

2.0 PROPOSED ACTION AND ALTERNATIVES

For an Environmental Impact Statement (EIS), Council of Environmental Quality (CEQ) regulations mandate that all reasonable alternatives must be rigorously explored and objectively evaluated, including the No-Action Alternative and those alternatives that were eliminated from detailed study with a brief discussion of the reason for elimination (40 CFR 1502.14). Project alternatives may originate from the proponent agency, local government officials, or members of the public, at public meetings, or during the early stages of project development. Alternatives may also be developed in response to comments from coordinating or cooperating agencies. The alternatives analyzed in this document, in accordance with NEPA, are the result of internal scoping and public scoping.

This chapter describes the proposed action, the range of alternatives considered to achieve the Federal Highway Administration (FHWA) National Environmental Policy Act (NEPA) objectives for the proposed action, and the road and stormwater alternatives that were considered, but eliminated from detailed discussion. The FHWA, District Department of Transportation (DDOT), and the National Park Service (NPS) rigorously explored and objectively evaluated a range of alternatives from several studies that were precursors to this EIS. The first study, the *Klingle Road Feasibility Study* that was completed in August 2001 by DDOT, developed a range of seven options or uses for the Klingle Road right-of-way (DDOT 2001). The second study, the *Draft Klingle Creek Stormwater Management Plan* that was produced in November 2004 for DDOT, evaluated three alternatives for managing stormwater that originates within the Klingle Creek watershed and flows through Klingle Creek into Rock Creek (DDOT 2004). From these studies, six road alternatives and one stormwater management alternative were carried forward in this Draft EIS for further analysis. These alternatives are described in detail following a discussion of the options from the two studies that are being dismissed from further consideration. A preferred alternative for road reconstruction and a preferred alternative for stormwater management are also identified in this Draft EIS.

2.1 PROPOSED ACTION

The DDOT, in coordination with the FHWA, is proposing to reconstruct and reopen the 0.7-mile closed portion of Klingle Road between Porter Street, NW and Cortland Place, NW (approximate designations) in Washington, D.C. The National Park Service is a cooperating agency in the preparation of this environmental impact statement, as required by the National Environmental Policy Act (NEPA). The reconstruction of Klingle Road would re-link the roadway with a previously existing collector route, which extended from Beach Drive at Rock Creek Parkway to Wisconsin Avenue via Woodley Road prior to 1991. The FHWA is also proposing to improve stormwater conveyances and Klingle Creek within Klingle Valley to ameliorate ongoing road and environmental damage caused by uncontrolled storm water flows.

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED DISCUSSION

Two non-road options evaluated in the *Klingle Road Feasibility Study* (DDOT 2001) and two stormwater management alternatives analyzed in the *Draft Klingle Creek Stormwater Management Plan* (DDOT 2004) were eliminated from further consideration following careful consideration through analyses. Justification for eliminating the alternatives from further analysis was based lack of technical feasibility and inability to meet the project's purpose and need.

2.2.1 Non-Road Alternatives

Two non-road options presented in the *Klingle Road Feasibility Study* were eliminated from consideration in the EIS in response to the Fiscal Year 2004 Budget Support Act of 2003 (D.C. Law 15-39; D.C. Official Code § 9-115.11). Because the act mandates the reconstruction and reopening of Klingle Road, the Green Space option and the Bicycle, Recreation, and Facility Management option were eliminated from further study because neither option fulfills the purpose or need for the proposed action. The Green Space option would have allowed the closed portion of Klingle Road to return to a largely natural state by permanently closing the road and removing the roadbed through this area. The Bicycle, Recreation, and Facility Management option would have converted the closed portion of Klingle Road to a bike path with appropriate resurfacing while permanently banning vehicular traffic. These alternatives also do not satisfy the purpose and need as framed by the Fiscal Year 2004 Budget Support Act of 2003. The road supported east-west access for residents of the Crestwood, Mount Pleasant, Cleveland Park, Woodley Park and other neighborhoods by connecting to major arterial roads such as Wisconsin Avenue and 16th Street. Since 1991, the closed portion of Klingle Road has disrupted the continuity of this circulation route for the aforementioned neighborhoods.

2.2.2 Stormwater Management Plan

In addition to reconstruction of Klingle Road, the Fiscal Year 2004 Budget Support Act of 2003 mandated the preparation of the *Draft Klingle Creek Stormwater Management Plan* (DDOT 2004). Within the plan, several individual methods of stormwater management were evaluated and deemed infeasible as stand-alone methods of reducing peak stormwater flows in Klingle Creek. One of the three comprehensive stormwater alternatives evaluated was also not recommended. Following completion of the plan, a second alternative was further dismissed for the reasons that follow. Detailed descriptions of these alternatives and supporting information are provided in Appendix A.

Management Option: Retention or Detention of Peak Flows

Retention of peak water flows in the upper Klingle Creek watershed and retention of peak flows within Klingle Valley were deemed infeasible as stand-alone methods of reducing peak flows in Klingle Creek because of the sheer volume of stormwater that must be contained to sufficiently reduce stormwater volume and velocities in Klingle Creek during a storm event. For example, containing peak flows from the 25-year storm event from the two major outfalls within the Klingle Creek Watershed would require over 23 acres of wetlands/shallow ponds at a depth of approximately 1.5 feet. This amount of land area is simply not available in the densely developed watershed of Klingle Creek. If the volume of runoff from these two major outfalls were to be contained in a manmade cavern or a vault 25 feet deep, the structure would take up an area slightly larger than that of a regulation football field. Locating or designing structures of this size within Klingle Valley is not feasible. However, these methods could be modified in size and used successfully in conjunction with viable stormwater management alternatives.

Stormwater Management Alternative 1: All Stormwater Flow in Pipe

Under Stormwater Management Alternative 1, all stormwater conveyed in the existing pipes would be conveyed to Rock Creek through a new conduit under Klingle Road. In addition, stormwater that currently flow overland into the creek would be captured via drainage structures along Klingle Road and conveyed into the new conduit. This alternative would entail diverting the most stormwater flow from Klingle Creek and would require the most extensive piping infrastructure of the three stormwater alternatives, requiring in excess of a 72-inch diameter pipe. Roughly 92% to 96% of the stormwater flows and velocities currently flowing in the creek would be channeled through the conduit under Klingle Road allowing the least amount of the natural watershed drainage to discharge into Klingle Creek.

The diversion of such a large quantity of water would leave an inhospitable environment for existing and potential aquatic life in Klingle Creek. During the dry season, the creek would, in essence, dry up. The velocity of the flow in the new conduit would also require extensive engineering measures to dissipate the water velocity along the length of the pipe and at the outlet to Rock Creek. Because of the space limitations within the valley for piping infrastructure, the potential affect on the productivity of the creek due to limited surface flow, restrictions due to the Water and Sewer Authority (WASA) pipe velocity requirements and cost considerations, this alternative was dismissed from further consideration.

Stormwater Management Alternative 3: All Stormwater Flow in Klingle Creek

Stormwater Management Alternative 3 would allow the existing piped and overland stormwater flows to continue to discharge to Klingle Creek at their current locations and at their current rates. The largest portion of the natural watershed would be allowed to discharge to Klingle Creek. No new piping infrastructure would be installed; instead, the stream channel and banks would have to be stabilized and modified to handle the volume and velocity of anticipated stormwater flows to ensure that a new road is protected.

Because this scenario is the existing flow condition in Klingle Creek and because these existing flow volumes have severely damaged the road and eroded the creek during large storm events, significant engineering measures within the creek would be required. Engineered modifications, such as placement of rock and other methods of hardening, could affect the productivity of the creek and its natural character. In addition, the large volume of water that would be discharged from Klingle Creek during storm events could adversely impact the water quality of Rock Creek due to scouring and subsequent sediment deposit. NPS objectives include restoring Klingle Creek to as natural condition as possible. For these reasons, the alternative was dismissed from further consideration.

2.3 ALTERNATIVES

The road and stormwater management alternatives presented in this EIS were developed to fulfill the project's purpose and need and related objectives to provide transportation connectivity while minimizing environmental impacts. Other standards considered in the development of the alternatives were environmental laws and regulations, the FHWA and NPS standards and guidelines, American Association of State Highway and Transportation officials (AASHTO) road design standards guideline, and FHWA context sensitive design recommendations.

The process for developing the road and stormwater management alternatives for this EIS involved an iterative process that included the co-leads on the EIS, the FHWA and DDOT, and the NPS as cooperating agency. The initial review of the proposed road alternatives with the FHWA, DDOT, and NPS occurred at an internal scoping meeting on April 5, 2004. After the April 5, 2004 meeting, adjustments to the road alternatives were incorporated to reflect NPS concerns. Initially, the team had developed the No Action/No Build Alternative and several build alternatives that included a bike trail. After consultation with the NPS, the bike trail was replaced with a recreation path concept.

These new preliminary road alternatives were presented at a public meeting on April 27, 2004, where public comments were collected and recorded. On August 5, 2004, the FHWA, DDOT, and NPS met again to develop alternatives to address stormwater solutions that would correct damage that had been occurring unabated in Klingle Valley for many years. A brainstorming session during this meeting produced five stormwater management scenarios, which were later refined into three stormwater alternatives and presented to the group on October 21, 2004. At this meeting, the FHWA, DDOT, and the NPS reviewed and evaluated road alternatives again and the three stormwater management alternatives that originated in the *Draft Klingle Creek Stormwater Management Plan* (DDOT 2004), released for internal review in October 2004. On January 12 and 25, 2005 DDOT, FHWA, and NPS met to review internal agency comments on this DEIS. During these meetings, DDOT agreed to evaluate stormwater

management issues within the broader context of the Klingle Creek watershed. Best Management Practices (BMPs) that DDOT would consider incorporating in future road projects within the Klingle Creek watershed area can be found in Chapter 5 of the Klingle Creek Stormwater Management Plan (Appendix A).

2.3.1 Road Alternative A: No Action/No Build

Section 1502.14(d) of CEQ requires the alternatives analysis in the EIS to “include the alternative of no action.” This alternative represents the current management of the site and serves as the baseline by which to compare the effects of all other alternatives. Under this alternative, Klingle Road would not be rebuilt and essentially the status quo would be maintained. Basic maintenance would continue, such as the removal of fallen trees and other debris from the deterioration of the roadbed. In addition, fences that prohibit the public from entering this section of Klingle road would be maintained, and limited steps would be taken to ensure that unsafe conditions within these sections are cordoned off to the public (e.g., jersey barriers and signage). Actions would not include improvements to Klingle Creek to correct stormwater damage or replacement/repair of the existing retaining walls along the creek. The road would continue to be fenced off and closed to vehicular traffic and to other public uses.

2.3.2 Common Elements to All Build Alternatives

The following actions would be common to Alternatives B1 through D2 that involve rebuilding Klingle Road within Klingle Valley. Stormwater Management Alternative 2, as presented in the *Draft Klingle Creek Stormwater Management Plan* (DDOT 2004), is the preferred alternative for stormwater management of Klingle Creek. It is described below and is also incorporated into all the road build alternatives as a common element.

Stormwater Management: Keep Piped Flow in the Pipe and Overland Flow in Klingle Creek (Preferred Alternative)

In the Klingle Road build alternatives, stormwater flows would be managed through a combination of piping infrastructure and in-stream modifications. The piped portions of stormwater that currently flow into Klingle Creek would be removed and conveyed to Rock Creek through a new conduit under Klingle Road, while the overland flow would continue to discharge to the creek. Stormwater falling on the road itself would be conveyed through the new conduit to Rock Creek via storm drains. Only two-year flows would be allowed to enter Klingle Creek. The historic property adjacent to the project area has been examined preliminarily as a potential site for stormwater detention, although no recommendations have been developed at the time of this writing. Historically, a man-made pond was built on the property in the vicinity of a potential stormwater detention site. The channel and stream banks of Klingle Creek would be stabilized and re-established to handle the volume and the velocities associated with storm flows. The stream meander would also be restored and the temporary channel south of Klingle Road abandoned.

Significant engineering measures, such as drop structures, would be required in the new conduit to dissipate the flow velocities along the length of the pipe and at the outlet to Rock Creek. Accommodation of detention vaults on disturbed areas within park boundaries or within DDOT right-of-way areas outside the project area may be entertained in combination with other stormwater management treatments. Velocity dissipation measures would also have to be incorporated at the Rock Creek discharge location, which is outside the present project area of the EIS. Specific recommendations and potential design measures are identified in the Alternative 2 description and in Appendix A.

Context-Sensitive Design

The design of a road in a park setting creates a set of unique challenges that requires careful design consideration. In this case, the unique circumstance involves a low speed road located next to a creek that

has experienced extensive impacts from high volume and high velocity stormwater flowing through its narrow stream valley. The FHWA has developed a design standard that FHWA defines as context sensitive design (CSD). CSD is a “collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. CSD is an approach that considers the total context within which a transportation improvement project will exist.”

The treatment of the road design could include materials and colors that blend in with the natural environment. An example of this would be coloring the roadway pavement to blend in with the ground and rocks around it. Brown pigments in concrete or asphalt paving have been used successfully adjacent to national park settings to mute the presence of roads. Likewise, the rehabilitation of Klingle Creek must be designed in such a way as to appear not designed at all but rather a creek with a highly naturalistic appearance. Appendix B presents examples of appropriate design treatments that incorporate the tenets of CSD and other environmentally friendly design options for the road and stormwater alternatives.

Road Management Option

During the alternative development stage, a road management concept was considered that addressed the use of the reconstructed Klingle Road on weekends and during off-peak hours. The concept entailed the closure of Klingle Road during hours when the road experienced its lowest traffic volumes in order to provide pedestrians and other recreation-oriented users access to the road without automobiles, subject to FHWA approval. The concept was considered at length in light of the *1996 DDOT Traffic Study* (DDOT 1996). This study indicates that prior to its closure in 1991; Klingle Road functioned as a road that was used primarily for local trips during many different times of the day, rather than as a commuter route with dramatic increases in use during certain peak hours during the day. Current D.C. law would allow for periodic road closure or traffic management to allow for significant recreational opportunities.

Design Elements

As noted in the Klingle Road Engineering Evaluation (Appendix C), four the eight curves that occur along the road have design speeds of 25 mph or less, with three of these at 20 mph or less. On several of these curves, there is inadequate stopping sight distance due to the steep side slopes immediately adjacent to the travel way. Since Klingle Road is classified as a Collector Road, it should have a minimum design speed of 30 miles per hour. However, due to the restrictive physical conditions of the project area, sight distance limitations, the sensitive valley environment, the limited width of the right-of-way, and the low volume of traffic expected to use the road, a design exception would be requested to allow a design speed of 20 mph for this segment of road. Some of the other design elements that will be addressed in each alternative include the following:

- Removal of all road surfaces and subgrade, and backfilling and replacement of eroded subgrade, as required (recycle subgrade, if possible)
- Reconstruction of road surface
- Appropriate treatments along roadway for low level lighting that protects the night sky, particularly photovoltaic lighting, if appropriate
- Water quality structures to treat surface runoff from the roadway
- As-needed placement of guardrail along the roadway
- Replacement, relocation, and repair of utilities under the road, as required
- Road signage
- Replacement of concrete curb and gutter along the roadway

- Replacement, repair and addition of retaining walls, if needed
- Removal of site debris, including all waste asphalt on the streambanks, removal of all storm sewer infrastructure (such as culverts and headwalls), removal of all broken or collapsed retaining walls, and removal of any other trash or dumped refuse items during construction.

Issues related to the design of Klingle Road as a safe, low speed collector route arose during the course of alternatives formulation and included many design topics that have not been finalized. Design features, such as the width of road shoulders and the mechanism for separating a recreation path from the roadway, will vary by alternative and could affect decisions on how to manage the road. The identification and refinement of these types of design elements for Klingle Road will be a dynamic process that will continue into the final EIS. A detailed description of various engineering elements can be found in Appendix C.

Existing Retaining Walls

Existing retaining walls that support Klingle Road and protect it from potentially elevated stream flows were built on both DDOT and NPS properties (see Figure 5-2). An engineering analysis conducted in August 2004 of the condition of these existing retaining walls revealed that of the 15 walls assessed, 2 were in “good/very good” condition, 8 were in “fair/good” condition, while 6 were in a “failed/collapsed” condition. Although the number may vary by alternative, additional new walls would be constructed. All retaining walls would be stone-faced and with materials indigenous to the area in order to create a more historically accurate appearance.

Existing Utilities

The closed section of Klingle Road contains a number of existing utilities, which must be taken into consideration. These utilities include a 12-inch sewer line, an 8-inch gas main, and several drain lines, including a 54-inch pipe in the lower half of this roadway segment. The condition of the existing utilities is unknown at this time. For all of the alternatives, it is assumed that the existing utilities would remain in their existing location if feasible. However, the reconstruction of Klingle Road would provide an opportune time for utility providers to evaluate the adequacy and condition of existing infrastructure and to repair or replace utility lines during the roadway construction period.

The presence of these utilities would also require due consideration when designing the new stormwater management facilities. Of greatest concern is the existing 54-inch drain located in the lower portion of the road. This large conduit would impact the feasibility, location, size and cost of the installation of any new storm drainage systems.

2.3.3 Road Alternative B1: Construct Klingle Road as a One-Lane Road, One-Way Westbound

Klingle Road would be rebuilt as a one-lane road for one-way westbound vehicular use in Alternative B1 (Figure 2-1). The single travel lane would measure 10 feet wide and have two 4-foot shoulders, which would include the curb and gutter, on either side of the lane resulting in a total road width of 18 feet. The entire width of the road would fall within the DDOT right-of-way. Stormwater management measures and other road design features would be implemented as described in Section 2.3.2, Elements Common to All Action Alternatives.

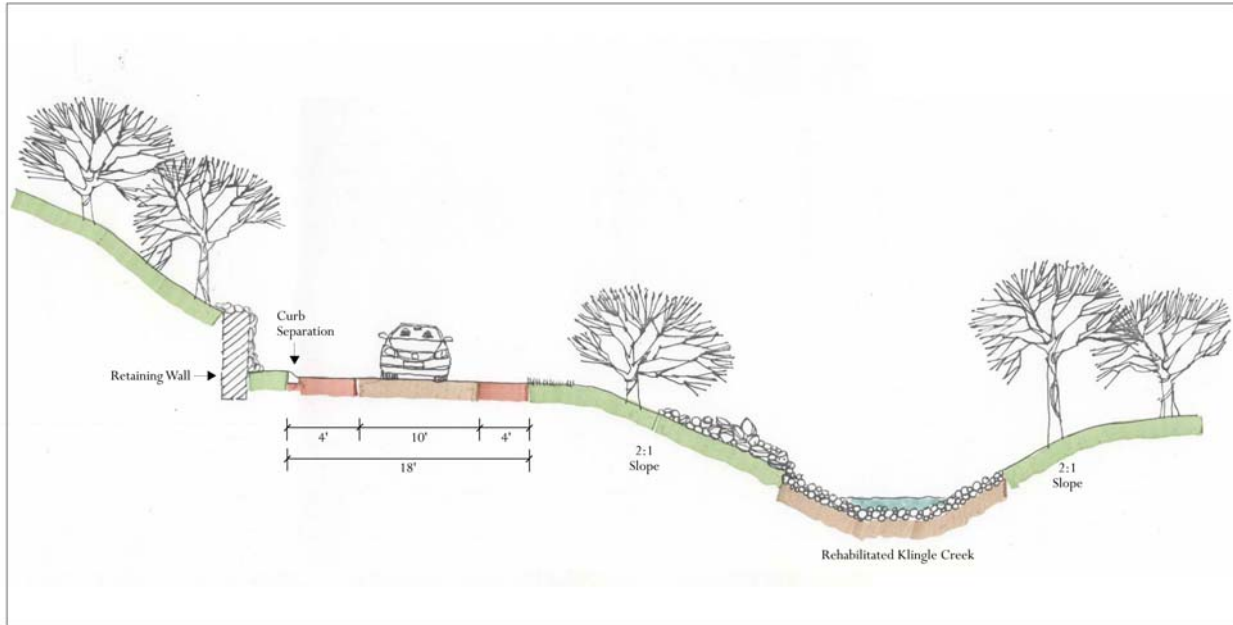
Results of the 2004 Household Study (DDOT 2004) provided in Appendix D indicate that the existing traffic pattern, through and from the neighborhoods surrounding Klingle Road, originates east of Beach Drive and flows west. According to the study, approximately 60% of local traffic travels west, while the remaining 40% travels east. As a result of this finding and historic traffic patterns, it is anticipated that the future traffic flows on Klingle Road would reflect this east to west traffic pattern.

This alternative would require a request for a waiver from the FHWA, exempting the proposed road design from FHWA and AASHTO standards. The proposed cost to implement this alternative would be approximately \$6.64 million.

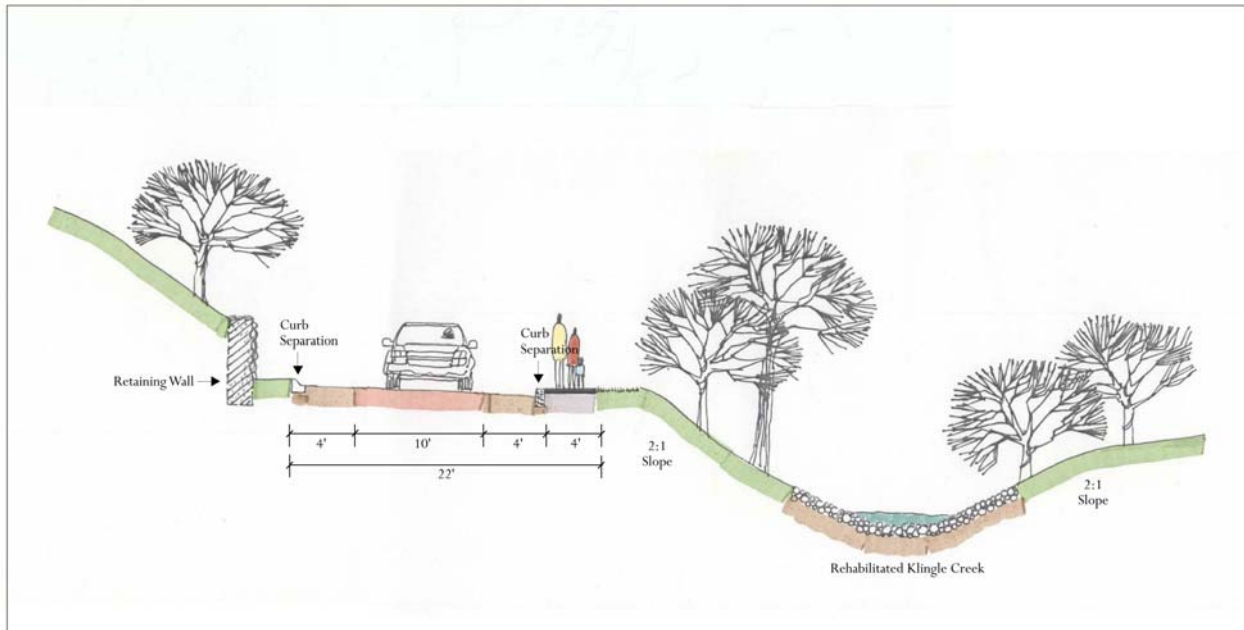
2.3.4 Road Alternative B2: Construct Klingle Road as a One-Lane Road, One-Way Westbound, with Recreation Path

In Alternative B2, Klingle Road would be rebuilt as a one-lane road for one-way westbound vehicular use similar to Alternative B1, (Figure 2-1). The 10-foot travel lane would be bordered by two 4-foot shoulders, which would include the curb and gutter, and a 4-foot wide recreation path that would be separated from the roadway. The path would be located on the Klingle Creek side of Klingle Road and would be designed to take advantage of views of the creek and other aesthetic treatments. The total width of the roadway with the recreation path would be 22 feet and would fall within the DDOT right-of-way. Stormwater management measures and other road design features would be implemented as described in Section 3.2.3, Common Elements to All Action Alternatives. This alternative would require a request for a waiver, exempting the proposed road design from AASHTO standards. The proposed cost to implement this alternative would be approximately \$6.64 million.

**FIGURE 2-1: ALTERNATIVES B1 AND B2:
CONSTRUCT KLINGLE ROAD AS A ONE-LANE ROAD, ONE-WAY WESTBOUND**



Road Alternative B1: Construct Klinge Road as a One-Lane Road, One-Way Westbound



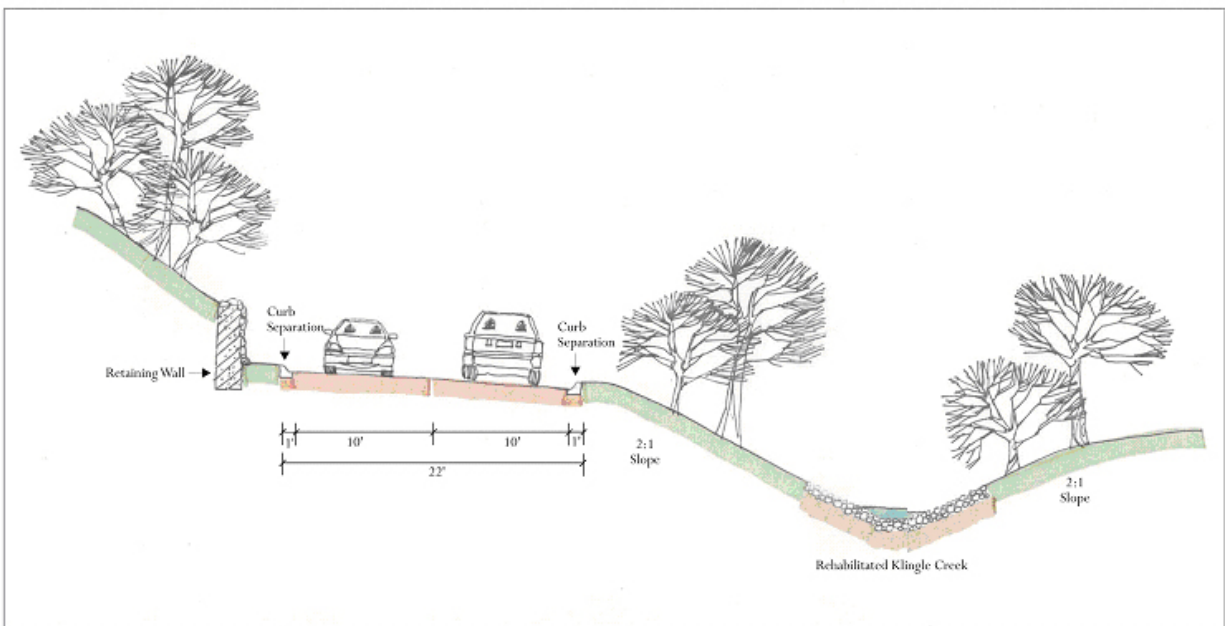
Road Alternative B2: Construct Klinge Road as a One-Lane Road, One-Way Westbound with Recreation Path

2.3.5 Road Alternative C: Reconstruct Klingle Road to its Original Alignment (Preferred Alternative)

Klingle Road would be restored to its original 22-foot alignment without standard shoulders within the DDOT right-of-way (Figure 2-2). The road would include two travel lanes, each measuring 10 feet in width, and would also include a one-foot clearance on either side of the road to accommodate the curb and gutter. Two-way traffic would also be restored. Stormwater management measures and other road design features would be implemented as described in Section 2.3.2, Common Elements to All Action Alternatives.

This alternative would require a request for a waiver, exempting the proposed road design from AASHTO standards. The proposed cost to implement this alternative would be approximately \$7.18 million.

FIGURE 2-2: ROAD ALTERNATIVE C: CONSTRUCT KLINGLE ROAD TO ITS ORIGINAL ALIGNMENT (PREFERRED ALTERNATIVE)



Road Alternative C – Preferred Alternative: Construct Klingle Road to its Original Alignment

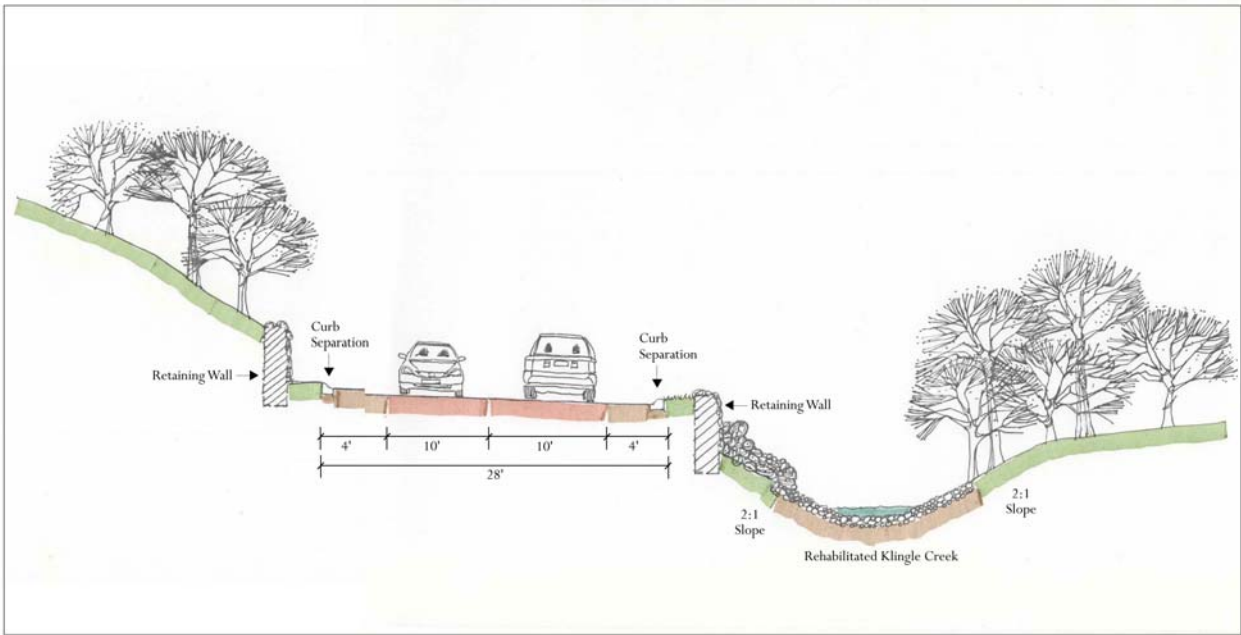
2.3.6 Road Alternative D1: Construct Klingle Road as a Two-Lane Road

Klinge Road would be rebuilt to accommodate two-way traffic with two 10-foot lanes and two 4-foot shoulders, which would include the curb and gutter, for a total road width of 28 feet in Alternative D1 (Figure 2-3). The road would not fall within the DDOT right-of-way limits, given the most current information available, thus requiring permission from the National Park Service to construct portions of Klingle Road on park land. Alternative D-1 would be designed to AASHTO standards. Stormwater management measures and other road design features would be implemented as described in Section 2.3.2, Common Elements to All Action Alternatives. The proposed cost to implement this alternative would be approximately \$8.96 million.

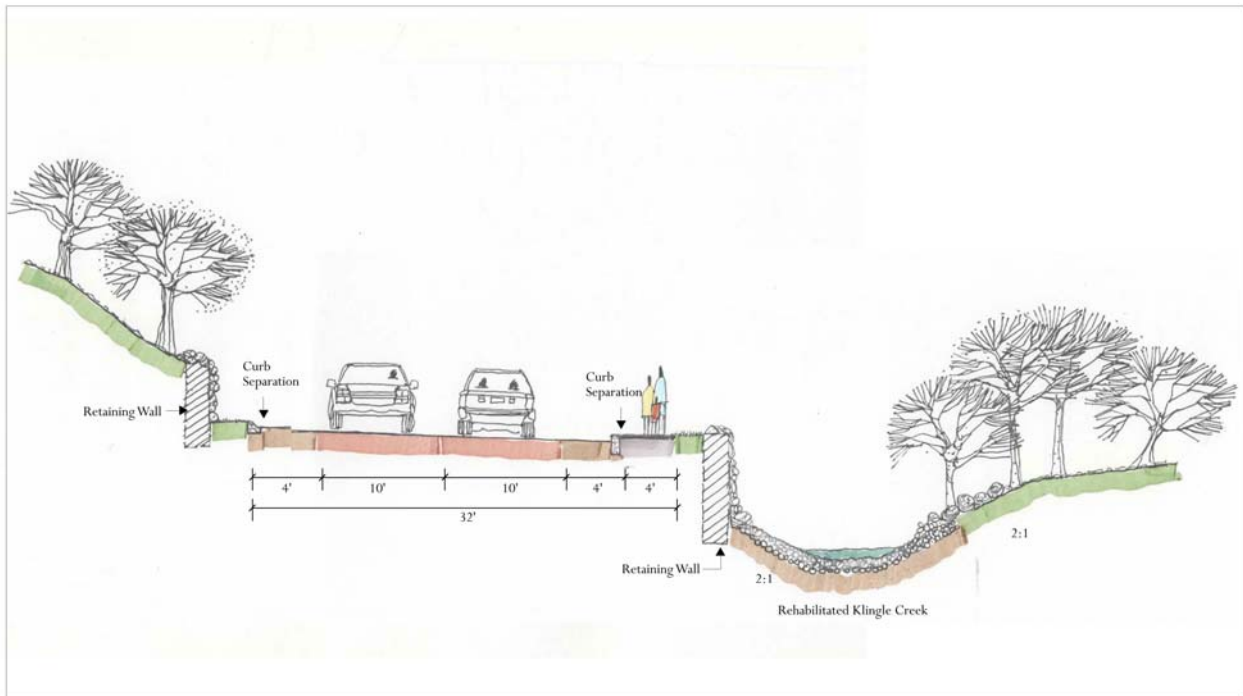
2.3.7 Road Alternative D2: Construct Klingle Road as a Two-Lane Road with Recreation Path

Similar to Alternative D1, this alternative proposes that Klingle Road would be rebuilt with two 10-foot wide lanes and two 4-foot shoulders, which would include the curb and gutter. In addition, a 4-foot wide recreation path would be constructed and separated from the roadway shoulder by a concrete curb (Figure 2-3). Total width of the roadway with the path would be 32 feet. The path would be located on the Klingle Creek side of Klingle Road and would be designed to take advantage of creek views and other aesthetic treatments. Opportunities for a relatively natural visitor experience along the recreational path, including possible boardwalk segments on the path, would be offered. The road would be designed to AASHTO standards and stormwater management measures and other road design features would be implemented as described in Section 2.3.2, Common Elements to All Action Alternatives. The road and the recreation path would not fall within the DDOT right-of-way limits, given the most current information available, thus requiring permission from the National Park Service to construct on park land. The proposed cost to implement this alternative would be approximately \$8.96 million.

FIGURE 2-3: ROAD ALTERNATIVE D1: CONSTRUCT KLINGLE ROAD AS A TWO-LANE ROAD



Road Alternative D1: Construct Klingle Road as a Two-Lane Road



Road Alternative D2: Construct Klingle Road as a Two-Lane Road with Recreation Path

2.3.8 Comparison of Alternatives

Table 2-1 briefly compares the elements of the six road alternatives.

TABLE 2-1: COMPARISON OF ROAD ALTERNATIVES

	Alternative A: No Action/ No Build	Alternative B1: One-Way Lane	Alternative B2: One-Way Lane with Recreation Path	Alternative C: Original Alignment (Preferred)	Alternative D1: Two Lanes	Alternative D2: Two Lanes with Recreation Path
Satisfies Purpose and Need? <i>(yes/no)</i>	<i>No</i>	<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Lane Widths	<i>N/A</i>	One – 10 ft	One – 10 ft	Two – 10 ft	Two – 10 ft	Two – 10 ft
Shoulder (incl. Curb and Gutter)	<i>N/A</i>	Two – 4 ft	Two – 4 ft	Two -1 ft curb and gutter, no shoulder	Two – 4 ft	Two – 4 ft
Total Rd Width (total area in SF/acres)	22 ft ^a (~82,000 SF/ 1.9 acres) ^b	18 ft (~70,000 SF/ 1.6 acres)	18 ft (~70,000 SF/ 1.6 acres)	22 ft ^c (~85,000 SF/ 2.0 acres)	28 ft (~109,000 SF/ 2.5 acres)	28 ft (~109,000 SF/ 2.5 acres)
Recreation Path	<i>No</i>	<i>No</i>	One – 4 ft	<i>No</i>	<i>No</i>	One – 4 ft
Total Impervious Width	22 ft ^a	18 ft	22 ft	22 ft	28 ft	32 ft
Total Impervious Surface	~82,000 SF/ 1.9 acres ^b	~70,000 SF/ 1.6 acres	~85,000 SF/ 2.0 acres	~85,000 SF/ 2.0 acres	~109,000 SF/ 2.5 acres	~124,000 SF/ 2.8 acres
Stormwater Control (yes/no)	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Retaining Wall Work	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Permanent Use of NPS Land– NPS land would be used in perpetuity	No NPS land would need to be used.	Approximately 425 linear feet of NPS land adjacent to Klingle Road would be required for retaining wall and headwall.	Approximately 425 linear feet of NPS land adjacent to Klingle Road would be required for retaining wall and headwall.	Approximately 425 linear feet of NPS land adjacent to Klingle Road would be required for retaining wall and headwall.	Approximately 985 linear feet of NPS land adjacent to Klingle Road would be required for retaining wall and headwall.	Approximately 985 linear feet of NPS land adjacent to Klingle Road would be required for retaining wall and headwall.
Temporary Use of NPS Land – NPS land would be affected for only the time of construction	No NPS land would need to be used.	NPS lands would be temporarily impacted.	NPS lands would be temporarily impacted.	NPS lands would be temporarily impacted.	NPS lands would be temporarily impacted.	NPS lands would be temporarily impacted.

^a Width of original road

^b Eroded road surfaces excluded from total

^c Includes 8-inch curb and 12-inch gutter

Table 2-2 provides a quick comparison of how the No Action/No Build alternative and the five build alternatives (B1, B2, C, D1, and D2) addresses the project objectives set forth by the FHWA, DDOT and NPS.

Table 2-3 briefly summarizes the environmental effects of the various alternatives. Chapter 4 discusses the environmental consequences of the proposed alternatives in detail.

TABLE 2-2: COMPARISON OF HOW ROAD ALTERNATIVES MEET OBJECTIVES

Objectives	Alternative A: No Action/No Build	Alternative B1: -One 10-foot driving lane -Two 4-foot shoulders	Alternative B2: -One 10-foot driving lane -Two 4-foot shoulders -One 4-foot recreational path	Alternative C (Preferred): -Two 10-foot driving lanes -Two 1-foot curb and gutter, no shoulder	Alternative D1: -Two 10-foot driving lanes -Two 4-foot shoulders	Alternative D2: -Two 10-foot driving lanes -Two 4-foot shoulder -One 4-foot recreational path
Traffic/Transportation						
Achieve improved east-west vehicular linkages by re-opening Klingle Road and consider multi-modal linkages for pedestrians and bicyclists.	Does not meet objective. Klingle Road would not be opened.	Proposing a one-way lane road would only meet 50 percent of the objective.	Proposing a one-way lane road would only meet 50 percent of the objective.	Fully meets objective.	Fully meets objective.	Fully meets objective.
Stormwater Management (Water Quality and Quantity)						
Implement improved stormwater management practices within the project area to control stormwater drainage, slow stormwater flows to enhance infiltration, and to improve the quality of degraded stream channel, aquatic life, floodplain, and other related environmental resources in Klingle Valley, which will enhance water quality within Rock Creek.	Does not meet objective. Under this alternative there would be no stormwater sewer improvements and water quality, aquatic habitats, and other related environmental resources would continue to degrade.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road, and restoring Klingle Creek that runs through NPS property within the project area, there would be direct improvements to overall water quality, aquatic habitats, floodplains, and other related environmental resources in Klingle Valley.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road, and restoring Klingle Creek that runs through NPS property within the project area, there would be direct improvements to overall water quality, aquatic habitats, floodplains, and other related environmental resources in Klingle Valley.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road and restoring Klingle Creek that runs through NPS property within the project area, there would be direct improvements to overall water quality, aquatic habitats, floodplains, and other related environmental resources in Klingle Valley.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road and restoring Klingle Creek that runs through NPS property within the project area, there would be direct improvements to overall water quality, aquatic habitats, floodplains, and other related environmental resources in Klingle Valley.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road and restoring Klingle Creek that runs through NPS property within the project area, there would be direct improvements to overall water quality, aquatic habitats, floodplains, and other related environmental resources in Klingle Valley.
Ensure that water quality in Klingle Creek and Rock Creek is not adversely impacted through the introduction of oils, greases, or other related pollutants from Klingle Road.	Does not meet objective. While Klingle Road would remain closed and there would be no introduction of oils, greases, or other related pollutants, under this alternative there would be no stormwater sewer improvements.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road, less polluted runoff will be allowed to enter Klingle Creek and Rock Creek directly. In addition, mechanisms will be installed within the stormwater sewers that help reduce the amount of pollutants in the stormwater runoff.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road, less polluted runoff will be allowed to enter Klingle Creek and Rock Creek directly. In addition, mechanisms will be installed within the stormwater sewers that help reduce the amount of pollutants in the stormwater runoff.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road, less polluted runoff will be allowed to enter Klingle Creek and Rock Creek directly. In addition, mechanisms will be installed within the stormwater sewers that help reduce the amount of pollutants in the stormwater runoff.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road, less polluted runoff will be allowed to enter Klingle Creek and Rock Creek directly. In addition, mechanisms will be installed within the stormwater sewers that help reduce the amount of pollutants in the stormwater runoff.	Fully meets objective. By updating the current stormwater sewer that runs along Klingle Road, less polluted runoff will be allowed to enter Klingle Creek and Rock Creek directly. In addition, mechanisms will be installed within the stormwater sewers that help reduce the amount of pollutants in the stormwater runoff.
Safety						
Ensure safety of travelers, neighbors, and park visitors while using Klingle Road and enjoying resources within Klingle Valley by incorporating contemporary design features on Klingle Road (where required by AASHTO standards), such as curb and gutter, sidewalks (in some alternatives), lighting, and guardrail.	Does not meet objective. Area would remain degraded and existing hazards would not be addressed.	Meets objective. Under this alternative, current hazards to human health and safety would be repaired. However potential safety issues arise as recreational use (e.g., jogging, biking) of the area would be limited to the road or along the shoulder.	Fully meets objective. Under this alternative, current hazards to human health and safety would be repaired. Safety of recreational users increases with the construction of recreation path.	Meets objective. Under this alternative, current hazards to human health and safety would be repaired. However potential safety issues arise as recreational use (e.g., jogging, biking) of the area would be limited to the road or along the shoulder.	Meets objective. Under this alternative, current hazards to human health and safety would be repaired. However potential safety issues arise as recreational use (e.g., jogging, biking) of the area would be limited to the road or along the shoulder.	Fully meets objective. Under this alternative, current hazards to human health and safety would be repaired.

Objectives	Alternative A: No Action/No Build	Alternative B1: -One 10-foot driving lane -Two 4-foot shoulders	Alternative B2: -One 10-foot driving lane -Two 4-foot shoulders -One 4-foot recreational path	Alternative C (Preferred): -Two 10-foot driving lanes -Two 1-foot curb and gutter, no shoulder	Alternative D1: -Two 10-foot driving lanes -Two 4-foot shoulders	Alternative D2: -Two 10-foot driving lanes -Two 4-foot shoulder -One 4-foot recreational path
Cultural Resources						
Maintain historic and cultural qualities and characteristics of Rock Creek Park that contribute to its listing on the National Register of Historic Places through context sensitive design.	Does not meet objective. As the road and streambanks continue to erode, the potential to lose unknown archeological resources remains.	Fully meets objective. Remediation of streambanks and improvements to the stormwater sewer would help reduce erosion and reduce the potential of loss or damage to unknown archeological resources and help maintain the cultural character of the areas.	Fully meets objective. Remediation of streambanks and improvements to the stormwater sewer would help reduce erosion and reduce the potential of loss or damage to unknown archeological resources and help maintain the cultural character of the areas.	Fully meets objective. Remediation of streambanks and improvements to the stormwater sewer would help reduce erosion and reduce the potential of loss or damage to unknown archeological resources and help maintain the cultural character of the areas.	Fully meets objective. Remediation of streambanks and improvements to the stormwater sewer would help reduce erosion and reduce the potential of loss or damage to unknown archeological resources and help maintain the cultural character of the areas.	Fully meets objective. Remediation of streambanks and improvements to the stormwater sewer would help reduce erosion and reduce the potential of loss or damage to unknown archeological resources and help maintain the cultural character of the areas.
Visual Resources						
Protect the aesthetic appearance of Klingle Valley and Klingle Creek through maintenance or improvement of important natural features, such as creek meanders and the tree canopy and aesthetically-pleasing road improvements achieved through context-sensitive design principles.	Does not meet objective. The area within Klingle Valley would continue to degrade aesthetically; trees would continue to be lost to erosion, streambanks would continue to erode, and the road would not get fixed,	Fully meets objective. While there would be some visual impacts as some trees are removed during construction, these impacts would be minimized to the greatest extent possible through mitigations. In addition, trees that are lost would be replaced with trees of various ages and sizes. Remediation of streambanks to a more natural condition and improving the overall condition of the road and stormwater sewer, there would be overall improvements of the visual resources of Klingle Valley from its current condition. In addition, as erosion is slowed, so would the loss of trees along Klingle Creek, helping to maintain the overall canopy of the forest.	Fully meets objective. While there would be some visual impacts as some trees are removed during construction, these impacts would be minimized to the greatest extent possible through mitigations. In addition, trees that are lost would be replaced with trees of various ages and sizes. Remediation of streambanks to a more natural condition and improving the overall condition of the road and stormwater sewer, there would be overall improvements of the visual resources of Klingle Valley from its current condition. In addition, as erosion is slowed, so would the loss of trees along Klingle Creek, helping to maintain the overall canopy of the forest.	Fully meets objective. While there would be some visual impacts as some trees are removed during construction, these impacts would be minimized to the greatest extent possible through mitigations. In addition, trees that are lost would be replaced with trees of various ages and sizes. Remediation of streambanks to a more natural condition and improving the overall condition of the road and stormwater sewer, there would be overall improvements of the visual resources of Klingle Valley from its current condition. In addition, as erosion is slowed, so would the loss of trees along Klingle Creek, helping to maintain the overall canopy of the forest.	Fully meets objective. While there would be some visual impacts as some trees are removed during construction, these impacts would be minimized to the greatest extent possible through mitigations. In addition, trees that are lost would be replaced with trees of various ages and sizes. Remediation of streambanks to a more natural condition and improving the overall condition of the road and stormwater sewer, there would be overall improvements of the visual resources of Klingle Valley from its current condition. In addition, as erosion is slowed, so would the loss of trees along Klingle Creek, helping to maintain the overall canopy of the forest.	Fully meets objective. While there would be some visual impacts as some trees are removed during construction, these impacts would be minimized to the greatest extent possible through mitigations. In addition, trees that are lost would be replaced with trees of various ages and sizes. Remediation of streambanks to a more natural condition and improving the overall condition of the road and stormwater sewer, there would be overall improvements of the visual resources of Klingle Valley from its current condition. In addition, as erosion is slowed, so would the loss of trees along Klingle Creek, helping to maintain the overall canopy of the forest.
Topography and Soils						
Control stormwater volume and velocity to protect Klingle Road, Klingle Creek, Rock Creek and Klingle Valley topography, vegetation, habitat and soils.	Does not meet objective. There would be no stormwater sewer improvements, degradation from uncontrolled stormwater would continue.	Fully meets objective. Installation of a new stormwater sewer system would help control overland stormwater flow and protect Klingle Road, Klingle Creek, Rock Creek, and all associated resources.	Fully meets objective. Installation of a new stormwater sewer system would help control overland stormwater flow and protect Klingle Road, Klingle Creek, Rock Creek, and all associated resources.	Fully meets objective. Installation of a new stormwater sewer system would help control overland stormwater flow and protect Klingle Road, Klingle Creek, Rock Creek, and all associated resources.	Fully meets objective. Installation of a new stormwater sewer system would help control overland stormwater flow and protect Klingle Road, Klingle Creek, Rock Creek, and all associated resources.	Fully meets objective. Installation of a new stormwater sewer system would help control overland stormwater flow and protect Klingle Road, Klingle Creek, Rock Creek, and all associated resources.
Vegetation, Wildlife, and Threatened and Endangered Species						
Ensure that native vegetation and wildlife resources within Klingle Valley are protected and, where possible, habitat is improved.	Does not meet objective. Habitats within the valley would continue to degrade as streambanks and topsoil are lost to erosion.	Fully meets objective. Habitats are protected and restored as erosion is slowed with stormwater improvements, and with the restoration of Klingle Creek.	Fully meets objective. Habitats are protected and restored as erosion is slowed with stormwater improvements, and with the restoration of Klingle Creek.	Fully meets objective. Habitats are protected and restored as erosion is slowed with stormwater improvements, and with the restoration of Klingle Creek.	Fully meets objective. Habitats are protected and restored as erosion is slowed with stormwater improvements, and with the restoration of Klingle Creek.	Fully meets objective. Habitats are protected and restored as erosion is slowed with stormwater improvements, and with the restoration of Klingle Creek.

Objectives	Alternative A: No Action/No Build	Alternative B1: -One 10-foot driving lane -Two 4-foot shoulders	Alternative B2: -One 10-foot driving lane -Two 4-foot shoulders -One 4-foot recreational path	Alternative C (Preferred): -Two 10-foot driving lanes -Two 1-foot curb and gutter, no shoulder	Alternative D1: -Two 10-foot driving lanes -Two 4-foot shoulders	Alternative D2: -Two 10-foot driving lanes -Two 4-foot shoulder -One 4-foot recreational path
Air Quality						
Ensure that emissions generated from the construction and operation of Klingle Road does not adversely affect local air quality (or exceed NAAQS standards).	Fully meets objective. Air quality standards would not be violated.	Fully meets objective. Air quality would only be slightly impacted. Air quality standards would not be violated.	Fully meets objective. Air quality would only be slightly impacted. Air quality standards would not be violated.	Fully meets objective. Air quality would only be slightly impacted. Air quality standards would not be violated.	Fully meets objective. Air quality would only be slightly impacted. Air quality standards would not be violated.	Fully meets objective. Air quality would only be slightly impacted. Air quality standards would not be violated.
Recreation						
Accommodate recreational uses in Klingle Valley compatible with Rock Creek Park mission goals and deemed appropriate by the Federal Highway Administration, the District Department of Transportation, and the National Park Service.	Would not meet objective. Klingle Road would officially remain closed to the public for recreational uses.	Meets objective. Opening Klingle Road would provide access into Klingle Valley for scenic recreation.	Fully meets objective. Opening Klingle Road would provide access into Klingle Valley for scenic recreation. In addition by providing a recreational path, there would be additional non-motorized recreational use (i.e., walking, jogging, and cycling) of the Klingle Valley as well.	Meets objective. Opening Klingle Road would provide access into Klingle Valley for scenic recreation.	Meets objective. Opening Klingle Road would provide access into Klingle Valley for scenic recreation.	Fully meets objective. Opening Klingle Road would provide access into Klingle Valley for scenic recreation. In addition by providing a recreational path, there would be additional non-motorized recreational use (i.e., walking, jogging, and cycling) of the Klingle Valley as well.
Interagency Cooperation						
Ensure that the re-opening of Klingle Road does not derogate the values of Rock Creek Park as defined by the National Park Service.	N/A	Meets objective. Construction of Klingle Road would mostly be accomplished within the DDOT right of way. Permission to use NPS land for road construction would not be required. Permission to use NPS land for staging of retaining wall construction would be required. Some permanent retaining wall structures would reside outside of the DDOT right of way. The proposed alternative would not constitute a derogation of values of Rock Creek Park as defined by the National Park Service.	Meets objective. Construction of Klingle Road would mostly be accomplished within the DDOT right of way. Permission to use NPS land for road construction would not be required. Permission to use NPS land for staging of retaining wall construction would be required. Some permanent retaining wall structures would reside outside of the DDOT right of way. The proposed alternative would not constitute a derogation of values of Rock Creek Park as defined by the National Park Service.	Meets objective. Construction of Klingle Road would mostly be accomplished within the DDOT right of way. Permission to use NPS land for staging of retaining wall construction would be required. Some permanent retaining wall structures would reside outside of the DDOT right of way. The proposed alternative would not constitute a derogation of values of Rock Creek Park as defined by the National Park Service.	Meets objective. Construction of Klingle Road would not be accomplished totally within the DDOT right of way. Permission to use NPS land for road and wall construction would be required. Some permanent retaining wall structures would reside outside of the DDOT right of way. The proposed alternative would not constitute a derogation of values of Rock Creek Park as defined by the National Park Service.	Meets objective. Construction of Klingle Road would not be accomplished totally within the DDOT right of way. Permission to use NPS land for road and wall construction would be required. Some permanent retaining wall structures would reside outside of the DDOT right of way. The proposed alternative would not constitute a derogation of values of Rock Creek Park as defined by the National Park Service.

TABLE 2-3: COMPARISON OF ENVIRONMENTAL EFFECTS OF ROAD ALTERNATIVES

Impact Topics	No Action/No Build	Sources of Impacts	Build Alternatives (B1, B2, C (Preferred), D1, D2)	Mitigations
Land Use and Zoning	The closure and deteriorating condition of Klingle Road has not adversely or beneficially affected the current zoning of properties in the study area; therefore, it is unlikely that the continued closure would affect future land use and zoning uses.	<p>Construction Impacts</p> <p>Operational Impacts</p>	As there is little opportunity of any growth or development within the immediate area of Klingle Road, the proposed actions (Alternatives B1, B2, C (Preferred), D1, and D2) are expected to have little to no adverse impact to land use and zoning.	N/A
Aesthetics and Viewsheds	Visual quality within the project would remain poor, deteriorating further in the future, because of the affects of uncontrolled stormwater on the existing roadway and within Klingle Creek.	<p>Construction Impacts</p> <p>Operational Impacts</p>	<p>While there would be some visual impacts as some trees are removed during construction, these impacts would be minimized to the greatest extent possible through mitigations. In addition, trees that are lost would be replaced with trees of various ages and sizes. While these replacement trees would not be in the age class as those lost, replanting trees of various sizes and species would help reduce monotony and help create a more aesthetic viewshed post construction.</p> <p>Once the road is operational and tree cover and other vegetation is re-established, views of Klingle Road would be relatively unchanged for residents in adjacent buildings and views from Klingle Road would be beneficial for travelers through the valley.</p> <p>Where necessary, guardrails and street lighting would be installed for public safety. These elements could have adverse impacts to some with regards to overall viewshed of Klingle Valley.</p>	<p>FHWA Design Standards would be employed that would:</p> <ul style="list-style-type: none"> Complement the existing natural environment. Maintain sensitivity to the existing context of the roadway corridor. Provide a sense of consistency along the entire route. Establish a design baseline for roadway enhancements.
Topography, Geology, and Soils	<p>Klingle Creek stream banks would continue to erode.</p> <p>Topography in the Klingle Creek flood plain would continue to be altered from erosive forces of the stormwater discharges.</p>	<p>Construction Impacts</p> <p>Operational Impacts</p>	<p>Minor alteration of bedrock may be needed for the restoration of Klingle Creek.</p> <p>Potential for increases in erosion as old road surface is removed.</p> <p>Potential for soil compaction and disturbance from construction activities.</p> <p>These impacts would be greatest under Alternatives D1 and D2 as the total amount of affected area is increased.</p> <p>Overall beneficial impacts to soils as the implementation of the associated stormwater management plan and the restoration of Klingle Creek stabilizes soil surfaces which helps reduce erosion.</p>	<p>Silt fences</p> <p>Erosion control blankets</p> <p>Streambank stabilization</p> <p>Retaining walls</p> <p>Temporary erosion and sediment control plans</p>

Impact Topics	No Action/No Build	Sources of Impacts	Build Alternatives (B1, B2, C (Preferred), D1, D2)	Mitigations
Biological Resources	<p>Erosion within Klingle Valley would continue unabated degrading habitat for native vegetation, and creating favorable conditions for, the already present, exotic invasive plant species. In addition, trees would continue to be lost as the continual erosion removes soils from around the bases of trees.</p> <p>Adverse impacts currently affecting aquatic organisms as a result of uncontrolled storm water runoff, associated erosion and sedimentation, and degraded water quality would continue.</p> <p>Impacts to terrestrial organisms are not expected to be substantial.</p> <p>Impacts to T&E species yet to determine.</p>	Construction Impacts	<p>There would be some loss of trees and other vegetation as a result of any of the build alternatives. These losses would be greater under Alternatives D1 and D2. Loss of a number of trees and other vegetation during the construction process would be minimized to the greatest extent possible through mitigations.</p> <p>Potential for tree damage from construction activities. These losses would be greater under Alternative D1 and D2.</p> <p>Potential for introduction of non-native invasive plants through construction activities.</p> <p>Temporary displacement of a few localized individuals or groups of animals.</p> <p>In Alternatives D1 and D2, a greater amount of new retaining walls would be constructed, resulting in additional stream bank and bottom disturbance during construction, having overall greater adverse impacts to aquatic organisms than Alternatives B1, B2, and C.</p> <p>Mortality of individuals of species not afforded special protection by state and/or Federal law; mortality of individuals would not affect total population.</p> <p>Likely loss of nesting habitat from loss of trees.</p> <p>May cause a slight temporary reduction in aquatic productivity due to turbidity caused by runoff.</p>	<p>Trees lost during construction would be replaced with trees of varying sizes and species.</p> <p>Best Management Practices help prevent runoff into Klingle Creek (see above)</p> <p>All mitigation measures aimed at minimizing impact to vegetation on NPS lands within Klingle Valley would be coordinated with the NPS Chief Arborist, located in the National Capital Region Headquarters</p> <p>Placing construction fencing at the outer drip line of trees to be saved and ensuring no activity occurs within the fencing</p> <p>Minimizing activities outside of the trees drip line, but in close proximity to trees, as much as possible</p> <p>Boring under root systems when trenching for utilities rather the cutting through them where possible</p> <p>Staging construction equipment to avoid compaction of soils over the root systems of trees</p> <p>Limiting grading or the placement of fill as much as possible in close proximity to trees</p> <p>Incorporating provisions ensure supply and drainage of both water and air if fill is placed around a tree.</p> <p>Minimizing trimming and removal of vegetation to accommodate construction equipment ingress and egress as much as possible</p> <p>Avoiding collision of equipment with trees and other vegetation and placing protective armoring around tree trunks in close proximity to construction activities to minimize potential adverse effects to bark, etc. resulting from collision</p> <p>Implementing erosion and sediment control practices to contain soils exposed during construction and to avoid offsite transport of soil on construction equipment and vehicles to ensure that the potential offsite related to the spread of exotic invasive species associated with construction</p>
		Operational Impacts	<p>Potential for car/animal conflicts would increase.</p> <p>Possible fragmentation of habitats.</p> <p>Disturbance to wildlife from increased presence of cars and streetlights.</p> <p>However, most of the urban wildlife has adapted to living in cities and among people and cars, opening the road should have little overall affects.</p>	
Water Resources	<p>Soils would continue to be displaced into Klingle Creek.</p> <p>Water quality would continue to degrade within Klingle Creek and Rock Creek.</p> <p>No additional impacts to groundwater.</p>	Construction Impacts	<p>Potential for increased sedimentation from runoff arising from construction activities as old road surface is removed.</p> <p>Alternatives D1 and D2 could be expected to have some small additional water resources impacts beyond the other alternatives. However, in the existing urbanized project area, the contribution of surface runoff to Klingle Creek by the build alternatives would be small and the differences among the alternatives would negligibly impact this total contribution.</p> <p>No impacts to wetlands or floodplains</p> <p>Little if any impacts to groundwater.</p>	<p>Construction design plans and environmental compliance, as well as implementation of best management practices, would be critical to mitigate potential water quality impacts, and would be similar to those discussed above in Topography, Geology, and Soils.</p> <p>No mitigation measures would be needed for normal operational impacts other than routine maintenance of the storm water sewer and Klingle Road.</p>
		Operational Impacts	<p>Implementation of any of the build alternatives would result in major reductions in stormwater flows and channel velocities in Klingle Creek that would decrease stormwater erosion and improve water quality.</p>	

Impact Topics	No Action/No Build	Sources of Impacts	Build Alternatives (B1, B2, C (Preferred), D1, D2)	Mitigations
Transportation	No change in current traffic patterns	Construction Impacts	Local adverse impacts to local traffic and parking from construction activities (e.g., truck traffic, workers private vehicles)	<p>Prepare traffic management plan for construction.</p> <p>Periods of construction would coincide with times to avoid A.M. and P.M. rush hours.</p> <p>Additional signage would be installed to direct construction traffic.</p> <p>Construction times would coincide with periods when people are most likely to be away from home, lessening impacts to local parking.</p>
		Operational Impacts	<p>Overall impacts, both beneficial and adverse, to traffic would be minor.</p> <p>Very slight increases in travel time on Woodley Road and other local roads that connect to Klingle Road.</p> <p>Alternatives B1 and B2 (one-way westbound) would provide access on a one-way westbound Klingle Road for a little over half the vehicles that would use the road under the two-way options of Alternatives C, D1, and D2.</p> <p>Under Alternatives B1 and B2, the primary intersections surrounding Klingle Road would experience little if any delay times.</p> <p>Alternatives C, D1, and D2 would provide two-way access on Klingle Road. Similar to Alternatives B1 and B2, most intersections would experience no perceptible change in vehicle delay times, except at the intersection of Beach Drive and Porter Street. Both delay times and LOS would be increased in the short and long-term.</p>	
Cultural Resources	<p>Existing retaining walls along the creek would not be repaired, and stormwater damage would not be corrected.</p> <p>There would be no short-term or long-term direct impacts to archaeological sites, historic districts or structures that may exist on the site.</p> <p>Potential for the gradual loss of unknown archaeological resources that may occur on the site by erosion.</p>	Construction Impacts	<p>Likely impacts to existing retaining walls, negligible where there are no obvious changes, moderate adverse impact where walls are partially dismantled, beneficial impacts where the wall is maintained and preserved, and where a wall is stabilized.</p> <p>Road construction under Alternatives B1, B2, and C would be very unlikely to have more than a negligible effect on archaeological resources.</p> <p>Under D1 and D2, additional grading of land may impact yet discovered archaeological deposits.</p>	<p>Reconstruction of retaining walls using original or similar materials.</p> <p>If Alternative D1 or D2 were selected, an archaeological survey of the area associated with the construction zone would be done to determine whether or not significant archaeological resources are present. If so, the DDOT would develop a plan to avoid, minimize, or mitigate adverse effects to such resources.</p> <p>Prior to installation of the stormwater sewer, an archaeological survey of the area associated with the stream stabilization measures to determine whether or not significant archaeological resources are present. If sites were identified, DDOT would develop a plan to avoid, minimize, or mitigate adverse effects to such resources.</p>
		Operational Impacts	<p>No measurable impacts on archeological resources that may occur on the site.</p> <p>Stormwater management features and restoration efforts to Klingle Creek would have net beneficial impacts on any streamside archaeological resources.</p>	
Air Quality	No impacts to current air quality.	Construction Impacts	Limited increases in the related CO, PM, fugitive dust, and other criteria pollutants from construction activities could impact local residents.	<p>Use low sulfur diesel fuel in off-road construction equipment.</p> <p>Where practicable, use diesel engine retrofit technology in off-road equipment to further reduce emissions. Such technology may include Diesel Oxidation Catalyst /Diesel Particulate Filters, engine upgrades, engine replacements, or combinations of these strategies.</p> <p>Limit unnecessary idling times on diesel powered engines to 3 ~ 5 minutes.</p> <p>Locate diesel powered exhausts away from fresh air intakes.</p> <p>Utilize water or appropriate liquids for dust control during demolition, land clearing, grading, on materials stockpiled on the ground surfaces, and other activities.</p> <p>Cover open-body trucks for transporting materials.</p> <p>Control dust related to construction site through a soil erosion sediment control procedures.</p>
		Operational Impacts	While there would be slight increases in levels of air pollutants, implementation of any of the build alternatives would have insignificant impacts on air quality and would comply with the rules and the requirements of the Clean Air Act.	

Impact Topics	No Action/No Build	Sources of Impacts	Build Alternatives (B1, B2, C (Preferred), D1, D2)	Mitigations
Noise (see Section 4.9)	No impacts to current noise levels.	Construction Impacts	Increases in the ambient noise levels from construction activities. Short-term adverse impacts to sensitive receptors	Air compressors and construction equipment shall meet current EPA noise emission exhaust standards. Minimizing potential nighttime construction activities.
		Operational Impacts	Slight increases in ambient noise levels from traffic. However these noise levels would not approach or exceed the FHWA Noise Abatement Criteria of 67 dBA for category B receptors. Noise impacts would be slightly less under Alternatives B1, and B2, as only about half the number of cars would be expected to utilize the road.	
Socioeconomic (see Section 4.10)	No impacts are expected.	Construction Impacts	Construction impacts would be negligible on social and economic factors in the study area. Noise, dust and potential inconveniences relating to construction traffic would be the only likely adverse impacts on the surrounding communities.	See mitigations for noise and air quality for construction impacts. No long-term mitigations are expected to be implemented for the operation of Klingle Road and stormwater sewer.
		Operational Impacts	It is unlikely that there would be any impacts on economic factors within the study area. There is no indication that traffic on this road will affect incomes or house values in the study area. Under any of the build alternatives, reopening Klingle Road for vehicular use would most likely have only negligible impacts since the road is located adjacent to National Park Land which would remain undeveloped.	
Infrastructure (see Section 4.11)	No impacts on the sanitary sewer, gas lines, or electrical conduits that are present beneath Klingle Road. The storm water sewer system would not be repaired and remain not functional.	Construction Impacts	There would likely be no physical impacts to sanitary sewer, gas lines, and electrical conduits, as care would be taken to avoid all underground utilities during construction. Services may be temporarily affected during construction activities. During installation of the new stormwater sewer system, the old system would first have to be removed, leaving the area without a functioning stormwater sewer system for a period of time. However, since mitigation measures would be utilized during the installation to protect soils, water, and vegetation, adverse impacts to the resources of Klingle Valley would be less than those that would occur under the No Action/No Build Alternative.	Care would be taken during construction activities so as to avoid all underground utilities. To minimize this impacts of temporarily shutting off services (e.g., gas and electricity), advanced notice would be given to those affected, and most likely the interruption of service would coincide with periods when people would most likely be away from their homes. Regular maintenance of storm water sewer system after installation is complete. If, during construction, infrastructure is found to be outdated or in disrepair, the system would either be replaced or repaired.
		Operational Impacts	The installation of a new storm water sewer system would have long-term beneficial impacts by replacing the current non-functioning system, with one that effectively controls overland storm water flow.	
Safety	While public access is restricted by fences, jersey barriers, and signage due to safety deficiencies within the project areas, people still trespass and use the area for recreation purposes. Hazards to public safety along the current alignment of Klingle Road would remain and grow worse as soil continues to be eroded from underneath the roadbed.	Construction Impacts	Because the construction area would be closed to the public there should be no adverse impacts to public health or safety.	Fences, barricades, signs, and construction personnel that limit public access to the construction site. Guardrails and street lighting would be installed to increase public safety.
		Operational Impacts	Overall beneficial impacts to public health and safety would be seen as current hazards are removed or remediated. Alternatives B2 and D2 would provide additional benefits users with the installation of a recreation trail that runs along Klingle Road minimizing conflicts between pedestrians and motorists. Safety issues potentially could arise from those alternatives that do not include a recreation path. Conflicts could arise between automobiles, pedestrians, and cyclists. These conflicts, however, are not expected to have an appreciable effect on public health and safety. People throughout the city currently bike and jog on public roadways without much adverse impacts to public safety. Those people driving on Klingle Road would be restricted by slower speed limits, which would provide both driver and recreational user more reaction time to avoid an accident.	
Hazardous Materials (Lead Abatement under Glover Bridge)	Prior to the start of any of the proposed alternatives (No Action/No Build, B1, B2, C, D1, and D2) DDOT would be responsible for removing all lead contaminated soils in the areas beneath and adjacent to Glover Bridge. In addition, lead paint that is currently peeling off the bridge would be removed, and the bridge would be re-painted to avoid further contamination. No impacts would result from of the proposed alternatives on this action, as the clean-up effort would be done prior to any proposed action.			Sampling would be done to determine whether the existing sampling data adequately cover the planned construction area. DDOT would perform a Phase I Environmental Site Assessment in accordance with the (ASTM) Standard E1527-00 to determine whether any additional hazardous materials are present. All potential aboveground and underground sources of hazardous waste in the project area would be investigated.

[Page intentionally left blank]