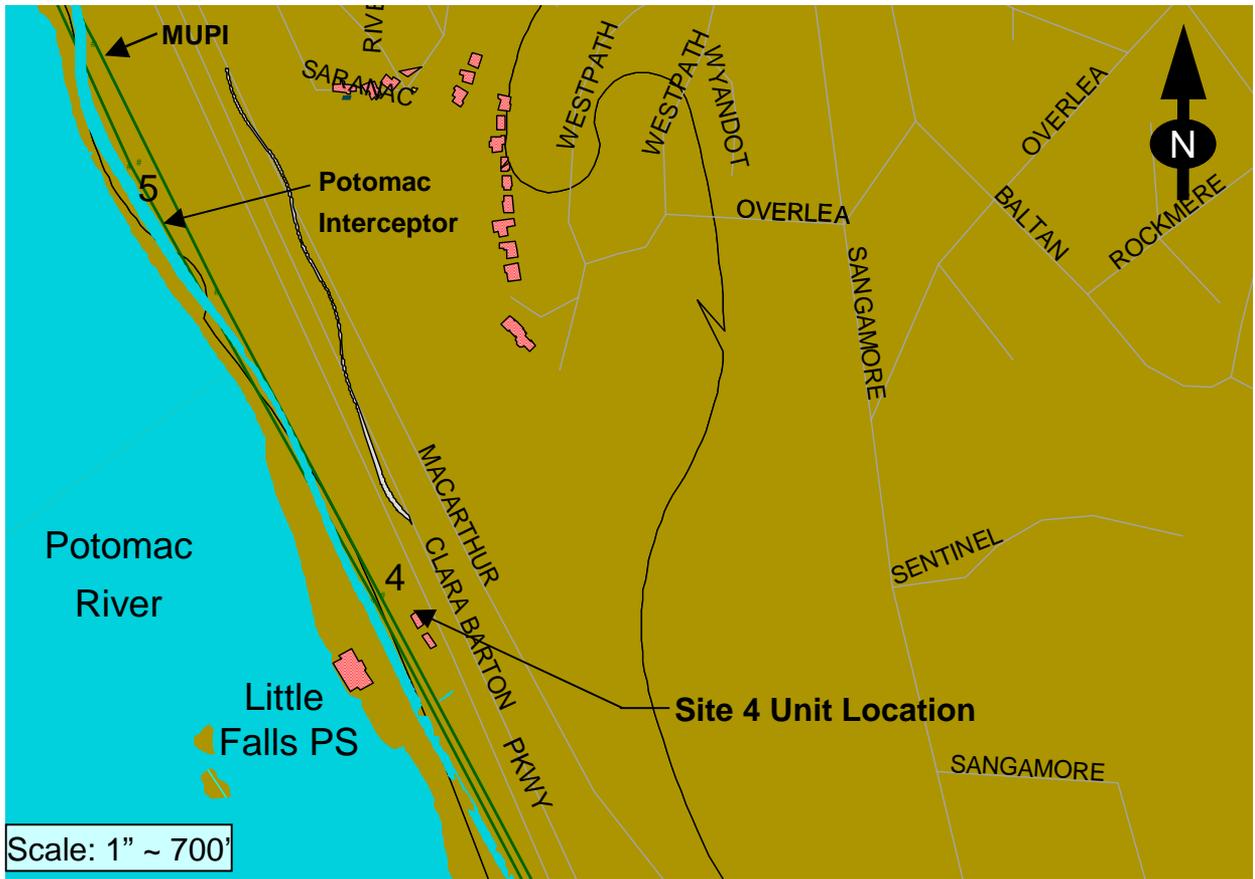


Figure 9a: Site 4 Location Map

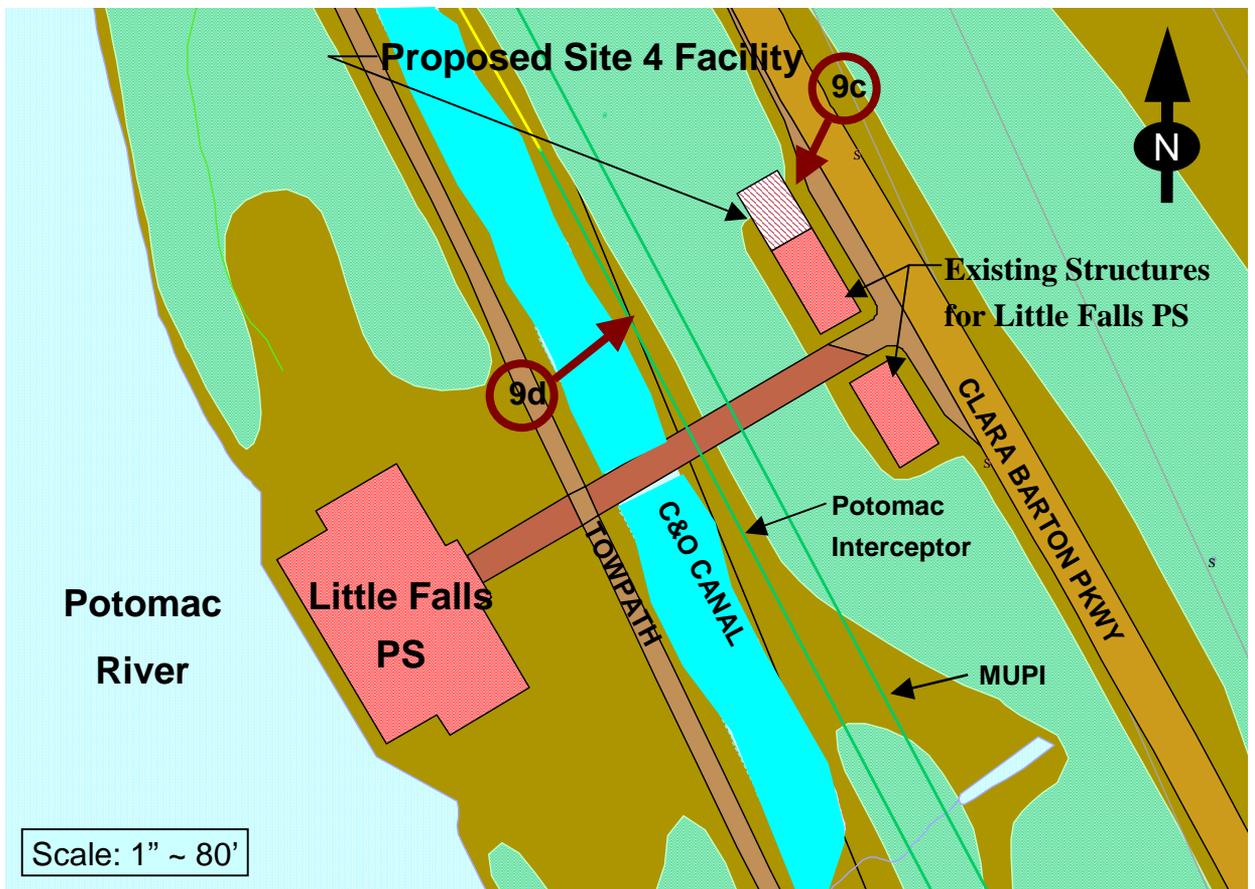


Figure 9b: View Directions 9c and 9d of Building Rendering for Site 4



Figure 9c.1: Existing Summer View 9c at Site 4 from Clara Barton Parkway (leaves-on)

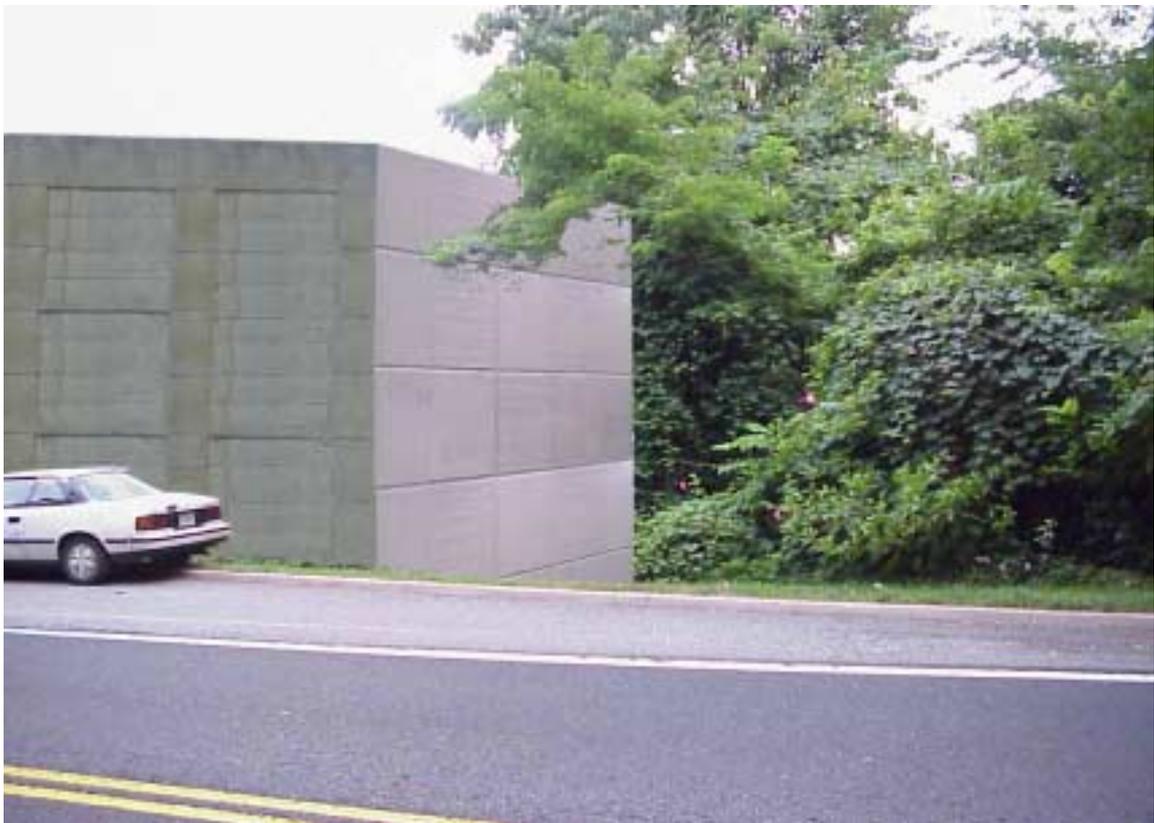


Figure 9c.2: Building Rendering at Site 4 from Summer Viewing Direction 9c (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 9c.3: Existing Winter View 9c at Site 4 from Clara Barton Parkway (leaves-off)



Figure 9c.4: Building Rendering at Site 4 from Winter Viewing Direction 9c (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 9d.1: Existing Summer View 9d at Site 4 from C&O Canal Towpath (leaves-on)



Figure 9d.2: Building Rendering at Site 4 from Summer Viewing Direction 9d (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 9d.3: Existing Winter View 9d at Site 4 from C&O Canal Towpath (leaves-off)



Figure 9d.4: Building Rendering at Site 4 from Winter Viewing Direction 9d (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)

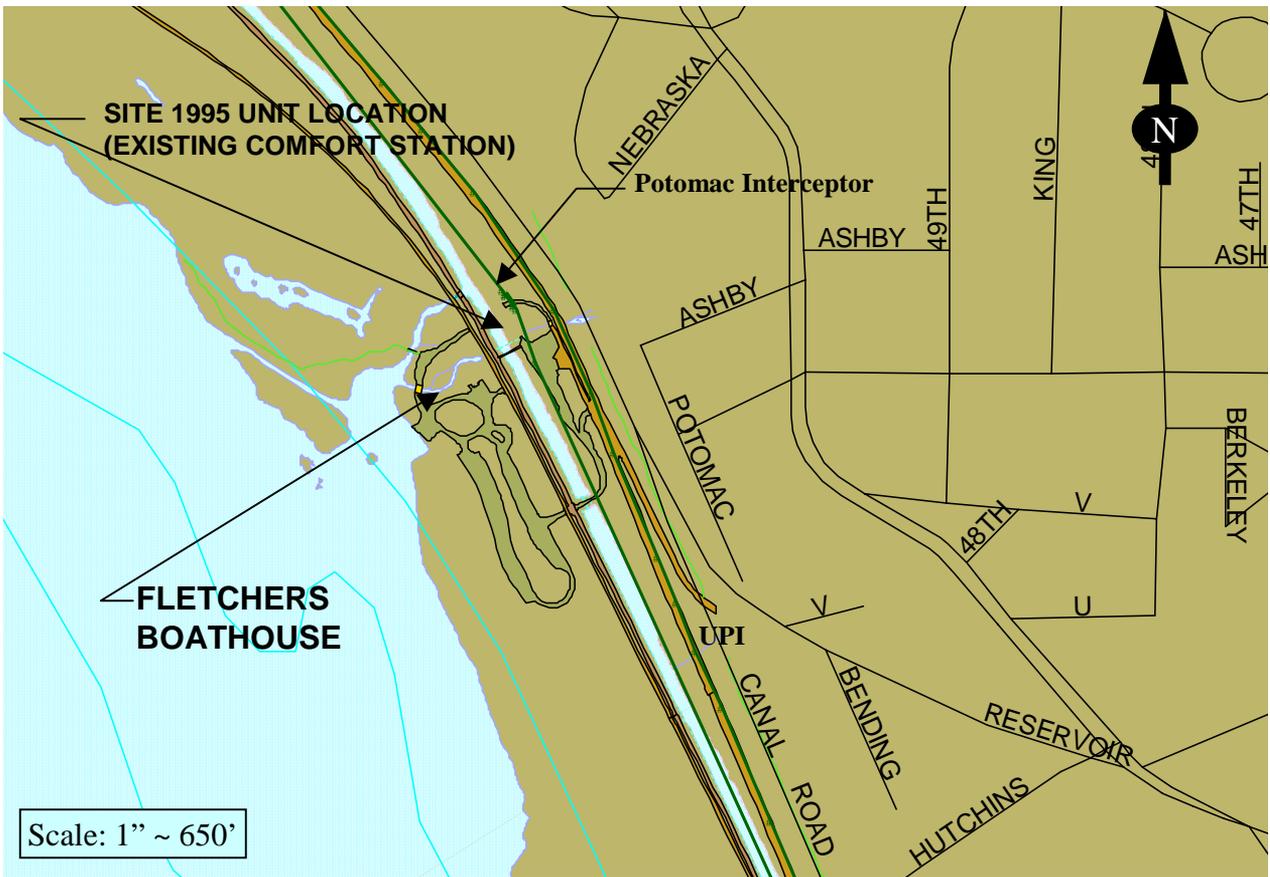


Figure 10a: Site 1995 Location Map

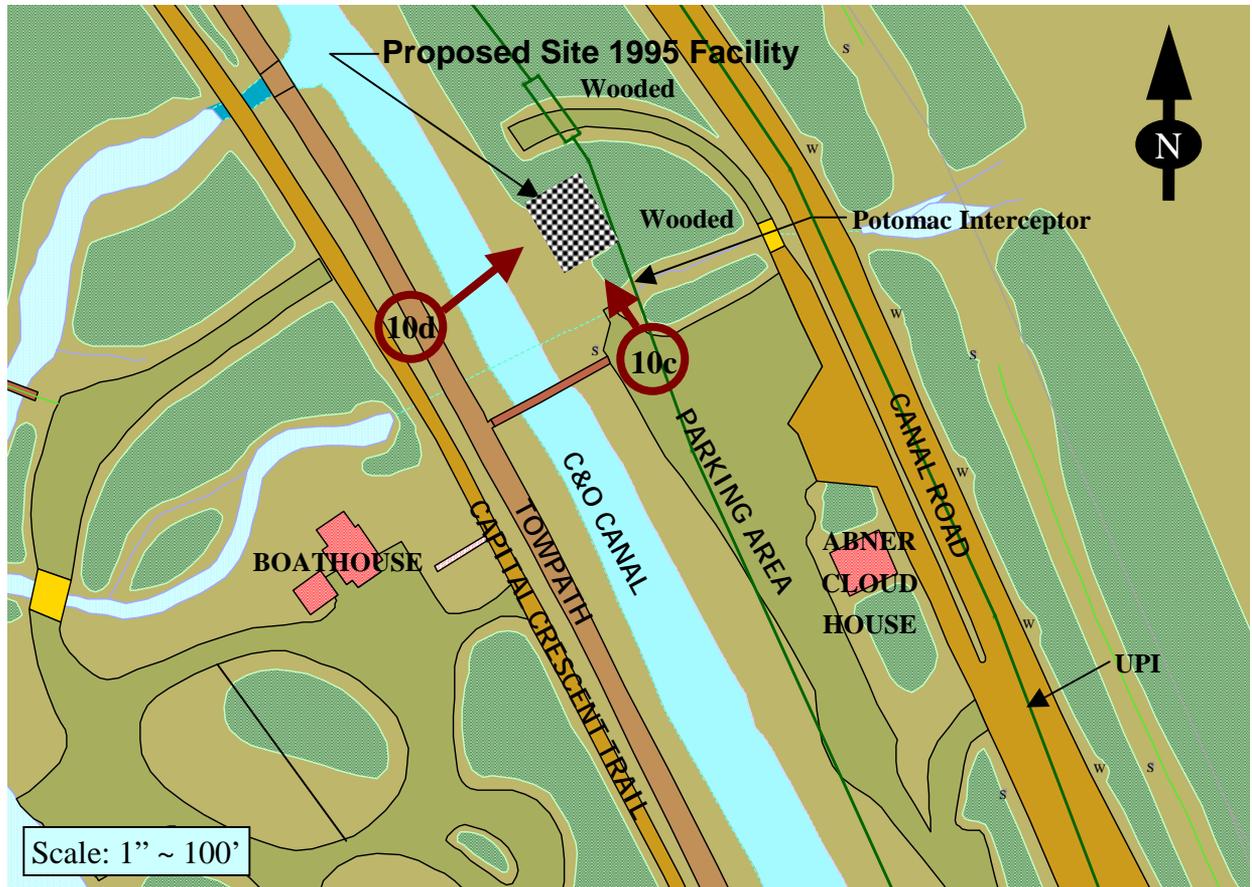


Figure 10b: View Directions 10c and 10d of Building Rendering for Site 1995
 (Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 10c.1: Existing Summer View 10c at Site 1995 from Upper Parking Area (leaves-on)



Figure 10c.2: Building Rendering at Site 1995 from Summer Viewing Direction 10c (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 10c.3: Existing Winter View 10c at Site 1995 from Upper Parking Area (leaves-off)



Figure 10c.4: Building Rendering at Site 1995 from Winter Viewing Direction 10c (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 10d.1: Existing Summer View 10d at Site 1995 from C&O Canal Towpath (leaves-on)



Figure 10d.2: Building Rendering at Site 1995 from Summer Viewing Direction 10d (leaves-on)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)



Figure 10d.3: Existing Winter View 10d at Site 1995 from C&O Canal Towpath (leaves-off)



Figure 10d.4: Building Rendering at Site 1995 from Winter Viewing Direction 10d (leaves-off)
(Building rendering is provided as an example, which is subject to final approval by the NPS and SHPOs)

A sound level survey was completed in March 2001 at two areas along the Clara Barton Parkway, near Locks 5 and 10 on the C&O Canal, to establish typical background sound levels in these areas. The data were reviewed by DCWASA's technical consultant for the purposes of recommending noise controls for the forced-air treatment units. It was determined that without noise controls, the noise levels would exceed background noise levels in the area of the proposed sites. However, several noise controls have been recommended by the DCWASA's technical consultant to reduce sound levels to typical background levels within 10 feet of the proposed forced-air treatment units. The proposed noise controls are discussed in Section 4, Environmental Impacts.

Technical data from the sound level survey and proposed sound control evaluation were provided to the Montgomery County Department of Environmental Protection's (MC DEP) Division of Policy and Compliance (DPC) for review against the County's Noise Control Ordinance. A senior environmental planner, specializing in noise control, from the MC DEP DPC provided the review. It was in the opinion of the County's noise specialist that the level of sound controls recommended by M&E should reduce noise levels to the background levels identified in the sound level survey. In addition, it was indicated by the County's noise specialist that the recommended sound controls would meet the "quiet hours" criteria of 55 decibels, as mandated by the County's Noise Control Ordinance, throughout the daily periods of proposed operation. The MC DEP DPC provided the GWMP and CHOH with a letter indicating their review and assessment of the sound level survey and recommended noise controls for the proposed forced-air blower systems (Appendix E).

3.4.c Building and Infrastructure Changes

Proposed building and infrastructure changes are provided in this section for each site proposed under Alternatives 2 and 3. The proposed building changes discussed include the anticipated site impacts due to the construction of an above-grade structure and an access road for O&M activities at each of the four preferred sites. Proposed infrastructure modifications include impacts for providing utility service and impacts for the construction of a pipe for air removal from the PI. Although the conceptual and detailed design has not been completed for the proposed treatment units and recommended utility service, estimates of construction activities have been provided to indicate anticipated impacts based on best engineering judgment.

Utility services proposed for the odor treatment units include electric, water, sewer, and telephone. Electric service would be provided to operate the blower, lighting, heating, and related controls for the proposed odor treatment unit, and the proposed public restroom facilities at Sites 27 and 1995. Water service is recommended at the locations for regeneration of the activated carbon (to remove hydrogen sulfide compounds), and for fire safety. Water service is also recommended at Sites 27 and 1995 for the proposed construction of public restroom facilities at these locations. Sewer service would be provided for the discharge of carbon regeneration wastewater on a periodic basis, and the discharge of wastewater from the proposed public restroom facilities at Sites 27 and 1995. Telephone service is recommended for remote supervisory control and data acquisition (SCADA) of the odor treatment unit. Remote SCADA operations would be performed at DCWASA's Blue Plains AWTP for O&M purposes. As

indicated by the NPS C&O Canal, telephone service may be requested for public pay phones at the combined facilities.

Figures have been provided to identify the area of impact of the proposed odor treatment unit sites and modifications to the parking area at Site 27. Impacts at Sites 27 and 1995 also include the construction of public restroom facilities in the proposed larger building structures. Two figures are provided for each site to indicate the anticipated area of impact at that location for construction of the proposed odor treatment units, restroom facilities (Sites 27 and 1995), and upgraded parking area (Site 27). Figure numbers which include an “a” present a detailed location map in plan view, and include the estimated area of impact of the proposed activities. When a “b” is included in the figure number, the figure includes a close-up plan view drawing with a section line that represents the profile view of the building. The profile view is provided to show the height of the proposed building in relation to the local topography.

Site 27 (Figures 11a and 11b):

- Site Impacts – Figures 11a and 11b highlight the potential area of impact to the site including construction of the proposed blower treatment unit and public restroom facility (4,000 square feet (sq. ft.)), and improvements to the parking area (24,000 sq. ft.). It is anticipated that this proposed area of impact would also include a temporary staging area during construction of the combination odor control/restroom facility. The area of impact also includes approximately 100 feet of open-cut trenching for the proposed vent pipe connection from the odor treatment unit to the PI.
- Utilities – Electric service is expected to be extended to the proposed facility from the existing overhead distribution lines along MacArthur Boulevard. However, a detailed request for power has not been submitted to the Potomac Electric and Power Company (PEPCO). Water service would be provided by WSSC from a nearby water line that may be located along MacArthur Boulevard, and would run underground to the proposed facility. A detailed request for water service has not been submitted to WSSC. Wastewater generated at the site would be discharged into the PI along the same alignment of the proposed vent pipe. Telephone service would be provided by Verizon from existing overhead lines to the proposed facility. A detailed request for telephone service has not been submitted to Verizon.

Site 17 (Figures 12a and 12b):

- Site Impacts – Figures 12a and 12b indicate the potential area of impact to the site including construction of the proposed blower treatment unit (3,500 sq. ft.) and a new access road (1,000 sq. ft.). It is anticipated that this proposed area of impact would also include a temporary staging area during construction of the odor treatment facility. The area of impact also includes approximately 100 feet of open-cut trenching for the proposed vent pipe connection from the odor treatment unit to the PI.
- Utilities – Electric, water, and telephone services are expected to be extended to the proposed facility from the existing distribution lines located on the north side of the Clara Barton Parkway across from the Lock 10 site. The new electric, telephone, and water service lines would be buried below grade and would run approximately 2,000 feet to the Site 17 facility. Horizontal directional drilling techniques are proposed for crossing under the Clara Barton Parkway. Surface impacts have not been quantified, but it is assumed that the buried electric, telephone, and water lines would be constructed along previously impacted areas from the

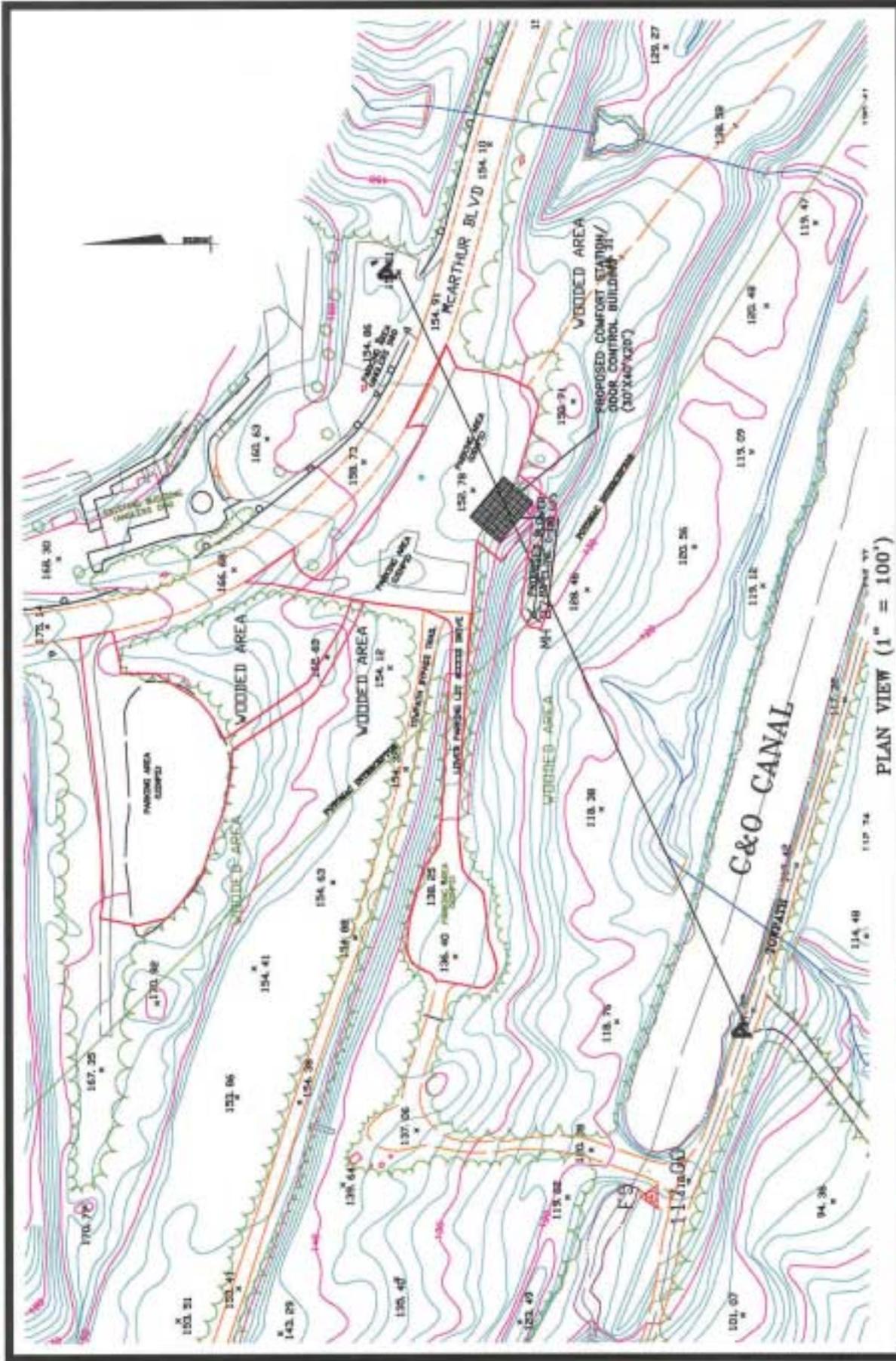
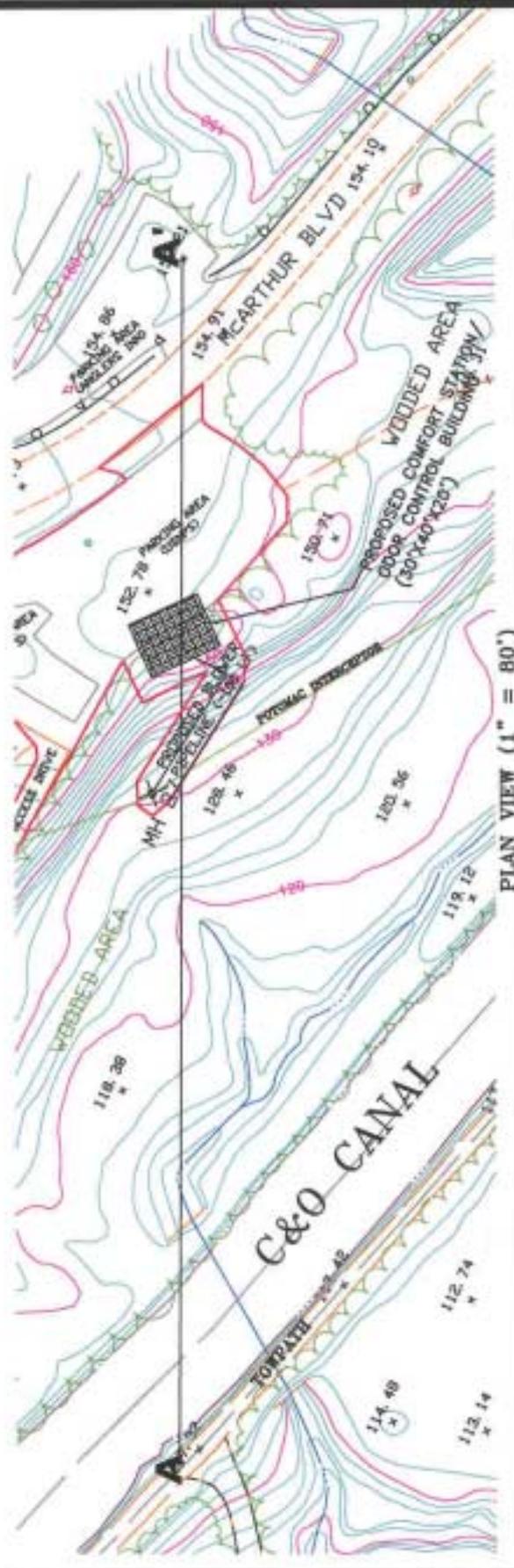


FIGURE 11A. SITE 27 AREA OF IMPACT
EA FOR THE PI LONG-TERM ODOR ABATEMENT PLAN
PAGE 24a

— AREA OF IMPACT
SCALE: AS NOTED



PROFILE VIEW (H: 1" = 80' ; V: 1" = 40')

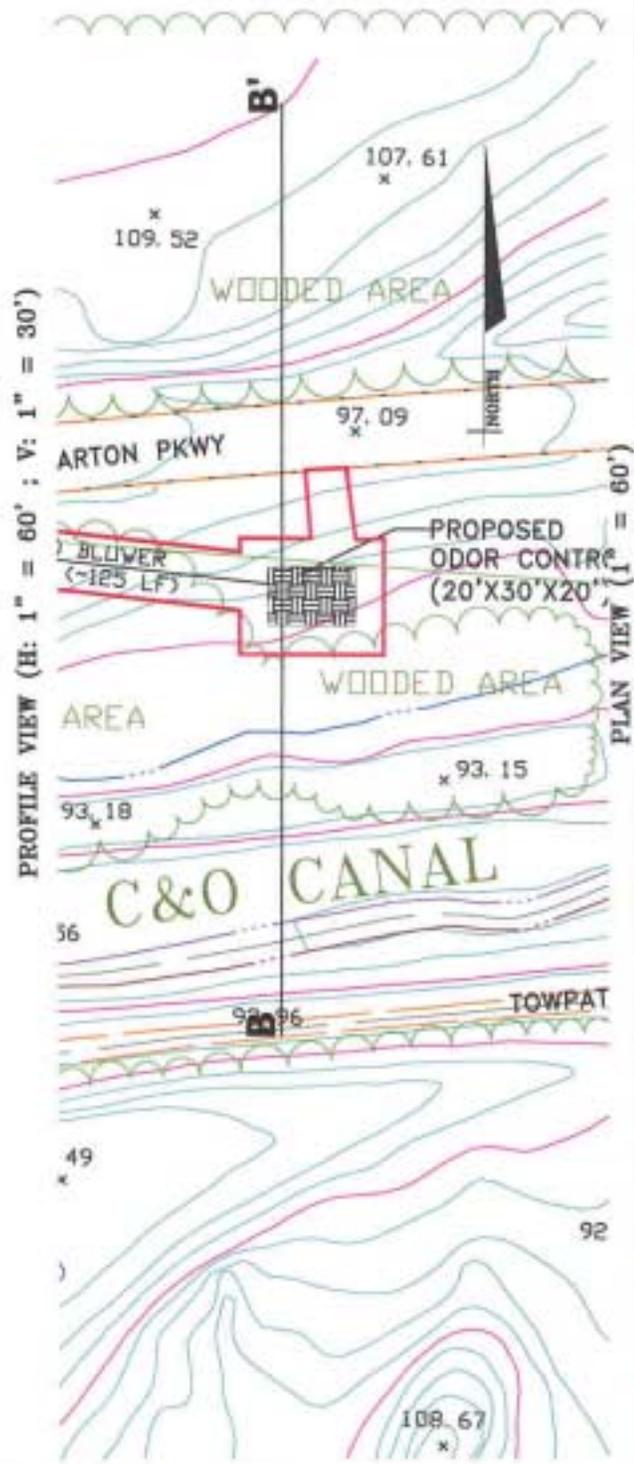
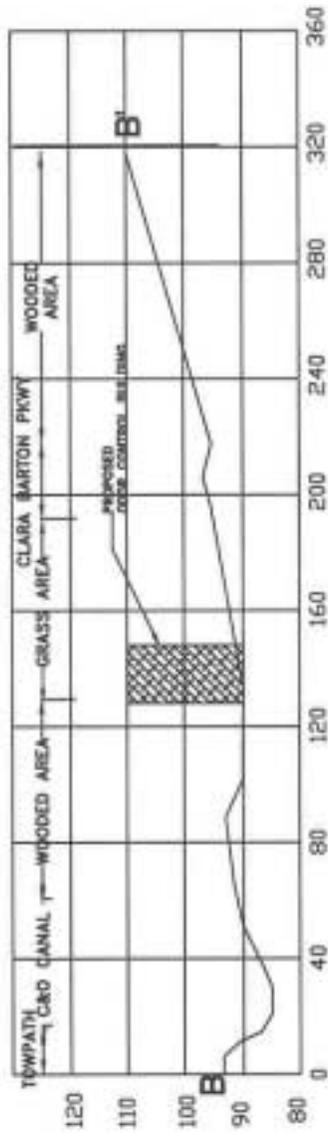


PLAN VIEW (1" = 80')

M&E Metcalf & Eddy

AREA OF IMPACT
SCALE: AS NOTED

**FIGURE 11B. SITE 27 PLAN AND PROFILE VIEW
EA FOR THE PI LONG-TERM ODOR ABATEMENT PLAN**
PAGE 24b



PROFILE VIEW (H: 1" = 60' ; V: 1" = 30')

FIGURE 12B. SITE 17 PLAN AND PROFILE VIEW
EA FOR THE PI LONG-TERM ODOR ABATEMENT PLAN PAGE 24d

— AREA OF IMPACT
SCALE: AS NOTED

construction of the Clara Barton Parkway and PI. Detailed requests for electric, water, and telephone service have not been submitted to the appropriate utilities, and other less intrusive options for utility service may be available. Wastewater generated at the site would be discharged into the PI along the same alignment of the proposed vent pipe.

Site 15 (Figures 13a and 13b):

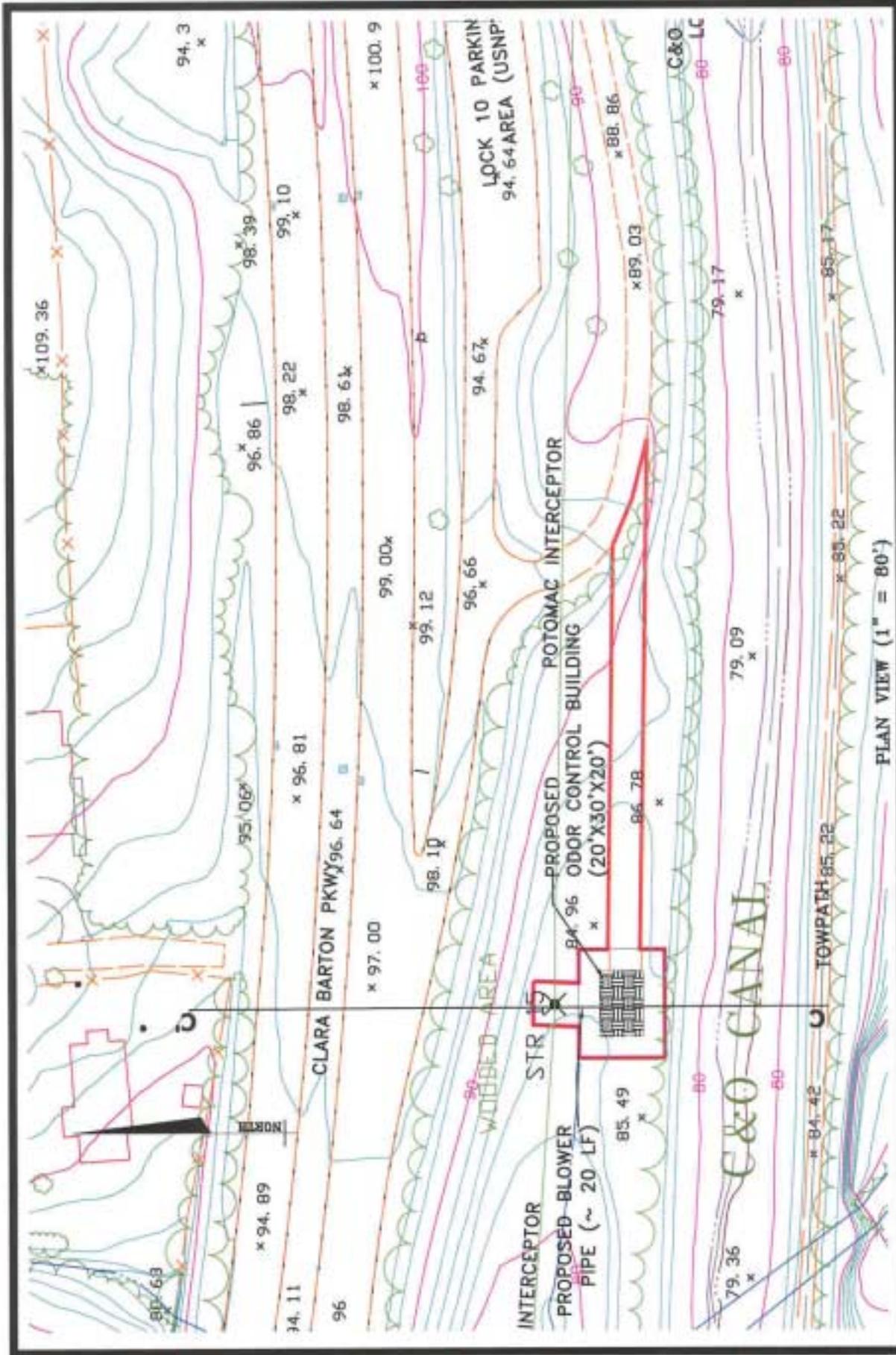
- Site Impacts – Figures 13a and 13b indicate the potential area of impact to the site including construction of the proposed blower treatment unit (2,000 sq. ft.) and a new access road (2,000 sq. ft.). It is anticipated that this proposed area of impact, as well as a portion of the existing parking area near the site, would also include a temporary staging area during construction of the odor treatment facility. The area of impact also includes 20 feet of open-cut trenching for the proposed vent pipe connection from the odor treatment unit to the PI.
- Utilities – Electric, water, and telephone services are expected to be extended to the proposed facility from the existing distribution lines located on the north side of the Clara Barton Parkway across from the Lock 10 site. The electric, telephone, and water service lines would be buried below grade and would run approximately 300 feet to the Site 15 facility. Horizontal directional drilling techniques are proposed for crossing under the Clara Barton Parkway. Surface impacts have not been quantified, but it is assumed that the buried electric, telephone, and water lines would be constructed along previously impacted areas from the construction of the Clara Barton Parkway and PI. Detailed requests for electric, water, and telephone services have not been submitted to the appropriate utilities, and other less intrusive options for utility service may be available. Wastewater generated at the site would be discharged into the PI along the same alignment of the proposed vent pipe.

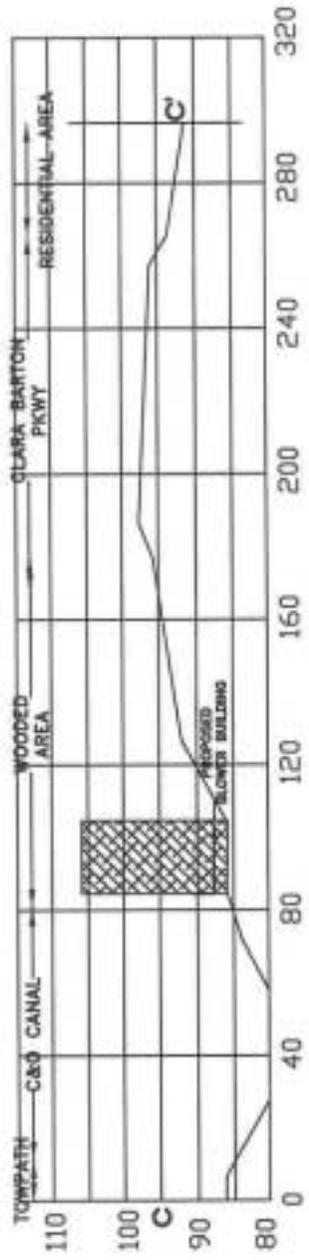
Site 4 (Figures 14a and 14b):

- Site Impacts – Figures 14a and 14b indicate the potential area of impact to the site including construction of the proposed blower treatment unit (3,000 sq. ft.) and a new pull-off area for O&M access (300 sq. ft.). It is anticipated that the temporary staging area during construction of the odor treatment facility would be located at Lock 5 (existing gravel area at site). The area of impact also includes 60 feet of open-cut trenching for the proposed vent pipe connection from the odor treatment unit to the PI, and the placement of a new manhole on the PI.
- Utilities – Electric, water, and telephone services are expected to be extended to the proposed facility from the existing distribution lines to the Little Falls PS. The new electric, telephone, and water service lines would be buried below grade and would run approximately 100 feet to the Site 4 facility. Surface impacts have not been quantified, but it is assumed that the buried electric, telephone, and water lines would be constructed along previously impacted areas from the construction of the Clara Barton Parkway. Detailed requests for electric, water, and telephone services have not been submitted to the appropriate utilities, and there may not be sufficient service available from Little Falls PS. Wastewater generated at the site would be discharged into the PI along the same alignment of the proposed vent pipe.

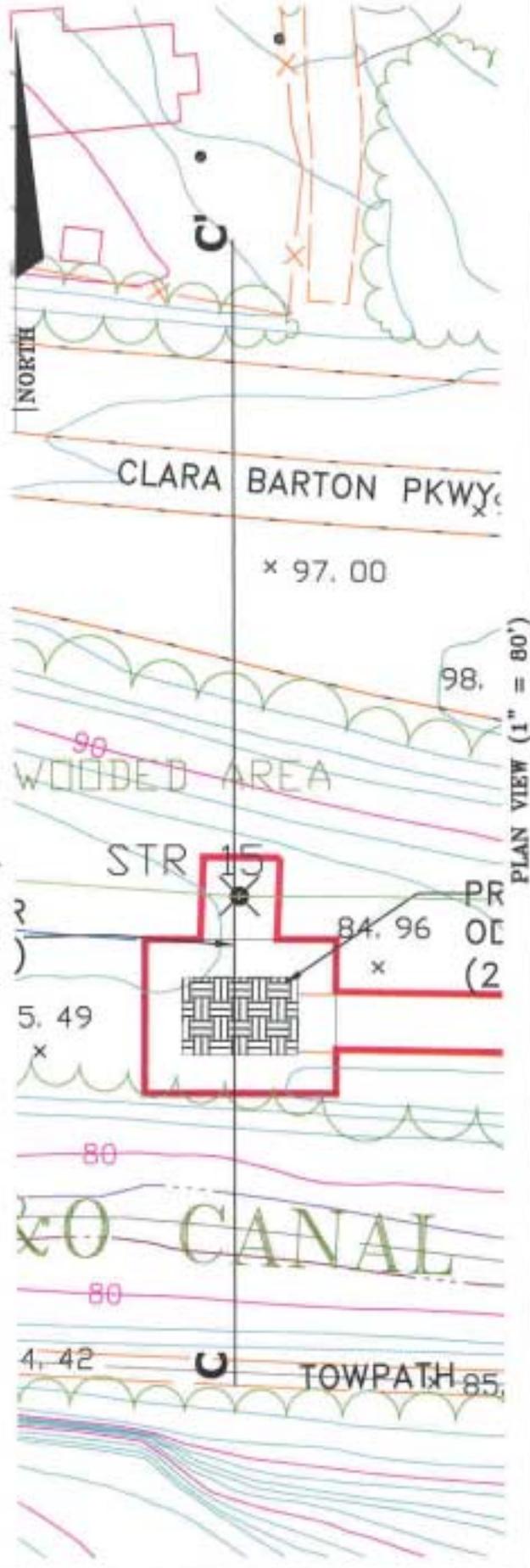
Site 1995 (Figures 15a and 15b):

- Site Impacts – Figures 15a and 15b indicate the potential area of impact to the site including construction of the proposed blower treatment unit (4,000 sq. ft.) in the current location of the trailer comfort station. It is anticipated that a temporary staging area during construction





PROFILE VIEW (H: 1" = 50' ; V: 1" = 12.5')



PLAN VIEW (1" = 80')

— AREA OF IMPACT
SCALE: AS NOTED

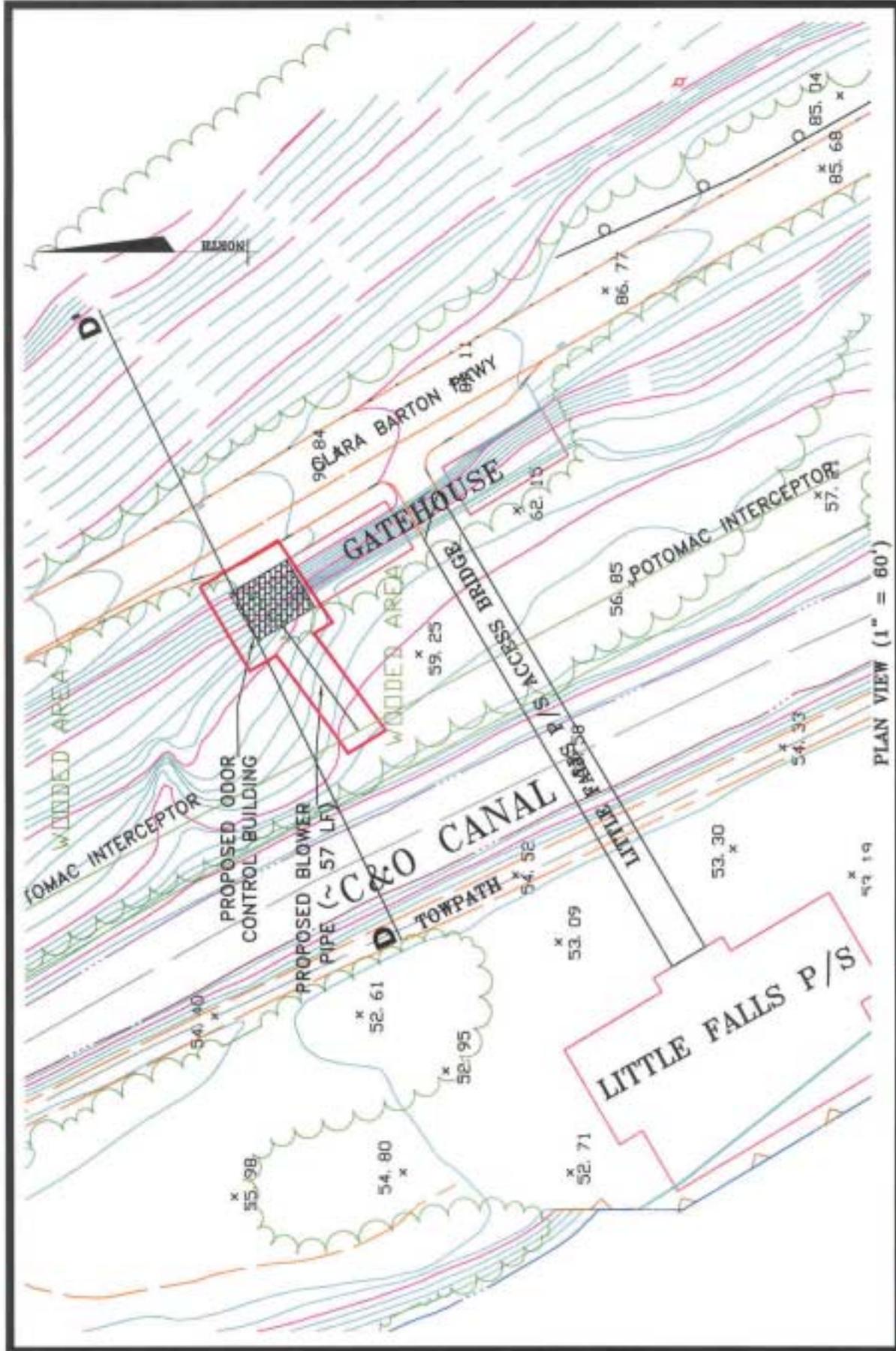


FIGURE 14A. SITE 4 AREA OF IMPACT
EA FOR THE PI LONG-TERM ODOR ABATEMENT PLAN
PAGE 25c

— AREA OF IMPACT
SCALE: AS NOTED

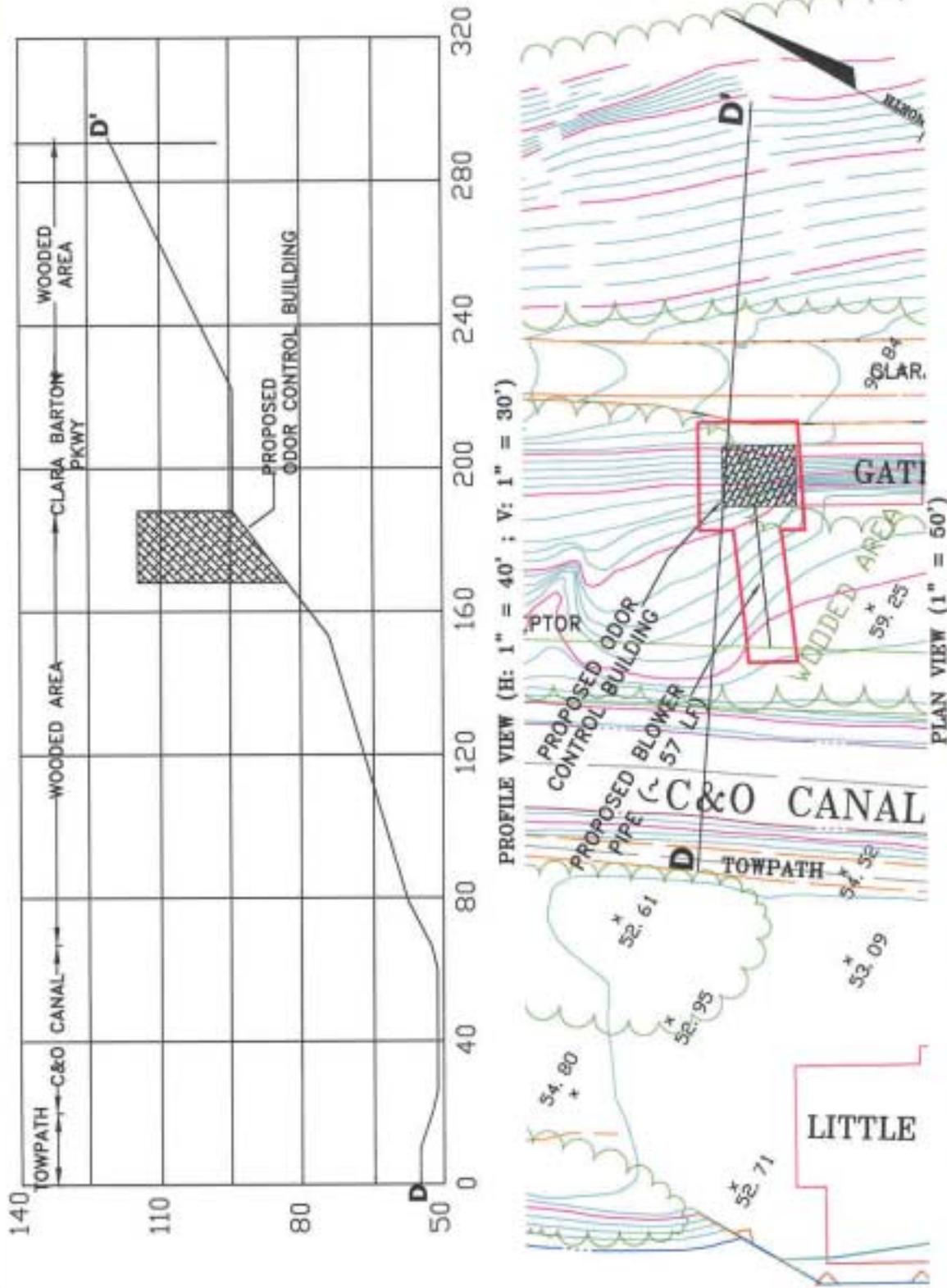
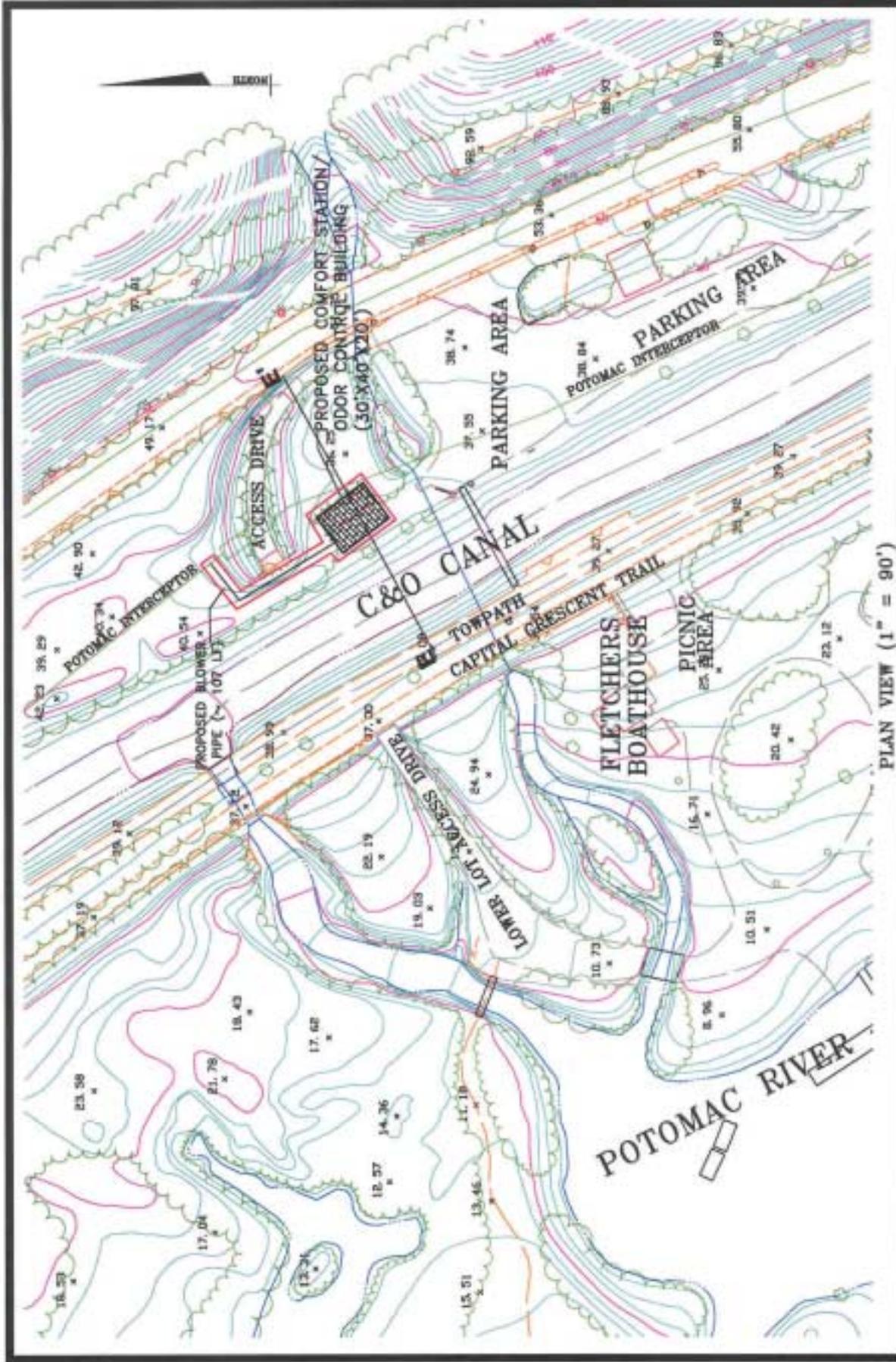


FIGURE 14B. SITE 4 PLAN AND PROFILE VIEW
EA FOR THE PI LONG-TERM ODOR ABATEMENT PLAN PAGE 25d

— AREA OF IMPACT
SCALE: AS NOTED



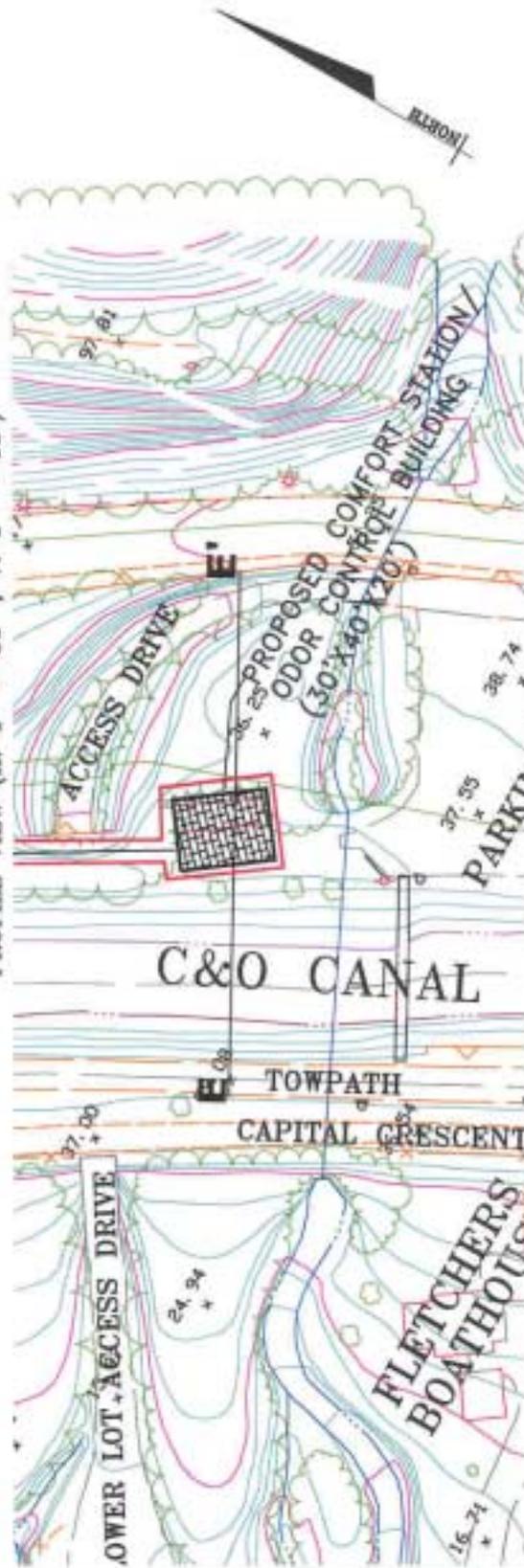
PLAN VIEW (1" = 90')

FIGURE 15A. SITE 1995 AREA OF IMPACT
EA FOR THE PI LONG-TERM ODOR ABATEMENT PLAN
PAGE 25e

— AREA OF IMPACT
SCALE: AS NOTED



PROFILE VIEW (H: 1" = 60' ; V: 1" = 15')



PLAN VIEW (1" = 70')

— AREA OF IMPACT

SCALE: AS NOTED

FIGURE 15B. SITE 1995 PLAN AND PROFILE VIEW
EA FOR THE PI LONG-TERM ODOR ABATEMENT PLAN PAGE 25f

of the odor treatment facility would be located on a portion of the existing gravel parking area at site. The area of impact also includes 100 feet of open-cut trenching for the proposed vent pipe connection from the odor treatment unit to the PI.

- Utilities – Electric, water, and telephone services are expected to be extended to the proposed facility from the existing distribution lines to the site. The electric service from the existing distribution line may not be adequate to operate the odor treatment facility. However, additional electric service would be extended to the site from the primary distribution lines along Canal Road using the existing utility poles on the site. Telephone service is currently provided to Fletchers Boathouse, which would also service the proposed odor treatment facility. Water service is located at the existing trailer comfort station and would likely be suitable for the Site 1995 facility. However, detailed requests for electric, water, and telephone services have not been submitted to the appropriate utilities. Wastewater generated at the site would be discharged into the PI using the existing line from the trailer comfort station.

3.5 Resources Considered and Found to Have No Significant Impact

3.5.a Environmental Justice

Adverse effects on low income and minority populations are not an issue for the implementation of the proposed odor control alternatives. Based on 1990 census data, the communities surrounding the assessment area are predominantly non-minority, economically stable, upper-income, owner-occupied and residential and therefore not classified as environmental justice communities.

3.5.b Floodplains and Wetlands

According to United States Geological Survey (USGS) area flood data, all proposed blower site ground facilities are above the 100-year floodplain. The limited number of natural plant species present in the managed park areas encompassing the proposed odor control unit locations are indicative of secondary growth upland forest and urban environments and there are no known springs, seeps or wetlands that will be impacted by the proposed action.

3.5.c Air Quality

While the variable levels of odorous hydrogen sulfide venting from the PI system under existing conditions (i.e., No Action alternative) may create a nuisance, the levels measured during the Odor Study (M&E, 2000) were not determined to affect air quality from a public health standpoint (EPA, 1993). Therefore, while the intent of the proposed long-term odor abatement program is to mitigate the nuisance effects associated with odorous sewer gases venting from the PI system, implementation of the program would not cause significant impacts on air quality. Proposed treatment of the sewer air using activated carbon would provide the removal of hydrogen sulfide and many other odorous compounds.

3.5.d Geology, Topography, Surface Hydrology, and Soils

There are no known aesthetic rock outcroppings within the potentially impacted areas at any of the proposed sites. Excavation for the building foundations and the vent connection piping would likely encounter shallow fractured bedrock at some locations. Excavations for the proposed odor control building foundations and vent connection piping trenches would be limited to depths above the local water table and would not impact area groundwater resources. With the exception of Site 4, the proposed site building locations are generally flat and the local topographic features would not be significantly altered by the proposed construction. The proposed building at Site 4 would be built into the hillside adjoining the existing LFPS building with the surrounding topographic features maintained.

The proposed action is not expected to affect surface water runoff characteristics (e.g., volume, flows, or water quality) in the study area, with the exception of the proposed asphalt parking area at Site 27. The C&O Canal and the Potomac River are prominent surface hydrologic features in the vicinity of the proposed sites. Storm water from the proposed structures would runoff onto the surrounding areas. However, roof gutters and drainage of collected stormwater using underground leachate pipes may be required. Stormwater runoff from the proposed asphalt parking area at Site 27 would be collected using stormwater catch-basins, and discharged toward the C&O Canal or Potomac River. Sediment and erosion controls would also be implemented at the discharge point of the collected stormwater from the proposed parking area improvements at Site 27. Additional measures may be required to limit impacts to a nearby amphibian-breeding habitat, and to reduce pollutants being discharged into the C&O Canal or Potomac River.

According to the Soil Survey of Montgomery County, Maryland (USDA, 1995), soils at the sites are primarily silt loams. Slopes at the sites range from 0 to 3 percent for Sites 15, 17, and 1995 to 15 to 25 percent for Site 4 and a portion of Site 27. These soils may be susceptible to moderate erosion on the steeper slopes. An approved sediment and erosion control plan would be required prior to any construction.

3.5.e Cumulative Actions

DCWASA will continue to operate and maintain the PI into the foreseeable future. The proposed action is comprehensive with respect to long-term odor abatement and similar or related actions are not expected to be duplicated by others. Therefore, the proposed action will not result in cumulative effects on any of the resources impacted.

3.5.f Transportation

Aside from the improvements to the parking areas at Site 27, the proposed alternatives would not permanently impact transportation resources in the area. During construction of the proposed facilities and routing of utilities, temporary lane closures on nearby roadways may be required. Temporary lane closures would require the use of flaggers to control traffic during those periods. In accordance with federal, state, and local regulations, temporary lane closures would not occur during morning and evening rush-hour periods. Although the proposed structures at Sites 17 and 4 have not been evaluated against traffic laws governing the placement of structures near

roadways, it is anticipated that the proposed building locations would be set back far enough away from travel lanes to negate the need for traffic safety features (e.g., reflective signs, guardrails and vehicle impact controls).

3.5.g Public Safety

The proposed structures described in Alternatives 2 and 3 should not pose any public safety risk. As indicated, the structures would be constructed using concrete and masonry block. The structures would not have any windows and the access doors would be secured at all times. There would be no permanent access ladders to the roofs of the structures, and the blower exhaust louvers would be located at roof level. The moving parts from the blower would be secured inside the proposed building. The blower fan blades are located on the inlet side of the carbon filters, which are located away from the blower exhaust louvers. The proposed restroom facilities would be fully accessible, lighted, and constructed with adequate safety features to prevent accidents when the facilities are in use. The proposed parking areas at Site 27 would enhance the ease and safety of access to this recreational area, including accessible parking spaces.

3.5.h Visitor Use and Recreation

The Clara Barton Parkway affords local commuters and park visitors the scenery of the Potomac River area, as well as pull-off parking areas for enjoyment of several areas (e.g., Sycamore Island, Lock 10). While Sites 17, 15, and 4 along the Parkway are not utilized directly for recreational activities, the Parkway is a scenic access route to the C&O Canal. The C&O Canal is a popular recreational area used by thousands of park visitors year round for a variety of activities. The Canal's towpath is used for hiking, running, and cycling and provides access to the Canal and River as well as scenic nature trails through the Potomac River Valley. The Canal and River are used for fishing, kayaking and rock climbing. Public access areas at the Old Anglers Inn (Site 27) and Fletchers Boathouse (Site 1995) also provide parking and other public facilities (e.g., comfort station, food, boat rental).

While there may be temporary disruptions to park visitors at the Anglers Inn, Fletchers Boathouse, and Lock 5 access areas, no permanent impacts are anticipated that would preclude future use of these access areas. Current recreational activities would not be limited during the proposed construction activities under Alternatives 2 and 3.

4.0 ENVIRONMENTAL IMPACTS

Impacts associated with the implementation of the proposed long-term odor abatement program alternatives would generally occur to the environment in the immediate vicinity of the proposed odor treatment unit sites. The environmental impacts would be directly related to the construction and operation of the odor treatment buildings. Construction impacts include the proposed odor treatment buildings, PI-connecting vent pipe trenches, utilities access, access roads for O&M activities, materials staging, and construction equipment access. Specific impacts for each alternative considered are described below. A summary of the impacts for each alternative evaluated is presented in Table 3.

Alternative 1: No Action

Under this alternative, the NPS would not issue a permit to DCWASA for construction of the proposed odor treatment units within NPS lands. However, interim odor controls currently in place would still be utilized and maintained. There would be no impacts to the natural and cultural resources along the C&O Canal and Clara Barton Parkway, and the visual quality of the area would not be impacted. Ambient and intermittent noise levels would remain unchanged. The recreational environment would remain the same. Existing buildings and infrastructure along the PI would remain unchanged. DCWASA would continue to operate and maintain the PI system based on current and future standard operating procedures. The PI system will continue to exhaust sewer air at the vented locations including the exhaust of occasionally odorous compounds. The dirt/gravel parking areas and portable toilets in the public access area near Site 27, and the public comfort station facility trailer near Site 1995 would remain unchanged. The C&O Canal may continue to evaluate the proposed improvements for both these locations at a future time.

Alternative 2: Odor Treatment Units at PI Sites 27, 17, 4, and 1995 (Preferred Alternative)

For the preferred alternative, the NPS would issue a permit and MOU to DCWASA for the construction of the four odor treatment units along the PI at Sites 27, 17, 4, and 1995. There are no known documented sites of archeological significance near the proposed area of impact at Sites 27, 17, and 1995. However, a known and documented archeological site is present within 30 feet of the proposed area of impact at Site 4. Efforts would be made to reduce impacts to the area of archeological significance at Site 4. During the construction and placement of utilities at each of these proposed sites, ground disturbance would be monitored for archeological resources.

Native tree and other plant species providing cover and forage habitat for common animals would be disturbed. A total of approximately 120 individual plants including 19 mature trees (greater than 2-inches in diameter) would be disturbed or removed at Sites 27, 4 and 1995 to complete construction under this alternative. The 120 individual plants that would be disturbed or removed are common species and not among any state listed species, and no known state listed rare, threatened or endangered species would be impacted by the proposed project. Site 17 is an open lawn area and no plants or trees are expected to be disturbed at this location. The elimination of cover and forage habitat would result in minor localized impacts. A considerable amount of similar habitat exists within the study area where animals temporarily displaced by

construction activities would likely relocate. Replacing lost vegetation would offset the loss of vegetative cover and habitat following construction activities. Soil stabilization and erosion control measures would be implemented during construction under this alternative, particularly at Site 4 and the sloping portion of Site 27. Following construction activities, the disturbed areas would be replanted with native species and require monitoring for spread and growth of exotic plant species. No permanent impacts to FIDS are expected. Long-term indirect effects to vegetation and wildlife are not expected under this alternative.

The visual quality for users of the Clara Barton Parkway and CHOH would be impacted under this alternative by the proposed odor treatment buildings. The proposed odor treatment facility/public comfort station and parking area improvements at Site 27, and the proposed odor treatment facility/public comfort station replacement building at Site 1995, would impact the visual quality of the recreational and cultural significance of the C&O Canal. The proposed odor treatment facilities at Sites 17 and 4 would be visible to the general public driving on the Clara Barton Parkway. However, the building at Site 4 would be designed as an addition/expansion to the existing concrete structure at the Little Falls PS, resulting in minimal impact to the current visual quality of the area.

In an effort to mitigate the impact on visual quality, the roof and building façades would be designed to complement the historic and cultural value of the area. The NPS and the SHPOs of Maryland and District of Columbia would provide input and review on the outside appearance of the proposed structures during design of the proposed structures. Design materials are available to enhance the historic appearance of the structure, and would be used based on input from the NPS and other involved parties. The structures would be designed to maximize the interior space, which would limit the size of the structure as much as practical. The planting of trees and other types of vegetation appropriate to the landscape and/or indigenous to the area may also be selected by the NPS and SHPOs to minimize the visual impact of the proposed structures. The placement of vegetative screening around the structure may minimize the visual impact on a year-round basis. As the structure would be secured, fencing is not recommended around the buildings, which would further aid in reducing the visual impact.

The proposed structure at Site 1995 would replace the existing public comfort station at that location. Although the proposed building is larger than the existing public comfort station, the visual quality of the proposed building would provide a cultural value more appropriate to this historic area than the existing structure. The proposed structure at Site 27 would replace the portable toilets currently used at this recreational access area. However, the proposed building would be located in a different area than the existing portable toilets. The proposed building at Site 27 would be located on the upper parking area along MacArthur Boulevard. Proposed improvements to the Site 27 parking area may cause a temporary disruption to the existing parking area, but the paving improvements are expected to result in clearly marked parking spaces, stormwater controls, and safer traffic routing through the parking areas.

There are currently dirt and gravel areas at Sites 27 and 1995 that would permit vehicular access to the proposed buildings for O&M activities. A new access road would be required at the proposed Site 17 facility from the Clara Barton Parkway. To minimize visual impacts and to reduce runoff from impermeable materials, cellular concrete blocks would be utilized to

construct the access road to the Site 17 facility. This type of surface combined with adequate subsurface base stone provides sufficient load-bearing strength for O&M access vehicles, and native grasses can be grown in the void spaces of the block. Access to the proposed building at Site 4 would require the need to expand a portion of the existing pull-off area located in front of the Little Falls PS. A concrete pull-off area approximately 20-foot by 15-foot in size would be constructed adjacent to the building access door for O&M activities.

As the proposed odor treatment units would operate on a continuous basis, increased noise levels generated by the blowers are a concern. To reduce the impacts of noise on the nearby residents and park visitors, several noise controls are recommended to reduce sound levels to existing background levels. The blower for the odor treatment units would be located inside the structures, which would be constructed using soundproofing masonry blocks. The inside roof of the structure would also be insulated using special panels to reduce noise. Soundproofing would be employed directly around the blower to significantly reduce the noise generated during operation. Finally, acoustical louvers would be placed at the blower exhausting point to reduce noise levels of the exhausting air. Results of the sound level survey and recommended noise abatement controls were reviewed and approved by the Montgomery County DEP DPC, in accordance with the County's Noise Control Ordinance (Appendix E).

No information regarding the potential impacts to FIDS or other wildlife from the noise and airflow associated with the odor treatment unit exhaust was available. As proposed noise controls would meet background sound levels, the noise from the proposed odor treatment units is not expected to affect wildlife in the area. Existing noise from road traffic along the Clara Barton Parkway, Canal Road, and MacArthur Boulevard already deters wildlife from habitating these areas.

Estimated areas of ground disturbance associated with the construction of the blower building and installation of the vent pipe connection to the PI at each site assumes a 10-foot perimeter area around each building, construction of a 12-foot wide access road, and a 20-foot area of impact for installation of each one foot of vent pipe. Estimates of ground impacts for the installation of utilities have not been determined. However, utilities required for the proposed odor treatment units would be extended to the structure along existing corridors that have been previously impacted (i.e., Clara Barton Parkway and the PI alignment). The placement of utilities would not affect recreational trails in the CHOH, but temporary lane closures on the Clara Barton Parkway, Canal Road, and MacArthur Boulevard may be required. Temporary lane closures would not occur during morning and evening rush-hour periods, and traffic control would be provided during periods of lane closures for public safety. Ground disturbances during construction of the proposed facilities would be monitored for archeological resources. The approximate areas of impact for each of the proposed sites under this alternative are summarized below.

- Site 27: 4,000 sq. ft., based on a 30-foot by 40-foot building with public restroom facilities, and 100 feet of trench for the vent pipe to the PI. The existing dirt and gravel parking areas, which encompass 24,000 sq. ft., would be paved to allow improved access and parking.
- Site 17: 4,500 sq. ft., based on a 20-foot by 30-foot building, 100 feet of trench for the vent pipe to the PI, and 80 feet of new access road.

- Site 4: 3,300 sq. ft., based on a 20-foot by 30-foot building, 60 feet of trench for the vent pipe to the PI, and 300 sq. ft. for access.
- Site 1995: 4,000 sq. ft., based on a 30-foot by 40-foot building, and 90 feet of trench for the vent pipe to the PI.

Alternative 3: Odor Treatment Units at PI Sites 27, 15, 4, and 1995

Under this alternative, the NPS would issue an Memorandum of Understanding (MOU) to DCWASA for the construction of the four active blower treatment units along the PI at Sites 27, 15, 4, and 1995. For this alternative, the blower buildings and improvements described in Alternative 2 for each of the sites would remain the same, with the exception of the blower building being located at Site 15 instead of Site 17. There are no known documented sites of archeological significance near the proposed area of impact at Site 15. During the construction and placement of utilities at each of these proposed sites, ground disturbance would be monitored for archeological resources.

Approximately 150 individual plants including 21 mature trees would be disturbed or removed to complete construction under this alternative. This estimate includes an additional 30 individual plants and two mature trees that would be disturbed or removed to complete construction at Site 15. The 150 individual plants that would be disturbed or removed are common species and not among any state listed species, and no state listed rare, threatened or endangered species would be impacted by the proposed project. Following construction activities, the affected areas would be replanted with native species and require monitoring for spread and growth of exotic plant species. No permanent impacts to FIDS are expected. Long-term indirect effects to vegetation and wildlife are not expected under this alternative.

The visual quality for users of the Clara Barton Parkway and CHOH would be impacted by the proposed odor treatment building at Site 15. The proposed odor treatment facility at Site 15 would be visible to the general public driving on the Clara Barton Parkway to a lesser extent than the proposed Site 17 facility. The location of Site 15 is set at a lower elevation than the Clara Barton Parkway, which helps to minimize the visual impacts. As indicated in Alternative 2, the roof and building façades would be designed to complement the historic and cultural value of the area. An access road would also be required at the proposed Site 15 facility with the entrance located off of the Lock 10 pull-off area. To minimize visual impacts and to reduce runoff from impermeable materials, the access road to Site 15 would be constructed using cellular concrete blocks that would allow the growth of native grasses between the void spaces of the block. Noise reduction controls, as indicated in Alternative 2, would be employed at the Site 15 facility to reduce sound levels to background levels.

Estimated areas of ground disturbance associated with the construction of the blower building and installation of the vent pipe connection to the PI at Site 15 assumes a 10-foot perimeter area around the building, construction of a 12-foot wide access road, and a 20-foot area of impact for installation of each one foot of vent pipe. Estimates of ground impacts for the installation of utilities have not been determined. However, utilities required for the proposed odor treatment unit at Site 15 would be brought to the structure along existing corridors that have likely been previously impacted (i.e., Clara Barton Parkway and the PI alignment). Ground disturbances

during construction of the proposed facilities would be monitored for archeological resources. The approximate area of impact for the proposed odor treatment unit at Site 15 under this alternative is summarized below.

- Site 15: 4,000 sq. ft., based on a 20-foot by 30-foot building, 20 feet of trench for the vent pipe to the PI, and 150 feet of new access road.

Impacts Common to Alternatives 2 and 3

Actions common to Alternatives 2 and 3 include the implementation and maintenance of the proposed vent seals and intake-only passive carbon filters for PI vents located in the lower CHOH and along the Clara Barton Parkway/Canal Road, which are not proposed for the placement of active carbon treatment units. Actions common to Alternatives 2 and 3 would result in minimal impacts to existing structures along the PI, which would neither enhance nor degrade the current visual quality. Vents proposed to be sealed would require plugging of the vent pipe from within the manhole structure. The vent sealing operations would not result in impacts to the surrounding environment. Placement of the proposed intake-only passive carbon filters would require the removal and disposal of the 4-foot by 4-foot concrete covers on top of the existing vent structures. The concrete covers would be replaced by 4-foot by 4-foot dark gray polyvinyl chloride (PVC) plastic covers, which would be secured to the existing vents by locking anchor bolts. The replacement PVC covers would allow for periodic O&M activities to replace spent carbon from the intake-only filters. Materials and equipment for both of these proposed activities would be hand-carried to and from the existing structures.

Since Alternatives 2 and 3 both include proposed active blower odor treatment units at Site 27, Site 4, and Site 1995, potential impacts not common to both alternatives are based on the differences in environmental conditions between Site 15 and Site 17. The potential impacts identified in this assessment related to odor abatement and the recreational environment are common to both alternatives. Based on engineering evaluations, the effectiveness of the long-term odor abatement program would be similar for either alternative. Involvement with public groups to date have revealed that communities in the area of the C&O Canal would prefer construction of the odor control building at Site 17 (near I-495). However, the Maryland SHPO and the GWMP have indicated a reduced visual impact to the cultural scenery if the proposed odor control unit were constructed at Site 15 due to the drop in grade from the Parkway.

There would be temporary impacts to recreational area access near the sites during the construction phase. These temporary impacts would be associated with parking area restrictions and exclusion of the public from work zones, and equipment and materials staging areas. Recreational area access issues during construction would be addressed through mitigation. The abatement of the PI odors, and the proposed improvements to parking areas and public comfort stations at Sites 27 and 1995 would provide positive impacts to the recreational environment.

Summary of Consequences Table

Table 3 is attached to provide a general summary of the environmental impacts evaluated in this section.

**TABLE 3
SUMMARY OF IMPACTS**

Resource/ Impact	Alternative 1: No Action	Alternative 2: Units at PI Sites 27, 17, 4, 1995				Alternative 3: Units at PI Sites 27, 15, 4, 1995 Site 15
		Site 27	Site 17	Site 4	Site 1995	
Cultural Resources						
Potential impacts to archeological resources	No identified impacts	No identified impacts	No identified impacts	Resource identified within 30 feet of the proposed area of impact, which would be avoided during project implementation.	No identified impacts	No identified impacts
Potential impacts to visual quality along the Clara Barton Parkway	No identified impacts	No identified impacts	Most of 20-foot by 30-foot odor treatment building near I-495/American Legion Bridge, and access road would be visible to motorists	Most of 20-foot by 30-foot odor treatment building adjacent to Little Falls PS, and expanded pull-off area would be visible to motorists	No identified impacts	Small portion of 20-foot by 30-foot odor treatment building located approximately 10 feet below road level would be visible to motorists
Potential impacts to visual quality for C&O Canal Park Visitors	No identified impacts	Most of 40-foot by 50-foot building with public restroom, and 24,000 sq. ft. of improvements to parking area would be visible to users of access area along MacArthur Blvd.	Small portion of 20-foot by 30-foot odor treatment building and access road would be visible to users of the C&O Canal Towpath	Most of 20-foot by 30-foot odor treatment building adjacent to Little Falls PS would be visible to users of the C&O Canal Towpath	Most of 40-foot by 50-foot building with public restroom would be visible to users of access area and C&O Canal Towpath	Most of 20-foot by 30-foot odor treatment building would be visible to users of C&O Canal Towpath
Natural Resources						
Potential impacts to vegetation	No identified impacts	Approximately 50 individual plants including 10 mature trees would be disturbed or removed during construction	No vegetation other than grass would be disturbed during construction	Approximately 20 individual plants including 4 mature trees would be disturbed or removed during construction	Approximately 50 individual plants including 5 mature trees would be disturbed or removed during construction	Approximately 30 individual plants including 2 mature tree would be disturbed during construction
Potential impacts to vertebrate and invertebrate animals other than birds	No identified impacts	No known significant impacts	No known significant impacts	No known significant impacts	No known significant impacts	No known significant impacts
Potential impacts to forest interior birds (FIDS)	No identified impacts	No known significant impacts	No known significant impacts	No known significant impacts	No known significant impacts	No known significant impacts

**TABLE 3
SUMMARY OF IMPACTS**

Resource/ Impact	Alternative 1: No Action	Alternative 2: Units at PI Sites 27, 17, 4, 1995				Alternative 3: Units at PI Sites 27, 15, 4, 1995
		Site 27	Site 17	Site 4	Site 1995	Site 15
Socioeconomic Environment						
Potential impacts from noise	No identified impacts	Users of the Canal access parking areas and comfort station users may hear the noise from construction and blower operation	No identified impacts	No identified impacts	Users of the Canal access parking areas may hear the noise from construction and blower operation	Users of the Lock 10 access area and nearby homeowners may hear noise from construction, users of area within 30 feet of proposed odor treatment building may hear blower operation
Potential impacts to recreation environment	Occurrence of nuisance odors may continue	Nuisance odors in area would be abated	Nuisance odors in area would be abated	Nuisance odors in area would be abated	Nuisance odors in area would be abated	Nuisance odors in area would be abated
	No identified impacts	Recreational area access would be temporarily impacted during construction	No identified impacts	No identified impacts	Recreational area access would be temporarily impacted during construction	No identified impacts
Potential impacts from infrastructure	No identified impacts	Increase in utilities would be accomplished within existing corridor, improvements to existing dirt parking area	Increase in utilities would be accomplished within existing corridor; construction of access road from Parkway	Increase in utilities would be accomplished within existing corridor; construction of access pull-off area from Parkway	Increase in utilities would be accomplished within existing corridor	Increase in utilities would be accomplished within existing corridor

5.0 PUBLIC INVOLVEMENT

DCWASA, MWCOG and the Montgomery County DEP have made significant efforts to work with public groups since the inception of the long-term odor abatement program. It was recognized early in the project planning that public involvement and support of the proposed long-term odor abatement plan was invaluable, as the nuisance odors from the PI affected their enjoyment of the surrounding national historic landscapes. Several public meetings and a site tour have been completed with the communities of Cabin John, Glen Echo, and Brookmont. Public groups in Loudoun and Fairfax Counties, Virginia, were also met with to discuss impacts of the proposed odor treatment facilities in those areas, which are outside of the jurisdiction of the NPS.

A presentation on the long-term odor abatement plan was presented to the Cabin John, Glen Echo, and Brookmont communities on December 5, 2000 outlining the odor study for the PI system and recommended odor abatement strategies. There were several questions from the public group relating to siting of the proposed odor treatment units, potential increase in noise levels, and the reliability of the equipment. DCWASA proceeded with additional evaluation of the siting alternatives based on the technical feasibility of implementation. Specifically, the proposed odor control units would not be as effective in some locations as those described herein. A summary of the sites evaluated along the CHOH and Clara Barton Parkway is presented in Table 1 (refer to page 13).

To further assist the community leaders with an understanding of the proposed locations, site visits were conducted on March 17, 2001 with representatives of the Cabin John, Glen Echo, and Brookmont communities, the NPS C&O Canal, GWMP, and the National Capital Regional Office. A second public meeting was held on March 22, 2001 to further describe the technical feasibility of locating the odor treatment units at different locations along the CHOH and Clara Barton Parkway, preliminary evaluations of the proposed locations for the odor treatment units by the NPS, reliability of the activated carbon media and proposed equipment, and to discuss results of the sound level survey and recommended noise controls.

Approximately 40 members of the Cabin John, Glen Echo, and Brookmont communities attended the public meeting on March 22, 2001. Most of the community concerns centered on the proposed locations of the odor treatment units and potential increases in noise levels from the blower units, especially related to the proposed location at Site 15. The public group generally preferred siting the proposed odor treatment units at Sites 27, 17, 4, and 1995. A noise specialist from the Montgomery County DEP DPC presented the results of the sound level survey, and his professional opinion of the proposed noise controls on the recommended odor treatment units. The proposed noise controls would significantly reduce noise levels as previously described in Section 3.4.b.

Since the last public meeting on March 22, 2001, the involved public groups have been contacted on several occasions to present updates in initiating a blower pilot test for the proposed odor treatment units, as well as to indicate progress on the EA document. Results from the pilot study for the blower systems indicated favorable technical conditions for placement of the proposed odor treatment units at Sites 27, 17 or 15, 4, and 1995. Public involvement will be continued throughout the design and implementation of the proposed long-term odor abatement plan, as well as during the permitting process.

6.0 COORDINATION AND CONSULTANTS

Representatives of the NPS C&O Canal, GWMP, and the National Capital Regional Office were consulted on several occasions since the project began in September 2000. NPS representatives were presented with the PI Odor Study results, odor control options evaluated, and DCWASA's proposed Long-Term Odor Abatement Plan. Details were provided to the NPS on the goals of the long-term plan to include control of odors along the PI within NPS lands, and reduced corrosion of the concrete pipes comprising the PI. NPS representatives were presented with a detailed overview of the proposed siting of the odor treatment facilities that were technically feasible for adequate odor control along the lower portions of the PI system. Two site walks were conducted with NPS representatives to identify preferred sites. The preferred sites indicated by the NPS are presented in Alternatives 1 and 2, which were indicated by the NPS to be more preferable based on cultural, historic, and scenic factors. Public input was also considered by the NPS in the identification of the preferred locations for the proposed odor treatment facilities. Following the review of the information detailing the long-term plan, the NPS proceeded with the development of this EA.

The Maryland and District of Columbia SHPOs were also consulted regarding the proposed siting of the odor treatment facilities, and provided guidance regarding the style and appearance of the proposed structure to house the odor treatment unit. The Montgomery County DEP provided input on the proposed project related to sound levels generated by the odor treatment units, and provided support for public involvement efforts. Project coordination and support was provided by MWCOG.

George Washington Memorial Parkway:

Audrey Calhoun, Superintendent

Al Loftin, Assistant Superintendent

Ron Blain, Right-of-Way Coordinator (*Former*)

Ann Brazinski, Natural Resource Manager

Dan Sealy, Chief Ranger

Sean McCabe, Park Ranger

Matthew Virta, Cultural Resource Manager

Deborah Feldman, Park Planner

Heather Germaine, Natural Resource Management Specialist

Chesapeake and Ohio Canal Historical Park:

Douglas Faris, Superintendent

Kevin Brandt, Assistant Superintendent

Lynne Wigfield, Compliance Officer

Susan Alberts, Natural Resource Management Specialist

Marie Frias, GIS Specialist

Dianne Ingram, Natural Resource Management Specialist

Dan Copenhaver, Park Engineer

Larry Umberger, Maintenance Supervisor Palisades District

National Park Service, National Capital Region:

Joseph Lawler, Deputy Regional Director
Steve Jones, Regional Special Use Permit Coordinator (Former)
Stephen Potter, Regional Archeologist

Maryland State Historic Preservation Office:

Elizabeth Cole, Administrator, Project Review and Compliance

District of Columbia State Historic Preservation Office:

Nancy Kassner, Project Archeologist

Montgomery County Department of Environmental Protection:

David Lake, Special Assistant for Regional Water and Wastewater Management
Thomas Ogle, Senior Environmental Planner: Noise

Metropolitan Washington Council of Governments:

Timothy Murphy, Environmental Engineer

District of Columbia Water and Sewer Authority:

Roger Gans, Manager of Planning and Design
Paul Drews, Chief of the Potomac Interceptor Division, Department of Sewer Services
John Mattingly, Potomac Interceptor Division, Department of Sewer Services
William Darrow, Supervisor of Civil and Structural Section

Metcalf & Eddy, Inc. (Technical Consultant):

Jonathan Doane, Program Manager
John Trypus, Project Engineer
Kurt VanGelder, Environmental Scientist
Larry Lennon, Engineer

John Milner Associates, Inc. (Archeological Consultant):

Charles Cheek, Project Archeologist

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ACRONYMS AND ABBREVIATIONS

AKA	Also Known As
AWTP	Advanced Wastewater Treatment Plant
C&O	Chesapeake and Ohio
CHOH	C&O Canal Historical Park
DCWASA	District of Columbia Water and Sewer Authority
DEP	Department of Environmental Protection
DC SHPO	District of Columbia State Historic Preservation Office
DO	Dissolved Oxygen
DPC	Division of Policy and Compliance
DS	Dissolved Sulfide
Dulles	Washington Dulles International Airport
FIDS	Forest Interior Dwelling Species
GWMP	George Washington Memorial Parkway
H ₂ S	Hydrogen Sulfide
LCSA	Loudoun County Sanitation Authority
LFPS	Little Falls Pumping Station
MD SHPO	Maryland State Historic Preservation Office
M&E	Metcalf & Eddy, Inc.
MGD	Million Gallons per Day
MH	Manhole
MOU	Memorandum of Understanding
MUPI	Maryland Upper Potomac Interceptor
MWCOG	Metropolitan Washington Council of Governments
NEPA	National Environmental Policy Act
NHS	National Historic Site
NPS	National Park Service
O&M	Operations and Maintenance
Parkway	Clara Barton Parkway
PEPCO	Potomac Energy and Power Company
PI	Potomac Interceptor

PL	Public Law
PS	Pump Station
PVC	Polyvinyl Chloride
SCADA	Supervisory Control and Data Acquisition
STP	Shovel Test Pit
UPI	Upper Potomac Interceptor
UPIRS	Upper Potomac Interceptor Relief Sewer
USGS	United States Geologic Survey
WSSC	Washington Suburban Sanitary Commission
WW	Wastewater
WWTP	Wastewater Treatment Plant

GLOSSARY

Abiotic – an inorganic resource (e.g., water, sand, gravel).

Aboriginal – existing from early times.

Acoustics – the science of sound waves and their production, transmission, reception and control.

Corrosion – the process of wearing away the surface of a solid (e.g., metals, building stone, concrete) by converting the compact, cohesive substance into a friable one as the result of chemical action or the surface action of moisture.

Decibels – a unit for measuring the relative loudness of sounds, equal to the smallest difference of loudness detectable by the human ear.

Façade – the main front of a building, an appearance intended as a pretense or mask.

Interceptor – large diameter sewer pipe used to collect wastewater flows from multiple sewers in different areas or towns for conveyance of combined wastewater flows to a WWTP.

Louvers – an arrangement of overlapping slats with gaps between them so that air is admitted to pass through but rain, small animals and bird, and other objects are excluded.

Manhole – a covered hole in the street or ground that allows access to a sewer or other feature.

Pumping Station – structure used to collect and lift water or wastewater to a higher elevation.

Sewer – an underground tunnel or pipe that carries off drainage and wastewater from a house or community.

Sewer Vent – opening in the sewer or manhole used to exhaust sewer air or to draw in outside air into the sewer.

Wastewater Treatment Plant – a facility used to treat or process wastewater using physical, and/or chemical, and/or biological methods prior to discharge of the effluent into a water body.

APPENDIX A

**PUBLIC LAW 86-515
(AUTHORIZING CONSTRUCTION OF THE
POTOMAC INTERCEPTOR)**

Public Law 86-515
86th Congress, H. R. 12063
June 12, 1960

AN ACT

To authorize the Commissioners of the District of Columbia to plan, construct, operate, and maintain a sanitary sewer to connect the Dulles International Airport with the District of Columbia System.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Commissioners of the District of Columbia (or their designated agents), hereinafter called the Commissioners, are hereby authorized to develop a plan for a sanitary interceptor and trunk sewer line to extend from Dulles International Airport to the District of Columbia system, hereinafter called the Potomac interceptor, which shall be of sufficient capacity to provide service for such airport and for the expected community growth and development in the adjacent areas in the States of Maryland and Virginia. Such plan shall be developed in consultation with the National Capital Planning Commission and the National Capital Regional Planning Council.

Dulles International Airport, D.C. sewage system.

Sec. 2. (a) Upon completion of the plan authorized by section 1 of this Act, the Commissioners are authorized to provide for acquisition of rights-of-way, development of the detailed plans and specifications, and construction of the Potomac interceptor. When such interceptor is completed, it shall be operated and maintained by the Commissioners as a part of a regional sanitary sewer system in cooperation with the proper authorities of the State and local jurisdictions concerned, under such regulations as may be prescribed by the Commissioners.

Interceptor, Plans.

(b) The Commissioners are authorized to establish, by agreements with the appropriate agencies of the United States and with the proper authorities of the States and local jurisdictions concerned, charges for the use of the Potomac interceptor, which shall be based upon the costs of operation, maintenance, and amortization of the cost of all planning and construction (including acquisition of rights-of-way) of such interceptor, but which shall exclude such amount as may be appropriated pursuant to section 3 of this Act. The Commissioners shall credit all receipts from such charges for the use of the Potomac interceptor to a special fund which is hereby established and which shall be known as the Metropolitan Area Sanitary Sewage Works Fund of the District of Columbia. Such special fund shall be available in such amounts as may be appropriated from time to time for expenses necessary to plan, construct, maintain, and operate the Potomac interceptor.

Charges.

~~74 STAT. 210.~~
74 STAT. 211.

Metropolitan Area Sanitary Sewage Works Fund.

(c) The Commissioners shall also charge all users of the Potomac interceptor, including any agency of the United States for carrying, treating, and disposing of sewage in the sewerage system of and within the District of Columbia consistently with the provisions of section 1 of the Act of August 21, 1958 (72 Stat. 702; D.C. Code, sec. 1-817c) and section 9 of the Act of September 1, 1916 (39 Stat. 717; D.C.

Code, sec.1-817), and the receipts derived from said charges shall be deposited to the credit of the D.C. Sanitary Sewage Works Fund (created by section 202 of the District of Columbia Public Works Act of 1954; 68 Stat.104).

D.C. Code
43-1602.

Appropriation

Sec.3. For the purposes of carrying out the provisions of this Act, there is authorized to be appropriated, without fiscal year limitation, to the Metropolitan Area Sanitary Sewage Works Fund the sum of \$3,000,000, as the Federal contribution toward the cost of planning, acquiring rights-of-way for, and constructing the Potomac interceptor.

Additional funds,
limitation.

Sec.4. The Secretary of the Treasury is authorized and directed to advance to the Commissioners, from time to time, and the Commissioners are authorized to accept as loans, such additional funds, not exceeding a total of \$25,000,000, as may be appropriated to carry out the purposes of this Act. Any loan advanced under this section shall be credited to the Metropolitan Area Sanitary Sewage Works Fund, and shall be repaid to the Secretary of the Treasury, from the receipts credited to said fund, in substantially equal annual payments including principal and interest, within a period of forty years beginning on July 1 of the second fiscal year following the date on which each such advance is credited to this fund: *Provided;* That interest and principal payments shall be deferred whenever the Secretary of the Treasury finds that the income received from charges for sewerage services is inadequate to cover these and other expenses properly chargeable to these receipts, and such deferred interest and principal shall be added to the sums payable to the Secretary of the Treasury in later years. The interest rates on such loans shall be determined in accordance with the provisions of section 218 of the District of Columbia Public Works Act of 1954, as amended (68 Stat.109).

D.C. Code
43-1617.

Acquisition of
lands in Mary-
land and Vir-
ginia.

Sec.5. (a) The Commissioners are authorized to acquire by purchase, condemnation, donation, or otherwise, any land or any interest in land located in Maryland or Virginia needed for construction and operation of the Potomac interceptor. Title to any such land or interest in land shall be taken in the name of the United States but shall be under the jurisdiction and control of the Commissioners. For the purpose of acquiring any such land or any interest in land, the Commissioners shall be deemed to be officers of the Government within the meaning and for the purposes of the Act approved August 1, 1888 (25 Stat.357), as amended (40 U.S.C., sec. 257). The provisions of the Act approved February 26, 1931 (46 Stat.1421; 40 U.S.C., secs.257a-e) and the Act approved October 21, 1942 (56 Stat.797; 40 U.S.C., sec.258f), shall be applicable to any condemnation proceedings instituted pursuant to authority of this Act.

74 STAT. 211
74 STAT. 212

40 USC 258a-e.

Transfer of
jurisdiction.

(b) When any land under the jurisdiction of any department or agency of the United States may be needed for the construction or operation of the Potomac interceptor, the appropriate officer of such department or agency is authorized, upon request of the Commissioners, to transfer to the Commissioners jurisdiction over so much of such land, or of such interests therein, as the Commissioners shall request.

Approved June 12, 1960.

AUTHORIZING THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA TO PLAN, CONSTRUCT, OPERATE, AND MAINTAIN A SANITARY SEWER TO CONNECT THE DULLES INTERNATIONAL AIRPORT WITH THE DISTRICT OF COLUMBIA SYSTEM

Mr. McMillan, from the Committee on the District of Columbia, submitted the following

R E P O R T

[To accompany H. R. 12063]

The Committee on the District of Columbia, to whom was referred the bill (H. R. 12063) to authorize the Commissioners of the District of Columbia to plan, construct, operate, and maintain a sanitary sewer to connect the Dulles International Airport with the District of Columbia system, having considered the same, report favorably thereon with amendments and recommend that the bill H. R. 12063 do pass.

The amendments are as follows:

On page 1, line 8, strike "Interceptor" and insert in lieu thereof "interceptor".

On page 2, line 8, strike "rights of way" and insert in lieu thereof "rights-of-way".

On page 2, line 10, strike the word "Interceptor" wherever it appears and insert in lieu thereof "interceptor".

On page 3, line 13, strike "title 1,817c" and insert in lieu thereof "sec. 1-817c".

On page 3, line 15, strike "title 1,817" and insert in lieu thereof "sec. 1-817".

On page 3, lines 16 and 17, strike "District of Columbia" and insert in lieu thereof "D.C.".

On page 5, line 9, strike "40 U.S.C. 257" and insert in lieu thereof "40 7.S.C., sec. 257".

On page 5, line 12, strike "40 U.S.C. 258f" and insert in lieu thereof "40 U.S.C., sec. 258f".

PURPOSE AND NEED FOR THIS LEGISLATION

This proposal was transmitted to the Congress on May 4, 1960, by the Bureau of the Budget. Its letter of transmittal states in part:

On September 1, 1959, in order to avoid, if possible, discharging treated effluent from the Dulles International Airport into the Potomac River above the District of Columbia water intakes, the President asked the Administrator of the Federal Aviation Agency to defer action on a proposed waste treatment plant at the Dulles International Airport until a study could be made to determine the feasibility of an alternative method of waste disposal.

On March 9, 1960, the Administrator submitted a "Report on Sewage Disposal Methods: Dulles International Airport." The President shared in the Administrator's conviction that the Federal Government has a degree of responsibility along with the local jurisdictions in assuring a comprehensive solution of the National Capital water problem.

He considered it essential, moreover, that the solution of the airport problem coincide with, rather than impinge upon, orderly community and regional development. Similarly, it is his belief that as local communities continue to expand, they will wish to provide for disposal facilities in a manner which will assure achievement of the longer range objectives sought for the Potomac River.

It has been concluded, therefore, that the appropriate solution to this problem will be the designation of the District of Columbia government as the agency to proceed with immediate construction of the necessary airport sewerlines. Accordingly, it is being requested that the Congress enact into law the enclosed legislative proposal.

The purpose of the sewer authorized by the bill is twofold. Primarily it will provide for disposal of the sanitary sewage from the Dulles International Airport through the District of Columbia sewerage system and sewage treatment plant at Blue Plains, which is located at the southernmost point of the District of Columbia on the Potomac River. Secondly, it will provide a means for the collection and treatment of sewage now and hereafter originating in those areas of Maryland and Virginia which would normally be considered tributary to the region through which the sewer will pass.

Although the Commissioners of the District of Columbia are designated as the agency for planning, constructing, operating, and maintaining the sewer, it will not be a part of the District of Columbia sewerage system nor will any part of the cost of construction, operation, or maintenance ever become an obligation of the District of Columbia.

The bill authorizes an appropriation of \$3 million as the Federal contribution toward the costs of planning, acquiring rights-of-way for, and constructing the sewer from the Dulles International Airport to the District of Columbia system. The balance of such costs, as well as the costs of operation and maintenance, will ultimately be paid by users of this sewer.

However, to make funds available when required the bill authorizes the Secretary of the Treasury to advance to the Commissioners, from time to time, loans not exceeding a total of \$25 million to carry out the purposes of the legislation.

The bill establishes a metropolitan area sanitary sewage works fund into which will be deposited the moneys which may be appropriated and loaned, as well as all receipts from charges paid by the users of the sewer. All expenditures necessary for planning and constructing the sewer as well as for its maintenance and operation, and all principal and interest payments on the loans, will be made from moneys appropriated from this metropolitan area sanitary sewage works fund.

The bill provides that the loans shall be repaid from the receipts credited to the metropolitan area sanitary sewage works fund in substantially equal annual payments including principal and interest, within a period of 40 years beginning on July 1 of the second fiscal year following the date on which each such advance is credited to this fund. Inasmuch as the revenues of the fund will be somewhat proportional to the use of the sewer, it is obvious that such revenues may be insufficient, particularly during the early years of the sewer's use, to provide for repayment of principal and interest as well as payment of the operating and maintenance costs. The bill, therefore, provides for a deferment of interest and principal payments whenever the Secretary of the Treasury finds that the income received from charges for sewerage services is inadequate to cover these and other expenses properly chargeable to these receipts, and that such deferred interest and principal shall be added to the sums payable to the Secretary of the Treasury in later years. However no

interest would accrue on such deferred amounts.

The sewage flowing through the interceptor will enter the District sewerage system and be conveyed to the plant at Blue Plains for treatment. Section 2(c) of the bill authorizes the Commissioners to charge all users of the interceptor including any agency of the United States, for carrying, treating, and disposing of sewage in the District's sewerage system. These charges are required to be consistent with the acts of September 1, 1916, and August 21, 1958. The 1916 act authorizes agreements with proper authorities of Maryland, under which the District has for many years been handling and treating sanitary sewage received from the Washington Suburban Sanitary Commission. The 1958 act authorizes similar agreements between the District and the proper authorities in Virginia under which Virginia sewage will be delivered to the District system and treated in its sewage treatment plant. The bill provides that the receipts derived from these charges shall be deposited to the credit of the existing District of Columbia sanitary sewage works fund (created by sec. 202 of the District of Columbia Public Works Act of 1954).

Since the interceptor will be built entirely outside the District of Columbia, title to any land or any interest in land required for the project will be taken in the name of the United States.

The construction of this interceptor will protect Federal interests and will also discharge several Federal obligations. A pure, uncontaminated water supply for the District of Columbia is necessary to supply the numerous Federal establishments in and near the District of Columbia. This interceptor and trunk sewer will remove present contamination, some of which is now contributed by a Federal installation a short distance above the water intake, and will prevent further contamination which will otherwise come from the airport and the community generated by the airport if any alternative solution should be adopted. The availability of the interceptor will make it possible for other communities in Maryland and Virginia to avoid discharging sewage effluent into the river. The improvement of the Potomac River as it flows past Washington, and the facilities for water recreation above Chain Bridge, will be important byproducts of the sewer's construction.

At a joint hearing held on May 19, 1960, by subcommittees of the Committees on the District of Columbia of the House of Representatives and the Senate, testimony was heard from the following witnesses:

Hon. Joel T. Broyhill, author of the bill.

Sam R. Broadbent, Chief, Division of Commerce and Finance, Bureau of the Budget.

James T. Pyle, Deputy Administrator, Federal Aviation Agency.

Hon. Robert E. McLaughlin, President, Board of Commissioners, District of Columbia.

Brig. Gen. A. C. Welling, Engineer Commissioner, District of Columbia.

Daniel H. Shear, General Counsel, National Capital Planning Commission and National Capital Regional Council.

Mrs. Stella B. Werner, member, Montgomery County Council.

William H. Moss, member, Fairfax County Board.

Hon. J. Emory Kirkpatrick, chairman, Loudoun County Board of Supervisors

Hon. Guy M. Wilson, mayor of Vienna, Va.

Ellis S. Tisdale, director, Interstate Commission on Potomac River Basin

Dr. Thomas Bartram, Montgomery County Civic Federation.

Charles W. Mander, legislative committee, Citizens Committee for a Clean Potomac.

The testimony of all witnesses was in favor of the legislation.

At a full meeting of the House District Committee on Wednesday, May 25,

1960, the bill was ordered reported unanimously. During the committee meeting the committee discussed the provision which requires the Commissioners to consult with the National Capital Planning Commission and the National Capital Regional Planning Council in developing the plan for the Potomac interceptor sewer. There was strong sentiment in the committee to delete the provision, but it was decided to leave it in the bill so that the consultation could be had if the District Commissioners felt that it was desirable. The committee, however, in leaving in the provision, desires it understood that it intends that if any such consultation is had it will not result in any delay whatever in the planning or construction of the sewer. The committee considered the impact which the operation of the new airport will have upon the development of the areas in Fairfax and Loudoun Counties, immediately adjacent to the airport, and intends that the interceptor and trunk sewer shall provide the service which this satellite development will require.

APPENDIX B

OVERVIEW OF THE ODOR REMEDY STUDY AND ODOR CONTROL TECHNOLOGIES EVALUATED FOR THE POTOMAC INTERCEPTOR

APPENDIX B

Overview of the Odor Remedy Study and Odor Control Technologies Evaluated for the Potomac Interceptor

Overview of the Odor Remedy Study

In 1999, M&E was contracted by MWCOG to perform a conditions survey, modeling and metering study of the Potomac Interceptor system. The initial conditions survey included an assessment of potential odors at each structure inspected, as well as several other tasks related to the sewage conveyance system. During the summer of 1999, odors were noted around the vented structures along the PI. The extremely hot and dry summer caused flows in the PI to be lower than normal, which was a major contributing factor to the noted odors. The low wastewater flows and warmer temperatures throughout the collection systems which discharge to the PI system resulted in reduced flow velocities, increased detention times, increased solids deposition, increased biological activity and increased sulfide production.

In areas where flows become turbulent due to the physical characteristics of the PI system, dissolved sulfides and other odorous volatile compounds can be stripped from the liquid phase and enter the headspace of the PI. The potentially odorous gas then escapes through the vent structures and vented manholes. This air becomes diluted after exhausting from the vented structures, so low levels of odorous gases can be detected in the general vicinity around the vented structures. During the summer of 1999, the perception of odors may have been aggravated by the hot, stagnant air, which limited the ability of the gas emissions to disperse, and may have caused more noticeable odors near the vented structures. Odor complaints were received during this time from people living and recreating along the Potomac River and the Potomac Interceptor alignment, and were in some cases forwarded to DCWASA through the NPS. Of primary concern, the conversion of dissolved sulfides (i.e., dissolved hydrogen sulfide) to hydrogen sulfide gas can cause odor problems as well as lead to corrosion of the PI's concrete pipes and structures.

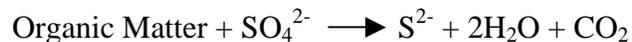
To further evaluate the odors recognized in the summer of 1999, M&E was contracted to accelerate the study of odors associated with the PI on behalf of the Blue Plains Regional Committee and DCWASA. The Odor Remedy Study consisted of a detailed field assessment and data collection phase to define the scope of the odor problems quantitatively and qualitatively, and a feasibility study was conducted to evaluate available odor control options. Data were evaluated to identify which areas of the PI or which specific structures may require odor controls, and to assess the types of remedies that were most suitable for specific venting structures. Other evaluations included subjective assessments of the odor levels around the structures, the proximity of the structures to human receptors (e.g., residences, recreation areas, roads, other public areas), site access, and access to utilities.

During the feasibility study, M&E evaluated available odor control technologies and determined which options were the most suitable for the potential remedial areas and structures identified during the field assessment. Numerous odor control technologies were evaluated including passive methods (e.g., sealing vents), active methods (e.g., forced-air carbon treatment units), and chemical addition systems (e.g., metal salts addition). Within each of the three categories,

several specific technologies were evaluated to determine which were the most effective for odor mitigation along the PI. Viable options were identified and design criteria were developed including equipment requirements, utility requirements, access requirements, size and space requirements, capital costs, and the operation and maintenance program. Since some odorous sections of the PI parallel the C&O Canal, implementation concerns included access issues, regulatory permitting, availability of land space, and other site-specific considerations. M&E worked closely with DCWASA and the Blue Plains Regional Committee to evaluate the various options and select the appropriate odor remedy program for the PI.

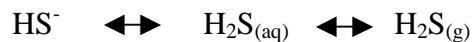
Formation and Release of Odors

Odorous substances from domestic wastewater include inorganic gases such as hydrogen sulfide (H₂S) and ammonia, as well as organic gases and vapors such as mercaptans, organic sulfides and amines. Of these, hydrogen sulfide is typically the most prevalent odorous compound in wastewater. The major mechanism of H₂S formation in wastewater systems is the anaerobic decomposition of organic matter containing sulfur, and the reduction of mineral sulfites present in the wastewater. Sulfur is required in the synthesis of proteins and is released in their degradation. Sulfate ions are naturally present in most water supplies and are consequently in wastewater as well. Typical sulfate concentrations in wastewater range between 20 and 30 mg/l. Sulfates are important to the discussion of odor control, as they may be reduced to sulfide under anaerobic conditions by a process known as dissimilatory or respiratory reduction. The processes by which sulfates are chemically reduced to sulfides and to H₂S by bacteria under anaerobic conditions are shown below:



For sulfate to be reduced to sulfide, a medium without free oxygen or another oxidizing agent must exist. When the wastewater stream has limited dissolved oxygen and/or low velocities, anaerobic sulfate-reducing bacteria can form in the submerged slime on the wall of a sewer pipe and utilize sulfate for the production of sulfide, shown above. Hydrogen sulfide is not formed in the presence of an abundant supply of oxygen. Anaerobic bacteria of the species *Desulfovibrio* are sulfate-reducing bacteria that convert sulfate in the wastewater to sulfide. However, aerobic bacteria of the genus *Thiobacillus* convert hydrogen sulfide to sulfuric acid.

Once sulfides are produced in the wastewater stream, they are governed by the following equilibria:



(g) – gaseous

(aq) - aqueous

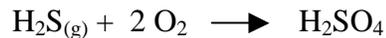
It is seen that as H₂S_(g) is released to the atmosphere, HS⁻ will be converted to H₂S_(aq) so the equilibrium can be maintained. The conversion between the three forms of sulfide will occur continuously until equilibrium is achieved or until the sulfides are completely removed from the wastewater stream. The solubility of H₂S_(g) is governed by Henry's Law and is influenced by temperature. The equilibrium between H₂S_(aq) and HS⁻ are also strongly influenced by pH. In

sewer areas where flows become turbulent due to the physical characteristics of the sewer, the above equilibria illustrate that dissolved sulfides are stripped from the liquid phase and enter the headspace of the sewer as hydrogen sulfide gas. This gas then escapes through vent structures and vented manholes.

In the Potomac Interceptor, conditions were not observed to be favorable for the formation of sulfides. Oxygen is present in the sewer headspace and in the wastewater (as dissolved oxygen), and oxygen levels have been measured to be near ambient levels (~21%) in upstream areas of the PI. Based on measured decreases in oxygen levels in downstream areas, oxygen levels appear to be depleted as flows move through the interceptor due to the transfer of oxygen in the headspace to the flowing wastewater. In addition, the wastewater flow velocities in the PI are high enough to prevent stagnation, promote the transfer of oxygen into the wastewater flow, and prevent formation of sulfide-producing slime layers on the sewer pipe walls. Turbulent conditions in the PI are observed to be favorable for the release hydrogen sulfide, which enters the conveyance system. Hydrogen sulfide and other dissolved gases are released in areas of turbulent flow, and higher hydrogen sulfide concentrations have been measured at venting structures near line, pipe size changes, areas of dynamic slope, and other areas of turbulence. In addition, the Potomac Interceptor's vented structures appear to be operating as designed to provide air exhaust and intake along the conveyance system.

Corrosion in Concrete Sewers

As $\text{H}_2\text{S}_{(g)}$ is released from the wastewater stream into the sewer atmosphere (pipe headspace), the corrosion of exposed concrete or metal surfaces occurs from the bacterial oxidation of H_2S to sulfuric acid (H_2SO_4) under aerobic conditions. This is shown by the following reaction.



After the hydrogen sulfide has escaped into the sewer headspace from the wastewater (dependant upon equilibrium relationships and physical flow conditions promoting stripping), the corrosion process occurs due to the reaction of the hydrogen sulfide in the damp sewer environment, above the wastewater flow level. The hydrogen sulfide is converted to sulfuric acid by the aerobic bacteria of the genus *Thiobacillus*. This reaction is dependent upon the amount of moisture and presence of oxygen in the sewer. The sulfuric acid proceeds to react with the cement in concrete pipes, producing a pasty mass of material that is loosely bonded to the inert materials (e.g., silica sands) used to manufacture the pipe. The pasty mass of material will eventually shear off the sewer pipe walls and deposit into the wastewater flow. The rate and pattern of corrosion varies according to the amount and rate of hydrogen sulfide generation, air circulation patterns, amount of condensate, and other physical characteristics of the sewer pipe. Moisture must be present on the exposed surfaces to support the bacterial metabolism necessary for the production of H_2SO_4 . Sufficient moisture must be present on the pipe wall to prevent the desiccation of the sulfur metabolizing bacteria. As a countermeasure, sewer ventilation can be used to reduce the $\text{H}_2\text{S}_{(g)}$ concentration and the amount of moisture formed on the pipe walls.

Potomac Interceptor Operation and Maintenance

DCWASA employs typical operations and maintenance practices for the PI system. Practices include routine inspections of above ground structures, internal pipe inspections utilizing CCTV equipment, collection of flow data, and analysis of information collected during the inspection and monitoring practices. Routine maintenance practices include inspection and repair of damaged manhole covers and other above ground structures, clearing of dirt, grease, and debris that have accumulated on structures or have caused blockages in vented structures, and cleaning or flushing as required. An extensive conditions survey was completed in 1999 and serves as a basis for future maintenance and rehabilitation planning.

In addition, a hydraulic model of the PI was recently completed in order to evaluate the hydraulic performance of the sewage conveyance system, and to evaluate potential needs for expanded capacity in the future. Based measured flow data, the Potomac Interceptor appears to operate as designed. The wastewater flow velocities (ranging from 2 to 6 feet per second) are adequate to prevent solids deposition and provide scouring of the PI's bacterial ("slime") layer. The ventilation of wastewater off-gases and the intake of "fresh" air through vent structures located along the PI system, which helps to prevent corrosion within the sewer pipelines and structures, appears to function as designed.

Technical Evaluation

Six types of vent structures were examined during the Odor Remedy Study to determine whether odor control devices had been previously installed. These inspections are summarized below.

Cast Iron Gooseneck Vent, 12-inch – This type of vent is usually associated with a nearby adjacent manhole. A cut-out in the manhole wall allows for connection of the 12-inch (inside diameter) cast iron pipe inside the manhole. The cast iron pipe extends out from the manhole and ultimately makes a 90-degree bend upward and protrudes from the ground. The cast iron riser is then fitted with a 12-inch cast iron "gooseneck". The "gooseneck" is comprised of two 90-degree bends connected in series to form a 180-degree bend. A stainless steel screen is also located between the two 90-degree bends in the gooseneck. This configuration is designed to prevent animals, trash, and other objects from entering into the sewer.

Cast Iron Gooseneck Vent, 6-inch – This type of cast iron vent is configured like the 12-inch cast iron vents described above, except the inner diameter of the pipe is 6-inches.

Square Park Style Vent – These vents are typically located in NPS areas along the C&O Canal and the Potomac River. The square park style vents are 12-inch cast iron vent pipe stick-ups concealed by a four-foot square brick structure with a 4.5-foot square concrete slab or wooden top. There is a vent window on each side of the square structures with each window covered by a stainless steel mesh screen. The vent windows vary in size from structure to structure, but are generally 18-inches wide by 6-inches high. The square park style vents were designed primarily for aesthetic reasons for use in NPS areas. Most square park style structure top covers are 4-inch thick slabs of reinforced concrete. This type of cover is not suitable for odor control methods requiring access for routine maintenance, because the concrete covers weigh approximately 300-

400 pounds and cannot be easily removed and replaced manually. Also, most structures are not accessible for the heavy equipment required to remove the concrete covers, because they are located on steep banks or in limited-access areas on NPS lands. Therefore, it is not practical to remove the concrete covers for routine maintenance.

Circular Park Style Vent – These structures are vent structures enclosed in circular structures constructed of concrete with decorative stone. There are vent windows located around the perimeter at the tops of the structures. One of the structures inspected (i.e., Structure 31, see below) had a 4-inch thick concrete top with a 30-inch wide manhole opening/cover towards the center. Structure 31 provides access through the manhole and vents the junction of the main stem PI with the Upper Maryland Extension branch of the PI system.

Vented Manhole Cover – There are manholes on the PI with vented covers to allow for exhausting and intaking of interceptor airflows. Most of the vented manhole covers are 30 inches in diameter and are constructed of cast iron, but 36-inch covers are also present at some locations. The vented covers generally have 36 round holes, each measuring approximately 1 inch in diameter.

Aluminum Air Exhauster – Air exhausters are another type of vent located on various segments of the PI system. They are constructed of aluminum and formed in a way to prevent animals, trash, and other objects from entering into the sewer. The large air exhausters typically have an aluminum frame cemented into the top of an access shaft for removal and replacement of the air exhauster.

M&E evaluated field data to identify off-gas characteristics and trends throughout the system. A few conclusions were drawn from the data. First, as shown by the wastewater sulfide data, total sulfides were present throughout the system and appeared to be entering the PI system from connecting jurisdictions rather than being formed within the PI system. This was demonstrated by the consistent presence of wastewater sulfides (sulfates already reduced) in all of the sampled areas, and the lack of an upward trend as flows move downstream. A similar distribution was seen in the hydrogen sulfide gas concentrations. Based on the distribution of the total sulfide and hydrogen sulfide data, it appeared that sulfide formation occurs upstream in the inter-jurisdictional collection/conveyance systems. These conclusions were confirmed by the oxygen levels and wastewater velocities observed in the PI system, which were not conducive to sulfide formation.

The wastewater velocities throughout the PI system (i.e., measured wastewater velocities range 2 to 6 feet per second (fps)) were adequate to prevent solids deposition and provide scouring of the interceptor. These flow velocities prevent stagnation, promote the transfer of oxygen into the wastewater flow, and prevent formation of sulfide-producing slime layers on the sewer pipe walls. Thus, the sources of total sulfides present in the wastewater were most likely located upstream in the collection systems that discharge into the PI system at multiple locations. Although conditions were not evaluated in the upstream collection systems as part of the Odor Remedy Study, it is probable that the conditions that do promote sulfide formation may be present in some of those systems. Some of the contributing collection systems are currently operating at wastewater flows lower than their projected build-out conditions, so low flow

velocities may be present in those systems, which could contribute to stagnation, buildup of slime-layers, and potentially anaerobic conditions. In addition, during the drought in the summer of 1999, the wastewater flows were lower than usual, which contributed to hydrogen sulfide formation resulting in the odor problems that were perceived during that time period.

The vented structures located throughout the PI system were generally observed to be operating as designed to exhaust off-gases, including hydrogen sulfide, as they were stripped from the wastewater flowing through the conveyance system. The distribution of hydrogen sulfide data appeared to reflect the configuration of the PI system rather than any general system-wide trend. Hydrogen sulfide and other dissolved gases are released in areas of turbulent flow, and higher hydrogen sulfide concentrations were generally found near line bends (Structure 51), pipe size changes (Structure 303), areas of dynamic slope changes (i.e., vertical bends – Structure 18), areas of turbulence (i.e., junction chambers – Structure 51), and areas where there were a combination of these factors (i.e., a pipe size change, a vertical bend, and a junction chamber occur at Structure 31). Evidence of hydrogen sulfide release was also noted during field inspections of structures with high turbulence (Structures 31 and 74). A closed-circuit television (CCTV) inspection of pipe segments near Structures 31 and 74 revealed noticeable corrosion, another indicator of the presence of H₂S. Evidence of pipe corrosion caused by H₂S includes pitting and crumbling of the outer cement layer. For both of these sites discussed, aggregate and reinforcing wire in the concrete were also exposed.

The hydrogen sulfide concentrations taken from the discrete samples (i.e., the one-time samples rather than the 24-hour samples) ranged from 0-7.8 ppm. These concentrations were measured directly at the point of exhaust inside the structures. Hydrogen sulfide concentrations collected during diurnal sampling ranged from 0-65 ppm, and these measurements were collected inside the manholes prior to exhaust. Hydrogen sulfide exhausting from the structures becomes diluted immediately after exhausting into ambient air so concentrations are much lower in the areas surrounding the structures. The odor threshold of hydrogen sulfide typically varies between 0.005 ppm and 0.03 ppm, which has a characteristic “rotten egg” odor.

Other than the odors perceived by persons in the vicinity of the structures, there are no harmful public health effects anticipated from the diluted concentrations occurring around the vented structures. Health standards for hydrogen sulfide have been developed by the Occupational Safety and Health Administration (OSHA) for workers who are exposed to hydrogen sulfide, but these standards are not used to regulate exposure by the general public or anyone other than exposed workers. The standards that OSHA enforces for worker exposure include a permissible exposure limit (PEL) of 20 ppm for hydrogen sulfide, which is an acceptable ceiling concentration, and a short-term exposure limit (STEL) of 50 ppm for 10 minutes, which is the maximum allowable peak above the ceiling concentration for an 8-hour work shift. These levels require that sewer workers or wastewater treatment plant operators not be exposed to more than the indicated concentrations for the set durations in the work environment.

Although the general public may perceive the odors above the 0.005 ppm odor threshold when they are in the vicinity of the structures, it does not appear likely that they would be exposed in concentrations approaching the limits set by OSHA, which are considered to be protective of personnel who may be exposed to hydrogen sulfide on a regular basis. Public users of property

near the sewer vents are not likely to remain in the area for extended periods of time, and, as mentioned previously, would only be exposed to diluted concentrations during the times they are near the vented structures. There are no known physical or chemical interactions between dilute hydrogen sulfide gas emissions and nearby water bodies, so there is no evidence to suggest that the low levels of hydrogen sulfide detected around the PI's vented structures would have any effect on the Potomac River, the C&O Canal, or any other nearby water bodies.

Based on the information collected during the study, M&E developed a list of areas with a high priority for remediation due to their potential for significant odor issues and their proximity to human receptors. These high priority areas were determined to include:

- C&O Canal National Historical Park and the Clara Barton Parkway (Structure 28 in Montgomery County, Maryland extending down to Structure 1989 in the District of Columbia).
- PI main trunk in Virginia, near Structure 56 in Loudoun County to Structure 29 in Fairfax County. These areas are near residential developments and public recreational areas.
- Upper Maryland Spur in Montgomery County, Maryland, along the accessible public recreation areas of the C&O Canal National Historical Park along the Potomac River from Structure 410 through Structure 400.
- Difficult Run Extension in Fairfax County, Virginia, beginning at Structure 208 and extending down to Structure 200 along the accessible public recreation areas inside of Great Falls Park, Virginia.

After developing the priority locations for remedial action, M&E reviewed available odor control technologies to determine which were the most feasible for remediation of specific areas along the PI system. Odor control technologies fall into three broad categories according to the mechanism of treatment, each of which have advantages and disadvantages in terms of effectiveness, applicability, and cost. These three types of treatment methods are: 1) passive odor control methods, which mitigate odors by either bringing the exhaust gas in contact with media (without mechanical equipment) that treats or removes the odor-causing compounds, or blocking the vent opening to prevent odors from escaping into the atmosphere; 2) active odor control measures, which are similar to passive measures but use forced ventilation to bring the odorous air to the treatment unit; and 3) chemical control technologies, which treat the wastewater with chemicals to prevent the sulfides from being released into the sewer headspace, thereby limiting the exhaust of hydrogen sulfide into the atmosphere through the vented structures. However, the chemical control technologies evaluated would not necessarily reduce other odorous volatile organic compounds from being released in the turbulent portions of the PI.

Within these three categories, a number of passive, active and chemical odor control technologies were evaluated. The passive technologies recommended for further evaluation included carbon filters, sealing specific venting structures, and the use of gel neutralizers to reduce odors at some locations. Two types of active air treatment systems were also recommended for further evaluation, including carbon filters with forced-air ventilation, and biofilters with forced-air ventilation. Chemical treatment with either metals salts or sodium hypochlorite was also evaluated in greater depth as part of the study.

M&E evaluated the proposed remedial areas to identify site-specific conditions that may limit the application of any of the three types of technologies. M&E determined that active and chemical treatment technologies could be feasible at some of the downstream structures (i.e., downstream of Structure 31), while passive filters and sealing the structures were generally not recommended at those downstream locations due to already depressed oxygen levels that could become further reduced by either of those options. The depressed oxygen levels in the downstream areas suggested that conditions could be favorable for hydrogen sulfide accumulation, which could result in dangerous and corrosive atmospheric conditions in the sewer. The installation of passive odor remedies that could further restrict airflow could result in long-term sewer deterioration or potentially explosive conditions. As described earlier, some sections of the PI have deteriorated in areas where high levels of H₂S are released. These areas require costly rehabilitation to maintain their structural integrity and prevent sewer failure. Conditions resulting in significant deterioration should be avoided in order to protect the integrity and function of the PI, so measures that compromise the levels of sewer ventilation are not recommended. One passive remedy that did appear feasible at some of the downstream locations was the gel neutralizer, since it does not restrict airflow.

In the proposed upstream remedial areas, M&E determined that passive, active and chemical treatment technologies were feasible. The installation of passive units were feasible if applied in a limited fashion at some of the accessible upstream locations, since oxygen data indicated that there was adequate fresh air entering the upstream portions of the PI system. However, M&E recommended that their use be limited to avoid compromising the introduction of fresh air into the upstream portions of the system.

M&E evaluated the available technologies based on their feasibility and their relative effectiveness and cost. In addition, there were several other considerations. First, it was decided by the Blue Plains Technical Committee, Potomac Interceptor User's Workgroup, that the selected remedy would be applied to the PI system directly, since the PI was generally releasing the odors under turbulent conditions, as previously described. Therefore, the evaluation focused on remedies with the potential for reducing odors released from the PI system structures, rather than potential remedies which could be effective in prevention of sulfide formation in the upstream tributaries to the PI system (i.e., oxygen injection, nitrate addition, caustic slugging, biological treatment). As discussed, a second important consideration was the impact of selected technologies on sewer airflow dynamics. M&E recommended only limited use of technologies that could negatively impact airflow through vented structures (i.e., passive filters and vent seal) to avoid compromising the ventilation of the system. Finally, each of the treatment mechanisms evaluated has advantages and disadvantages in terms of effectiveness, applicability, and cost. The available potential remedies were developed to address odors within the PI system on a system-wide basis with the intent of mitigating or reducing odor release from as many of the affected public areas as feasible.

Conclusions

Based on the evaluation of PI system data and multiple odor remedy technologies, it was determined that active (forced-air) carbon treatment was the most effective method of treating the odorous air, and maintaining the integrity of the PI's concrete pipes. In addition, since some areas are not practical for active treatment (due to their inaccessibility or other factors), it was determined that passive controls would be implemented in select areas to supplement the odor remedy program. Ultimately, a remedy was recommended which included passive controls in addition to active (forced-air) carbon treatment to control and remove odorous compounds in the exhausting sewer air. The remedial strategy was developed to provide concentrated treatment of the downstream area along the C&O Canal along with site-specific treatment at the other upstream areas that have been associated with odor problems. The long-term odor abatement plan recommends the design and construction of several active blower treatment units at several locations along the PI system, as well as the closure (sealing) of multiple vents and the installation of intake-only carbon filter. The long-term odor abatement plan evolved from the recommendations provided in the Odor Remedy Study as well as an additional field pilot study that was conducted in 2001.

Chemical addition systems were eliminated from consideration due to the perceived negative perception held by the public and park agencies on storing hazardous chemicals on parkland and near protected streams. In addition, chemical additions systems would require large chemical tanker trucks to travel frequently through narrow roads in residential areas, which could lead to significant safety concerns from the affected community. Chemical addition systems would also require greater inter-jurisdictional coordination than other options, since the contributed wastewater streams may require monitoring or control in order to provide the proper chemical dosing at the dosing stations located on the PI. One final concern was that the dose delivered in upstream areas of the PI would be concentrated to treat downstream flows that were higher than the flows occurring at the dosing stations. This could result in overdosing of the flows occurring at the dosing stations, which could result in corrosive conditions in those areas surrounding the dosing stations.

The extensive use of passive measures that restrict sewer ventilation was also eliminated due to the need to maintain the Potomac Interceptor's ability to vent sewer gases, and intake "fresh" air. The vented structures on the PI provide fresh air into the system, which helps prevent the formation of sulfide in the sewer and allows gases to exhaust, which could otherwise cause corrosive and potentially explosive conditions in the sewer if not vented. Passive filters could lead to conditions that would accelerate deterioration and eventually compromise the system's structural integrity. Sewer rehabilitation caused by corrosion is costly and if a sewer system fails, environmental damage can result from sewer overflows. In addition, passive systems that restrict air exhaust in one location cause the air to exhaust elsewhere, which transfers the nuisance odor rather than treating the odor problem.

Active carbon systems were selected due to their ability to treat and remove odors, and provide a high level of control over gases exhausting from the PI system. Active carbon units promote air movement within the sewer, and create a negative pressure inside the sewer, so can be used to control the exhaust of odorous air from structures located near the treatment units, rather than

causing odors to release elsewhere, as do passive controls. In addition, the induced air movement can be beneficial in terms of sewer protection, because it helps to dry the walls of the sewer, dilute H₂S concentrations, and protect against the deterioration caused by sulfuric acid. Active ventilation units also have a relatively small site footprint, which is important on sites located in NPS lands due to their historical and cultural value. Finally, active air treatment systems provide state of the art treatment and are relatively low maintenance systems.

APPENDIX C
THREATENED AND ENDANGERED SPECIES

APPENDIX C THREATENED AND ENDANGERED SPECIES

Global and state species ranks follow the system instituted by TNC and used by all 50 state Natural Heritage Programs. The system is based on standard criteria and used to assess the range-wide status of a species and the status within portions of the species' range.

GLOBAL RANK

Global ranks refer to a species' rarity throughout its total range. Global ranks are denoted with the letter "G" followed by a number.

- G4 - Common and apparently secure globally, though it may be rare in parts of its range, especially at the periphery.
- G% - Very common and demonstrably secure globally, though it may be rare in parts of its range, especially at the periphery.

MARYLAND STATE RANK

The Maryland Department of Natural Resources sets protection priorities for Natural Heritage Resources (NHR's) and assigns a state rank (the letter S followed by a number). NHR's are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHR's is related to the number of populations or occurrences; the number of known distinct localities; the number of individuals in existence at each locality; the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- S1 - Highly State rare. Critically imperiled in MD, 5 or fewer occurrences.
- S2 - State rare. Imperiled in MD due to rarity, 6-20 occurrences or few remaining individuals.
- S3 - Watch list. Rare to uncommon with the number of occurrences between 21-100.
- S4 - Apparently secure in MD with typically 100 occurrences in the state or may have fewer occurrences if they contain large numbers of individuals.
- B - A migrant species, rank only applies to breeding status.

FEDERAL STATUS

The U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation develop the standard abbreviations for Federal endangerment.

- LE - Listed Endangered
- LT - Listed Threatened
- PE - Proposed Endangered
- PT - Proposed Threatened
- C - Candidate (formerly C1 - Candidate category 1)

MARYLAND STATE STATUS

The status of a species as determined by the Maryland Department of Natural Resources, in accordance with the Nongame and Endangered Species Conservation Act. Definitions for the following categories have been taken from the Code of Maryland Regulations (COMAR) 08.03.08.

- E – Endangered
- I – In Need of Conservation
- T – Threatened
- X – Endangered Extirpated

Migratory Bird Species Found in Area of Potential Impact and State Ranked as Rare

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	MD STATE RANK	FEDERAL STATUS	MD STATE STATUS
<i>Ardea alba</i>	Great Egret	G5			
<i>Carpodacus purpureus</i>	Purple Finch	G5	S3B		
<i>Catharus guttatus</i>	Hermit Thrush	G5	S3, S4B		
<i>Certhia americana</i>	Brown Creeper	G5			
<i>Circus cyaneus</i>	Northern Harrier	G5			
<i>Dendroica cerulea</i>	Cerulean Warbler	G5	S3, S4B		
<i>Dendroica magnolia</i>	Magnolia Warbler	G5			
<i>Empidonax flaviventris</i>	Yellow-Bellied Flycatcher	G5			
<i>Eporornis philadelphia acea</i>	Mourning Warbler	G5	S1B		E
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G3	S2, S3B	LT	E
<i>Limnithlypis swainsonii</i>	Swainson's Warbler	G4	S1B		E
<i>Nyctanassa violacea</i>	Yellow-Crowned Night-Heron Golden-Crowned Kinglet	G5	S2, S3B		
<i>Regulus satrapa</i>		G5	S2B		
<i>Sitta canadensis</i>	Red-Breasted Nuthatch	G5	S1B		
<i>Troglodytes troglodytes</i>	Winter Wren	G5	S2B		

APPENDIX D
LEGISLATIVE MANDATES

APPENDIX D LEGISLATIVE MANDATES

A variety of federal laws and mandates establish protections for Great Falls Park and Chesapeake and Ohio Canal National Historical Park. The following summary provides an overview of the management considerations for any action in these areas.

National Park Service Organic Act, August 25, 1916 (Public Law 64-235)

Congress created the NPS within the Department of Interior to:

...conserve the scenery and the natural and historic objects and the wild life 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.

Redwood National Park Expansion Act, 1978 (Public Law 95-250)

In order to strengthen the ability of the Secretary of the Interior and the NPS to protect park resources and clarify language in the NPS Organic Act, Congress amended the original legislation in 1978. This legislation reasserted the system-wide standard of protection.

The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes of which these various areas have been established.

Capper-Cramton Act, May 29, 1930 (Public Law 71-284)

Providing for land acquisition to establish the George Washington Memorial Parkway along the Potomac River, this act mandates:

...the protection and preservation of the natural scenery of the Gorge and the Great Falls of the Potomac, the preservation of the historic Patowmack Canal; and the acquisition of that portion of the Chesapeake and Ohio Canal below Point of Rocks...

Chesapeake and Ohio Canal Development Act, January 8, 1971 (Public Law 91-664)

The enabling legislation for C&O Canal has a legislated mission "...to preserve and interpret the historic and scenic features of the Chesapeake and Ohio Canal..."

National Trails System Act, 1993 (Public Law 103-145)

In this legislation the C&O Canal Towpath is identified as an official segment of the Potomac Heritage National Scenic Trail corridor. As stated in the act, "Designation of such trails or routes...shall have as their purpose the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment..."

Designation of American Heritage Rivers, July 30, 1998 (Presidential Proclamation 7112)

Competing among 126 nominations, the Potomac River was selected as one of fourteen rivers to be part of an initiative focusing on natural resource and environmental protection, economic revitalization, and cultural preservation.

NPS Management Policies, 1988

Park managers must preserve Park resources “unimpaired;” qualifying impairment to mean reaching a level that violates the Organic Act. “That level is reached when an action that is taken would permanently impair essential park resources that are fundamental to the values and purposes for which a park was established.” These policies are reiterated in the more recent Draft NPS Management Policies of 1999.

National Environment Policy Act, 1969 (NEPA, 42 U.S.C. §§ 4321 *et seq.*)

Recognizing the profound impact of man’s activity on the natural environment, Congress directs all agencies of the Federal Government to report on actions affecting the environment and include in the report:

- (i) The environmental impact of the proposed action,
- (ii) Any adverse environmental effects which can not be avoided should the proposal be implemented,
- (iii) Alternatives to the proposed action...

National Historic Preservation Act, 1966, (NHPA, 16 U.S.C. §§ 470 *et seq.*)

Section 110 was added in a 1980 amendment to the law, charging each Federal agency with a responsibility for identifying and protecting historic properties and avoiding unnecessary damage to them.

All other regulations and guidelines governing NPS operations will be complied with, including but not limited to: NEPA, Clean Air Act, Clean Water Act, all Executive Orders, Directives, etc.

APPENDIX E
SOUND LEVEL EVALUATION SUMMARY

January 22, 2002

Mr. Al Loftin, Assistant Superintendent
George Washington Memorial Parkway
National Park Service
GWMP Headquarters c/o Turkey Run Park
McLean, VA 22101

Mr. Kevin Brandt, Assistant Superintendent
C&O Canal National Historic Park
National Park Service
P.O. Box 4
Sharpsburg, MD 21782

Subject: Sound Level Survey and Recommended Noise Controls for the Proposed Forced-Air Blower Systems for Odor Control along the Potomac Interceptor Sewer

Dear Mr. Loftin and Mr. Brandt:

On behalf of the Montgomery County Department of Environmental Protection, I evaluated the proposed noise abatement plan for the proposed forced-air blower systems to be located along the Potomac Interceptor (PI) Sewer. Metcalf & Eddy, Inc. provided the proposed plan, including 24-hour background sound level monitoring that was performed at two locations (Lock 5 and Lock 10) along the Clara Barton Parkway and C&O Canal National Historic Park, proposed sound controls for the forced-air blowers and the associated buildings, and measured noise levels at various distances away from a similar forced-air blower system. After careful review of the information provided, I can conclude with reasonable certainty that the proposed sound attenuation measures for the PI forced-air blower facilities will at a minimum comply with the most restrictive receiving property line standards of the County's Noise Control Ordinance (Chapter 31B, Montgomery County Code). For reference, the complete Noise Control Ordinance, with supporting literature, may be found at my Department's web site, www.askdep.com, by selecting Noise from the index.

I found the submissions by Metcalf and Eddy to be thorough and comprehensive, particularly by anticipating my desire to see existing ambient background levels expressed as both an equivalent sound level (Leq) and a percentage metric indicating the upper range (L10). Moreover, based upon my experience and best engineering practice, their combination of noise mitigation measures will not only be sufficient to meet the nighttime Ordinance standard of 55 dBA (A-weighted decibels), but also to remain reasonably close to the existing ambient levels. By reasonably close, I mean equal to, or less than, 3 dBA which is essentially minimal impact. This is our preferable design criteria for new facilities and especially important to me, insofar as I share the Park Service's commitment to the environmental quality and tranquility of the C&O Canal towpath.

Mr. Al Loftin
Mr. Kevin Brandt
January 22, 2002

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If there are any questions or if you would like to discuss this matter further, please do not hesitate to contact me at 240.777.7755 or oglet@co.mo.md.us.

Sincerely,

Thomas S. Ogle, Noise Program Manager
Division of environmental Policy and Compliance

Cc: David Lake
Ellen Scavia