

CC2DCA

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ENVIRONMENTAL ASSESSMENT

CRYSTAL CITY TO RONALD REAGAN WASHINGTON NATIONAL AIRPORT
MULTIMODAL CONNECTION



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
VIRGINIA DEPARTMENT OF TRANSPORTATION

ENVIRONMENTAL ASSESSMENT

Crystal City to Ronald Reagan Washington National Airport Multimodal Connection

Arlington, Virginia

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ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ACS	American Community Survey
ADA	Americans with Disabilities Act
ART	Arlington Transit
BID	Business Improvement District
CC2DCA	Crystal City to Ronald Reagan Washington National Airport Multimodal Connection
CEP	Arlington County Community Energy Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CSXT	CSX Transportation
CZMP	Coastal Zone Management Program
DCA	Ronald Reagan Washington National Airport
EA	Environmental Assessment
EO	Executive Order
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
GW Parkway	George Washington Memorial Parkway
HQ2	Amazon second headquarters
LOD	Limit of Disturbance
MARC	Maryland Area Regional Commuter Rail
MTP	Master Transportation Plan
MVMH	Mount Vernon Memorial Highway

MWAA	Metropolitan Washington Airports Authority
NEPA	National Environmental Policy Act
NPS	National Park Service
NRHP	National Register of Historic Places
RF&P	Richmond, Fredericksburg, and Potomac Railroad
ROM	Rough Order of Magnitude
RPA	Resource Protection Area
RTPP	Regional Transportation Priorities Plan
TNC	Transportation Network Company
TPB	Transportation Planning Board
TSM	Transportation System Management
U.S.	United States
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USC	United States Code
VaFWIS	Virginia Fish and Wildlife Information Service
VDOT	Virginia Department of Transportation
VPRA	Virginia Passenger Rail Authority
VRE	Virginia Railway Express
WMATA	Washington Metropolitan Area Transit Authority

1 Purpose and Need

On behalf of Arlington County, the Virginia Department of Transportation (VDOT) in coordination with the Federal Highway Administration (FHWA), as the lead federal agency, has prepared this Environmental Assessment (EA) for the Crystal City to Ronald Reagan Washington National Airport Multimodal Connection (CC2DCA) Study (the Study), in accordance with the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations.¹ The Study considers a multimodal connection between Crystal City in Arlington County, Virginia, and Ronald Reagan Washington National Airport (DCA) to meet the needs of pedestrians, bicyclists, and micromobility users.² The Study Area is shown in **Figure 1-1**.

This EA was prepared in accordance with FHWA and Council on Environmental Quality regulations implementing NEPA (23 CFR 771 and 40 CFR 1500-1508, respectively), which provide direction regarding implementation of the procedural provisions of NEPA, and the FHWA's *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (Technical Advisory T6640.8A, October 1987).³ The environmental review process was carried out following the *National Environmental Policy Act and Clean Water Act (Section 404) Merged Process for Highway Projects in Virginia* (Merged Process) between VDOT, FHWA, the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), and the U.S. Fish and Wildlife Service.⁴ FHWA is the lead federal agency for the CC2DCA Study, while USACE and USEPA have agreed to be Concurring and Cooperating Agencies, along with the National Park Service (NPS).

This chapter presents the Purpose and Need for the action being considered by the CC2DCA Study. The following sections describe the CC2DCA Study Area and existing transportation services; the history of the Study up to initiation of the EA; and the current and future transportation needs in the Study Area. The chapter concludes with a statement of Purpose and Need.

¹ 23 CFR 771.109(c)(2). Environmental Impact and Related Procedures: Applicability and responsibilities.

² Micromobility refers to small, low-speed vehicles for individual use, including electric scooters, electric-assist bicycles, and bikeshare systems. Micromobility can support multimodal transportation by extending the reach of transit; its users typically need the same infrastructure and safety features as bicyclists.

³ FHWA. Technical Advisory T6640.8A, [Guidance for Preparing and Processing Environmental and Section 4\(f\) Documents](#). October 1987. Accessed on December 21, 2021.

⁴ VDOT. [National Environmental Policy Act and Clean Water Act \(Section 404\) Merged Process for Highway Projects in Virginia](#). Accessed on December 21, 2021. The Merged Process facilitates an environmental review process and development of documentation that comply with the requirements of NEPA and provide sufficient information to support FHWA approval or Federal regulatory decision-making. The merged process identifies five concurrence points – Methodologies, Purpose and Need, Range of Alternatives, Preferred Alternative, and Conceptual Mitigation. Concurring Agencies are Federal agencies that have accepted VDOT and FHWA's invitation to concur on these points. Concurring Agencies are also Cooperating Agencies as defined in 40 CFR 1508.1(e).

1.1 Description of CC2DCA Study Area

The CC2DCA Study Area is located in Arlington County, Virginia and includes lands owned by the Federal government and administered by NPS and the Metropolitan Washington Airports Authority (MWAA). It is bounded by 6th Street South and Roaches Run (exclusively) to the north; DCA (inclusively of landside facilities west of Smith Boulevard only) to the east; the Airport Access Road/Route 233 bridge (inclusively) to the south; and Crystal Drive (inclusively) to the west (see **Figure 1-1**). The Study Area is large enough to encompass the alignment of any reasonable potential alternatives for a new connection between Crystal City and DCA. The area within which the impacts of a CC2DCA connection would occur may be different and vary according to the resource considered. Resource-specific study areas are defined in Chapter 3, as applicable.

1.1.1 Land Use

The CC2DCA Study Area can be divided into four sub-areas with distinct characteristics. Moving west to east, these areas are:

- **Crystal City.** Crystal City is a linear neighborhood of Arlington County bounded by Richmond Highway to the west and the Richmond, Fredericksburg, and Potomac (RF&P) railroad right-of-way, shared and jointly controlled by the Virginia Passenger Rail Authority (VPRA) and CSX Transportation (CSXT), to the east. Crystal City consists of multi-story buildings containing a mix of office, commercial, and residential uses. This portion of the Study Area also includes Crystal City Water Park and the Virginia Railway Express (VRE) Crystal City Station. The future east entrance to the Crystal City Metrorail Station is located at the intersection of Crystal Drive and 18th Street South, near Water Park and the VRE station.
- **Railroad Corridor (VPRA/CSXT rail corridor).** The railroad corridor consists of three railroad tracks and is shared and jointly controlled by the Virginia Passenger Rail Authority (VPRA) and CSX Transportation (CSXT). The tracks converge on the Long Bridge which crosses the Potomac River to north of the study area. The corridor is used by freight and passenger trains, including VRE trains.
- **George Washington Memorial Parkway (GW Parkway).** GW Parkway is a major feature of the Study Area. It is a unit of the National Park Service (NPS) consisting of a scenic parkway that honors the nation's first president. Authorized by the Capper-Cramton Act of 1930,⁵ the GW Parkway protects and preserves cultural and natural resources along the Potomac River south of Great Falls to Mount Vernon and is part of the comprehensive system of parks, parkways, and recreational areas surrounding the

⁵ [Capper-Cramton Act of 1930](#) (46 Stat. 482). Accessed on December 12, 2021.

nation's capital.⁶ In addition to being a park, the GW Parkway is also an historic resource listed in the National Register of Historic Places (NRHP).⁷ The section of the GW Parkway within the Study Area includes the Mount Vernon Memorial Highway, which is also listed in the NRHP.⁸ The GW Parkway includes the Mount Vernon Trail. The section of the Mount Vernon Trail within the Study Area was opened in 1972 and is eligible for listing in the NRHP.

- **Ronald Reagan Washington National Airport (DCA).** DCA is located to the east of the GW Parkway. Airport facilities included in the Study Area consist of access roadways (including West Entrance Road, National Avenue, and Thomas Avenue), parking garages, and other landside support facilities. Airside facilities (gates, runways, and taxiways) are not within the Study Area. DCA is owned by the Federal government. It is leased and operated by MWA. ⁹ The Washington National Airport Terminal and South Hangar Line are listed in the NRHP.¹⁰ In addition, the Abingdon Research Station/Department of Transportation Laboratory Buildings and Abingdon Ruins have been determined eligible for listing in the NRHP.

1.1.2 Transportation Network

The Study Area is served by a multimodal transportation network that facilitates travel by foot, bicycle, scooter, bus, Metrorail, commuter rail, automobile, and airplane. Within Crystal City, a grid network of streets provides sidewalks and crosswalks at intersections and midblock, both signalized and unsignalized. Striped bike lanes are located along southbound Crystal Drive between 12th Street South and Potomac Avenue, and then following Potomac Avenue to Four Mile Run. In the northbound direction, striped bike lanes run from Four Mile Run along Potomac Avenue to Crystal Drive and on Crystal Drive from 23rd Street South to 12th Street South. Striped bike lanes also run southbound on South Clark Street between 20th Street South and the Metroway station north of 23rd Street South. The southbound striped bike lane picks up again south of the 23rd Street South intersection and runs to 27th Street South. Within Crystal City, there are multiple Capital Bikeshare stations. Several local and commuter bus routes serve Crystal City, providing local and regional connectivity. Local bus routes that serve the Study Area include Washington Metropolitan Area Transit Authority (WMATA) Metrobus Routes 23A and 23B; Arlington Transit (ART) 43; and Fairfax Connector 599.

⁶ National Park Service. [Foundation Document, George Washington Memorial Parkway](#). 2014. Accessed on February 9, 2023.

⁷ National Register of Historic Places. [Registration Form, George Washington Memorial Parkway](#). 1995. Accessed on December 21, 2021.

⁸ National Register of Historic Places. [Nomination Form, Mount Vernon Memorial Highway](#). 1981. Accessed on December 21, 2021.

⁹ MWA. [MWA History and Facts](#). Accessed on December 21, 2021.

¹⁰ National Register of Historic Places. [Registration Form, Washington National Airport Terminal and South Hangar Line](#). 1997. Accessed on February 9, 2023.

In addition to this pedestrian and bicycle network, key transportation features in the Study Area and Crystal City are described below and shown in **Figure 1-2**.

- The **Mount Vernon Trail** is part of the GW Parkway. It is an 18-mile paved shared-use trail for pedestrians and cyclists that stretches from Mount Vernon to Theodore Roosevelt Island and provides multiple connections to the regional trail system.¹¹
- The **Crystal City Connector**. This trail provides a connection between Crystal City and the Mount Vernon Trail at Crystal City Water Park via a tunnel underneath the railroad right-of-way.¹²

Metroway. Metroway is a Bus Rapid Transit (BRT) WMATA service that operates in both dedicated lanes and mixed traffic from the Braddock Road Metrorail Station to the Pentagon City Metrorail Station via Potomac Yard and Crystal City.¹³

- **Metrorail.** The Metrorail Blue and Yellow Lines serve Crystal City and DCA. The current entrance to the Crystal City Metrorail Station is located at 18th Street South and South Clark Street.¹⁴ The Ronald Reagan Washington National Airport Metrorail Station is an elevated structure located between Terminal 2 of the airport and the airport's parking garage. Station entrances are at the north and south end of the station platform, connecting to Terminal 2 via bridges.¹⁵
- **Virginia Railway Express (VRE).** The VRE Crystal City Station is one of the busiest stations in VRE's commuter rail system, serving approximately 800,000 trips annually before the COVID-19 pandemic. The current station consists of a single side platform with access on the north end of Water Park, east of Crystal Drive.¹⁶
- Within Crystal City, north-south vehicular circulation is primarily via **Crystal Drive**, supplemented by South Clark and South Bell Streets. East-west cross streets provide connectivity within Crystal City and across Richmond Highway. The main cross streets are, from north to south, 15th Street South, 18th Street South, and 23rd Street South.¹⁷
- At the southern end of Crystal City, Richmond Highway connects to Virginia Route 233, also known as **Airport Access Road**, through a network of ramps. While signed as a Virginia state route, the road is federally owned and is administered by MWAA.¹⁸
- The **roadway within the GW Parkway** runs through the entire length of the Study Area. An NPS-administered facility, the roadway is generally two lanes in each direction. The

¹¹ NPS. [Mount Vernon Trail](#). Accessed on December 21, 2021.

¹² Arlington's Car-Free Diet. [Getting Around Crystal City](#). Accessed on December 21, 2021.

¹³ City of Alexandria. [National Landing-Potomac Yard Metroway](#). Accessed on December 21, 2021.

¹⁴ WMATA. [Rider Guide, Crystal City](#). Accessed on December 21, 2021.

¹⁵ WMATA. [Rider Guide, Ronald Reagan Washington National Airport](#). Accessed on December 21, 2021.

¹⁶ VRE. [Crystal City Station Improvements Alternatives Analysis](#). Accessed on January 13, 2022.

¹⁷ Arlington County. [Crystal City Sector Plan](#). Accessed on January 13, 2022.

¹⁸ AARoads. [State Route 233](#). Accessed on January 13, 2022.

GW Parkway has two exits to DCA in the southbound direction, one at the north of the airport and the other at Airport Access Road. In the northbound direction, only one exit, at the northern end of the airport, is currently provided. The GW Parkway does not have an exit providing direct access to Crystal City.¹⁹

- **DCA** is one of three commercial airports serving Metropolitan Washington and, along with Washington Dulles International Airport, one of two administered by MWA. DCA has 60 gates. In 2019, the last full year before the COVID-19 pandemic affected air travel, DCA served approximately 23.9 million passengers.^{20,21}

1.1.3 Existing Walking Routes between Crystal City and DCA

Travelers can currently walk or bicycle between Crystal City and DCA via two routes: a northern connection that makes use of the existing trail network or a southern route that makes use of the existing sidewalk network. As seen in **Figure 1-3**, the northern route starts at the Crystal City Water Park and crosses underneath the VPRA/CSXT railroad right-of-way via a tunnel that is part of the Crystal City Connector. East of the railroad tracks, the route follows the Connector trail alongside the access ramp to DCA that links the southbound GW Parkway to West Entrance Road and passes under the main GW Parkway roadway (North Entrance Underpass). In the underpass, the Connector trail is narrow (approximately 5.5 feet wide) and constrained between a protective railing on the north side and the bridge abutment on the south side.

After the underpass, the northern route continues to follow the Connector trail, which makes a nearly 360-degree uphill turn to merge with the Mount Vernon Trail. Travelers to the airport then mix with bicyclists, runners, and pedestrians on the Mount Vernon Trail for approximately 1,500 feet before turning off the trail. The northern route then takes travelers through an airport maintenance yard; across a roadway providing vehicular access to the maintenance yard from West Entrance Road; through a tunnel under West Entrance Road (approximately 100 feet long and 9 feet wide); into the airport parking garage via a sidewalk; and through the garage to the airport terminal.

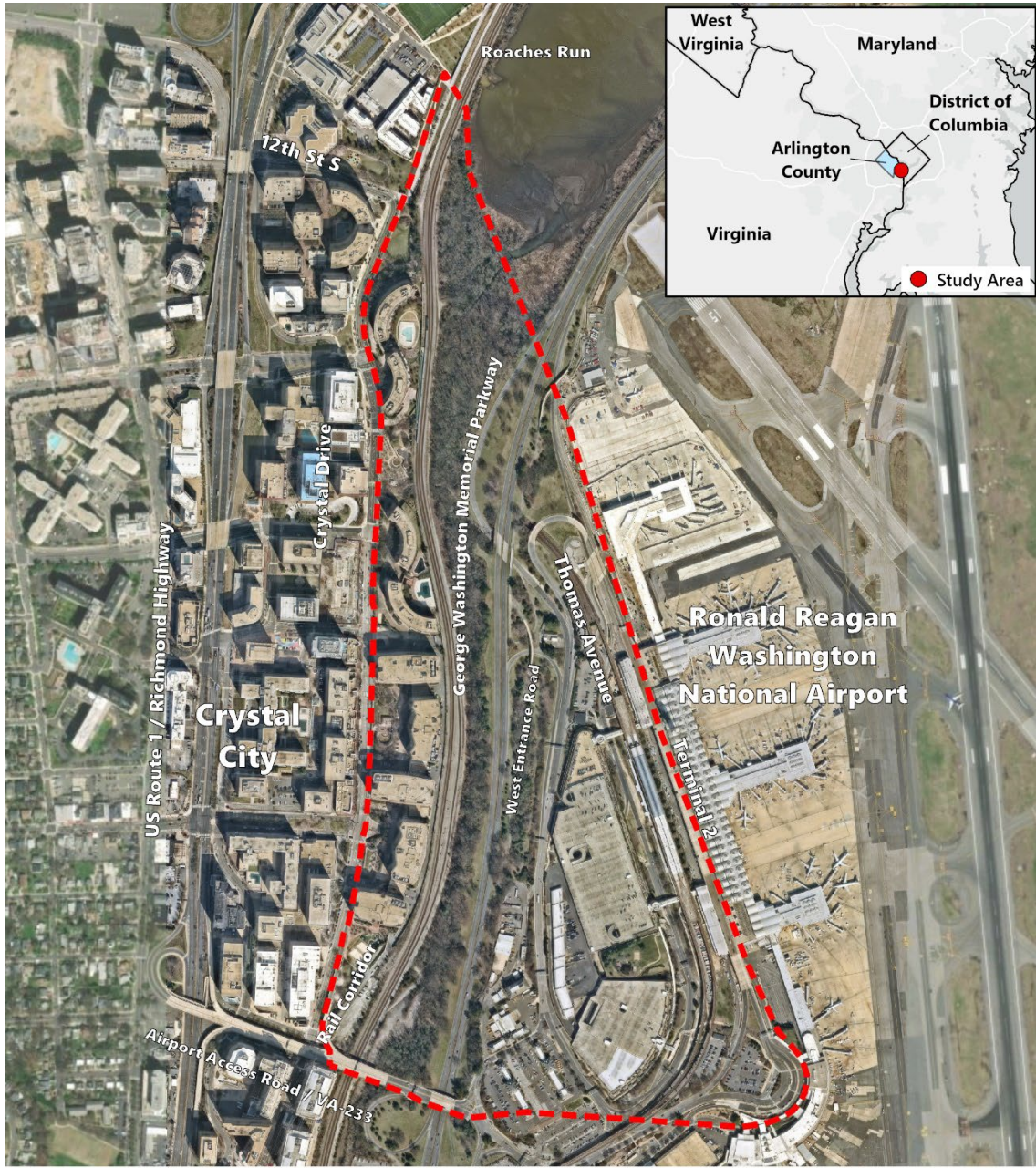
At the southern end of Crystal City, as shown in **Figure 1-3**, travelers making use of the southern route must follow the Airport Access Road to walk or bike to the airport. This route requires walking up the narrow, steep sidewalk along the off-ramp to Crystal Drive and continuing on a narrow sidewalk adjacent to the Airport Access Road (Virginia Route 233) and from there connecting to sidewalks that run along the airport road network and the Metrorail tracks.


¹⁹ NPS. [Public Transportation](#). Accessed on January 13, 2022.

²⁰ Throughout this document, existing travel activity is described based the most recent data available prior to the COVID-19 pandemic. While changes to travel behavior may occur post-pandemic, those patterns are not yet clear and, therefore, cannot be used to establish needs.

²¹ MWA. [Air Traffic Statistics](#). Accessed on January 13, 2022.

Figure 1-1 Study Area



 Study Area

CC2DCA | Crystal City, Arlington, VA

Study Area

Source: NearMap

Figure 1-2 Transportation Infrastructure in Crystal City

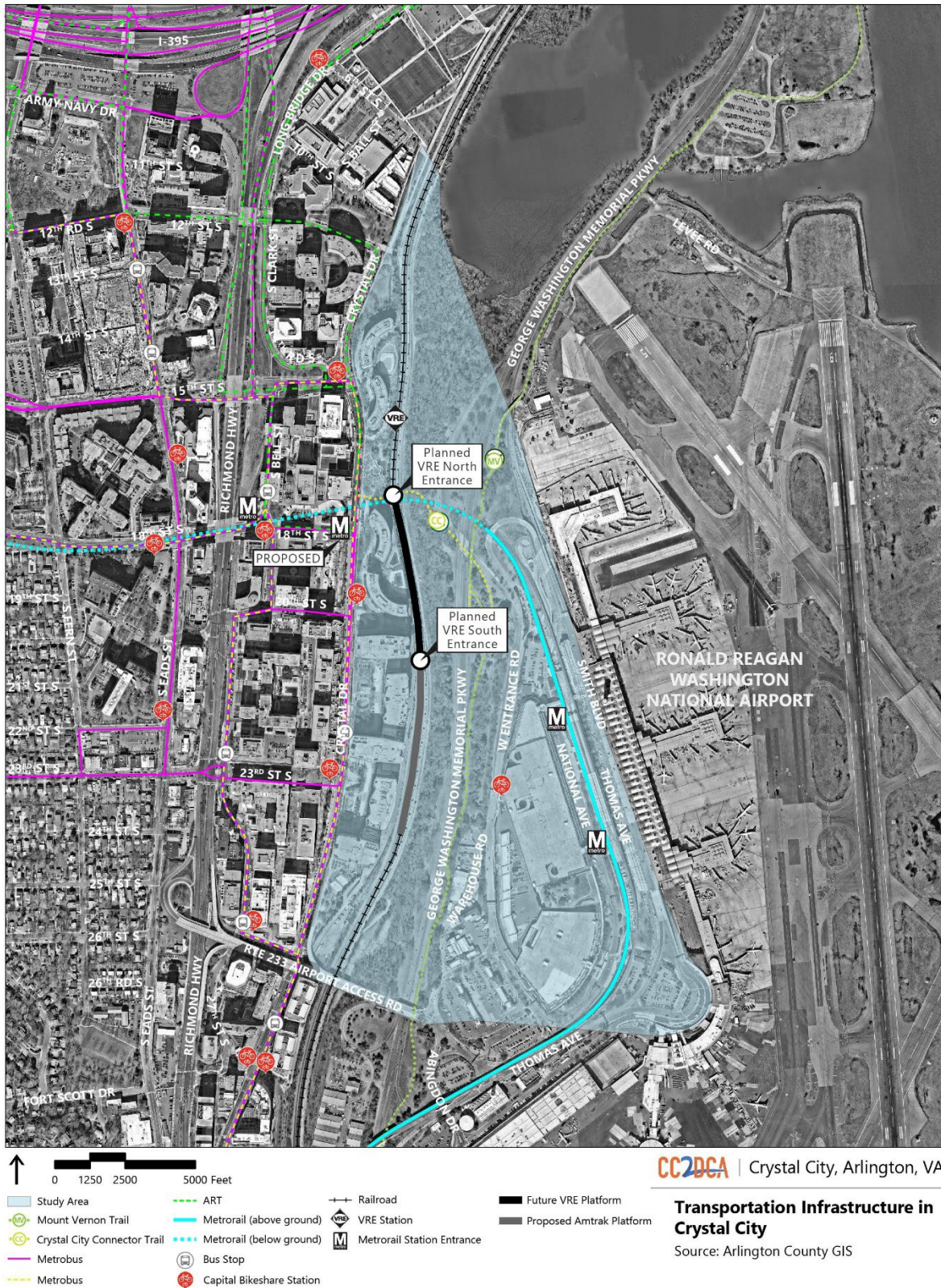
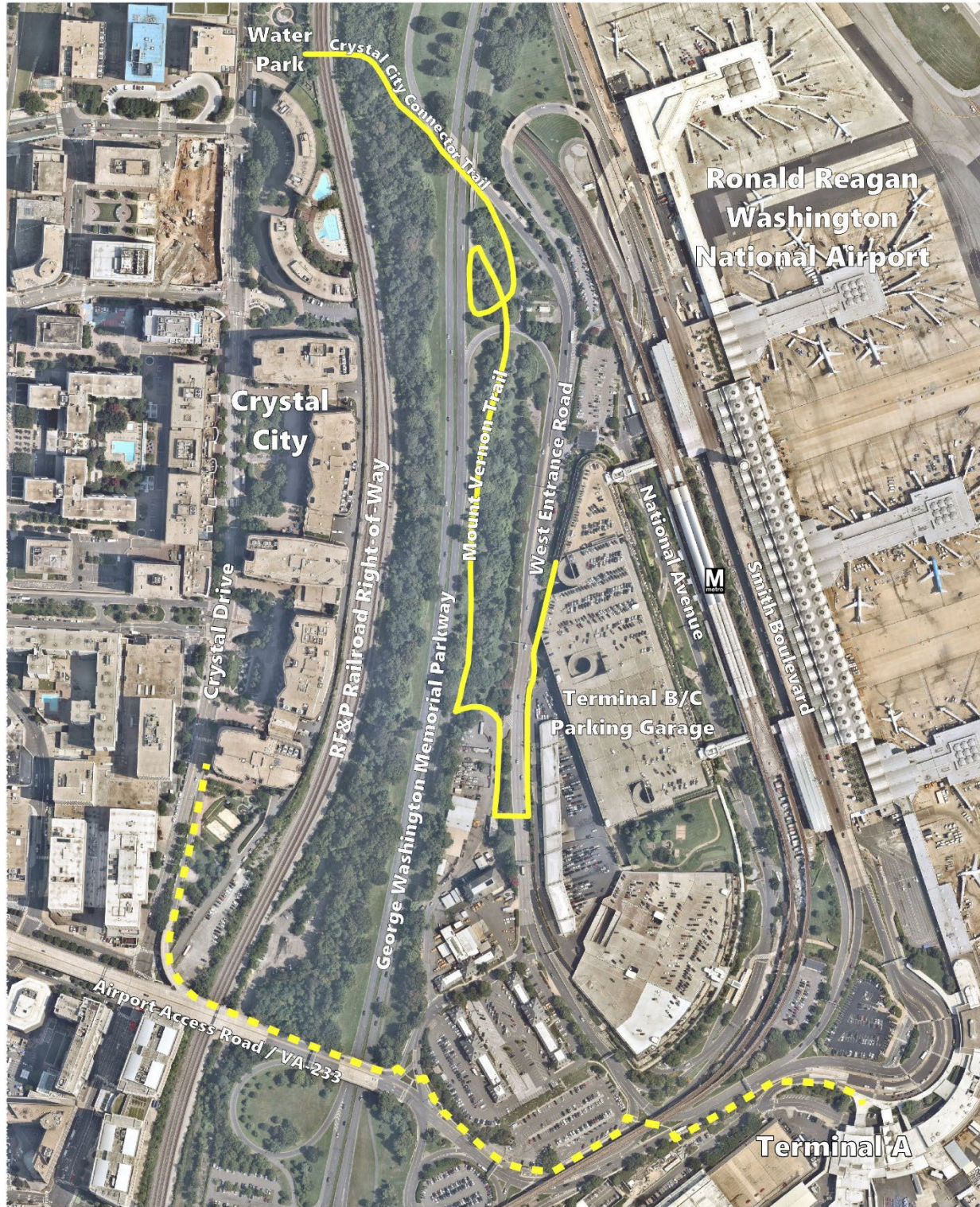


Figure 1-3 Existing Pedestrian and Bicycle Routes between Crystal City and DCA



— Northern Route - - - Southern Route

CC2DCA | Crystal City, Arlington, VA

**Existing Pedestrian and Bicycle Routes
between Crystal City and DCA**

Source: NearMap, Arlington County GIS

1.2 Study History

In 2010, Arlington County adopted the *Crystal City Multimodal Transportation Study*,²² a supporting study to the *Crystal City Sector Plan*.²³ The study made transportation improvement recommendations for the Crystal City area, including constructing “a high-quality bicycle and pedestrian trail connection between Crystal City and the airport.” As shown in the *Crystal City Multimodal Transportation Study*, this connection was envisioned as extending between the Mount Vernon Trail and the southern tip of the Terminal 2 parking garage. In addition, the *Crystal City Multimodal Transportation Study* and the *Crystal City Sector Plan* make specific recommendations that promote multimodal connectivity, including streets designed for all users; transit-pedestrian amenities; cycling connections using existing long-haul trails; and improved airport connections. These recommendations provide the context within which the present study developed.

In 2017, the Crystal City Business Improvement District (now known as the National Landing Business Improvement District [BID]) initiated a feasibility assessment that looked at how to connect Crystal City and its myriad transportation options to the airport.²⁴ The feasibility assessment evaluated various alignments and facility types to serve existing development and planned growth in Crystal City. Although the present study borrowed its name (CC2DCA) from the BID’s study, it is a separate and independent effort.

During development of its fiscal year 2019-2028 Capital Improvement Plan, Arlington County created a new project in the Crystal City, Pentagon City, Potomac Yard Streets Program to conduct alternatives analysis and preliminary planning for a connection between Crystal City and DCA.²⁵ The project had limited funding due to budget constraints.

In late 2018, with the announcement of an agreement to bring Amazon’s HQ2 to Crystal City, the Commonwealth of Virginia identified a CC2DCA connection as one of five transportation projects to be fully or partially funded by the Commonwealth.²⁶ VDOT added the project to its Six-Year Improvement Program in 2019.²⁷ This included an allocation of \$9.5 million in federal funding for project planning, NEPA documentation and preliminary engineering.

²² Arlington County. [Crystal City Multimodal Transportation Study](#). Accessed on January 13, 2022.

²³ Arlington County. [Crystal City Sector Plan](#). Accessed on January 13, 2022.

²⁴ National Landing Business Improvement District. [CC2DCA: Crystal City to DCA](#). Accessed on January 13, 2022.

²⁵ Arlington County. [2019-2028 Capital Improvement Plan](#). Accessed on January 13, 2022.

²⁶ Commonwealth of Virginia et al. [Memorandum of Understanding. Major Headquarters Program](#). Accessed on May 4, 2022.

²⁷ VDOT. [Six-Year Improvement Program](#). Accessed on January 13, 2022.

1.3 Needs – Existing Conditions

1.3.1 Overview

Travelers between Crystal City and DCA currently have multiple transportation options, including automobiles (whether driving or being driven), shuttles, Metrorail, and walking or biking. However, the existing network does not support active transportation, facilitate intermodal connectivity, or advance the goals of local and regional plans as summarized below and discussed in more detail in the following sections.

- **Support Active Transportation:** The shortcomings of the two existing routes for walking or biking between Crystal City and DCA limit the number of users who might choose an active transportation mode to make the connection. Both routes are indirect, not clearly signed, and their design is substandard or creates safety issues. The northern route is circuitous and convoluted. Sections of the route are not compliant with the Americans with Disabilities Act (ADA); have poor visibility; and create the opportunity for conflicts between pedestrians and bicyclists and between pedestrians and vehicles as described below. Meanwhile, the southern route features narrow sidewalks along busy roadways and requires crossing multiple roadways and parking lots. Key shortcomings of both routes are illustrated in **Figure 1-4**.
- **Facilitate Intermodal Connectivity:** Neither of the existing routes provides an air-rail connection with commuter and intercity rail or connections with other transit services such as Metroway and other bus services.
- **Advance Goals of Local and Regional Plans:** These routes also do not support local and regional plans that focus on providing a mix of high-quality transportation services that can move more people without traffic, including robust pedestrian and bicycle infrastructure.

1.3.2 Support Active Transportation

1.3.2.1 Limitations of Existing Routes

Northern Route

The primary shortcoming of the northern route is its circuitous and convoluted character. Other concerns about the northern route include design issues, usability, conflicts between pedestrians and vehicles, unclear routing, and visibility obstructions.

The total walking distance along the northern route to the airport garage is approximately 5,100 feet. Because of this, some travelers are known to take shortcuts based on visual cues, including dashing across West Entrance Road just past the North Entrance Underpass, where the road comes close to the trail and the proximity of the airport facilities “as the crow flies” creates a strong temptation to take a shortcut (see **Figure 1-5**). While no systematic study of such behavior has been conducted, it was reported in responses to the July-August 2021 CC2DCA

public engagement questionnaire when people were asked about how they access the airport.²⁸ It is also indirectly confirmed by observed walking paths worn into the grass across the landscaped areas between West Entrance Road and the nearest entrance to the airport garage.²⁹ This behavior is consistent with responses to the public engagement questionnaire, where 84 percent of respondents included directness in their top five priorities.

Moving from west to east (Crystal City to DCA), limitations of the existing northern route include:

- **The steep slope at the Water Park access point** is not compliant with ADA requirements and encourages southbound bicyclists to increase their speed, potentially creating safety concerns with pedestrians.
- **The bottleneck at the North Entrance Underpass**, where the narrow path cannot accommodate more than one user at a time safely and comfortably. This creates a high potential for conflicts, especially between pedestrians and bicyclists. The path in this location is heavily used – based on Arlington County’s bike counter at the Crystal City Connector, over 150,000 pedestrians and 140,000 bicyclists used this path in 2021. During site visits, it has been observed that at this location, pedestrians must step aside or wait to allow bicyclists to pass safely. The width of the path (5.5 feet) is well below the minimum paved width of 10 feet for a two-directional shared use path defined by American Association of State Highway and Transportation Officials (AASHTO) standards.³⁰
- **The substantial overlap with the Mount Vernon Trail**, a shared-use trail that carries approximately 1 million users annually.³¹ As noted in the *Mount Vernon Trail Corridor Study*, the northern section, which includes the portion of the trail in the CC2DCA Study Area, is the most heavily-used part of the Mount Vernon Trail, especially during peak commuting times.³² In the section between DCA and the 14th Street Bridge, the Mount Vernon Trail study documented an average of approximately four bicyclists per minute passing through a given point during peak commute times in the summer. Weekends also see heavy usage, with peak weekend usage at the section of the trail in the Study Area roughly matching peak weekday usage. On weekdays, approximately 13 percent of users at this location are pedestrians. This share rises to 22 percent on weekends.

²⁸ See Chapter 4 (*to be added*) for a description of public engagement activities and a summary of the comments received.

²⁹ Based on observations conducted in November 2020.

³⁰ AASHTO. [Guide for the Development of Bicycle Facilities, Fourth Edition](#). 2012. Accessed on January 20, 2022.

³¹ U.S. Department of Transportation Volpe Center and NPS, [Mount Vernon Trail Corridor Study](#). 2020. Accessed on January 14, 2022. Page 3.

³² U.S. Department of Transportation Volpe Center and NPS, [Mount Vernon Trail Corridor Study](#). 2020. Accessed on January 20, 2022. Page 9.

The Mount Vernon Trail averages 8 to 9 feet in width through the Study Area, which is below AASHTO minimum standards for two-way multi-use paths.³³ As noted in the 2020 *Mount Vernon Trail Corridor Study*, multiuse trails should be 10 feet wide at a minimum, with at least 11-foot width needed for a bicyclist to pass another user going in the same direction and allow a user coming in the opposite direction to continue traveling safely. As a result of the *Mount Vernon Trail Corridor Study*, NPS plans to widen this section of the trail to 11 feet. The AASHTO *Guide for Bicycle Facilities* also recommends separating bicyclists and pedestrians in areas with very heavy usage, using at least a 5-foot bi-directional pedestrian section and 10-foot section for bicyclists with separate bicycle travel lanes for each direction, for a total of 15 feet. Wider paths are also recommended where there is significant use by inline skaters, adult tricycles, children, or other users that need more operating width.³⁴ In its current condition, the Mount Vernon Trail cannot accommodate such travelers in accordance with AASHTO standards. High usage by recreational and commuter bicyclists exacerbates the potential for conflict between pedestrians carrying luggage and possibly unfamiliar with the area and bicyclists given the speed differentials.

- **The crossing of an airport maintenance yard**, generating potential conflicts between DCA-bound pedestrians or bicyclists and vehicles and maintenance activities. Operators of maintenance trucks and equipment may not be on the lookout for pedestrians or bicycles, and vice versa. Inclement weather or darkness may exacerbate the risk. Past the yard, the tunnel under West Entrance Road is only 7 feet wide and is accessed via two long ramps that intersect the tunnel at a 90-degree angle, a geometry that inhibits visibility.

Southern Route

The southern route is less circuitous than the northern route (walking distance is approximately 2,800 feet from the bottom of the ramp to Terminal 1) but it starts at the southern end of the Crystal City neighborhood, meaning that many users would actually have a longer walk, depending on their origin or destination point. Limitations of this route include:

- **The steep ramp from Crystal Drive to Virginia Route 233**, which limits comfort and accessibility for all users.

³³ As noted in the executive summary of the *Mount Vernon Trail Corridor Study*, "The NPS originally constructed the Mount Vernon Trail in the 1970s and 1980s. During this period, there were no commonly held industry engineering standards, guidelines, or best practices for multi-use trails. Instead, the NPS based the design and ultimate alignment of the trail on a series of historical design concepts for bridle trails and footpaths. The trail is relatively narrow by modern standards, and characterized by meandering curves, timber bridges, and in some areas, dense vegetation." U.S. Department of Transportation Volpe Center and NPS, [Mount Vernon Trail Corridor Study](#). 2020. Accessed on January 20, 2022. Page x.

³⁴ U.S. Department of Transportation Volpe Center and NPS, [Mount Vernon Trail Corridor Study](#). 2020. Accessed on May 24, 2022. Page 41. AASHTO. [Guide for the Development of Bicycle Facilities, Fourth Edition](#). 2012. Accessed on May 24, 2022. Page 5-3.

- **Narrow sidewalks along busy roadways** – The existing sidewalk is between 5 and 6 feet wide, with some sections as narrow as 4.5 feet.
- **Crossings of multiple roadways**, including an only partially signalized crossing at West Entrance Road where both right-turning and left-turning traffic may conflict with pedestrian crossing.
- **Crossing of a parking lot** generally used for Transportation Networking Company (TNC) vehicle staging, creating the opportunity for pedestrian-vehicle conflicts.

Neither route was designed for the purpose of providing a link between Crystal City and DCA, which leads to some of their deficiencies – in particular the circuitous nature of each route and the sections of each route that require traversing parking lots and maintenance yards. The deficiencies of the existing pedestrian and bicycle routes related to length, directness, accessibility, and safety discourage their use by travelers who might otherwise walk or bike between Crystal City and DCA. Therefore, there is a need to address these routes’ limitations and provide a direct and safe connection that supports active transportation choice.

1.3.2.2 Limitations of Existing Modes

The 2019 *Washington-Baltimore Regional Air Passenger Survey - General Findings Report* found that 79 percent of travelers access DCA using a private vehicle, rental car, taxi, or TNC service, with 36 percent using TNCs.³⁵ StreetLight data show that approximately 7,200 daily trips occurred between Crystal City and DCA in 2019.³⁶ In 2019, Metrorail trips between Crystal City and DCA averaged approximately 500 per day.

Accessing DCA via vehicle from Crystal City requires driving on Richmond Highway, which currently carries more than 45,000 vehicles per day in the Crystal City and Pentagon City area. To the extent that travelers from Crystal City rely on TNC services and taxis to access DCA, this creates demands on finite curbside resources. As noted in the Transportation Planning Board (TPB)’s 2020 *Comprehensive Regional Air System Plan*, “Growing traffic congestion and surface transportation disruptors throughout the region continue to necessitate a greater amount of resources and strategic consideration be dedicated to each airport’s individual ground access facilities, as well as the system-wide infrastructure that connects the region’s air passengers and airport employees to the region’s airports.”³⁷

While Metrorail offers a non-vehicular option to travel between the two destinations, its convenience is limited by several factors. Metrorail is not available for early morning or late-night trips and its convenience is further reduced at certain times of day when frequencies are

³⁵ TPB. [Washington-Baltimore Regional Air Passenger Survey – General Findings Report](#). 2019. Accessed on January 20, 2022.

³⁶ [StreetLight data](#) are compiled using anonymized records from smart phones and navigation devices. Accessed on May 6, 2022.

³⁷ TPB. [Comprehensive Regional Air System Plan](#). 2020. Accessed on January 20, 2022.

less, or during peak times, when the trains are crowded and unfriendly to people with luggage. In addition, Metrorail is sometimes unavailable during periodic shutdowns for maintenance or repairs, which can last several days, weeks, or even months depending on the work to be done. The lack of early morning trips is particularly challenging for DCA flight crews and passengers booked on an early flight who need to be at the airport one hour or more before departure time. In Crystal City, the first train in direction of DCA arrives at 5:41 AM on weekdays and at 7:41 AM on weekends, whereas flights start leaving the airport at around 5:30 AM. Late arriving passengers and crews also have limited service during the week and on Sundays, with the last train to Crystal City leaving DCA at 11:45 PM or 11:50 PM (Saturday service at DCA runs until 12:50 AM).³⁸

To help address the issues associated with the predominance of vehicular travel between Crystal City and the airport, there is a need to encourage shifts to non-vehicular modes in addition to the option presented by Metrorail.

1.3.3 Facilitate Intermodal Connectivity

VRE serves Crystal City with 32 trains operating daily between Washington, DC and communities in Northern Virginia. As noted above, Crystal City is VRE's second most heavily used station. Yet, there is currently no direct connection between the Crystal City VRE Station and DCA. VRE passengers wishing to make that connection must leave the rail station and transfer to Metrorail, take a taxi or TNC, or use one of the existing pedestrian routes described above. Therefore, there is a need for a direct air-rail connection to improve intermodal connectivity in Crystal City consistent with the *Crystal City Multimodal Transportation Study* and to expand the options available to DCA's passengers and employees to travel to and from DCA.³⁹

Bus routes serving Crystal City include Metroway; two Metrobus routes providing service between Crystal City and Shirlington, Ballston, Tysons, McPherson Square, and Lincolnia Road; one ART route connecting to Court House via Rosslyn; one Fairfax Connector route serving Reston; and two commuter bus routes serving Dale City and Lake Ridge. There is currently no bus service to DCA. Prior to the COVID-19 pandemic, Metrobus 10N provided service between Crystal City and DCA but it has been suspended since August 2020. Additionally, this route only operated on weekends and outside Metrorail operating hours. Currently, airport-bound bus riders must transfer to Metrorail. When Metrorail is not running, these riders must either walk using one of the inadequate existing routes described above or take a taxi or TNC vehicle.

There is a need to improve intermodal connectivity in Crystal City consistent with the *Crystal City Multimodal Transportation Study* and expand the options available to DCA's passengers and employees who travel to and from DCA.⁴⁰

³⁸ WMATA. [Timetables](#). Accessed on May 5, 2022.

³⁹ Arlington County. [Crystal City Multimodal Transportation Study](#). 2010. Accessed on January 13, 2022.

⁴⁰ Arlington County. [Crystal City Multimodal Transportation Study](#). 2010. Accessed on January 13, 2022.

1.3.4 Advance the Goals of Local and Regional Plans

Transportation and land use planning in Arlington County has long focused on providing a mix of high-quality transportation services that can move more people without traffic, including robust pedestrian and bicycle infrastructure. Regional plans approved by the TPB also include goals related to providing a range of transportation options, linking transportation infrastructure and land use, and supporting inter-regional and international travel and commerce. The Arlington County Master Transportation Plan (MTP); Regional Transportation Priorities Plan (RTPP); Visualize 2045, a Long-Range Transportation Plan for the National Capital Region (Visualize 2045); the Crystal City Sector Plan; and Arlington County Community Energy Plan (CEP) are described below. Also described below is the NPS National Capital Region (NCR) Long Range Transportation Plan (LRTP), which sets forth a performance-based, 20-year vision for providing access to the region’s most special and iconic places.⁴¹

Overall, the goals of local and regional plans and policies include establishing a robust multimodal and intermodal network that provides a variety of transportation options, encourages the use of environmentally friendly transportation modes, and accommodates the needs of more travelers as the region and Crystal City grow. Therefore, there is a need to provide an effective transportation solution between Crystal City and DCA that aligns with regional and Arlington County transportation and environmental goals and supports the continued development of Crystal City as identified in the Sector Plan.

1.3.4.1 Arlington County Master Transportation Plan

The MTP is an integral component of the County’s Comprehensive Plan.⁴² Along with the General Land Use Plan, it ensures that land use and transportation planning are integrated. The MTP provides general guidance for Arlington’s transportation system through 2030. Arlington County’s goals as articulated in the plan include:

- Goal 1: Provide High-Quality Transportation Services
- Goal 2: Move More People Without More Traffic
- Goal 3: Promote Safety
- Goal 4: Establish Equity
- Goal 5: Manage Effectively and Efficiently
- Goal 6: Advance Environmental Sustainability

The MTP includes the policy to “actively manage County-controlled streets, parking, transit services, and commuter service programs to minimize the growth in single occupant vehicle

⁴¹ National Park Service. [National Capital Region Long Range Transportation Plan](#). Accessed on February 10, 2023.

⁴² Arlington County. [Master Transportation Plan](#). Accessed on January 19, 2022.

trips and to promote the use of all other modes of travel” (General Policy C - Manage Travel Demand and Transportation Systems).

The MTP identifies the need for better pedestrian and bicycle connections as part of the County’s approach to integrated land use and transportation planning. The current substandard connections via non-motorized modes from Crystal City to DCA do not meet this need.

1.3.4.2 Regional Transportation Priorities Plan

The TPB adopted the RTPP in 2014.⁴³ The RTPP calls for maintaining the region’s existing system of roadways and transit first, strengthening public confidence and ensuring fairness, and finding better, more efficient ways to move people and goods throughout the region. The RTPP identified the need to implement transportation options that boost the local and regional economy while advancing environmental equity.

1.3.4.3 Visualize 2045, a Long-Range Transportation Plan for the National Capital Region

Visualize 2045, approved by the TPB in 2018, takes a multimodal approach, relying not on any one travel mode to accommodate anticipated growth or to address the region’s diverse transportation challenges.⁴⁴ The plan presents and analyzes key land-use issues facing the region, considering the intricate link between land-use, economic vitality, and transportation. The plan identifies needs, including increasing the safety of the transportation system for motorized and nonmotorized users; promoting consistency between transportation improvements and State and local planned growth and economic development patterns; enhancing travel and tourism; and increasing accessibility and mobility of people. The Travel and Tourism Element (p. 85) notes the need to align transportation planning efforts with regional travel and tourism strategy (p. 89). It also includes the planning factor to “enhance the integration and connectivity of the transportation system across and between modes for people.”

1.3.4.4 Crystal City Sector Plan

One of the goals of the Crystal City Sector Plan, adopted by Arlington County in 2010, is to enhance multimodal access and connectivity (p. 26).⁴⁵ Objectives related to that goal include:

- Enhance Crystal City’s multimodal transportation infrastructure by designing transit facilities as integral architectural elements and improving overall transit, pedestrian, and bicycle access and connectivity.

⁴³ MWCOG. [Regional Transportation Priorities Plan](#). Accessed on January 19, 2022.

⁴⁴ TPB. [Visualize 2045: A Long-Range Transportation Plan for the National Capital](#). 2018. Accessed on January 19, 2022.

⁴⁵ Arlington County. [Crystal City Sector Plan](#). 2010. Accessed on January 19, 2022.

- Provide better connections to Reagan National Airport and the surrounding regional transportation network.

Specific recommendations in the plan that support the goal of enhanced multimodal access and connectivity include:

- Extend and enhance the bikeway and trail system of Crystal City, particularly its connections to the regional trail system and DCA (p. 48).
- Direct pedestrian and bicycle connection from the Mount Vernon Trail to Terminal 1 of DCA (p. 52).
- Direct pedestrian and bicycle connection from the Mount Vernon Trail to Terminal 2 of DCA (p. 52).

1.3.4.5 Arlington County Community Energy Plan

Arlington County adopted the CEP in 2019.⁴⁶ The CEP is an element of the County's comprehensive plan. The plan serves as both an integrated energy policy and climate action framework. The purpose of the CEP is to define Arlington's energy goals and identify energy policies that will drive Arlington to remain economically competitive, environmentally committed, and strategically served by secure, consistent, and reliable energy sources and programs that are equitably available to all constituents. Goal 4 of the CEP is to move more people with fewer greenhouse gas emissions (p. 25). A supporting policy of the goal is to reduce vehicle miles traveled and increase use of alternative and public transportation (multimodalism).

1.3.4.6 NPS National Capital Region Long Range Transportation Plan

The NPS-NCR LRTP was published in 2018. The plan "provides a strategy for using constrained transportation funding to ensure the most important transportation assets remain in good condition to support the National Park Service's highest-priority mission objectives in resource stewardship, visitor enjoyment, and safety."⁴⁷ The LRTP sets forth the following goal statements:

- **Asset Management:** Strategically manage, preserve, and maintain a right-sized and mission-focused portfolio of National Capital Region (NCR) transportation assets through an appropriate level of funding while sustaining long-term access to all transportation services.
- **Transportation Finance:** Sustainably manage an appropriate level of funding to accomplish the goals of the LRTP and pursue other opportunities to expand funding.

⁴⁶ Arlington County. [Community Energy Plan](#). 2019. Accessed on January 19, 2022.

⁴⁷ National Park Service. [National Capital Region Long Range Transportation Plan](#). Page xi. Accessed on February 10, 2023.

- **Resource Protection:** Incorporate the ideal of leaving park resources unimpaired into all aspects of transportation, including planning, design, construction, maintenance, and disposition.
- **Visitor Experience:** Provide sustainable and context sensitive multimodal transportation systems that support the visitor experience through universally accessible and seamless connections between parks, and to and from surrounding communities.
- **Safety and Security:** Enhance the safety of transportation system users and provide a transportation system that is resilient to human-made hazards.

Figure 1-4 Shortcomings of Existing Pedestrian and Bicycle Routes between Crystal City and DCA

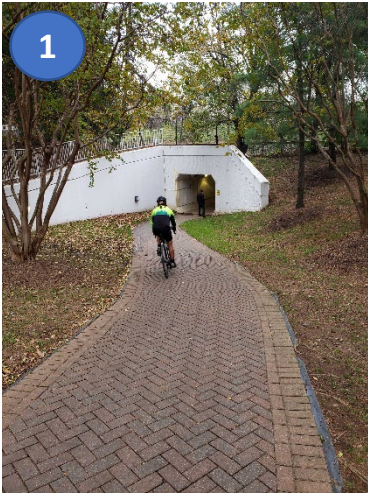


— Northern Route - - - Southern Route

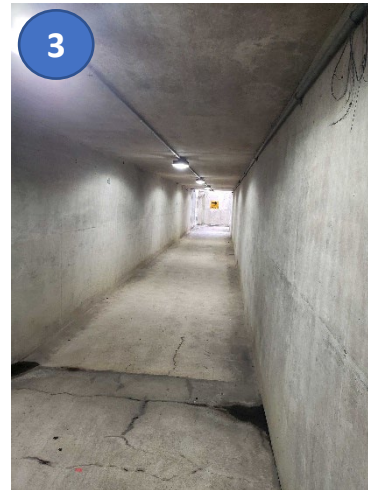
CC2DCA | Crystal City, Arlington, VA

Shortcomings of Existing Pedestrian and Bicycle Routes between Crystal City and DCA
 Source: NearMap, Arlington County GIS

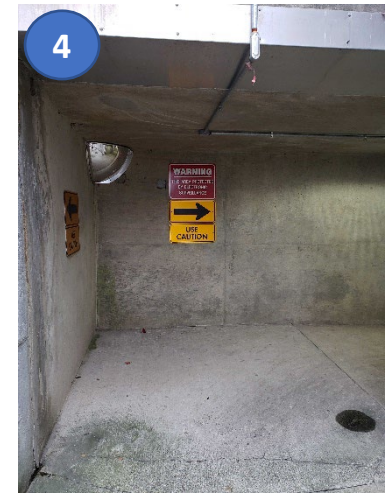
Figure 1-4 (Continued) Shortcomings of Existing Pedestrian and Bicycle Routes between Crystal City and DCA



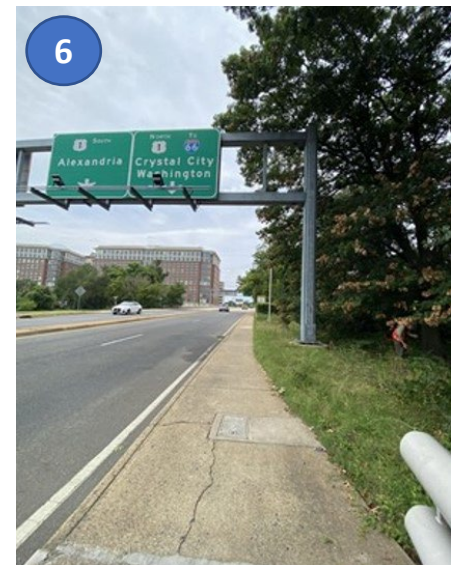
Steep slopes and bottlenecks create potential conflicts between pedestrians and bicyclists



Long tunnel is challenging to navigate (access ramp angles, width)

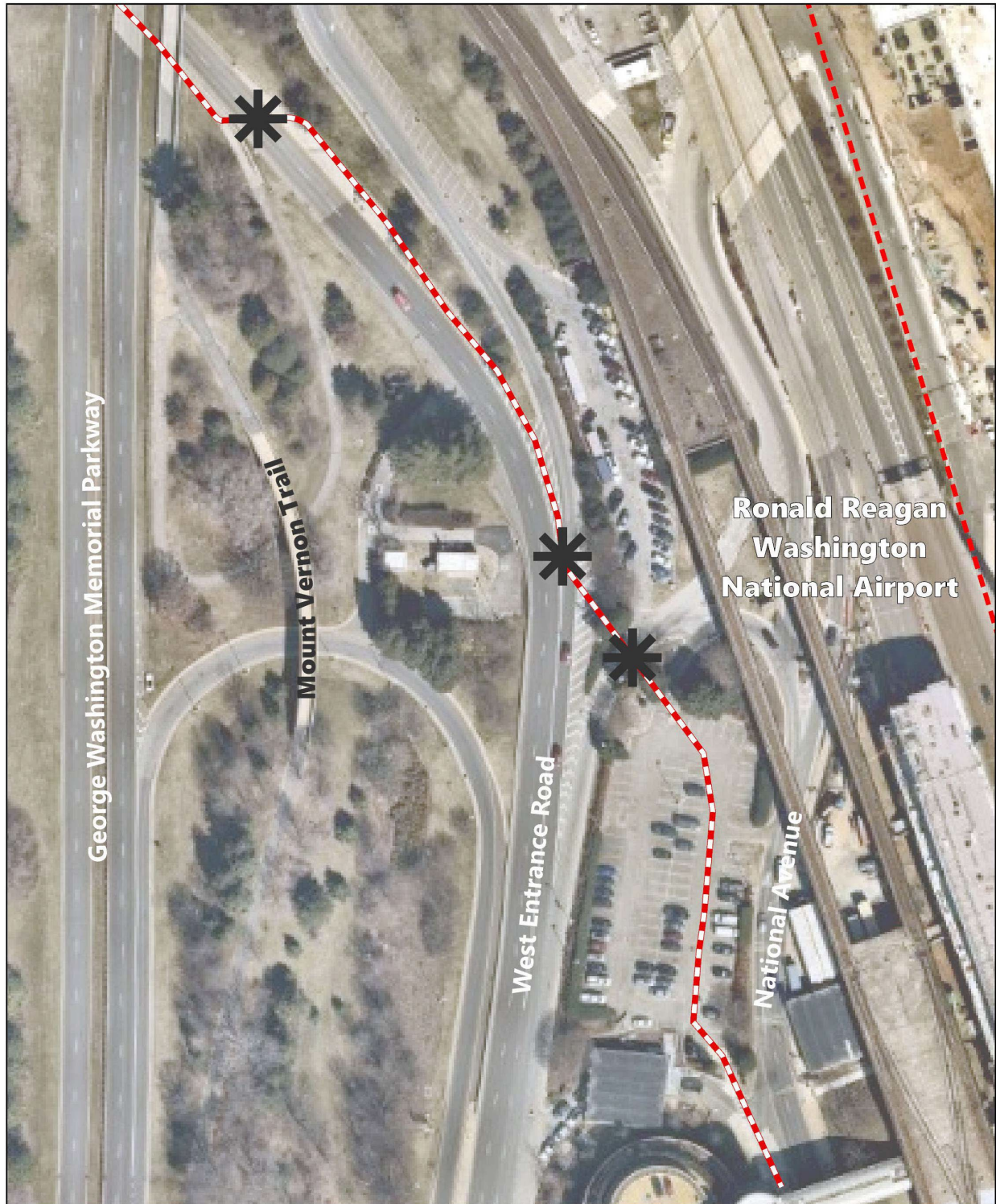


Crossing a maintenance yard creates potential conflicts with vehicles



Sidewalk narrows along the Airport Access Road

Figure 1-5 Potential Pedestrian Shortcut Based on Visual Cues



- Study Area
- Shortcut Based on Visual Cues
- Vehicle Conflict Points

CC2DCA | Crystal City, Arlington, VA

Potential Pedestrian Shortcut Based on Visual Cues

Source: NearMap

1.4 Needs – Future Conditions

1.4.1 Overview

It is anticipated that travelers between Crystal City and DCA will continue to have the same transportation options as today through 2030 and beyond, including automobiles (whether driving or being driven), shuttles, Metrorail, and walking or biking. However, as explained in **Section 1.3**, the existing network does not support active transportation, facilitate intermodal connectivity, or advance the goals of local and regional plans. In the future, if no action is taken, these factors will continue limiting transportation options for travelers accessing Crystal City and the airport and foreseeable actions and growth will aggravate existing shortcomings.

1.4.2 Support Active Transportation Choice

As described in **Section 1.3.2**, existing pedestrian and bicycle routes to the airport are inadequate, which will be made more severe with foreseeable future actions and growth. The Crystal City Sector Plan calls for the removal of the Crystal City off-ramp from the Airport Access Road to support redevelopment.⁴⁸ This demolition would result in the loss of the southern route to DCA. Meanwhile, the establishment of Amazon's new second headquarters (known as HQ2) in parts of Pentagon City and Crystal City in Arlington and Potomac Yard in Alexandria is planned to create at least 12,000 new jobs in the area by 2030. In the near term, the development pipeline in Crystal City is expected to add approximately 5,000 jobs and 5,000 households to the area.⁴⁹ The growth in households, jobs, and economic activity is expected to increase demand for travel between Crystal City and DCA for both business and leisure travel. If no action is taken, only the inadequate northern route will be available to these new workers and residents. Therefore, there is a need for a direct and safe active transportation option between Crystal City and DCA to accommodate anticipated demand from planned growth in Crystal City while encouraging mode shift.

1.4.3 Facilitate Intermodal Connectivity

The Commonwealth of Virginia's *Transforming Rail in Virginia* program will result in greatly expanded rail service at Crystal City.⁵⁰ Over the next decade, this program will leverage strategic partnerships, investments, and capital improvements to nearly double Amtrak state-supported service and increase VRE service, including additional weekend and late-night service.

Based on an estimate of future demand, approximately 4,033 VRE riders are anticipated to use the Crystal City rail station every day in 2030.⁵¹ Additionally, as noted above, it is anticipated that both MARC and Amtrak will serve Crystal City by 2040. Amtrak is planning to construct a

⁴⁸ Arlington County. [Crystal City Sector Plan](#). 2010. Accessed on January 19, 2022.

⁴⁹ Based on a review of development projects provided by Arlington County Community Planning, Housing, and Development (CPHD) staff as of June 2021.

⁵⁰ Transforming Rail in Virginia. [About Transforming Rail in Virginia](#). Accessed on January 30, 2022.

⁵¹ This estimate is based on an annual growth rate of one percent, derived from VRE historical ridership data for 2009-2019.

separate platform to serve Amtrak trains, extending southward from the southern end of the proposed VRE station platform. TPB's *Market Assessment and Technical Considerations for VRE-MARC Run-Through Service in the National Capital Region* (2020) estimated 1,620 MARC daily riders in Crystal City in 2040.⁵² Based on a 2018 study conducted for JBG SMITH, the long-term market demand for Amtrak ridership in Crystal City is expected to be from 570 to 800 passengers daily.

These service increases will generate a demand for trips between the Crystal City VRE and Amtrak stations and DCA. A direct air-rail connection is needed to accommodate this demand as well as encourage mode shift.

1.4.4 Advance Goals of Local and Regional Plans

The CC2DCA Study Area is at the hub of a growing multimodal network intended to facilitate local, regional, and national travel. Ongoing and planned projects in Crystal City, along the Mount Vernon Trail, and at DCA will increase capacity, improve access, and enable intermodal connections in support of these goals. As noted in **Section 1.3.4**, the goals of local and regional plans and policies include a robust multimodal and intermodal network that provides a variety of transportation options, encourages the use of environmentally friendly transportation modes, and accommodates the needs of more travelers as the region and Crystal City grow. In the future, as new projects enhance multimodal connectivity and opportunities for active recreation, the limitations of the existing walking and biking routes between Crystal City and DCA will become a more prominent "missing link" within the transportation network that will limit the benefits from other improvements. Therefore, there is a need to provide an effective transportation solution between Crystal City and DCA that aligns with regional and Arlington County transportation and environmental goals, supports the continued development of Crystal City as identified in the Sector Plan, and is consistent with the ongoing and planned projects at DCA and Crystal City.

1.5 Purpose and Need Summary

Based on the above considerations and analyses, the purpose of the CC2DCA Study is to enhance connectivity for non-vehicular travel between Crystal City and Ronald Reagan Washington National Airport. The following needs have been identified for the Study:

- **Support active transportation travel choice** – There is a need for a direct and safe active transportation option that addresses the limitations of the existing paths between Crystal City and DCA; encourages mode shift; and accommodates anticipated demand from planned growth in Crystal City.

⁵² MWCOG. [Market Assessment and Technical Considerations for VRE-MARC Run-Through Service in the National Capital Region](#). 2020. Accessed on January 30, 2022.

- **Facilitate intermodal connectivity** – There is a need to enable air-rail connections with commuter and intercity rail; and to support other intermodal connections.
- **Advance goals of local and regional plans** – There is a need to provide an effective transportation solution that aligns with regional and Arlington County transportation and environmental goals to provide a range of transportation options and reduce emissions associated with transportation; supports the continued development of Crystal City as identified in the Sector Plan; and is consistent with ongoing and planned projects at Crystal City and DCA.

Additionally, the Purpose and Need stipulates that any selected build alternative will be designed and implemented in a context sensitive manner, especially with consideration to the George Washington Memorial Parkway, a unit of the National Park Service.

2 Alternatives

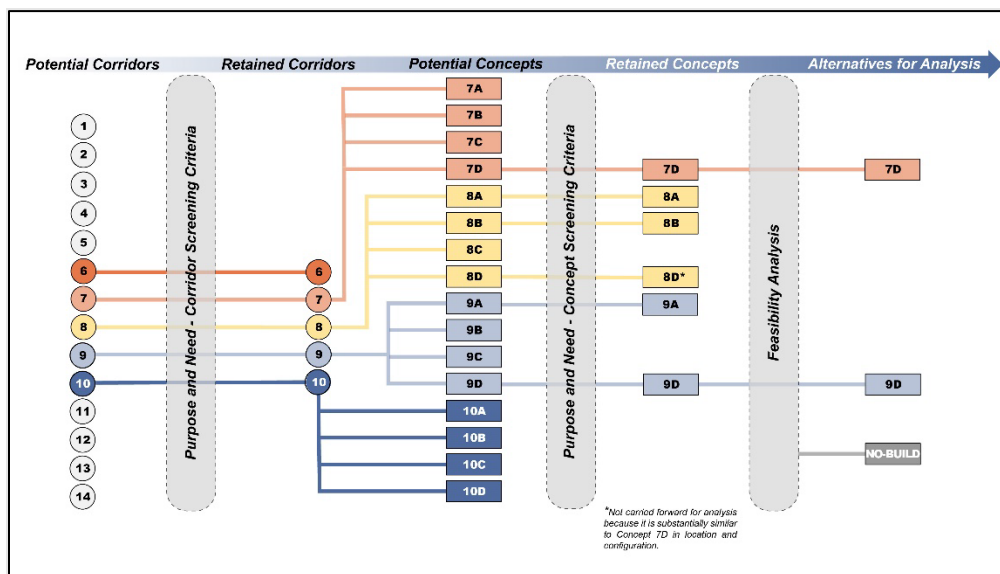
This chapter describes the process used to identify and screen alternatives; alternatives considered and eliminated from further consideration; and alternatives carried forward for analysis.⁵³ As will be described in more detail in **Section 2.3**, the alternatives retained for analysis include:

- No-Build Alternative
- Alternative 7D
- Alternative 9D

2.1 Alternatives Development and Screening Process

As illustrated in **Figure 2-1**, the alternatives were developed using a multi-step alternatives development and screening process that consisted of the following steps: (1) Corridor Screening, (2) Concept Screening, and (3) Feasibility Analysis. As described in more detail in **Chapter 4**, agencies discussed and provided feedback on the Purpose and Need, corridor development and screening, concept development and screening, and alternatives identified for analysis in the EA at the VDOT’s NEPA Program monthly agency meeting (monthly agency meeting), and at focused meetings with individual agencies. The public was asked for input and feedback on the Purpose and Need, alternatives development process, and recommended preferred alternative during three public engagement periods in July through August 2021, November 2021 through January 2022, and October through November 2022. This input and feedback from agencies and the public informed the development, screening, and refinement of the Purpose and Need and the alternatives.

Figure 2-1 CC2DCA Alternatives Development and Screening Process



⁵³ More information for each of the sections can be found in the *Alternatives Technical Report*. Once a preferred alternative has been identified, it will be described in this chapter.

2.1.1 Corridor Screening

Fourteen potential corridors were identified that could be used to connect Crystal City and DCA. These corridors are illustrated in **Figure 2-2** (the figure also shows the corridors eliminated by the screening and those retained). The corridors are described in more detail in Section 3.2 of the *Alternatives Technical Report*.

Development of the corridors considered the following parameters:

- **Crystal City:** On the western end in Crystal City, the landing must be in a publicly accessible location. Therefore, roadway intersections or public parks were preferred to set the western landings of potential corridors. Additionally, because the south entrance of the future VRE Crystal City Station will make use of the “breezeway” section of the Crystal Park private development at 2011 Crystal Drive, other breezeways were considered to be viable options for a western CC2DCA landing. Breezeways are one-story structures that connect adjacent high-rise buildings. Other potential western landings included the future VRE Crystal City and proposed Amtrak platforms, consistent with multimodal connectivity and the feasibility of coordinating construction of both facilities.
- **DCA:** At the airport, project goals require that the landing provide access to locations on the airport property that serve both passengers and employees. Therefore, potential corridors connect to the nearest public entrance to the airport.

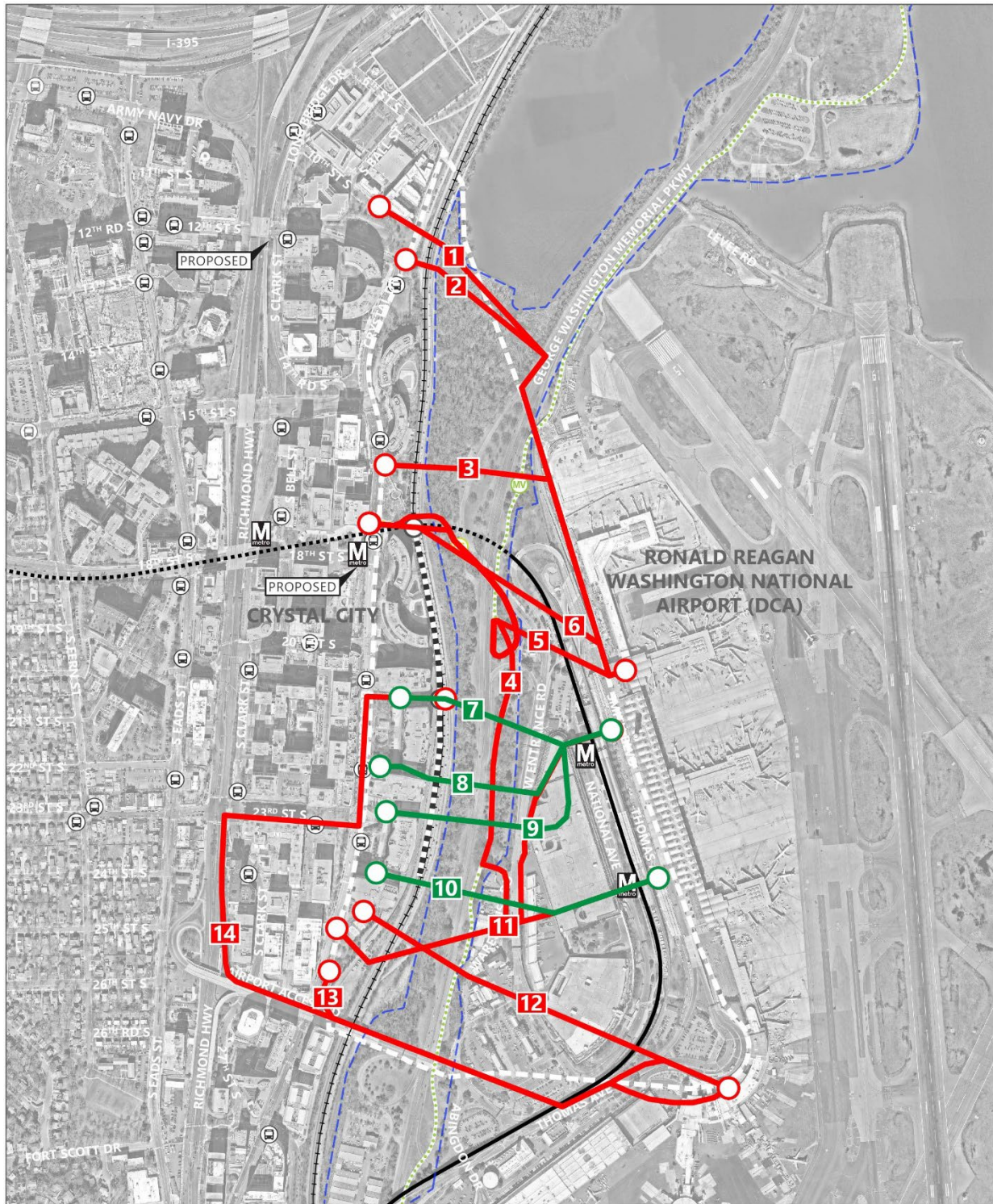
The potential corridors were screened using criteria derived from the Purpose and Need.⁵⁴ The screening criteria applied to the potential CC2DCA corridors are listed in **Table 2-1**. Given the high-level nature of the corridors, the corridor screening criteria focused on whether a given corridor could accommodate minimum standards as stated in **Table 2-1** and offered opportunities for key multimodal connections.

Table 2-2 and **Figure 2-2** show the results of corridor screening. The results of the screening for each corridor are described in more detail in Section 3.7.2 of the *Alternatives Technical Report*.

The retained corridors meet all the criteria in **Table 2-1**. Each corridor is centrally located within Crystal City and connects to DCA Terminal 2. All corridors have walking routes that are less than 2,000 feet long. They can accommodate a sufficiently wide connection to meet American Association of State Highway and Transportation Officials (AASHTO) guidance for busy multi-use paths; they allow for a direct connection with the future VRE or Amtrak platforms; they are within ¼ mile of a Metroway station; and they enable a potential connection with the Mount Vernon Trail. Finally, they are readily accessible for a significant portion of Crystal City’s residents and workers.

⁵⁴ The Purpose and Need is described in **Chapter 1**.

Figure 2-2 Corridor Screening Results



- Study Area
- Mount Vernon Trail
- Crystal City Connector Trail
- Railroad
- Metrorail (above ground)
- Metrorail (below ground)
- Metrorail Station Entrance
- Bus Stop
- Future VRE & Potential Amtrak Entrances
- Future VRE & Potential Amtrak Platforms
- Retained Corridor
- George Washington Memorial Parkway Boundary

CC2DCA | Crystal City, Arlington, VA

Potential and Retained CC2DCA Corridors

Basemap Source: Arlington County GIS, NPS

Table 2-1 Corridor Screening Criteria

Purpose and Need Element	ID	Screening Criterion	Metric
1. Support Active Transportation Travel Choice			
Address the limitations of the existing paths between Crystal City and DCA	1A	Can this corridor permit a pedestrian/bicycle connection that can be up to 30 feet wide? ⁵⁵	Can generally accommodate a 30-foot-wide connection along the corridor ⁵⁶
Provide a direct and safe active transportation option	1B	Can this corridor reduce the walking or biking distance relative to existing and planned active transportation infrastructure?	Walking distance is less than the nearest existing connection (5,100 feet along the Northern Route via the Crystal City Connector and Mount Vernon Trails or 2,800 feet along the Southern Route via the Airport Access Road bridge)
	1C	Can this corridor avoid pedestrian and bicycle conflicts with each other and with vehicles?	Can accommodate a minimum width of 15 feet along its entire length
2. Facilitate Intermodal Connectivity			
Enable air-rail connections	2A	Can this corridor provide a direct connection between the future VRE Crystal City Station and DCA?	Can physically connect to the future VRE Crystal City Station or platform, or to the future Amtrak platform
Support other multimodal connections	2B	Is the western end of the corridor within ¼-mile of a current or future Metroway station?	Western end is within ¼-mile of a current or future Metroway stop
	2C	Is there the potential for this corridor to provide a connection to the Mount Vernon Trail?	Intersects or is adjacent to the Mount Vernon Trail
3. Advance Goals of Local and Regional Plans			
Supports the continued development of Crystal City as identified in Sector Plan	3A	Does this corridor provide convenient access to jobs/population in Crystal City?	25% of Crystal City jobs or households are within ¼ mile of the western terminus

⁵⁵ In coordination with NPS, the maximum usable width envelope was changed to 20 feet during the development of a reasonable range of alternatives: see Section 4.2.2 of the *Alternatives Technical Report*.

⁵⁶ The criterion does not require the entire length of the corridor to be able to accommodate a 30-foot-wide connection and there can be segments where this width would not be achieved (see screening criterion 1C for the minimum acceptable width). No corridors were eliminated based on Criterion 1A.

Table 2-2 Corridor Screening Summary

Corridor	Criteria						
	Support Active Transportation Travel Choice			Facilitate Intermodal Connectivity			Advance Goals of Local and Regional Plans
	1A	1B	1C	2A	2B	2C	3A
Corridor 1	YES	YES	YES	NO	YES	YES	YES
Corridor 2	YES	YES	YES	NO	YES	YES	YES
Corridor 3	YES	YES	YES	NO	YES	YES	YES
Corridor 4	YES	NO	NO	YES	YES	YES	YES
Corridor 5	YES	YES	NO	YES	YES	YES	YES
Corridor 6	YES	YES	YES	YES	YES	YES	YES
Corridor 7	YES	YES	YES	YES	YES	YES	YES
Corridor 8	YES	YES	YES	YES	YES	YES	YES
Corridor 9	YES	YES	YES	YES	YES	YES	YES
Corridor 10	YES	YES	YES	YES	YES	YES	YES
Corridor 11	YES	YES	YES	NO	YES	YES	YES
Corridor 12	YES	YES	YES	NO	YES	YES	YES
Corridor 13	YES	NO	NO	NO	YES	YES	NO
Corridor 14	YES	NO	NO	NO	YES	YES	YES

2.1.2 Concept Screening

2.1.2.1 Concept Development

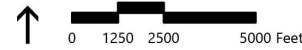
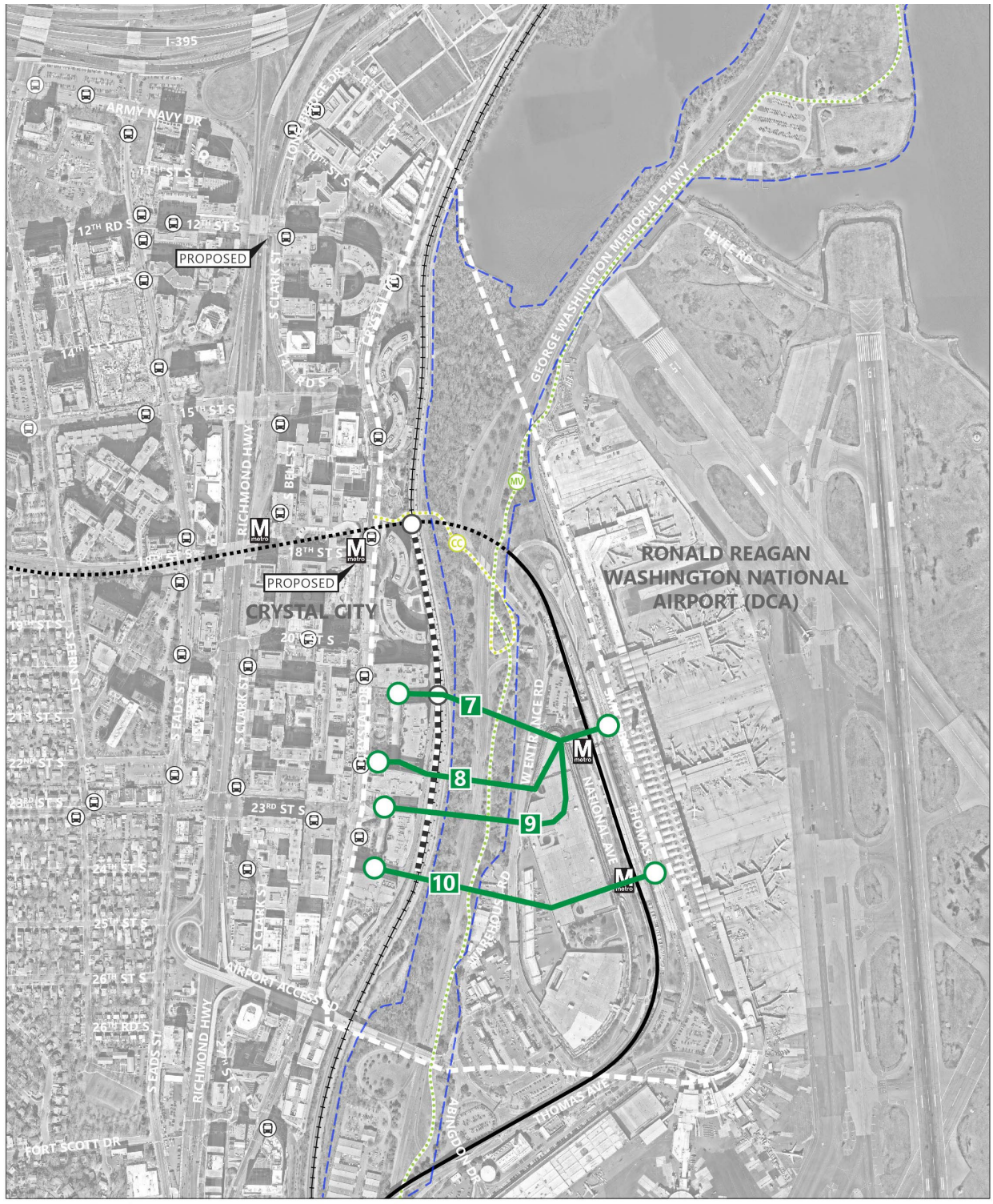
Sixteen potential concepts (connection types) using combinations of bridge, tunnel, and surface trail connections between Crystal City and DCA were developed for four of the retained corridors: Corridors 7, 8, 9, and 10 (shown in **Figure 2-3** and listed in **Table 2-3**). Concepts were developed to be consistent with applicable design standards and guidelines as well as with corridor screening criteria. Both bridge and tunnel options were considered, and concepts were designed to support efficient and direct connection on the airport side. They were also designed to allow for a link with the Mount Vernon Trail. The concepts were developed to a level adequate for screening. Considerations like exact heights or depths, column locations, or aesthetic features were not defined or considered at this stage.

No feasible concepts could be developed for Corridor 6 due to the constraints of existing infrastructure crossed by this corridor (see Section 3.5.3.1 of the *Alternatives Technical Report* for more information). For this reason, Corridor 6 was eliminated from further consideration. More information on the concept development process is provided in Section 3.5 of the *Alternatives Technical Report*.

Table 2-3 Concepts for Screening

Corridor	Concept	Short Description	Across Rail Corridor	Across GW Parkway	Across Airport Roadways
7	A	Tunnel	Tunnel	Tunnel	Tunnel
	B	Bridge-Tunnel	Bridge	Tunnel	Tunnel
	C	Bridge-Tunnel-Bridge	Bridge	Tunnel	Bridge
	D	Bridge	Bridge	Bridge	Bridge
8	A	Tunnel	Tunnel	Tunnel	Tunnel
	B	Tunnel-Bridge	Tunnel	Tunnel	Bridge
	C	Tunnel-Surface-Bridge	Tunnel	Tunnel and surface trail	Bridge
	D	Bridge	Bridge	Bridge	Bridge
9	A	Tunnel	Tunnel	Tunnel	Tunnel
	B	Bridge-Tunnel	Bridge	Tunnel	Tunnel
	C	Bridge-Tunnel-Bridge	Bridge	Tunnel	Bridge
	D	Bridge	Bridge	Bridge	Bridge
10	A	Tunnel	Tunnel	Tunnel	Tunnel
	B	Bridge-Tunnel	Bridge	Tunnel	Tunnel
	C	Bridge-Tunnel-Bridge	Bridge	Tunnel	Bridge
	D	Bridge	Bridge	Bridge	Bridge

Figure 2-3 Retained CC2DCA Corridors 7-10



- Study Area
- Mount Vernon Trail
- Crystal City Connector Trail
- Railroad
- Metrarail (above ground)
- Metrarail (below ground)
- Metrarail Station Entrance
- Bus Stop
- Future VRE & Potential Amtrak Entrances
- Future VRE & Potential Amtrak Platforms
- Retained Corridor
- George Washington Memorial Parkway Boundary

CC2DCA | Crystal City, Arlington, VA

Retained CC2DCA Corridors 7-10

Basemap Source: Arlington County GIS, NPS

2.1.2.2 Concept Screening

Concepts were screened using the criteria listed in **Table 2-4**. Like the corridor screening criteria (see **Section 2.1.1** and **Table 2-1** above), the concept screening criteria were derived from the Purpose and Need elements described in **Chapter 1**. Because the aspects of the Purpose and Need relevant to concept-level screening are not the same as the aspects relevant to corridor-level screening, the two sets of screening criteria are different. More details on the concept screening criteria are provided in Section 3.6 of the *Alternatives Technical Report*.

Table 2-5 presents the results of concept screening. The 16 potential concepts were assessed as either “Compatible” or “Not Compatible” with the criteria based on Purpose and Need. Any concept found not to be compatible with any criterion was eliminated from further consideration as not meeting the Purpose and Need.

As shown in **Table 2-5**, six concepts were found to meet all the criteria and were retained for further consideration. For a description of the concept screening process, see Section 3.7 of the *Alternatives Technical Report*. After reviewing agency and public comments and input,⁵⁷ five of the six retained concepts were included in the reasonable range of alternatives: Concepts 7D, 8A, 8B, 9A, and 9D. Given the similarity and proximity of Concepts 7D and 8D, Concepts 7D, 8A, 8B, 9A, and 9D were considered sufficient to constitute a reasonable range covering the full range of alternatives.⁵⁸ These five concepts encompass the geographic span within which concepts capable of meeting the Purpose and Need have been identified (between Corridors 7 and 9) as well as the range of potential connection types, including bridge (7D and 9D); tunnel (8A and 9A); and hybrid (8B).

⁵⁷ See Section 3.8 of the *Alternatives Technical Report* for a lengthier summary of the public and agency engagement process for corridor and concept development and screening.

⁵⁸ Although Concept 8D was found to meet all the screening criteria, it was not included in the range of alternatives due to its similarity to Concept 7D. Like Concept 7D, Concept 8D is a bridge-only option that terminates in the northernmost section of the Terminal 2 parking garage at DCA. For this reason, both concepts coincide along approximately 25 percent of their length. Both concepts cross the George Washington Memorial Parkway (GW Parkway) within 300 feet of one another and their average north-south separation is only approximately 200 feet. It was decided to move forward with Concept 7D rather than Concept 8D because Concept 7D connects directly to the future VRE and potential Amtrak station entrance and Concept 8D does not.

Table 2-4 Concept Screening Criteria

Purpose and Need Element	ID	Screening Criterion	Compatibility Metric
1. Support Active Transportation Travel Choice			
Address the limitations of the existing paths between Crystal City and DCA	1A	Does this concept minimize the number of level changes for users?	No more than two level changes ⁵⁹
Provide a direct and safe active transportation option	1B	Is this concept accessible?	Appears able to comply with Americans with Disabilities Act (ADA) standards and guidance
2. Facilitate Intermodal Connectivity			
Enable air-rail connections	2A	Does this concept provide a convenient connection for rail passengers?	No VRE or Amtrak passengers would walk more than a ¼ mile (1,320 feet) to reach the connection
3. Advance Goals of Local and Regional Plans			
Is consistent with ongoing and planned projects at Crystal City and DCA	3A	Is this concept compatible with the future VRE Crystal City Station and the future Amtrak platform? ⁶⁰	Avoids conflicts with the station’s stairs, elevators, or ramps
	3B	Is this concept compatible with the Alexandria Fourth Track project? ⁶¹	Avoids conflicts with the project’s infrastructure elements
	3C	Is this concept compatible with ongoing projects at DCA? ⁶²	Avoids conflicts with planned and new DCA infrastructure

⁵⁹ “Level change” refers to a need for vertical circulation (for instance, from street level to a tunnel or a bridge, or from a tunnel to a bridge). As explained in Section 3.6.1 of the *Alternatives Technical Report*, level changes are an inconvenience to users and reduce the directness of the connection.

⁶⁰ VRE is designing a new [Crystal City Station](#) to the south of the existing station to accommodate current service needs and planned growth in service. The new station will feature a central island platform and have two entrances: a north entrance at Water Park (tunnel) and a south entrance at 2011 Crystal Drive (bridge over tracks and stair tower on platform). In addition, Amtrak is planning to construct a new intercity passenger rail platform just south of the new VRE platform. Accessed February 9, 2023.

⁶¹ Within the CC2DCA Study Area, the [Alexandria Fourth Track Project](#), part of VPRA’s [Transforming Rail in Virginia](#) program, will design and construct 6.0 miles of a fourth railroad track and related infrastructure between Arlington, VA and Alexandria, VA. The existing tracks will be shifted to accommodate station and platform improvements planned by VRE for the Alexandria and Crystal City passenger stations. New tracks and related infrastructure will be constructed to increase the efficiency of train operations in the corridor. Accessed February 9, 2023.

⁶² The Metropolitan Washington Airports Authority (MWAA) is preparing an EA for a [program of roadway and facility projects](#) intended to address needs related to vehicular and pedestrian circulation at DCA. The proposed roadway modifications would shift West Entrance Road to the west and eliminate existing signalized intersections in favor of interchanges. Accessed February 9, 2023.

Table 2-5 Concept Screening Results

Concept	Criteria					
	Support Active Transportation Travel Choice		Facilitate Intermodal Connectivity	Advance Goals of Local and Regional Plans		
	1A	1B	2A	3A	3B	3C
7A	Compatible	Compatible	Compatible	Not Compatible	Compatible	Compatible
7B	Not Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
7C	Not Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
7D	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
8A	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
8B	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
8C	Not Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
8D	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
9A	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
9B	Not Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
9C	Not Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
9D	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
10A	Compatible	Compatible	Not Compatible	Compatible	Not Compatible	Compatible
10B	Not Compatible	Compatible	Not Compatible	Compatible	Not Compatible	Compatible
10C	Not Compatible	Compatible	Not Compatible	Compatible	Not Compatible	Compatible
10D	Compatible	Compatible	Not Compatible	Compatible	Not Compatible	Compatible

2.1.3 Agency Concurrence with the Range of Alternatives

As described in more detail in **Chapter 4**, the Concurring Agencies provided guidance and feedback throughout the alternatives development and screening process through the monthly agency meetings as well as individual agency meetings on specific topics when needed. On April 13, 2022, the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers concurred with the range of alternatives. The National Park Service (NPS) also concurred, with the following qualification:

The National Park Service concurrence is specific to the range of CC2DCA alternatives regarding alignments and connection types that are to move forward to determine feasibility analysis and conceptual design. The NPS concurrence on the CC2DCA alternatives should not be construed as agreement with any specific criteria such as the width of a connection, size/massing of a facility, or design elements/characteristics which have not been explored thus far in the process.

All NPS concurrence is contingent upon VDOT and Arlington County continuing to coordinate with the NPS to ensure that any selected build alternative is designed in a context-sensitive manner. Any connection must be consistent with the context of the George Washington Memorial Parkway and cannot adversely affect the status of the George Washington Memorial Parkway as a historic property on the National Register of Historic Places.⁶³

2.1.4 Feasibility Analysis

Following agency concurrence, a feasibility analysis was performed to establish whether the range of alternatives concurred-with by the agencies could be constructed within the highly constrained area between Crystal Drive in Crystal City and the DCA Terminal 2 parking garage.⁶⁴ The feasibility analysis is described in more detail in Section 4.1 of the *Alternatives Technical Report*. Based on this analysis, it was determined that:

- Alternatives 7D and 9D (bridge alternatives) should be carried forward and further evaluated. These alternatives do not present unusual technical or construction challenges.
- Alternatives 8A, 8B, and 9A (tunnel alternatives) should be eliminated from further consideration. At both ends of the tunnel, it would be necessary to excavate access shafts that cannot be physically accommodated by existing and future land uses, even under the most restrictive assumptions (27-foot-wide shafts with room for only one set of stairs and one elevator).

VDOT presented the findings of the feasibility analysis to the concurring, cooperating, and participating agencies at the May 2022 monthly agency meeting.

2.1.5 Consideration of TSM Strategies

Transportation System Management (TSM) strategies consist of actions that increase the efficiency of existing facilities. TSM alternatives for CC2DCA would make use of the two existing pedestrian and bicycle routes while increasing their efficiency. The existing routes were

⁶³ Email from NPS/GW Parkway to VDOT, April 7, 2022.

⁶⁴ The analysis conservatively assumed a connection with a 15-foot-wide usable area, consistent with the minimum width used for corridor screening (see **Table 2-1**, Criterion 1C). The rationale for adopting this assumption is that an analysis that would show a 15-foot-wide connection to be unfeasible would also establish the unfeasibility of any wider connection.

evaluated during the corridor screening process as Corridor 4 and Corridor 13.⁶⁵ Screening found that neither corridor could meet the Purpose and Need (See **Table 2-2**). Neither corridor would reduce the walking or biking distance relative to existing and planned active transportation infrastructure. TSM alternatives cannot reduce the walking distance along these routes. Similarly, TSM alternatives cannot widen the existing routes to 15 feet to avoid pedestrian and bicycle conflicts or eliminate crossings that create conflicts with vehicles. Finally, TSM alternatives using Corridor 13 could not provide a connection to the future VRE Crystal City Station.

A number of measures could make the existing pedestrian and bicycle routes between Crystal City and DCA more efficient and user-friendly. Such measures include better signage and better lighting, for instance. In addition, some sidewalks along the southern route could be widened and traffic calming measures could be implemented at locations where the route crosses active roadways or parking lots. However, such measures would not be sufficient to meet the Purpose and Need and are not considered further. While these measures are not being considered as a separate TSM alternative, this does not preclude incorporating such measures into a selected alternative or implementing them as a separate project.

2.2 Summary of Concepts Not Retained for Analysis

During the concept development and screening process, feasibility analysis, and consideration of TSM solutions presented in the above sections, 14 concepts were considered but not retained for further evaluation. **Table 2-6** summarizes these concepts, along with the basis for their elimination.

Table 2-6 Concepts Not Retained for Analysis

Concept	Basis for Elimination	Notes
TSM	Purpose and Need	TSM strategies cannot reduce walking distance along existing routes, avoid conflicts between pedestrians and bicyclists, or eliminate crossings that create conflicts with vehicles.
7A	Purpose and Need	Concept not compatible with the future VRE Crystal City Station. Tunnel would conflict with foundations and structure supporting the station’s headhouse.
7B	Purpose and Need	Concept would require three level changes.
7C	Purpose and Need	Concept would require three level changes.

⁶⁵ See Section 3.4 of the *Alternatives Technical Report* for more information.

Concept	Basis for Elimination	Notes
8A	Feasibility	Concept would require constructing access shafts that cannot be physically accommodated by existing and future land uses.
8B	Feasibility	Concept would require constructing access shafts that cannot be physically accommodated by existing and future land uses.
8C	Purpose and Need	Concept would require three level changes.
8D	Similarity to Concept 7D	Meets Purpose and Need but is substantially similar to Concept 7D due to location and configuration.
9A	Feasibility	Concept would require constructing access shafts that cannot be physically accommodated by existing and future land uses.
9B	Purpose and Need	Concept would require three level changes.
9C	Purpose and Need	Concept would require three level changes.
10A	Purpose and Need	Concept would require some rail passengers to walk farther than the ¼-mile threshold to reach the connection. Concept would potentially affect the rail alignments and is not compatible with the Fourth Track project.
10B	Purpose and Need	Concept would require some rail passengers to walk farther than the ¼-mile threshold to reach the connection. Concept would require three level changes. Concept would potentially affect the rail alignments and are not compatible with the Fourth Track project.
10C	Purpose and Need	Concept would require some rail passengers to walk farther than the ¼-mile threshold to reach the connection. Concept would require three level changes. Concept would potentially affect the rail alignments and are not compatible with the Fourth Track project.
10D	Purpose and Need	Concept would require some rail passengers to walk farther than the ¼-mile threshold to reach the connection. Concept would potentially affect the rail alignments and are not compatible with the Fourth Track project.

2.3 Alternatives Carried Forward

This section describes the No-Build Alternative and provides descriptions of Alternative 7D and Alternative 9D, including pier construction, connections to existing infrastructure, and structure types assumed for the purpose of analysis.

The design of Alternatives 7D and 9D was advanced to a level sufficient to analyze their respective potential impacts consistent with National Environmental Policy Act (NEPA) requirements without unnecessarily constraining future design decisions, including decisions pertaining to the width of the connection, its materiality, and other architectural features. Design considerations for Alternative 7D and Alternative 9D are described in more detail in Section 4.4 of the *Alternatives Technical Report*.

This approach resulted in the alternatives described below in **Section 2.3.2** and **Section 2.3.3**, respectively. Under both alternatives, the CC2DCA bridge connection would cross three properties, each with its own set of standards and requirements: The rail corridor; the GW Parkway; and DCA's access roads and Terminal 2 parking garage. As a result, the bridge, although a singular structure, can be thought of as comprising three sections. The alternatives are described accordingly.

2.3.1 No-Build Alternative

The No-Build Alternative is an alternative that represents the conditions that would exist if the proposed action was not implemented. While the No-Build Alternative does not meet the Purpose and Need, it serves as a baseline for assessing the potential impacts of the build alternatives. Under the No-Build Alternative, no improvements would be implemented. Because Arlington County plans to remove the off-ramp from the Airport Access Road/VA 233 to Crystal Drive, individuals walking or biking between Crystal City and DCA would be required to make use of the existing northern route via Water Park, the Crystal City Connector Trail, and the Mount Vernon Trail. This route would continue to encourage pedestrian shortcuts at the airport based on visual cues, including crossing West Entrance Road just past the North Entrance Underpass.⁶⁶

Under the No-Build Alternative, it can be reasonably foreseen that the following changes to the multimodal transportation network in Crystal City and DCA would be independently completed:

- Removal of the off-ramp from the Airport Access Road/VA 233 to Crystal Drive;⁶⁷
- Changes to the roadway network at DCA and construction of a new rental car facility;⁶⁸
- Alexandria Fourth Track Project;⁶⁹

⁶⁶ The existing pedestrian and bicycle routes between Crystal City and DCA are described in more detail in Section 1.3.2.1 of **Chapter 1, Purpose and Need**.

⁶⁷ Arlington County. [Crystal City Sector Plan](#). 2010. Accessed on May 16, 2022.

⁶⁸ MWAA. [Ronald Reagan Washington National Airport Roadway Network Improvements Environmental Assessment Update](#). 2020. Accessed on May 16, 2022.

⁶⁹ Virginia Passenger Rail Authority. [Alexandria Fourth Track](#). Accessed on June 10, 2022.

- New VRE Crystal City Station;⁷⁰
- New Amtrak platform;
- Widening of the Mount Vernon Trail to 11 feet;⁷¹
- Completion of the planned Crystal City Bicycle Network;⁷²
- Extension of Metroway to Pentagon City;⁷³ and
- New Potomac Yard Metrorail Station.⁷⁴

Because of both existing routes' shortcomings as documented in Section 1.3.2.1 of **Chapter 1, Purpose and Need**, which would be aggravated by the anticipated removal of the ramp from Crystal Drive to the Airport Access Road/VA 233 bridge, it can be anticipated that under the No-Build Alternative, most trips between Crystal City and DCA would continue to take place by motor vehicles (including private cars, for-hire vehicles, and airport shuttles) or Metrorail.

2.3.2 Alternative 7D

2.3.2.1 Overview

Alternative 7D would consist of a bridge between the future VRE Crystal City Station south entrance stair tower and the northwest corner of the DCA Terminal 2 parking garage at the L2 level.⁷⁵ Structurally, the Alternative 7D bridge is assumed to be a long-span girder (haunch girder) system. The alignment of Alternative 7D is shown in **Figure 2-4**. (Additional conceptual drawings and renderings illustrating Alternative 7D are provided in Section 5.2 of the *Alternatives Technical Report*.) Access to Crystal Drive in Crystal City would be through the future VRE station's stair tower, connecting bridge, and vertical circulation elements at 2011 Crystal Drive. Access to the airport terminal would be through a dedicated walkway on Level L2 of the Terminal 2 parking garage leading to the existing Terminal 2 north connector bridge. The south stair tower connection would provide VRE and Amtrak passengers with direct access to CC2DCA. A link with the Mount Vernon Trail would be provided on the north side of the CC2DCA bridge. Alternative 7D assumes completion of the projects included in the No-Build Alternative as described in Section 2.3.1 above.

⁷⁰ VRE. [Crystal City Station Improvements](#). Accessed on May 27, 2022.

⁷¹ U.S. Department of Transportation, Volpe Center and NPS. [George Washington Memorial Parkway: Mount Vernon Trail Corridor Study](#). 2020. Accessed on January 20, 2022.

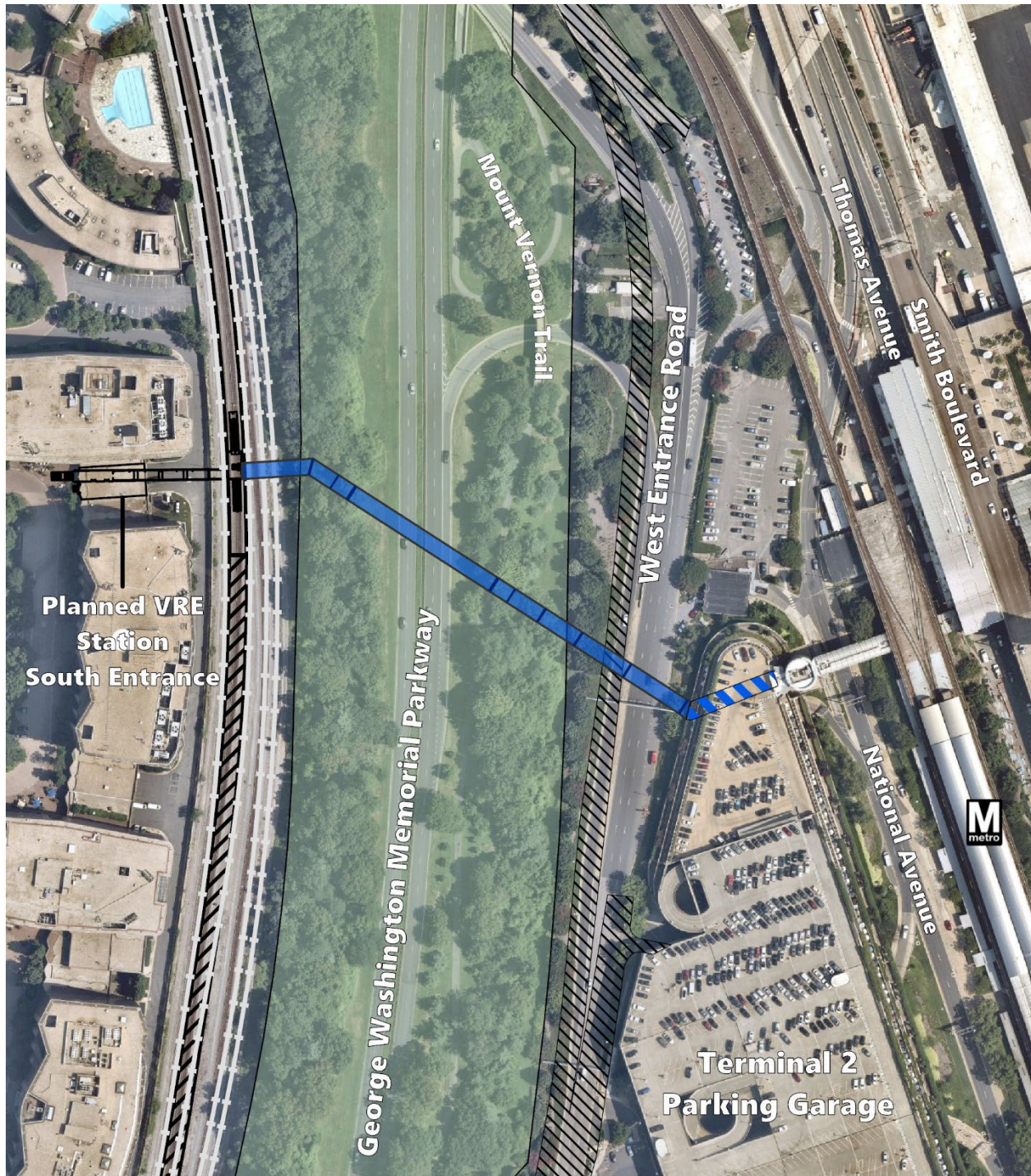
⁷² Arlington County. [Crystal City Bike Network. Recommended Bike Network](#). Accessed on May 16, 2022.

⁷³ Arlington County. [Transitway Extension to Pentagon City](#). 2022. Accessed on May 16, 2022.

⁷⁴ City of Alexandria. [Potomac Yard Metrorail Station Construction](#). Accessed on May 16, 2022.

⁷⁵ The south entrance to the future [VRE Crystal City Station](#) is anticipated to consist of a bridge above the existing breezeway building at 2011 Crystal Drive that will connect across the westernmost track to a stair tower providing vertical access to the new central platform. Under Alternative 7D, the CC2DCA bridge would connect to the east side of the stair tower. The [VRE Crystal City Station](#), including its south entrance and stair tower, is a separate and independent project from CC2DCA. Alternative 7D would involve no construction or other activities to the west of the future VRE platform.

Figure 2-4 Alternative 7D Alignment



- CC2DCA Bridge Alignment
- Dedicated CC2DCA Walkway in Parking Garage
- George Washington Memorial Parkway
- Future Track
- Future VRE Platform
- Future Amtrak Platform
- Future DCA Roadways
- Piers

CC2DCA | Crystal City, Arlington, VA

Alternative 7D Alignment

Source: NearMap, National Park Service

2.3.3 Alternative 9D

2.3.3.1 Overview

Alternative 9D would consist of a bridge extending from the Crystal Park development at the south side of 2231 Crystal Drive to the middle of the DCA Terminal 2 parking garage at the L3 level. Structurally, the Alternative 9D bridge is assumed to be a long-span girder (haunch girder) system. The alignment of the bridge under Alternative 9D is shown in **Figure 2-5**. (Additional conceptual drawings and renderings illustrating Alternative 9D are provided in Section 5.3 of the *Alternatives Technical Report*.) On the west side, stairs and an elevator would provide access from Crystal Drive to a bridge over the railroad tracks. At the eastern end of the connection, access to the airport terminal would be through a dedicated walkway on Level L3 of the Terminal 2 parking garage, then to the existing Terminal 2 north connector bridge one level below. CC2DCA users would reach the connector via the garage's existing elevators and stairs.

Alternative 9D would provide VRE and Amtrak passengers with direct access to CC2DCA through a stair tower similar to the tower being planned for the future VRE Crystal City Station. A link with the Mount Vernon Trail would be constructed on the north side of the CC2DCA bridge.

Alternative 9D assumes completion of the projects included in the No-Build Alternative as described in **Section 2.3.1** above.

Figure 2-5 Alternative 9D Alignment



- CC2DCA Bridge Alignment
- Dedicated CC2DCA Walkway in Parking Garage
- George Washington Memorial Parkway
- Future Track
- Future VRE Platform
- Future Amtrak Platform
- Future DCA Roadways
- Piers

CC2DCA | Crystal City, Arlington, VA

Alternative 9D Alignment

Source: NearMap, National Park Service

2.4 Limits of Disturbance

The Limits of Disturbance (LOD) for each build alternative was developed for the purposes of the impact analysis in this EA. The LOD delineates the areas that may be permanently or temporarily disturbed by the construction of the alternatives. Impacts were generally calculated based on the overlap between the LOD and the specific resource under consideration. Impact values presented for the various resources represent the worst-case scenarios and assume complete direct impact to the resource occurring in the LOD. The LOD includes subsurface and air rights in addition to any ground disturbance.





The LOD was defined conservatively. **Figure 2-6** and **Figure 2-7** show the LOD for Alternative 7D and Alternative 9D, respectively. For the purposes of impact analysis, it is assumed that each alternative would provide 20 feet of usable width, corresponding to 22 feet of structural width. (The exact width of the connection would be determined as part of the design process in coordination with NPS and other agency stakeholders.) For each build alternative, the LOD encompasses land within 50 feet of each side of the CC2DCA bridge, for a total width of approximately 122 feet. The LODs also encompass the area where a link to the Mount Vernon Trail would be constructed in each alternative.

For the purposes of impact analysis, a potential, conceptual approach to the construction of Alternative 7D and Alternative 9D was developed. Construction would involve site work to establish construction site and laydown facilities, which would require trees and other vegetation within the LOD to be removed or limbed through clearing and grubbing. It is assumed that bridge spans would be constructed off site and delivered to the job site ready for installation. It is anticipated that, as much as possible, given the need to maintain rail and roadway operations, spans crossing active roadways and railroad tracks would be installed at night or on weekends. Other spans could be installed during the regular work week.⁷⁶ Construction of the Mount Vernon Trail Link may require a portion of the Mount Vernon Trail to be temporarily shifted to the west to provide clearance from the work zone.

⁷⁶ [NPS Management Policies 2006](#) and Federal regulations (36 CFR 5.6) prohibit commercial vehicles from traveling on the GW Parkway roadway. NPS policies state that “commercial traffic will be prohibited on roads within parks, except for the purpose of serving park visitors and park operations.” If access to private lands is otherwise not available, the Park Superintendent has the discretion to issue permits for commercial vehicles. Such a permit would be required for the construction of CC2DCA.

Figure 2-6 Alternative 7D Limits of Disturbance



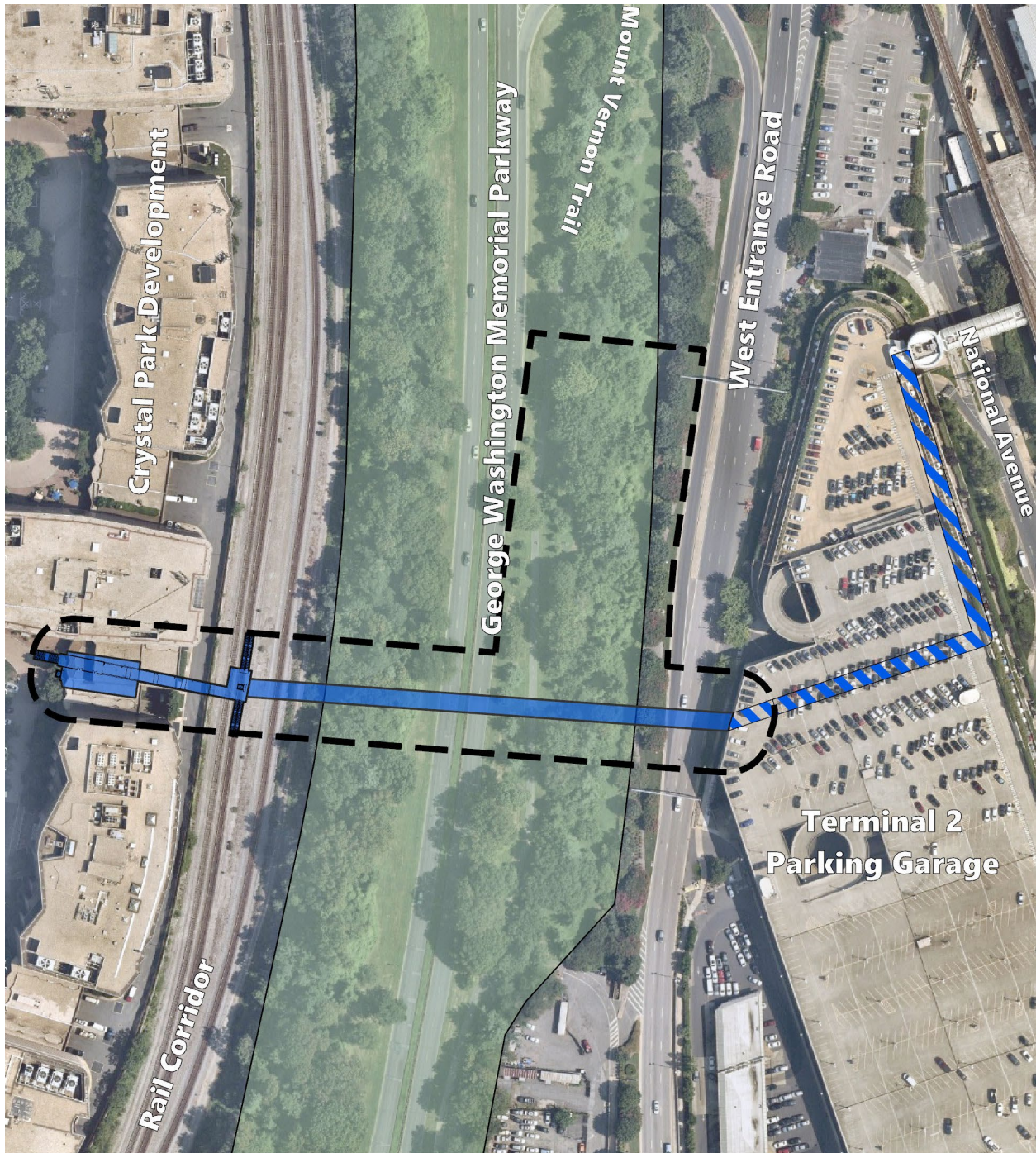
-  CC2DCA Bridge Alignment
-  Dedicated CC2DCA Walkway in Parking Garage
-  George Washington Memorial Parkway
-  Limit of Disturbance





CC2DCA | Crystal City, Arlington, VA

Alternative 7D Limit of Disturbance

Source: NearMap, National Park Service

Figure 2-7 Alternative 9D Limits of Disturbance



-  CC2DCA Bridge Alignment
-  Dedicated CC2DCA Walkway in Parking Garage
-  George Washington Memorial Parkway
-  Limit of Disturbance

CC2DCA | Crystal City, Arlington, VA

Alternative 9D Limit of Disturbance

Source: NearMap, National Park Service

2.5 Preferred Alternative (Modified Alternative 7D)

VDOT and Arlington County, in coordination with the concurring, cooperating, and participating agencies, identified two feasible alternatives for CC2DCA: Alternative 9D and Alternative 7D, both consisting of a bridge (see **Chapter 4** for more information on agency and public coordination). Based on discussions and feedback from the concurring, cooperating, and participating agencies and feedback from members of the public, VDOT and Arlington County designated Alternative 7D with a girder system across the GW Parkway as the Recommended Preferred Alternative because it best balanced cost and impacts while meeting the Purpose and Need of the Study based on available information. VDOT and Arlington County presented the Recommended Preferred Alternative at the September 2022 monthly agency meeting. From October 4 to November 6, 2022, VDOT and Arlington County solicited public feedback on the Recommended Preferred Alternative.

VDOT and Arlington County made the following refinements to the Recommended Preferred Alternative (see **Figure 2-8**) based on coordination with the concurring, cooperating, and participating agencies and feedback from members of the public:

- **Shifting the Recommended Preferred Alternative a short distance to the north** so impacts to the DCA Terminal 2 parking garage could be avoided or minimized, as requested by MWAAs.⁷⁷ MWAAs also requested that the alternative accommodate current plans for the construction of a new elevated recirculation ramp west of the existing West Entrance Road. Because the planned recirculation ramp is in the very early stages of design, it is not yet possible to determine which specific alignment would allow CC2DCA to best meet these requests. Therefore, across the DCA property, the Recommended Preferred Alternative no longer includes a specific alignment. Instead, it consists of a broad LOD area covering a range of potential alignments, with the final alignment to be defined during design after the NEPA decision. The agencies found this approach to be appropriate because (1) the LOD is entirely developed with transportation infrastructure and there would be no difference among the various potential alignments with regard to environmental impacts; and (2) the exact alignment of CC2DCA across DCA property does not substantially affect the rest of the bridge, including the portion across the GW Parkway.
- **Adjusting the alignment of the Recommended Preferred Alternative across the GW Parkway to allow for a more perpendicular crossing of the roadway.** In conjunction with the shifting to the north of the Recommended Preferred Alternative, two options were considered for a CC2DCA alignment across the GW Parkway that would be more perpendicular than the original alignment of Alternative 7D: Option A, featuring a fully

⁷⁷ The height of the Preferred Alternative would not exceed the overall height of the existing DCA Terminal 2 parking garage. Therefore, the Preferred Alternative should not (pending the completion of a 7460 Airspace Analysis by FAA) create a hazard to air navigation at DCA or negatively impact any instrument approach procedure into the airport.

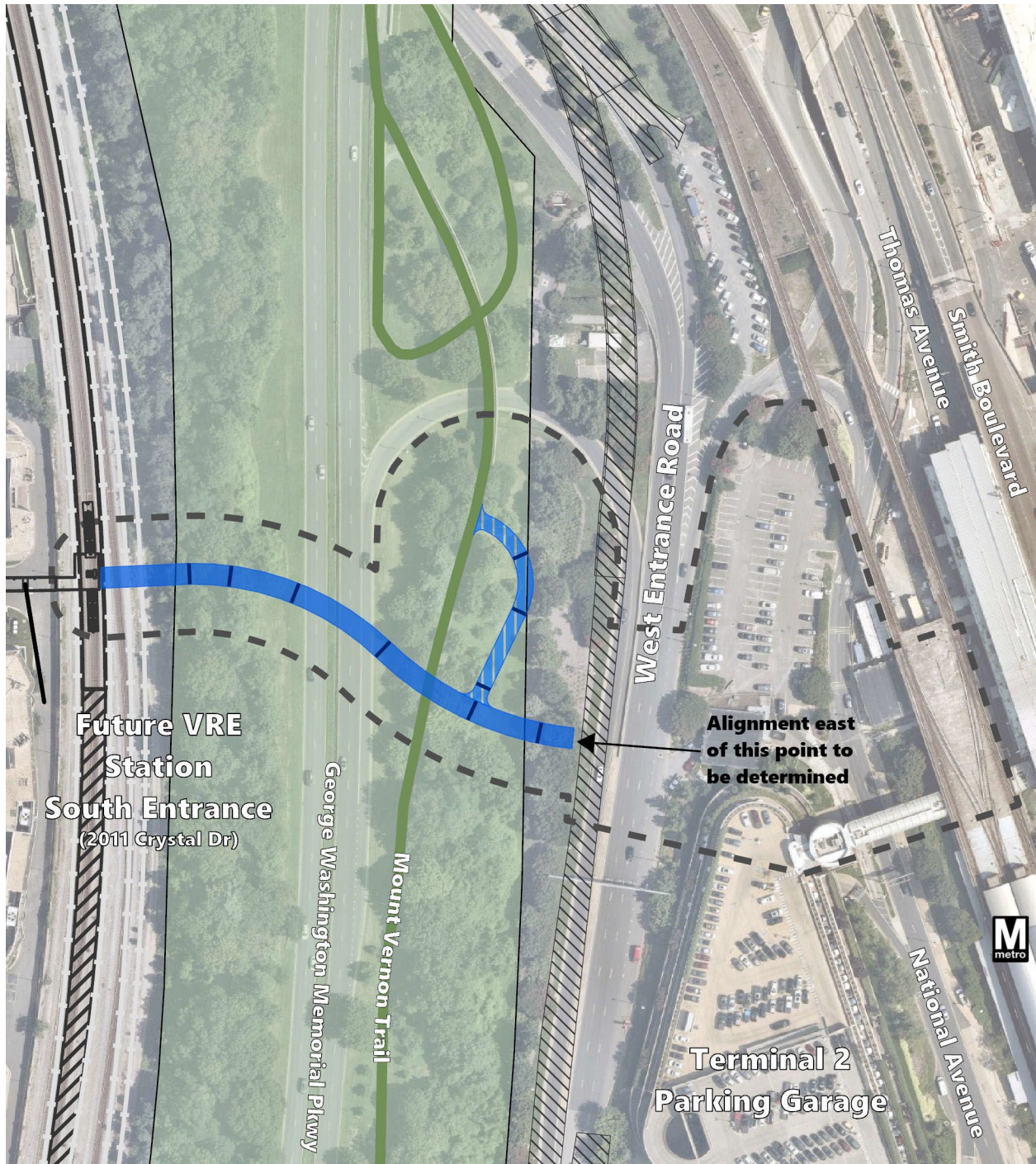
perpendicular crossing of the GW Parkway roadway; and Option B, crossing the GW Parkway roadway at a slight angle. After coordination with NPS, Option B was adopted. The refinement of the CC2DCA alignment across the GW Parkway did not meaningfully alter the anticipated impacts of the Recommended Preferred Alternative.

These modifications are in line with agency and public comments and result in an alternative that remains generally consistent with the alignment of Alternative 7D as originally recommended. The refined Preferred Alternative still best balances cost and impacts while meeting the study's Purpose and Need. In addition, it addresses key comments from major stakeholders on the original Alternative 7D.

On February 8, 2023, NPS, USACE, and EPA concurred with the Preferred Alternative as shown in **Figure 2-8**. As a result of further analysis and agency and public feedback, additional design refinements to reduce impacts may occur as part of the EA or as the project advances to more detailed design.

The proposed Federal action of NPS associated with the Preferred Alternative includes issuance of a permit or permits to authorize construction activities occurring on NPS-administered parkland and development of a maintenance agreement between NPS and Arlington County for maintenance of the Preferred Alternative where it crosses the GW Parkway. It is anticipated that permanent impacts to the GW Parkway will be authorized through a highway easement deed that FHWA would execute on behalf of the USA, in accordance with 23 USC 107.

Figure 2-8 Preferred Alternative



- Preferred Alternative Alignment
- Preferred Alternative LOD
- Mount Vernon Trail Link Option 1
- Piers
- Mount Vernon Trail

- George Washington Memorial Parkway
- Future Track
- Future DCA Roadways
- Future Amtrak Platform
- Future VRE Platform

CC2DCA | Crystal City, Arlington, VA

Preferred Alternative Alignment and LOD

Source: NearMap, National Park Service, Arlington County GIS

3 Environmental Consequences

This chapter presents existing conditions for each of the resources identified within the CC2DCA Study Area; the resource assessment methodology; and the environmental consequences that would result from the alternatives evaluated.

The impact analysis for resources that are present in the study area and may be affected by the Preferred Alternative or Build Alternative 9D evaluates the following factors: whether any of the resources overlap with the alternatives' limits of disturbance (LODs); whether there would be a loss of the resources or access to them; whether impacts to the resources would affect people and wildlife; and whether there would be measurable indirect, cumulative, or temporary impacts. The overall methodology is explained in the *Resource Identification and Impact Analysis Methodologies* report and in respective technical reports for these resources (see **Appendix A**).

Table 3-1 summarizes estimated impacts to environmental resources for the No-Build Alternative, the Preferred Alternative, and Alternative 9D.

Table 3-1 Direct Impacts of the Alternatives

Notable Feature	No-Build Alternative	Preferred Alternative	Build Alternative 9D
Land Use, Property, and Right-of-Way (ROW)			
Commercial Property (acres)	0	0	0.1
Residential Property (acres)	0	0	0
Open Space (acres)	0	0.21 acre*	0.19 acre*
Transportation Uses (acres)	0	0.16 acre*	0.16 acre*
Water Resources			
Impacts to Surface Water	None	None	None
Impacts to Groundwater	None	None	None
Parks and Recreation Areas			
Visitor Use and Experience of GW Parkway	None	Visual impacts and loss of vegetation	Visual impacts and loss of vegetation
Impact to GW Parkway from LOD (acres)	0	1.9 acres*	2.5 acres*
Communities and Community Facilities			
Community Connectivity and Cohesion	None	Enhanced connectivity	Enhanced connectivity
Population and Housing			
Residential Acquisitions	0	0	0
Economic Resources			
Connectivity Between Crystal City and DCA	None	Beneficial impact	Beneficial impact

Notable Feature	No-Build Alternative	Preferred Alternative	Build Alternative 9D
Impacts to Commercial Tenants	None	No impact	Potential adverse impact
Loss of Parking Spaces at DCA	None	Loss of up to 0.5% of existing capacity and up to 0.3% of future capacity	Loss of up to 1.5% of existing capacity and up to 1.1% of future capacity
Hazardous Materials			
Impacts to Known Sites or Spills	None	None	None
Wildlife and Habitat			
Removal of Forested Area (acres)	0	1.9 acres	1.9 acres
Threatened and Endangered Species			
Removal of Known Roosting Habitat for Listed Bats (acres)	0	None	None
Historic Resources			
Historic Properties Affected	0	3	3

*NPS and Arlington County GIS information differ in the location of the GW Parkway boundary. When these sources conflict, the reported impacts represent the greatest impact to the GW Parkway. Impact numbers may be revised once property survey has been completed.

Note: All reported impacts are based on current information and may change as design advances.

3.1 Resources Not Present or Not Affected

FHWA’s *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* and VDOT’s *Environmental Assessment Outline and Guidance* state that resources that “do not have a reasonable possibility for individual or cumulative significant environmental impacts need not be discussed” in this chapter.^{78,79} As part of the study’s scoping and environmental analysis, it was determined that CC2DCA does not have the potential for environmental impacts to the following resources (or they are not present): Population and Housing; Water Quality; Floodplains; Water Supply; Waters of the U.S.; Aquatic Biota and Habitat; Coastal Zone Management; Threatened, Endangered, and Special Status Species; Air Quality; and Noise. The rationale for this conclusion is explained in the following sections.

3.1.1 Population and Housing

The full methodology for assessing population and housing, along with more information on existing conditions and environmental consequences, is provided in the *Socioeconomic, Land Use, and Right-of-Way Technical Report*. The 2022 Arlington County Profile and 2015-2019 American Community Survey (ACS) population estimates were used to identify resident population and housing characteristics in the study area. Much of the area is dedicated to non-

⁷⁸ FHWA. 1987. [Technical Advisory T6640.8A: Guidance for Preparing and Processing Environmental and Section 4\(f\) Documents](#). Accessed March 8, 2023.

⁷⁹ VDOT. 2018. [Environmental Assessment Outline and Guidance](#). Accessed January 11, 2023.

residential use, such as the GW Parkway and DCA (see **Figure 3-3** below). The single inhabited Census block group in the study area (Block Group 5 of Census Tract 1034.02) contains only 0.7 percent of the county's population. No impacts to population or housing would occur under the No-Build Alternative. Either the Preferred Alternative or Alternative 9D would enhance connectivity between Crystal City and DCA for area residents, whose population is expected to increase over the next decade due to regional population growth, redevelopment plans, and completion of Amazon's HQ2. None of the alternatives would require any residential acquisitions or relocations, and no negative effects on population and housing resources are anticipated.

3.1.2 Water Quality

The full methodology for assessing water quality in the study area, along with more information on existing conditions and regulatory context, is provided in the *Natural Resources Technical Report*. Prior to onsite field investigation, an online review was conducted to examine the general landscape and soils within the study area using tools from the Natural Resources Conservation Service (NRCS) Web Soil Survey, the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), and US Geological Survey Quadrangle Map. There are no natural streams, lakes, ponds, or navigable waters within the study area. Approximately 2.9 acres of identified wetland lie within the study area, along the southern extent of Roaches Run, as well as 5.8 acres of Resource Protection Area (RPA) (see **Figure 3-1**).

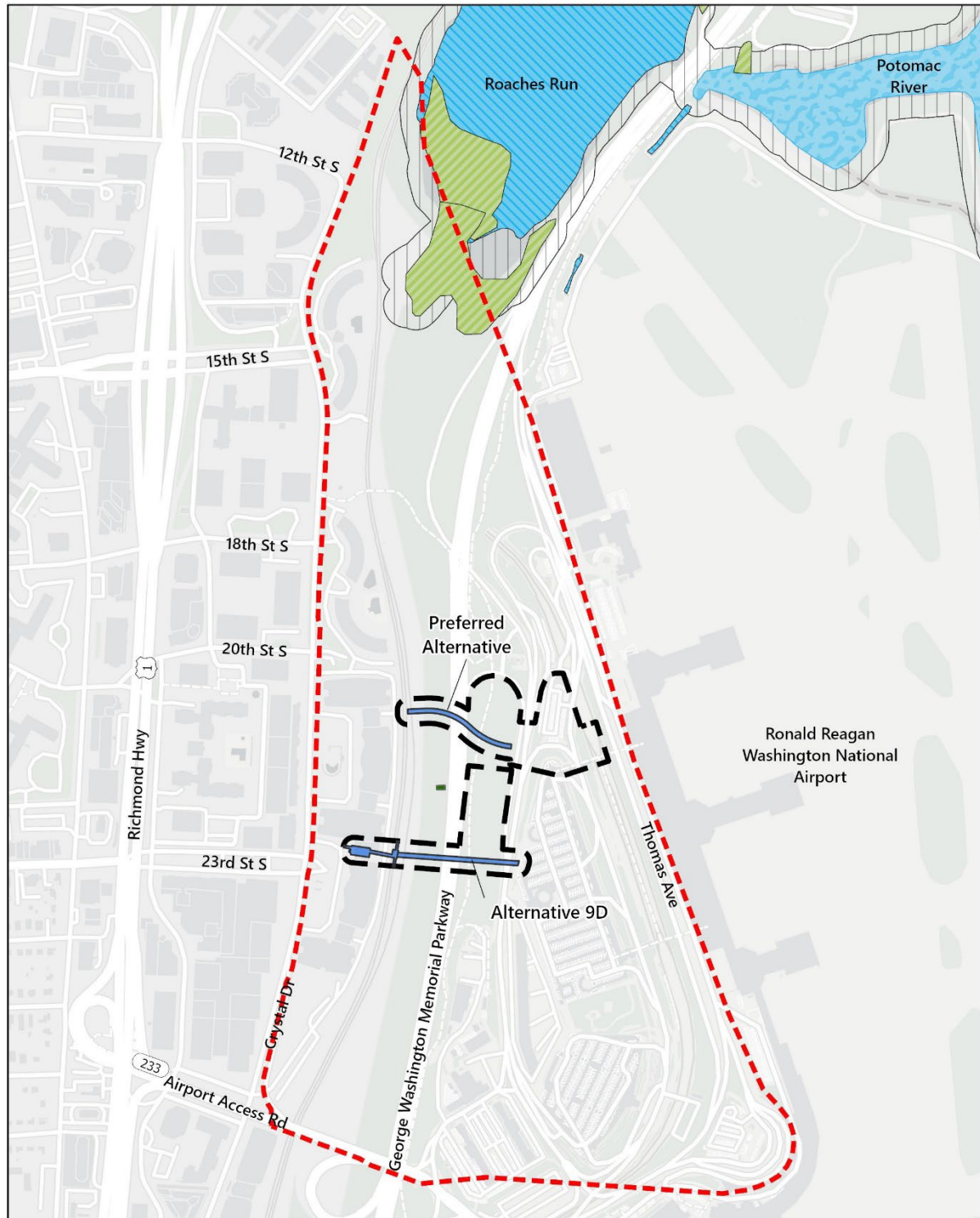
No impacts to water quality would occur under the No-Build Alternative. No impacts are anticipated as a result of either the Preferred Alternative or Alternative 9D, since there are no water features or RPAs present within the proposed limits of disturbance for either alternative.

3.1.3 Floodplains

The full methodology for assessing impacts to floodplains, along with more information on existing conditions, environmental consequences, and potential mitigation, is provided in the *Natural Resources Technical Report*. Floodplains in the study area are associated with Roaches Run and the Potomac River; however, the majority of the study area is not in the 100-year or 500-year floodplain.

No Impacts to floodplains would occur under the No-Build Alternative. No impacts are anticipated as a result of either the Preferred Alternative or Alternative 9D, since there are no floodplains present within the proposed limits of disturbance for either alternative.

Figure 3-1 Wetlands and Waters of the US in the Study Area



- Boundary of Study Area
- CC2DCA Bridge Alignments
- Limits of Disturbance
- Resource Protection Area
- Palustrine Unconsolidated Bottom Wetland
- NWI Wetland
- Stream/River
- U.S. Water Bodies

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Wetlands and Waters of the U.S.

Source: NearMap, National Wetlands Inventory (NWI), Arlington County GIS, VHB

3.1.4 Water Supply

The full methodology for assessing impacts to water supply, along with more information on existing conditions, environmental consequences, and potential mitigation, is provided in the *Natural Resources Technical Report*. There are no public groundwater wells within one mile of the study area, no surface water intakes within five miles, and the study area is not within the watershed of any public surface water intakes or within a designated groundwater management area. A review of previous geotechnical studies found a groundwater table approximately 30 feet below the surface on the airport's western side. Most of the unconfined groundwater near the surface flows relatively short distances to nearby streams. No impacts to source aquifers, surface water intakes, groundwater, or any other water supply would occur under the No-Build Alternative; no impacts to these resources are expected from the Preferred Alternative or Alternative 9D, due to the limited increase in impervious surface.

3.1.5 Waters of the U.S.

On November 16, 2022, the U.S. Army Corps of Engineers (USACE) issued an approved jurisdictional determination for the study area (see **Appendix D**). In accordance with 33 CFR 329 and 33 CFR 328, the USACE determined that the study area contains approximately 901 square feet of isolated wetlands (see **Figure 3-1**), not subject to Federal permitting requirements. No impacts to these wetlands would occur under the No-Build Alternative. No impacts are anticipated from either the Preferred Alternative or Alternative 9D since no wetlands are within either LOD.

3.1.6 Aquatic Biota and Habitat

Mapping indicates that existing Submerged Aquatic Vegetation (SAV) beds occur downstream, outside of the study area within the Potomac River. No SAV beds are within the study area or LODs, therefore no direct effects to SAV would occur under the No-Build Alternative, the Preferred Alternative, or Alternative 9D. In addition, no aquatic habitats are located within the LOD of either build alternative. Therefore, no direct impacts to any aquatic environments or wildlife are expected from the Preferred Alternative or Alternative 9D. See the *Indirect and Cumulative Effects Technical Report* for an analysis of potential downstream effects of construction to aquatic biota and habitat and best management practices to minimize adverse indirect effects.

3.1.7 Coastal Zone Management

The study area is located in Arlington County within the Tidewater Virginia coastal zone; therefore, the study must be consistent with the enforceable policies of Virginia's Coastal Zone Management Program (CZMP) per Section 307 of the Federal Coastal Zone Management Act of 1972 and NOAA regulations (15 CFR 930). The full methodology for assessing the coastal zone management resources of the study area, along with more information on the Federal and state regulatory context, is provided in the *Natural Resources Technical Report*. Within the study area, the coastal resources meriting consideration include non-tidal wetlands at Roaches Run (see

Figure 3-1 below), the Chesapeake Bay Preservation Area associated with Roaches Run, wildlife and inland fisheries, plant pests and noxious weeds, and non-point source water pollution.

Neither the Preferred Alternative nor Alternative 9D would affect subaqueous lands, dunes and beaches, marine fisheries, Commonwealth lands, point source air pollution, point source water pollution, or shoreline sanitation. Construction of either alternative would be consistent with the applicable Enforceable Regulatory Programs that comprise Virginia's CZMP.

3.1.8 Threatened, Endangered, and Special Status Species

The full methodology for assessing threatened and endangered species, along with greater detail on existing conditions and regulatory context, is provided in the *Natural Resources Technical Report*. A review of the USFWS iPaC database found no threatened or endangered species present within the study area; neither are there any critical habitats, refuge lands, documented bald eagle nests, bat roosts or hibernacula, or fish hatcheries. A professional wildlife biologist performed a site visit on August 3, 2021, determining that while potential habitats exist within the study area for some protected species, their presence is very unlikely due to dense surrounding development.

The Virginia Fish and Wildlife Information Service (VaFWIS) database identified the following Federal and state threatened, endangered, or candidate species that could occur within two miles of the study area, though there are no recorded sightings within that radius. However, the likelihood of these species being present is very low due to the small size, fragmentation, and isolation of their potential habitats amidst dense surrounding development.

- northern long-eared bat
- Atlantic sturgeon
- shortnose sturgeon
- little brown bat
- tri-colored bat
- brook floater
- wood turtle
- loggerhead shrike
- migrant loggerhead shrike
- Appalachian grizzled skipper
- spotted turtle
- timber rattlesnake

The northern long-eared bat has been reclassified as endangered under the Endangered Species Act as of March 31, 2023. No bat roosts or hibernacula are documented in the study area or within a 5.5-mile radius. In accordance with the final rule reclassifying the northern long-eared bat from threatened to endangered and approved survey guidelines for the northern long-eared bat, an initial screening and habitat assessment found no presence of a known maternity colony or "suitable summer and winter habitat (i.e., potential hibernaculum)," the nearest being approximately 90 miles from the study area.^{80,81}

⁸⁰ 87 FR 73488. [Federal Register :: Endangered and Threatened Wildlife and Plants; Endangered Species Status for Northern Long-Eared Bat](#). November 30, 2022.

⁸¹ USFWS. [Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines](#). Accessed January 11, 2023.

Habitats of the other listed species (wetlands, streams, meadows, fields, and ridges) are not found within the LODs of the Preferred Alternative and Alternative 9D, therefore no impacts to them are expected to occur from tree removal or other construction activities in the LODs.

3.1.9 Air Quality

The study area is located in Arlington County, which has been designated by EPA as a Moderate Non-attainment area for 8-hour ozone. Arlington County is in a Moderate Maintenance area for carbon monoxide and particulate matter 2.5 and is in attainment for all remaining criteria pollutants, including nitrogen oxides and particulate matter 10. The CC2DCA study is exempt from Conformity requirements because it qualifies as a “bicycle and pedestrian facility” as listed in both federal regulation and VDOT guidance.⁸² In addition, modeling of project-level carbon monoxide (CO) emissions is not required under the 2020 FHWA-VDOT Programmatic Agreement for Project-Level Air Quality Analyses for Carbon Monoxide.⁸³

No significant impacts to air quality would occur under the No-Build Alternative or as a result of either the Preferred Alternative or Alternative 9D as any additional emissions are expected to be minimal.

3.1.10 Noise

In accordance with FHWA guidance, the CC2DCA study is exempt from noise analysis requirements because the build alternatives are bicycle and pedestrian facilities, which are classified as “Type III” projects.⁸⁴ Type III projects include projects that typically do not add capacity and are not expected to cause noise impacts, such as bicycle and pedestrian projects. Noise analysis is not required for Type III projects. The predominant sources of noise in the study area include railroad operations, traffic on roadways, and airport operations. Noise-sensitive receptors include several residential buildings between Crystal Drive and the railroad corridor. No significant impacts to noise level would occur under the No-Build Alternative or with the Preferred Alternative or Alternative 9D, as none of the modes that would use the new facility generate appreciable noise.

3.2 Resources Affected

3.2.1 Parks and Recreation

3.2.1.1 Existing Conditions

The location and boundaries of each park or recreation area are shown in **Figure 3-2** and were identified using data from VDOT, Arlington County, the NPS, and other sources. The full

⁸² 40 CFR 93.126. Exempt Projects; and VDOT. December 2018. [Project-Level Air Quality Analysis Resource Document, Appendix C](#). Accessed January 25, 2023.

⁸³ FHWA and VDOT. October 2020. [Programmatic Agreement for Project-Level Air Quality Analyses for Carbon Monoxide](#). Accessed January 25, 2023.

⁸⁴ FHWA. June 2018. [Techniques for Reviewing Noise Analyses and Associated Noise Reports](#); and VDOT. February 2018. [Highway Traffic Noise Impact Analysis Guidance Manual](#). Accessed January 25, 2023.

methodology for assessing parks and recreation resources, along with more information on existing conditions and context, is provided in the *Socioeconomic Resources Technical Report*.

George Washington Memorial Parkway and Mount Vernon Trail

The GW Parkway, a unit of the National Park Service, is a linear park that provides for scenic driving, historic connections, and recreational amenities. Its fundamental resources and values include the parkway driving experience, transportation infrastructure, vistas and views, and the memorialization and celebration of American ideals.⁸⁵ Though used heavily by local commuters, it is also used by many visitors to the area for transportation and recreation. More than a quarter of a million vehicles pass through this portion of the GW Parkway each year, with peak volumes during morning and evening commutes.⁸⁶ Therefore, driving is the primary way visitors experience the GW Parkway.

Within the study area, drivers can experience a relatively natural environment compared to other transportation corridors in the region, despite glimpses of local development. Visitors to this section of the GW Parkway pass through a landscape designated as the “Urban Valley” by the 2009 report *The Vegetation of the George Washington Memorial Parkway*. DCA forms the eastern edge of the Urban Valley, where “the lines of vegetation on either side undulate close to and away from the road, making for a subtle spatial experience even though the roadway runs straight.”⁸⁷

The other major way to experience the GW Parkway is through the Mount Vernon Trail, which runs roughly parallel to the roadway in the study area. Bicyclist and pedestrian counts are at their highest on the trail in the vicinity of DCA from spring to fall. A study of trail use conducted from 2016-2018 measured an average of 246 bicyclists per hour passing by DCA during peak weekday use, while an average of 47 pedestrians per hour use the Crystal City Connector (see **Chapter 1**) during weekend peaks.⁸⁸

Other Parks

Crystal City has several privately-owned outdoor spaces open to the public, including Water Park, an urban park featuring shade trees, seating, bicycle facilities, and a namesake fountain. A regular neighborhood event at Water Park is “Fridays at the Fountain,” sponsored by the National Landing Business Improvement District (BID) from June through October. Squares across from 2011 Crystal Drive (the Common) and 2231 Crystal Drive (Friends Plaza) are designated as parks by their owner JBG SMITH in its Open Space Framework Plan.⁸⁹

⁸⁵ NPS. 2014. *Foundation Document, George Washington Memorial Parkway*.

⁸⁶ NPS. 2022. [NPS Stats: National Park Service Visitor Use Statistics](#). Accessed April 28, 2022.

⁸⁷ Kelsch, P, Miller A, Mills I, Swallow J. 2009. *The Vegetation of the George Washington Memorial Parkway, Central Section: Alexandria to Arlington Memorial Bridge, Cultural Landscape Report, Volume 2*.

⁸⁸ Daddio, David et al. 2020. *George Washington Memorial Parkway: Mount Vernon Trail Corridor Study*.

⁸⁹ JBG SMITH. 2020. [Open Space Framework Plan. Plan Overview](#). Accessed on June 13, 2022.

As part of the ongoing implementation of the County’s Crystal City Sector Plan, JBG SMITH is planning redevelopment of five parks that will eventually be turned over to Arlington County either via easement or in fee simple. These include Crystal Park at the southern end of the study area and Gateway Park at the northern end (see **Figure 3-2**).⁹⁰

3.2.1.2 Environmental Consequences

No-Build Alternative

With the No-Build Alternative, no new connection would be constructed between Crystal City and DCA. There would be no changes or impacts to any parks or recreation areas. Visitors to parks would have the same recreational opportunities as under the existing conditions.

Preferred Alternative

Impacts to Parks and Recreation Resources

The Preferred Alternative would have no impacts on any of the existing privately-owned spaces open to the public in Crystal City, including Water Park. The western terminus of the Preferred Alternative would be well to the east of these open spaces and would not affect them, their accessibility, or their use by the public.

The Preferred Alternative would have long-term impacts on the GW Parkway, as it would construct a new bridge across the parkway and the Mount Vernon Trail. Piers supporting the bridge as well as the trail link would permanently occupy areas of the park that are currently vegetated or open land. The amount of impact is provided in **Table 3-2**. The table provides the area that would be permanently occupied by the bridge and ramp piers, as well as the LOD, which delineates the areas that may be permanently or temporarily disturbed by the construction of the alternative as described in **Section 2.4** above.

Table 3-2 Impacts to GW Parkway Land

	Preferred Alternative	Alternative 9D
CC2DCA Connection		
Individual Pier Footprint	101 sf	96 sf
Total Pier Footprint	352 sf (0.008 acres)*	288 sf (0.007 acres)*
Mount Vernon Trail Link		
Individual Pier Footprint	56 sf	56 sf
Total Pier Footprint	192 sf (0.004 acres)*	288 sf (0.013 acres)*
LOD		
CC2DCA Connection + Mount Vernon Trail Link	1.9 acres*	2.5 acres*

**Based on NPS GIS layer for parkway, which differs from the Arlington County GIS property layer. Impacts may change as design advances.*

⁹⁰ JBG SMITH. 2020.

The parkway is a highly designed landscape, and therefore vegetation is considered a park resource. Vegetation within the LOD would be cleared, resulting in the removal of up to approximately 146 trees of various species. While the LOD area would be replanted after construction is complete, the new trees would take several decades to reach the size of the existing vegetation. The impact of vegetation removal on habitat, described in **Sections 3.6** and **3.15** of this chapter, is expected to be minimal.

Impacts to Visitor Use and Experience

As noted above, the GW Parkway is a linear park that provides for scenic driving, historic connections, unique vistas, and recreational amenities. Visitors include bicyclists and pedestrians using the Mount Vernon Trail, as well as tourists and area residents driving on the roadway. NPS, which administers the GW Parkway, considers impacts to visitor use and experience in this NEPA document. Therefore, this analysis of impacts has been included to facilitate NPS decision-making.

The Preferred Alternative would affect the experience of GW Parkway visitors, as described in the *Visual Impact Analysis*, by building a new bridge structure across the park and by causing a loss of vegetation. It would not, however, interfere with any views of the Potomac River Gorge, monuments in Washington, DC, or any historic and commemorative features, which do not exist in this portion of the park. (See the *Cultural Resources Technical Report* for photo simulations.) Although bridge piers and abutments would be placed on either side of the GW Parkway roadway and the trail, the Preferred Alternative would not affect usable recreation space.

The trail link would provide a benefit to users by improving the trail's connectivity to both Crystal City and DCA. The shortcomings of the existing connector between the Mount Vernon Trail and Crystal City are described in **Chapter 1**; many trail users would likely find it easier to use the CC2DCA link than the existing Crystal City Connector, particularly for locations south of Water Park. Construction of the link would create a new intersection on the trail, which would be designed to minimize potential for new conflicts between users moving along it and those turning into or from the link.

The Preferred Alternative would have temporary impacts on some recreation and park resources during construction, limited to the duration of specific construction phases. Roadway closures or changes in traffic patterns would impact the experience of scenic driving on the GW Parkway, particularly if drivers are required to detour off the parkway. However, these traffic pattern changes are anticipated to be limited to between one and four weekends. Access to the Mount Vernon Trail for recreational users would be maintained during the trail's operating hours.⁹¹

The NPS *Management Policies 2006* and Federal regulations for park land access prohibit commercial vehicles from travelling on the GW Parkway.⁹² However, if access to private lands is

⁹¹ NPS. [Mount Vernon Trail - George Washington Memorial Parkway](#). Accessed July 5, 2022.

⁹² NPS. [Management Policies 2006](#). Accessed June 14, 2022; 36 CFR 5.6. Commercial Vehicles.

otherwise not available, the Park Superintendent has the discretion to issue special use permits for commercial construction vehicles. Construction staging locations would be set up outside the boundaries of all parks and recreation areas in the study area. During installation of the piers and spans, an adjacent portion of the LOD would be used for temporary staging and storage. Noise and dust from construction vehicles and loading or unloading activities may be noticeable to park users. Similarly, construction equipment and materials would be partially visible, which may diminish the experience of using the park. These impacts would be temporary, however, and would only last for the duration of construction within the GW Parkway.

Alternative 9D

Impacts to Parks and Recreation Resources

Alternative 9D would have no impacts on any of the existing privately-owned spaces open to the public in Crystal City, including Water Park. The western terminus of Alternative 9D would be well to the east of these open spaces and would not affect them, their accessibility, or their use by the public.

Alternative 9D would have long-term impacts on the GW Parkway, as it would construct a new bridge across the parkway and the Mount Vernon Trail. Piers supporting the bridge as well as the trail link would permanently occupy areas of the park currently vegetated or open land. The amount of impact is provided in **Table 3-2**.

The parkway is a highly designed landscape, and therefore vegetation is considered a park resource. Vegetation within the LOD would be cleared, resulting in the removal of up to 133 trees of various species. While the LOD area would be replanted after construction is complete, the new trees would take several decades to reach the size of the existing vegetation. The impact of vegetation removal on habitat, described in **Sections 3.6** and **3.15** of this chapter, are expected to be minimal.

Impacts to Visitor Use and Experience

As noted above, the GW Parkway is a linear park that provides for scenic driving, historic connections, unique vistas, and recreational amenities. Visitors include bicyclists and pedestrians using the Mount Vernon Trail, as well as tourists and area residents driving on the roadway. NPS, which administers the GW Parkway, considers impacts to visitor use and experience in this NEPA document. Therefore, this analysis of impacts has been included to facilitate NPS decision-making.

Alternative 9D would affect the experience of GW Parkway visitors, as described in the *Visual Impact Analysis*, by building a new bridge structure across the park and by causing a loss of vegetation. It would not, however, interfere with any views of the Potomac River Gorge, monuments in Washington, DC, or any historic and commemorative features, which do not exist in this portion of the park. Although bridge piers and abutments would be placed on either side

of the GW Parkway roadway and the trail, Alternative 9D would not affect usable recreation space.

The trail link would provide a benefit to users by improving the trail's connectivity to both Crystal City and DCA. The shortcomings of the existing connector between the Mount Vernon Trail and Crystal City are described in **Chapter 1**; many trail users would likely find it easier to use the CC2DCA link than the existing Crystal City Connector, particularly for locations south of Water Park. Construction of the link would create a new intersection on the trail, which would be designed to minimize potential for new conflicts between users moving along it and those turning into or from the link.

Alternative 9D would have temporary impacts on some recreation and park resources during construction, limited to the duration of specific construction phases. Roadway closures or changes in traffic patterns would impact the experience of scenic driving on the GW Parkway, particularly if drivers are required to detour off the parkway. However, these traffic pattern changes would be limited to between one and four weekends. Access to the Mount Vernon Trail for recreational users would be maintained during the trail's operating hours.⁹³

The NPS *Management Policies 2006* and Federal regulations for park land access prohibit commercial vehicles from travelling on the GW Parkway.⁹⁴ However, if access to private lands is otherwise not available, the Park Superintendent has the discretion to issue special use permits for commercial construction vehicles. Construction staging locations would be set up outside the boundaries of all parks and recreation areas in the study area. During installation of the piers and spans, an adjacent portion of the LOD would be used for temporary staging and storage. Noise and dust from construction vehicles and loading or unloading activities may be noticeable to park users. Similarly, construction equipment and materials would be partially visible, which may diminish the experience of using the park. These impacts would be temporary, however, and only last for the duration of construction.

⁹³ NPS. [Mount Vernon Trail - George Washington Memorial Parkway](#). Accessed July 5, 2022.

⁹⁴ NPS. [Management Policies 2006](#). Accessed June 14, 2022; 36 CFR 5.6. Commercial Vehicles.

Figure 3-2 Existing and Planned Parks in Crystal City and the Study Area



- JBG Smith Proffered Parks (Planned)**
- a. Gateway Park
 - b. Metro Market Square
 - c. Center Park
 - d. 23rd Street Plaza
 - e. Crystal Park
- JBG Smith Parks**
- 1. Water Park (existing)
 - 2. Friends Plaza (planned)
 - 3. The Common (planned)



- Boundary of Study Area
- CC2DCA Bridge Alignments
- Limits of Disturbance
- Airport Property
- National Park Service Park
- County Parks
- Other Parks

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Land Use and Parks
 Source: Arlington County GIS, Crystal City Open Space Framework Plan (Jan 2020), JBG Smith

3.2.2 Communities and Community Facilities

3.2.2.1 Existing Conditions

As described in more detail in the *Transportation Technical Report* and in **Chapter 1**, Crystal City is bounded on the west by US Route 1/Richmond Highway and on the east by the CSXT/VPRA rail corridor. The rail corridor and the GW Parkway form barriers crossed only by the Crystal City Connector tunnel and the Airport Access Road bridge. The only community facility within the study area is the MWAA Police Department Headquarters, at the far southern end.

Impacts on community cohesion from construction of transportation infrastructure “may be beneficial or adverse, and may include splitting neighborhoods, isolating a portion of a neighborhood or an ethnic group [...] or separating residents from community facilities” on a temporary or permanent basis.⁹⁵ Conversely, projects may enhance connectivity or ease access to community facilities.

3.2.2.2 Environmental Consequences

No-Build Alternative

No impacts to community facilities or cohesion would occur under the No-Build Alternative; pedestrians and bicyclists would continue to use existing paths and encounter existing physical barriers.

Preferred Alternative

No adverse impacts to community facilities are anticipated from the Preferred Alternative because there are no such resources within or near the LOD. The Preferred Alternative would enhance community connectivity and cohesion by providing a dedicated pedestrian and bicycle pathway between Crystal City, the future VRE Crystal City Station’s platform, and DCA.

Alternative 9D

No adverse impacts to community facilities are anticipated from Alternative 9D because there are no such resources within or near the LOD. Alternative 9D would enhance community connectivity and cohesion by providing a dedicated pedestrian and bicycle pathway between Crystal City, the future VRE Crystal City Station’s platform, and DCA.

3.2.3 Economic Resources

3.2.3.1 Existing Conditions

Crystal City is a major employment center within Arlington County. According to the 2022 Arlington County Profile, the Richmond Highway Corridor (which includes Pentagon City as well

⁹⁵ FHWA. 1987. *FHWA Technical Advisory T 6640.8a: Guidance for Preparing and Processing Environmental and Section 4(f) Documents*.

as Crystal City) provides approximately 47,000 jobs.⁹⁶ Most of these (71 percent) are office jobs, with another 22 percent in retail. An additional 7,750 jobs are located at DCA.

The Crystal City Sector Plan envisions significant growth in jobs and residents in Crystal City by 2040.⁹⁷ As Amazon establishes its second headquarters (HQ2) in this area, it is expected to bring more than 25,000 jobs to the region.⁹⁸ According to the *Washington Post*, as of April 2022, National Landing had “8 million square feet of new office space in the pipeline, with 9,000 new jobs in addition to those being created by Amazon.”⁹⁹

3.2.3.2 Environmental Consequences

No-Build Alternative

With the No-Build Alternative, no new bridge would be constructed, causing no impact to income, employment, tax revenues, or business activity in the study area.

Preferred Alternative

The Preferred Alternative would enhance connectivity between Crystal City and DCA, with a positive impact on local and regional businesses. The new bridge would facilitate economic activity by providing a dedicated pedestrian connection between DCA and Crystal City businesses. In the short term, the Preferred Alternative would support planning, engineering, and construction jobs in the area during implementation of the project.

The Preferred Alternative would result in the potential loss of up to 40 parking spaces and associated revenue at the Terminal 2 parking garage at DCA, depending on its final alignment across DCA property. This amounts to a maximum of approximately 0.5 percent of the total parking currently available and 0.3 percent of planned future parking capacity at DCA. When combined with the wide variety of options for travelers accessing the airport, further enhanced by the construction of the CC2DCA connection, the loss of parking spaces is not anticipated to adversely affect airport operations. It would result in a small reduction in revenue derived from parking fees. However, the Purpose and Need of MWAA’s *DCA Roadway Network Improvements* EA identifies parking capacity as an issue to be addressed and therefore MWAA has requested that VDOT and Arlington County explore options to avoid or minimize impacts to the parking garage to “maximize MWA’s development plans in that area, preserve high-demand parking spaces and associated revenue, and optimize pedestrian safety.”¹⁰⁰ Coordination with MWAA will continue through the preliminary engineering phase to determine the final alignment and eastern project terminus.

⁹⁶ Arlington County. [Profile 2022](#). Accessed June 10, 2022.

⁹⁷ Arlington County. [Crystal City Sector Plan](#). Accessed July 11, 2022.

⁹⁸ Amazon. April 2022. [Building on progress at Amazon’s HQ2 in Arlington, Virginia](#). Accessed July 11, 2022.

⁹⁹ Teo Armus. May 14, 2022. [“Boeing’s move to Arlington pushes ‘tech hub’ vision closer to reality.”](#) *Washington Post*. Accessed July 11, 2022.

¹⁰⁰ MWAA comments on the *Socioeconomic, Land Use, and Right-of-Way Technical Report*, August 2022.

Alternative 9D

Alternative 9D would enhance connectivity between Crystal City and DCA, with a positive impact on local and regional businesses. The new bridge would facilitate economic activity by providing a dedicated pedestrian connection between DCA and Crystal City businesses. In the short term, some commercial tenants of 2231 Crystal Drive would be affected during construction of the western terminus of the bridge; coordination with area businesses would minimize disruptions. Alternative 9D would support planning, engineering, and construction jobs in the area during implementation of the project.

Alternative 9D would result in the loss of up to 130 parking spaces and associated revenue at the Terminal 2 parking garage at DCA. This amounts to approximately 1.5 percent of the total parking currently available and 1.1 percent of planned future parking capacity at DCA. When combined with the wide variety of options for travelers accessing the airport, further enhanced by the construction of the CC2DCA connection, the loss of parking spaces is not anticipated to adversely affect airport operations. It would likely result in a small reduction in revenue derived from parking fees. However, the Purpose and Need of MWAA's *DCA Roadway Network Improvements* EA identifies parking capacity as an issue to be addressed and therefore MWAA has requested that VDOT and Arlington County explore options to avoid or minimize impacts to the parking garage to "maximize MWA's development plans in that area, preserve high-demand parking spaces and associated revenue, and optimize pedestrian safety."¹⁰¹

3.2.4 Existing and Future Land Use

3.2.4.1 Existing Conditions and Future Planned Land Use

The study area can be divided into four main land use areas running roughly north-south: Crystal City, the shared and jointly-owned CSXT/VPRA railroad corridor, the GW Parkway, and DCA. **Chapter 1** of this document and the *Socioeconomic, Land Use, and Right-of-Way Technical Report* describe these areas in more detail. Types of land use are shown in **Figure 3-3**.

Crystal City

Crystal City is a high-density, urban, mixed-use neighborhood of Arlington County between Richmond Highway and the CSXT/VPRA railroad corridor. Much of it was built in the 1970s and early 1980s, but major changes are underway, as the neighborhood includes part of the future Amazon HQ2.¹⁰² Land use planning in Crystal City has focused on encouraging additional mixed-use development and creating a "more inviting, lively, and walkable community."¹⁰³

¹⁰¹ MWAA comments on the *Socioeconomic, Land Use, and Right-of-Way Technical Report*, August 2022.

¹⁰² Arlington County. ["Amazon in Arlington: What to Know."](#) Accessed on June 14, 2022.

¹⁰³ Arlington County. [Crystal City Sector Plan Webpage](#). Accessed on July 7, 2022.

CSXT/VPRA Railroad Corridor

The railroad corridor just east of Crystal City consists of three north-south tracks converging on the Long Bridge, shared and owned by CSXT and VPRA. Both freight and passenger trains use the corridor, with the existing VRE Crystal City Station located in the northern part of the study area. Currently, it carries 76 trains per day, expected to increase to 192 trains per day in 2040.¹⁰⁴

Under the ongoing VRPA Alexandria Fourth Track project, the existing tracks will be re-aligned, and a fourth track added along the eastern edge of the right-of-way. In addition, VRE plans to construct a new Crystal City Station south of the current station, which will be accessed on the south by a pedestrian bridge at 2011 Crystal Drive and on the north via a tunnel from Water Park. Amtrak also plans to extend the platform further south to provide new intercity service in Crystal City.¹⁰⁵

George Washington Memorial Parkway

The GW Parkway is a unit of the National Park Service. It is a linear park honoring the nation's first president, which protects and preserves cultural and natural resources along the Potomac River below Great Falls to Mount Vernon. It provides scenic driving, historic connections, and recreational amenities. In the study area, the parkway consists of a four-lane, divided roadway with landscaped areas on both sides, located between the CSXT/VPRA railroad corridor and DCA.

The Mount Vernon Trail, administered by the NPS as part of the GW Parkway, runs roughly parallel to it in the study area. It is an 18-mile multiuse paved trail that stretches from Mount Vernon to Theodore Roosevelt Island and accommodates over one million pedestrians and cyclists annually.¹⁰⁶ NPS plans to widen, repave, and make other upgrades to the trail between Theodore Roosevelt Island and Jones Point Park, which includes the study area, starting in 2025.

In the study area, the park will continue to be managed as a protected unit of NPS in the future. Vegetation management will serve to screen out the dense urban skyline and airport that parallel the roadway. NPS plans to incorporate woodland plantings and shrubs to create understory and canopy trees. Land use will continue to support recreational trail use and driving within a landscaped environment consistent with a park setting.

Ronald Reagan Washington National Airport

One of three commercial airports serving the Washington area, DCA is owned by the Federal government and operated by the Metropolitan Washington Airports Authority (MWAA). DCA facilities within the study area, east of the GW Parkway, consist of access roadways, light industrial buildings and yards, and parking garages.

¹⁰⁴ DDOT. 2020. [Long Bridge Project Draft EIS, Chapter 2: Purpose and Need](#). Accessed June 14, 2022.

¹⁰⁵ VRE. 2017. *Virginia Railway Express Crystal City Station Improvements Alternatives Analysis*.

¹⁰⁶ NPS. 2020. *George Washington Memorial Parkway: Mount Vernon Trail Corridor Study*.

3.2.4.2 Environmental Consequences

Impacts to land use include conversions to transportation use based on permanent right-of-way and air rights needs and the compatibility of CC2DCA with existing and planned land uses. Temporary right-of-way needs for construction are not considered converted land.

No-Build Alternative

With the No-Build Alternative, no new connection between Crystal City and DCA would be constructed. There would be no impact to land use, properties, or right-of-way other than the existing planned changes described above, unrelated to CC2DCA.

Preferred Alternative

The total land use conversions and right-of-way needs that would result from the Preferred Alternative are shown in **Table 3-3**. More information is provided in the *Socioeconomic, Land Use, and Right-of-Way Technical Report*.

Table 3-3 Right-of-Way Needs by Alternative

Land Use Class	Preferred Alternative	Alternative 9D
Commercial	0 acres	0.1 acre
Residential	0	0
Open Space (GW Parkway)	0.21* acre	0.19* acre
Railroad Corridor	0.04* acre	0.1 acre
DCA	0.02* acre	0.1* acre
All Transportation & Open Space (including railroad corridor, GW Parkway, and DCA)	0.37* acre	0.35* acre
Total Land (All Uses)	0.27* acre	0.48* acre

**NPS and Arlington County GIS information differ in the location of the GW Parkway boundary. The reported impacts represent the greatest impact to the GW Parkway when these sources conflict. Impact numbers may be revised once property survey has been completed.*

Crystal City

The Preferred Alternative would have no impact on land uses in Crystal City, as its western terminus would be within the CSXT/VPRA right-of-way. In general, the Preferred Alternative would be consistent with and promote the goals of local land use plans and studies, including the Crystal City Sector Plan.

CSXT/VPRA Railroad Corridor

The Preferred Alternative would cross over the railroad right-of-way east of the future VRE Crystal City Station platform. Air rights would need to be acquired from both CSXT and VPRA; a small area of land may also be needed to construct a bridge pier on the eastern edge of the right-of-way. Altogether, the total permanent footprint of the Preferred Alternative within the railroad right-of-way (including the portion in CSXT/VPRA air rights) would be approximately 0.04 acres.

GW Parkway

The Preferred Alternative would cross over the GW Parkway, with several piers within parkway property. It would result in some loss of currently vegetated open space to construct the piers and ramp for the bridge and Mount Vernon Trail link. This would total approximately 0.21 acres depending on the surveyed location of the property line (see **Table 3-3**). Some of the loss would be offset by the proposed link, which would enhance the trail's connectivity to both Crystal City and DCA.

Ronald Reagan Washington National Airport

The footprint of the Preferred Alternative on DCA property would depend on the final alignment of CC2DCA and how it would connect to the airport terminal. Based on alignments considered during the alternatives development process, the footprint on DCA property is likely to be approximately 0.1 acre. If CC2DCA connects to the terminal through the parking garage, a small area of the garage may be needed to establish a dedicated walkway. This would result in the loss of some existing parking space. In such a case, it is anticipated that fewer than 40 parking spaces (amounting to only 0.3 percent of future parking capacity) would be lost (see **Section 3.11** of this chapter). No other impacts to land use on DCA property would occur as a result of the Preferred Alternative.

Alternative 9D

Crystal City

In Crystal City, Alternative 9D would require constructing an access to CC2DCA at 2231 Crystal Drive; approximately 0.1 acres would be needed. Alternative 9D would be consistent with and promote the goals of local land use plans and studies, including the Crystal City Sector Plan.

CSXT/VPRA Railroad Corridor

Alternative 9D would cross over the entire railroad right-of-way. Air rights and possibly a small area of land for a bridge pier would need to be acquired from both CSXT and VPRA.

Additionally, Alternative 9D would make use of the future Amtrak platform to construct a stair tower for access to and from CC2DCA. The total permanent footprint of Alternative 9D within the railroad right-of-way would be approximately 0.1 acres.

Figure 3-3 Land Use by Building



CC2DCA | Crystal City, Arlington, VA

- Boundary of the Study Area
- CC2DCA Bridge Alignments
- Limits of Disturbance
- Parks
- National Park Service Park
- Industrial
- Office
- Commercial/Retail
- High-Density Residential
- Low-Density Residential
- Airport Property
- Surface Water
- Railroad

Land Use by Building

Source: Arlington County GIS, Arlington County Real Estate Map, Virginia Department of Transportation, Esri

GW Parkway

Alternative 9D would cross over the GW Parkway, with several piers within parkway property. It would result in some loss of vegetated open space to construct the piers and ramp for the bridge and Mount Vernon Trail link, totaling approximately 0.19 acres (see **Table 3-3**). Some of the loss would be offset by the link, which would enhance the trail's connectivity to both Crystal City and DCA.

Ronald Reagan Washington National Airport

The footprint of Alternative 9D on DCA property (outside the parking garage) would be 0.05 acres. Approximately 0.33 acres of the Terminal 2 parking garage would be used for the CC2DCA walkway. This would result in the loss of up to 130 parking spaces, amounting to 1.1 percent of future parking capacity (see **Section 3.11** of this chapter). No other impacts to land use on DCA property would occur as a result of Alternative 9D.

3.2.5 Historic Resources

3.2.5.1 Existing Conditions

Architectural Resources¹⁰⁷

Within the study area, historic properties were identified using GIS mapping data provided by Arlington County, the National Register of Historic Places (NRHP) database, the Virginia Landmarks Register (VLR), and the Virginia Cultural Resource Information System (V-CRIS). There are seven historic properties in the study area. Three are listed in the NRHP: the GW Parkway, Mount Vernon Memorial Highway, and Washington National Airport Terminal and South Hangar Line. Three others have been recommended as eligible for listing in the NRHP (see **Table 3-4**). No assemblage of buildings that could comprise a historic district is within the study area, nor are any lands potentially eligible for the American Battlefield Protection Program.

Archaeological Resources

Since the early 20th century, the study area has seen moderate to heavy development of roads, airport and rail infrastructure, and buildings. Less than 25 percent of it remains undeveloped.

Phase IA investigations consisting of general background and archival research were conducted to assess the archaeological and architectural resource potential of the CC2DCA study area, in accordance with Federal and state guidelines. This research found one previously recorded archaeological site (44AR0018, Abingdon) located within the study area and an additional 10 archaeological sites within the 1-mile radius. Site 44AR0018 was identified and evaluated during a 1988 survey of DCA and has been thoroughly documented.

¹⁰⁷ For the purposes of this analysis, "architectural resources" encompasses all above-ground historic resources, to distinguish from archaeological resources.

In August 2022, a Phase IB archaeological survey was completed for the limits of disturbance (LODs) of Alternatives 7D and 9D, in consultation with the NPS. Phase IA and IB surveys identified the LODs for construction activities as highly disturbed, and the likelihood of identifying intact and significant cultural features or deposits associated with the precontact period is poor. The historic disturbance of the area has made it unlikely that features related to 17th-, 18th-, and antebellum 19th-century occupations would be identified. The late 19th- and early 20th-century usage of the area for brick manufacturing indicates potential for the undeveloped portions of the study area to contain related deposits, but this potential is low.

Table 3-4 Historic or Eligible Properties

Name	Description	VLR ID	NRHP Status
George Washington Memorial Parkway (GW Parkway)	Important contribution to landscape design, exemplifies City Beautiful parkway concept. First opened in 1932	029-0228	Listed (No. 95000605)
Mount Vernon Memorial Highway (MVMH)	First parkway project of the US government, valued for its landscape architecture and scenic views. Built 1929-1932	029-0218	Listed (No. 81000079)
Washington National Airport Terminal and South Hangar Line	Represents the advancement of American aviation architecture, technology, and New Deal government initiatives. Terminal completed in 1941 and South Hangar Line built in staged between 1941 and 1948.	000-0045	Listed (No. 97001111)
Richmond, Fredericksburg, and Potomac (RF&P) Railroad Historic District	Historic railroad corridor that played critical role in region's development from 1837-1943		Eligible
Mount Vernon Trail	18-mile paved multiuse trail within the GW Parkway envisioned as part of original MVMH design. Built by NPS, first section opened in 1972		Eligible
Abingdon Research Station/Department of Transportation Laboratory Buildings	Six buildings constructed by USDA as road surface testing laboratories. Built in Colonial Revival style starting in 1934, on site of former plantation		Eligible
Abingdon Ruins	Ruins of the Abingdon Plantation house – built c. 1740-1741 and burned on March 5, 1930. The ruins remain within the grounds of DCA.		Eligible

3.2.5.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any construction and therefore no impact to historic, archaeological, or architectural resources would occur.

Preferred Alternative

The Preferred Alternative would not impact the RF&P Railroad Historic District, the Abingdon Research Station/Department of Transportation Laboratory Buildings, the Abingdon Ruins, or the Washington National Airport Terminal and South Hangar Line (see **Table 3-5** for summary of effects.)

Impacts to the GW Parkway and MVMH would result from the physical alteration of contributing features. The introduction of contemporary infrastructure into the landscape and removal of vegetation that may be part of historic planting plans would result in the diminishment of setting and feeling for the GW Parkway and the MVMH. The new bridge would also result in the further erosion of the "Urban Valley" historic viewshed and would diminish this section of the integrity of design and feeling in this section of the GW Parkway and MVMH. To mitigate for the diminishment of setting and feeling, the new bridge structure would use similar forms and materials as existing bridges seen throughout the historic property; it would also be partially screened from travelers approaching from both directions on the GW Parkway by existing mature vegetation. In addition, the construction of the intersection with the Mount Vernon Trail and removal of vegetation would impact the trail as an historic resource by diminishing its integrity of design, setting, and feeling.

Staging and access for construction of the Preferred Alternative would not permanently affect the GW Parkway, MVMH, or Mount Vernon Trail, as staging would be limited to the periods of construction. These effects would be avoided or minimized in intensity and duration through the use of appropriate construction management techniques. If construction activities are required deeper than 82.7 in (210 cm) below ground surface, further archaeological work would be needed.

Alternative 9D

The historic resource assessment found that Alternative 9D would not adversely affect the RF&P Railroad Historic District, the Abingdon Research Station/Department of Transportation Laboratory Buildings, the Abingdon Ruins, or the Washington National Airport Terminal and South Hangar Line. (See **Table 3-5** for summary of effects.)

Impacts to the GW Parkway and MVMH would result from the physical alteration of contributing features. The introduction of contemporary infrastructure into the landscape and removal of vegetation that may be part of historic planting plans would result in the diminishment of setting and feeling for the GW Parkway and the MVMH. The new bridge would also result in the further erosion of the "Urban Valley" historic viewshed and would diminish the integrity of

design and feeling in this section of the GW Parkway and MVMH. To mitigate for the diminishment of setting and feeling, the new bridge structure would use similar forms and materials as existing bridges seen throughout the historic property; it would also be partially screened from travelers approaching from both directions on the GW Parkway by existing mature vegetation. In addition, the construction of the intersection with the Mount Vernon Trail and removal of vegetation would impact the trail as an historic resource by diminishing its integrity of design, setting, and feeling.

Staging and access for construction of Alternative 9D would not permanently affect the GW Parkway, MVMH, or Mount Vernon Trail, as staging would be limited to the periods of construction. These effects would be avoided or minimized in intensity and duration through appropriate construction management techniques. If construction activities are required deeper than 82.7 in (210 cm) below ground surface, further archaeological work would be needed.

3.2.5.3 Completion of the Section 106 Process

Arlington County, with VDOT and FHWA, initiated the Section 106 process with the Virginia Department of Historic Resources (DHR), which serves as the State Historic Preservation Officer (SHPO); see **Chapter 4** of this document for more details on this process and a list of consulting parties invited to participate. In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 and its implementing regulations 36 CFR 800, anticipated impacts of CC2DCA on historic resources were assessed, as described in the sections above. These resources include buildings, structures, sites, districts, and objects listed on or eligible for listing on the NRHP.

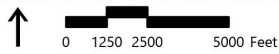
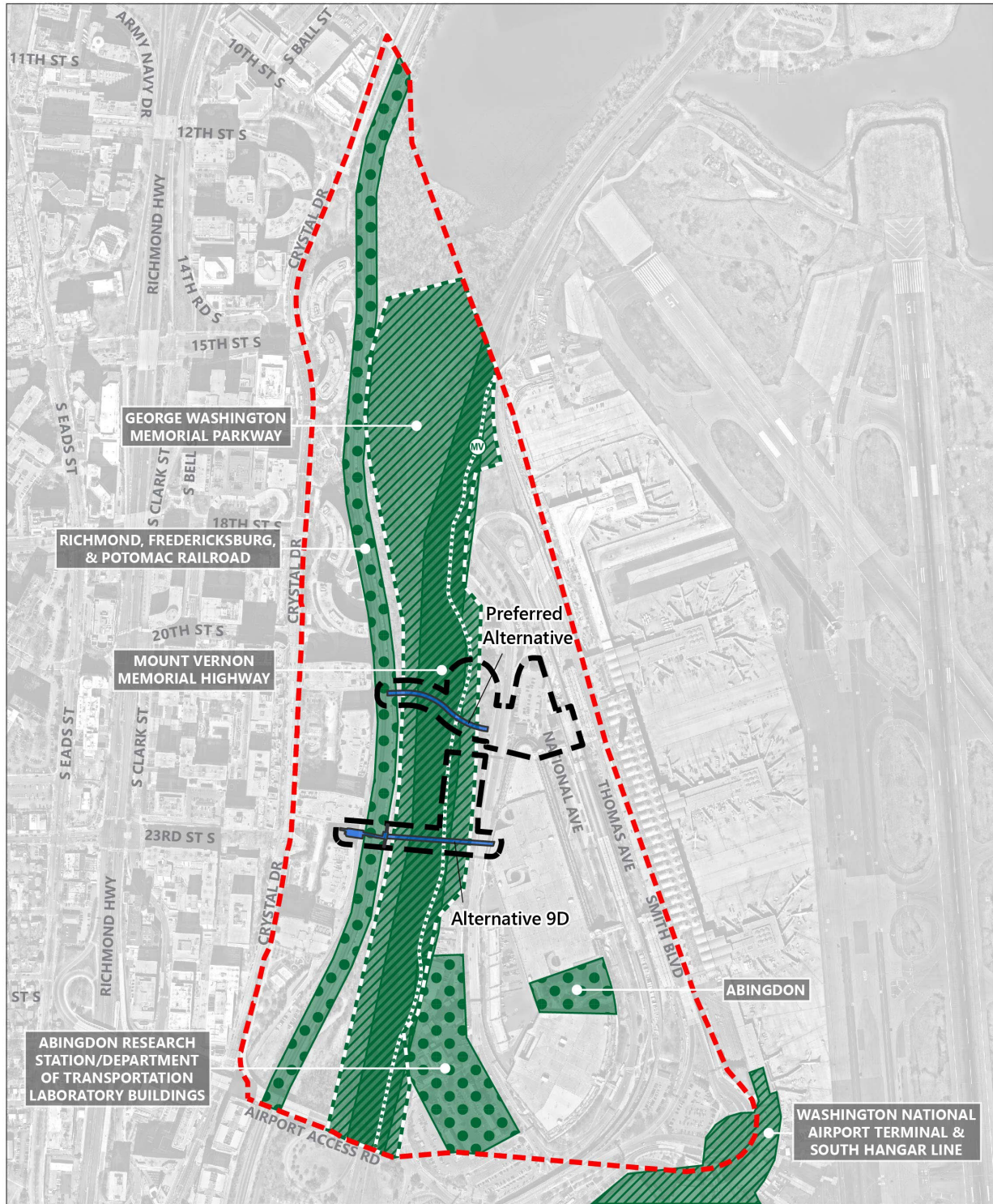
For the purposes of Section 106, an Area of Potential Effects (APE) was defined for the CC2DCA study. The APE is “the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.”¹⁰⁸ It must be defined before the identification of historic properties and assessment of potential effects. An APE and Limits of Disturbance (LOD) were developed for the alternatives under consideration (see **Figure 3-4**). The LOD boundary represents the area for each alternative within which CC2DCA has the potential to directly alter an existing feature or result in ground-disturbing activities. DHR concurred with the APE on August 23, 2022.¹⁰⁹

Table 3-5 shows the assessment of effects for both the Preferred Alternative and Alternative 9D. DHR concurred with the assessment of effects on April 21, 2023. The Assessment of Effects report is provided in **Appendix C1**. **Appendix C2** contains a draft Programmatic Agreement specifying measures to resolve the adverse effects identified in the report.

¹⁰⁸36 CFR 800.16(d)

¹⁰⁹ In defining the APE, nearby listed and eligible historic properties were considered, including Abingdon Ruins, Washington National Airport Terminal and South Hangar Line, and the Jet Engine Cell Site. These properties were ultimately excluded because they have no potential to be affected by either alternative.

Figure 3-4 Historic Resources in the Study Area



- Boundary of the Study Area
- NRHP-Listed Resource
- NRHP-Eligible Resource
- Limits of Disturbance
- Parkland (GW Parkway)
- CC2DCA Bridge Alignments
- Mount Vernon (MV) Trail

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Historic Resources in the Study Area

Source: Arlington County GIS; NRHP; V-CRIS

Table 3-5 Summary of Adverse Effects Determination – Historic Resources

Historic Property	Preferred Alternative	Alternative 9D	Assessment of Effect
GW Parkway	<p>Construction of bridge and removal of vegetation would diminish this section of parkway’s integrity of design, setting, and feeling, with adverse effects in both Alternatives</p> <p>Both Alternatives would contribute to further erosion of the GW Parkway Urban Valley’s historic viewshed from original plan</p>		Adverse Effect
MVMH	<p>Construction of bridge and removal of vegetation would diminish this section of highway’s integrity of design, setting, and feeling, with adverse effects in both Alternatives</p> <p>Both Alternatives would contribute to further erosion of the MVMH’s historic viewshed from original plan</p>		Adverse Effect
Washington National Airport Terminal and South Hangar Line	<p>No physical changes to this property</p> <p>No significant views or viewsheds identified</p>		No Adverse Effect
RF&P Railroad Historic District	<p>Construction of bridge pier (disturbing 0.04 acres) on eastern edge consistent with existing features in historic district; would not diminish historic setting and feeling</p> <p>No significant views or viewsheds identified</p>	<p>Construction of bridge pier and stair tower to Amtrak platform (disturbing 0.1 acres) consistent with features in district; would not diminish historic setting and feeling</p> <p>No significant views or viewsheds identified</p>	No Adverse Effect
Mount Vernon Trail	<p>Link between trail and CC2DCA would require permanent construction of an intersection with the trail which would diminish the trail’s integrity of design and setting.</p> <p>No significant views or viewsheds identified</p>	<p>Link between trail and CC2DCA would require permanent construction of an intersection with the trail which would diminish the trail’s integrity of design and setting.</p> <p>No significant views or viewsheds identified</p>	Adverse Effect
Abingdon Research Station	<p>No physical changes to this property</p> <p>No significant views or viewsheds identified</p>		No Adverse Effect
Abingdon Ruins	<p>No physical changes to this property</p> <p>No significant views or viewsheds identified</p>		No Adverse Effect

3.2.6 Hazardous Materials

3.2.6.1 Existing Conditions

Hazardous materials as defined in 40 CFR 261 are regulated by the EPA and are associated with health risks, environmental damages, clean-up costs, and project delay. No Superfund sites or sites governed by the Resource Conservation and Recovery Act are located within the study area. As shown in **Figure 3-5**, the Virginia Department of Environmental Quality (DEQ) has identified 14 confirmed leaks, spills of petroleum, or regulated substances in the study area. One of these sites is at the Crystal Park Condominiums at 1805 Crystal Drive, while the rest are on DCA property.

3.2.6.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any construction and therefore would not impact any hazardous materials sites within the study area.

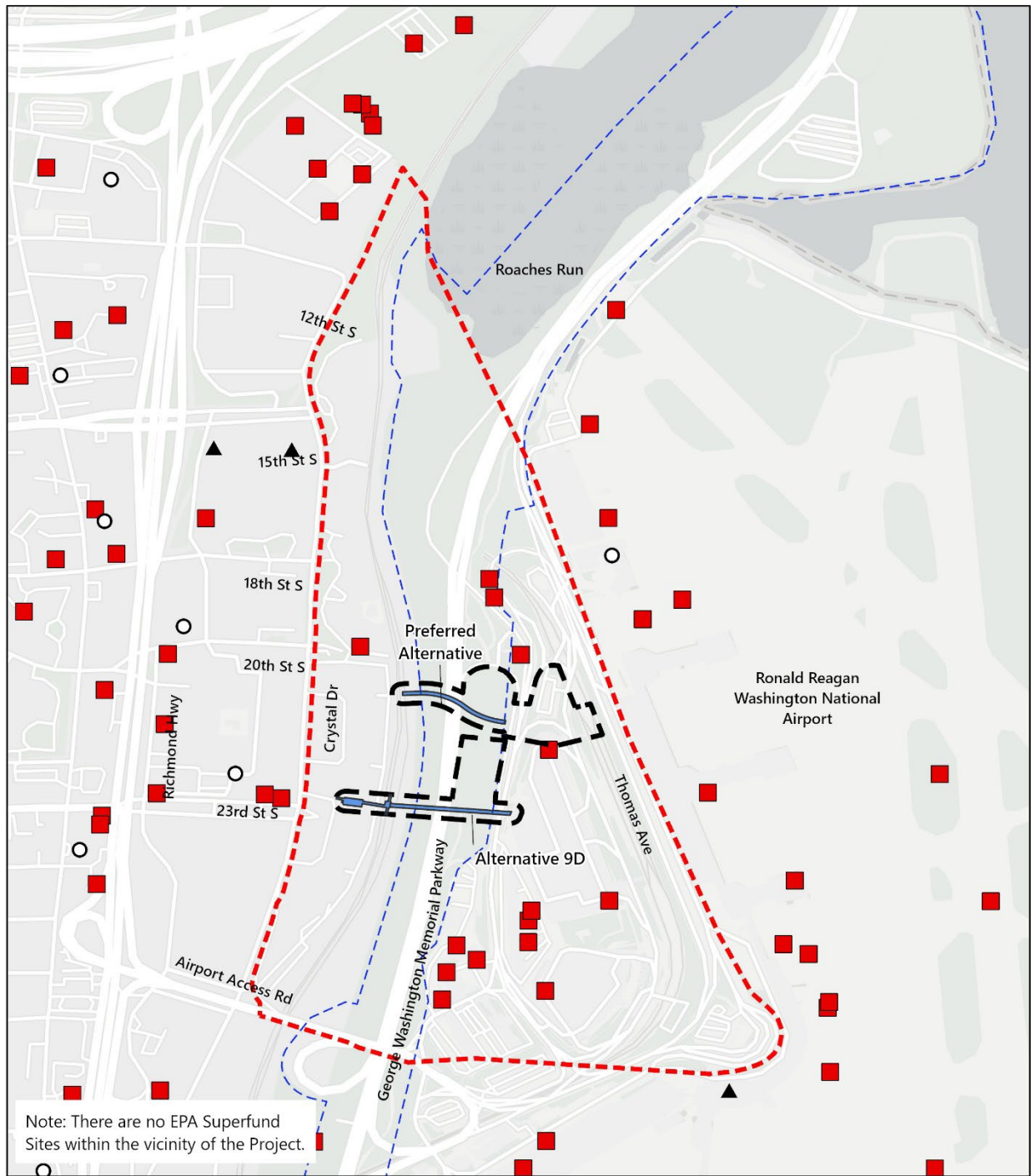
Preferred Alternative

The Preferred Alternative is not expected to impact an active spill site or create new hazards that would adversely impact the environment. Any undocumented hazardous materials encountered during construction would be handled and disposed of in accordance with Federal, state, and local regulations.

Alternative 9D

Alternative 9D is not expected to impact an active spill site or create new hazards that would adversely impact the environment. Any undocumented hazardous materials encountered during construction would be handled and disposed of in accordance with Federal, state, and local regulations.

Figure 3-5 Known Hazardous Waste Sites in the Study Area



Note: There are no EPA Superfund Sites within the vicinity of the Project.



- Boundary of Study Area
- CC2DCA Bridge Alignments
- Limits of Disturbance
- Dept of Environmental Quality (DEQ) Petroleum Release Sites
- Resource Conservation and Recovery Act (RCRA) Sites
- EPA Toxics Release Inventory (TRI)
- George Washington Memorial Parkway Boundary

CC2DCA | Crystal City, Arlington, VA

Hazardous Waste

Source: Arlington County GIS, Virginia Department of Transportation, Esri

3.2.7 Terrestrial Wildlife and Habitat

3.2.7.1 Existing Conditions

Biologists inspected the study area's land use, geomorphological, and vegetative features. The full methodology for assessing wildlife and habitat, along with more information on existing conditions and regulatory context, is provided in the *Natural Resources Technical Report*. The study area comprises mostly developed lands associated with transportation corridors and DCA, and animals found there are typically habituated to human, suburban environments.¹¹⁰ Habitats available for wildlife include the upland forested area and maintained grassy fields with ornamental shade trees that run parallel to the GW Parkway. Roaches Run Waterfowl Sanctuary, a preserved habitat for migrating and wintering waterfowl on the Atlantic flyway, lies partially within the study area at the northern end.

3.2.7.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not involve any project-related construction and therefore no impacts to wildlife or their habitat would occur.

Preferred Alternative

The Preferred Alternative would disturb approximately 1.9 acres of upland forested habitat that various avian species may use for nesting and feeding, including species listed in the Federal Migratory Bird Treaty Act and Virginia's Migratory Bird Incidental Take rule.¹¹¹ Avoidance of incidental take of migratory birds would be accomplished by conducting nesting surveys and initiating tree removal in fall/winter outside of nesting season.

The Preferred Alternative would result in temporary construction disturbances that would affect local wildlife. Given the relatively high ambient noise level already generated in the project area from passing vehicles and DCA jet traffic, animals such as the gray squirrel, raccoon, white-tailed deer, and songbirds are adapted to everyday urban noise levels, and noise from construction equipment will likely have little effect on their behavior from safe distances. However, immediate disturbances to home territories from tree clearing activities would disperse animals to neighboring habitats.

Alternative 9D

Alternative 9D would disturb approximately 1.9 acres of upland forested habitat that various avian species may use for nesting and feeding, including species listed in the Federal Migratory Bird Treaty Act and Virginia's Migratory Bird Incidental Take rule.¹¹² Avoidance of incidental take

¹¹⁰ Common types of animals within the study area include songbirds, various species of woodpeckers, box turtles, ratsnakes, frogs, salamanders, and mammals such as raccoons, weasels, deer, and rabbits.

¹¹¹ 16 USC 703-712 Migratory Bird Treaty Act of 1918; 4VAC15-35 Birds: Incidental Take of Bird Species.

¹¹² 16 USC 703-712 Migratory Bird Treaty Act of 1918; 4VAC15-35 Birds: Incidental Take of Bird Species.

of migratory birds would be accomplished by conducting nesting surveys and initiating tree removal in fall/winter outside of nesting season.

Alternative 9D would result in temporary construction disturbances that would affect local wildlife. Given the relatively high ambient noise level already generated in the project area from passing vehicles and DCA jet traffic, animals such as the gray squirrel, raccoon, white-tailed deer, and songbirds are adapted to everyday urban noise levels, and noise from construction equipment will likely have little effect on their behavior from safe distances. However, immediate disturbances to home territories from tree clearing activities would disperse animals to neighboring habitats.

3.2.8 Environmental Justice

President Clinton issued Executive Order 12898 on February 11, 1994, which reinforces the importance of fundamental rights and legal requirements contained in Title VI of the Civil Rights Act of 1964 (Public Law 88–352, 78 Statute 241)¹¹³ and NEPA. The Executive Order directs that “each Federal agency and State Highway Administration / Department of Transportation make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.”¹¹⁴ The CC2DCA study uses VDOT’s standard method for identifying EJ populations for transportation studies in Virginia, based on VDOT’s May 2022 interim guidance.¹¹⁵

Census data was used to identify EJ communities (the block groups within the study area with low-income and/or minority populations), using the EPA’s EJScreen screening and mapping tool. Next, the analysis assessed anticipated impacts and whether they would represent a disproportionately high and adverse effect to EJ communities. In addition, a robust, sustained, and transparent engagement process provided meaningful opportunities for public participation in the CC2DCA study, starting in the pre-NEPA phase and continuing throughout (see **Chapter 4**). The methodology is described in greater detail in the *Environmental Justice Memorandum*.

3.2.8.1 Existing Conditions

While EO 12898 itself does not define the terms “minority” or “low income”, FHWA Order 6640.23A defines “minority” as a person who is Black, Hispanic or Latino, Asian American, or American Indian and Alaskan Native, and “low-income” as a person whose median household

¹¹³ Public Law 88–352, 78 Statute 241. The Civil Rights Act of 1964.

¹¹⁴ EO 12898.

¹¹⁵ VDOT. May 2022. [Memorandum Regarding Environmental Justice \(EJ\) Analyses to Support NEPA Documents](#). Accessed August 24, 2022.

income is at or below Federal poverty guidelines.¹¹⁶ In 2022 this was \$27,750 for a household of four or \$13,590 for a single individual.¹¹⁷

The study area consists mostly of airport property and parkland, with only one populated Census block group: Block Group 5, Census Tract 1034.02. According to the EJScreen data, the population of this block group is 42 percent minority (see **Figure 3-6**). Additionally, 13 percent of this block group's population is low-income. Therefore, it was determined that minority and low-income populations are present in the study area.

3.2.8.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any construction and therefore would not cause disproportionately high and adverse effects on EJ populations within the study area.

Preferred Alternative

For the EJ analysis, the impact topics of socioeconomics, transportation, cultural resources, and natural resources were considered. The permanent impacts of the Preferred Alternative would occur on the other side of the railroad corridor from the residential population. To the extent that adverse impacts would be experienced by park users, travelers on roadways or the railroad, bicyclists and pedestrians using the trail system, or visitors to the airport, these impacts would be experienced by the general population within study area, regardless of race, ethnicity, or socioeconomic status. Therefore, there would be no disproportionately high and adverse effects on EJ populations, and EJ populations would not be denied benefits from the Preferred Alternative due to improved access between Crystal City and DCA.

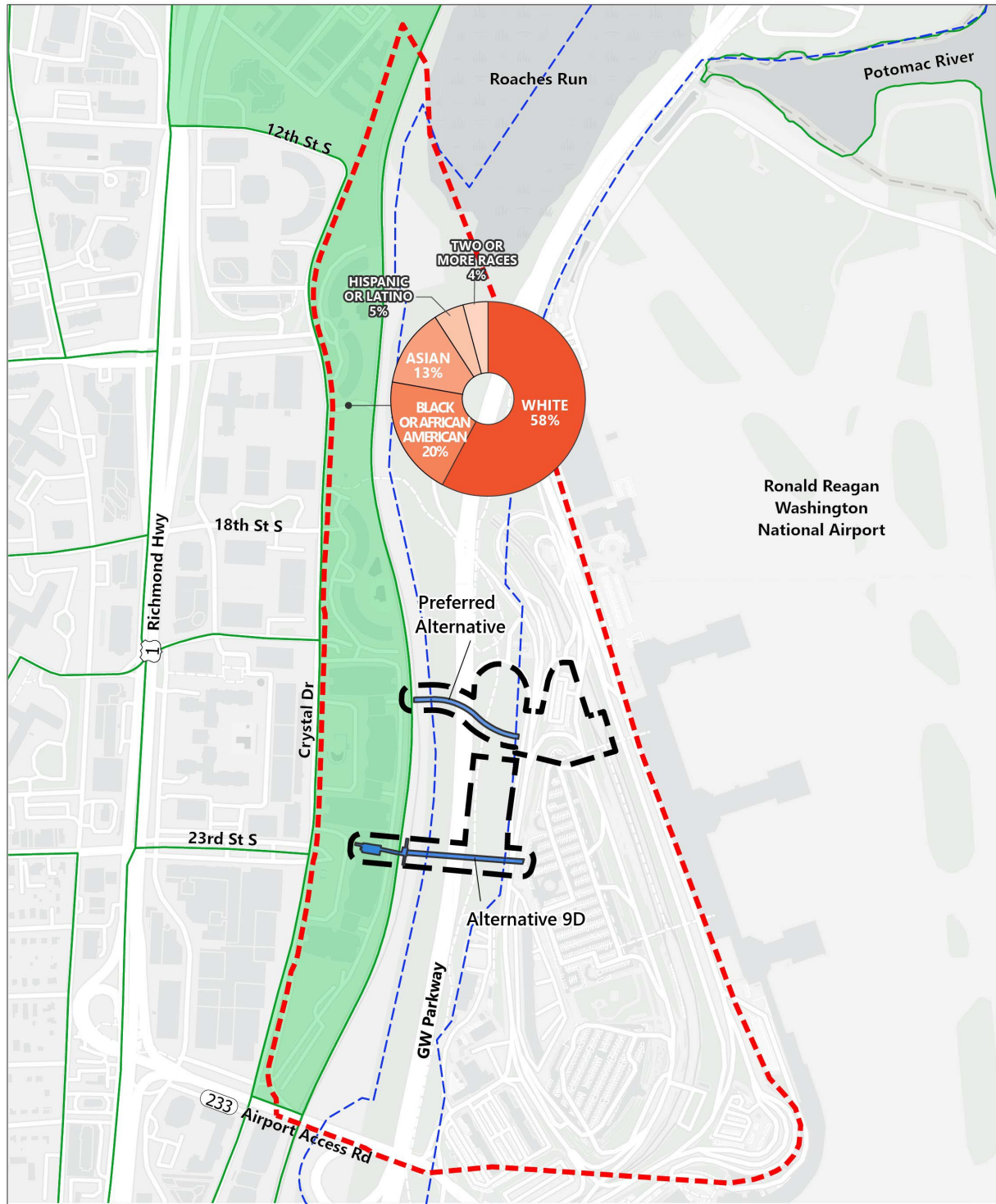
Alternative 9D

For the EJ analysis, the impact topics of socioeconomics, transportation, cultural resources, and natural resources were considered. The permanent impacts of Alternative 9D would either occur on the other side of the railroad corridor from the residential population or would occur within areas adjacent to office buildings. To the extent that adverse impacts would be experienced by park users, travelers on roadways or the railroad, bicyclists and pedestrians using the trail system, or visitors to the airport, these impacts would be experienced by the general population within study area, regardless of race, ethnicity, or socioeconomic status. Therefore, there would be no disproportionately high and adverse effects on EJ populations, and EJ populations would not be denied benefits from Alternative 9D due to improved access between Crystal City and DCA.

¹¹⁶ FHWA. June 2012. [Actions to Address Environmental Justice in Minority Populations and Low-Income Populations](#). Accessed December 28, 2022.

¹¹⁷ Department of Health and Human Services (HHS). January 2022. [Annual Update of the HHS Poverty Guidelines](#). Accessed December 28, 2022.

Figure 3-6 Minority Populations in the Study Area



CC2DCA | Crystal City, Arlington, VA

- - - Boundary of Study Area
- CC2DCA Bridge Alignments
- Limits of Disturbance
- Census Block Groups
- Block Group 5, Census Tract 1034.02
- George Washington Memorial Parkway Boundary

Minority Populations
 Source: U.S. Census Bureau, American Community Survey, Arlington County GIS

3.2.9 Indirect and Cumulative Effects (ICE)

This section evaluates the potential for indirect and cumulative effects in accordance with the *Indirect and Cumulative Effects Analysis Environmental Memorandum* formalized by VDOT in June 2020. The full methodology for assessing indirect and cumulative effects (ICE) is explained in the *Resource Identification and Impact Analysis Methodologies* and in the *Indirect and Cumulative Effects Technical Report* for this study. The CC2DCA study focuses on the construction of an active transportation connection in a highly urbanized environment with protected lands. As a result, substantial indirect and cumulative effects are unlikely to occur because of the proposed action.

The ICE analysis uses resource-specific study areas to account for indirect and cumulative effects that could occur beyond the boundaries of the environmental study area used in the previous sections. Specific ICE study areas were developed for each of the following resource topics:

- **Socioeconomic Resources:** This study area was established to analyze indirect and cumulative effects to communities, community facilities, parks and recreation areas, population and housing characteristics, environmental justice (EJ) populations, and land use. The Socioeconomic Resources ICE study area expands past the western boundary of the environmental study area to encompass the parts of Crystal City east of Richmond Highway (US Route 1). This is because the indirect effects to socioeconomic resources are likely to be experienced at a neighborhood scale.
- **Natural Resources:** This study area was established to analyze indirect and cumulative effects to water resources, floodplains, wildlife habitat, and threatened, endangered, and special status species. The Natural Resources ICE study area is based on watersheds as defined in Arlington County GIS. The environmental study area lies within the Roaches Run and National Airport watersheds, which drain to the Potomac River. Therefore, the ICE study encompasses those two watersheds.
- **Historic Resources:** Adverse effects to archaeological and architectural historic properties are considered under Section 106 of the NHPA. The types of indirect effects assessed for the ICE analysis include changes to accessibility or visitation during or after construction.¹¹⁸ The Historic Resources ICE study area is the same as the Area of Potential Effects (APE) which was developed in consultation with the DHR (see **Figure 3-4** above).

ICE study areas for induced growth, air quality, and noise were not developed for the following reasons:

¹¹⁸ Consistent with [National Parks Conservation Assoc. v. Semonite](#) No. 18-5179 (D.C. Cir. 2019), effects that come from the undertaking at the same time and place with no intervening cause are considered “direct” regardless of the specific type (e.g., whether it is visual, physical, auditory, etc.). “Indirect” effects to historic properties are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable.

- **Induced Growth:** No Induced Growth study area was developed because of the study's location within the core of the DC region, which is already highly developed with mature infrastructure. In addition, a large portion of the environmental study area consists of the GW Parkway, which is preserved as parkland, and DCA. Therefore, any infill development due to the Build Alternatives would be negligible.
- **Air Quality and Noise:** No ICE study areas for air quality or noise were defined. This is because, as a pedestrian and bicycle facility, the Build Alternatives are not anticipated to generate additional emissions or appreciable changes in noise.

3.2.9.1 Indirect Effects

No-Build Alternative

Effects to Socioeconomic Resources

With the No-Build Alternative, no new connection between Crystal City and DCA would be constructed. In the future, the number of Crystal City residents and employees is expected to increase due to regional population growth, redevelopment plans included in the Crystal City Sector Plan, and completion of Amazon's new East Coast headquarters (known as HQ2). The lack of a new connection between Crystal City and DCA could have an adverse indirect effect on socioeconomic resources throughout the Socioeconomic Resources ICE study area by limiting connectivity.

Effects to Natural Resources

With the No-Build Alternative, no new connection between Crystal City and DCA would be constructed. Pedestrians would continue to use the existing route and shortcuts. No adverse effect to natural resources would result.

Effects to Historic Resources

With the No-Build Alternative, no new connection between Crystal City and DCA would be constructed. Pedestrians would continue to use the existing route and shortcuts. No adverse effect to historic resources would result.

Preferred Alternative

Effects to Socioeconomic Resources

The Preferred Alternative would add a new connection to the Mount Vernon Trail, which could result in increased use of the trail. While the trail is intended for bicycle and pedestrian usage, it is currently heavily used within the Socioeconomic Resources ICE study area. Therefore, additional demand could result in added conflicts between trail users. However, these indirect impacts are expected to be minor.

Depending on the alignment on airport property, the Preferred Alternative could potentially remove parking spaces at DCA which could potentially reduce the number of travelers able to

utilize the parking structure. This could result in decreased business for retail outlets and restaurants at the airport. However, the parking removed amounts to less than 1 percent of total capacity and therefore these indirect impacts are expected to be minor.

Effects to Natural Resources

Potential indirect effects to water resources, wildlife and habitat, and threatened and endangered species are not anticipated to be substantial. Negligible indirect effects may occur due to increased stormwater runoff due to increases in impervious surface area and changes to vegetative composition due changes in light and hydrologic regimes from clearing of existing vegetation.

Water Resources

Construction of the Preferred Alternative may potentially result in short- and long-term degradation of water resources. Short-term adverse effects include increased downstream sedimentation from land disturbing activities. Long-term adverse effects include increased runoff due to the construction of new impervious surface. Pollutants carried in stormwater runoff could worsen the existing surface water impairments of the Natural Resources ICE study area. The introduction of pollutants from stormwater runoff can facilitate the degradation of nearby terrestrial and aquatic habitat through deposition of sediments or contamination from chemical pollutants. This can result in accelerated changes in the microbenthic community structure and composition, which in turn can affect the fish and amphibian populations that rely on them as a food source, as well as the birds and aquatic mammals that prey on the fish and amphibians. However, impacts would be minor in the overall context of the Natural Resources ICE study area, which encompasses the Roaches Run and National Airport watersheds.

Pursuant to the Clean Water Act of 1972 (as amended) and the Virginia State Water Control Law, which encompasses the Chesapeake Bay Preservation Act, the Virginia Erosion and Sediment Control Law, the Virginia Stormwater Management Act, and the Virginia Water Resources and Wetlands Protection Program, various control measures would be incorporated into the facility design and maintenance plans to reduce impacts to wetland hydrology, water quantity, and water quality. Control measures would include implementing stormwater best management practices (BMPs) and adhering to strict erosion and sediment control measures. Therefore, there would be no long-term degradation of water resources.

Wildlife and Habitat

Implementation of the Preferred Alternative could potentially result in long-term adverse impacts to wildlife habitat. Clearing vegetation for the new bridge could allow opportunistic species, including invasive species, to permanently establish. Further, the introduction of invasive species by construction equipment or vehicles could lead to permanent vegetation, habitat, and wildlife composition changes. Invasive species are already established in the Natural Resources ICE study area. Consequently, introduction of additional invasive species as a result of the Preferred Alternative would have an indirect impact on the Natural Resources ICE study area.

However, the acreage affected would be small in the context of the amount of habitat available in the Natural Resources ICE study area.

Additional long-term indirect effects to wildlife could include changes in vegetative composition due to changes in light and hydrologic regimes. These vegetative composition changes, as well as vegetation removal, could displace wildlife due to habitat and food loss. However, the acreage affected would be small in the context of the amount of habitat available in the Natural Resources ICE study area. In addition, construction of stormwater facilities, as described above, would serve to minimize pollution impacts.

These potential impacts could be further reduced through use of design measures to minimize vegetation removal. Temporary impacts would be reduced through the proper location and the minimization of staging areas and construction access roads in valuable habitats. To prevent the introduction and establishment of invasive species during construction, the contractor would adhere to VDOT's Road and Bridge Specifications Manual, Chapter 40 of Title 3.2 of the Code of Virginia, Virginia Administrative Code (VAC) 2VAC-5-390-20, and other applicable regulations.

Threatened and Endangered Species

Impacts to threatened and endangered species would be similar to the impacts described to wildlife, except that the life history characteristics of threatened, endangered, and special status species tend to render them less resilient when faced with habitat loss or alteration, or with competition from invasive species. Even so, the indirect effects would be minor, given that no habitat for threatened and endangered species nor any known occurrences of these species have been documented within the LOD of the Preferred Alternative (see the *Natural Resources Technical Report* for more information). In addition, any known occurrences of these species are far enough away from the LOD that any indirect effects would be negligible.

Historic Resources

The Preferred Alternative could potentially increase access to historic resources in the Historic Resources ICE study area such as the RF&P Railroad Historic District, the GW Parkway, Mount Vernon Memorial Highway, and Mount Vernon Trail. The Preferred Alternative would provide a new way of interacting with these historic resources by providing a viewpoint from above – currently, these resources are experienced only by travelers on the railroad (RF&P Railroad Historic District) in automobiles (GW Parkway and Mount Vernon Memorial Highway), and on foot, bicycle, or micromobility devices (Mount Vernon Trail). The Preferred Alternative would also potentially increase usage of the Mount Vernon Trail. As the trail was intended for use by pedestrians and bicyclists, it is not anticipated that an increase in visitation would degrade the integrity of the resource.

No indirect adverse effects are anticipated with the Preferred Alternative. VDOT is currently undertaking consultation in accordance with Section 106 of the NHPA and will seek the concurrence of DHR regarding the effect of the Preferred Alternative on historic resources within

the Historic Resources ICE study area. VDOT anticipates executing a Programmatic Agreement as part of the Section 106 process, which will identify mitigation for any adverse effects.

Alternative 9D

The indirect effects to socioeconomic, natural, and historic resources due to Alternative 9D would be roughly the same as the effects due to the Preferred Alternative due to the similarity in the affected environment and the design of the alternative.

3.2.9.2 Cumulative Effects Analysis

The cumulative effects analysis follows the five-step process described in FHWA guidance.¹¹⁹ See the *Indirect and Cumulative Effects Technical Report* for more discussion of the evaluation. The period for the analysis runs from 1928, when GW Parkway construction began, to 2045, the horizon year for Visualize 2045, the long-range transportation plan for the National Capital Region.¹²⁰ The geographic boundary is the same used throughout the CC2DCA study (see **Figures 3-1** and **3-2**). Currently, at least 21 transportation and development projects are planned or underway that would contribute to cumulative effects on resources affected by CC2DCA (see the *Indirect and Cumulative Effects Technical Report* for the list of projects).

Overall, since the region is already highly developed, many past, present, and future actions have shaped or continue to shape socioeconomic, natural, and historic resources within the study area. Within this context, most cumulative effects of the No-Build Alternative, the Preferred Alternative, or Alternative 9D are expected to be minimal. Additionally, Federal, state, and local regulatory requirements are helping to prevent or minimize some adverse cumulative effects from present and future actions on environmental resources.

Socioeconomic Resources

Past and present actions have had both beneficial and adverse effects on socioeconomic resources and combined with reasonably foreseeable future actions would result in cumulative impacts under the No-Build Alternative. Construction of Richmond Highway, the railroad corridor, GW Parkway, and DCA have all contributed to making Crystal City a high-density residential and office node. However, these corridors also create barriers to connectivity and have affected the visual experience for GW Parkway users (see **Sections 3.13** and **3.15**).

No-Build Alternative

Under the No-Build Alternative, no new connection between Crystal City and DCA would be implemented. Because Arlington County plans to remove the off-ramp from the Airport Access Road/VA 233 to Crystal Drive, individuals walking or biking between Crystal City and DCA would be required to access Airport Access Road/VA 233 from Richmond Highway or make use of the

¹¹⁹ FHWA. Undated. [Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process](#). Accessed Jan. 18, 2023.

¹²⁰ National Capital Region Transportation Planning Board. 2022. [Approved Plan, TIP and Conformity - TPB Visualize 2045](#). Accessed August 28, 2022.

existing northern route via Water Park, the Crystal City Connector Trail, and the Mount Vernon Trail. This route would continue to encourage pedestrian shortcuts at the airport based on visual cues, including crossing West Entrance Road just past the North Entrance Underpass.

The No-Build Alternative would not improve connectivity between Crystal City and DCA. Past actions have resulted in poor connectivity in the Socioeconomic Resources ICE study area, which would be exacerbated by removal of the off-ramp from the Airport Access Road/VA 233 to Crystal Drive. Therefore, the No-Build Alternative would likely contribute negligible to minor adverse increments to a long-term adverse cumulative effect on socioeconomic resources.

Preferred Alternative

The Preferred Alternative would have no impact to land uses in Crystal City, would not create new physical barriers that would adversely impact community connectivity or cohesion and would not require any residential relocations. Therefore, it would not contribute to cumulative effects to socioeconomic resources due to any of these factors.

The Preferred Alternative is expected to have beneficial impacts to parks and recreation areas, community cohesion, and economic resources by improving connectivity between Crystal City, the Mount Vernon Trail, and DCA. As noted above, past and present actions have led to the development of Crystal City as a high-density residential and office node but have also created barriers that limit connectivity from Crystal City to other neighborhoods, recreational opportunities (such as the Mount Vernon Trail), and the airport. By enhancing connectivity and accessibility among residences, businesses, recreational resources, and air travel, the Preferred Alternative would contribute moderate beneficial increments partially offsetting long-term cumulative adverse effects on socioeconomic resources.

The Preferred Alternative would adversely affect user experience on the GW Parkway by removing trees and introducing a new structure into the viewshed. When combined with previous development that has negatively affected the viewshed, the Preferred Alternative would likely contribute moderate adverse increments to long-term adverse cumulative adverse effects on the GW Parkway.

The Preferred Alternative could potentially result in the loss of a small fraction of parking capacity at DCA (see **Section 3.6.2**). Given planned parking expansion at DCA, the Preferred Alternative could potentially contribute negligible to minor adverse increments to long-term beneficial cumulative effects to parking capacity at the airport.

Alternative 9D

The cumulative effects to socioeconomic resources due to Alternative 9D would be roughly the same as the effects due to the Preferred Alternative due to the similarity in the affected environment and the design of the alternative.

Natural Resources

From 1928 to the present, Arlington County rapidly transitioned from a rural and suburban to an urban area. Past actions during and after the major urbanization have led to adverse effects on waters, wetlands and floodplains, wildlife habitat, threatened and endangered species, and vegetation within Natural Resources ICE study area. Many of these past actions occurred without the benefit of modern stormwater management facilities and/or water quality regulations. Past actions also resulted in the loss and fragmentation of much of the terrestrial wildlife habitat that previously existed within the Natural Resources ICE study area. Much of the degradation of wildlife habitat occurred up through the 1980s prior to the enactment of a number of major environmental regulations.

Present and reasonably foreseeable future actions would generally occur within the developed portion of the Natural Resources ICE study area and would not be expected to result in direct effects to water resources, floodplains, wildlife and habitat, or threatened and endangered species. Exceptions include the Long Bridge Project, which would have impacts within the Potomac River and associated Resource Protection Areas, and the Alexandria Fourth Track Project, which would impact Resource Protection Areas associated with Roaches Run. Present and reasonably foreseeable future actions would also be expected to have minor indirect impacts due to increased stormwater runoff or removal of vegetation. This is because they would be expected to cause minimal increase in impervious surface and would likely require removal of few trees due to their location (again except for the Long Bridge Project).

Present and reasonably foreseeable future actions would be constructed in accordance with protections to wetlands, floodplains, water quality, and threatened and endangered species afforded by federal, state, and local regulations. These protections could limit future adverse impacts to natural resources. Additionally, local comprehensive planning includes natural resource management plans that aim to preserve remaining high valued wildlife habitat and water quality by directing growth to specific areas and densities, with the goal of sustaining natural resources for the future.

No-Build Alternative

Under the No-Build Alternative, existing surface water impairments would continue, as well as the continued loss of natural resources due to present and ongoing developments (although minor). However, not constructing a new connection between Crystal City and DCA would not result in additional impacts. Therefore, the No-Build Alternative would not contribute to cumulative natural resource impacts.

Preferred Alternative

As previously discussed, past growth and urbanization have diminished natural resources within the Natural Resources ICE study area. However, current federal, state, and local regulations and conservation efforts lessen the effects of future actions.

The Preferred Alternative would result in a small increase in impervious surface within the watershed. Past development has resulted in a high amount of impervious surface within Crystal City and on the airport property and has contributed to impairment of surface waters such as the Potomac River and Roaches Run. However, other present and future actions are not anticipated to appreciably increase the amount of impervious surface and associated pollutant runoff. In addition, the Preferred Alternative and other current and future actions would be implemented in accordance with current stormwater regulations and best practices, which are anticipated to reduce pollutants entering waterways. Therefore, the Preferred Alternative is anticipated to contribute negligible adverse increments to minor adverse and minor beneficial cumulative impacts.

The Preferred Alternative would result in a small loss of vegetated habitat within the GW Parkway. Due to past development, the parkway represents the majority of habitat within the Natural Resources ICE study area. While the GW Parkway is generally protected lands, other projects within its footprint such as the I-495 Next Project, the Long Bridge Project, and the new Potomac Yard Metrorail Station have all resulted in small losses in habitat within the Parkway. The DCA Roadways Project may also result in minor loss of vegetation. However, these projects are geographically distinct, and the areas of habitat loss are isolated from one another. Therefore, the Preferred Alternative is anticipated to contribute minor adverse increments to minor adverse cumulative impacts.

Alternative 9D

The cumulative effects to natural resources due to Alternative 9D would be roughly the same as the effects due to the Preferred Alternative due to the similarity in the affected environment and the design of the alternative.

Historic Resources

Damage or loss of historic resources was far more prevalent from actions that occurred prior to the NHPA of 1966. The NHPA of 1966 combined with the establishment of historic resource protection objectives established at the local planning level, have reduced the rates of impacts to historic resources. However, conflicts between the protection of historic properties and development and transportation continue to occur.

Most of the historic resources within the Historic Resources ICE study area are extensive transportation or recreational linear properties (the GW Parkway, Mount Vernon Memorial Highway, Mount Vernon Trail, and RF&P Railroad).¹²¹ Therefore, they are subject to continued pressure from transportation projects planned to support the continued development of the Washington, DC region and the I-95 corridor. In particular, the continuous viewshed of the GW Parkway and Mount Vernon Memorial Highway has been negatively affected by development

¹²¹ The Mount Vernon Trail has not been formally evaluated for eligibility for listing in the NRHP but it is over 45 years of age and is therefore being treated as historic for the purpose of this analysis.

including Crystal City and DCA and is anticipated to be negatively affected by both the Long Bridge Project and the new Potomac Yard Metrorail Station.

No-Build Alternative

Under the No-Build Alternative, historic resources within the Historic Resources ICE study area would continue to experience pressure from other projects in the region.

Preferred Alternative

The Preferred Alternative would negatively impact the GW Parkway and Mount Vernon Memorial Highway due to the removal of vegetation that was part of historic planting plans and changes to the "urban valley" viewshed within the Historic Resources ICE study area. Development in Crystal City and the construction of DCA have resulted in negative impacts to views from the Parkway, but they have also created the "urban valley" viewshed. As noted above, the continuous viewshed of the GW Parkway and Mount Vernon Memorial Highway is anticipated to be negatively affected by both the Long Bridge Project and the new Potomac Yard Metrorail Station. Therefore, the Preferred Alternative is anticipated to contribute minor adverse increments to moderate adverse cumulative impacts to the continuous viewshed of the GW Parkway and Mount Vernon Memorial Highway. The Preferred Alternative is not anticipated to contribute to cumulative impacts to the "urban valley" as that viewshed was created by past actions.

Alternative 9D

The cumulative effects to historic resources due to Alternative 9D would be roughly the same as the effects due to the Preferred Alternative due to the similarity in the affected environment and the design of the alternative.

4 Coordination and Comments

This chapter summarizes the coordination and consultation process through which Arlington County and the Virginia Department of Transportation (VDOT), in coordination with the Federal Highway Administration (FHWA), have involved Federal, state, and local agencies; elected officials; members of the public; and other interested stakeholders in the Crystal City to Reagan National Airport Multimodal Connector (CC2DCA) Study. This chapter also summarizes the public and agency comments received to date through a variety of methods. Input from agency consultation and public participation helped inform decisions throughout the National Environmental Policy Act (NEPA) assessment process.

4.1 Agency Coordination

Early and ongoing coordination with Federal, state, and local agencies is essential to determine the scope of environmental documentation and analysis, potential impacts, and mitigation measures. It is also useful in identifying, addressing, and resolving issues that may arise during the NEPA process. Arlington County and VDOT conducted agency coordination in compliance with the following regulations:

- Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966
- Section 106 of the National Historic Preservation Act (NHPA) of 1966
- the Coastal Zone Management Act of 1972
- the Clean Water Act of 1972 (including Section 404)
- Section 7 of the Endangered Species Act of 1973

The primary method for agency coordination for the study is VDOT’s NEPA Program monthly agency meeting (monthly meeting), which occurs on the second Wednesday of every month. The monthly meetings were complemented by agency-specific meetings, as appropriate (see **Section 4.1.3**). **Table 4-1** lists the agency coordination milestones throughout the NEPA process.

Table 4-1 Agency Coordination Milestones

Date	Milestone	Coordination Points
July 16, 2021	Invitation of Potential Concurring, Cooperating, & Participating Agencies	<ul style="list-style-type: none"> • Identified state and Federal agencies and confirmed level of participation
July – Aug. 2021	Scoping Documents Submitted for Interagency Review	<ul style="list-style-type: none"> • Provided drafts of Agency Coordination Plan, Purpose and Need statement, and study methodologies for agency review
Aug. 11, 2021	Agency Meeting: Scoping	<ul style="list-style-type: none"> • Presented draft Agency Coordination Plan, Purpose and Need, and methods
Aug. 27 – Oct. 1, 2021	Scoping Comment Period	<ul style="list-style-type: none"> • Sent scoping questionnaires to agencies • Requested and incorporated input on Agency Coordination Plan

Date	Milestone	Coordination Points
Sept. 8, 2021	Agency Meeting: Concurrence on Study Methodologies	<ul style="list-style-type: none"> • Also discussed Purpose and Need and public input summary at meeting
Oct. 13, 2021	Agency Meeting: Alternatives Development Process	<ul style="list-style-type: none"> • Also discussed Purpose and Need at meeting and sought input
Nov. 10, 2021	Agency Meeting: Concurrence on Purpose and Need	<ul style="list-style-type: none"> • Also presented preliminary alternative concepts and concept screening results at meeting
Dec. 8, 2021	Agency Meeting: Alternative Concepts and Screening	<ul style="list-style-type: none"> • Presented recommended range of alternatives and sought input on concepts
Jan. 12, 2021	Agency Meeting: Review of Public Input and Resource Mapping	<ul style="list-style-type: none"> • Summarized public meeting input • Identified and confirmed resources for environmental analysis and technical reports
April 13, 2022	Agency Meeting: Concurrence on Range of Alternatives	<ul style="list-style-type: none"> • Presented refined concepts for discussion and concurrence
June – Oct. 2022	Agency Review of draft EA Chapter 1 (Purpose and Need) and Chapter 2 (Alternatives) & Technical Reports	<ul style="list-style-type: none"> • Provided drafts of EA chapters 1 and 2, technical reports, and Section 4(f) Evaluation
Aug. – Sep. 2022	Identification of Recommended Preferred Alternative	<ul style="list-style-type: none"> • Discussed, updated, and presented alternative concepts moving towards Preferred Alternative • Coordinated with individual agencies
Dec. 2022- January 2023	Refinement of Recommended Preferred Alternative	<ul style="list-style-type: none"> • Presented refinement options to Concurring Agencies • Meeting with individual agencies
Feb. 8, 2023	Concurrence on Preferred Alternative	<ul style="list-style-type: none"> • Requested from Concurring Agencies
Apr 24, 2023	Agency Review of Draft EA and Draft Section 4(f) Evaluation	

4.1.1 Agency Roles and Responsibilities

This section describes the responsibilities of Lead, Cooperating, and Participating agencies as defined by Federal regulations.¹²² It also describes the responsibilities of Concurring Agencies as defined in the *National Environmental Policy Act and Clean Water Act (Section 404) Merged Process for Highway Projects in Virginia* (Merged Process) between VDOT, FHWA, the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (EPA), and the U.S. Fish and Wildlife Service.¹²³ **Table 4-2** lists these agencies for the study.

The Federal **Lead** and **Joint Lead Agency** share the primary responsibility for facilitating the environmental review and documentation process under NEPA as well as other Federal laws, such as Section 106 of NHPA. They also share responsibility for identifying the status and level

¹²² 23 USC 139(d)(3). Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Section 6002; 40 CFR 1508.1. National Environmental Policy Act Implementing Regulations.

¹²³ VDOT. Undated. [National Environmental Policy Act and Clean Water Act \(Section 404\) Merged Process for Highway Projects in Virginia](#). Accessed January 23, 2023.

of involvement of other agencies in the environmental review process and distributing invitations to participate. Because any improvements identified as a result of the study would be eligible for federal funding, FHWA is the Lead Agency for this study, and VDOT, as the direct recipients of federal funding for transportation improvements, is the Joint Lead Agency; Arlington County is the Project Sponsor.

Concurring Agencies provide input as well as concurrence or non-concurrence on specific steps throughout the environmental review process, in addition to the opportunities for involvement granted to Cooperating and Participating Agencies. If a project has the potential to directly affect resources or property under the control of these agencies and may require their agreement to be implemented, they may be considered Concurring Agencies. For the CC2DCA study, the National Park Service (NPS), EPA, and USACE were invited and confirmed to be Concurring Agencies.

Cooperating Agencies are Federal, state, or local agencies other than the Lead Agency that have jurisdiction, required actions, or special expertise on a specific environmental issue involved in a particular project. Cooperating Agencies help inform the NEPA process by commenting on scoping, methodologies, Purpose and Need, alternatives, and potential impacts on resources.

Participating Agencies are any agencies that have an interest in a project and its NEPA process. Participating Agencies also help identify potential environmental or socioeconomic impacts and provide input on particular project issues. Any Federal agency invited to participate was designated as a Participating Agency for the study unless the invited agency declined in writing (see **Table 4-2**).

Table 4-2 Agencies and Roles

Agency Role	Agency
Concurring and Cooperating Agency	National Park Service (NPS)
	United States Army Corps of Engineers (USACE)
	United States Environmental Protection Agency (EPA)
Participating Agency	Advisory Council on Historic Preservation
	City of Alexandria
	Federal Aviation Administration (FAA)*
	Federal Railroad Administration
	Metropolitan Washington Airports Authority (MWAA)
	National Capital Planning Commission (NCPC)
	Northern Virginia Transportation Authority (NVTA)
	Northern Virginia Transportation Commission (NVTC)
United States Department of Defense (DOD)	

Agency Role	Agency
	United States Department of Homeland Security (DHS)
	United States Department of the Interior (DOI)
	United States Department of Transportation (USDOT)
	United States Fish and Wildlife Service (USFWS)
	Virginia Department of Aviation (DOA)
	Virginia Department of Conservation and Recreation (DCR)
	Virginia Department of Environmental Quality (DEQ)
	Virginia Department of Historic Resources (DHR)
	Virginia Department of Rail and Public Transportation (DRPT)
	Virginia Department of Wildlife Resources (DWR)
	Virginia Economic Development Partnership
	Virginia Passenger Rail Authority (VPRA)
	Virginia Railway Express (VRE)
	Washington Metropolitan Area Transit Authority (WMATA)
Declined to Participate	Amtrak

**First accepted to be a potential cooperating agency in July 2021 before electing to be a participating agency in April 2022.*

Note: While the Arlington Police and Arlington County Parks and Recreation departments initially accepted invitations to be Participating Agencies, it was subsequently determined that, as Arlington County is the project sponsor, individual departments should not be treated as separate agencies for the purposes of NEPA coordination.

4.1.2 Scoping

This section describes agency involvement in the study scoping process. At the study’s initiation in July 2021, VDOT and Arlington County identified potential Concurring, Cooperating, and Participating Agencies. On July 13, 2021, VDOT sent letters to representatives of 28 agencies (see **Table 4-2** above) providing a brief introduction to the study and inviting them to participate in the pre-NEPA and NEPA review process.

Agency scoping began at the August 11, 2021 monthly meeting, at which VDOT presented an overview of the study, sought input on the study methods and draft coordination plan, and summarized the study’s first public meeting held on July 15, 2021 (see **Section 4.2**). Following the meeting, VDOT and Arlington County issued a scoping questionnaire to Concurring and Participating Agencies. This questionnaire yielded comment submissions from 15 agencies, which were taken into consideration as the Scoping process wrapped up in October 2021 and as the Purpose and Need statement was finalized.

4.1.3 Merged Process Agreement Coordination

The environmental review process as part of this EA followed Virginia’s NEPA-Section 404 Merged Process MOU.¹²⁴ In accordance with the agreement, agency input was sought at the following concurrence points: Methodologies; Purpose and Need; Range of Alternatives; and Preferred Alternative (see **Table 4-3**).

Table 4-3 Concurrence Points

Concurrence Point	Details
Environmental Analysis Methodologies	Resource impact methodologies distributed to stakeholder agencies and revisions made to address comments. USACE, EPA, and NPS concurred on September 8, 2021.
Purpose and Need	Participating agencies were given the opportunity to review potential purpose and need elements and a draft Purpose and Need statement and provide comments. USACE, EPA, and NPS concurred with the Purpose and Need on November 10, 2021.
Range of Alternatives	From December 2021 to April 2022, potential alternatives were presented, discussed, and refined through various agency coordination meetings. USACE and EPA concurred with the range of alternatives on April 13, 2022. NPS concurred with a qualification, contingent on committing to design any build alternative in a context-sensitive manner.
Preferred Alternative	After considering the Purpose and Need, the anticipated environmental impacts, and cost, VDOT and Arlington County identified Alternative 7D as the Recommended Preferred Alternative. Arlington County and VDOT presented this alternative to agencies at the September 14, 2022 monthly meeting and sought community feedback during a public comment period (see Section 4.2). Further refinements through early 2023 incorporated comments received and additional agency feedback. With these refinements, Alternative 7D is the Preferred Alternative. Agencies concurred on the Preferred Alternative on February 8, 2023.

In addition to the monthly meetings, VDOT and Arlington County met separately with individual agencies to provide progress updates and discuss conceptual designs and alternatives. These meetings (see **Table 4-4**) provided opportunities to further coordinate, present, and revise various aspects of the study.

¹²⁴VDOT. [Section 404 Merged Process for Highway Projects in Virginia](#).

Table 4-4 Timeline of Additional Agency Coordination Meetings

Date	Agency or Agencies	Topics
June 10, 2021	NPS	Project introduction, concurrence process, and timeline
June 24, 2021	DRPT, FTA	Project introduction, NEPA approach, and coordination
June 29, 2021	MWAA, FAA	
July 22, 2021	CSXT	
July 28, 2021	VRE	
Sept. 9, 2021	VPRA	Project coordination, agency role, and background info
Sept. 28, 2021	NPS	Approach to context sensitivity for GW Parkway
Nov. 4, 2021	MWAA	Corridor and concept development and screening criteria
Nov. 5, 2021	VPRA, VRE	
Nov. 8, 2021	NPS	
Dec. 8, 2021	MWAA	Project coordination
Dec. 14, 2021	VPRA, VRE, Amtrak	Progress update and concept screening results
Dec. 15, 2021	MWAA, FAA	
Jan. 5, 2022	NPS	
Jan. 11, 2022	NCPC	
Jan. 31, 2022	NPS	Context sensitivity for GW Parkway
Feb. 2, 2022	EPA, USACE	Update on public and agency comments and recommended range of alternatives
Feb. 3, 2022	MWAA	
Feb. 7, 2022	VRE, Amtrak	
March 24, 2022	NPS	Context sensitivity for GW Parkway
March 31, 2022	VRE, Amtrak	Project coordination
April 6, 2022	MWAA, FAA	
May 2, 2022	NPS	Feasibility and context sensitivity for GW Parkway
June 14, 2022	VRE	Range of alternatives and alternative coordination
June 29, 2022	NPS	Alternatives development and visual impacts
July 15, 2022	VPRA	Range of alternatives and alternative coordination
July 19, 2022	NPS	Coordination with Mount Vernon Trail improvements project
Aug. 4, 2022	MWAA	Refinement of alternatives
Aug. 25, 2022	MWAA, WMATA	Refinement of alternatives and alternative coordination
Sept. 20, 2022	MWAA	Refinement of preferred alternative
Nov. 2, 2022		Alignment of CC2DCA and DCA roadway projects
Nov. 22, 2022		
Dec. 1, 2022		Refinement of preferred alternative
Jan. 25, 2023	VRE	Coordination about design of future VRE station's stair tower
Feb. 13, 2023	VRE	Continued coordination about design of the stair tower
March 6, 2023	Amtrak	Coordination about status of Amtrak platform project
March 8, 2023	NPS	Initial discussion of potential mitigations

4.2 Public Involvement

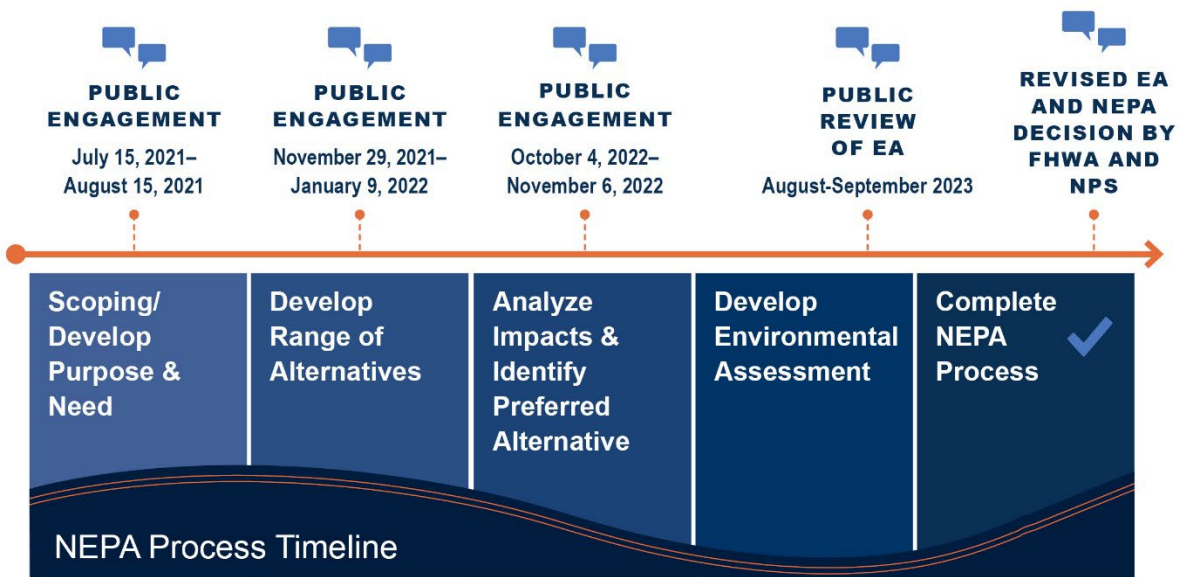
Starting with the scoping of this study, Arlington County and VDOT have conducted outreach and engagement activities to provide the public with background information about the study, solicit feedback, and identify potential issues to discuss and resolve.

This section describes public and stakeholder engagement efforts. It also summarizes the topics discussed and comments received through these efforts. The public engagement periods aligned with key milestones before and during the NEPA process (see **Figure 4-1** below).

VDOT and Arlington County used the following communication tools and outreach activities:

- **Website:** This site (<http://cc2dca.us>) is maintained by Arlington County and hosts an overview of the study, description of the NEPA process, materials and recordings from past engagement events (in English, Spanish, and Mandarin Chinese), fact sheets, and an email list sign-up.
- **Email:** Arlington County’s existing Crystal City/Pentagon City Transportation Update email list (approximately 4,500 recipients) serves as the primary public contact list; members of the public interested in receiving study updates are directed to sign up for it. A study-specific email address (info@cc2dca.us), which is included in all engagement materials, enables people to send comments or request addition to the public contact list.

Figure 4-1 Study Outreach Timeline



- **Newsletter:** Newsletters with study updates, meeting summaries, and next steps (in English, Spanish, and Mandarin) were sent to the public contact list in October 2021 and April 2022.

- **Social media:** Study updates, images, and notices about public meetings were posted via Arlington County Twitter, Facebook, Instagram, and NextDoor accounts
- **Digital & print news advertisements** (in English, Spanish, and Mandarin): Print and/or digital ads were published in the *Washington Post*, *El Tiempo Latino*, *Arlington Now*, and *Washington Chinese Daily News* to inform the public about meetings and associated public comment periods, in addition to Arlington County press releases.
- **Questionnaires:** Online feedback forms solicited public input during comment periods associated with each public meeting. Questionnaires provided opportunities for the public to share information, concerns, and feedback related to the study through multiple-choice questions, priority-ranking, rating various potential options for CC2DCA, and free-form comments. Each questionnaire was available in English, Spanish, and Mandarin.
- **Stakeholder Meetings:** Three meetings were held to inform key groups and organizations with a special stake in a potential CC2DCA connection about the study, provide updates, and solicit comments. These took place on August 9, 2021, January 4, 2022, and October 14, 2022. **Table 4-5** lists the meeting invitees and participants, which included representatives of local civic groups, pedestrian/bicycle advocacy groups, property owners, and businesses.
- **Pop-up events:** Pop-ups were held at highly-visible locations in and around the study area to actively engage broader segments of the public who may not be aware of CC2DCA or able to attend public meetings. Locations were informed by demographic research (with emphasis on reaching underrepresented populations) and included places where people already gather or pass through during their daily routines. Arlington County staff shared project information through display boards and flyers or postcards, which inform people about upcoming public meetings and opportunities to review and comment on online materials.

Table 4-5 Stakeholder Meeting Participation

Group or Organization	Role	Aug. 9, 2021	Jan. 4, 2022	Oct. 14, 2022
Arlington County Civic Federation	Neighborhood Representative	✓		
Arlington Ridge Civic Association	Neighborhood Representative	✓		
Aurora Highlands Civic Association	Neighborhood Representative	✓	✓	✓
B. F. Saul Company	Local Property Owner	✓	✓	

Group or Organization	Role	Aug. 9, 2021	Jan. 4, 2022	Oct. 14, 2022
Crystal City Citizen Review Council	Neighborhood Representative	✓	✓	✓
Crystal City Civic Association	Neighborhood Representative	✓		✓
Crystal Place Unit Owner Association	Local Property Owner	✓	✓	
Dweck Properties	Local Property Owner	✓	✓	✓
Friends of the Mount Vernon Trail	Potential CC2DCA users			
Gould Property Company	Local Property Owner			
JBG SMITH	Local Property Owner	✓	✓	
LCOR	Local Property Owner		✓	✓
Lowe	Local Property Owner			
National Landing BID	Local Business Representative	✓	✓	✓
Sustainable Mobility for Arlington County	Local Transportation Advocacy Group	✓		✓
Washington Area Bicyclist Association	Potential CC2DCA users/Advocacy Group	✓	✓	✓

- **Targeted outreach:** The public outreach efforts including specific steps to engage residents are nearby residential complexes with a high percentage of affordable units, including Crystal Houses and Lenox Club.
- **Public Meetings:** Arlington County and VDOT hosted three public meetings, with the primary goals of sharing information on CC2DCA with the public and soliciting input and questions. These meetings took place on July 15, 2021, December 7, 2021, and October 25, 2022 (see **Table 4-6** below and following sections). All three meetings were conducted online (Zoom Webinar platform) in English, with Spanish and Mandarin interpretation available.

Table 4-6 Public Meetings Overview

Meeting Topics	Meeting Topics	Meeting Topics
Project Introduction, NEPA Process, and Purpose and Need	Purpose and Need and Alternatives Development	Recommended Preferred Alternative
Date	Date	Date
July 15, 2021	December 7, 2021	October 25, 2022
Location	Location	Location
Meeting held virtually via Zoom	Zoom	Zoom
Time	Time	Time
7:00 PM – 8:30 PM ET	7:00 PM – 8:00 PM	7:00 PM – 8:00 PM
Statistics	Statistics	Statistics
<ul style="list-style-type: none"> - 57 total attendees - 8 presenters (Arlington County, VDOT, Consultants) - 1 Spanish language interpreter - 1 Mandarin interpreter - 26 questions and comments submitted via Zoom Q&A window - 57 participants of live poll 	<ul style="list-style-type: none"> - 24 total attendees - 7 presenters (Arlington County, VDOT, Consultants) - 1 Spanish interpreter - 1 Mandarin interpreter - 12 questions and comments submitted 	<ul style="list-style-type: none"> - 31 total attendees - 2 presenters (Arlington County, Consultant) - 1 Spanish interpreter - 1 Mandarin interpreter - 16 questions and comments submitted

4.2.1 Public Engagement Period 1: July 15, 2021 – August 15, 2021

4.2.1.1 Public Meeting (July 15, 2021)

Primarily informational in nature, this meeting was intended to introduce CC2DCA and solicit input on the Purpose and Need. Held online on Thursday, July 15, 2021, from 7 to 8:30 pm, it consisted of a slide presentation, live polls, and question-and-answer session. Meeting participants were encouraged to submit questions and comments via Zoom’s built-in Q&A feature at any point during the meeting. Attendees who preferred to watch the same presentation pre-recorded in Spanish or Mandarin were provided YouTube links to do so; they were asked to rejoin the meeting afterwards for the poll and Q&A, with live interpretation available. The meeting kicked off a 30-day public engagement period, during which further input was collected through an online questionnaire.

Sixteen meeting participants shared a total of 26 comments and questions about a diverse range of topics, with a focus on community engagement opportunities, methods for promoting the questionnaire, and the NEPA process. Other topics included transportation modes and design; Purpose and Need; existing conditions and data collection; meeting logistics; and funding.

4.2.1.2 Stakeholder Meeting (August 9, 2021)

The purpose of the first stakeholder meeting, held by Arlington County and VDOT, was to give groups and organizations with a special stake in a potential CC2DCA connection an additional opportunity to learn about the study and provide comments. Stakeholders were also asked to distribute information about the online questionnaire to their members or constituents. Main topics of discussion included:

- Role of the stakeholders
- Data used to support the Purpose and Need and questionnaire
- Connection of CC2DCA to the DCA Metrorail Station
- Pick-up and drop-off activities potentially associated with CC2DCA in Crystal City
- Need for full multimodality and accommodation of bicycles

4.2.1.3 Questionnaire

The first questionnaire (or feedback form), using the MetroQuest platform, was available during the first comment period from July 15, 2021, to August 15, 2021.¹²⁵ A total of 376 people responded to at least one question. The questionnaire included: general questions about where respondents work and live, and their travel patterns between Crystal City and DCA; ranking five of ten possible characteristics of a potential CC2DCA connection in order of preference; rating statements by their level of agreement; whether respondents would use a CC2DCA connection if one were available; and optional demographic questions.

Overall, the vast majority of respondents said they would use a CC2DCA connection. When defining their priorities, respondents strongly favored a potential connection that is safe, quick, direct, and multiuse. They also showed a strong interest in connecting CC2DCA to other transportation modes such as bus, rail, or the Mount Vernon Trail (as opposed to non-transportation land uses). Most envisioned CC2DCA as primarily a transportation link rather than a new open space or neighborhood landmark.

4.2.2 Public Engagement Period 2: November 29, 2021 – January 9, 2022

4.2.2.1 Public Meeting (December 7, 2021)

This meeting took place during the alternatives development and screening phase of the study and sought input and ideas on potential connection concepts. Held online on Tuesday, December 7, 2021, from 7 to 8 pm, it consisted of a slide presentation and question-and-answer session. Spanish and Mandarin interpretation was available. Meeting participants were encouraged to submit questions and comments via Zoom chat throughout the meeting, as well as to provide feedback on information materials via an online form or the study's email address.

¹²⁵ An archived copy of the questionnaire is available here: <http://demo.metroquestsurvey.com/ek0l0r>

Twelve comments and questions were submitted during the meeting. Specific topics included clarification about NEPA stages; the project schedule, costs, and procurement process; and coordination with other projects and stakeholders in the area.

4.2.2.2 Stakeholder Meeting (January 4, 2022)

The purpose of the stakeholder meeting was to provide groups and organizations with a specific interest in the study with an additional opportunity to receive updates, ask questions, and provide comments. Stakeholders were also asked to distribute information about the public engagement effort to their members or constituents. Main topics of discussion included:

- Quality of the public engagement effort, which several participants commended
- Stage of the study at which design and user experience would be addressed
- Importance of safety and walkability
- Interface of some concepts with the future Amtrak platform and consequences for these concepts if the platform is not built
- Importance of a connection with the Mount Vernon Trail and of accommodating all types of bicyclists
- Importance of the CC2DCA connection being open 24/7

4.2.2.3 Questionnaire

The second questionnaire (or feedback form) was made available through the SurveyMonkey platform from November 29, 2021 to January 9, 2022. The questionnaire included links to factsheets on the potential corridors and concepts developed, the screening process and criteria, and a pre-recorded presentation providing an overview of the study's progress to date, all available in English, Spanish, and Mandarin. Public feedback was requested both on the alternatives development process to date and the effectiveness of the public information materials. A total of 178 people responded to at least one question.

Overall, most respondents felt they had a good understanding of the study's progress and the concept development process after watching the pre-recorded presentation. Most also agreed that the Purpose and Need was explained clearly. Regarding these concepts, the majority agreed that the 14 corridors considered in the process adequately covered the range of possibilities. Several of the free-form comments did question the purpose of the study. Issues raised in the comments included connecting to the Mount Vernon Trail; the needs and safety of pedestrians and bicyclists; designing for user experience; and preferring bridge options over tunnels.

4.2.2.4 Pop-Ups and Targeted Outreach

Pop-up events took place on Saturday, December 11, 2021, at the Long Bridge Aquatic Center from 1:00 to 3:00 pm and Thursday, December 16, 2021, at DCA (departure level) from 4:00 to 5:30 pm. While exact numbers were not recorded, substantially more people were engaged at the Aquatic Center than at DCA, due to the large number of families attending swim events.

In addition, from January 5 to January 9, 2022, Arlington County conducted a targeted virtual outreach campaign at Crystal Houses (1900 South Eads Street), home to 44% of the affordable housing units in the study's vicinity.¹²⁶ Flyers in English, Spanish, Mandarin, and Arabic were distributed, directing residents toward an online feedback form specifically developed for this purpose; this generated 62 responses. Far fewer of the targeted outreach respondents had participated in the first public engagement period, compared to general respondents to the questionnaire.

4.2.3 Public Engagement Period 3: October 4, 2022 – November 6, 2022

The NEPA process for CC2DCA formally began on January 28, 2022, after the second agency and public review period. A third public engagement period ran from October 4 to November 6, 2022, with the goal of presenting the recommended preferred alternative and explain the process through which Arlington County and VDOT identified this alternative. In addition to five pop-up outreach events, stakeholder meetings, an online questionnaire (feedback form), and prerecorded presentation posted on the CC2DCA website, Arlington County and VDOT hosted a third public meeting on Tuesday, October 25, 2022.

4.2.3.1 Public Meeting (October 25, 2022)

This meeting provided a high-level overview of the progress of the CC2DCA study to date by summarizing the information available online and solicited input and questions about these materials. Held online from 7 to 8 pm, it consisted of a slide presentation reviewing the build alternatives and the Recommended Preferred Alternative, followed by a question-and-answer session. Spanish and Mandarin interpretation was available. Meeting participants were encouraged to submit questions and comments via Zoom chat throughout the meeting, as well as to provide feedback on information materials via the online questionnaire or the study's email address.

Sixteen comments and questions were submitted during the meeting. Specific topics included the build alternatives cost, the CC2DCA and VRE platform expansion project timelines, how to coordinate the multimodal use of the bridge, and ways to protect CC2DCA users from inclement weather.

4.2.3.2 Stakeholder Meeting (October 14, 2022)

The purpose of the stakeholder meeting was to provide groups and organizations with a specific interest in the study with an additional opportunity to receive updates, ask questions, and provide comments. Stakeholders were also asked to distribute information about the public engagement effort to their members or constituents. Main topics of discussion included:

¹²⁶ The targeted outreach was performed in partial fulfillment of Executive Order 12898, [Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations](#) (February 11, 1994) and FHWA Order 6640.23A, [Actions to Address Environmental Justice in Minority Populations and Low-Income Populations](#).

- Length and width of the CC2DCA connection
- Basis for choosing between the arch and girder options
- Pedestrian experience in the segment within the DCA Terminal 2 parking garage
- Opportunities for a park-like bridge design, including “bump-outs” for greater width
- Length of the link with the Mount Vernon Trail
- Design and construction schedule

4.2.3.3 Questionnaire

The third questionnaire (or feedback form), using the SurveyMonkey platform, was available between October 4, 2022 and November 6, 2022, in English, Spanish, and Mandarin Chinese. The form provided an overview of the process to date and included a link to a pre-recorded presentation. Public feedback was requested on the engagement process; Alternatives 7D and 9D; and the Recommended Preferred Alternative. A total of 244 people responded to at least one question.

Overall, a majority of questionnaire respondents felt the study’s progress, the development of concepts and alternatives, and the identification of Alternative 7D as the Recommended Preferred Alternative had been explained clearly. 78 percent of respondents strongly agreed or agreed that Alternative 7D meets the Purpose and Need and best balances benefits, impacts, and costs. Free-form comments ranged from enthusiastic support of Alternative 7D to objections to the project cost; others focused on specific design aspects to be addressed in a future phase.

4.2.3.4 Pop-Ups and Targeted Outreach

Pop-up events during this engagement period took place on:

- Thursday, October 6, 2022, in the lobby of the Crystal Houses apartment building from 5:00 to 7:00 pm. (Site chosen for its high percentage of affordable housing units.)
- Saturday, October 8, 2022, at the Long Bridge Aquatic Center from 1:30 to 3:30 pm. (Site chosen because it was successful in the previous round of engagement.)
- Tuesday, October 11, 2022, at the Crystal City VRE Station from 3:30 to 5:30 pm. (Site chosen to target potential future rail-to-air CC2DCA users.)
- Saturday, October 15, 2022, in the lobby of the Lenox Club apartment building from 9:30 to 11:30 am. (Site chosen for its high percentage of affordable housing units.)
- Saturday, October 15, 2022, at Gravelly Point Park from 1:30 to 3:30 pm. (Site chosen to target Mount Vernon Trail users.)

While exact engagement numbers were not recorded, the following numbers of postcards distributed (400 in total) can indicate respective levels of engagement:

- Crystal Houses: Approximately 70 postcards
- Long Bridge Aquatic Center: Approximately 100 postcards (including postcards left behind at the ticket counter)
- Crystal City VRE Station: Approximately 150 postcards
- Lenox Club: Approximately 60 postcards
- Gravelly Point Park: Approximately 20 postcards

4.2.4 Future Public Engagement Period

After publication of the EA, a public hearing will be held (anticipated for Summer 2023), with the purpose of receiving public comment on the EA. The comments received, along with those received from the public, stakeholder groups, and agencies, will be considered before making a NEPA decision.

4.3 Section 106 Consultation

Arlington County and VDOT conducted outreach as part of the Section 106 process of the National Historic Preservation Act (NHPA) for the study. Section 106 requires Federal agencies to consider the effects of their undertakings on historic properties listed or eligible for listing in the National Register of Historic Places, and to provide interested parties with an opportunity to comment.

Arlington County initiated the Section 106 consultation process with the Virginia Department of Historic Resources (DHR) on behalf of the Lead Agencies by a letter dated August 11, 2021.

Arlington County and VDOT identified the following Section 106 Consulting Parties for the study:

- | | |
|---|---|
| • Amtrak | • National Capital Planning Commission (NCPC) |
| • Catawba Indian Nation | • National Park Service (NPS) |
| • Commission of Fine Arts** | • Pamunkey Indian Tribe* |
| • Crystal City Civic Association | • Richmond, Fredericksburg & Potomac Railroad Historical Society* |
| • CSX Transportation (CSXT) | • Virginia Department of Historic Resources (DHR) |
| • Delaware Nation | • Virginia Passenger Rail Authority (VPRA) |
| • Federal Aviation Administration (FAA) | • Virginia Railway Express (VRE) |
| • Metropolitan Washington Airports Authority (MWAA) | |

**Did not respond to invitation letter.*

***Declined*

Table 4-7 lists the Consulting Parties' meetings to date. The Section 106 consultation process is ongoing.

Table 4-7 Section 106 Milestones

Date	Milestone	Topic(s)
Aug. 11, 2021	<ul style="list-style-type: none"> • Initiated Consultation 	<ul style="list-style-type: none"> • Overview of project and Section 106 process
Oct. 6, 2021	<ul style="list-style-type: none"> • Invited Consulting Parties 	<ul style="list-style-type: none"> • Project overview and request for response
July 18, 2022	<ul style="list-style-type: none"> • Meeting #1: Inventory of Historic Properties 	<ul style="list-style-type: none"> • Project overview • Preliminary identification of historic properties
July 18 – Aug. 18, 2022	<ul style="list-style-type: none"> • Comment Period 	<ul style="list-style-type: none"> • Consulting party feedback requested on inventory of historic properties and alternatives
Aug. 23, 2022	<ul style="list-style-type: none"> • Concurrence with APE 	<ul style="list-style-type: none"> • DHR concurred with APE and inventory
Sept. 29, 2022	<ul style="list-style-type: none"> • Meeting #2: Assessment of Effects 	<ul style="list-style-type: none"> • Review methodology for assessing effects • Determine adverse effects to historic properties
May 3, 2023	<ul style="list-style-type: none"> • Meeting #3: Resolution of Adverse Effects 	<ul style="list-style-type: none"> • Review adverse effects to historic properties • Potential mitigation measures to resolve adverse effects to historic properties

5 References

5.1 Laws and Regulations

16 USC 703-712 Migratory Bird Treaty Act of 1918.

23 CFR 771.109(c)(2). Environmental Impact and Related Procedures: Applicability and responsibilities.

23 USC 139(d)(3). Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Section 6002.

36 CFR 5.6. Commercial Vehicles.

36 CFR 800.16(d). Protection of Historic Properties.

40 CFR 1508.1. National Environmental Policy Act Implementing Regulations.

40 CFR 93.126. Exempt Projects.

46 Stat. 482. Capper-Cramton Act of 1930.

4VAC15-35 Birds: Incidental Take of Bird Species.

87 FR 73488. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Northern Long-Eared Bat.

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