

4 ENVIRONMENTAL CONSEQUENCES

According to the Council on Environmental Quality (CEQ) guidelines (40 CFR Section 1500-1508), the determination of a significant impact is a function of both context and intensity. Significance of an action is analyzed within the setting of an action, or context, including regional, local, or site-specific. Intensity refers to severity of an impact which is analyzed in terms of type, quality, and sensitivity of particular resource. The appropriate class of environmental documentation is determined by level of significance, which is established through impact analysis of each resource. This “Environmental Consequences” chapter addresses the potential impacts to each of the resource areas (i.e., impact topics) discussed under the “Affected Environment” chapter for the No Action, Preferred Action, and Candidate Build Alternatives

As stated in 40 CFR 1508.27(a), the analysis of significance as used in NEPA requires both the context and intensity of an action.

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

4.1 NATURAL RESOURCES

4.1.1 GEOLOGY, SOILS, AND TOPOGRAPHY

In the District, land disturbing activities are regulated and require a construction permit from the District prior to engaging in any such activities. In accordance with the District of Columbia Municipal Regulations (DCMR) Title 21-Chapter 5 Water Quality and Pollution, an erosion and sediment control plan is required for 50 square feet of land disturbance and a stormwater management plan is required for 5,000 square feet of land disturbance. Construction activities are also regulated for compliance.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, the improvements to Oregon Avenue would be limited to maintenance, such as the removal of fallen trees and other debris caused by the deterioration of the roadway, and the resurfacing of the roadway. This maintenance work would not impact the topography, geology, or soils, unless road bed stabilization is necessary to maintain the site conditions or provide access for construction vehicles. Under the No Action Alternative, the uncontrolled runoff from the roadway and adjacent parcels would continue to result in pavement deterioration and the topography in Rock Creek Park would continue to be altered through erosion. Therefore, the No Action Alternative would have a minor, long-term impact to geology, soils, and topography because the runoff would continue unabated and alter the natural environment.

ALTERNATIVES 2, 3, AND 4 INCLUDING THE PREFERRED ALTERNATIVE

The majority of land within the project area has been previously graded and paved over from the construction and maintenance of the existing Oregon Avenue, and much of the project area is currently experiencing moderate to severe erosion.

Depending on the alternative, construction may extend beyond the existing roadway footprint to the west of the corridor, an area which has been previously disturbed for residential lots. Roadway construction limitations such as moderate to high erosion potential, steep slopes, frost

action, low strength, depth to bedrock, depth to saturation, and flooding will need to be taken into account for this project.

Alternatives 2, 3, and 4 would have a minor short-term and long-term site-specific impacts on the geology, soils, and topography in and around the Oregon Avenue project area.

ALTERNATIVE 2

This alternative would result in minor long-term impacts to geology, soils, and topography as it would disturb approximately 1.37 additional acres that have not been previously graded for facility construction. Short-term impacts include redistributing previously graded areas.

ALTERNATIVE 3

This alternative would result in minor, long-term impacts to geology, soils, and topography as it would disturb approximately 3.36 additional acres. Short-term impacts include redistributing previously graded areas.

PREFERRED ALTERNATIVE/ALTERNATIVE 3 MODIFIED

The Preferred Alternative is a modified Alternative 3, as described in Section 2.3.1, that would result in minor short-term and long-term impacts to geology, soils, and topography. Short-term impacts include redistributing previously graded areas. Although the Preferred Alternative/Alternative 3 Modified would disturb approximately 2.62 additional acres for facility construction, the modifications to Alternative 3 will decrease the amount of area to be disturbed by about three-quarters of an acre. The Preferred Alternative incorporates the open bottom arch culvert option for the replacement of the Pinehurst Run Crossing because it provides a continuous natural stream bottom that would reduce velocities and erosion potential thus minimizing impacts to geology, soils, and topography in the project area.

ALTERNATIVE 4

This alternative would result in minor, long-term impacts to geology, soils, and topography as it would disturb approximately 3.40 additional acres. Short-term impacts include redistributing previously graded areas.

Areas of disturbance associated with each alternative are presented in **Table 4-1**. Areas of disturbance associated with Options A, C, and D are included within the estimates for each of the Candidate Build Alternatives. The areas of disturbance for the two options at the Nebraska Avenue intersection, however, are included as separate line items in Table 4-1.

AGRICULTURAL LANDS, PRIME, AND UNIQUE FARMLAND SOILS

ALTERNATIVES 1, 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

There are no prime farmlands within the project area; therefore, there would be no impact to farmland from any of the alternatives.

Table 4-1. Areas of Disturbance (in square feet)

ALTERNATIVE & OPTION	EXISTING FOOTPRINT	ALTERNATIVE FOOTPRINT	ADDITIONAL AREA OF DISTURBANCE
Alternative 1 – No Action	250,318 sf	250,318 sf	0 sf
Preferred Alternative/ Alternative 3 Modified	250,318 sf	364,562 sf	114,244 sf
Alternative 2	250,318 sf	309,867 sf	59,549 sf
Alternative 3	250,318 sf	396,465 sf	146,147 sf
Alternative 4	250,318 sf	398,596 sf	148,278 sf
Option B – 4-way	--	18,658 sf	18,658 sf
Option B - Circle	--	20,302 sf	20,302 sf

4.1.2 WATER RESOURCES

DRINKING WATER AND GROUNDWATER

No drinking water resources occur in the project vicinity. Groundwater regeneration may be enhanced by incorporating stormwater sewers with perforations that allow for some of the stormwater to naturally infiltrate the ground as it travels through the culverts.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

No addition of impervious surfaces and no improvements to the existing stormwater sewers would occur under this alternative. No changes to groundwater volume or quality would be expected under the No Action Alternative. No drinking water resources occur in the project vicinity; therefore, this alternative would not have an impact.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

All of the alternatives would result in minor beneficial impacts. All alternatives include a stormwater sewer with perforations that would allow for some of the stormwater to naturally infiltrate as it travels through the culverts. This type of system would compensate for some of the impervious surfaces in the area and allow for groundwater regeneration closer to historic volumes. Stormwater swales and rain gardens were also considered as options for this project to compensate for impervious surfaces in this area. These facilities would allow for additional recharge and filtration of pollutants that currently drain directly into the local surface water system. These stormwater facilities are known to filter 60 to 80 percent of unwanted contaminants. Therefore, impacts to groundwater associated with recharge would not be expected under Alternatives 2, 3, and 4 including the Preferred Alternative.

No drinking water resources occur in the project vicinity; therefore, the alternatives are not expected to have any impact on these resources.

SURFACE WATER

Actions potentially affecting surface waters are regulated at the federal and state (including the District) levels in accordance with Section 404 of the Clean Water Act. General impacts to water resources from roadway construction would be similar among the action alternatives, the primary difference being the amount of impervious surface that would occupy the project area

and the length of stream disturbance over Pinehurst Run (**Table 4-2**). The length of stream disturbance over Pinehurst Run is dependent on the proposed typical section of each alternative rather than the crossing option selected. As described in Section 2.3.1, in-stream work for this project would include replacement of the crossing at Pinehurst Run; and reconstruction of culvert outfalls and installation of sand seepage berms at other streams. Such in-stream work will require permits with the US Army Corps of Engineers and District Department of the Environment (DDOE) in accordance with Sections 402 and 404 of the Clean Water Act.

Table 4-2. Pinehurst Run Limits of Disturbance (in linear feet)

ALTERNATIVE	PREFERRED/ 3 MODIFIED	2	3	4
Length of Pinehurst Run within Limits of Disturbance	74	57	73	74
Total Stream Length within Limits of Disturbance	350	350	350	350

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Surface waters in the area are currently receiving increased sediment, nutrients, and chemicals that are washed from Oregon Avenue and the upstream neighborhoods to the west directly. In addition, the lack of stormwater infiltration and increased water volume and velocity have caused scouring of slopes and channels and degradation of water quality and roadway infrastructure. Under the No Action Alternative, these impacts would not be corrected and would continue to impact local streams and surface waters.

ALTERNATIVES 2, 3, AND 4 INCLUDING THE PREFERRED ALTERNATIVE

Alternatives 2, 3, and 4 including the Preferred Alternative, would result in minor beneficial long-term impacts to surface waters. General impacts to water resources from roadway construction would be similar among the alternatives the primary difference being the amount of impervious surface that would occupy the project area and the length of stream disturbance over Pinehurst Run (see Table 4-2). Alternative 3 was modified to narrow the footprint and amount of impervious (paved) surfaces to reduce potential impacts to surface waters while maintaining a length over Pinehurst Run consistent with the other alternatives. Although the action alternatives would result in an increase of impervious surfaces, they all incorporate stormwater systems that will accommodate the infiltration of the first 1.2 inches of stormwater from the project area (provided that studies during design confirm that soils are adequately pervious and the water table is low). Stormwater treatment measures will allow for infiltration of stormwater to more closely match pre-urbanization conditions for the area and reduce the amount of additional sediment, chemicals, nutrients, and heat in run-off that comes from impervious surfaces. As a part of this project, an erosion and sediment control plan, stormwater management plan, and a “treatment train” of BMP techniques will be developed. Work in this area is not expected to have an impact past the confluence with Rock Creek, a tributary to the Potomac River. This will not result in any significant impacts to Surface Water resources.

FLOODPLAINS

In accordance with Executive Order 11988, Floodplain Management, and corresponding NPS Floodplain Management Director's Order (DO) 77-2, Floodplain Management, floodplain encroachments should be avoided or minimized to the maximum extent practicable. Federal agencies are required to reduce the risk of flood loss, minimize flood impacts to human safety, health, and welfare and to restore and preserve beneficial floodplain values and functions.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

A portion of the existing Oregon Avenue lies within the 100-year floodplain for Pinehurst Run. The No Action Alternative would not introduce new development within the floodplain; however, scouring of stream beds, sedimentation in the floodplain, and greater stormwater volumes and velocities than accommodated previous to urbanization in this area, due to impervious surfaces and lack of stormwater infrastructure would continue. Floodplain values and functions would continue to be effected and local erosion would continue due to lack of stormwater management structures. The 100-year flood overtops the culvert at Oregon Avenue and has potential to create significant erosion damage to the roadway. This No Action Alternative would result in moderate long-term impacts to the floodplains ability to handle existing water levels as well as continued structural degradation to the existing culvert.

ALTERNATIVES 2, 3, AND 4 INCLUDING THE PREFERRED ALTERNATIVE

All of the action alternatives would have minor short-term impacts to the Pinehurst Run floodplain and long-term beneficial impacts to local floodplains upstream and down of Oregon Avenue. Each of the action alternatives would require temporary work within the floodplain for the replacement of the existing deteriorating culvert over Pinehurst Run and reconfiguration of the overbanks and channel. However, the new culvert or bridge will be sized so as to pass episodic flood events and will therefore eliminate previous problems associated with flood waters overtopping the roadway. The effective sizing of the box culverts (and/or the bridge structure) will prevent any increase in backwater elevations, which are commonly experienced today due to the inadequate size of the existing culvert. The width of the roadway crossing will increase due to the addition of sidewalk and/or bike lanes in Alternatives 2,3, and 4 (**Table 4-3**); however, this minor increase in width will have no short-term or long-term effects on the functional values of the associated floodplain. As part of the development of the Preferred Alternative, Alternative 3 was modified to decrease the width of the crossing to include a sidewalk only, reducing the amount of floodplain encroachment that will occur with reconstruction of the crossing over Pinehurst Run. Although each of the options for structures to replace the existing crossing would have accommodated the design year storm, they would have varying effects on the floodplain downstream of the current crossing. The open bottom arch culvert selected as part of the Preferred Alternative would provide a continuous natural stream bottom that would reduce velocities and erosion potential in the floodplain. This will not result in any significant impacts to floodplains. In addition, improved geomorphology, reestablishment of riparian buffer, and improved floodplain functions will result in long-term benefits to the Pinehurst Run floodplain as well as downstream systems of this tributary.

Table 4-3. Floodplain Encroachments (in square feet)

ALTERNATIVE	EXISTING AREA WITHIN FLOODPLAIN	ALTERNATIVE AREA WITHIN FLOODPLAIN	ADDITIONAL FLOODPLAIN ENCROACHMENT
1	5,616 sf	5,616 sf	0 sf
2	5,616 sf	8,124 sf	2,508 sf
3	5,616 sf	11,869 sf	6,253 sf
Preferred/3 Modified	5,616 sf	10,697 sf	5081 sf
4	5,616 sf	12,376 sf	6,760 sf

WATER QUALITY

One of the goals of the proposed project is to improve water quality and stormwater management in this area to alleviate drainage issues and prevent further damage from uncontrolled runoff. As such, temporary (during construction) and permanent stormwater management and erosion and sediment controls and upgraded stormwater conveyance will be implemented as part of the project. BMPs will be used and any work completed as part of this project will improve stormwater management and is anticipated to improve water quality downstream of the project area. Work in this area is not expected to have an impact past the confluence with Rock Creek, a tributary to the Potomac River.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under this alternative, Oregon Avenue would not be reconstructed to include any additional stormwater management systems and as a result, erosion and chemical and nutrient loading would continue. Although roadbed erosion would continue to occur, there would be no discernable change in the existing impervious surface within the study area (approximately 1.92 acres). The stormwater volumes and channel velocities would continue unabated, resulting in continued erosion of the stream channel, sedimentation from overland erosion, and loss of riparian vegetation. Therefore, the No Action Alternative would continue to have minor long-term impacts to water resources quality due to continued erosion and sedimentation.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

All build alternatives would result in moderate beneficial long-term impacts to local water quality and minor to negligible benefits downstream. None of these will result in any significant impacts to Water Quality. Although all build alternatives would result in an increase of impervious surfaces, the Preferred Alternative includes modifications to Alternative 3 that reduce the width of sidewalk and incorporate a grass strip/tree buffer as elements of the design to reduce overall impervious surfaces. The reconstruction of Oregon Avenue incorporates Low Impact Development techniques that include infiltration of up to the first 1.2 inches of stormwater from the project area, approximately 25,060 cubic feet of water (Table 4-4). Further, the open bottom arch culvert option selected to replace the Pinehurst Run crossing as part of the Preferred Alternative would also improve water quality by reducing sediment that would have accumulated with the traditional concrete-bottomed box culvert could cause floodwaters to pick up velocity, resulting in increased erosion and introduction of sediment on the downstream

side of the culvert during a storm event. The natural stream bottom of the open bottom arch culvert would also be beneficial to aquatic organisms within the stream and floodplain by allowing for easier access upstream and downstream of the crossing.

Table 4-4. Comparison of Water Treatment System Capabilities (Infiltration Volumes in cubic feet)

ALTERNATIVE	CLOSED SYSTEM	CLOSED SYSTEM WITH BIORETENTION	OPEN SYSTEM WITH DITCHES	OPEN SYSTEM WITH DITCHES AND BIORETENTION
1 – No Action	No Treatment	N/A	N/A	N/A
2, 3, and 4 including Preferred	25,060 cf	27,360 cf	27,710 cf	30,010 cf

WETLANDS

In accordance with survey methods presented in the 1987 US Army Corps of Engineers Wetlands Delineation Manual, no wetlands were identified within the project area;

ALTERNATIVES 1, 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

There would be no impact to wetlands from any of the project alternatives because no wetlands were identified in the project area.

NAVIGABLE WATERS

There are no Navigable Waters located within the project vicinity.

ALTERNATIVE 1 - NO ACTION ALTERNATIVE

Under this alternative, inadequate stormwater management for this area would result in continued erosion of the roadbed and stream channels, sedimentation from overland erosion, chemical and nutrient loading from untreated stormwater, and loss of riparian vegetation. Therefore, the No Action Alternative would have negligible long-term impacts to downstream water resources including Navigable Waters due to continued degraded water quality.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

The Alternatives would have negligible beneficial, long-term impacts to downstream water resources, including Navigable Waters because there are no navigable waters in the project area, but the project would support preservation of downstream waters and their resources by implementing stormwater management practices that will reduce pollutants and alleviate damage from water during rain events, which would improve downstream water quality. None of these will result in any significant impacts to Navigable Waters.

WILD AND SCENIC RIVERS

There are currently no Wild or Scenic Rivers in the immediate or extant project area.

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING THE PREFERRED ALTERNATIVE

None of the described alternatives or options would have an impact to wild and scenic rivers.

COASTAL ZONE

There are no Coastal Zones within the District of Columbia.

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING THE PREFERRED ALTERNATIVE

The proposed project Candidate Build Alternatives 2, 3, 4 and Options will have no impact on the management of Coastal Zone resources.

CHESAPEAKE BAY PROTECTION

ALTERNATIVE 1 - NO ACTION ALTERNATIVE

Under this alternative, inadequate stormwater management for this area would continue resulting in continued erosion of the roadbed and stream channels, sedimentation from overland erosion, chemical and nutrient loading from untreated stormwater, and loss of riparian vegetation. Therefore, the No Action Alternative would have minor, long-term effects to downstream water resources, including the Chesapeake Bay, due to continued degraded water quality.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

By implementing stormwater management practices that will reduce pollutants and alleviate damage from water during rain events, each of the build Alternatives would support preservation of local tributaries that eventually reach the Chesapeake Bay and its resources resulting in minor beneficial impacts from implementation of the proposed action.

MARINE AND ESTUARINE RESOURCES

No marine or estuarine resources are located in the immediate vicinity of this project.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under this alternative, inadequate stormwater management for this area would continue resulting in continued erosion of the roadbed and stream channels, sedimentation from overland erosion, chemical and nutrient loading from untreated stormwater, and loss of riparian vegetation. Therefore, the No Action Alternative would have minor long-term effects to downstream water resources, including the marine and estuarine resources, due to continued degraded water quality.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Although no marine or estuarine resources are located in the immediate vicinity of this project, the action alternatives would support preservation of downstream resources by implementing stormwater management practices that will reduce pollutants and alleviate damage from water during rain events, resulting in minor beneficial impacts from implementation of the proposed action.

4.1.3 WILDLIFE INCLUDING THREATENED AND ENDANGERED SPECIES

As discussed in Chapter 3, a search of databases and communication with park officials indicate no federal or state-listed threatened or endangered species are known to occur in the project vicinity. The US Fish and Wildlife Service (USFWS) was consulted and has confirmed that no

other proposed or federally listed endangered or threatened species are known to exist within the project area. Therefore, as determined by USFWS in the letter dated January 26 2011, **no further consultation with USFWS under Section 7 of the Endangered Species Act is required** (Miranda, 2011).

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Although no threatened or endangered species are known to exist in the project vicinity, other terrestrial and aquatic wildlife would be affected by the No Action Alternative. Under this alternative, inadequate stormwater management for this area would continue the erosion of the roadbed and stream channels, sedimentation from overland erosion, chemical and nutrient loading from untreated stormwater, and loss of riparian vegetation.

Degradation of the riparian habitats through erosion and sedimentation could result in potential displacement of terrestrial populations. Sensitive habitats located downstream of the project would continue to receive contaminated stormwater degrading the quality of that habitat. Therefore, the No Action Alternative would have minor long-term impacts to local riparian habitat and downstream water resources, including aquatic habitat, due to continued degraded water quality.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Minor short-term impacts to terrestrial and aquatic organisms and their habitat would occur during construction, and minor long-term beneficial impacts upon completion of the project under alternatives 2, 3, and 4 including the Preferred Alternative. Species likely to be found in the area are adapted to urban habitats and the more protected wooded park habitats. Construction associated with the action alternatives will be primarily in previously disturbed areas that are predominantly grassed lawns, which provides very little habitat for terrestrial animals. Reconstruction activities and operation of machinery would be disruptive to wildlife, which would likely retreat to deeper parts of the forest, and repopulate the site when construction is complete.

Although there are no aquatic species of concern near the project area, sensitive habitats downstream would benefit from increased stormwater management. Erosion and sediment control plans, stormwater management plans, and BMPs will be used during construction to protect water quality and habitat integrity. Build alternatives would support preservation of downstream resources, including aquatic habitat, by implementing stormwater management practices that will reduce pollutants and alleviate damage from water during rain events, improving the water quality. Stormwater management would alleviate erosion and allow for riparian habitat to reestablish. Disturbed areas will be replanted with a native mix and trees in consultation with NPS. The open bottom arch culvert selected under the Preferred Alternative would accommodate larger stormwater events compared to the existing culvert, resulting in a moderate, long-term, beneficial, local effect on downstream aquatic habitat. In addition, the open bottom arch culvert would provide a continuous natural stream bottom that would further reduce velocities and erosion potential. The natural stream bottom of these two options would also be beneficial to aquatic organisms within the stream and floodplain by allowing for easier access upstream and downstream of the crossing.

WILDLIFE AND WATERFOWL REFUGES

No wildlife or waterfowl refuges are located in the vicinity of this project.

ALTERNATIVES 1, 2, 3, 4 INCLUDING PREFERRED ALTERNATIVE

Neither the No Action nor the build alternatives are anticipated to have any impact on wildlife and waterfowl refuges because no resources are located in the vicinity of the project. Potential long-term, minor beneficial impacts may occur from implementation of any of the build alternatives which would support preservation of downstream resources by implementing stormwater management practices that will reduce pollutants and alleviate damage from water during rain events, which would improve downstream water quality. No impacts from any of the build alternatives are anticipated.

ANADROMOUS FISH, TROUT WATERS, AND SHELLFISH

None of the waters in the project area or immediately downstream support populations of trout and shellfish – nor do they provide spawning areas for anadromous fish species.

ALTERNATIVES 1, 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Neither the No Action nor the build alternatives are anticipated to have any effect on these fishery resources.

None of alternatives will result in any significant impacts to Water Resources.

4.1.4 VEGETATION

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Although no reconstruction would take place, this alternative would have minor long-term impacts to vegetation due to continued erosion. Excess stormwater from the upland areas surrounding Oregon Avenue currently flows unchecked into Rock Creek Park causing erosion, damaging vegetation, and making it difficult for new vegetation to take hold.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

This project would expand the width of the existing Oregon Avenue footprint, decrease vegetated areas, and result in a minor long-term impact. The footprint will be expanded in areas that are primarily urban and planted as lawn, which provides very little habitat for terrestrial animals. Although no work will be conducted on park land, construction may damage the root systems of large trees located in the park resulting in their ultimate loss.

Limits of disturbance are the same on the east/park side of Oregon Avenue for Alternatives 2, 3, and 4 including the Preferred Alternative. The limits of disturbance for vegetation vary on the west or residential/institutional side for each alternative. All vegetation occurring within the limits of disturbance is considered to be impacted. Trees for which 30 percent or more of the critical root zone is located within the limits of disturbance are also considered to be impacted. According to the tree survey, 62 trees in Alternative 2 and 85 trees in both Alternatives 3 and 4 have a diameter of six inches or greater and have the potential of being impacted. Modifications to Alternative 3 since the original EA reduced the number of trees to be impacted from 85 to 65

trees, thus reducing the impacts from implementation of the Preferred Alternative on vegetation and adjacent property owners.

Impacts to trees will be avoided to the maximum extent possible by minimizing cut/fill/pavement within the root zone. In order to prevent the introduction of new invasive species and to prevent the spread of existing populations, best management practices should be followed, including washing machinery before it enters the area, minimizing ground disturbance, and reseeded of disturbed areas. Rock Creek Park staff will be providing a preferred seed mix for use in disturbed areas after construction.

4.2 CULTURAL AND PALEONTOLOGICAL RESOURCES

In this EA, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the CEQ that implement NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act (NHPA). In accordance with the Advisory Council on Historic Preservation's (ACHP) regulations implementing Section 106 (36 CFR Part 800, Protection of Historic Properties), impacts to cultural resources were identified and evaluated by (1) determining the area of potential effects (APE); (2) identifying cultural resources present in the APE that are either listed in or eligible to be listed in the National Register of Historic Places (NRHP); (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the NRHP; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the ACHP's regulations, a determination of either adverse effect or no adverse effect must be made for affected NRHP listed or eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the NRHP (e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, Assessment of Adverse Effects).

CEQ regulations and the National Park Service's Conservation Planning, Environmental Impact Analysis and Decision Making (NPS Director's Order #12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse.

A separate, stand-alone document, the Section 106 Compliance Review, provides a cultural resources assessment of the Oregon Avenue project area and this EA summarizes the findings.

Pursuant to the requirements of the Section 106 of the NHPA, FHWA determined that the Oregon Avenue Reconstruction Project will have “no adverse effect” on historic properties. The District of Columbia State Historic Preservation Office (DC SHPO) concurred with this determination with the following conditions:

1. DC SHPO will be provided an opportunity to review and comment on the design of the replacement culvert over Pinehurst Branch in order to ensure it is compatible with its setting adjacent to the Rock Creek Park Historic District. The “Arch Culvert” or “Bridge” options appear to be more appropriate for this setting than the “Box Culvert”;
2. DC SHPO will also be provided an opportunity to review and comment on any alterations proposed for the stone and concrete outfall south of Bingham Drive if it is determined to be a contributing element of the Rock Creek Park Historic District (Subsequent revisions to the design of stormwater management system upgrades eliminated the need to alter this outfall). The NPS indicated that the stone and concrete outfall south of Bingham Drive is considered a contributing element to the RCPHD. Because no impacts will occur to this or any culvert in Rock Creek Park, the second condition above will not be implemented.)
3. DDOT shall ensure that the stone boundary monuments that mark the border of Rock Creek Park will not be altered or damaged in any way; and
4. In consultation with the DC SHPO, DDOT shall conduct a Phase IA archaeological survey including geoarchaeological consultation if the LOD [Limits of Disturbance] to determine if any locations warrant testing for the presence of potentially significant archaeological resources. (Appendix F – Maloney comment).

Conditions 1 and 4 will be implemented during the design phase and Condition 3 will be implemented in the construction phase and may include a requirement in the construction contract that NPS will mark a buffer area around each boundary monument for avoidance or use of an archeological monitor during construction activities.

4.2.1 ARCHEOLOGICAL RESOURCES

ALTERNATIVE 1- NO ACTION ALTERNATIVE

Continued erosion and natural degradation of areas within Rock Creek Park which contain archeological resources will continue to occur as a result of uncontrolled stormwater runoff. Archeological resources would continue to be managed in accordance with Sections 106 and 110 of the National Historic Preservation Act and the National Park Service’s Conservation Planning, Environmental Impact Analysis and Decision Making (Director’s Order #12). Implementation of the No Action Alternative (repaving and general maintenance) would result in negligible impacts to archeological resources.

ALTERNATIVE 2

The proposed modifications to the existing roadway would include removal of existing asphalt paving, cut and fill construction with excavation to depths of 3 to 4 feet within the existing Oregon Avenue alignment, and addition of fill to create the east to west slope for drainage. The addition of a curb along the east side of the road and a curb and sidewalk on the west side of

the road would require minimal excavation to a depth of 8 inches (6 inches for the base and 2 inches for the surface treatment) in areas that are currently unpaved, but within the DDOT right-of-way. The installation of a subsurface gutter will require excavation of up to 3 additional feet in a narrow (2 feet wide) linear path parallel to the roadway, also within the DDOT right-of-way. The construction of a retaining wall in the Southern Section of the project area, defined as Military Road to Nebraska Avenue, may require excavation below surface for wall footings on the east side of the DDOT right-of-way. The use of heavy equipment during construction in any unpaved staging areas (including equipment yards and materials storage areas) may cause soil disturbance several inches deep.

The area of proposed road reconstruction under Alternative 2 has likely been previously disturbed by road construction and maintenance, installation of underground infrastructure and utilities, and residential development on the west side of the road; however, the APE includes two previously identified archeological sites and areas of archeological potential.

Reconstruction of Pinehurst Run Crossing will most likely require the demolition of existing abutments and construction or installation of new supports on the terrace ledges above the waterway. Previous excavation into these landforms likely occurred with the construction of the current crossing; however, additional excavation beyond the previous limits will occur and may result in disturbance to unidentified intact archeological resources. Although no prehistoric artifacts were identified in the floodplain along Pinehurst Run just inside the park, there is a potential for prehistoric archeological resources to occur on these terraces.

If additional archeological sites or deposits are identified and cannot be avoided, then implementation of Alternative 2 (reconstruction with sidewalk) could result in moderate impacts to archeological resources. FHWA has determined in consultation with DC SHPO under Section 106 of the NHPA that the proposed undertaking would include a geoarcheological assessment. In consultation with the DC SHPO, DDOT shall conduct a Phase IA archeological survey including geoarcheological consultation of the LOD to determine if any locations warrant testing for the presence of potentially significant archeological resources. This assessment will be conducted prior to the ground disturbing activities related to the Oregon Avenue project. If archeological resources are found, FHWA would consult with DC SHPO on measures to avoid or mitigate the potential impacts to these resources.

ALTERNATIVE 3

Impacts to archeological resources in the Southern Section of the alignment between Military Road and Nebraska Avenue as part of Alternative 3 would be similar to those described under Alternative 2. In the Northern Section, defined as Nebraska Avenue to Western Avenue, the construction of a wider alignment to include a 10-foot wide shared-use path will require minimal excavation to a depth of 8 inches (6 inches for the base and 2 inches for the surface treatment) in areas that are currently unpaved, but within the DDOT right-of-way. The installation of a vegetated swale will require excavation of up to 3 additional feet in a 10-foot wide linear path on the west side of the roadway, within the DDOT right-of-way. Retaining walls in the Northern Section along the western edge of the roadway would require excavation for footings.

The area of proposed road reconstruction under Alternative 3 has likely been previously disturbed by road construction and maintenance, installation of underground infrastructure and utilities, and residential development on the west side of the road; however, the APE includes two previously identified archeological sites and areas of archeological potential. Even though avoidance is the preferred approach for previously identified sites, additional deposits related to these sites or new resources in areas of potential could be identified as a result of the geoarcheological assessment.

Reconstruction of Pinehurst Run Crossing will most likely require the demolition of existing abutments and construction or installation of new supports on the terrace ledges above the waterway. Previous excavation into these landforms likely occurred with the construction of the current crossing; however, additional excavation beyond the previous limits will occur with Alternative 3 (expanding the width of the crossing from 27 feet existing to 37 feet) and may result in disturbance to unidentified intact archeological resources. Although no prehistoric artifacts were identified in the floodplain along Pinehurst Run just inside the park, there is a potential for prehistoric archeological resources to occur on these terraces.

If additional archeological sites or deposits are identified and cannot be avoided, then implementation of Alternative 3 (reconstruction with shared-use trail) could result in moderate impacts to archeological resources. FHWA has determined in consultation with DC SHPO under Section 106 of the NHPA that the proposed undertaking would include a geoarcheological assessment. In consultation with the DC SHPO, DDOT shall conduct a Phase IA archaeological survey including geoarcheological consultation of the LOD to determine if any locations warrant testing for the presence of potentially significant archaeological resources. This assessment will be conducted prior to the ground disturbance activities related to the Oregon Avenue project. If archeological resources are found, FHWA would consult with DC SHPO on measures to avoid or mitigate the potential impacts to these resources.

PREFERRED ALTERNATIVE/ALTERNATIVE 3 MODIFIED

Under the Preferred Alternative/Alternative 3 Modified, proposed modifications to the existing roadway would include removal of existing asphalt paving, cut and fill construction with excavation to depths of 3 to 4 feet within the existing Oregon Avenue alignment, and addition of fill to create the east to west slope for drainage. In the Southern Section of the project area, defined as Military Road to Nebraska Avenue, the addition of a curb along the east side of the road and a curb and 5 foot wide sidewalk on the west side of the road would require minimal excavation to a depth of 8 inches (6 inches for the base and 2 inches for the surface treatment) in areas that are currently unpaved, but within the DDOT right-of-way. The installation of a subsurface gutter will require excavation of up to 3 additional feet in a narrow (2 feet wide) linear path parallel to the roadway, also within the DDOT right-of-way. The construction of a retaining wall would require excavation of up to 4 feet below surface for wall footings on the east side of the DDOT right-of-way. The use of heavy equipment during construction in any unpaved staging areas (including equipment yards and materials storage areas) may cause soil disturbance several inches deep.

In the Northern Section, defined as Nebraska Avenue to Western Avenue, the construction of a wider alignment to include a 6 foot wide sidewalk and a 4 foot grass strip along the roadway will require minimal excavation to a depth of 8 inches (6 inches for the base and 2 inches for the surface treatment) in areas that are currently unpaved, but within the DDOT right-of-way. Retaining walls (up to 8 feet) in the Northern Section along the western edge of the roadway would require excavation up to 4 feet for footings.

The area of proposed road reconstruction under Preferred Alternative/Alternative 3 has likely been previously disturbed by road construction and maintenance, installation of underground infrastructure and utilities, and residential development on the west side of the road; however, the APE includes two previously identified archeological sites and areas of archeological potential. Even though avoidance is the preferred approach for previously identified sites, additional deposits related to these sites or new resources in areas of potential could be identified as a result of the geoarcheological assessment.

Reconstruction of Pinehurst Run Crossing will most likely require the demolition of existing abutments and construction or installation of new supports on the terrace ledges above the waterway. Previous excavation into these landforms likely occurred with the construction of the current crossing; however, additional excavation beyond the previous limits will occur with Preferred Alternative/Alternative 3 (expanding the width of the crossing from 27 feet existing to 37 feet) and may result in disturbance to unidentified intact archeological resources. Although no prehistoric artifacts were identified in the floodplain along Pinehurst Run just inside the park, there is a potential for prehistoric archeological resources to occur on these terraces.

If additional archeological sites or deposits are identified and cannot be avoided, then implementation of Preferred Alternative/Alternative 3 sidewalk and grass strip/tree buffer could result in moderate impacts to archeological resources. FHWA has determined in consultation with DC SHPO under Section 106 of the NHPA that the proposed undertaking would include a geoarcheological assessment. In consultation with the DC SHPO, DDOT shall conduct a Phase IA archaeological survey including geoarcheological consultation of the LOD to determine if any locations warrant testing for the presence of potentially significant archaeological resources. This assessment will be conducted prior to the ground disturbance activities related to the Oregon Avenue project. If archeological resources are found, FHWA would consult with DC SHPO on measures to avoid or mitigate the potential impacts to these resources.

ALTERNATIVE 4

Impacts to archeological resources in the Southern Section of the alignment between Military Road and Nebraska Avenue as part of Alternative 4 would be similar to those described under Alternative 2. In the Northern Section, the construction of a wider alignment to include a sidewalk and a bike lane will require minimal excavation to a depth of 8 inches (6 inches for the base and 2 inches for the surface treatment) in areas that are currently unpaved, but within the DDOT right-of-way. The installation of a vegetated swale will require excavation of up to 3 additional feet in a 10-foot wide linear path on the west side of the roadway, within the DDOT

right-of-way. Retaining walls in the Northern Section along the western edge of the roadway would require excavation for footings.

The area of proposed road reconstruction under Alternative 4 has likely been previously disturbed by road construction and maintenance, installation of underground infrastructure and utilities, and residential development on the west side of the road; however, the APE includes two previously identified archeological sites and areas of archeological potential. Even though avoidance is the preferred approach for previously identified sites, additional deposits related to these sites or new resources in areas of potential could be identified as a result of the geoarcheological assessment.

Reconstruction of Pinehurst Run Crossing will most likely require the demolition of existing abutments and construction or installation of new supports on the terrace ledges above the waterway. Previous excavation into these landforms likely occurred with the construction of the current crossing; however, additional excavation beyond the previous limits will occur with Alternative 4 (expanding the width of the crossing from 27 feet existing to 40 feet) and may result in disturbance to unidentified intact archeological resources. Although no prehistoric artifacts were identified in the floodplain along Pinehurst Run just inside the park, there is a potential for prehistoric archeological resources to occur on these terraces.

Implementation of Alternative 4 (reconstruction with bike lanes) could result in moderate impacts to archeological resources. FHWA has determined in consultation with DC SHPO under Section 106 of the NHPA that the proposed undertaking would include a geoarcheological assessment. In consultation with the DC SHPO, DDOT shall conduct a Phase IA archaeological survey including geoarcheological consultation of the LOD to determine if any locations warrant testing for the presence of potentially significant archaeological resources. This assessment will be conducted prior to the ground disturbance activities related to the Oregon Avenue project. If archeological resources are found, FHWA would consult with DC SHPO on measures to avoid or mitigate the potential impacts to these resources.

4.2.2 HISTORIC STRUCTURES

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Deterioration of historic structures will continue to occur as a result of uncontrolled stormwater runoff. Historic resources in Rock Creek Park would continue to be managed in accordance with Sections 106 and 110 of the National Historic Preservation Act and the National Park Service’s Conservation Planning, Environmental Impact Analysis and Decision Making (Director’s Order #12).

One historic concrete and stone culvert (Outfall 4) is a contributing element to the Rock Creek Park Historic District (RCPHD). Debris including downed branches and trash will continue to obstruct the flow of water through the structure, resulting in potential failure. Vegetation will continue to grow between the cracks, crevices, and openings in the concrete and stone structure, further destabilizing it. Continuation of the existing conditions would result in negligible impacts to the RCPHD.

ALTERNATIVE 2

Proposed reconstruction of the roadway under Alternative 2 would include the removal of existing asphalt paving, cut and fill construction, and installation of new surface treatments consisting of new roadway paving; a context-sensitive designed sidewalk and a gutter along the full western side of the roadway corridor; curbing on both sides; and a retaining wall in the Southern Section, within the existing Oregon Avenue alignment.

The RCPHD and contributing elements to the District, including intersecting roads and nearby trails of the park circulation network (Wise and Bingham Roads and multi-use trail [Bike Trail #1]) and historic park boundary monuments occur in the project area. Minimal repaving of portions of the historic roads that intersect Oregon Avenue may occur but no alterations to the asphalt-paved multi-use trail [Bike Trail #1] are proposed; the location of historic boundary monuments will not be altered because reconstruction of Oregon Avenue will occur in the existing right-of-way and no staging areas will occur on the park side of the road or near boundary monuments. No impacts to these resources are anticipated as a result of implementing roadway reconstruction under Alternative 2.

No new outfalls will be installed in the project area; however, improvements to existing outfalls (Outfalls 2, 3, 6 and 8) may occur to better handle the flow of stormwater into the park. None of these outfalls exhibit characteristics that would appear to make them historic properties as contributing elements of the RCPHD so no adverse effects are expected from modifications to these structures.

Temporary visual intrusions to historic structures, including contributing resources in the park, residences, and Knollwood, on the west side of the roadway will likely occur during the period of construction, including the presence of large machinery, excavated roadway and earth, spoil and fill piles, stockpiling of new construction material, and road blocks and detours. Temporary audible intrusions may include increased noise from construction activity such as jack-hammering; large vehicle movement, braking, and back-up signals; and construction crews. Long-term audible intrusions are not anticipated because reconstruction of Oregon Avenue is not a capacity-building project; no increased noise from additional traffic is expected to occur.

The addition of low (three to five foot) retaining walls in the Southern Section will not disrupt the view from structures on the west side of the roadway into the RCPHD. Structures in this area are elevated on the slope and the view into the park from these structures would occur above the grade of the top of the retaining wall. The outward view from the historic district to the residential area on the west side of Oregon Avenue is not a contributing element to the NRHP-eligibility of the park and will not result in an impact to this historic property.

In summary, minor, short-term visual and audible impacts may occur to historic structures, including contributing resources in the park, residences, and Knollwood on the west side of the roadway during construction.

ALTERNATIVE 3

Impacts to historic structures in the Southern Section of the alignment between Military Road and Nebraska Avenue as part of Alternative 3 would be similar to those described under Alternative 2. In the Northern Section, the construction of a wider alignment to include a 10-foot wide shared-use path will require additional surface treatments and landscaping in areas that are currently unpaved or unmaintained by DDOT, but within the DDOT right-of-way. The installation of a vegetated swale instead of a gutter will reduce alterations to the surface in areas that are currently maintained as lawns and preserve some grass cover on the west side of the roadway while providing a buffer between vehicles and pedestrians in the Northern Section.

Retaining walls in the Northern Section will be constructed along the western edge of Oregon Avenue. Structures in this area are elevated on the slope and the view into the park from these structures would occur above the grade of the top of the retaining wall. The length and height of the retaining walls will be finalized in the final design. The outward view from the historic district to the residential area on the west side of Oregon Avenue is not a contributing element to the NRHP-eligibility of the park and will not result in an impact to this historic resource.

In summary, minor, short-term visual and audible impacts may occur to historic structures, including contributing resources in the park and residences and Knollwood, on the west side of the roadway during construction.

PREFERRED ALTERNATIVE/ALTERNATIVE 3 MODIFIED

Impacts to historic structures in the Southern Section of the alignment between Military Road and Nebraska Avenue as part of Preferred Alternative/Alternative 3 Modified would be similar to those described under Alternative 2. In the Northern Section, the construction of a wider alignment to include a 6-foot wide sidewalk and 4-foot wide grass strip/tree buffer will require additional surface treatments and landscaping in areas that are currently unpaved or unmaintained by DDOT, but within the DDOT right-of-way. The installation of a grass strip/tree buffer will reduce alterations to the surface in areas that are currently maintained as lawns and preserve some grass cover on the west side of the roadway while providing a buffer between vehicles and pedestrians in the Northern Section.

A retaining wall in the Northern Section will be constructed along the western edge of Oregon Avenue and in Southern Section on the eastern side. An 18-inch coping wall will be constructed on the western edge of the road in Southern Section. Structures on the west side of the road are elevated on the slope and the view into the park from these structures would occur above the grade of the top of the retaining wall. The length and height of the retaining walls will be finalized in the final design. The outward view from the historic district to the residential area on the west side of Oregon Avenue is not a contributing element to the NRHP-eligibility of the park and will not result in an impact to this historic resource.

The Preferred Alternative incorporates selection of the bottomless concrete arch culvert to replace the existing structure for the Pinehurst Run crossing. Selection of this option does not affect historic structures. The DC SHPO considers the arch culvert to be an appropriate replacement structure considering the visual aesthetic to RCPHD; however, the DC SHPO

requested an opportunity to review and comment on the final design of the replacement structure to ensure its compatibility with the adjacent Rock Creek Park Historic District (RCPHD) (Appendix F – Maloney comment).

In summary, minor, short-term visual and audible impacts may occur to historic structures, including contributing resources in the park and residences and Knollwood, on the west side of the roadway during construction.

ALTERNATIVE 4

Impacts to historic structures in the Southern Section of the alignment between Military Road and Nebraska Avenue as part of Alternative 4 would be similar to those described under Alternative 2. In the Northern Section, the construction of the widest alignment of the three candidate build alternatives to include a sidewalk and a bike lane will require additional surface treatments in areas that are currently unpaved, but within the DDOT right-of-way. The installation of a vegetated swale instead of a gutter will reduce alterations to the surface and preserve some grass cover on the west side of the roadway in the Northern Section.

Retaining walls in the Northern Section will be constructed along the western edge of Oregon Avenue. Structures in this area are elevated on the slope and the view into the park from these structures would occur above the grade of the top of the retaining wall. The length and height of the retaining walls will be finalized in the final design. The outward view from the historic district to the residential area on the west side of Oregon Avenue is not a contributing element to the NRHP-eligibility of the park and will not result in an impact to this historic resource.

In summary, minor, short-term visual and audible impacts may occur to historic structures, including contributing resources in the park and residences and Knollwood, on the west side of the roadway during construction.

4.2.3 CULTURAL LANDSCAPES

Temporary visual and audible intrusions to an element of the Rock Creek Park cultural landscape, Bike Trail #1, part of the Western Ridge Trail and the White Horse Trail, will likely occur during the period of construction for any of the alternatives for reconstruction of Oregon Avenue. Visual intrusions may include the presence of large machinery, excavated roadway and earth, spoil and fill piles, stockpiling of new construction material, and road blocks and detours. Temporary audible intrusions may include increased noise from construction activity such as jack-hammering; large vehicle movement, braking, and back-up signals; and construction crews. Long-term visual intrusions are not expected to occur because the roadway will be rehabilitated in its existing corridor and the natural setting of the park will be restored after construction. Long-term audible intrusions are not anticipated because reconstruction of Oregon Avenue is not a capacity-building project; no increased noise from additional vehicular traffic is expected to occur.

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

Implementation of either the No Action, or build alternatives would result in negligible long-term impacts and potential short-term impacts from visual and audible intrusions to cultural landscapes.

4.2.4 ETHNOGRAPHIC RESOURCES

Ethnographic resources are not known to exist in the proposed project area. No impacts to ethnographic resources are anticipated as a result of implementing the No Action or Candidate Build Alternatives.

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

No known ethnographic resources exist within the Oregon Avenue project area. No impacts are anticipated.

4.2.5 MUSEUM COLLECTIONS

Although artifacts from previous archeological surveys conducted in Rock Creek Park have been collected, none are housed in the Oregon Avenue project area. No impacts to museum collections are anticipated as a result of implementing the No Action or Candidate Build Alternatives.

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

No known museum collections occur within the Oregon Avenue project area. No impacts are anticipated.

4.2.6 INDIAN TRUST RESOURCES AND NATIVE AMERICAN SACRED SITES

No Indian Trust Resources are known to exist within the proposed project area and the lands are not held in trust by the Secretary of Interior for the benefit of American Indians or Alaska Native Tribes. No sites sacred to Native Americans are known to exist in the project area. No impacts to Indian Trust Resources and Native American sacred sites are anticipated from the No Action or Candidate Build Alternatives.

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

No known Indian Trust Resources or Native American sacred sites exist within the Oregon Avenue project area. No impacts are anticipated.

4.2.7 PALEONTOLOGICAL RESOURCES

Although surface outcrops of the fossiliferous Potomac Formation occur in the project area, no localities have been identified. Because no known resources exist within the project area, no impact to paleontological resources would occur from the No Action or the Candidate Build Alternatives.

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

No known paleontological resources exist within the Oregon Avenue project area. No impacts are anticipated.

4.2.8 CULTURAL AND PALEONTOLOGICAL RESOURCES SUMMARY

The No Action Alternative would result in negligible to no impacts to archeological resources. Alternatives 2, 3, and 4 including the Preferred Alternative may result in moderate, long-term impacts to archeological resources.

Implementation of the No Action Alternative will result in negligible impacts to historic structures. Implementation of Alternatives 2, 3, and 4, including the Preferred Alternative, may result in minor, short-term visual and audible impacts to historic structures during construction.

Implementation of the No Action Alternative will result in negligible impacts to cultural landscapes. Implementation of Candidate Build Alternatives 2, 3, and 4, including the Preferred Alternative, may result in minor, short-term visual and audible impacts to cultural landscapes during construction.

Implementation of the No Action and Alternatives 2, 3, and 4, including the Preferred Alternative, as well as all Options would result in no impacts to ethnographic resources, museum collections, Indian Trust Resources and Native American Sacred Sites, and paleontological resources.

Because the EA identified two archeological sites and areas of archeological potential along the Oregon Avenue roadway corridor, potential long-term, moderate adverse impacts to archeological resources were identified for both the Candidate Build Alternatives (2 and 4) and the Preferred Alternative/Alternative 3 Modified in the analysis of environmental consequences. However, none of these effects will result in any significant impacts. To resolve these potential impacts and avoid potential adverse effects to historic properties under Section 106 of the NHPA, a geoarcheological investigation of the project area will be conducted prior to ground disturbing activities and results will be integrated in a Phase IA survey report that will be submitted to the DC SHPO and NPS for review.

The DC SHPO concurred that the Oregon Avenue Reconstruction Project will have “no adverse effect” on historic properties under Section 106 of the NHPA provided that the following conditions are implemented:

1. DC SHPO will be provided an opportunity to review and comment on the design of the replacement culvert over Pinehurst Branch in order to ensure it is compatible with its setting adjacent to the Rock Creek Park Historic District. The “Arch Culvert” or “Bridge” options appear to be more appropriate for this setting than the “Box Culvert”;
2. DC SHPO will also be provided an opportunity to review and comment on any alterations proposed for the stone and concrete outfall south of Bingham Drive if it is determined to be a contributing element of the Rock Creek Park Historic District (Subsequent revisions to the design of stormwater management system upgrades eliminated the need to alter any of the outfalls located in Rock Creek Park. The NPS indicated that the stone and concrete outfall south of Bingham Drive is considered a contributing element to the RCPHD. Because no impacts will occur to this or any culvert in Rock Creek Park, the second condition above will not implemented.)
3. DDOT shall ensure that the stone boundary monuments that mark the border of Rock Creek Park will not be altered or damaged in any way; and
4. In consultation with the DC SHPO, DDOT shall conduct a Phase IA archaeological survey including geoarchaeological consultation if the LOD [Limits of Disturbance] to

determine if any locations warrant testing for the presence of potentially significant archaeological resources. (Appendix F – Maloney comment).

Conditions 1 and 4 will be implemented during the design phase and Condition 3 will be implemented in the construction phase and may include a specifications in the construction contract that NPS will mark a buffer area around each boundary monument for avoidance or use of an archeological monitor during construction activities to identify and protect resources from damage.

4.3 SOCIOECONOMIC RESOURCES

4.3.1 LAND USE

According to DC Policy UD-1.2.1: *Respecting Natural Features in Development*, it is an important goal of the District to maintain and protect Washington’s unique landscape and natural features. The District’s comprehensive plan states that natural features should be preserved in low-density, wooded, or hilly areas and new construction should accommodate these resources rather than altering them. Designs for this project should take into consideration the bucolic setting of the project area and strive to maintain the existing neighborhood setting (DC Government 2007a, 2007b, 2007c).

The methodology used to determine the environmental consequences to land use was derived from the potential for changes to land use as a result of the implementation of any of the Candidate Build Alternatives.

ALTERNATIVES 1, 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Land use within the project area is not anticipated to change from either the maintenance or improvement of this road. The land is zoned as single family residential and is currently at capacity. Zoning will not be changed in this area and is not expected to change in the near future.

ZONING

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

The No Action Alternative, Alternatives 2,3, 4 including the Preferred Alternative, would not change zoning within or surrounding the project area; therefore there would be no impact to zoning.

4.3.2 DEMOGRAPHICS

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, Oregon Avenue would not be reconstructed, but only repaved within the DDOT right-of-way, and existing conditions would remain unchanged. There would be no impact to demographics under the No Action Alternative.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Oregon Avenue would be reconstructed within existing DDOT right-of-way and would not result in any residential relocations, nor would it directly affect populations in the project area.

Alternatives 2, 3, and 4 including the Preferred would have no impact on population distribution within the project area.

4.3.3 ENVIRONMENTAL JUSTICE

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, Oregon Avenue would not be reconstructed, only repaved within DDOT right-of-way, and maintenance activities would occur as with existing conditions. No impacts to low-income or minority populations would occur under the No Action Alternative.

ALTERNATIVES 2, 3, 4 INCLUDING PREFERRED ALTERNATIVE

Alternatives 2, 3, 4 including the Preferred Alternative would not result in impacts to low-income or minority populations. To ensure minority populations were afforded the opportunity to participate during the public scoping and alternatives development period, advertisements were placed in several area newspapers, including The Current Newspaper and El Tiempo Latino Spanish newspaper, and postings were made to the surrounding communities' and ANC listservs, DDOT Public Notice Board as well as the project website. A contact was provided with each advertisement for individuals to request special assistance or translation services during the meetings, and English and Spanish versions of meeting handouts were available at each public meeting or upon request (please see the Public Involvement section of this EA).

4.3.4 ECONOMICS AND DEVELOPMENT

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, Oregon Avenue would not be reconstructed, only repaved. No impact would occur to existing economics and development.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

The three build alternatives would not change employment or development in the project area. Minimal employment opportunities and some related revenues would result from the construction of the proposed project. While construction activities have the potential to be beneficial, the relatively small scope of the project makes economic impacts negligible and short-term in nature.

4.3.5 JOINT DEVELOPMENT

ALTERNATIVES 1, 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

The No Action Alternative, Alternatives 2, 3, and 4 including the Preferred Alternative, would have no impact on joint development, since there are no proposed or existing joint development projects within or surrounding the project area.

4.3.6 AESTHETICS AND VISUAL QUALITY

NEPA requires the examination of environmental impacts of a Federal project including those associated with the visual and aesthetic quality of a project area.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Oregon Avenue has been damaged by the forces of uncontrolled stormwater, which has resulted in significant pavement damage and erosion. Under the No Action Alternative, there would be no major changes to the existing visual quality of the project area; however, unchecked stormwater would continue to cause erosion, affecting the existing roadbed, slopes, and vegetation, resulting in a minor, long-term impact on visual quality due to stormwater damage.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Although preservation of the area would be a benefit of reconstruction, the new design would have temporary moderate impacts to the local aesthetics and visual quality of the Oregon Avenue corridor during construction. All alternatives would result in minor long-term impacts by altering the setting of the corridor with the addition of a sidewalk, curbs and gutters, and a retaining wall in some places, creating a more urban atmosphere. None of these will result in any significant impacts to the resources.

The rural atmosphere in the neighborhoods bordering the park will be preserved through context-sensitive design of sidewalks and retaining walls, the stabilization of the adjacent streams, and improvement of stormwater management. Stormwater management facilities would protect the scenic quality of this area from further erosion and degradation due to unchecked stormwater, allow for riparian vegetation to reestablish, and increase vegetated elements. Designs for this project will take into consideration the bucolic setting of the project area and strive to maintain the existing neighborhood atmosphere and may include: graded curbs, stone facing, and stamped concrete, native tree, and vegetation plantings. The restoration of the Pinehurst Run stream in locations where there is visible vegetation damage, erosion, and/or debris would increase the visual quality of the project area. In addition, the selection of the bottomless arch culvert design to replace the Pinehurst Run crossing as part of the Preferred Alternative is in keeping with the aesthetic and visual quality of the natural setting provided by the adjacent Rock Creek Park. The incorporation of context-sensitive design for elements of the built environment including the sidewalks, retaining wall, and the culvert serve to blend in with the natural setting of Rock Creek Park.

SCENIC EASEMENTS

ALTERNATIVES 1, 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Oregon Avenue is not located within viewing distance of the nearby NPS scenic easements due to separation by the forested area within Pinehurst Parkway Park; therefore, none of the alternatives are anticipated to have any effect on scenic easements.

4.3.7 HEALTH AND SAFETY

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under this alternative, no improvements would be made, and Oregon Avenue would continue to have inadequate facilities for pedestrian and non-motorized vehicle use. Lack of appropriate lighting, sidewalks, bus stop facilities, marked crossings, speeding vehicles, and a narrow winding roadway with poor sight distances would remain, generating unsafe passage for pedestrians and bicyclists. Drainage issues would remain, causing ice slicks at crossings in the

winter, unsafe footing for pedestrians, and ponding on the roadway in warmer weather, which makes it difficult for cars to stop.

Under the No Action Alternative, the project area facilities would remain inadequate, posing a continued risk to public safety and resulting in moderate, adverse, local, long-term effects.

ALTERNATIVES 1, 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Under all the build alternatives this project would have moderate, beneficial, local, long-term effects as public safety would improve over existing conditions with the addition of designated non-motorized infrastructure, repair of degraded facilities including pavement and guardrails, improved lighting, stormwater facilities, and marked pedestrian crossings.

ALTERNATIVE 2

Construction of a sidewalk will create safer conditions for pedestrians who currently share the narrow roadway with motorized traffic. With this option, bicyclists would continue to share the roadway with motorized vehicles without a dedicated bike lane. However, bicyclists' safety will be enhanced by roadway improvements including a consistent roadway width and stabilized pavement edge.

ALTERNATIVE 3

Under this alternative, bicyclists and pedestrians would share a wide trail, which would allow for both to remain separate from motorized traffic.

PREFERRED ALTERNATIVE/ALTERNATIVE 3 MODIFIED

Under this alternative, a sidewalk ranging from 5 to 6 feet will be constructed on the west side of the roadway allowing for safer conditions for pedestrians who currently share the roadway with motorized traffic. Bicyclists will have two options: (1) continue to share the travel lanes with motorized vehicles or (2) cross Oregon Avenue and continue their trip along the multi-use trail inside Rock Creek Park. However, their safety will be enhanced by roadway improvements including a consistent roadway width and stabilized pavement edge.

ALTERNATIVE 4

Construction of a sidewalk will create safer conditions to pedestrians who currently share the avenue with motorized traffic. With this option, bicyclists would continue to share the roadway with motorized vehicles; however, the pavement would be extended and bike lanes would be added in either direction.

4.3.8 COMMUNITY RESOURCES

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

EMERGENCY SERVICES

The No Action Alternative would have no impact on emergency services in the general project vicinity.

SCHOOLS

The No Action Alternative would have moderate, long-term, adverse effects to schools in the study area, including St. John's College High School, from the lack of pedestrian and bicycle facilities providing access.

PARKS AND RECREATION AREAS

The No Action Alternative would have no direct impact on NPS land. However, continued lack of maintenance of the project area would induce indirect impacts on the natural and biological resources of NPS lands. Erosion and sedimentation would gradually worsen as the road structure deteriorates, causing continued sedimentation and debris. The No Action Alternative would result in moderate long-term indirect impacts to NPS land, natural and biological resources, and the water quality of waterways if the roadway is left in its current state and maintenance/clean-up is not performed.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

During construction, all alternatives would result in minor, short-term, local, adverse impacts to community resources including schools, emergency service, and local parks and recreation areas. Although there are many alternative routes that could be used, access via Oregon Avenue during construction would be limited.

Access for motorized vehicles would improve with the upgrade of facilities and improved safety resulting from stormwater management and improved roadway engineering. Maintenance and operational activities would remain essentially unchanged. Project work should be planned and scheduled to allow for the least disruption of road and park use and coordinated with park staff to identify any concerns.

EMERGENCY SERVICES

Access for motorized vehicles would improve with the upgrade of facilities and improved safety resulting from stormwater management.

SCHOOLS

Build Alternatives would have moderate, long-term, beneficial impacts to schools in the study area, including St. John's College High School. In accordance with the District's "Safe Routes to Schools" program, improvements under Alternatives 2, 3, and 4, including the Preferred Alternative, in this project would improve safety for students who walk or bike to school with the addition of a sidewalk, a shared-use trail, or roadway improvements to enhance bicycle safety.

PARKS AND RECREATION AREAS

This project would have moderate, long-term, beneficial impacts to NPS land. All alternatives would provide for safer access to community resources by the addition of non-motorized facilities. Alternatives will include the inclusion of a sidewalk and crosswalks that would allow for safer access to the existing multi-use trail and park facilities than provided by existing facilities.

4.3.9 UTILITIES AND INFRASTRUCTURE

Impacts to utilities and other infrastructure were assessed through coordination with various utilities companies to determine existing infrastructure and utility demands. Utility coordination would continue into the design phase of the project.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, existing utilities, including water and sewer lines, Washington Gas lines, PEPCO overhead and underground electric lines, DC Street lighting, Verizon overhead and underground communication lines, Comcast overhead and underground cable lines, and their house service connections, would not be impacted as the roadway work would be limited to routine maintenance. This work would include milling and resurfacing of pavement areas with minor base repair depending upon the subsurface condition encountered.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

During construction of the build alternatives, existing utilities on Oregon Avenue such as those that run under roadway pavement and parallel to or across Oregon Avenue would have to be considered. Continuous coordination with utility companies during design and construction would be required to avoid utilities’ conflict as much as possible, and the contractor would be required to contact Miss Utility to identify and mark all utilities prior to earth disturbance activities. The estimated extent of utility relocations for each of the alternatives is presented in **Table 4-5**.

Table 4-5. Utility Relocations

ALTERNATIVE	WATERMAIN (LINEAR FEET)	SANITARY SEWER (LINEAR FEET)	ELECTRICITY AND COMMUNICATIONS (LINEAR FEET)	GAS (LINEAR FEET)
2	1,100	1,250	5,500	0
3	4,900	2,750	7,500	500
Preferred/3 Modified	4,900	2,750	7,500	500
4	4,900	2,750	7,500	3,000

4.4 TRANSPORTATION

Potential impacts on the transportation system elements – bicycle and pedestrian facilities, the roadway network, and transit services – are discussed in the subsections below.

4.4.1 BICYCLE AND PEDESTRIAN NETWORK

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, DDOT would not reconstruct Oregon Avenue. The roadway would be repaved but infrastructure would remain deteriorated and damage from stormwater runoff would continue unabated. The No Action Alternative would have minor long-term regional impacts to the pedestrian and bicycle network because of the lack of facilities to serve those users of the roadway.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Under Alternatives 2, 3, and 4, including the Preferred Alternative, DDOT would reconstruct the existing roadway with appropriate stormwater management systems; provide facilities for motorists, pedestrians, and bicyclists; and improve linkages with respect to serving pedestrian and bicycle travel.

During construction, temporary disruption could occur to pedestrians and cyclists using Oregon Avenue; however, in general, alternative routes, including the existing multi-use trail in Rock Creek Park, are available and would minimize travel impacts.

4.4.2 ROAD NETWORK

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, DDOT would not reconstruct Oregon Avenue. The roadway would be resurfaced, resulting in minor improvements to the driving surface, and the potential to hydroplane due to surface water in tire ruts would be eliminated in the short term. Improvements from a resurfacing project would be expected to last about two years. Without reconstruction of the sub-grade, it is anticipated that the driving surface would deteriorate again within a short time frame.

ALTERNATIVES 2, 3 AND 4 INCLUDING PREFERRED ALTERNATIVE

Under Alternatives 2, 3, and 4, including the Preferred Alternative, DDOT would reconstruct the roadway within the existing transportation right-of-way. The roadway would be excavated to a depth of approximately three feet and then reconstructed with appropriate material. Minor changes to the alignment and profile would be made to improve sight distances. It is anticipated that an alignment that meets the requirements of a 25 mph design speed can be achieved throughout the full length of the corridor with minor grading changes to adjacent properties. During reconstruction of the road and stormwater management infrastructure, short-term, temporary impacts would occur on the local streets due to truck traffic generated by construction activities. Specifically, the contractor would have to remove and haul the existing concrete, asphalt, and other materials by dump truck and would be required to deliver clean fill, asphalt or concrete, and other construction materials. It is anticipated that construction access could be provided via either Western Avenue or Military Road. DDOT would prepare a maintenance of traffic plan that would identify routes to be used by the contractor to minimize traffic impacts and disruption to residential areas and parkland.

Due to the limited right of way and narrow roadway, portions of Oregon Avenue would be closed to all but local and emergency vehicle traffic during construction. Therefore, in order to minimize impacts, it is recommended that reconstruction occur in three phases, as presented in **Table 4-6**. Potential detour plans during each phase of construction are described in **Appendix D**.

Although Alternatives 2, 3 and 4, including the Preferred Alternative, would have minor short-term impacts because of temporary traffic delays and congestion during the transport and delivery of construction materials, no long-term impacts are expected on the roadway network with the reconstruction of Oregon Avenue. Once reconstructed, Oregon Avenue will have a superior travel surface and will function as it has in the past.

Table 4-6. Construction Phasing / Maintenance of Traffic

PHASE	LOCATION	CONSTRUCTION DURATION
1	Nebraska Avenue/Bingham Drive to Chestnut Street/Wise Road	6 – 9 months
2	Chestnut Street/Wise Road to Western Avenue	3 – 6 months
3	Military Road to Nebraska Avenue/Bingham Drive	3 – 6 months

Year 2030 forecasts show that traffic volumes are expected to remain at current levels with the exception of increased commuter traffic during the peak periods. Projected traffic volumes for 2030 are shown in **Figure 4-1**. With this increase in traffic, the level of service at the Wise Road intersection will drop to F in the AM peak hour (**Table 4-7**). The proposed action is not a roadway capacity-building project and is not adding to increased traffic. Increased traffic is a factor of increased employment and population density in the District of Columbia. The addition of a dedicated left-turn lane would raise the level of service to acceptable levels; however, its construction is not recommended because, as stated earlier, this is not a capacity-building project and the addition of the turn lane may encourage additional “cut through” traffic. Instead, the use of traffic calming techniques is recommended to control speeds and minimize commuter and through traffic.

Table 4-7. Existing and Year 2030 Intersection Levels of Service

INTERSECTION WITH OREGON AVENUE	PEAK HOUR*	EXISTING	2030
Military Road	AM	E	D
	PM	D	D
Nebraska Avenue/Bingham Drive	AM	C	D
	PM	A	A
Chestnut Street/Wise Road	AM	E	F
	PM	B	C

* AM Peak Hour between 7:30 and 8:30 AM; PM Peak Hour between 5:30 and 6:30 PM.

4.4.3 TRANSIT

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

The No Action Alternative would have no impact on transit operations or the public’s ability to use transit in the study area. Washington Area Metropolitan Transit Agency’s (WMATA) Metrobus E-6 route would continue to service the project area.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Improved pedestrian facilities will result in a long-term benefit to bus service along Oregon Avenue.

During construction of Alternatives 2, 3, and 4, including the Preferred Alternative, bus service would be disrupted during Phases 1 and 2. DDOT will work with WMATA during design of the selected alternative to develop service plans for each phase of construction. During Phase 1, service could be maintained in the north end of the corridor by rerouting the bus along Chestnut Street to return to Western Avenue without traveling south along Oregon Avenue to Knollwood. Service to Knollwood may be possible from Western Avenue via Tennyson Street to Oregon Avenue. Provision to allow the buses to traverse the short section of Oregon Avenue between Tennyson Street and Knollwood would be required. Use of shuttle bus to provide service to Knollwood to and from the Friendship Heights Metro Station will also be explored.

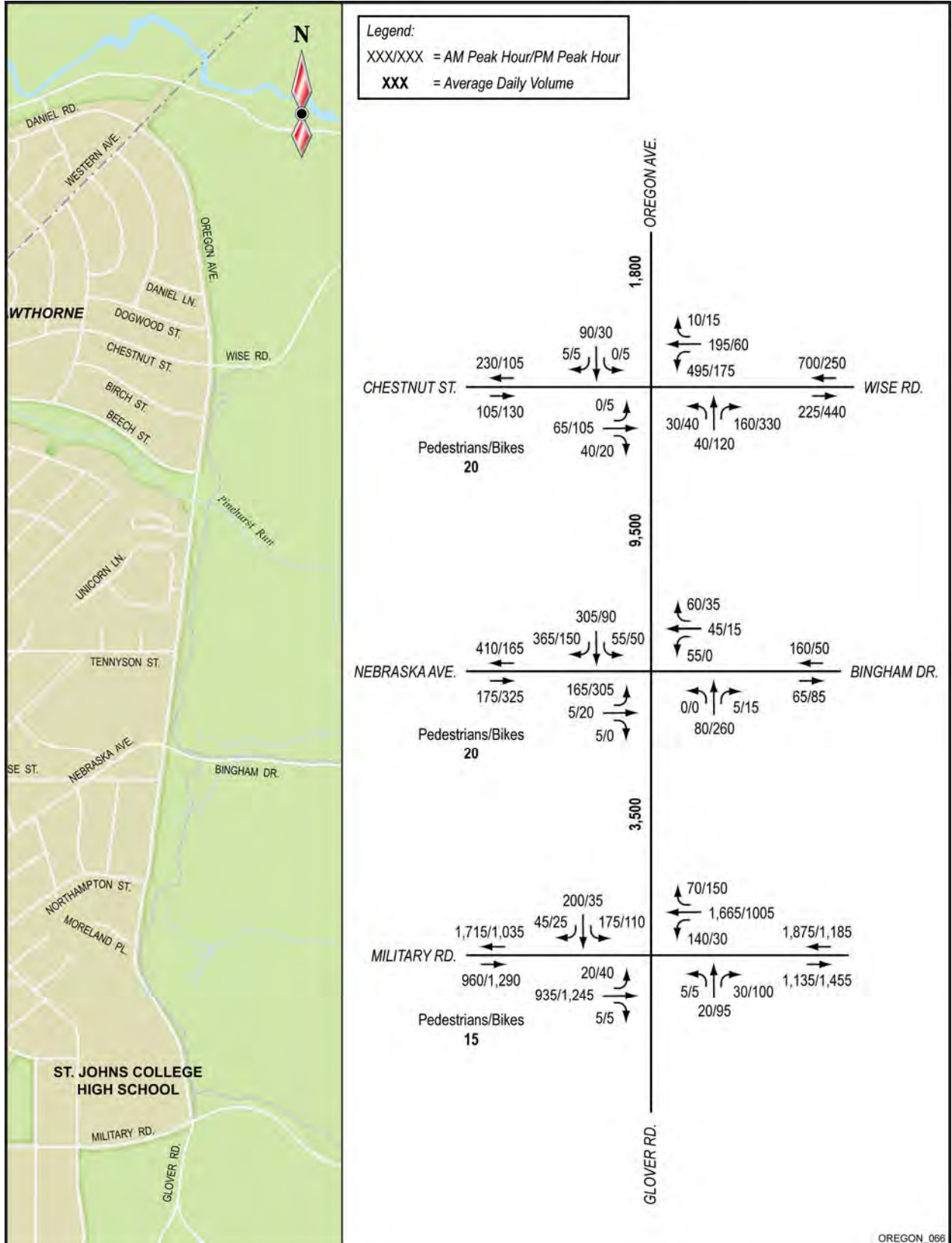


Figure 4-1. 2030 Traffic Volumes

During Phase 2, Route E-6 service could be provided by rerouting the line to Chestnut Street for the inbound trip.

4.5 AIR QUALITY

Impacts to air quality can generally occur in three ways: 1) by raising the vehicle emission levels near a project site through an increase in vehicular traffic; 2) by introducing new stationary sources, such as the case with development; and 3) through the generation of airborne dust from construction activities. The Oregon Avenue project is not anticipated to impact air quality with respect to either of the first two ways. As explained below, air quality impacts due to construction will be temporary.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, Oregon Avenue would remain in its current state. Therefore, this alternative would have no impact to air quality.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Project-Level CO Conformity

The District is currently a maintenance zone for the carbon monoxide (CO) air quality standard. However, under 40 CFR § 93.126 and as noted in Section 3.5.2, the Oregon Avenue project is exempt from air quality conformity determination because it is a rehabilitation project.

Project-level Fine Particulate Matter (PM_{2.5}) Conformity

While the Oregon Avenue project is located within the Washington DC-MD-VA PM_{2.5} nonattainment area, the project does not meet the definition of a project of air quality concern according to 40 CFR 93.123(b)(1).

Mobile Source Air Toxics (MSATs)

As noted in Section 3.5.4, the Oregon Avenue project falls into the first category of "Projects with No Meaningful Potential MSATs Effects or Exempt Projects" based on the fact that this project will have "no meaningful impacts on traffic volumes or vehicle mix." Therefore, no analysis or discussion of MSATs is needed for the project.

Greenhouse Gas (GHG) Impacts

The Oregon Avenue project would not increase roadway capacity and would not increase vehicle emissions or vehicle miles traveled. Therefore, the project would not contribute to an increase in greenhouse gases.

In terms of all of the pollutant categories cited above, it is important to note that implementation of any of the build Alternatives would not contribute additional air emissions when compared to the No Action Alternative. This is because traffic volumes, vehicle mix, speeds, and traffic controls would be the same between the No Action Alternative and Alternatives 2, 3, and 4, including the Preferred Alternative. There would, therefore, be no impact to air quality for any of the alternatives.

CONSTRUCTION IMPACTS

Construction impacts from any of the build alternatives would be similar across all alternatives, would be temporary, and there would be no long-term air quality impacts.

4.6 NOISE AND VIBRATION

As described in the District Department of Transportation Noise Policy (January 10, 2011), “the FHWA Noise Standard requires that noise abatement measures be considered when traffic noise impacts are identified for Type I Federal projects.” The definitions of project types for purposes of noise analysis and abatement, as indicated by *Highway Traffic Noise: Analysis and Abatement Guidance*, Federal Highway Administration, June 2010 (Revised January 2011), is provided below.

Type I Project: The following projects are considered Type 1 projects:

1. The construction of a highway on new location; or,
2. The physical alteration of an existing highway where there is either:
 - i. Substantial Horizontal Alteration. A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
 - ii. Substantial Vertical Alteration. A project that removes shielding, therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor; or,
3. The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lane; or,
4. The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or,
5. The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or,
6. Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or,
7. The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot, or toll plaza.

Type II Project: A Federal or Federal-aid highway project for noise abatement on an existing highway. For a Type II project to be eligible for Federal-aid funding, the highway agency must develop and implement a Type II program in accordance with section 772.7(e). *[Note: DDOT does not currently have a Type II program.]*

Type III Project: A Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

The proposed improvements to Oregon Avenue will take place along the existing alignment of the road and will not add lanes or increase capacity. Alterations to the horizontal and vertical alignment of the roadway will not be substantial based on the definitions included for a Type I project. Therefore, the Oregon Avenue project is classified as a Type III project that does not require a noise analysis (note that, at this time, DDOT does not have a Type II program).

As noted in Chapter 3, the Oregon Avenue project is located in an area with sensitive land uses, including a mix of residential, park, and education (institutional) land uses, which can be categorized as Activity Category B based on Noise Abatement Criteria. Current noise levels in the project area range from 55 to 62 decibels (dBA), which do not approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA. None of the build alternatives are anticipated to change traffic volumes, speeds, or vehicle mix as compared to the No Action Alternative.

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

No new noise sources would be created in the Oregon Avenue project area as a result of the No Action Alternative; therefore, impacts to the existing noise and vibration levels are not expected to occur.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

All of the build alternatives and options would have a short-term impact to noise and vibration levels in the study area during the construction phase. The length and degree of noise impacts associated with construction activities would vary and would be caused by activities associated with removal of the existing infrastructure and reconstruction of the roadway and stormwater management facilities. However, these noise impacts would be temporary and could be minimized by implementing BMPs, such as time restrictions, during construction.

No appreciable impacts to noise and vibration would occur from implementation of Alternatives 2, 3, and 4, including the Preferred Alternative, because, as noted above, they would not increase traffic or change the vehicle mix, speeds, or traffic controls.

4.7 HAZARDOUS WASTE AND MATERIALS

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Based on a review of available data and site inspection, no evidence of recognized environmental concerns was identified within the project area. Therefore, there would be no impact from Hazardous Wastes/Materials under the No Action Alternative.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

Based on a review of available data and site inspection, no evidence of recognized environmental concerns was identified within the project area. Although it is unlikely, undocumented hazardous materials could be uncovered during construction. If contaminated soils, water, or other hazardous materials are discovered, construction should stop and the situation assessed by the contract officer. The notification of appropriate authorities, including coordination with the DDOE, and proper removal, disposal, treatment, and/or remediation of the material should be evaluated and suitable measures taken, as necessary.

In order to address any potential risk to public safety, the contractor for the proposed construction will prepare and implement a plan for management and disposal of controlled hazardous materials and contaminated soil and groundwater that may be encountered during construction activities, as defined in *DC Department of Transportation Design and Engineering Manual, Chapter 4.11 (Hazardous Waste and Materials/Contaminated Soils)*.

No adverse effects due to hazardous materials are anticipated and no additional coordination will be required under Alternatives 2, 3, and 4, including the Preferred Alternative.

4.8 ENERGY CONSERVATION

ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Currently there are no energy conservation measures being conducted along the alignment. Under this alternative no changes would be made to the project area; however, routine pavement maintenance would continue. Therefore, there would be no effect on energy conservation.

ALTERNATIVES 2, 3, AND 4 INCLUDING PREFERRED ALTERNATIVE

One of the largest energy consumers for urbanized areas is water treatment. Utilizing natural stormwater management through various BMPs possible under these alternatives will reduce the load to water treatment facilities. Adding or upgrading stormwater facilities to an area that previously lacked adequate resources will reduce the need for maintenance and therefore energy consumption.

Lighting options to improve the safety of this corridor are being considered. Using energy efficient lighting would reduce energy consumption in the corridor while improving safety.

4.9 INDIRECT AND CUMULATIVE EFFECTS

Indirect effects are those that may be caused by the proposed action but occur later in time or farther in distance than the direct impacts discussed elsewhere in this document. The most common indirect effects associated with road and highway projects have to do with induced development, that is, development and the impacts of such development that would not otherwise occur if the project were not constructed. Lands surrounding the proposed project corridor currently can be accessed by the existing road network. As such, they could be subject to development or redevelopment even in the absence of implementation of this project. Much of the land along the west side of the road already is in residential uses and substantial additional development is not expected in the foreseeable future. Land along the east side of the road consists entirely of federal lands owned by the National Park Service as part of Rock Creek Park. As such, it is very unlikely that this land will be developed in the future. Rather, the land will be managed by the National Park Service in accordance with the Park's General Management Plan to preserve and enhance the recreational and natural and cultural resource protection functions of the Park. The proposed project would not provide any new direct access to adjacent undeveloped lands where access does not currently exist. Furthermore, the proposed improvements will not increase roadway vehicular capacity. Accordingly, no indirect impacts are anticipated. In summary, the proposed project would serve traffic generated by development on adjoining lands and beyond the limits of the project, but would not cause any

further such development. Moreover, the project is consistent with local comprehensive planning regarding land use goals in the surrounding area and transportation in the project corridor.

Cumulative effects are the incremental effects of an action when added to other past, present, and reasonably foreseeable future actions, regardless of the sponsor of those actions. The assessment of cumulative effects requires an assessment of the impact that past and present actions have had on the environmental resources in the project area that would also be impacted by the proposed project. The current affected environment is a reflection of the impacts of those past and present actions over time. Additionally, a review of cumulative effects requires an assessment of how reasonably foreseeable future actions may affect the same environmental resources that would be directly affected by the project. Reasonably foreseeable future actions include the following:

- Implementation of the Rock Creek Park General Management Plan by the National Park Service.
- Improvements to Broad Branch Road between Linnean Avenue and Beach Drive (length approximately 1.75 miles) along the western perimeter of Rock Creek Park south of the Oregon Avenue improvements project.

Table 4-8 summarizes the more prominent environmental resources in the project area that would be impacted by the proposed project, the impact that these resources have experienced from past and present actions, the incremental impact expected from the proposed project, identification of potential reasonably foreseeable future actions, and the potential impact that may occur from other reasonably foreseeable future actions in or near the project area.

Table 4-8. Summary of Cumulative Effects

ENVIRONMENTAL RESOURCES	IMPACTS FROM PAST AND PRESENT ACTIONS	IMPACT FROM PROPOSED PROJECT	POTENTIAL FUTURE ACTION	POTENTIAL IMPACT ON RESOURCES FROM POTENTIAL FUTURE ACTIONS
Air Quality	Decrease in regional air quality as population, industry, and traffic increases, offset by improvements to air quality resulting from increasingly stringent emissions and fuel standards.	No violations of NAAQS; because traffic volumes are low, localized pollutant emissions also are low and contributions to regional pollutant burdens are low.	Continuing development in region, accompanied by increasing regional traffic volumes; construction of other roadway improvements as programmed in the Constrained Long Range Plan.	Continuing improvements in vehicle and fuel technology, and resulting cleaner emissions, anticipated to offset increases in volumes of vehicles on regional travel network and potential impacts from other road improvements.
Noise	Increase in noise levels as urbanization and traffic increase.	Not a Type 1 project, no noise analysis required. No highway capacity increases and no significant changes in horizontal or vertical alignment.	Continued urbanization with accompanying increases in traffic volumes.	Cumulative effect not significant.

ENVIRONMENTAL RESOURCES	IMPACTS FROM PAST AND PRESENT ACTIONS	IMPACT FROM PROPOSED PROJECT	POTENTIAL FUTURE ACTION	POTENTIAL IMPACT ON RESOURCES FROM POTENTIAL FUTURE ACTIONS
Waters of the U.S., Including Wetlands	Conversion or culverting of water resources to make way for development; degradation of water quality from urban runoff, impervious surfaces, increased runoff and sediment volumes.	Repair/replacement of drainage structures and other construction would cause temporary siltation during construction, which would be minimized through implementation of best management practices and stormwater management measures. Long-term improvements to receiving waters are expected as a result of the proposed stormwater management elements included.	Additional impervious surfaces and conversion of resources for growing urban area; long-term water quality effects could occur as a result of increased impervious surface; spills from vehicles; an increase in non-point source pollutants from asphalt, grease, oil, metals, nutrients, nitrogen, deicing salts, roadside vegetation management chemicals, and suspended solids and other elements associated with roadways. Implementation of Rock Creek Park General Management Plan by National Park Service will include elements to improve water quality in Rock Creek and tributaries.	Adverse effects offset by enforcement of stormwater management, erosion and sediment controls, and water quality permitting requirements under local and federal laws, including compensation requirements; cumulative effect not substantial.
Terrestrial and Aquatic Habitat and Wildlife	Conversion of wildlife habitat to other uses, and degradation of remaining habitat from urban impacts and fragmentation. Preservation of wildlife habitat in Rock Creek Park.	Minor impacts to vegetated areas that border the roadway as part of construction activities.	Continued urbanization and population growth. Implementation of Rock Creek Park General Management Plan by National Park Service will include elements to preserve and enhance wildlife habitat in Rock Creek Park.	Potential further degradation of remaining habitat due to urban influences, offset by preservation/enhancement activities in Rock Creek Park; cumulative effect not substantial.
Rock Creek Park	Minor impacts from in-park infrastructure (roads, trails, recreational and maintenance facilities. Minor impacts from other nearby projects, such as Broad Branch Road Improvements.	No direct use of Park lands for project right-of-way; minor visual impacts, particularly during the construction period. Stormwater management elements will reduce severe erosion and sedimentation occurring in streams within the park.	Implementation of Rock Creek Park General Management Plan by National Park Service will continue to preserve and protect Park resources.	Implementation of Rock Creek Park General Management Plan by National Park Service will continue to preserve and protect Park resources.

Despite the dramatic changes in the landscape that have occurred over time due to human settlement in the surrounding area, the intensity of the incremental impacts of the project are considered small, when viewed in the context of impacts from other past, present, and

reasonably foreseeable future actions and would not rise to a level that would cause significant cumulative impacts.

4.10 PERMITS AND AUTHORIZATIONS

The following resources may require coordination with regulatory agencies and/or permits if they will be affected by the proposed project.

4.10.1 HAZARDOUS MATERIALS SITES

Coordination with the District Department of the Environment (DDOE) office is recommended if hazardous substances occur in the construction area to determine permit requirements and appropriate management procedures.

4.10.2 WATER QUALITY

Section 402 of the Clean Water Act (33 U.S.C. 1344) regulates the discharge from any point source into the waters of the US and requires a permit from the US EPA. Activities that would require a permit include construction dewatering operations associated with activities such as utility excavation, culvert or bridge pier installation, trench digging, or other subsurface activities.

The placement of dredge or fill materials into waters of the US, including wetlands, is regulated under Section 404 of the Clean Water Act and requires a permit from the US Army Corps of Engineers. Construction activities that could require a permit include extended roadway embankments, stream crossings, and culvert rehabilitations. The District Department of the Environment (DDOE) provides the Water Quality Certificate for Section 402 and 404 permits.

In accordance with the District of Columbia Municipal Regulations (DCMR) Title 21-Chapter 5 Water Quality and Pollution, an erosion and sediment control plan is required for 50 square feet of land disturbance and a stormwater management plan is required for 5,000 square feet of land disturbance.

In accordance with the Clean Water Act, work resulting in alteration of, or work within a floodplain, waterway, or tidal or nontidal wetland within the District of Columbia will require a Jurisdictional Determination and Joint Federal/State Application for the Alteration of any Floodplain, Waterway, Tidal or Nontidal Wetland from the Baltimore District of the Army Corps of Engineers.

4.10.3 TREE REMOVAL

According to DCMR Title 24 – Chapter 37, removal of any tree with a circumference greater than 55 inches, except for tree of heaven (*Ailanthus altissima*), mulberry (*Morus species*), and Norway maple (*Acer platanoides*), requires a **Special Tree Removal Permit** from the District Department of Transportation Urban Forestry Administration.

A tree survey was conducted of the project area to identify trees greater than six inches in diameter ; however, continued coordination with NPS is required for any work that may have an effect on trees and shrubs with a diameter greater than half an inch within park property.

This includes work done outside park property that may cause damage to species within park property (root damage).

4.10.4 FLOODPLAINS

In accordance with DCMR Title 20 – Chapter 31 Flood Hazard Rules, a building permit shall be required for all construction and development occurring in an identified floodplain area and a floodplain development plan and study are required.

In accordance with NPS DO 77-2 Floodplain Management, construction within floodplains on NPS land requires authorization from the NPS Water Resources Division.

4.10.5 PARK

In accordance with NPS DO 53 Special Park Uses, restoration and stabilization of streams within park property would require a **Special Use Permit** from the National Park Service.

Continued coordination with NPS should be conducted for any work that may have an effect on trees and shrubs with a diameter greater than half an inch within park property. This includes work done outside park property that may cause damage to species within park property (root damage).

4.10.6 CULTURAL RESOURCES

Because the proposed action involves federal assistance and federal permitting, licensing, or approval (36 CFR 800.16(y)), the project is under the purview of Section 106 of the NHPA. The DC SHPO has concurred with DDOT and FHWA that the project will have “no adverse effect” on historic properties.

4.11 SECTION 4(f) EVALUATION

The majority of work for this area will be conducted within the existing right-of-way; however, damage due to erosion from unchecked stormwater has occurred on park land. This project does not permanently use any new Section 4(f) resource, hence Section 4(f) is not triggered. During construction, some temporary use of a Section 4(f) resource may occur.

The Land and Water Conservation Fund (LWCF) Program was established in 1965 by the federal government to expand public, outdoor recreation space. Section 6(f) provides matching funds in the form of grants to states or municipalities for acquisition, planning, or improvements to public outdoor recreation space. Any property in which LWCF money was used is considered a 6(f) resource. In the District of Columbia, the District Department of Parks and Recreation (DPR) is the recipient of such funds. A list from NPS of LWCF grants in the DC area does not indicate that any funds were used in the project area.

4.12 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The implementation of the improvements to Oregon Avenue involves a commitment of natural, physical, human, and fiscal resources. Land used in the construction of the improvements is considered an irreversible commitment during the time that the land is used for transportation facilities. Land use within this project area is already used for the roadway and is not anticipated to change from either the maintenance or improvement of this road. If a greater

need arises for use of the land or if Oregon Avenue is no longer needed, the land can be converted to another use. At present, there is no reason to believe that such a conversion will ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials, such as cement, aggregate, asphalt, and steel would be expended for the improvements. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable; however, they are not in short supply and their use would not have an adverse effect on the continued availability of these resources. Any construction would also require a substantial one-time expenditure of local, state, and federal funds that are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area and the region would benefit from the improved quality of the transportation system. These benefits would consist of improved infrastructure, including roadway pavement and geometrics, stormwater management, and upgraded structures, and separate facilities for pedestrians and bicycles to improve system linkage for pedestrians and bicyclists to parks, schools, and residential areas adjacent to Oregon Avenue and to the Rock Creek Park multi-use trail system.