District Department of Transportation

District Freight Plan Update

November 1, 2022

Resubmitted March 17, 2023

SENT ELECTRONICALLY

U.S. Department of Transportation
Federal Highway Administration

District of Columbia Division
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June 12, 2023

In Reply To: HDA-DC

Mr. Everett Lott
Director, District Department of Transportation
250 M Street, SE, Suite 900
Washington, DC 20003

Subject: District of Columbia's Updated State Freight Plan – BIL/IIJA Compliant

Dear Mr. Lott:

The Federal Highway Administration (FHWA) District of Columbia Division Office (Division Office) has reviewed the District Department of Transportation titled District Freight Plan Update (revised) on March 17, 2023 and received by the Division Office on March 19, 2023.

The Division Office finds that the Plan contains all elements required by 49 U.S.C. § 70202. The State has, therefore, met the prerequisite in 23 U.S.C. § 167(h)(4) that it develops a State Freight Plan in accordance with 49 U.S.C. § 70202 before it may obligate funds apportioned to the State under 23 U.S.C. § 104(b)(5). The State may now obligate such funds for projects that meet all National Highway Freight Program ("NHFP") eligibility requirements described in 23 U.S.C. § 167, and all other applicable Federal requirements.

Please be advised that the Division Office's finding that the Plan satisfies the requirements of 49 U.S.C. § 70202 and 23 U.S.C. § 167(h)(4) is not a determination that the projects listed in the freight investment plan component of the Plan required by 49 U.S.C. § 70202(c)(2) meet all other NHFP eligibility requirements set forth in 23 U.S.C. § 167, or any other applicable Federal requirement.

If you have any questions regarding NHFP eligibility requirements, please contact Sandra.Jackson@dot.gov or 202 493-7031.

Sincerely,

JOSEPH C LAWSON

Digitally signed by JOSEPH C LAWSON
Date: 2023.06.12 10:16:26 -04'00'

Joseph C. Lawson
Division Administrator

Table of Contents

LIST OF FIGURES

1. EXECUTIVE SUMMARY

1.0 Executive Summary

The Infrastructure Investment and Jobs Act (IIJA), passed on November 6, 2021, requires each State receiving funding under the National Highway Freight Program to develop a State Freight Plan that defines the immediate and long-range planning activities and investments of the State with respect to freight, and adds several new required elements that a State Freight Plan must include. This update serves as the guiding document for freight in the District while a larger consultant-led state freight plan update is underway. Launched December 2022, the consultant-led update will include more in-depth data analysis and community outreach and will be submitted to FHWA in December 2023. In the interim, this update includes all of the required elements of a state freight plan per IIJA.

Chapter 2 Highlights: Introduction

The District of Columbia (the District) is a dense urban environment with a diverse mixture of land uses that place significant demand on the city's transportation infrastructure. The city's role as a regional employment center creates a high volume of commuter traffic in peak hours, while the consumer-driven economy generates significant demand for freight.

The District has experienced a substantial population increase and sustained economic development over the past decade, generating a growing demand for freight activity. While businesses continue to thrive, contributing greatly to the economic needs of the city, the District's overall population growth has caused an increase in demand for housing, employment, and goods and services, all of which create increasing pressure on the city's transportation network.

Chapter 3 Highlights: Strategic Goals & Objectives

The strategic vision is of an efficient goods movement system that is sustainable, safe, and secure. All projects will be reviewed and prioritized through an equity lens and will work to eliminate or minimize negative impacts on historically burdened communities. Additionally, the vision is of reliable freight operations to carry the goods that will enable the District's economy to continue to grow and the residents and public and private sector

establishments to thrive. The vision is comprised of six goals focused on improving mobility, sustainability, management & operations, safety, security, and equity. The District will strategically invest in technology to support the goals of this vision.

#	Required State Freight Plan Element	Plan Location
1	an identification of significant freight system trends, needs, and issues with respect to the State	Chapter 5 (pp 42-62) and Chapter 6 (pp 85-90)
2	freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions	Chapter 3 (pp 17-21) and Chapter 9 (pp 106-112)
3	When applicable, a listing of— --multimodal critical rural freight facilities and corridors designated within the State --critical rural and urban freight corridors designated within the State	Chapter 4 (p 34)
4	how the plan will help meet the national multimodal freight policy goals and the national highway freight program goals	Chapter 9 (p 104)
5	description of how innovative technologies and operational strategies that improve the safety and efficiency of freight movement were considered	Chapter 6 (p 84)
6	where heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) are projected to substantially deteriorate roadway conditions, ways to reduce or impede the deterioration	Chapter 6 (p 83)
7	An inventory of facilities with freight mobility issues, such as bottlenecks, within the State, and for those facilities that are State owned or operated, a description of the strategies the State is employing to address those freight mobility issues	Chapter 6 (p 79)
8	consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay;	Chapter 6 (82)
9	a freight investment plan	Chapter 8 (p 97)
10	the most recent commercial motor vehicle parking facilities assessment conducted by the State: --- the capability of the State, together with the private sector, to provide adequate parking facilities and rest facilities for CMVs engaged in interstate transportation ---the volume of commercial motor vehicle traffic in the State ---whether there are any areas with a shortage of adequate CMV parking facilities, including an analysis of the underlying causes	Chapter 4 (p 33)

11	the most recent supply chain cargo flows in the State, expressed by mode of transportation	Chapter 5 (pp 50-61)
12	an inventory of commercial ports in the State	Chapter 4 (p 31)
13	consideration of the findings or recommendations made by any multi-State freight compact to which the State is a party under sec. 70204	Chapter 6 (p 73)
14	the impacts of e-commerce on freight infrastructure in the State	Chapter 5 (p 63)
15	considerations of military freight	Chapter 5 (p 67)
16	Strategies and goals to decrease: --the severity of impacts of extreme weather and natural disasters on freight mobility; --the impacts of freight movement on local air pollution; --the impacts of freight movement on flooding and stormwater runoff; and --the impacts of freight movement on wildlife habitat loss; &	Chapter 6 (pp 74-79)
17	Consultation with the State freight advisory committee	Chapter 7 (p 91)

Chapter 4 Highlights: Freight Infrastructure

- Trucking accounts for almost all of the inbound and outbound freight shipments in the District. Based on a recent DDOT transportation asset management analysis[1], 91 percent of DDOT-owned National Highway System pavements were in good or fair condition, 99 percent of DDOT-owned Interstate Pavements were in good or fair condition, 90 percent of DDOT-owned Non-Interstate NHS Pavements were in good or fair condition, and 82 percent of non-DDOT owned pavements were in good or fair condition.
- The District has more than 600 commercial loading zones, each with signs that specify days and hours of operation. These zones are short-term curbside metered parking zones exclusively for commercial vehicles that provide local businesses a designated space to receive deliveries when off-street options are not available.
- Approximately 44 million tons of cargo is shipped by rail that travels through, to or from the District along 20 miles of active track. Rail traffic is nearly 100% “through” with essentially no pickups or drop-offs in the District.
- While the DC region is currently served by three airports, Baltimore Washington International (BWI), Washington Dulles International Airport (IAD), and Ronald

[1] DDOT TAMP October 2022 Report
https://ddot.dc.gov/sites/default/files/dc/sites/ddot/TAMP_Master_SlideDeck_v3.pdf

Reagan Washington National Airport (DCA), only BWI and IAD play a substantial role in the movement of cargo. BWI continues to serve domestic demand, while IAD's growth in air cargo is more in the international sector. Both markets are forecast to grow through the year 2040.

- Although the District's boundary encompasses two major rivers, neither is a significant source of freight movements. The only dock located on District land that serves as a commercial port is adjacent to the South Capitol Street Bridge on the Anacostia River. DDOT has used this S Street SW dock to support the inspection, maintenance, and construction of bridges. There is also a small U.S. government maritime operation by the U.S. Army Corps of Engineers along the Anacostia River, which has been used to import gasoline and aggregate. If existing District maritime facilities are not preserved, there could be negative environmental, safety, and cost implications of diverting these heavy materials to trucks.
- DDOT estimates that truck traffic in the District on Interstate roads is roughly 4% of AADT (Annual Average Daily Traffic) and is approximately 3% AADT on all other District roadways. Between 2020 and 2022 there were 6,888 crashes involving commercial vehicles in the District. These crashes resulted in 11 fatalities and over 1,000 injured persons. Of all crashes in those two years, 92 involved pedestrians and 37 involved bicyclists. Half of all incidents were side swipes or rear end collisions. DDOT understands that a lack of truck parking can cause fatigue-related crashes. Since providing truck parking in the District is extremely challenging due to our constrained right of way and dense development, DDOT is coordinating with neighboring jurisdictions to identify regional truck parking facilities.
- The District National Highway Freight Network (NHFN) is comprised of Primary Highway Freight System and Critical Urban Freight Corridor (CUFC) roadways. A total of 74.98 miles of CUFC roadways are currently identified by DDOT for the District. Since, under IIJA, the District of Columbia qualifies for up to 150 miles of CUFCs, DDOT plans to identify additional roadway miles in the near future.

Chapter 5 Highlights: Freight Demand

- Goods movements into the District dwarf those traveling within or out of the District. By weight and value, more freight comes into the District than leaves it.

- Freight traffic in the District is expected to grow by 74 percent from 2011 to 2040 in terms of tons, and 159 percent from 2011 to 2040 in terms of value.
- 129,950 jobs directly or tangentially affected by truck represented 15.8 percent of the 823,000 jobs in the District (in 2011).
- Wholesale Trade and Manufacturing were perhaps the most truck-integrated industry. The Retail Trade and Construction sectors were also highly dependent on truck transportation.
- The top five trading partners by cargo tonnage are the District's close neighbors of Maryland and Virginia within the Metropolitan Washington, D.C. Freight Analysis Framework Zone, followed by Baltimore, the rest of Virginia, and the Virginia Beach Norfolk metropolitan zone. The same pattern emerges when looking at the District's top five trading partners by cargo value.
- Foreign zones make up less than 2% of the District's trade by tonnage. More than a third of the District's trade by tonnage is with Mexico and the Rest of the Americas (not including Canada). Foreign zones also make up less than 2% of the District's trade by value, with the two biggest trading partners by value being the SW & Central Asia zones.
- For commodities imported into the District by tonnage, nonmetal mineral products and petroleum-based products make up nearly 40%, reflecting the construction and energy needs of the region. By cargo value, however, electronics, pharmaceuticals, miscellaneous manufactured products (such as cleaning tools, sports equipment, jewelry, and toys), and motorized vehicles rise to prominence, reflecting its large consumer market.
- In keeping with the District's large consumer market, nearly 40% of the District's commodity exports by weight is comprised of waste / scrap. For outbound commodities by value, pharmaceuticals and electronics make up nearly 40% of District exports.
- Key industries within the region: construction and utilities, pharmaceuticals, government, and a large consumer-based economy requiring goods and services.
- The increasing prominence of e-commerce has challenging impacts on freight infrastructure and logistics. These deliveries require infrastructure such as distribution centers and curb space or loading dock access to unload goods. This poses challenges in the District because of the limited and highly contested curb space. DDOT is exploring new strategies and policies to address these challenges.

- As for military freight considerations, DDOT has identified the Strategic Highway Network (STRAHNET) and the Strategic Rail Corridor Network (STRACNET), any DDOT related projects that might overlap those networks, and general military freight considerations to incorporate into planning efforts.

Chapter 6 Highlights: Freight System Performance

- Coalitions that forge multi-state freight connections and contribute to planning and operations management, to which the District of Columbia is a party, include: The Eastern Transportation Coalition (TETC), M-495 Potomac River Commuter Fast Ferry Project, and the National Capital Region Transportation Planning Board (TPB), the metropolitan planning organization (MPO) for the region.
- DDOT's freight program expands on resilience, environmental, and equity considerations already within District plans, such as MoveDC and Sustainable 2.0. To prepare for climate change and transportation disruptions, the District is investing in green infrastructure and projects that create network redundancy. To support the District's goal to be carbon neutral by 2050, DDOT is leading a delivery microhub feasibility study, developing a delivery demand management program, and investing in electric vehicle charging. To reduce wildlife impacts, commercial access to wildlife habitats will continue to be restricted. Additionally, all DDOT freight projects will prioritize safety and equity.
- The District's top 20 freight bottlenecks, or roadways with the highest total delay in 2019, align with freight corridors the agency has identified for improvements, including I-395 and the I-295/Malcolm X interchange. While these projects will improve freight performance in the long term, DDOT anticipates that they will have negative short-term impacts on truck travel time reliability during construction.
- To help mitigate freight-related congestion, DDOT has hired a dedicated staff to manage curbside commercial vehicle loading zones, optimized signal timing along priority freight corridors; is researching policy and technology improvements to its oversize/overweight vehicle permitting process, and developing a delivery demand management program to reduce loading impacts.
- Regarding heavy vehicles, the District manages an oversize/overweight permitting process, coordinates with its enforcement partners, is investing in upgrades to its existing weigh station and weigh-in-motion facilities, and implements its transportation asset management plan.

- DDOT is investing in technology to support enforcement and data collection via WIM technology upgrades and automated enforcement technology.
- Freight needs cluster around constraints—limited roadway and curb space, aging infrastructure, low clearances—and increased demands on those constraints, such as growing population, economy, e-commerce, and extreme weather.

Chapter 7 Highlights: Freight Advisory Committee Input

- The District works with a group of stakeholders that incorporate the roles and expertise described in Section 11125 of the IIJA to stand up a District Freight Advisory Committee.
- DDOT shared this update with these stakeholders, held a virtual open house to provide context, and requested comments for the agency to incorporate before its submission to FHWA, explaining that a larger, consultant-led update was underway.
- DDOT has received and incorporated comments from more than 8 freight advisory committee members in this update.

Chapter 8 Highlights: Recommendations, Funding & Investment Plan

This plan incorporates the following recommendations:

- Maintain a freight advisory committee
- Improve curbside loading operations
- Focus additional resources on inter-jurisdictional cooperation in rail planning to preserve and enhance rail throughput
- Provide publicly available comprehensive & up to date truck route information
- Update Freight Design Guidelines
- Invest in Freight Data
- Coordinate with FMCSA, NHTSA, and Vision Zero to support road safety
- Coordinate with Bus Priority / Sustainable Transportation Projects to maintain goods movement and mitigate truck conflicts
- Update Oversize/Overweight Routing Process and Policy
- Support Existing Weigh In Motion Systems
- Invest in Truck Enforcement Equipment
- Study Positive Truck Route Signage
- Regularly Update State Freight Plan
- Invest and Implement Innovative Freight Delivery Practices
    - Sustainable delivery pilot program
    - Delivery Demand Management Program
- Invest in Paving Repair
- Maintain & Improve DC Port.

- Study Geometric & Safety Improvements along I-295
- Rehabilitate Minnesota Ave Bridge over East Capitol Street

The Infrastructure Investment and Jobs (IIJ) Act requires states and MPOs to provide an eight-year financially constrained freight-investment plan to include a list of priority projects and proposed funding within their freight plans (49 U.S. Code § 70202). The District of Columbia NHFP fund apportionment totals $50.67 million for FY 2023 through FY 2030. DDOT's approach for allocating federal freight funds is to apply the funding for federal fiscal years 2023-2030 to projects preserving and optimizing existing resources, and assessing the potential of innovative practices to mitigate freight movement impacts.

Chapter 9 Highlights: Implementation Plan & Performance Measures

This plan incorporates updated performance measures to assess success and meet achievable outcomes over the next eight years:

- Sustainability: Interstate congestion as measured by the Truck Time Reliability Index, GHG emissions from the transportation sector, and percentage of Alternative Fuel Corridors (AFCs) with DCFCs (direct current fast charging)
- Mobility: number of vehicle permits issued with appropriate routing and engineering assessment (as needed), number of functioning static weigh station and weigh in motion (WIM) systems, percent of primary freight route pavement in good condition, number of tickets issued for unauthorized vehicles in loading zones, number of tickets issued to vehicles in violation of through-truck restrictions, number of tickets issued to commercial vehicles for double-parking, number of street redesign and reconstruction projects utilizing freight considerations checklist, and number of feeders on schedule for undergrounding per the biennial plan
- Safety: number of crashes involving trucks, number of fatalities in crashes involving trucks, and number of serious injuries in crashes involving trucks
- Security: number of hazardous material incidents involving truck, water, or rail
- Management and operations: percent of bridges on primary freight routes in fair or better condition, percent of freight route pavement in good condition, number of emerging technology pilots implemented, number of operational loading zone spaces, and timeframe to install or relocate loading zones by request

- Equity: number of projects assessed for equity

2. INTRODUCTION

2.0 Introduction

The Infrastructure Investment and Jobs Act (IIJA), passed on November 6, 2021, requires each State receiving funding under the National Highway Freight Program to develop a State Freight Plan that defines the immediate and long-range planning activities and investments of the State with respect to freight, and adds several new required elements that a State Freight Plan must include. This update serves as the guiding document for freight in the District while a larger consultant-led state freight plan update is underway. Launched December 2022, the consultant-led update will include more in-depth data analysis and community outreach and will be submitted to FHWA in December 2023. In the interim, this update includes all of the required elements of a state freight plan per IIJA specifications.

The District of Columbia (the District) is a dense urban environment with a diverse mixture of land uses that place significant demand on the city's transportation infrastructure. The city's role as an employment center for the region creates a high volume of commuter traffic in peak hours, while the consumer driven economy generates significant demand for freight movement.

The District has experienced a substantial population increase and sustained economic development over the past decade, generating a growing demand for freight activity. In 2021, the District had an estimated population of 670,050. While businesses continue to thrive, contributing to the city's economy, population growth increases demand for housing, employment, and goods and services, all of which create increasing pressure on the city's transportation network.

The 2022 INRIX Traffic Scorecard[2] ranked the Washington, DC Region as the 20th worst in congestion among major metropolitan areas – behind Los Angeles, San Francisco, New York and Boston. And congestion is expected to get worse: According to the Metropolitan Washington Council of Governments' 2022 Congestion Management Process Technical Report, the Metropolitan Washington region is expected to be home to 23% more residents and 29% more jobs by 2045, creating a demand on roadways that is expected to outpace the increase in supply, and leading to significant increase in congestion[3].

In addition to the congestion caused by a high volume of private vehicles traveling into the city, the District's transportation infrastructure is shared with other modes such as transit vehicles and bicyclists. Many of the city's residents rely on the extensive bus system and services to conduct their daily business. Surface transit options such as the Washington Metropolitan Transit Authority's (WMATA) Metrobus, DDOT's Circulator, and the development of a streetcar system, initiated on H Street NE, provide an essential service to the estimated 24 percent of District households that do not have access to motor vehicle. In addition to local transit services, the District's transportation network also supports regional transit with over 300 commuter buses entering the city every weekday. As well as the traditional transit options, the District also has a well-established and successful bicycle program. In 2010, DDOT launched the largest bike-sharing program in the country (Capital Bikeshare) and has installed over 50 miles of bike lanes and 64 miles of signed bike routes in the intervening years. All of these modes are important parts of the District's transportation network, but they create competing demands on infrastructure that has few options to expand.

In 2011, the District moved $21.7 billion and 16.8 billion tons in domestic goods to, within, and from the District. By 2040, the District's freight system will move over $61.2 billion worth of goods, weighing 28.9 billion tons. In order to accommodate this projected increase in freight movement, the District Freight Plan will outline freight transportation strategies and recommendations to support sustainable economic growth and balance the needs between communities and various industries in the District.

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[2] https://inrix.com/scorecard/#city-ranking-list

[3] MWCOG 2022 Congestion Management Process Technical Report: https://www.mwcog.org/file.aspx?D=ioxzbWHMefHpfjALW7Km9f93c7oxosp01AvVc%2fwclvo%3d&A=tE1fNwsPMzwISk6ug%2b6UeMZgnRrrgdda6gMUaGSBVH4%3d

3. STRATEGIC GOALS & OBJECTIVES

3.0 Strategic Goals & Objectives

1.1. Federal Requirements

The Infrastructure Investment and Jobs Act requires that States complete a State Freight Plan in order to obligate freight formula funds under 23 U.S.C. 167.

There are 17 federally required elements that all State Freight Plans must address for each of the transportation modes. The list below indicates where that requirement can be found within this guiding document:

Figure 1 I Required State Freight Plan Elements and Location in Freight Plan Update

#	Required State Freight Plan Element	Plan Location
1	an identification of significant freight system trends, needs, and issues with respect to the State	Chapters 5 and 6
2	freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions	Chapters 3 and 9
3	When applicable, a listing of— --multimodal critical rural freight facilities and corridors designated within the State --critical rural and urban freight corridors designated within the State	Chapter 4
4	how the plan will help meet the national multimodal freight policy goals and the national highway freight program goals	Chapter 9
5	description of how innovative technologies and operational strategies that improve the safety and efficiency of freight movement were considered	Chapter 6

6	where heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) are projected to substantially deteriorate roadway conditions, ways to reduce or impede the deterioration	Chapter 6
7	An inventory of facilities with freight mobility issues, such as bottlenecks, within the State, and for those facilities that are State owned or operated, a description of the strategies the State is employing to address those freight mobility issues	Chapter 6
8	consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay;	Chapter 6
9	a freight investment plan	Chapter 8
10	the most recent commercial motor vehicle parking facilities assessment conducted by the State: --- the capability of the State, together with the private sector, to provide adequate parking facilities and rest facilities for CMVs engaged in interstate transportation ---the volume of commercial motor vehicle traffic in the State ---whether there are any areas with a shortage of adequate CMV parking facilities, including an analysis of the underlying causes	Chapter 4
11	the most recent supply chain cargo flows in the State, expressed by mode of transportation	Chapter 5
12	an inventory of commercial ports in the State	Chapter 4
13	consideration of the findings or recommendations made by any multi-State freight compact to which the State is a party under sec. 70204	Chapter 6
14	the impacts of e-commerce on freight infrastructure in the State	Chapter 5
15	considerations of military freight	Chapter 5
16	Strategies and goals to decrease: --the severity of impacts of extreme weather and natural disasters on freight mobility; --the impacts of freight movement on local air pollution; --the impacts of freight movement on flooding and stormwater runoff; and --the impacts of freight movement on wildlife habitat loss; and	Chapter 6
17	Consultation with the State freight advisory committee	Chapter 7

1.2. State Strategic Vision, Goals & Objectives

The strategic vision for the District of Columbia Freight Plan is intended to inform long-term planning and transportation decision-making for the District and the region. The

strategic vision includes high level goals for freight planning within the District as well as specific elements of what will comprise the future system to best serve the District. The vision is consistent with the current Federal transportation legislation, IIJA, which places new emphasis on e-commerce, equity, and environmental concerns within a multimodal freight network. The vision also builds on the National Capital Region Freight Plan 2016, developed by the Transportation Planning Board of the Metropolitan Washington Council of Governments. Elements of this strategic vision include mobility, sustainability, operations, safety, security, and equity, and align with moveDC, the District's long-range transportation plan.

1.2.1. Vision

The strategic vision is of an efficient goods movement system that is sustainable, safe, and secure. All projects will be reviewed and prioritized through an equity lens and will work to eliminate or minimize negative impacts on historically burdened communities. Additionally, the vision is of reliable freight operations to carry the goods that will enable the District economy to continue to grow and the residents and public and private sector establishments to thrive. District will strategically invest in technology to support the goals of this vision. The following subsections outline the details of the six elements of this strategic vision.

1.2.2. Goal 1: Mobility

The District's moveDC goal of mobility, which includes improving system reliability, accessibility and congestion management for goods movement as well as commuters, is key to supporting the District's economic vitality. This element of the strategic vision is for a freight transportation system that can efficiently provide residents, businesses, and public sector organizations in District with the goods they require. Continued growth in employment and business activity in the District will be enabled by a freight transportation system that is efficient and reliable, and able to handle increased goods volume to support the District's continued growth. The District's transportation system should provide for a reliable, accessible goods movement system to support the District's tax-paying business community and tax-paying residents.

1.2.3. Goal 2: Sustainability

The District has a goal to be carbon neutral by 2050, and transportation will be a key sector for achieving this goal. The District's Sustainable 2.0 plan sets a target of reducing GHG emissions from the transportation sector by 60 percent. The Department of Energy and Environment regularly tracks the District's GHG emissions to measure progress towards these goals.

Improving sustainability within the freight sector is a key element of the strategic vision. As freight transportation equipment is a significant source of criteria pollutants and greenhouse gas (GHG) emissions, the plan envisions the District will benefit from

increased use of cleaner later-generation diesel engines, increased use of auxiliary power units to reduce truck and rail locomotive idling, and greater use of advanced routing and traffic information by truckers to reduce congestion, which contributes to pollution, as well as noise impacts on communities.

Additionally, innovative last-mile delivery solutions such as curb management strategies, delivery microhubs, and common carrier lockers are also effective methods to reduce emissions and vehicle miles traveled within the District, and can help minimize the negative environmental impacts of freight movement (especially on historically over-burdened communities); these are discussed in more detail in the E-Commerce and Related Planning Considerations section.

Rail freight operations through the District are also important to the region and will be taken into consideration in rail planning. Investments in regional rail infrastructure, such as Long Bridge, will enhance the operational capabilities of both rail freight and passenger operations by removing existing bottlenecks and clearance restrictions, and possibly expand rail service to the District. These actions would not only benefit existing or potential rail users, but also reduce of the number of trucks traveling through the region, producing safety and environmental benefits for the area.

1.2.4. Goal 3: Management and Operations (State of Good Repair)

As one of its moveDC goals, DDOT will ensure the state of good repair for existing assets by investing in maintenance and operations, and the advances in technology that will support a state of good repair for District infrastructure.

This vision includes supporting a robust paving plan and enforcing vehicle size and weight regulations. Asset management such as signal timing improvements and updated roadway designs that accommodate truck movements supports efficient freight operations while minimizing traffic impacts. This vision also incorporates truck operating needs into transportation planning and land-use planning. Truck corridor preservation, truck turning radii considerations, loading dock access provision, assuring truck parking availability, and efficient truck permitting are all to be incorporated into comprehensive planning in the District.

Support for continued maritime and rail freight operations will also be incorporated into the plan to preserve access to non-truck modes of transport. The vision is for all planning in the District to have freight operations incorporated due to the shared use of the transportation system by freight, transit, personal vehicles, bicyclists, and pedestrians. Investing in advanced permitting systems will support the integrity of District infrastructure, along with improved data collection for planning and tracking purposes. Roadway engineering and intelligent transportation system technologies will accommodate

the operational characteristics of freight equipment while minimizing pavement wear and infrastructure damage.

1.2.5. Goal 4: Safety

Safety is a goal laid out in moveDC; this goal states that "DDOT will design and manage a transportation network that offers safe and secure travel choices for all users." Safety improvements and considerations in planning will result in fewer crashes, property damage, injuries, and loss of life related to goods movement. Developing street designs that accommodate goods movement while incorporating safety improvements aim to reduce conflicts between trucks and other transportation system users. This supports the District's Vision Zero commitment to having zero fatalities or serious injuries on District streets by 2024[4]. Investing in technologically advanced weigh stations and weigh-in-motion systems support enforcement efforts and integration into national motor carrier safety databases, as well as provide better understanding of existing conditions.

1.2.6. Goal 5: Security

The transportation system will provide for the secure movement of goods. Public agencies responsible for security of the transportation system will have access to information and an educated freight system workforce as partners in assuring security for freight. Freight plans will be developed with considerations for the special security requirements of the District, including cooperation with the agencies responsible for security.

1.2.7. Goal 6: Equity

In the MoveDC plan, transportation equity is defined as "the shared and just distribution of benefits and burdens when planning for and investing in transportation infrastructure and services. Just distribution means investing in the communities and areas that are in the greatest need that include, but are not limited to:

- People of color
- People with low income
- People living with disabilities

[4] Vision Zero DC: https://visionzero.dc.gov/pages/2022-update

- LGBTQ+ people
- Individuals who identify as female
- Youth and older adults
- Residents at risk of displacement
- People experiencing homelessness or housing insecurity
- Immigrant and refugee communities
- People with limited English proficiency and literacy”

This freight plan shares the equity goal of moveDC, which states that “DDOT will advance transportation equity by evaluating its policies, planning, community engagement, and project delivery to ensure public investments in transportation justly benefit all residents, visitors, and commuters.” All projects at DDOT, including freight projects, are evaluated based on an equity assessment within the agency’s project prioritization and budget process. Additionally, the DDOT freight program is prioritizing projects that aim to lessen negative freight impacts in overburdened communities, such as the positive truck route signage study and sustainable delivery modes pilot project, which are currently underway.

4. FREIGHT INFRASTRUCTURE

4.0 Freight Infrastructure

1.0. Highway

The highway section describes the extent and condition of the roadway system that serves trucking in the District. The section includes points of entry, principal corridors, and pavement and bridge condition. The project team drew from freight survey data and DDOT’s information management system to develop the highway profile.

The highway system serves several important functions in the District’s freight transportation system, including mobility for trucked freight, connectivity between freight generating facilities to, from, or within the District, and connectivity between airports, waterways, railroads, and businesses within the District of Columbia.

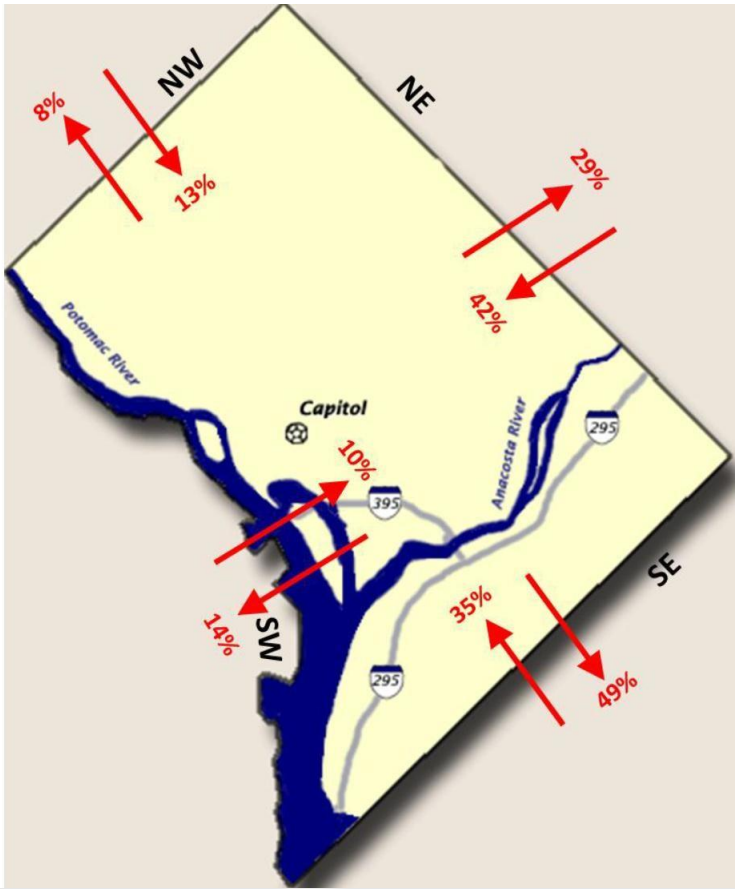
Trucking accounts for almost all of the inbound and outbound freight shipments in the District. In terms of tonnage, 99.3 percent and 98.9 percent of inbound traffic moves by truck, while in terms of value the shares are nearly identical at 99.5 percent and 99.9

percent, respectively.

Almost all trucks operating in the District have either an origin or a destination within the city. In other words, there is very little truck through-traffic within the city. Additionally, more trucks enter the District from Maryland than from Virginia. Further, inbound and outbound truck traffic is heavily concentrated to the east and south of the District. The percent of truck traffic entering and exiting the District is shown in **Figure 1.**

More than 40 percent of inbound trucks enter the District from the northeast on routes such as US 1, and US 50. The eastern part of the District, and the areas of MD east of the District, are home to many warehouses and transfer points, particularly along New York Avenue and in the Landover and Lanham, Maryland, areas. Additionally, truck traffic from Baltimore and other locations on the Eastern Shore enters the District from the east. There is also substantial truck traffic, 35 percent, from Maryland to southeast Washington. Similarly, for outbound traffic, over 75 percent of trucks leave via the District's eastern and southern borders with Maryland.

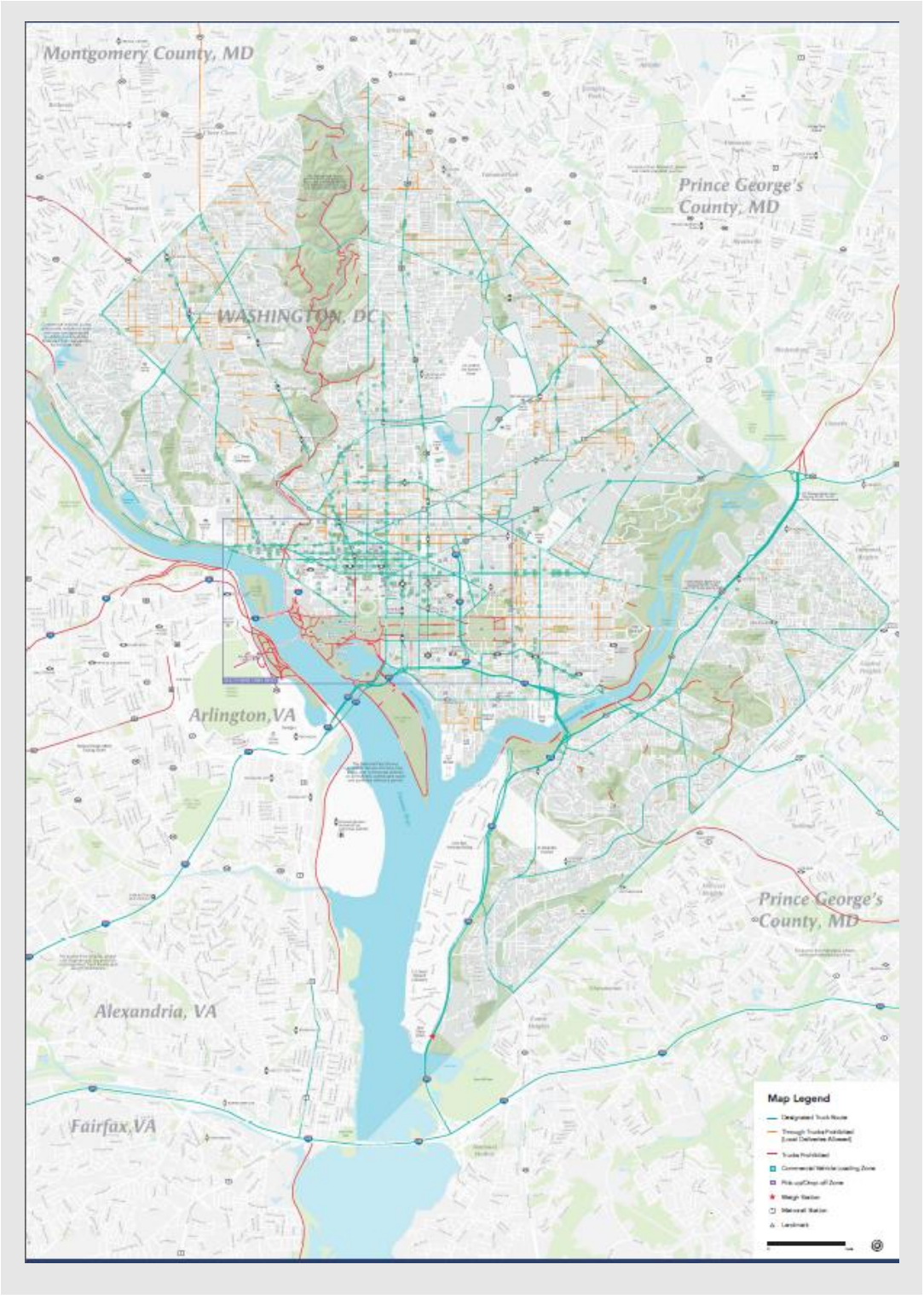
Figure 1: Inbound and Outbound Truck Traffic



In 2010, DDOT developed a city-wide truck and bus route system to improve the management and monitoring of truck and bus traffic in the city under a single, comprehensive regulatory system. Specific routes were designated as part of the truck and bus route system based on a variety of factors, which included engineering characteristics, roadway classifications, planner review, industry and community feedback, and field observations. Routes included in the truck and bus route system were designated as primary or restricted.

A “primary route” designation indicates the road meets technical standards, can handle high truck traffic volumes, or serves major truck and/or bus destinations. A “restricted route” designation indicates a road that may not be used by trucks or buses for any purpose due to security reasons, inadequate capacity, or the residential quality of the area. Roads in the District that have neither a “primary route” or “restricted route” designation may have trucks and/or buses travel on them, but only for an official business need. All trucks or buses which must travel on a non-designated road must take the most direct access road to their destination, conduct their business (i.e. deliver a package) and take the most direct road back to a ‘primary route’ for travel through the rest of the city. The District’s truck and bus route and restrictions map is shown below.

Figure 2: Truck Routes in Washington, DC



1.0.0. Pavement Type & Condition

Pavement conditions on the District's roadways are surveyed regularly to

measure rutting, cracking, and roughness. This information is summarized into a pavement condition index (PCI) that ranges from zero to 100; where 80-100 represent good condition, 65-79 fair, and <64 poor. In general, trucks, due to their greater per-axle loads, cause more roadway damage than automobiles. It is important to note that proper distribution of weight across axles helps to minimize the impact of additional weight on pavement and is a greater factor in determining the extent of damage than the absolute weight of a load (i.e., the lower the weight per axle the lesser the road damage caused by that vehicle).

In the District, asphalt overlay on concrete accounts for 100 percent of the primary route lane-miles. As per a recent DDOT transportation asset management analysis[5], 91 percent of DDOT-owned National Highway System pavements were in good or fair condition, 99 percent of DDOT-owned Interstate Pavements were in good or fair condition, 90 percent of DDOT-owned Non-Interstate NHS Pavements were in good or fair condition, and 82 percent on non-DDOT owned pavements were in good or fair condition.

1.0.1. Bridge Characteristics & Condition

The entire bridge system within the District is comprised of 265 bridges, 160 of which are on the primary truck route network. Individual analyses of bridge characteristics (material, age, and condition) along the primary truck route network are beyond the scope of this task, but in general, 88 percent of NHS Bridges are in good or fair condition, 92 percent of DDOT-owned NHS bridges are in good or fair condition, an only 42 percent of National Park Service-owned NHS bridges are in good or fair condition[6].

1.0.2. Loading Zones

Commercial loading zones are short-term curbside metered parking zones exclusively for commercial vehicles. These zones provide local businesses a designated space to receive deliveries when off-street options are not available. To keep these zones free for active loading – and reduce double-parking in travel or bike lanes – longer-term commercial vehicle parking should be accommodated off-street, where feasible.

The District has more than 600 commercial loading zones, each with signs that specify days and hours of operation, which are typically between 7:00 AM and 6:30 PM, for time

[5] DDOT TAMP October 2022 Report https://ddot.dc.gov/sites/default/files/dc/sites/ddot/TAMP_Master_SlideDeck_v3.pdf

[6] DDOT TAMP October 2022 Report https://ddot.dc.gov/sites/default/files/dc/sites/ddot/TAMP_Master_SlideDeck_v3.pdf

periods up to 2 hours at a time, unless otherwise posted. A map of commercial loading zones is available at: https://godcgo.com/dc-truck-and-bus-map.

Commercial vehicles must pay to use commercial loading zones by purchasing annual or daily permits via DDOT's Transportation Online Permitting System, TOPS (https://tops.ddot.dc.gov/), or by paying on a per-use basis via the District's pay-by-cell provider (posted on the sign).

1.1. Rail

The rail profile describes the use, extent, and condition of the freight rail system that serves the District. This section is sourced from DDOT materials. Freight railroads in the U.S. are generally categorized as Class I railroads, Class II or regional railroads, and Class III or short-line railroads. Some short-line railroads are further classified as terminal railroads.

Approximately 44 million tons of cargo is shipped by rail that travels through, to or from the District. The District of Columbia is currently served by two Class I railroads; there is also one Class III switching or terminal railroad used for passenger trains at Union Station. **Table 1** summarizes the mileage data for the two freight railroads operating within the District of Columbia, CSX Transportation (CSXT) and Norfolk Southern Railway (NS). NS does not own railroad lines but has leased the trackage rights from CSX Transportation. CSX currently serves 3 customers in the District.

Table 1: Freight Rail Owners and Operators in Washington, DC

RAILROAD	REPORTING MARKS	WASHINGTON, DC RAIL ROUTE MILES		
		MILES OPERATED	MILES OWNED	MILES OPERATED VIA TRACKAGE RIGHTS
Class I Railroads — CSX	CSXT	20	18	2
Class I Railroads — Norfolk Southern	NS	13	-	13

Source: CSXT and NS 2012 R-1 Annual Reports; AAR State Fact

In addition to 20 miles of active track, there are 6.2 miles of inactive rail tracks located parallel to and just west of I-295 near the Joint Bolling Anacostia Base. The city is looking into alternative transportation uses for this right-of-way.

The District's rail network is expected to play a prominent role in the country's growing international and domestic rail intermodal movements. DC is located on one of CSXT's major intermodal routes. As such CSXT has undertaken a massive rail infrastructure improvement program to remove existing restrictions to the movement of double-stack container trains in the DC area. Currently, 30 freight-carrying trains enter the District of Columbia daily; this number is

expected to increase to 34 daily trains by 2040.

One such prominent investment was the Virginia Avenue Tunnel Project in southeast Washington, DC. The tunnel, running under Virginia Avenue, featured west and east portals near 2nd Street SE and 11th Street SE, respectively. The project, begun in 2015, replaced the old tunnel with two new tunnels to allow for double-stacked freight containers to travel through the tunnel. The project, including streetscape restoration, was completed in 2018.

The Long Bridge Project is another prominent rail investment. Long Bridge is a two-track railroad bridge owned by CSXT that was constructed in the late 19th and early 20th century. It serves CSXT, Amtrak, and Virginia Railway Express (VRE), is the only rail bridge that connects the District of Columbia and the Commonwealth of Virginia, and is a major choke point for both freight and passenger rail movements.

The Long Bridge Project will construct two additional tracks on a new bridge structure over the Potomac River and railroad infrastructure improvements between the RO Interlocking in Arlington, Virginia, and the L'Enfant (LE) Interlocking near 10th Street SW in the District of Columbia. The purpose of the Project is to provide additional long-term railroad capacity and to improve the reliability of Amtrak, VRE, and CSX Transportation (CSXT) railroad service. This improvement project is currently being managed by the Virginial Passenger Rail Authority and is in the preliminary design stage, with construction scheduled to be completed by 2030.

Ongoing improvements to the rail freight network will further enhance the importance of the District's network by providing a key to the double-stack intermodal container freight route from the East Coast to Midwest markets. Although the DC freight rail network is small in terms of rail infrastructure mileage and the amount of freight currently originating and terminating in the District, it plays a key role in the regional freight network and with regard to local and regional rail passenger operations, with over 90 intercity or commuter passenger rail trains operating over the CSXT network daily. Although these improvements will not likely result in the District becoming an intermodal hub, it will enhance the operational capabilities of both rail freight and passenger operations by removing existing bottlenecks and clearance restrictions, and possibly expand rail service to District markets by reducing rail transportation costs. These actions would not only benefit existing or potential rail users, but also result in a reduction of the number of trucks traveling through the region producing safety and environmental benefits for the area.

1.2. Air

This section provides a summary review of the airport facilities that serve cargo activity in the National Capital Region. Information in this section is sourced from the latest

Washington-Baltimore Regional Air Cargo Study[7]. The DC region is currently served by three airports, Baltimore Washington International (BWI), Washington Dulles International Airport (IAD), and Ronald Reagan Washington National Airport (DCA). Both passenger airlines and dedicated cargo carriers transport high-value, time-sensitive goods through these hubs. While these three airports are widely known for their role in transporting thousands of travelers on a daily basis, both BWI and IAD also play a substantial role in the movement of goods, or cargo, to and from the region. Since DCA's role in air cargo is so minor, it will not be discussed further.

Air cargo accounts for the smallest share of freight in terms of volume (weight), by freight mode, but it accounts for the largest share in terms of monetary value per ton. Air cargo is used to transport high-value commodities and/or commodities requiring just-in-time delivery. These may include medicines and vaccines, fresh food, flowers, or other perishable items, as well as precision-engineered and manufactured electronic components.

Air cargo industry is forecast to expand worldwide. In terms of demand, both BWI and IAD are poised to embrace this growth. BWI has historically served domestic demand for air cargo. That market is expected to continue. Contrastingly, IAD's growth in air cargo will be more focused in the international sector. Both markets are forecast to grow through the year 2040. Accessibility from the airports to other parts of the region, however, will generally constrict between 2015 and 2040 due to growing traffic volumes, a potential risk for the delivery of time-sensitive cargo.

Washington Dulles International Airport (IAD) is located 26 miles west from downtown Washington, DC, located in Fairfax and Loudoun Counties, VA. IAD is situated with direct access to Dulles Greenway Toll Road, and is 14 miles from I-495 (Capital Beltway) which connects to multiple metropolitan areas. Connectors through I-495 include: I-270, I-95, MD 201, and MD 4. The interstate also provides direct access to Andrews AFB (45 miles from IAD).

Baltimore Washington International (BWI) is situated with direct access to I-195, six miles from I-95 which connects to multiple metropolitan centers along the East Coast. Connectors through I-95 include I-495, MD 100, I-195, I-695, I-895, MD 295, and I-395. The interstate also provides direct access to Andrews AFB (37 miles from BWI) and the Port of Baltimore seaport (10 miles from BWI).Air cargo trends at BWI and IAD airports are described below.

[7] Washington Baltimore Regional Air Cargo Study - 2015. https://www.mwcog.org/documents/2017/02/15/washington-baltimore-regional-air-cargo-study-airport-access-freight/

Baltimore Washington International Airport (BWI)

Between 2008 and 2014, air cargo increased slightly from 102,000 to 105,000 metric tons. Through the year 2040, air cargo at BWI is expected to increase annually, although modestly. Domestic air cargo accounts for the greatest share of total freight handled at BWI, which is expected to remain at over 90% of total freight at BWI.[8]

Washington Dulles International Airport (IAD)

Air cargo at IAD decreased sharply from 334,000 metric tons to 267,000 metric tons between 2008 and 2014, though forecasts call for air cargo growth through 2040. IAD's air cargo market share position in the air system planning region will continue to expand during the forecast period. This expansion will be fueled by increases in international air cargo demand. IAD has extensive international service to other markets, including Europe and Latin America, which fuel the bulk of the international air cargo demand.

Air cargo trucked in and out of the DC market will likely remain on interstate and other limited access highway systems as much as possible, due to the congestion and access issues on the District's arterial road system.

1.3. Maritime / River

Although the District's boundary encompasses two major rivers, neither is a significant source of freight movements, due to the District's service-based economy, the rivers' lack of accessibility, and lack of shipping infrastructure. The region's major rivers are the Potomac, Anacostia, and Occoquan. According to U.S. Army Corps of Engineers Waterborne Commerce Statistics (USACE), shipments totaled 110,000 short tons of one inbound commodity in 2011: gasoline. Earlier years (2000-2006) show 600,000-700,000 short tons total, due to shipments of aggregate, probably for construction purposes. Some other tonnage shipments are suppressed in the USACE data due to confidentiality.

Shipping the gasoline by truck instead of by pipeline would add 10 truck trips per day, assuming 300 tons of gasoline per day and roughly 30 tons of gasoline per tank truck. As a share of total truck traffic, this number is not significant in the regional context.

There is also a small U.S. government maritime operation, by the U.S. Army Corps of Engineers along the Anacostia River at the edge of a property that used to be a Washington Gas gas manufacturing plant (closed in 1983, demolished in 1988). The U.S. government owns a 0.35-acre portion of the old gas plant property and it

[8] Washington Baltimore Regional Air Cargo Study - 2015. https://www.mwcog.org/documents/2017/02/15/washington-baltimore-regional-air-cargo-study-airport-access-freight/

is managed by the U.S. Army Corps of Engineers. The Army Corps uses this small section as a station for debris collection boats that patrol the Anacostia and Potomac Rivers.

1.0. Commercial Ports

Although the District encompasses two major rivers, neither is a significant source of freight movements due to the District's service-based economy, the rivers' lack of accessibility, and a dearth of shipping infrastructure. The region's major rivers – the Potomac, Anacostia, and Occoquan – are part of a Federal initiative, known as the Marine Highway Program, to provide financial incentives for investment that increases waterborne freight and reduces highway demands. This is known as the M495 Marine Highway corridor. These incentives may encourage shippers to look for more cost-effective means of transporting commodities from and to the District. In the meantime, the only functional dock located on District land that serves as a commercial port – commonly recognized as a place where cargo is transferred between ships and trucks, trains, pipelines, storage, facilities, or refineries, as per the Bureau of Transportation Statistics – is in Ward 6, on S

Figure 2 | Map of general location of S Street SW Dock

Street SW, adjacent to the South Capitol Street Bridge on the Anacostia River.

According to the District's most recent research into the U.S. Army Corps of Engineers Waterborne Commerce Statistics (USACE), shipments totaled 110,000 short tons of one inbound commodity in 2011: gasoline. Earlier years (2000-2006) show 600,000-700,000 short tons total, due to shipments of aggregate, probably for construction purposes. Indeed, DDOT has used the S Street SW dock to support the inspection, maintenance and construction of bridges. It has also been used by PEPCO to unload large transformers and more recently as the location where the Captain White Seafood barge was dismantled after leaving the SW Waterfront. DDOT does not have free access to any other developed dock in the District, which makes this facility a significant and important asset.

In order for the District to continue to benefit from the existing freight capacity provided via maritime transportation, this S Street SW District Dock will need repair and investments to maintain its current use of providing water access for DDOT bridge inspection, maintenance and construction projects.

There is also a small U.S. government maritime operation by the U.S. Army Corps of Engineers along the Anacostia River adjacent to property to a former Washington Gas manufacturing plant (closed in 1983, demolished in 1988). The U.S. government owns a 0.35-acre portion of that old gas plant property, and it is managed by the U.S. Army Corps of Engineers. The Army Corps uses this small section as a station for debris collection boats that patrol the Anacostia and Potomac Rivers.

The District as a whole will also need to consider and avoid the impacts of encroachment by waterfront development into berthing locations and navigation channels in the rivers. This potential conflict, however, could also be an opportunity: The private waterside development, The Wharf, for instance, has a large crane that may be able to add redundancy and serve as a model for public-private partnership. The Wharf has a roadway immediately along the water that may be serviceable for some water borne freight. The Wharf facility could be a model to draw on for a public-private partnership at the Buzzard Point location. Given that barge-based freight service is relatively infrequent in the District, it may be possible to integrate the dock facility with a larger waterside development if the needed operating parameters, such as truck access, priority access to the dock, and the load capacity of the facilities, are identified within the planning process.

If the existing District maritime transportation system is not preserved, there could be negative environmental, safety, and cost implications of diverting these heavy materials to trucks. Marine shipping offers clear benefits in terms of air quality and other environmental

impacts as well as road-congestion reduction benefits. The District should strive to maintain, and where feasible, increase opportunities to divert land surface mode transportation to maritime vessels.

1.1. Truck Parking Facilities and Safety

DDOT estimates that truck traffic in the District on Interstate roads is roughly 4% of AADT (Annual Average Daily Traffic) and is approximately 3% AADT on all other District roadways. It is important to note that this truck traffic data only includes heavy vehicles and excludes light commercial trucks. Light commercial trucks likely would raise these values, as most trucks coming into the District are short haul/regional.

The District has unique constraints in regards to vehicle parking facilities. Currently, the District does not have any rest stops in our jurisdiction; there are no existing facilities for trucks or any passengers. While most distribution centers in the metropolitan region outside of the District, DDOT encourages the limited number of distribution centers that are within the District to provide parking for their vehicles on site.

The District's regulations also limit where and how trucks can park on public thoroughfares. District of Columbia's Municipal Regulations Title 18 2405.5 prohibits the following vehicles from parking on any public thoroughfare alongside a bike lane that does not have a barrier between the bike lane and the road, or in front of, alongside, or in the rear of any private dwelling or apartment, house of worship, school, playground, or hospital, except while engaged in work at such place for which the vehicle is reasonably necessary:

(a) Any passenger vehicle with a seating capacity of more than fifteen (15) passengers;

(b) A boat;

(c) A trailer, whether loaded or unloaded;

(d) Any vehicle longer than twenty-two feet (22 ft.) or wider than eight feet (8 ft.); or

(e) Any vehicle that has been designed or modified to haul trash, junk, or debris

With only one exception, vehicles over 22 feet in length are prohibited from parking in on-street metered spaces – other than in commercial loading zones, which are designated

metered curbside zones with time limits to encourage active loading and/or provide commercial vehicle access for active service calls.[9]

Providing truck parking in the District is extremely challenging due to our extremely constrained right of way and dense development. DDOT, however, does participate in a truck parking working group through the Eastern Transportation Coalition and seeks opportunities to coordinate with neighboring jurisdictions to address truck parking needs.

Safety

Between 2020 and 2022 there were 6,888 crashes involving commercial vehicles in the District. These crashes resulted in 11 fatalities and over 1,000 injured persons. Of all crashes in those two years, 92 involved pedestrians and 37 involved bicyclists. Half of all incidents were side swipes or rear end collisions. DDOT understands that a lack of truck parking can cause fatigue-related crashes, but due to the constrained space, DDOT is coordinating with neighboring jurisdictions to identify regional truck parking facilities.

1.2. Critical Urban Freight Corridors (CUFC)

The IIJA requires that roadways important to freight be identified and classified. Roadways identified as a part of the National Highway Freight Network (NHFN) are eligible for freight funding and can be classified as one of the following:

- **Primary Highway Freight System (PHFS):** A network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective freight data. Intermodal connectors, roadways providing access to other freight transportation such as ports and rail terminals, can be designated as part of the PHFS.
- **Other Interstate Portions not on the PHFS:** The portion of the interstate system not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. States whose PHFS accounts for less than two percent of the nation total PHFS mileage can apply National Highway Freight Program funds to improve these roads.
- **Critical Rural Freight Corridors (CRFC):** Non-urban area public roads which provide access and connections to the PHFS and the interstate with ports, public

[9] Commercial vehicles up to 40ft with day or annual passes can park in metered zones between 10am-2pm within posted time limits.

transportation facilities, or other intermodal freight facilities. (There are none of these in the District.)

- **Critical Urban Freight Corridors (CUFC):** Urban area public roads which provide access and connections to the PHFS and the interstate with other ports, public transportation facilities, or other intermodal transportation facilities.

The District NHFN is comprised of Primary Highway Freight System and Critical Urban Freight Corridor (CUFC) roadways. State transportation agencies are responsible for defining the CUFC's. Section 167 of title 23 (National Highway Freight Program) establishes that MPOs in urbanized areas with a population greater than 500,000 may designate public roads as CUFCs in consultation with state DOTs. Roads identified in the DDOT truck route system were the primary source of designated CUFC roadways. Based on Section 167, roads designated as critical urban freight corridors (CUFCs) must be in an urban area and meet at least one of the following criteria:

A) Connects an intermodal facility to

    1. the Primary Highway Freight System (PHFS),
    2. the Interstate System, or
    3. an intermodal freight facility;

B) Is located within a corridor of a route on the PHFS and provides an alternative highway option important to goods movement;

C) Serves a major freight generator, logistic center or manufacturing and warehouse industrial land; or

D) Is important to the movement of freight within the region, as determined by the MPO or the State.

Public Law 23 U.S.C 167(g) provides that each State (District) or MPO (MWCOG) that designates a corridor as either a CRFC or CUFC must certify to the FHWA Administrator that the designated corridor meets the applicable CRFC or CUFC requirements. In an urbanized area with a population of more than 500,000, the MPO, in consultation with the State, is responsible for designating the CUFC. In this case the MPO, or MWCOG, will submit the CUFC to FHWA.

The District NHFN consists of PHFS and CUFC roadways. Under IIJA, The District of Columbia qualifies for up to 150 miles of designated CUFCs. This section of the report

describes the process for selecting 75 miles of CUFCs and identifies those critical corridors.

1.2.1. CUFC Identification Process

In 2010 the District identified a truck route system. This system was created to address concerns within the city regarding truck traffic and to improve the management and monitoring of truck traffic under a single, comprehensive system. Specific routes were designated based on a variety of factors including: traffic characteristics, functional classification, pavement characteristics, connectivity to major roadways or commercial activity, crash statistics, existing truck restrictions, stakeholder feedback, land use/neighborhood context and field observation. The resulting network amounted to 114 miles of potential CUFCs. To meet the previous maximum CUFC mileage limit of 75 miles for the District, 39 miles were removed, based upon specified criteria. DDOT coordinated with its MPO during this identification process in accordance with federal requirements, and the proposed CUFCs were formally reviewed and approved by the Transportation Planning Board.

These forty-two (42) CUFCs were selected based on their importance to freight movements within the District and connectivity to the freight network outside the District. The list is shown in the table above. The following criteria were considered during the CUFC identification process:

- 2010 District Truck and Bus Route Designation
- Additional Factors
    - High Traffic Corridors
    - Freight Generators/Commercial Districts
    - Other Projects and Plans
    - Roadway Classification
    - Access
    - High Traffic Corridors
    - Freight Generators/Commercial Districts
    - Other Projects and Plans

1.2.2. Washington, DC Critical Urban Freight Corridors

A total of 74.98 miles of CUFC roadways were identified by DDOT for the District. These corridors are shown in the figures below. A table listing each route, its start and end points, and length is shown on the following pages.

Figure 3 | Washington, DC Critical Urban Freight Corridors

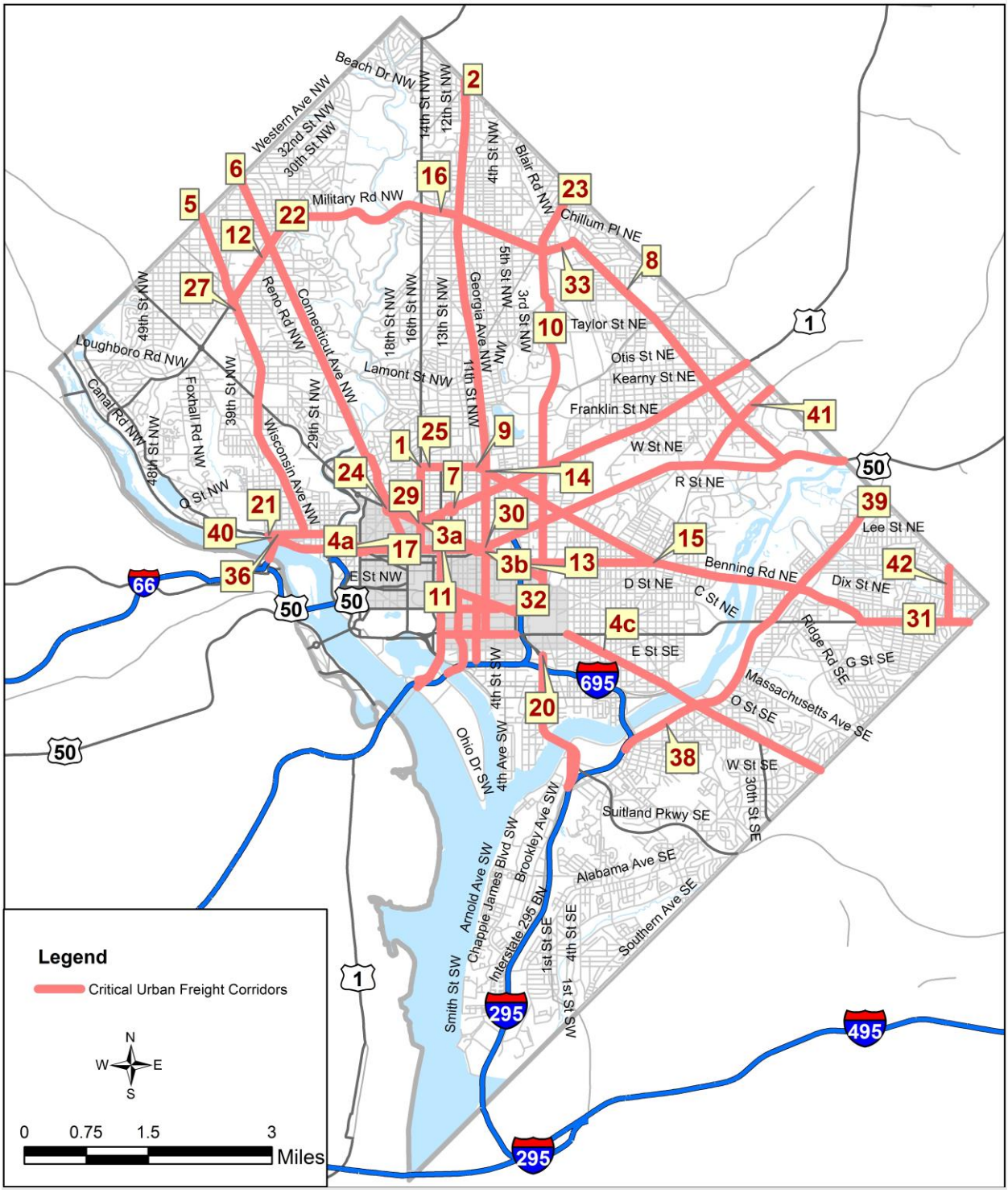


Figure 4 | Washington, DC Critical Urban Freight Corridors in Downtown DC

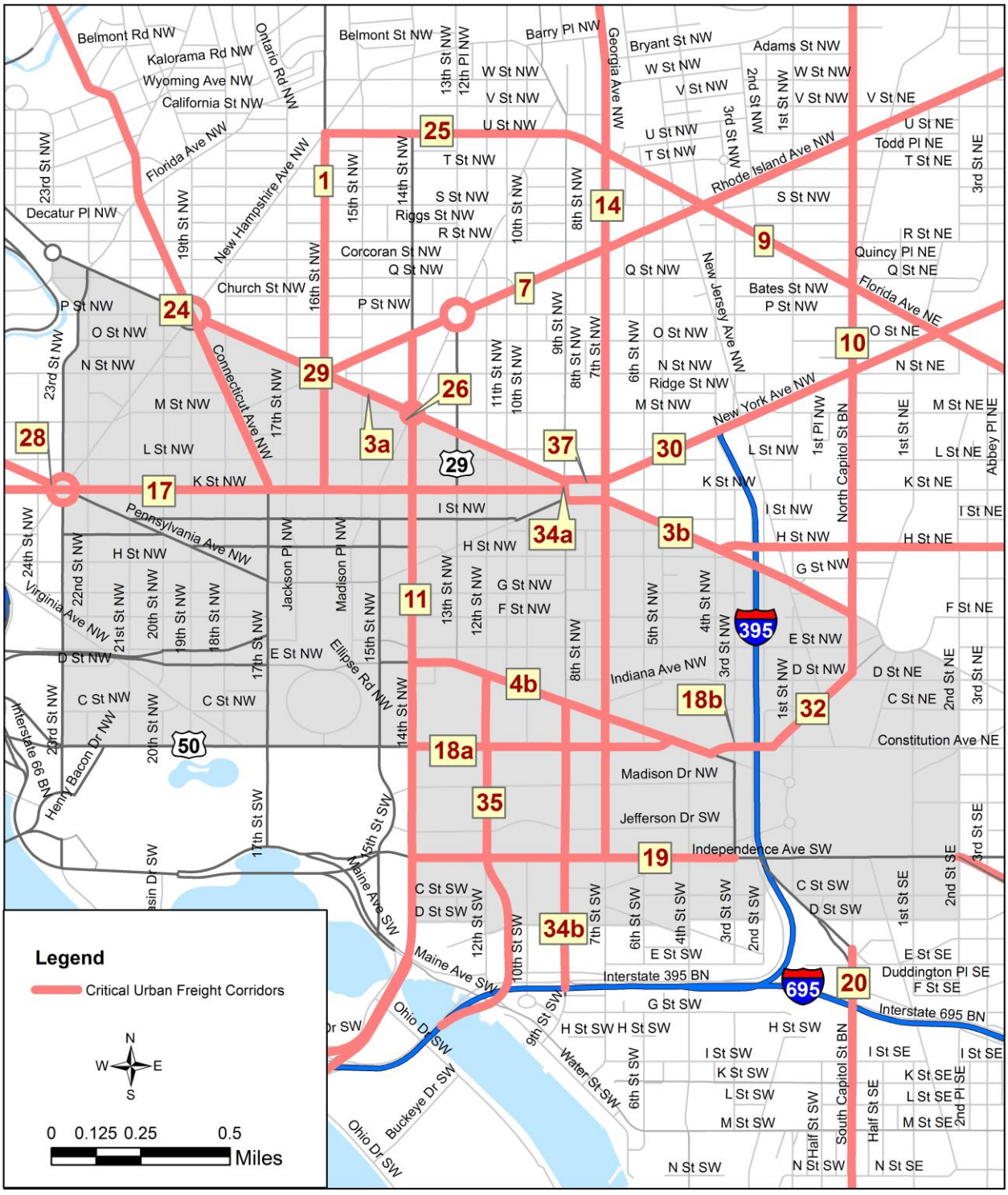


Figure 5 | Critical Urban Freight Corridor Descriptions

ID	Route	Start Pt.	End Pt.	Length (miles)	CUFC _ID	Comments
1	16th St.	U St NW/New Hampshire Ave NW	K St NW	0.9986	K	
2	Georgia Ave.	DC Line/Eastern Ave NW	U St NW	4.755	J, K, I	
3a	Massachusetts Ave.	Dupont Cir NW	9th St NW	1.0611	J, K	
3b	Massachusetts Ave.	7th St NW	North Capitol St BN	0.7636	J, K	
4a	Pennsylvania Ave.	29th St NW	22nd St NW	0.4341	J, K	Runs through Washington Cir
4b	Pennsylvania Ave.	14th St NW	3rd St NW	0.8831	J, K	
4c	Pennsylvania Ave.	Independence Ave SE/2nd St SE	DC Line/Southern Ave SE	3.4834	K	
5	Wisconsin Ave.	DC Line/Western Ave NW	M St NW	4.1218	J, K	
6	Connecticut Ave.	DC Line/Western Ave NW	K St NW	5.0031	J, K	
7	Rhode Island Ave.	DC Line/Eastern Ave NE	Scott Cir NW/16th St NW	4.5508	J, K	Runs through Logan Cir
8	South Dakota Ave.	Riggs Rd NE	New York Ave NE	3.7028	J, K	
9	Florida Ave.	9th St NW	H St NE	2.4386	J, K	
10	North Capitol St.	New Hampshire Ave NE	Louisiana Ave NE	4.3487	K, I	
11	14th St.	Rhode Island Ave NW	I-395	2.5628	J, K	Runs through Thomas Cir.
12	Nebraska Ave.	Military Rd NW	Tenley Cir NW	1.1852	K	
13	H St.	Florida Ave NE	Massachusetts Ave NW	1.7157	K	
14	7th St.	Florida Ave NW	Independence Ave SW	1.9797	J, K	
15	Benning Rd.	East Capitol St BN	Florida Ave NE	2.6696	J, K	
16	Missouri Ave.	Military Rd NW	North Capitol St BN	1.3273	K	
17	K St.	27th St NW	7th St NW	1.8414	J, K	
18a	Constitution Ave.	14th St NW	Pennsylvania Ave NW	0.7297	K	

ID	Route	Start Pt.	End Pt.	Length (miles)	CUFC _ID	Comments
18b	Constitution Ave.	Pennsylvania Ave NW	Louisiana Ave NW	0.1781	K	
19	Independence Ave.	14th St SW	3rd St SW	0.9043	K	
20	South Capitol St.	Firth Sterling Ave SE	Canal St SW	2.3447	J, K, I	
21	M St.	US29	29th St NW	0.6764	J, K	
22	Military Rd.	Nebraska Ave NW	Missouri Ave NW	1.9496	K	
23	New Hampshire Ave.	DC Line/Eastern Ave NE	North Capitol St BN	0.702	J, K	
24	Dupont Cir.	Massachusetts Ave NW	Massachusetts Ave NW	0.1635	K	Shared by 3a and 6
25	U St.	New Hampshire Ave NW	9th St NW	0.6756	J, K	
26	Thomas Cir.	M St NW	M St NW	0.1569	K	Shared by 3a and 11
27	Tenley Cir.	Nebraska Ave NW	Nebraska Ave NW	0.1359	K	Shared by 5 and 12
28	Washington Cir.	Pennsylvania Ave NW	Pennsylvania Ave NW	0.2318	K	Shared by 4a and 17
29	Scott Cir.	Massachusetts Ave NW	Massachusetts Ave NW	0.1165	K	Shared by 1, 3a and 7
30	New York Ave. (US 50)	DC Line NE	7th St NW	4.6039	J, K, I	
31	East Capitol St.	DC Line/Southern Ave SE	Benning Rd SE	1.3113	K, I	
32	Louisiana Ave.	North Capital St BN	Constitution Ave NW	0.3042	K	
33	Riggs Rd.	South Dakota Ave NE	North Capitol St BN	0.4001	K	
34a	9th St.	Mt Vernon Pl NW	K St NW	0.0581	K	
34b	9th St.	Pennsylvania Ave NW	Frontage Rd SW	0.8	K	
35	12th St.	I-395 BN	Pennsylvania Ave NW	1.1082	K	
36	Francis Scott Key Bridge	DC Line/GW Memorial Pkwy	M St NW	0.3111	K	
37	Mt. Vernon Pl.	7th St NW	9th St NW	0.1145	K	
38	Anacostia Fwy	I-295	East Capitol St BN	2.46	K, I	
39	Kenilworth Ave	East Capitol St BN	DC Line/Eastern Ave NE	2.0424	K	

ID	Route	Start Pt.	End Pt.	Length (miles)	CUFC_ID	Comments
40	Water St NW/ Whitehurst Fwy NW	350' east of Key Bridge NW/C&O Canal	27th St NW	0.785	K	
41	Bladensburg Rd NE	Eastern Ave NE	New York Ave NE	1.22575	K	
42	58th St NE	Eastern Ave NE	East Capitol St NE	0.659558	K	
			Total =	**74.98**		

CUFC_ID Route/facility descriptor:

H – Connects an intermodal facility to the PHFS, the Interstate System, or an intermodal freight facility.

I – Located within a corridor of a route on the PHFS and provides an alternative highway option important to goods movement.

J – Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land.

K – Corridor that is important to the movement of freight within the region, as determined by the MWCOG and DDOT.

5. FREIGHT DEMAND & ECONOMY

5.0 Freight Demand & Economy

1.3. Role of Freight in the District Economy

Economic impacts of freight activity in the District of Columbia come from transportation services and from industries that use such freight transportation services to trade goods. The District's most recent analysis of the role of freight in the District economy is based on its 2014 freight plan[10]. This analysis remains relevant as the District has maintained a

[10] District of Columbia Economic and Revenue Trends: November 2014: https://cfo.dc.gov/sites/default/files/dc/sites/ocfo/publication/attachments/DC%20Economic%20and%20Revenue%20Trend%20Report%20November%202014_rev.pdf

similar economic base and infrastructure network in the intervening years[11]. As such, the analysis is summarized below.

Data came from the TRANSEARCH freight flow database product. TRANSEARCH-derived, inbound, outbound, and intra-District commodity flow volumes and values were applied together with the IMPLAN economic model to determine how such commodity movements generate direct economic impacts in the District of Columbia. Further, the indirect impacts associated with suppliers, and the induced impacts associated with the re-spending of income, were also quantified. Combined, the direct, indirect, and induced types comprised the total economic impacts, with each measured in terms of employment, income, value-added (i.e., Gross State Product), output, and taxes. The only economically significant commodity movements identified within the available TRANSEARCH commodity flow database within the District pertained to truck movements (i.e., inbound, outbound, and intra-district truck tonnage). In addition to the truck movements, some inbound and outbound rail and water movements were identified, but the magnitude was dwarfed by trucking and constituted such a small fractional component within the region that the related estimates were within margin of errors and thus deemed inconsequential for the economy.

This analysis determined that truck service is essential to the District of Columbia's economy. While the basic provision of truck service generated a modest 350 direct jobs (450 total jobs including multiplier effects), truck transport users in the District generated a much greater 103,670 direct jobs. Combining the total truck transport users job impacts of 129,500 (inclusive of the 25,830 multiplier job impacts) with truck transport-services jobs yielded a total truck-related employment impact of 129,950 jobs, with $9.2 billion paid in income and output of $18.9 billion.

In summary:

- 129,950 jobs directly or tangentially affected by truck represented 15.8 percent of the 823,000 jobs in the District (in 2011).
- $9.2 billion earned by these employees represented 8.3 percent of the District of Columbia's total wage and salary income ($110.1 billion in 2011).
- The combined value-added impact, $12.7 billion, associated with the truck operations and truck users represented 9.1 percent of Gross State Product-equivalent ($139.5 billion in 2011).
- Total output measured $18.9 billion for both transport service and trade users', amounting to 11.2 percent of District-wide output ($167.6 billion in 2011).
- The $882 million in taxes associated with truck transport accounted for about

[11] District of Columbia Economic and Revenue Trends: November 2022: https://cfo.dc.gov/sites/default/files/dc/sites/ora-cfo/publication/attachments/Trend%20Report%20November%202022.pdf

21.1 percent of total tax collections in the District ($4.2 billion).

- Wholesale Trade and Manufacturing were perhaps the most truck-integrated industry, as measured by the truck-related industry impacts in comparison with the total industry sector economic measures (output, employment, etc.). In addition, the Retail Trade and Construction sectors were also highly dependent on truck transportation, as per the similar composition of impacts in comparison with total economic activity in the District for each industry sector.

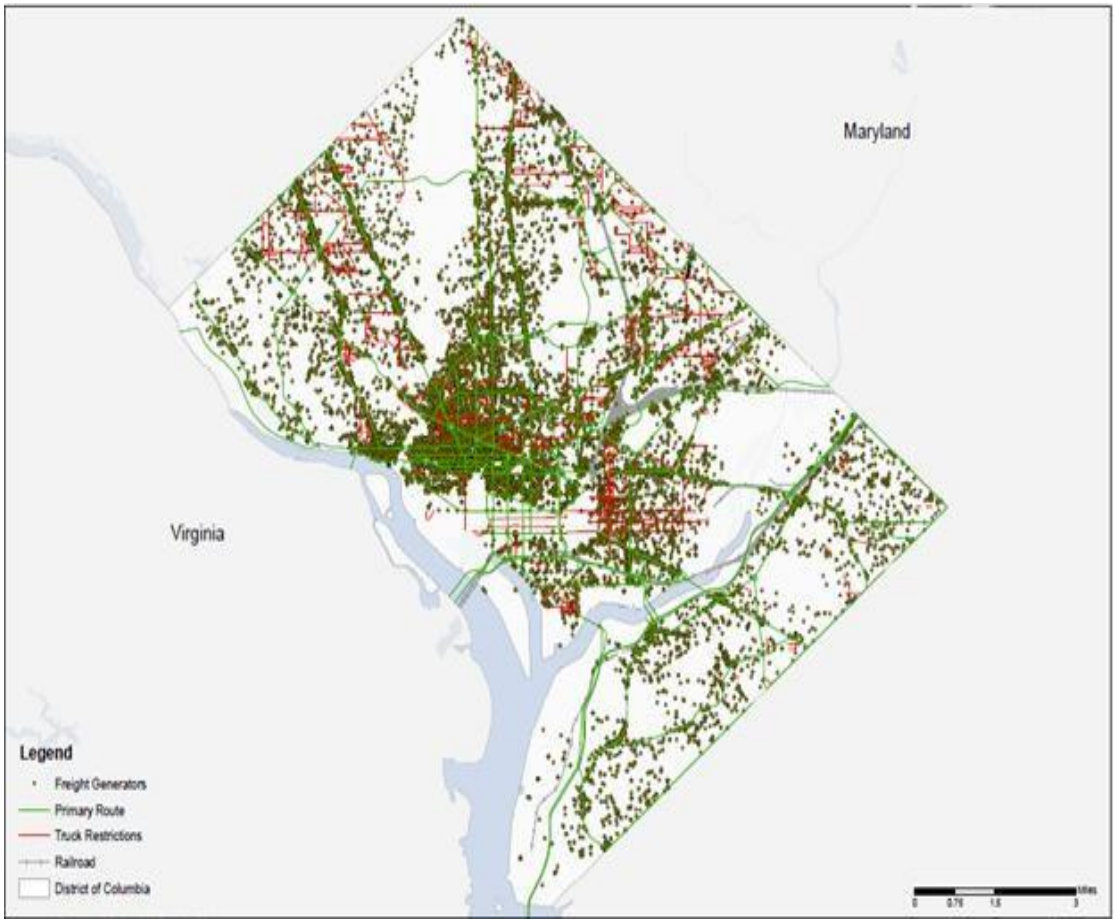
The analysis demonstrated the impact of truck transport on the District's economy, and that a vast majority of the impacts pertained to those firms that use freight truck to deliver goods and/or materials they have purchased from businesses outside the District. In turn, the resultant multiplier impacts associated with the indirect supplier impacts and the re-spending of income (both direct and indirect) was significant. The economic analysis demonstrated that freight transportation as provided by truck activities and services plays a vital role in the District of Columbia's economy.

Other modal shipments totaled 113,132 tons (predominantly water-based refined petroleum imports going into tank storage via pipe) and comprised less than one half of one percent of truck tonnage shipments. Further, except for the barged refined petroleum, most all of these movements would be trucked from/to a rail yard (or other intermodal facility) to/from the receiver/shipper. These facilities are located outside the District, with the connectivity to them provided by truck. Hence, virtually any District impact associated with other modal freight movements was already included in the truck-related impact estimates.

1.4. Freight Generators

A freight generator is any establishment that produces something of commercial value and is of interest to the plan because of the traffic and logistics implications. Despite the absence of traditionally recognized freight generators, e.g., heavy industry and large scale warehousing, there are significant freight movements within the District. Apart from the more recognizable movement of small packages and letters associated with the many governmental agencies and associated departments and allied industries, freight movement within the District is aligned with the needs of resident and workforce consumers. Over 60,000 locations in the District have the potential to generate inbound and/or outbound deliveries. These locations are depicted in along with the truck routes.

Figure 6 Freight-Generating Locations in Washington, DC



Source: IHS Global Insight Freight Locator Database

A catalogue of freight generators was created to summarize the 60,000 freight-generating businesses and non-profit agencies in the District into eight industry categories. The categories are:

- Agriculture/Forest/Fish
- Mining
- Construction
- Manufacturing
- Transportation/Utilities
- Wholesale Trade
- Retail Trade
- Finance/Insurance/Real Estate
- Services/Public Administration

The industries with greater than 100 employees as a percentage of total

District employment are presented below.

Table 2: Percentage of Organizations with Greater than 100 Employees (Categorized by Industry**)**

INDUSTRY	PERCENTAGE OF
Agriculture/Forest/Fish	0.6%
Manufacturing	11.9%
Transportation/Utilities	2.3%
Wholesale Trade	4.5%
Retail Trade	37.9%
Services	42.9%

Agriculture / Forest / Fish

There are very few locations within the District that generate activities related to agriculture, forestry, or fishing. However, the locations that do exist typically reside in or are encircled by residential areas.
Planning efforts should focus on mitigating potential conflict between the commercial vehicles servicing these businesses and the needs of local communities.

Key Trends:

- Location within low-medium density residential areas and potentially smaller commercial venues serving localized resident populations

- May lack adequately sized loading/unloading facilities to accommodate commercial vehicles

- Truck configuration varies with commodity, small courier to tractor-trailer
  - Predominantly inbound freight movements with little or no outbound
  - Large vehicle configuration supporting inbound movements to reduce shipment transportation costs
  - Freight movement origins typically outside the District
  - Long-haul vehicle operators may not be familiar with the area

Manufacturing

Many of the District's manufacturing-related businesses are located in areas not identified as heavy industrial or manufacturing centers. Due to limited space available for manufacturing and shipping, the manufacturing businesses are small, limited to production in small quantities producing unique manufacturing outputs, e.g., specialty or promotional items. Though largely publishers and printers, this category includes breweries and a perfume-toiletries manufacturer.

Key Trends:

- Located within the District center, near governmental and commercial areas
  - Smaller vehicles to support local office needs
  - Potential distribution capabilities

- Located in outer regions of District
  - Facilities with warehouse characteristics, e.g., loading/unloading docks
  - Expected to receive materials in bulk in larger configured vehicles
  - Distribution to points within the District utilizing single unit vehicles

Transportation / Utilities

A limited number of organizations position fleets of trucks on properties within the District. For the most part, motor carrier operators choose to serve the District from facilities in neighboring cities such as Winchester and Fairfax, Virginia. Cost, capacity, and accessibility are concerns when looking at locations within the District. Commercial real estate costs are significantly higher in the District than in outlying areas. A lack of "truck-friendly" roadway design limits the efficiency of accessing an available parcel. Space for parking trucks is limited and trucks are banned from or unwelcome in many residential or mixed-use designated areas. Utilities position fleets outside of the District for similar reasons.

Within the District, however, the U.S. Postal Service (USPS) operates off Brentwood Parkway where it maintains a fleet of local delivery vehicles. USPS also operates larger commercial (tractor-trailer) vehicles to transport mail between its larger distribution center and local Post Offices. In addition, the city's trash transfer site in Ward 5 attracts city and private trash haulers.

A local household goods transport company is identified within this group. This carrier type does not maintain equipment locally, as trucks generally move directly from pick-up to delivery. The impact on local movement, for this and similar businesses, is the need of tractor-trailers and other smaller commercial vehicles to access warehouses for temporary warehousing. This may occur when a delay at delivery has arisen, long-term storage is contracted, or the delivery location requires a special vehicle which predicates "cross dock activities" or unloading and reloading goods between the over-the-road truck and the special vehicle.

An area of consideration for these types of access needs is the non-local nature of the vehicle operator. The driver may only be passing through the District, seeking access for delivery or pick-up of goods. Drivers without access to wayfinding information may find themselves on roads not intended for their commercial vehicle.

Key Trends:

- Located in mixed use and light commercial areas

- Fleet configuration typically smaller delivery trucks

- Storage and warehouse may attract large tractor-trailer, class eight vehicles. Limitations on vehicle configuration size:
  - Elevates operating costs through requirement of specialty vehicles
  - Emissions increases due to increased trip volumes relaying goods from less restrictive transfer locations to storage within the District.

Wholesale Trade

There is not a large amount of wholesale activity in the District. The few wholesale locations that exist utilize medium and larger commercial vehicles to service the final mile delivery of goods. Representing a variety of commodities (e.g. electrical supplies, beverages), these activities generate trips on a daily basis to end users, or retail sites.

Key Trends:

- Located in areas parallel to US 50 towards the border with Maryland

- Inbound and outbound trips expected with more trips out to local consumption points
  - Inbound expected to be on larger tractor-trailer combinations
  - Outbound to end user expected to be on smaller vehicles

Retail Trade, SIC 52-59

Tourism and government-centric travel produce a significant volume of freight trips to support retail activities in the District. Just-in-time inventory strategies and high consumption at the end user location contributes to the high frequency of trips associated with these businesses. Restaurants, bars, and caterers consume perishable goods daily and often require numerous replenishment trips throughout a single day's operation. This variety of trip types may include all types of commercial vehicles. Groceries and other retail establishments also require daily restocking of existing inventory. The larger the volume of goods sold through a retail and/or grocery business, the larger the vehicles used to reduce trip costs.

Key Trends:

- Retail activity located throughout District

- Predominantly inbound to location with little to no outbound

- Movements subject to inventory strategies and seasonal influences
  - Holiday or specialty, e.g., Christmas, back-to-school

- Tourism seasonality

Services

Service industries (lodgings and health services) include business sectors with unique supply chain needs. Hotels, motels, and other temporary lodgings require a diverse set of supply chains. Related commodities include cleaning chemicals, paper products, and food products. The health services sector requires the delivery of highly specialized, perishable materials and requires source-to-end-user delivery on an immediate and reliable basis.

Key Trends:

- Variety of vehicle configurations and sizes need to access locations
- Predominately inbound movements with little to no outbound traffic generation
- Activity in health services subject to:
  - 24 hours a day, seven days a week, 365 days a year access
  - Reliable access

Summary

The District hosts diverse types of local freight generation, and where businesses are located on or within close proximity of a major commercial or freight corridor, the District's primary routes accommodate those goods movements.

Where freight generators are not on these corridors, the District's restricted routes present potential challenges to commercial vehicle movement. Through-truck restrictions prohibit the use of the roadway as a cross area access route, only allowing access to facilitate a local delivery or pick-up. The District's finite number of primary routes and numerous restricted routes can be challenging for truck operators to navigate and create conflicts in residential neighborhoods. This may occur more frequently when the driver is not regularly operating in the District, as is often seen in the manufacturing and wholesale industries.

The District's continuing review and interaction with the community and private sector organizations involved in goods movements will present opportunities to educate the public on the need to provide access for goods movement, as well as refine routes and restrictions to ensure a balance between economic vitality and community needs.

1.5. Economic Forecasts

Over the next 25 years, the District is projected to add more than 250,000 residents, 90,000 housing units, and almost 200,000 jobs. Areas in the Southeast and Northeast quadrants of the District and Northwest quadrant east of Rock Creek Park are projected to have the greatest population density increases. There is a higher rate of population growth around Metrorail stations, particularly near the Columbia Heights and Stadium-Armory Stations. The central business district, southwestern parts of the District, and the Navy Yard will experience the highest increases in employment density. The Navy Yard and the areas around the Union Station, NoMa, and Rhode Island Avenue Metrorail Stations are forecast to experience an increase in both employment and population density in the next 25 years[12]. In keeping with this growth, freight shipments are expected to grow accordingly within a similar time frame: by 75 percent from 2011 to 2040 in terms of tons, and 159 percent from 2011 in terms of value[13].

1.6. Supply Chain Cargo Flows

1.6.1. Cargo Flows

Cargo flows in the District of Columbia are provided by the Freight Analysis Framework (FAF) for the following categories:

2.2.1 Trade type and directionality

Because the District of Columbia has few manufacturing facilities, the majority of the goods demanded by its residents and businesses originate from outside of its boundaries. Domestic-only trade data from the FAF 5.4 State Summaries 2022 Forecast[14] indicate that about 3.5 times more annual freight by weight is transported into the District of Columbia (4,717 kilotons) from external jurisdictions than originates within the District of Columbia and is transported to other jurisdictions (1,343 kilotons). Freight that both originates and terminates within the District of Columbia accounts for 4,889 kilotons per year.

[12] moveDC The District of Columbia's Multimodal Long Range Transportation Plan December 2021 p 16
[13] DDOT Freight Plan Addendum & 2014 Freight Plan: https://ddot.dc.gov/publication/district-freight-plan-addendum
[14] https://faf.ornl.gov/faf5/SummaryTable.aspx

Figure 6 I 2022 Tonnage for Shipments Within, From, and To the District of Columbia by Trade Type and Mode (in kilotons)

			Within		Outbound		Inbound		Total	
State (S)	Trade Type	Domestic Mode	Tons Within	Tons Within (%)	Tons Out	Tons Out (%)	Tons In	Tons In (%)	Tons In	Tons In (%)
Washington DC	**Domestic Only**		**4,489.2**	**99.8%**	**1,215.5**	**90.5%**	**4,717.1**	**96.8%**	**10,421.8**	**100.0%**
		Air (include truck-air)	0.0	0.0%	0.9	0.1%	1.1	0.0%	**2.0**	**0.0%**
		Multiple modes & mail	2.2	0.0%	7.2	0.5%	90.7	1.9%	**100.1**	**1.0%**
		Pipeline	0.0	0.0%	0.0	0.0%	718.1	14.7%	**718.1**	**6.9%**
		Rail	0.0	0.0%	0.0	0.0%	85.4	1.8%	**85.4**	**0.8%**
		Truck	4,487.0	99.7%	1,207.4	89.9%	3,821.9	78.4%	**9,516.3**	**91.3%**
Washington DC	**Export**		**7.5**	**0.2%**	**39.2**	**2.9%**	**71.1**	**1.5%**	**117.7**	**100.0%**
		Air (include truck-air)	0.0	0.0%	0.5	0.0%	26.2	0.5%	**26.7**	**22.7%**
		Multiple modes & mail	0.0	0.0%	0.1	0.0%	0.1	0.0%	**0.1**	**0.1%**
		Other and unknown	7.2	0.2%	1.9	0.1%	10.1	0.2%	**19.2**	**16.3%**
		Rail	0.0	0.0%	33.1	2.5%	0.3	0.0%	**33.4**	**28.4%**
		Truck	0.2	0.0%	3.6	0.3%	34.4	0.7%	**38.2**	**32.4%**
		Water	0.0	0.0%	0.1	0.0%	0.0	0.0%	**0.1**	**0.0%**
Washington DC	**Import**		**3.5**	**0.1%**	**87.8**	**6.5%**	**86.0**	**1.8%**	**177.3**	**100.0%**
		Air (include truck-air)	0.0	0.0%	18.6	1.4%	1.3	0.0%	**19.9**	**11.2%**
		Multiple modes & mail	0.1	0.0%	7.9	0.6%	2.4	0.0%	**10.4**	**5.9%**
		Other and unknown	0.1	0.0%	3.6	0.3%	0.0	0.0%	**3.6**	**2.1%**
		Rail	0.3	0.0%	12.2	0.9%	54.4	1.1%	**66.9**	**37.8%**
		Truck	3.1	0.1%	45.6	3.4%	27.8	0.6%	**76.4**	**43.1%**
Washington DC			**4,500.2**	**100.0%**	**1,342.5**	**100.0%**	**4,874.2**	**100.0%**	**10,716.9**	

For total flows (the domestic portion of domestic and foreign trade flows), the total freight volume from a given state is equal to the sum of within and outbound flows.
For domestic flows, the total freight volume originated from a given state is equal to the sum of within and outbound flows.
For import flows, the total freight volume imported to a given state is equal to the sum of within and inbound flows.
For export flows, the total freight volume exported from a given state is equal to the sum of within and outbound flows.
Outbound: Outbound flow from the given state to all other states (not including Within)
Inbound: Inbound flow all other states to the given state (not including Within)

By cargo value, however, the District of Columbia imports much more cargo ($26,807 million) than it exports ($10,531 million). While most of cargo by value is also domestic-only trade, it is a smaller percentage of the majority (78%).

Figure 7 | 2022 Value for Shipments Within, From, and To the District of Columbia by Trade Type and Mode (in million U.S. Dollars)

			Within		Outbound		Inbound		Total	
State (S)	Trade Type	Domestic Mode	Value Within	Value Within (%)	Value Out	Value Out (%)	Value In	Value In (%)	Value	Value (%)
Washington DC	**Domestic Only**		**$2,285.31**	**92.0%**	**$1,872.60**	**17.8%**	**$20,813.47**	**77.6%**	**$24,971.38**	**100%**
		Air (include truck-air)	$0.00	0.0%	$0.89	0.0%	$93.94	0.4%	$94.84	0%
		Multiple modes & mail	$49.99	2.0%	$201.10	1.9%	$4,718.44	17.6%	$4,969.53	20%
		Pipeline	$0.00	0.0%	$0.00	0.0%	$148.17	0.6%	$148.17	1%
		Rail	$0.00	0.0%	$0.00	0.0%	$9.89	0.0%	$9.89	0%
		Truck	$2,235.32	90.0%	$1,670.61	15.9%	$15,843.02	59.1%	$19,748.95	79%
Washington DC	**Export**		**$89.28**	**3.6%**	**$1,381.58**	**13.1%**	**$5,606.70**	**20.9%**	**$7,077.56**	**100%**
		Air (include truck-air)	$0.00	0.0%	$98.46	0.9%	$2,330.48	8.7%	$2,428.93	34%
		Multiple modes & mail	$0.00	0.0%	$1.16	0.0%	$0.23	0.0%	$1.38	0%
		Other and unknown	$20.85	0.8%	$3.86	0.0%	$40.19	0.1%	$64.89	1%
		Rail	$0.00	0.0%	$802.82	7.6%	$1.53	0.0%	$804.35	11%
		Truck	$68.43	2.8%	$475.19	4.5%	$3,234.28	12.1%	$3,777.90	53%
		Water	$0.00	0.0%	$0.11	0.0%	$0.00	0.0%	$0.11	0%
Washington DC	**Import**		**$108.92**	**4.4%**	**$7,276.76**	**69.1%**	**$386.61**	**1.4%**	**$7,772.30**	**100%**
		Air (include truck-air)	$0.00	0.0%	$2,272.27	21.6%	$64.75	0.2%	$2,337.02	30%
		Multiple modes & mail	$0.25	0.0%	$16.60	0.2%	$11.22	0.0%	$28.07	0%
		Other and unknown	$0.33	0.0%	$12.12	0.1%	$0.03	0.0%	$12.49	0%
Total			**$2,483.51**	**100.0%**	**$10,530.94**	**100.0%**	**$26,806.78**	**100.0%**	**$39,821.24**	

For total flows (the domestic portion of domestic and foreign trade flows), the total freight volume from a given state is equal to the sum of within and outbound flows.
For domestic flows, the total freight volume originated from a given state is equal to the sum of within and outbound flows.
For import flows, the total freight volume imported to a given state is equal to the sum of within and inbound flows.
For export flows, the total freight volume exported from a given state is equal to the sum of within and outbound flows.
Outbound: Outbound flow from the given state to all other states (not including Within)
Inbound: Inbound flow all other states to the given state (not including Within)

1.6.2. Freight Modes

Trucks are the predominant transportation mode for cargo within, inbound, and outbound of the District of Columbia. As detailed in the table below, nearly all of cargo by tonnage is transported by truck within and out of the District, while approximately 15% of cargo tonnage arrives by pipeline and barely 3% arrives by rail.[15] (Rail traffic is nearly 100% "through" with essentially no pickups or drop-offs in the District.)

[15] https://faf.ornl.gov/faf5/SummaryTable.aspx

Figure 8 I 2022 Freight Modes Within, From, and To the District of Columbia by Shipment Tonnage (in kilotons)

Freight Mode	Tons Within	Tons Within (%)	Tons Out	Tons Out (%)	Tons In	Tons In (%)	Total	Total (%)
Air (include truck-air)	0.0	0.0%	20.0	1.5%	28.7	0.6%	**48.7**	**0.5%**
Multiple modes & mail	2.3	0.1%	15.2	1.1%	93.1	1.9%	**110.6**	**1.0%**
Other, Unknown & Pipeline	7.3	0.2%	5.5	0.4%	728.2	14.9%	**740.9**	**6.9%**
Rail	0.3	0.0%	45.3	3.4%	140.2	2.9%	**185.7**	**1.7%**
Truck	4,490.4	99.8%	1,256.5	93.6%	3,884.1	79.7%	**9,631.0**	**89.9%**
Total	**4,500.2**	**100.0%**	**1,342.4**	**100.0%**	**4,874.2**	**100.0%**	**10,716.9**	**100.0%**

Trucks also transport the majority of cargo in terms of value within, inbound, and outbound of the District, as detailed in the below chart, but additional modes are used for freight movement across District borders: More than 20% of cargo value leaving the District goes by air and nearly 10% leaves by rail. More than a quarter of inbound cargo value arrives by air and/or multiple modes and mail.

Figure 9 I 2022 Freight Modes Within, From, and To the District of Columbia by Shipment Value (in million U.S. dollars)

Freight Mode	Value Within	Value Within (%)	Value Out	Value Out (%)	Value In	Value In (%)	Total	Total (%)
Air (include truck-air)	$0.00	0.0%	$2,371.63	22.5%	$2,489.17	9.3%	**$4,860.79**	**12.2%**
Multiple modes & mail	$50.24	2.0%	$218.86	2.1%	$4,729.88	17.6%	**$4,998.98**	**12.6%**
Other, Unknown & Pipeline	$21.18	0.9%	$15.98	0.2%	$188.39	0.7%	**$225.55**	**0.6%**
Rail	$2.26	0.1%	$844.89	8.0%	$184.84	0.7%	**$1,031.99**	**2.6%**
Truck	$2,409.83	97.0%	$7,079.49	67.2%	$19,214.49	71.7%	**$28,703.81**	**72.1%**
Total	**$2,483.51**	**100.0%**	**$10,530.84**	**100.0%**	**$26,806.78**	**100.0%**	**$39,821.13**	**100.0%**

1.6.3. Domestic and Foreign Trading Partners

Using the most recent disaggregated Freight Analysis Framework data, FAF 5, the top five trading partners of the District of Columbia by cargo tonnage are its close neighbors of Maryland and Virginia within the Metropolitan Washington, D.C. Freight Analysis Framework Zone, followed by Baltimore, the rest of Virginia, and the Virginia Beach Norfolk metropolitan zone[16].

Figure 10 I Top 5 Domestic Trading Partners, Ranked by Kilotons

Rank	Freight Analysis Framework Zone	KTons In	KTons Out	KTons (In & out)
1	Washington DC-VA-MD-WV (MD)	1541.35	197.90	1739.26
2	Washington DC-VA-MD-WV (VA)	797.10	348.69	1145.78
3	Baltimore MD	904.77	114.86	1019.62
4	Rest of VA	221.23	739.88	961.11
5	Virginia Beach-Norfolk VA-NC (VA)	39.97	215.76	255.73

The same pattern emerges when looking at the District's top five trading partners by cargo value. By cargo value, the top five trading partners of the District of Columbia are its close neighbors Virginia and Maryland within the Metropolitan Washington D.C. freight analysis framework zone, and then zones further north along the Eastern Seaboard: Philadelphia and New York[17].

Figure 11 I Top 5 Domestic Trading Partners Ranked by Value (in million U.S. dollars)

Rank	Freight Analysis Framework Zone	Value In	Value Out	Value (In & out)
1	Washington DC-VA-MD-WV (VA)	$6,396.43	$351.24	$6,747.67
2	Baltimore MD	$2,597.11	$163.64	$2,760.76
3	Washington DC-VA-MD-WV (MD)	$2,057.73	$485.77	$2,543.50
4	Philadelphia PA-NJ-DE-MD (PA)	$711.99	$36.12	$748.11
5	New York NY-NJ-CT-PA (NY)	$336.53	$301.43	$637.96

[16]https://ops.fhwa.dot.gov/freight/freight_analysis/faf/

[17] https://faf.ornl.gov/faf5/SummaryTable.aspx

As for foreign trading partners, foreign zones make up less than 2% of the District's trade by tonnage, based on Freight Analysis Framework 5 data. Of those foreign partners, more than a third of the District's trade by tonnage is with Mexico and the Rest of the Americas (not including Canada). From there, Africa, Canada, Europe, and SW & Central Asia all claim 11-15% of the District's market share each.

Figure 12 I Foreign Trading Partners for District of Columbia (in kilotons)

Foreign Zones	KTons Out	KTons In	Combined KTons	Combined KTons (%)
Africa	11.70	1.99	**13.69**	**11.8%**
Canada	2.83	14.04	**16.87**	**14.5%**
Eastern Asia	0.17	5.94	**6.11**	**5.3%**
Europe	2.42	12.97	**15.39**	**13.2%**
Mexico	0.94	9.51	**10.45**	**9.0%**
Rest of Americas	2.05	31.01	**33.06**	**28.4%**
SE Asia & Oceania	0.14	3.39	**3.53**	**3.0%**
SW & Central Asia	16.46	0.73	**17.20**	**14.8%**
Total	**36.72**	**79.57**	**116.29**	**100.0%**

Foreign zones also make up less than 2% of the District's trade by value, based on Freight Analysis Framework 5 data. Of those foreign partners, the District's biggest trading partner by value is the SW & Central Asia zone, due to large exports. Europe is the second biggest foreign zone for District trade by value, with an even balance of exports and imports.

Figure 13 I Foreign Trading Partners for District of Columbia (in million U.S. dollars)

Foreign Zone	Value Out	Value In	Combined Value	Combined Value (%)
Africa	$107.48	$15.85	**$123.33**	**6%**
Canada	$11.99	$96.96	**$108.95**	**5%**
Eastern Asia	$5.00	$91.53	**$96.53**	**5%**
Europe	$154.52	$169.58	**$324.10**	**16%**
Mexico	$19.13	$22.34	**$41.47**	**2%**
Rest of Americas	$71.34	$33.46	**$104.80**	**5%**
SE Asia & Oceania	$12.40	$16.97	**$29.36**	**1%**
SW & Central Asia	$1,162.30	$12.23	**$1,174.53**	**59%**
Grand Total	**$1,544.15**	**$458.93**	**$2,003.08**	**100%**

1.6.4. Commodity type

Top Ten Commodities by Tonnage within DC

Commodities relating to construction, such as nonmetal mineral products, gravel, and sand, and wood products, make up approximately 82% of cargo tons transported within the District. Electronics and alcoholic beverages coming in at 3rd and 5th place reflect the large consumer base in the region as well.

Figure 14 I Shipments Within District of Columbia - Tons by Commodity: 2022

Data from the Freight Analysis Framework Version 5.4
Unit of measure is thousand tons
Outbound: Outbound flow from the given state to all other states (not including Within)
Inbound: Inbound flow all other states to the given state (not including Within)

		Within	
State (S)	Commodity	Tons Within	Tons Within (%)
Washington DC		**4,500.2**	**100.0%**
	Nonmetal min. prods.	2,831.5	62.9%
	Gravel	591.4	13.1%
	Electronics	216.7	4.8%
	Natural sands	204.5	4.5%
	Alcoholic beverages	129.3	2.9%
	Animal feed	107.0	2.4%
	Mixed freight	68.4	1.5%
	Nonmetallic minerals	63.0	1.4%
	Wood prods.	45.2	1.0%

Articles-base metal	32.3	0.7%

Top Ten Commodities by Value within DC

When it comes to the top commodities by value moving within the District, the strong consumer base of the District can be seen by having commodities such as alcoholic beverages, electronics, meat/seafood, and furniture top the list. The category of Mixed Freight comes from the Commodity Flow Survey and it includes items (including food) for grocery and convenience stores, supplies and food for restaurants and fast food chains, hardware or plumbing supplies, and office supplies. This category of freight high on the list indicates strong consumer and business demand.[18]

Figure 15 I Shipments Within District of Columbia - Value by Commodity: 2022

Data from the Freight Analysis Framework Version 5.4
Unit of measure is million U.S. dollars (2017 constant $)
Outbound: Outbound flow from the given state to all other states (not including Within)
Inbound: Inbound flow all other states to the given state (not including Within)

		Within	
State (S)	**Commodity**	**Value Within**	**Value Within (%)**
Washington DC		**2,483.5**	**100.0%**
	Alcoholic beverages	612.3	24.7%
	Mixed freight	314.5	12.7%
	Electronics	246.4	9.9%
	Nonmetal min. prods.	183.0	7.4%
	Furniture	128.7	5.2%
	Misc. mfg. prods.	107.7	4.3%
	Precision instruments	107.4	4.3%
	Articles-base metal	106.5	4.3%

[18] https://bhs.econ.census.gov/bhsphpext/brdsearch/scs_code.html

	Meat/seafood	99.1	4.0%
	Machinery	92.8	3.7%

Top Ten Commodities Into DC by Kilotons

Nonmetal mineral products, and petroleum-based products make up nearly 40% of commodity tonnage imported into the District, reflecting the construction and energy needs of the region. The category of "Coal- n.e.c", short for "Other Coal and Petroleum Products, not elsewhere classified", includes things like liquified natural gas, liquified propane, and asphalt and supports construction and other activities. The category of "Non-metallic mineral products" includes construction materials, such as pre-fabricated concrete components, building stones, and bricks, also reflect the large construction sector within the District.[19]

Figure 16 I Shipments Inbound District of Columbia - Kilotons by Commodity: 2022

Data from the Freight Analysis Framework Version 5.4
Unit of measure is thousand tons
Outbound: Outbound flow from the given state to all other states (not including Within)
Inbound: Inbound flow all other states to the given state (not including Within)

		Inbound	
State (S)	**Commodity**	**Tons In**	**Tons In (%)**
Washington DC		**4,874.2**	**100.0%**
	Nonmetal min. prods.	1,193.3	24.5%
	Mixed freight	813.4	16.7%
	Coal-n.e.c.	722.6	14.8%
	Other foodstuffs	491.5	10.1%
	Base metals	154.6	3.2%
	Articles-base metal	128.0	2.6%
	Alcoholic beverages	118.6	2.4%
	Wood prods.	99.0	2.0%
	Basic chemicals	95.9	2.0%
	Waste/scrap	91.8	1.9%

[19] https://bhs.econ.census.gov/bhsphpext/brdsearch/scs_code.html

Top Ten Commodities Into DC by Value

By cargo value, however, electronics, pharmaceuticals, miscellaneous manufactured products (such as cleaning tools, sports equipment, jewelry, and toys), and motorized vehicles rise to prominence for imported cargo to the District, reflecting its large consumer market.

Figure 17 I Shipments Inbound District of Columbia - Value by Commodity: 2022

Data from the Freight Analysis Framework Version 5.4
Unit of measure is million U.S. dollars (2017 constant $)
Outbound: Outbound flow from the given state to all other states (not including Within)
Inbound: Inbound flow all other states to the given state (not including Within)

		Inbound	
State (S)	**Commodity**	**Value In**	**Value In (%)**
Washington DC		**26,806.8**	**100.0%**
	Mixed freight	7,408.8	27.6%
	Electronics	2,774.0	10.3%
	Misc. mfg. prods.	1,904.0	7.1%
	Pharmaceuticals	1,649.5	6.2%
	Transport equip.	1,455.1	5.4%
	Motorized vehicles	1,351.6	5.0%
	Machinery	1,246.0	4.6%
	Precision instruments	1,129.8	4.2%
	Textiles/leather	859.6	3.2%
	Articles-base metal	808.9	3.0%

Top Ten Commodities Out of DC by Ton

In keeping with the District's large consumer market, nearly 40% of the District's commodity exports by weight is comprised of waste / scrap.

Figure 18 I Shipments Outbound District of Columbia - Kilotons by Commodity: 2022

Data from the Freight Analysis Framework Version 5.4
Unit of measure is thousand tons
Outbound: Outbound flow from the given state to all other states (not including Within)

Inbound: Inbound flow all other states to the given state (not including Within)

		Outbound	
State (S)	Commodity	Tons Out	Tons Out (%)
Washington DC		**1,342.5**	**100.0%**
	Waste/scrap	492.7	36.7%
	Electronics	220.8	16.4%
	Articles-base metal	153.2	11.4%
	Nonmetal min. prods.	131.5	9.8%
	Mixed freight	123.0	9.2%
	Furniture	38.6	2.9%
	Misc. mfg. prods.	32.3	2.4%
	Motorized vehicles	30.1	2.2%
	Meat/seafood	16.5	1.2%
	Machinery	15.8	1.2%

Top Ten Commodities Out of DC by Value

For outbound commodities by value, pharmaceuticals and electronics make up nearly 40% of District exports, with basic chemicals, miscellaneous manufactured products and machinery rounding out the District's top ten export commodities.

Figure 19 I Shipments Outbound District of Columbia - Value by Commodity: 2022

Data from the Freight Analysis Framework Version 5.4
Unit of measure is million U.S. dollars (2017 constant $)
Outbound: Outbound flow from the given state to all other states (not including Within)
Inbound: Inbound flow all other states to the given state (not including Within)

		Outbound	
State (S)	Commodity	Value Out	Value Out (%)
Washington DC		**10,530.9**	**100.0%**
	Pharmaceuticals	2,652.0	25.2%
	Electronics	1,422.0	13.5%
	Basic chemicals	1,097.8	10.4%
	Misc. mfg. prods.	875.3	8.3%
	Machinery	656.5	6.2%
	Plastics/rubber	526.4	5.0%
	Motorized vehicles	472.9	4.5%
	Mixed freight	469.1	4.5%
	Articles-base metal	412.9	3.9%
	Chemical prods.	364.2	3.5%

1.6.5. Key industries

The above commodity flows within, inbound, and outbound of the District of Columbia reflect the following key industries within the region: construction and utilities, pharmaceuticals, government, and a large consumer-based economy requiring goods and services.

1.7. Supply Chain Considerations

Multimodal Freight Considerations

Since most cargo enters, leaves, and travels within the District either exclusively by truck, or via truck in combination with air or mail, the District's supply chains are heavily dependent on the roadway network to carry the goods and services needed by residents. The District of Columbia recognizes that a reliable multimodal freight transportation system is key to support regional supply chains. The District's planned freight transportation system improvement projects are detailed within its investment plan update in Chapter 14. In addition, DDOT is investing in efforts to expand multimodal freight infrastructure and

reduce the truck-related impacts of goods movement within the District through the following initiatives:

- DDOT has received funding to conduct a delivery microhub feasibility study and then implement a sustainable delivery mode pilot. These projects should provide insights into what infrastructure is needed to divert cargo deliveries to sustainable modes such as e-bikes or foot couriers and reduce the impacts of last-mile deliveries in the District.
- DDOT plans to invest in its District-owned dock along the Anacostia River that is in need of inspection, repair and updating to continue its current use of providing water access for large equipment and materials, including for DDOT bridge inspection, maintenance and construction projects. The District as a whole will also need to balance the needs of waterfront development with marine cargo need, as the former may encroach into berthing locations and navigation channels in the rivers. If the existing District maritime transportation system is not preserved, there could be negative environmental, safety, and cost implications of diverting these heavy materials to trucks.
- As the technology improves more freight vehicles will be able to transition to electric. In anticipation of these technological advances, the District developed a NEVI (National Electric Vehicle Infrastructure) EV Infrastructure Deployment Plan to use federal funding to install EV chargers along highways. This will not only provide important charging infrastructure for vehicles whose destination is the District, but also to those traveling through the District to other destinations to support the national network.

Freight-Efficient Land Use

DDOT also recognizes that supply chain cargo flows rely on distribution centers and loading spaces to receive, sort and deliver goods to customers reliably. While land use decisions are not directly within the jurisdiction of DDOT, the agency coordinates with the relevant agencies and governmental bodies to educate and advocate for a better understanding of freight needs and impacts within land use decisions – from the inclusion of curb cuts and the dimensions of loading docks to the rezoning of freight corridors. At the same, DDOT works to improve the operations of the land uses already designated to

support cargo flows, such as curbside commercial vehicle loading zones, with dedicated staff in charge of their programmatic needs.

Driver Workforce

While truck driver workforce recruitment, training and employment fall beyond DDOT's mandate, there are opportunities to address operational needs that may help to ease key burdens and challenges that truck and delivery drivers face, such as streamlining truck permitting and routing within the District, improving availability of curbside loading zones, and implementing congestion mitigation strategies.

1.8. E-Commerce and Related Planning Considerations

The increasing prominence of e-commerce has challenging impacts on freight infrastructure and logistics. The term "e-commerce" is defined by the US Department of Commerce as "a term that covers everything a business does online to sell to consumers, both domestically and overseas" and includes: "the sale through a website, the online advertising that leads to a sale, and the brand building that helps tie it all together as a narrative for consumers."[20] This definition is broad and includes many things such as the online ordering of food to be delivered on demand or picked up by the consumer and the online ordering of goods.

Growth of e-commerce

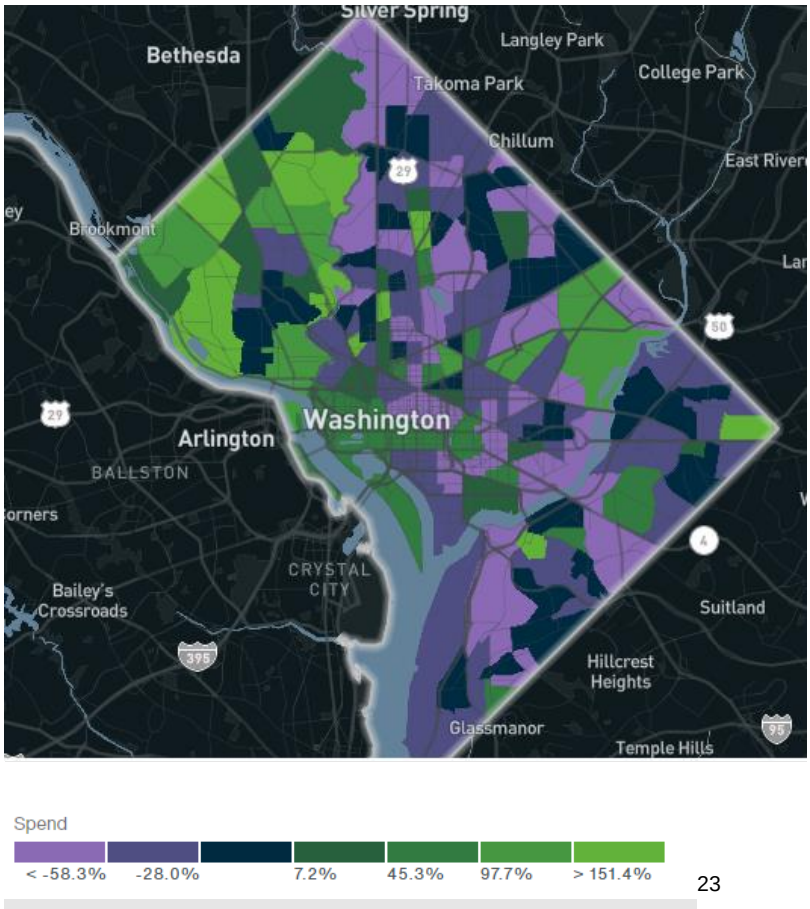
E-commerce had already been on the rise, but the COVID-19 pandemic accelerated its growth. During 2021, e-commerce sales totaled $870 billion in the United States; this represents a 50.5% increase over 2019 sales and a 14.2% increase over 2020 sales.[21] Between 2020 and 2021 food and beverage e-commerce grew 170%; this represented 9.6% of all grocery sales in 2021.[6] E-commerce sales are projected to continue to increase in the coming years; worldwide e-commerce sales growth is projected at 10.4% for 2023 and 8.2% for 2026[22] as part of a long-term growth trend extending through 2031. The growth in e-commerce sales has also increased the number of returns; returns generate

[20] https://www.trade.gov/ecommerce
[21] https://www.forbes.com/sites/jasongoldberg/2022/02/18/e-commerce-sales-grew-50-to-870-billion-during-the-pandemic/?sh=69e9246e4e83
[22] https://www.oberlo.com/statistics/global-ecommerce-sales-growth

additional commercial vehicle trips and labor. This growth of e-commerce and associated deliveries poses challenges to freight planning that will need to be considered.

The distribution of e-commerce growth, however, varies throughout the District. The map below shows the change in online retail spending from October 2021 to October 2022. While many areas have seen a large amount of growth, other areas have seen declines, especially in the southeast quadrant of the District.

Figure 20 I Change in Online Retail Spending from October 2021 to October 2022

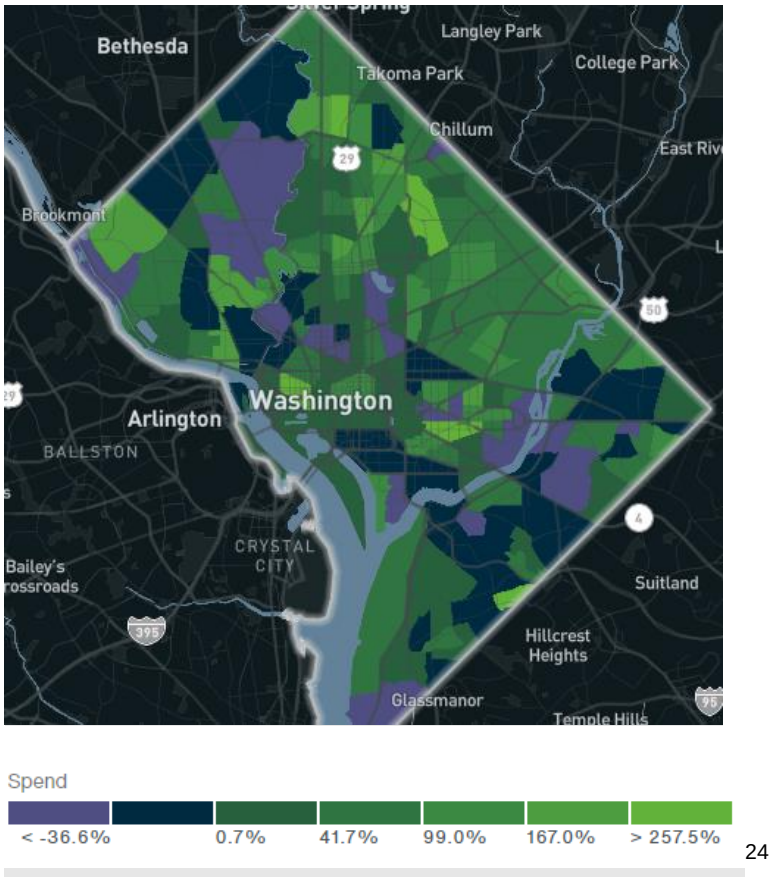


[23]

The change in online spending at restaurants and bars from October 2021 to October 2022 saw much more growth throughout all areas of the District, as shown in the map below.

[23] https://replicahq.com/

Figure 21 I Change in Online Spending at Restaurants and Bars from October 2021 to October 2022



[24]

Impacts of e-commerce

With e-commerce comes deliveries to businesses, homes, and offices. These deliveries require infrastructure such as distribution centers and curb space or loading dock access to unload goods. This poses challenges in the District for last-mile deliveries because of the limited and highly contested curb space. Space at the curb is sought after for many uses included but not limited to the following:

- Pick up and drop off from TNCs (Transportation Network Companies, Uber, Lyft, etc.)
- Micromobility (such as dockless e-scooters, e-bikes, etc.)
- Residential parking
- Metered parking

[24] https://replicahq.com/

- Transit stops
- Trash collection
- Bicycle lanes and parking
- ADA access
- Food trucks
- Streateries

When curb space is not available at a delivery location, commercial vehicles will often double park, block bike lanes, block bus lanes, etc. This causes safety hazards as road users attempt to maneuver around these vehicles. Additionally, the growth in e-commerce and delivery volumes increases traffic congestion and vehicle emissions.

Relevant Planning Considerations

The impacts of e-commerce on city infrastructure require new strategies and policies to adequately address them.

Curb Management

Curb management is important in order to provide convenient and safe access for commercial vehicles to load and unload goods that do not conflict with other users. One attempt in the District to allocate curb space for such activities are “PUDO zones” (pick-up, drop-off zones). These zones allow vehicles to briefly stop/stand at the curb in order to pick-up or drop-off on demand delivery orders or pick-up or drop-off passengers. DDOT also tries to design our roadways to accommodate for the many diverse users of the curb by making it clear where road users should not stop or load and ensure there are legal places to stop and load. Some design principles to help convey this are by protecting bike lanes, painting bus stop and lanes red, installing flexposts, etc.

DDOT is also looking to start a delivery demand management program that aims to reduce the impacts of loading. The concept of this program is inspired by transportation demand management (TDM) and will include programs of information, encouragement, and incentives to reduce the curbside impacts of loading.

Microhubs

Many of the negative impacts from current deliveries are due to the large size of current delivery vehicles and their high emissions. Smaller and more sustainable last-mile delivery modes can help to reduce these impacts; examples include deliveries by e-cargo bikes, bikes, on foot, or small electric vehicles. Often, these last-mile delivery modes work best

when supported by staging areas called “microhubs.” DDOT has received funding to conduct a delivery microhub feasibility study and then implement a sustainable delivery mode pilot. These projects should provide insights into what infrastructure is needed for sustainable delivery modes and should help to reduce the negative impacts of last-mile deliveries in the District.

1.9. Military Freight Considerations

As per IIJA, DDOT is evaluating the District’s freight network and potential needs in relationship to the military facilities and strategic defense networks in the District of Columbia to better understand and integrate military freight implications.

The following military bases or installations have been identified within the borders of the District of Columbia, with the understanding that there are additional installations within the jurisdictions of the identified districts and bases.

Figure 22 I Military Installations within the District of Columbia

Military Branch	Base/Installation	Location
Army	Fort Lesley J. McNair	317 P Street SW, Washington, DC 20024
Coast Guard	US Coast Guard Headquarters	1790 Ash Street SE, Washington, DC 20032
Navy / Air Force	Joint Base Anacostia-Bolling	20 MacDill Boulevard SE, Washington, DC 20032
Navy	Naval District	1411 Parsons Avenue, Washington DC 20003
Navy	Naval Research Laboratory	4555 Overlook Ave SW, Washington, DC 20375

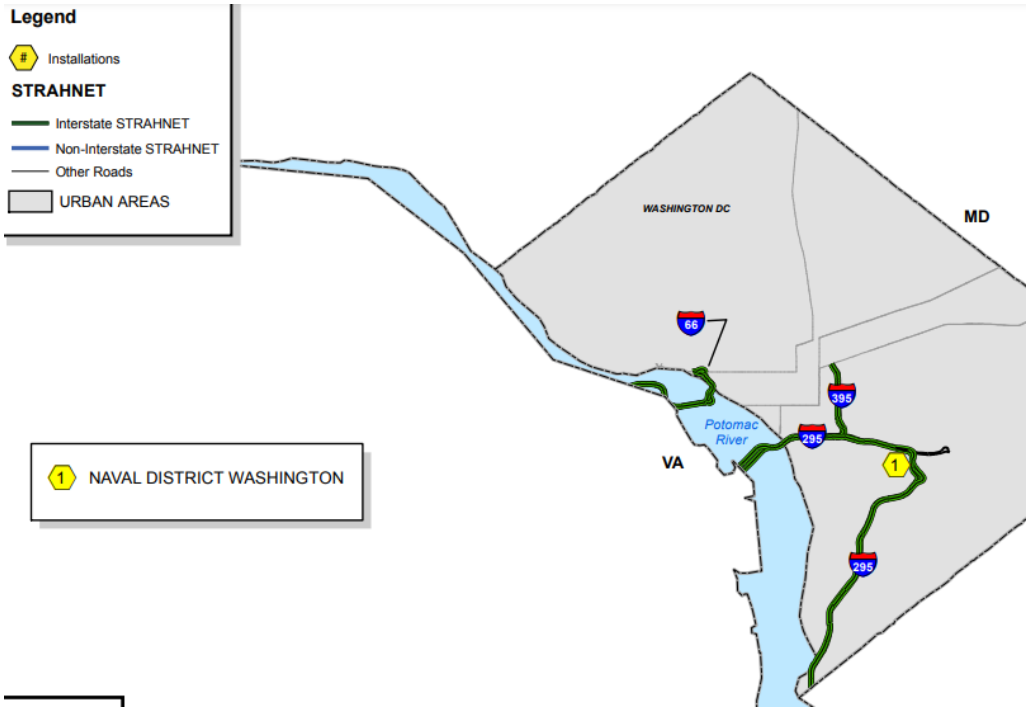
1.9.1. Strategic Defense Networks

The military’s strategic defense network includes the Strategic Highway Network (STRAHNET) and the Strategic Rail Corridor Network (STRACNET). The STRAHNET and STRACNET networks within the District of Columbia are a part of the District’s multi-modal freight network.

Strategic Highway Network (STRAHNET)

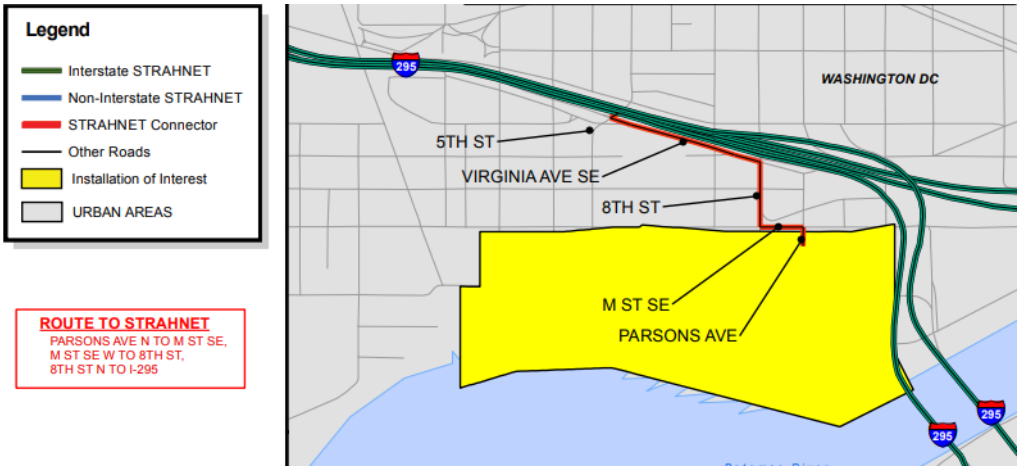
The STRAHNET is a system of public highways that are a part of the deployment of the United States armed forces. It provides defense access, continuity, and emergency capabilities for movements of personnel and equipment in both peace time and war. The STRAHNET is a subset of the National Highway System and includes STRAHNET Connectors that link military installations and ports to the STRAHNET, as illustrated by the U.S. Army Transportation Engineering Agency, below.[25]

Figure 23 I STRAHNET within the District of Columbia



25 https://www.sddc.army.mil/sites/tea/functions/specialassistant/strahnet/forms/allitems.aspx#InplviewHashc80b7ba4-4558-4209-812e-aa6daf72bd27=Paged%3DTRUE-p_SortBehavior%3D0-p_FileLeafRef%3DMontana%252epdf-p_ID%3D28-PageFirstRow%3D31

Figure 24 I STRAHNET and STRAHNET Connectors within the District of Columbia

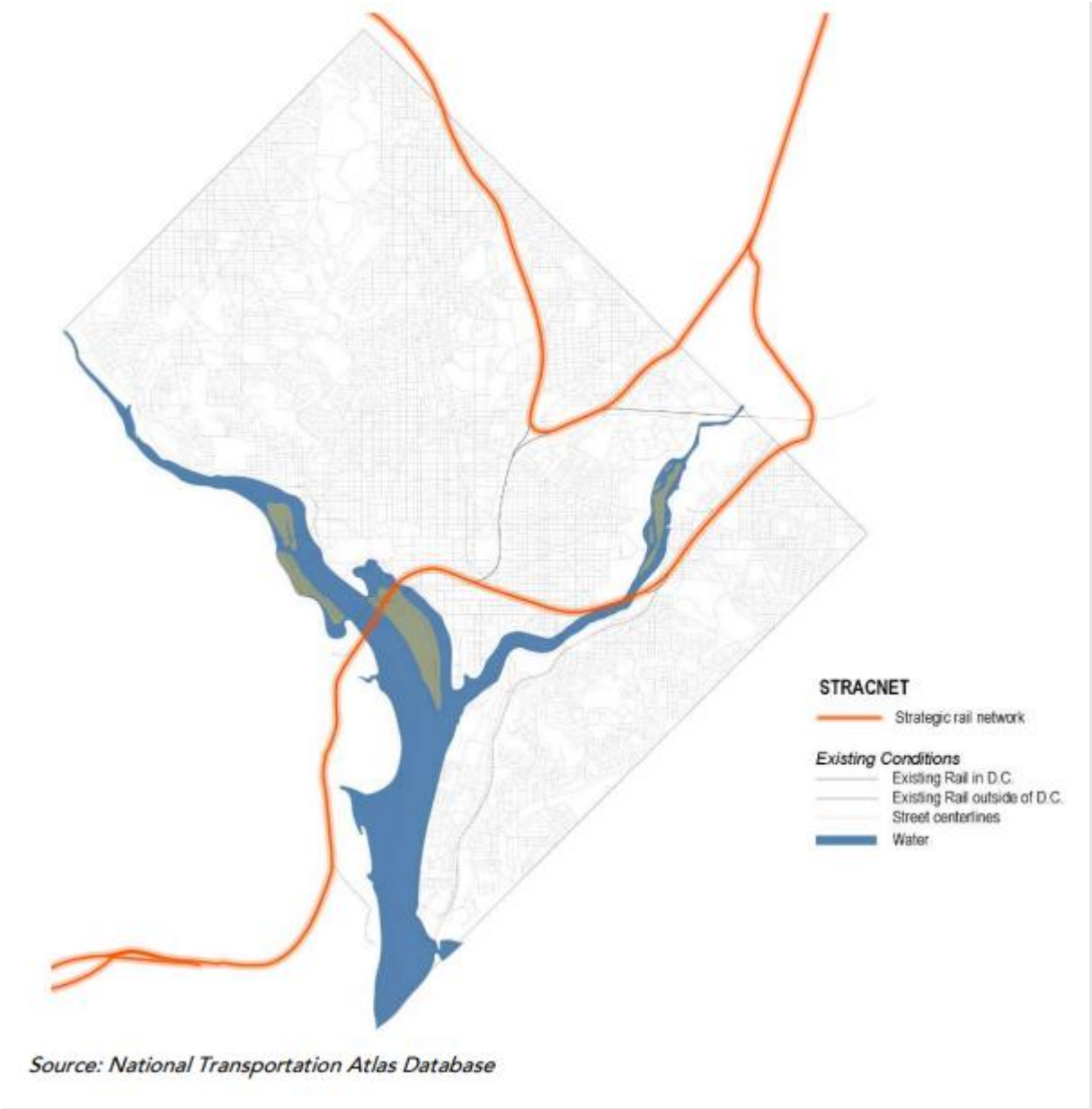


Strategic Rail Corridor Network (STRACNET)

The Strategic Rail Corridor Network (STRACNET), as defined by the U.S. Department of Defense (DoD) and the Federal Railroad Administration (FRA), provides access to essential military bases and support installations and is used for the deployment of military equipment during emergencies or natural disasters. A number of the rail lines within the District are on the STRACNET. One practical implication of being on the STRACNET is that lines must be able to accommodate railcars of the DoD clearance profile, which includes a 12-foot overall width and 16.92-foot overall height above rails. The exhibit below shows the STRACNET network, as per the District's State Rail Plan (3-42).[26]

[26] https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/DC%20SRP%20FinalReport.pdf

Figure 25 I STRACNET within the District of Columbia



1.9.2. Projects Overlapping the Strategic Defense Networks

DDOT's approved FY 2023 – FY 2028 budget includes 26 projects that overlap portions of the strategic defense networks, which range from safety, trail, and transit improvements to rehabilitation and maintenance projects, as described in the below table. In addition, the District of Columbia is wrapping up its reconstruction of several interchanges along I-295 south of the new Frederick Douglass Memorial Bridge to streamline the flow of traffic. Understanding the relationship of the strategic military networks, military facilities, and the

District of Columbia's multimodal freight network improves our ability to identify and address considerations of military freight.

Figure 26 I Projects within DDOT's FY 2023-2028 Budget Overlapping the Strategic Defense Networks

Number	Project Description
1	295 Dynamic Messaging System Replacement
2	I-695 Bridges, I-395 to I-295/DC-295
3	Rehabilitation of I-395 HOV Bridge over Potomac River
4	I-395 SB Entrance Ramp Bridge over SB Mall Tunnel Exit Ramp to WB S.W. Freeway
5	I-695 Eastbound D4 Ramp
6	Safety & Geometric Improvements of I-295 / DC-295
7	Southwest Freeway Bridge over South Capitol Street
8	Theodore Roosevelt Memorial Bridge
9	M Street SE/SW Safety and Mobility Improvements
10	Citywide Sign Structure Upgrade and Replacement
11	Guardrails and Attenuators Repair and Replacement
12	Highway Structures Preventive Maintenance and Repair
13	I-66 Ramp to Whitehurst Frwy and K Street NW Bridge over Whitehurst Freeway Ramp
14	Weigh in Motion Operations Support
15	Weigh In Motion Upgrade and Repair
16	Long Bridge Pedestrian and Bicycle Connection
17	New York Avenue Streetscape and Trail Florida Ave to Bladensburg Rd NE
18	MBT Blair Road to Piney Branch Rd NW
19	MBT First Place to Oglethorpe Street NE
20	Anacostia River Trail Neighborhood Access: Nannie Helen Burroughs Ave to Deane Ave
21	Pavement Restoration - NHPP Streets
22	295 Weigh Station Upgrade
23	I-295 Weigh Station Construction Southbound
24	I-295 Weigh Station Upgrade - Northbound
25	I-295 Northbound Weigh Station Construction

26	New York Ave over Anacostia Rehabilitation

1.9.3. Considerations of Military Freight Movements

In addition to considerations regarding specific projects overlapping strategic defense networks, there are also general considerations regarding military freight movements to take into consideration within planning efforts. Based on regional freight and travel patterns, most military freight trips would typically stay on the Beltway and bypass Washington D.C. roadways unless their destination was within the District. For those trips headed into the District, trip coordinators typically leverage existing systems to manage the impacts and needs of heavy or large loads relating to military freight movements. For instance, contractors delivering equipment for a military convention held in the District apply for permits via DDOT's oversize-overweight permit application process and follow existing guidance regarding any needed vehicle escorts. For special events, such as presidential inaugurations and Fourth of July celebrations, preparations are communicated through the Joint All Hazards Operations Center (JAHOC) housed within the DC Homeland Security and Emergency Management Agency, which connects all relevant organizations, including the Metropolitan Police Department and DDOT's Special Operations branch and traffic management center, in order to manage any operational issues arising from transporting military vehicles and cargo. These coordination procedures are in keeping with FHWA's guidance on Coordinating Military Deployments on Roads and Highways.

6. FREIGHT SYSTEM PERFORMANCE

6.0 Freight System Performance

1.10. Multistate Freight Compacts

As per the IIJA, state freight plans must now include, if applicable, consideration of the findings or recommendations made by any multi-state freight compact to which the state is a party under 49 U.S.C. §70204. These compacts are based on shared regional interests to improve goods movement across jurisdictional boundaries. Potential outcomes of such coordination may include negotiating as a group for improved access to data sources, identifying projects along a corridor that benefit multiple states, or assembling rights-of way for improvements. Multi-state freight compacts can provide advisory committees to support decision-making and prioritization efforts, serve as a broader freight discussion forum, and promote the sharing of information between private/public sectors. Coalitions that forge multi-state freight connections and contribute to planning and operations management, to which the District of Columbia is a party, include:

The Eastern Transportation Coalition (TETC) (https://tetcoalition.org/) – TETC is a partnership of 19 states and the District of Columbia focused on connecting public agencies across modes of travel to increase safety and efficiency. Formerly the I-95 Corridor Coalition, TETC has evolved to include more than 200 public agencies working together to address the pressing challenges facing the eastern corridor with a focus on TSMO, freight, and innovation. Freight-specific resources include emphases on freight data, commercial vehicle operations, truck parking, member states' federally compliant freight planning activities, the M-95 Marine Highway corridor, and involvement with the National Freight Fluidity Program. Freight-related findings and recommendations stemming from the TETC include oversize overweight permit harmonization, which DDOT is building into its work plan for future permitting updates; freight data education and validation, in which DDOT participates for future planning and budget considerations; and truck parking workshops, which DDOT attends and uses to inform its multi-state coordination efforts to address truck parking needs.

M-495 Potomac River Commuter Fast Ferry Project (https://novaregion.org/1369/Regional-Policy-Steering-Committee) – The Northern Virginia Regional Committee's Regional Policy Steering Committee for the M-495

Potomac River Commuter Fast Ferry Project is comprised of members from federal, state, and local government, including DC Council, as well as non-profits and private industry. The project has raised funds for studies, received government grants, hired and provided consultant oversight, and launched a website and Facebook page. The group also sponsored a series of three Fast Ferry Summits in DC, Maryland, and Virginia in 2017-2018, introducing more than 500 attendees to this service. In its June 2022 stakeholder meeting, however, the Steering Committee acknowledged that it has not been able to produce a freight/commodity case for this investment, which is required for a marine highway program designation. As such, the Steering Committee will let its M495 designation sunset until a freight/commodity case for the investment is developed. Irrespective of a freight case for the Fast Ferry Project, a designated DDOT representative participates in project meetings and remains an engaged stakeholder within the planning process.

1.11. Multistate Metropolitan Planning Organization Coordination

DDOT also coordinates with the National Capital Region Transportation Planning Board (TPB), the metropolitan planning organization (MPO) for the greater Washington, DC region. DDOT works in close collaboration with the TPB on a multitude of fronts, including goal setting, performance management, investment coordination, and data sharing. DDOT chairs regularly scheduled TPB Freight Subcommittee meetings, to bring together planners and transportation officials from other states and local jurisdictions to share knowledge and to collaborate on regionally significant freight transportation issues. DDOT has also taken advantage of funding opportunities based on shared climate goals, such as a recent transportation-land use coordination technical assistance grant that the freight program received to conduct a delivery microhub feasibility study in support of sustainable last-mile delivery modes.

1.12. Freight Resilience, Environmental, and Equity Considerations

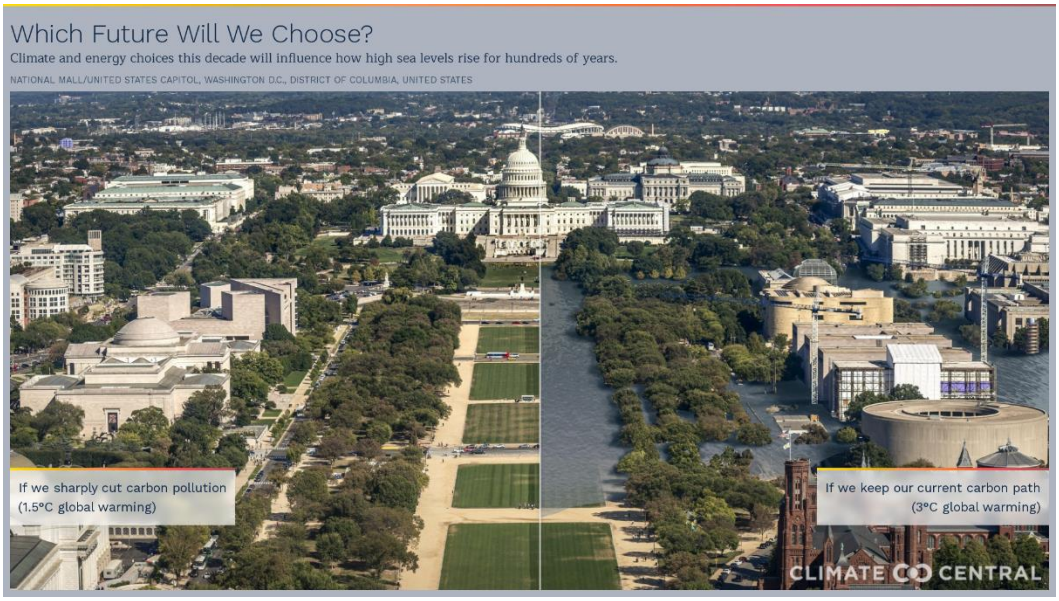
Mobility and sustainability are key goals in the District's multimodal long-range transportation plan, MoveDC. The mobility goal aims to increase system reliability and manage congestion. The sustainability goal aims to reduce emissions and strengthen resilience in the face of climate change, especially in historically underserved

neighborhoods that may experience greater impacts. The freight program works towards these goals in coordination with other divisions within DDOT as well as other District agencies.

Climate Change Impacts and Mitigation

DDOT is committed to the resilience of the freight network in the face of climate change. The Potomac and Anacostia rivers will likely contribute to flooding and other climate-change-induced scenarios.

Figure 27 I Projected Future Sea Levels at National Mall/United States Capitol in Washington D.C[27]



In order to prepare for potential impacts of climate change, the District is utilizing green infrastructure and stormwater management techniques. The green infrastructure practices used on our streets include:

- Bioretention (aka rain gardens)
- Street trees
- Landscape areas
- Permeable pavement
- Green alleys

[27] https://picturing.climatecentral.org/#search

In the District's Sustainable 2.0 plan, one goal is to implement green infrastructure practices to capture, retain, or reuse stormwater from at least 10% of the District's land area by 2032. In support of this goal, DDOT seeks opportunities to include green infrastructure whenever planning and implementing freight infrastructure, such as roadway reconstructions.

Extreme weather and natural disasters also impact freight mobility. One related strategy in moveDC is to improve the resiliency of transportation infrastructure in order to incorporate climate adaptation. One way the District is tackling this is through the DC Power Line Undergrounding (DC PLUG) initiative. This initiative is a partnership between the District and its local electrical utility, PEPCO, to move overhead wires underground and improve the resiliency of the energy grid. This will help to reduce power outages caused by severe storms. Power outages impact transportation infrastructure such as traffic signals, so this program will help to keep freight moving safely and efficiently even in the face of severe weather.

Freight Network Redundancy

To be prepared for any interruptions within our transportation network, DDOT is committed to projects that create redundancy in our network. DDOT coordinates with the Homeland Security and Emergency Management Agency (DC HSEMA) to help implement and prioritize freight network needs for continued resiliency in food and water supply chains.[28] This ensures that even during extreme weather and natural disasters, vital freight can keep moving. The following are some recent and current projects that will help to create redundancy in our network:

- Frederick Douglass Memorial Bridge and I-295 interchange reconstruction
- Long Bridge Project to create additional long-term railroad capacity across the Potomac River for freight, intercity passenger rail, and commuter rail
- Rehabilitation of New York Avenue NE over the Anacostia River

Sustainable Freight

[28] https://www.mwcog.org/file.aspx?&A=euocBqQm4rvT8I3aXQnS82aZRgzOnyq7mkPGzG4kI0M%3D

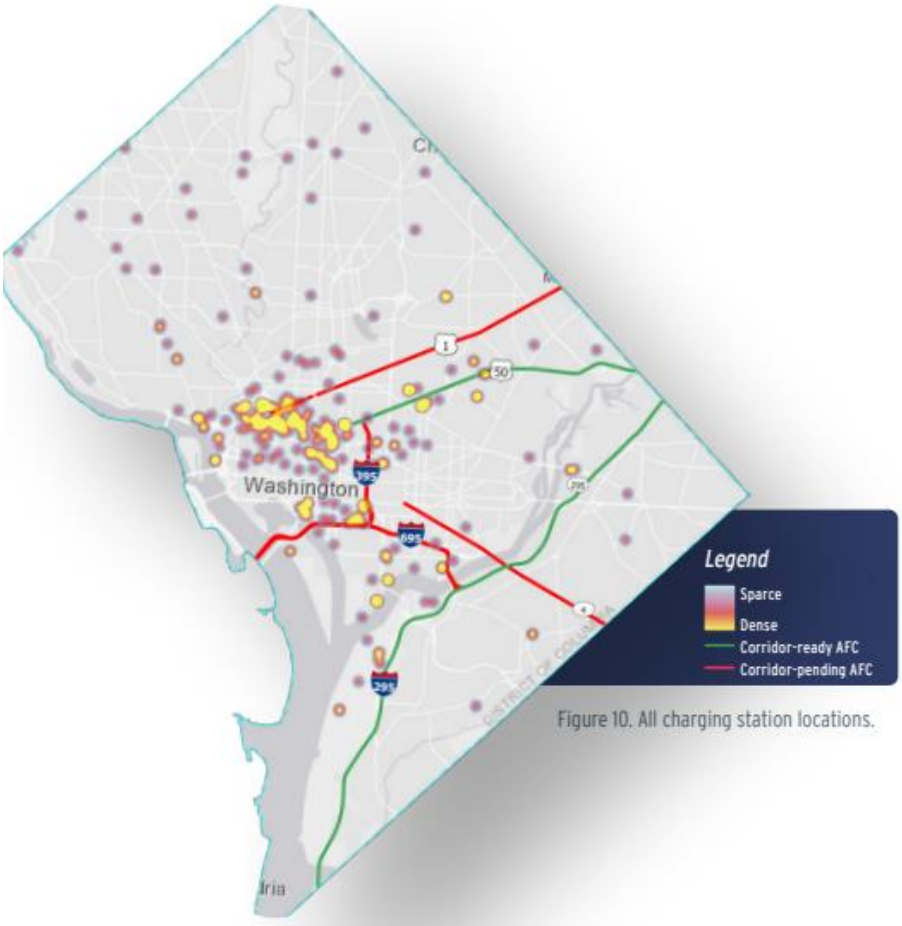
DDOT recognizes that the transportation sector is one of the largest contributors to emissions causing climate change. To address climate change and local air pollution, the District has a goal to be carbon neutral by 2050. Our latest data from 2016 showed that the District's citywide emissions totaled 7.5 million metric tons of carbon dioxide equivalent (MMtCO2e). The freight planning program is working to encourage and support sustainable freight in order to help achieve this goal in a variety of ways:

The freight program is leading a delivery microhub feasibility study that will lead into a sustainable delivery modes pilot program. This is being conducted to promote safety, efficiency, and the environmental benefits associated with low/zero emission last-mile deliveries. The pilot program will prioritize equity and focus on historically marginalized communities. A goal of this program is to improve local air quality in these communities.

Electric vehicle infrastructure plans have not been relevant to freight in the past, but as bat the technology improves, more heavy vehicles such as trucks will be able to transition to electric motors. Related to this, the District recently had its NEVI (National Electric Vehicle Infrastructure) EV Infrastructure Deployment Plan approved by the USDOT. This will provide $16,679,459 in funding to the District over the next five years to install EV chargers, with Interstates being the highest priority location. This commitment will not only provide important charging infrastructure for vehicles whose destination is the District, but also to those traveling through the District to other destinations to support the national network. The map below shows EV charging infrastructure in the District as of September 31, 2021 and the designated EV Alternative Fuel Corridors (AFCs).[29]

[29] https://nevi.ddot.dc.gov/documents/DCGIS::district-nevi-plan-2022/explore

Figure 28 I EV Charging Infrastructure



DDOT is also developing a delivery demand management program that aims to reduce the impacts of loading and related congestion (and freight-related emissions). The concept of this program is inspired by transportation demand management (TDM) and will include programs of information, encouragement, and incentives targeted to businesses to reduce the impacts of loading. This program will educate businesses on their curbside constraints and opportunities, provide information on their off-street and off-peak loading options, and create incentives for reducing curbside loading impacts.

Freight Equity

As stated in the previous section, many sustainable freight projects will prioritize equity in the formation of these projects. The NEVI plan discusses equity and is committed to charger location equity. Also considered in equity are traffic safety improvements: large commercial vehicles pose greater threats to vulnerable road users. Within the District, the

burden of traffic injuries and fatalities has fallen disproportionately within Wards 7 and 8. DDOT is committed to Vision Zero – zero traffic deaths and serious injuries by 2024 - and freight projects will accordingly prioritize safety and equity.[30]

Freight and Wildlife Habitat

While the District's wildlife habitat is limited, DDOT works to ensure that this habitat is protected. The District is home to 240 species of birds, 78 fish, 32 mammals, and 19 species of amphibians among other wildlife. While 78% of the District is developed land, it contains 289 acres of wetlands. From the Sustainable DC 2.0 Plan, the District has goals to protect, restore, and create more acres of critical aquatic habitat and critical land habitat; currently the District contains 36.25 acres of critical aquatic habitat and 350 acres of critical land habitat. Much of the wildlife habitat in the District is within National Park Service (NPS) owned land. By policy, trucks are not allowed on NPS land which limits freight impacts on wildlife habitat in these areas, and DDOT coordinates with NPS when relevant. Truck access to wildlife habitat will continue to be restricted. Additionally, DDOT follows a robust environmental review process for all projects that includes consideration of wildlife habitat.

1.13. Freight Bottleneck Inventory and Mitigations

1.13.1. Freight Bottleneck Inventory

The District Department of Transportation is identifying freight bottlenecks through an analysis of Total Delay of all roadways within the District using the CATT Lab's Vehicle Probe Data Analytics Suite. The CATT Lab's PDA Suite ranking by Total Delay comprises of the average annual raw speed drop weighted by vehicle miles traveled and the length of the resulting traffic queue along District roadways. The INRIX data used by the CATT Lab's PDA Suite is most robust along interstates and major arterials, and while this data set does not distinguish between passenger and truck vehicles, the District's dense urban environment forces trucks and passenger cars into similar travel patterns. As a result, the top 20 roadways in the District with the highest total delay in 2019, as detailed below, align with the priority freight corridors the agency has identified for construction improvements, including I-395 and the I-295/Malcolm X interchange.

[30] https://visionzero.dc.gov/

Figure 29 I The Top 20 Roadways in the District with the Highest Total Delay in 2019

Rank	Head Location	Average daily duration	Total duration	All events	Congestion	TOTAL DELAY
1	I-395 N @ 7TH ST SW	3 h 2 m	46 d 7 h 31 m	4,118	297,802	693,108,905
2	I-395 (HOV) N @ OHIO DR	5 h 27 m	83 d 26 m	441	262,654	546,491,507
3	I-395 N @ US-1	1 h 47 m	27 d 8 h 51 m	4,062	168,247	381,701,440
4	DC-295 S @ CAPITOL ST	6 h 34 m	100 d 2 h 16 m	44	266,847	304,008,506
5	US-50 W @ I-395	8 h 1 m	122 d 18 m	238	195,014	285,086,749
6	I-295 N @ I-395	2 h 59 m	45 d 12 h 38 m	202	216,250	248,539,133
7	DC-295 N @ EASTERN AVE	1 h 18 m	20 d 7 m	109	175,651	199,776,676
8	US-1-ALT E @ BLADENSBURG RD	3 h	45 d 16 h 18 m	22	131,166	191,522,972
9	I-295 S @ DC--MD STATE BORDER	1 h 2 m	15 d 21 h 57 m	158	163,772	154,914,133
10	DC-295 S @ PENNSYLVANIA AVE	1 h 23 m	21 d 5 h 52 m	68	113,380	111,138,729
11	I-395 N @ MEMORIAL BRIDGE	35 m	8 d 20 h 57 m	4,061	52,048	110,577,529
12	I-395 S @ MEMORIAL BRIDGE	57 m	14 d 16 h 34 m	128	57,311	104,544,985
13	SOUTH DAKOTA AVE NE S @ US-50/NEW YORK AVE	2 h 37 m	39 d 20 h 53 m	3	127,044	102,210,237
14	I-295 N @ CAPITOL ST	1 h 15 m	19 d 53 m	56	103,482	101,338,609
15	US-50 W @ BLADENSBURG RD	3 h 38 m	55 d 10 h 49 m	255	92,272	99,327,901
16	US-50 E @ I-66/US-50/THEODORE ROOSEVELT MEMORIAL BRIDGE	3 h 13 m	48 d 23 h 27 m	96	107,199	97,101,580
17	I-395 N @ US-50/NEW YORK AVE NW	9 h 19 m	141 d 22 h 21 m	4,191	115,230	93,900,645
18	I-295 S @ DC/MARYLAND STATE LINE	33 m	8 d 12 h 31 m	159	89,460	84,383,137
19	I-395 S @ 11TH ST/EXIT 11	37 m	9 d 9 h 58 m	128	44,777	84,007,680
20	I-66 E @ US-50/POTOMAC RIVER FWY/E STREET EXPY	1 h 23 m	21 d 4 h 24 m	1,129	83,105	83,706,188

1.14. Freight Bottleneck Mitigations

- The District had made good progress on the major construction projects already underway to improve system performance: The South Capitol Street Bridge replacement has been completed in 2022, as has the Arlington Memorial Bridge reconstruction managed through the National Park Service, and the Capitol Crossing development has been completed. DDOT is also beginning additional major construction projects to improve system capacity and associated truck travel time reliability in the long-term. These include:
- Theodore Roosevelt Bridge rehabilitation
- Construction to improve the interchange at I-295 and Benning Road, and
- Construction of HOV lanes on I-395 over the Potomac River
- H Street Bridge reconstruction

While these projects will improve system capacity and freight performance in the long term, DDOT anticipates that they will continue to have negative short-term impacts on truck travel time reliability during their construction.

DDOT developed an FHWA-approved 2022 Freight Investment Plan that includes funding for construction projects that will provide long-term freight system performance improvements, such a study of safety and geometric improvements for I-295 and DC-295 and annual maintenance for DDOT's oversize / overweight (OSOW) truck route-planner tool. Some of the following freight system improvement projects also come with short-term negative impacts on system capacity:

- Rehabilitation of Minnesota Ave Bridge over East Capitol St.
- Geometric & Safety Improvements along I-295 Study
- Paving restoration projects on National Highway Performance Program streets
- Repair and upgrades to DDOT's existing weigh station and Weigh in Motion systems

DDOT is also managing bus lane pilot projects along several major arterials in the District, including 14th St NW, M St SE/SW, Martin Luther King Boulevard SE, H St NW, Eye St NW, and 16th Street NW. DDOT is coordinating with freight stakeholders and receivers to ensure commercial access to and through these corridors. DDOT will be adjusting these pilot projects as their impacts on bus and freight reliability are studied.

In addition to truck-based goods movement, recent rail infrastructure projects have – and will – relieve regional freight rail bottlenecks in the region, such as the recent Virginia Avenue Tunnel improvements that removed a critical rail bottleneck. The Long Bridge project, which will increase rail capacity over the Potomac River, promises to reduce freight and commuter rail congestion into the city and within the region upon its completion in 2030.

1.15. Freight-Related Congestion and Mitigations

As discussed in the e-commerce section, commercial vehicles compete with many other uses for space at the curb to complete their deliveries. When curb space is not available at a delivery location, commercial vehicles will often double park and block a travel lane or bike lane, or block bus lane or bus stops, in order to make the delivery. This causes safety hazards and congestion as road users attempt to maneuver around these vehicles, or as buses block general travel lanes when their dedicated facilities are filled by unauthorized vehicles. In order to reduce curbside loading impacts on transit service and general traffic, DDOT is investing in the following strategies:

Delivery Demand Management Program: DDOT is developing a delivery demand management program that aims to reduce the impacts of loading. The concept of this program is inspired by transportation demand management (TDM) and will include programs of information, encouragement, and incentives targeted to businesses to reduce the impacts of loading. This program will educate businesses on their curbside constraints and opportunities, provide information on their off-street or off-peak loading options, and create incentives for reducing curbside loading impacts.

Commercial Vehicle Loading Zone Program: DDOT has provided designated staff to support the ongoing management of the more than 600 curbside commercial vehicle loading zones across the District that are dedicated for the exclusive use of commercial vehicles. Dedicated management of the curbside commercial vehicle loading zone program aims to provide commercial vehicles with reliable curbside space available for commercial vehicle access and loading needs. Staff assess loading zone requests, create orders to fabricate and install signs, coordinate with agency partners to provide consistent enforcement, and evaluate existing conditions to inform new policies for loading zone operations.

Oversize/Overweight Vehicle Permitting Program: DDOT is responsible for maintaining safe, efficient roadways and ensuring a state of good repair along rights of way for all forms of mobility. This includes permitting oversized and overweight (OSOW) vehicles – vehicles that exceed the by-right size and weight dimensions outlined in federal law Title 23, U.S.C Section 12. DDOT issues single haul permits for OSOW vehicles and generates mandatory routes for them to travel along to ensure that the vehicles' dimensions and load size can safely navigate local roads, tunnels, and bridges. DDOT is researching potential policies to direct especially large OSOW vehicles to travel solely during off-peak or overnight periods to reduce traffic impacts during rush hours.

Freight Corridor Signal Optimization: Because trucks have longer acceleration and deceleration times, many corridors experience increased travel times, idling, and blocked intersections. These travel conditions create inefficiencies not only to trucks but passenger vehicles as well. Optimizing signal timing is a strategy used by many jurisdictions throughout the country. DDOT has completed signal timing optimization projects along high priority freight corridors, while balancing the safety needs of pedestrians and cyclists within the District's urban context.

1.16. Consideration of Heavy Vehicle Impacts & Mitigations

While the District of Columbia does not host mining, logging, or agricultural industries, the District is host to many construction projects and special events that attract heavy vehicle traffic. These vehicles can include dump trucks and mobile cranes for construction activity, as well as large-scale military and agricultural equipment for conventions and special events.

Any operators of vehicles over the gross vehicle weight of 80,000 lbs, or exceeding axle weight configuration thresholds as determined by the FHWA's bridge formula analysis are required to apply for oversize/overweight single haul permits with mandatory routes to ensure they travel along the most appropriate routes and cause the least amount of damage to District roadways.

With the projected growth of freight shipments in terms of both value and weight, the need to ensure compliance with the District's vehicle size and weight regulations will be all the more crucial to ensure roadways and related infrastructure remain in a state of good repair.

To that end, the Metropolitan Police Department's Commercial Vehicle Safety Unit conducts truck and weight enforcement activities through a fixed weigh station on southbound I-295 near Blue Plains and the deployment of portable scales at locations throughout the District based on construction activities or other special events. While the District currently does not have a facility for a truck to off-load items if is overweight, DDOT has an active contract to develop designs for improvements to the existing southbound I-295 weigh station and has budgeted for their construction in future fiscal years. DDOT also recognizes the potential benefit of designing and constructing a corresponding weigh station for northbound I-295.

To mitigate the damaging impacts of heavy vehicles on District roadways, DDOT also develops and implements a Transportation Asset Management Plan to ensure assets are identified, prioritized based on conditions assessments, and maintained within a state of good repair.[31] When infrastructure is assessed to be in an insufficient state to support heavy vehicle traffic, such as the H Street NE bridge by Union Station, the DDOT freight program coordinates internally to install appropriate signage and communicate that information to freight stakeholders until such time as repairs are completed.

1.17. Innovative Technology and Intelligent Transportation Systems Considerations

The District has Weigh-in-Motion (WIM) systems on I-295 and New York Ave NE providing vehicle volume, weight data, and truck travel trends to the District. DDOT is investing in maintenance and upgrades to these ITS systems along SB I-295 in order to use them to identify and direct noncompliant vehicles into the existing SB I-295 roadside weigh station for in-person, manual weight inspections by enforcement officers, as per the current industry standard. (There is little precedent for using WIM systems for direct enforcement in the United States, as the high travel speeds and pavement conditions around the roadway-embedded scales have the potential to affect the accuracy of weight readings beyond enforcement-accepted tolerances.)

DDOT recognizes the importance of funding to upgrade these WIM systems so that they can be integrated within other systems to ensure commercial vehicles follow FMSCA regulations, and screen vehicles for weigh station enforcement. DDOT also recognizes the

[31] https://ddot.dc.gov/page/transportation-asset-management-plan-tamp-0-a

importance of providing funding for new portable weigh-in-motion technology to be deployed across the District on an as needed basis, and has conducted market scans to identify options most suitable to the District context, in order to support enforcement activities for vehicle size and weight outside of the existing weigh station and WIM system footprints.

DDOT is also investing in automated camera enforcement technology to enforce through-truck restrictions through its automated traffic enforcement (ATE) program, which is in the process of selecting new vendors for implementation in the coming year. This ATE technology is designed to be portable and rotate through the District at locations identified by data analysis and community needs.

Lastly, DDOT is also researching and piloting the use of automated enforcement technologies for curbside regulations, such as commercial loading zones and pick-up/ drop-off zones, to support our enforcement officers in delivering effective curbside management.

1.18. Freight Needs & Issues

Key issues confronting the freight system, both in the present and in the future, span a range of physical, economic, and climate conditions, as bulleted below and detailed in this and other specified sections of this document:.

- Competition for Space
- Truck Routes & Enforcement
- Congestion & Parking Constraints
- Constrained and/or aging infrastructure
    - Bridge Network
    - Vertical Clearances
    - Pavement Condition
    - Geometric Design
- Growing market share of e-commerce and associated deliveries (Competition for Space & e-Commerce section)
- Climate Change (Resilience, Environmental & Equity section)
- Heavy Vehicle Impacts, Mitigations & Enforcement (Heavy vehicles section)
- Intelligent Transportation Systems Technology (ITS section)

1.18.1. Competition for Space

Increasingly, freight-carrying commercial vehicles compete for limited roadway space with passenger vehicles, buses, bicycles and pedestrians. This increased competition

raises both short- and long-term concerns over transportation safety and efficiency. The District is investing heavily in expanding passenger transportation choices and establishing supporting policies, in order to grow its economy. With careful planning, engineering, and coordination with the freight community, the potential negative consequences of a passenger transportation-focused policy can be avoided. Understanding the way shippers use the transportation system and its corridors at the level of individual deliveries is an important first step towards creating a shared system that can accommodate the many freight transactions that must be completed, and that are necessary for the District's economy to function.

1.18.2. Truck Routes, Restrictions & Enforcement

The District of Columbia currently utilizes an advisory designated truck and bus route network, which encourages but does not require heavy vehicles to travel along designated routes. The District also designates bus restrictions and through-truck restrictions along residential streets, which are enforced by the Metropolitan Police Department when there is associated signage in place. Few streets in the District of Columbia are completely restricted to trucks. Except for a few locations near sensitive federal structures, a truck restriction means that the street is closed to through truck traffic, but open to trucks making local deliveries. While DDOT has designated primary truck routes and through-truck restricted roadways, residents report inconsistent compliance throughout the District.

DDOT is looking into expanding automated traffic enforcement and industry outreach as well as researching the feasibility of implementing a mandatory truck route framework as part of its current Positive Truck Route Signage Study.

1.18.3. Congestion & Parking Constraints

The Washington, DC region has one of the highest levels of traffic congestion in the nation. While trucks are not the main cause of congestion, they are a contributor. Their operating characteristics (slower to accelerate and to stop) make them less nimble in traffic. When truck operators park illegally, circulate excessively in search of parking, cause an incident, or circulate on streets where they are not permitted, they add inefficiencies (and danger) to an already-overwhelmed system.

The 2022 INRIX Traffic Scorecard[32] ranked the Washington, DC Region as the 20th worst in congestion among major metropolitan areas – behind Los Angeles, San Francisco, New York and Boston. And congestion is expected to get worse: According to the Metropolitan Washington Council of Governments' 2022

[32] https://inrix.com/scorecard/#city-ranking-list

Congestion Management Process Technical Report, the Metropolitan Washington region is expected to be home to 23% more residents and 29% more jobs by 2045, creating a demand on roadways that is expected to outpace the increase in supply, and leading to significant increase in congestion[33].

A 2012 Texas Transportation Institute study[34] estimated that truck congestion in the Washington, DC Region costs $730 million annually, based on a commodity value of $86.9 billion or about 8.4 percent of total value. This degree of congestion causes many truckers who can avoid peak hour traffic in the region to do so, while those who cannot incur increased costs of operation and increased delivery delays. These costs are passed on to the District business community (and ultimately the District residents) through increased freight charges and increased stock requirements as a buffer against delivery failures.

As shown in the following sections, congestion in the District is concentrated in the busiest commercial areas.

- Congestion and Parking Constraints
  - **Ward 1**: Ward 1 experiences some of the heaviest truck traffic within the commercial/retail corridor of U Street NW, 14th Street NW, Columbia Road, and 18th Street NW.
  - **Ward 2**: Heavy traffic congestion on I, K, L, and M Streets, as well as Connecticut Avenue, is the prominent concern for commuters and business people alike. While the congestion is not exclusively due to trucks, the double-parking and loading/unloading of truck deliveries along those corridors exacerbate already congested traffic conditions.
  - **Ward 3**: Wisconsin Avenue, Connecticut Avenue and Massachusetts Avenue are the major corridors carrying the bulk of truck traffic within the ward. Inadequate loading zone space and management along the arterials exacerbates severe traffic congestion, which induces trucks to spill over onto neighboring streets.
  - **Ward 4**: 16th Street NW, Georgia Avenue, and Military Road/Missouri Avenue experience high truck volumes.
  - **Ward 5**: More than 40 percent of trucks entering the District do so via its northeastern border with Maryland. The Maryland suburbs east of the District and the eastern part of the District are home to many warehouses and transfer points, particularly along New York Avenue and in the Landover and Lanham, Maryland areas. The industrial facilities range from

[33] MWCOG 2022 Congestion Management Process Technical Report: https://www.mwcog.org/file.aspx?D=ioxzbWHMefHpfjALW7Km9f93c7oxosp01AvVc%2fwclvo%3d&A=tE1fNwsPMzwISk6ug%2b6UeMZgnRrrgdda6gMUaGSBVH4%3d

[34] 2012 Transportation Urban Mobility Report, Texas Transportation Institute, Texas A&M Transportation Institute, Shrank, Lomax and Eisele, December, 2012

major food and beer distributors to garbage transfer stations to a major parcel delivery distribution center. Many of the area's roadways (New York Avenue, Rhode Island Avenue, Bladensburg Road, South Dakota Avenue, Florida Avenue) are major delivery routes that experience heavy truck traffic.

- **Ward 6**: Buffering the industrial activities of Ward 5 and the corporate activities of Ward 2, Ward 6 consists of both residential and commercial uses, in addition to housing Union Station and part of the U.S. Capitol complex. Within the ward, many of the retail and restaurant destinations for truck deliveries are located along H Street NE and 8th Street NE.
- **Ward 7**: Ward 7 is situated in the eastern-most section of the District, and is primarily a residential area with industrial and commercial activity restricted to streets such as Pennsylvania Avenue, Branch Avenue, Benning Road, Minnesota Avenue and East Capitol Street.
- **Ward 8**: Covering the southernmost end of the District, Ward 8 consists primarily of residences with a few institutional and commercial areas. Due to its location near the Maryland line and I-295, and due to the relative lack of commercial activity within the ward itself, most of the truck traffic in Ward 8 is through-traffic. Major roadways with truck traffic are South Capitol Street, Martin Luther King Jr. Avenue, and Alabama Avenue.

1.18.4. Bridge Network on Truck Routes

It is critical that the highway infrastructure is maintained in a state of good repair to support goods movement by truck and to maximize the freight's contribution to the District's economy. The District has 265 bridges, of which DDOT owns 232 and National Park Service owns 33. Bridges owned by private railways are not included in this analysis[35]. Trucks weighing over the allowable legal limit (80,000 lbs.) affect these bridges in several ways. Concrete decks and other bridge elements wear out with repetitive loadings by heavy vehicles. Weight restrictions on bridges along truck routes are not immediately available to the freight industry, unless the bridges are posted, which currently only applies to about five bridges within the District. (The bridge must be signed for restricted use when the design criteria for a bridge is exceeded.)

Deficient bridges conditions have a major impact on the routing and movement of over dimensional and over-weight loads. A previous 2011 DDOT Truck Safety Enforcement Study analyzed the cost impacts resulting from commercial vehicle traffic on bridges along the truck routes and found that the total bridge impacts (costs) associated with overweight trucks on the truck routes in the District is

[35] DDOT TAMP Report October 2022:
1https://ddot.dc.gov/sites/default/files/dc/sites/ddot/TAMP_Master_SlideDeck_v3.pdf

estimated to be $7 million per year.

1.18.5. Vertical Clearance Restrictions

Low clearance structures create problems for drivers of high vehicles such as trucks, forcing them to use circuitous routings to get around the barrier. And for unfamiliar drivers, these structures are a hazard; hitting them can severely damage a load, and weaken the structure itself.

There are many low-vertical clearance structures in the District, including elevated rail lines, tunnels, bridges, highway ramps, and other obstructions. Varying height restrictions along high volume routes can potentially create a hazardous conditions and it is important that the same height restriction is maintained along a truck route.

- Tunnels, bridges, and other infrastructure create constraints for larger vehicles along primary routes.
- Differing height restrictions along the same routes (for instance, the height restriction on I-395 varies between 13’ to 15’).
- Inadequate advance signage for restrictions less than 14’.
- Vertical clearance information is not available for all overhead structures.

1.18.6. Pavement Condition

Engineers design roads to accommodate projected vehicle loads but, in particular, they design for vehicle axle loads. The life of a pavement is related to the magnitude and frequency of these heavy axle loads. Pavement engineers use the concept of an equivalent single-axle load (ESAL) to measure the effects of heavy vehicles on pavements. Any truck axle configuration and weight can be converted to this common unit of measure. Adding axles to a truck can greatly reduce the impact on pavement. A conventional five-axle tractor-semitrailer operating at 80,000 pounds gross vehicle weight (GVW) is equivalent to about 2.4 ESALs. If the weight of this vehicle were increased to 90,000 pounds (a 12.5 percent increase), its ESAL value goes up to 4.1 (a 70.8 percent increase), because pavement damage increases at a geometric rate with weight increases. However, a six-axle tractor-semitrailer at 90,000 pounds has an ESAL value of only 2.0, because its weight is distributed over six axles instead of five. An added pavement benefit of the 90,000-pound six-axle truck is that fewer trips are

required to carry the same amount of payload, resulting in almost 30 percent fewer ESAL miles per payload ton-mile.

The effect of ESALs on pavements is not constant throughout the year. During the winter, when the ground is frozen, a truck carrying a given load causes much less damage to pavements than at other times of the year. During the spring, the inverse is true: pavement layers are generally in a saturated, weakened state due to partial thaw conditions and trapped water, causing greater pavement damage by the same truck.

The 2011 DDOT Truck Safety Enforcement Plan calculated the damage on the District's highways due to overweight trucks. Based on the distribution of pavement types in the District, the analysis computed an aggregate per-mile cost of truck impacts for District highways of $0.68 per mile on Interstates, $0.60 per mile on other arterials, and $1.16 for collector/local routes. The ESAL analysis identifies two-axle single-unit trucks (Class SU2) as the greatest contributor to overweight damage. Excluding buses, overweight commercial vehicles traveling in the District of Columbia are estimated to contribute approximately $10 million to pavement wear on the proposed truck route network.

Excluding bridge and pavement costs associated with buses, overweight commercial vehicles are estimated to cost the District more than $16 million per year in premature infrastructure damage (pavement and bridge).

1.18.7. Geometric Design

Design deficiencies can have significant cost implications for operators. Tight maneuvering can lead to increased travel times, increased safety hazards, and property damage. In some instances, where design deficiencies prohibit the use of the operators' traditional fleet, investment in new equipment is required. These costs directly affect the price of transporting freight, thereby impacting regional economic competitiveness.

While street segments may be rebuilt adjacent to the construction of redevelopment projects to meet today's design standards for large trucks, similar improvements cannot be made to all of the streets comprising the designated Truck Route Network. Some of the most difficult intersections for trucks to maneuver are listed below. It should be noted that these locations were identified based on stakeholder interviews and previous studies. Therefore, the list is not complete and there might be others that are not included here.

- Georgia Avenue and Missouri Avenue NW
- Edwin Street and Montana Avenue NE
- Mid-town area, K St, NW, L St, NW, I St, NW, Wisconsin Avenue, and Connecticut Avenue

- Most intersections in Georgetown and Adams Morgan
- Insufficient lane widths on traffic circles (Dupont Cir, Thomas Cir, Washington Cir, etc.)

The District's roadway system faces numerous challenges in meeting the ever growing demand of both passenger and freight highway users. Meeting these demands and managing the shared use of the system is critical to the future economic competitiveness and quality of life in the District.

7.0 FREIGHT ADVISORY COMMITTEE INPUT

7.0 Freight Advisory Committee Input

The District works with a group of stakeholders that make up the Freight Advisory Committee and incorporate the roles and expertise described in Section 11125 of the IIJA. These stakeholders include:

- Representatives of our metropolitan planning organization, environmental protection department (as applicable), air resources board (as applicable), economic development agencies, relevant agencies and jurisdictions,
- Businesses representing a range of products and services (retail, construction, parcel delivery, grocery, restaurant/bar, niche markets),
- Motor carriers that frequently travel in the District or engage with DDOT,
- Developers that actively participate in District freight dialogs, and
- Business owners and organizations impacted by a District freight plan.

DDOT engages with these stakeholders on an as needed basis to discuss transportation decisions affecting freight mobility, communicate and coordinate regional priorities, share information, and participate in the development of District freight projects and plans.

DDOT shared this update content with the freight advisory committee, held a virtual open house to provide context, and requested comments for the agency to incorporate before its

submission to FHWA, explaining that a larger, consultant-led update effort was underway. DDOT has received and incorporated comments from more than 8 freight advisory committee members within this update.

8.0 RECOMMENDATIONS, FUNDING & INVESTMENT PLAN

8.0 Recommendations, Funding, & Investment Plan

The District is seeking ways to increase the efficiency, safety, and overall condition and performance of its freight network and has developed the following list of recommendations and projects to achieve the goals of this freight plan update:

1.19. Freight Projects & Recommendations

Maintain a freight advisory committee Building off of stakeholder engagement through the freight plan update project, maintaining a standing formal freight advisory committee would benefit both the freight industry and the District by providing a structured method for information exchange. A formal standing committee, made up of a diverse group of freight stakeholders could provide regular feedback to DDOT and also serve as a pool to provide data to the District for future studies. Feedback from committee members would not preclude participation from other stakeholders but would provide a minimum level of stakeholder feedback for ongoing studies, projects, and policy considerations.

Improve curbside loading operations Explore new strategies & technology, such as progressive pricing, automatic enforcement, service vehicle vs delivery specific zones, to improve curbside operations for commercial loading.

Focus additional resources on inter-jurisdictional cooperation in rail planning to preserve and enhance rail throughput in the District of Columbia The District of Columbia is a major gateway for rail freight moving through the mid-Atlantic region but it is not a major generator or destination of rail freight. The District should be a good steward of the portion of the regional freight rail network that is within its borders, so the District

doesn't become a choke affecting many states' rail market shares. The District should also support freight and commuter rail system capacity expansion efforts, while minimizing disruptions to city streets and utilities during construction.

Provide publicly available comprehensive & up to date truck route information Develop public GIS files of posted weights, height restrictions, truck routes and restrictions, bus routes & restrictions.

Update Freight Design Guidelines Review and revise DDOT's Design and Engineering Manual to include information on the special logistical needs of commercial motor vehicles (turning radii, loading zone design, etc.). Review roadway and intersection design criteria and standards to consider modifications to enhance truck operations, especially on major truck corridors. To ensure traffic forecasts effectively guide the design of roadway improvements along major truck corridors. projects should include a specific estimate of truck traffic and identify truck operational issues for input to project design.

Invest in Freight Data Investigate and invest in freight data sources to better understand and plan for freight demand and movements in the District.

Coordinate with FMCSA, NHTSA, and Vision Zero to support road safety Expand educational efforts to advise motorists and pedestrians regarding safety issues associated with the operation of trucks on District streets. There is a need for a broad-based public understanding of the hazards associated with trucks, passenger vehicles, and pedestrians circulating in dense urban areas, and the District should take advantage of all the resources provided by the Federal Motor Carrier Safety Administration (FMCSA) and the National Highway Traffic Safety Administration (NHTSA). Public information and education campaigns are ways of increasing this understanding.

Coordinate with Bus Priority / Sustainable Transportation Projects to maintain goods movement and mitigate truck conflicts. As the District grows, its streets will need to support more and different transportation users and an increasingly broad mix of vehicular traffic. To support a mix of uses and vehicular trips, the MoveDC project assigned modal priorities for each major District corridor. Shared truck/bus lanes should be considered as one component among a much broader group of treatment and policy options that can be used to improve truck travel time, reliability, safety, and to reduce emissions in urban areas. Stakeholder consultation and involvement are essential for helping to decide whether truck/bus lanes are appropriate for a given situation. While

loading zones typically allow deliveries to be made safely without having to block the travel lane, there are some inherent competing uses of curb side space. For instance, navigating in and out of a loading zone directly into a bicycle lane presents an potential safety hazard to both the delivery person and the bicyclist.

Oversize/Overweight Routing Tool Maintenance and Enhancement The Oversize / Overweight (OSOW) vehicle routing tool generates mandatory, vetted routes for OSOW vehicles needing single-haul permits to travel within the District. The tool needs to be regularly updated to mitigate impacts of OSOW vehicles in the District. This funds updates to the tool's HERE roadway data and Hexagon routing application every five years as well as software subscriptions and IT support to fix bugs and keep the tool operational.
Update OSOW Permitting System to integrate bridge rating system, automatically issue standard OSOW permits.
Institute regulations for private escort vehicle operators to support safe traffic management of select OSOW loads.

Support Existing Weigh In Motion Systems

WIM Operations Support The District has Weigh-in-Motion (WIM) systems on I-295 and New York Ave NE providing vehicle volume and weight data. This funds calibration, data collection, QA/QC.
Weigh In Motion Upgrade and Repair The District has Weigh-in-Motion (WIM) systems on I-295 and New York Ave NE providing vehicle volume and weight data. This funds repairs and upgrades to the systems.

Invest in Truck Enforcement Equipment Currently, the District operates permanent weigh-in-motion (WIM) systems on I-295 near Blue Plains Drive SE exit and on New York Avenue near Prince George's County line. While existing WIM stations provide commercial motor vehicle volume and weight data, it is recommended that DDOT invest in additional, portable, WIM scales that can be deployed by MPD to support direct enforcement. These portable WIM scales can be moved to key entry locations on high commercial vehicle corridors based on traffic conditions and freight flows. These types of truck enforcement equipment investments are informed by an Intelligent Transportation System unit funded feasibility study.

Positive Truck Route Signage: Funds to develop a needs assessment, implementation plan, and cost proposal for positive truck route signage, which identifies truck routes. DDOT should consider implementing a comprehensive signage program that easily identifies designated truck routes, facilitates the safe and efficient movement of trucks, and minimizes illegal truck traffic especially in historically marginalized communities. The goal of this study is to understand the costs and benefits of proactively restricting trucks from all local streets instead of having community members request a restriction for certain streets/blocks, and the process by which the District would implement this policy. The intended outcome of this potential policy is to lead to a more equitable truck restriction framework across the District and lessen the truck traffic in minority communities. Potential

signage for the District would consist of two general sign types: 1) positive or guide signs for route identification and 2) prohibitive regulatory signs. Positive or guide signs direct drivers to and through the truck route network. Prohibitive signage consists of regulatory signs intended to discourage truck drivers from using restricted roads. Central to the program is a sign that is designed for easy recognition and consistency with a single standardized design, size, shape, color, and content. Any new signs should be clear in their meaning and intention and be consistent with Manuel on Uniform Traffic Control Devices (MUTCD) standards. Thoughtful placement of signs is also essential so that truckers know where to look for the information at decision points in the Truck Route Network. Designating a typical placement for the truck signs at intersections and setting a typical spacing between signs along a corridor will cultivate driver awareness and help serve as a self-enforcing mechanism to regulate truck movements.

State Freight Plan Update: This funds a federally mandated update to the State Freight Plan.
State Freight Plan Update (2026): This funds a federally mandated update to the State Freight Plan, due every four years under the IIJ Act.
State Freight Plan Update (2030): This funds a federally mandated update to the State Freight Plan, due every four years under the IIJ Act.

I-295 Weigh Station Upgrade – Northbound DDOT is seeking a consultant to design a weigh station on NB I-295 to support regular enforcement of truck violations identified by the adjacent WIM system. Upgrades to the fixed scale and weigh station along I-295 will be funded through the National Highway Freight Program, and managed through DDOT's Infrastructure Project Management Administration (IPMA).

I-295 Weigh Station Construction Southbound DDOT is seeking a consultant to construct upgrades for its weigh station on SB I-295 to support regular enforcement of truck violations identified by the adjacent WIM system. Upgrades to the fixed scale and weigh station along I-295 will be funded through the National Highway Freight Program, and managed through DDOT's Infrastructure Project Management Division (IPMD).

I-295 Northbound Weigh Station Construction DDOT is seeking a consultant to construct a weigh station on NB I-295 to support regular enforcement of truck violations identified by the adjacent WIM system. Upgrades to the fixed scale and weigh station along I-295 will be funded through the National Highway Freight Program, and managed through DDOT's Infrastructure Project Management Division (IPMD).

Highway sign design & installation Funding to address truck-related signage needs within the agency's existing highway sign structure contract.

Innovative Freight Delivery Practices – Research & Analysis: As mentioned in the 2014 state freight plan and moveDC long range transportation plan, DDOT seeks to encourage innovative practices to mitigate the impacts of freight movement in the District. Some of the emerging innovative practices to consider include: Systematic use of human-powered vehicles (often with electric assistance modes) for delivery and pick-ups, designated residential loading zones, and/or curbside delivery depots in dense commercial districts for last-mile delivery by foot or (e-)bike. DDOT seeks to hire a consultant to further

research these and potentially a few additional innovative practices to determine the feasibility and potential benefits of widespread implementation in the District.
Implement a sustainable delivery pilot program Many small retail businesses, offices, and cafés regularly receive small shipments which can be carried without the use of gas or electricity. Human-powered vehicles (often with electric assistance modes) can do a hefty share of last-mile carrying, replacing diesel trucks and making the Central Business District cleaner and more livable.

Implement Delivery Demand Management Program This program adapts the concept of transportation demand management to use outreach, education, and incentives to reduce overall traffic congestion and delays, commercial motor vehicles conflicts in bus and bike lanes, and improve delivery travel times. This program will educate businesses on their curbside constraints and opportunities, provide information on their off-street or off-peak loading options, and create incentives for reducing curbside loading impacts.

Paving Restoration – NHPP Streets The DDOT's National Highway Freight Network is in continual need of maintenance and upgrade in order to support and improve truck mobility through the District. To that end, DDOT's freight program has identified planned agency infrastructure improvement projects along this network that support truck mobility, such as paving restoration projects on National Highway Performance Program streets. This project will be funded through the National Highway Freight Program, and managed through DDOT's Asset Management Division.

Maintain & Improve DC Port There is a District-owned dock along the Anacostia River that is in need of inspection, repair and updating to continue its current use of providing water access for large equipment and materials, including for DDOT bridge inspection, maintenance and construction projects. The Dock will also require design of upgrades to enable possible future uses.

Geometric & Safety Improvements along I-295 Study The DDOT's National Highway Freight Network is in continual need of maintenance and upgrade in order to support and improve truck mobility through the District. To that end, DDOT's freight program has identified planned agency infrastructure improvement projects along this network that support truck mobility, such as the Safety and Geometric Improvements of I-295 and DC-295 Study. This corridor has been identified as a critical urban freight corridor. The project will be funded in part through the National Highway Freight Program, and managed through DDOT's Infrastructure Project Management Division (IPMD).

Rehabilitation of Minnesota Ave Bridge over East Capitol St. Funding to support infrastructure rehabilitation along a critical urban freight corridor and supporting freight mobility. The project will be funded in part through the National Highway Freight Program, and managed through DDOT's Infrastructure Project Management Division (IPMD).

1.20. Freight Funding Sources

DDOT updated its freight investment plan to comply with the Infrastructure Investment & Jobs Act, which requires an eight-year outlook on each State's freight-related investments involving National Highway Freight Program funding, and FHWA approved it on September 23, 2022.

1.20.1. Current District DOT Federal Funding Allocation

The below table lists the apportionment of the National Freight Program to the District for each Fiscal Year through 2030. The total Federal freight funds for the eight-year period is $50.67 million.

Figure 30 | District of Columbia Apportionments under the National Freight Program FY 2023-2030

Fiscal Year	NHFP Apportionment
FY 2023	$6,585,599
FY 2024	$5,753,167
FY 2025	$5,925,762
FY 2026	$6,103,535
FY 2027	$6,286,641
FY 2028	$6,475,241
FY 2029	$6,669,498
FY 2030	$6,869,583
TOTAL	**$50,669,027**

Source: DDOT and FHWA. *Before post-apportionment set asides, before penalties, and before sequestration.

1.21. Freight Investment Plan

The Infrastructure Investment and Jobs (IIJ) Act requires states and MPOs to provide an eight-year financially constrained freight-investment plan to include a list of priority projects and proposed funding within their freight plans (49 U.S. Code § 70202). The District of Columbia NHFP fund apportionment totals $50.67 million for FY 2023 through FY 2030. The following Table lists District of Columbia freight projects identified for freight formula

funds for FY2023 to FY2030. The federal and local matches are identified in Figure 24. This summary of the District's planned National Highway Freight Program funds expenditure includes the projected unused balance at the end of each fiscal year.

DDOT's approach for allocating federal freight funds is to apply the funding for federal fiscal years 2023-2030 to projects preserving and optimizing existing resources, and assessing the potential of innovative practices to mitigate freight movement impacts.

DDOT used the projects and priorities identified in the 2014 District of Columbia Freight Plan, its 2020 freight plan addendum, and the agency's moveDC long term transportation plan as the basis of this 2023 investment plan update. The projects identified for federal funds incorporate agency projects that support DDOT's long-term transportation and freight programmatic goals while being managed by partner DDOT units in order to make full use of the District's federal freight funding authority.

Figure 31 | District of Columbia Freight Investment Plan (2023-2030) Projects Funded by NHFP Funds

Project Title	FY	Ratio	Federal NHFP	Non-Federal Funding	Projected Expenditures
Oversize/Overweight Routing Tool Maintenance and Enhancement	2023	80/20	$202,482	$50,621	$253,103
	2024	80/20	$186,620	$46,655	$233,275
	2025	80/20	$186,620	$46,655	$233,275
	2026	80/20	$404,202	$101,050	$505,252
	2027	80/20	$186,620	$46,655	$233,275
	2028	80/20	$186,620	$46,655	$233,275
	2029	80/20	$186,620	$46,655	$233,275
	2030	80/20	$480,000	$120,000	$600,000
WIM Operations Support	2023	80/20	$172,000	$43,000	$215,000
	2024	80/20	$172,000	$43,000	$215,000
	2025	80/20	$172,000	$43,000	$215,000
	2026	80/20	$172,000	$43,000	$215,000
	2027	80/20	$172,000	$43,000	$215,000
	2028	80/20	$172,000	$43,000	$215,000
	2029	80/20	$172,000	$43,000	$215,000
	2030	80/20	$172,000	$43,000	$215,000
Weigh In Motion Upgrade and Repair	2023	80/20			
	2024	80/20	$2,765,747	$1,031,753	$3,797,500
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20			

	2029	80/20			
	2030	80/20			
Positive Truck Route Signage	2023	80/20			
	2024	80/20	$800,000	$200,000	$1,000,000
	2025	80/20	$1,600,000	$400,000	$2,000,000
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20			
	2030	80/20			
State Freight Plan Update	2023	80/20			
	2024	80/20			
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20			
	2030	80/20			
State Freight Plan Update (2026)	2023	80/20			
	2024	80/20			
	2025	80/20	$640,000	$160,000	$800,000
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20			
	2030	80/20			
State Freight Plan Update (2030)	2023	80/20			
	2024	80/20			
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20	$640,000	$160,000	$800,000
	2030	80/20			
I-295 Weigh Station Upgrade - Northbound	2023	80/20			
	2024	80/20	$1,041,600	$260,400	$1,302,000
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20			
	2030	80/20			
I-295 Weigh Station Construction Southbound	2023	80/20	$5,453,717	$2,141,283	$7,595,000
	2024	80/20			
	2025	80/20			
	2026	80/20			

	2027	80/20			
	2028	80/20			
	2029	80/20			
	2030	80/20			
I-295 Northbound Weigh Station Construction	2023	80/20			
	2024	80/20			
	2025	80/20			
	2026	80/20			
	2027	80/20	$9,600,000	$2,400,000	$12,000,000
	2028	80/20			
	2029	80/20			
	2030	80/20			
Highway sign design & installation	2023	80/20			
	2024	80/20			
	2025	80/20	$800,000	$200,000	$1,000,000
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20			
	2030	80/20			
Innovative Freight Delivery Practices – Research & Analysis	2023	80/20	$120,000	$30,000	$150,000
	2024	80/20	$440,000	$110,000	$550,000
	2025	80/20	$440,000	$110,000	$550,000
	2026	80/20	$440,000	$110,000	$550,000
	2027	80/20	$440,000	$110,000	$550,000
	2028	80/20	$440,000	$110,000	$550,000
	2029	80/20	$440,000	$110,000	$550,000
	2030	80/20	$440,000	$110,000	$550,000
Delivery Demand Management Program	2023	80/20	$160,000	$40,000	$200,000
	2024	80/20	$347,200	$86,800	$434,000
	2025	80/20	$347,200	$86,800	$434,000
	2026	80/20	$347,200	$86,800	$434,000
	2027	80/20	$347,200	$86,800	$434,000
	2028	80/20	$347,200	$86,800	$434,000
	2029	80/20	$347,200	$86,800	$434,000
	2030	80/20	$347,200	$86,800	$434,000
Pavement Restoration - NHPP Streets	2023	80/20			
	2024	80/20			
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20	$1,600,000	$400,000	$2,000,000
	2030	80/20	$1,600,000	$400,000	$2,000,000
	2023	80/20			
	2024	80/20			

Pavement Restoration - NHPP Streets	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20			
	2029	80/20	$800,000	$200,000	$1,000,000
	2030	80/20	$800,000	$200,000	$1,000,000
Truck Enforcement Equipment	2023	80/20	$477,400	$119,350	$596,750
	2024	80/20			
	2025	80/20			
	2026	80/20	$480,000	$120,000	$600,000
	2027	80/20			
	2028	80/20			
	2029	80/20			
	2030	80/20	$480,000	$120,000	$600,000
DC Port	2023	80/20			
	2024	80/20			
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20	$160,000	$40,000	$200,000
	2029	80/20	$1,736,000	$434,000	$2,170,000
	2030	80/20			
Safety & Geometric Improvements of I-295 / DC-295 (long term)	2023	80/20			
	2024	80/20			
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20	$2,880,000	$720,000	$3,600,000
	2029	80/20	$1,600,000	$400,000	$2,000,000
	2030	80/20			
Rehabilitation of Minnesota Ave Bridge over East Capitol St.	2023	80/20			
	2024	80/20			
	2025	80/20			
	2026	80/20			
	2027	80/20			
	2028	80/20	$2,048,480	$512,120	$2,560,600
	2029	80/20			
	2030	80/20			
Total			**$47,189,128**	**$12,915,452**	**$60,104,580**

Figure 32 | District of Columbia Freight Funding Summary

Fiscal Year	Federal NHFP Funds	Non-Federal Funds	Projected Expenditures	Annual NHFP Apportionments	Unused NHFP

					Balance at End of FY
2023	$6,585,599	$2,424,254	$9,009,853	$6,585,599	$0
2024	$5,753,167	$1,778,608	$7,531,775	$5,753,167	$0
2025	$4,185,820	$1,046,455	$5,232,275	$5,925,762	$1,739,942
2026	$1,843,402	$460,850	$2,304,252	$6,103,535	$6,000,076
2027	$10,745,820	$2,686,455	$13,432,275	$6,286,641	$1,540,897
2028	$6,234,300	$1,558,575	$7,792,875	$6,475,241	$1,781,838
2029	$7,521,820	$1,880,455	$9,402,275	$6,669,498	$929,516
2030	$4,319,200	$1,079,800	$5,399,000	$6,869,583	$3,479,898
Total	**$47,189,128**	**$12,915,452**	**$60,104,580**	**$50,669,027**	

IIJA freight funding can be used for projects on the National Highway Freight Network (NHFN). The NHFN is designed to direct federal resources toward improvement of highway or otherwise crucial portions of the national freight system. The National Highway Freight Network includes:

- Primary Highway Freight System (PHFS),
- Other Interstate Portions Not on the PHFS,
- Critical Rural Freight Corridors (CRFCs), and
- Critical Urban Freight Corridors (CUFCs).

States DOT's, in conjunction with metropolitan planning organizations are responsible for designating roadways for the Critical Urban Freight Corridors (CUFCs). The District has already designated 75 miles of CUFCs, (please refer below for information on CUFC designation in the District) and will be coordinating with the National Capitol Region Transportation Planning Board, its MPO, to designate additional miles as appropriate. The District can spend IIJA freight funds for projects on the PHFS and Critical Urban Freight Corridors.

9. FREIGHT PLAN IMPLEMENTATION & PERFORMANCE MEASURES

9.0 Freight Plan Implementation & Performance Measures

This section summarizes identified recommendations for performance measures that will advance national and state/local freight and transportation goals.

The Infrastructure Investments and Jobs Act (IIJA) maintained national freight policy, which includes seven goals oriented “to improve the condition and performance of the national freight network to ensure that the national freight network provides the foundation for the United States to compete in the global economy.” These goals served as a guide for DDOT’s development of the following performance measures.

For state freight plans, U.S. DOT recommends that measures of conditions and performance reflect the State’s freight transportation goals—for each goal, there would be at least one measure that indicates how well the freight transportation system is achieving that goal. Regarding the performance of the freight system specifically, the relevant federal rule requires states to set targets for freight performance measures and use these targets to measure progress.

Performance measures are tools used to determine if the desired outcomes are being achieved over a specified period. They are an important element of plans that assist in tracking the plan’s progress towards reaching its goals and objectives. The District’s long-range transportation plan, moveDC, ties freight-related strategies and their related performance metrics to many of moveDC’s seven goals: Safety, Equity, Mobility, Project Delivery, Management and Operations, Sustainability, and Enjoyable Spaces. Below is an excerpt from moveDC showing a freight-related strategy with performance metrics.

Figure 29 | A Freight-Related Strategy in the District's 2022 moveDC Long Range Transportation Plan

1.22. National Freight Planning Goals

A State Freight Plan must include a description of how the plan will improve the ability of the State to meet the national multimodal freight policy goals as described in section 70101(b) of title 49 and the national highway freight program goals established under section 167 of title 23, which are:

(1) Identify infrastructure improvements, policies, and operational innovations that strengthen the contribution of the National Multimodal Freight Network to the economic competitiveness of the United States, reduce congestion and eliminate bottlenecks on the National Multimodal Freight Network, and increase productivity, particularly for domestic industries and businesses that create high-value jobs;

(2) To improve the safety, security, efficiency, and resiliency of multimodal freight transportation;

(3) Achieve and maintain a state of good repair of the national multimodal freight network;

(4) Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network;

(5) Improve the economic efficiency and productivity of the National Multimodal Freight Network;

(6) Improve the reliability of freight transportation;

(7) Improve the short- and long-distance movement of goods that travel across rural areas between population centers, travel between rural areas and population centers, and travel from the Nation's ports, airports, and gateways to the National Multimodal Freight Network;

(8) Improve the flexibility of States to support multi-State corridor planning and the creation of multi-State organizations to increase the ability of States to address multimodal freight connectivity;

(9) Reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network; and

(10) Pursue the goals described in this subsection in a manner that is not burdensome to State and local governments.

With regard to the performance of the freight system specifically, the relevant federal rule requires states to set targets for freight performance measures and use these targets against which they can measure progress. Two primary measures for gauging freight performance are required: (1) percent of interstate system uncongested and (2) percent of interstate system providing for reliable travel times.

Figure 33 | Alignment of National Goal Areas and National Performance Management Measures

National Goal Area	Relevant National Performance Measure
Safety	▪ Number and rate of traffic fatalities ▪ Number and rate of serious injuries ▪ Number of non-motorized fatalities and non-motorized serious injuries
Infrastructure Condition	▪ Percentage of National Highway System bridges classified in good condition ▪ Percentage of National Highway System bridges classified in poor condition ▪ Percentage of interstate pavements in good condition ▪ Percentage of interstate pavements in poor condition ▪ Percentage of non-interstate National Highway System pavements in good condition

National Goal Area	Relevant National Performance Measure
	▪ Percentage of non-interstate pavements in poor condition
Environmental Sustainability	Air quality criteria emission levels in areas that have not met standards: Volatile Organic Compounds, Nitrous Oxides, Carbon Monoxide, and particulate matter (PM_{10}/$PM_{2.5}$)[36]
System Reliability	Annual hours of peak hour excessive delay per person[37]
Freight Movement and Economic Vitality	Truck Travel Time Reliability on the Interstate System[38]

1.23. Recommended DDOT Performance Measures

This section recommends performance measures for each of the six goals in this District Freight Plan Update, and links them to national goals and those within the 2022 *moveDC* long-range transportation plan. By linking the District's documents through common goals, the District will outline a clear path toward performance management to monitor, sustain and improve the condition and performance of the District's transportation system.

1.23.1. Sustainability Goal

The freight-applicable metric under this goal is to reduce air and water quality impacts of transportation through reducing freight congestion. Eliminating and reducing congestion caused by freight bottlenecks improves mobility for all system users and in turn will make it

[36] Greenhouse gas emissions measure had not been determined at the time of this writing
[37] For areas over 1 million population by 2018 and 200,000 population, in 2022 and beyond
[38] For areas over 1 million population by 2018 and 200,000 population, in 2022 and beyond

more efficient for the movement of goods. The proposed Sustainability Performance Measures are shown in the below table.

Figure 34 | Sustainability Performance Measures

National Goal(s)	DDOT Goal	Metric
Goal 9: Reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network	Sustainability	Reduce congestion caused by freight bottlenecks Reduce GHG emissions from the transportation sector Reduce vehicle miles traveled (VMT) Add DCFCs (direct current fast charging) to the AFCs (alternative fuel corridors)

Performance Measures	Data Source	Timeframe
Interstate congestion as measured by the Truck Time Reliability Index	DDOT	Annually
GHG emissions from the transportation sector	DOEE	Annually
Percentage of Alternative Fuel Corridors (AFCs) with DCFCs (direct current fast charging)	DDOT	Annually

1.23.2. Mobility Goal

The freight applicable metrics under this goal are to improve system reliability, accommodate the movement and management of freight and goods, and integrate the District's transportation system with the region's transportation network. Moving people and goods efficiently, affordably and reliably is vital to the District's economic competitiveness and quality of life. Measures to meet moveDC's Mobility goal are provided in the below table.

Figure 35 | Mobility Performance Measures

National Goal(s)	DDOT Goal	Metric

Goal 2: Improve the safety, security, efficiency, and resiliency of multimodal freight transportation **Goal 4:** Use innovation and advanced technology to improve the safety, efficiency, and reliability of the national multimodal freight network	Mobility	Improve System Reliability, Create infrastructure and policies that enhance the movement of goods and improve efficiency
Goal 5: Improve the economic efficiency and productivity of the national multimodal freight network	Mobility	Accommodate the movement and management of freight and goods. Explore new freight strategies including delivery microhubs and delivery demand management techniques.
Goal 9: Reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network Goal 6: Improve the reliability of freight transportation	Mobility	Integrate the District's transportation system with the region's transportation network, Maintain freight access within planning of dedicated transit and bike facilities. Balance residential character of local streets with truck access for home deliveries.

Performance Measures	Data Source	Timeframe
Number of vehicle permits issued with appropriately auto-generated routing and manual engineering assessment, as needed	DDOT	Annually
Number of functioning static weigh station and weigh in motion (WIM) systems	DDOT	Annually
Percent of primary freight route pavement in good condition	DDOT	Annually
Number of tickets issued for unauthorized vehicles in loading zones	DDOT	Annually
Number of tickets issued to vehicles in violation of through-truck restrictions	DDOT	Annually
Number of tickets issued to commercial vehicles for double-parking	DDOT	Annually

Number of street redesign and reconstruction projects utilizing freight considerations checklist	DDOT	Annually
Number of feeders on schedule for undergrounding per the biennial plan	DDOT	Biannually

1.23.3. Safety Goal

The District's goals are to improve safety for all users and preserve key functions without impacting the transportation system. Roadway safety is critically important and affected by several factors including driver behavior, enforcement, education, infrastructure conditions, and technology innovations. In addition, the District of Columbia also published its Vision Plan Update in 2022, which seeks to achieve zero traffic deaths by 2024. With Mayor Bowser's commitment, the District will implement safety improvements on fifteen of the most dangerous corridors, reducing conflicts at fifteen high-crash intersections, expand its school crossing guard program. In addition, DDOT has lowered speed limits from 30 MPH to 25 MPH on key DC corridors to further Vision Zero goals. DDOT has changed the speed limit to 25 MPH on Connecticut Avenue NW and New York Avenue NE. Future locations for speed limit reductions will include North Capitol Street/Blair Road NW from Harewood Road NE/NW to Van Buren Street NW, and Wheeler Road SE from Wahler Place SE to Southern Avenue SE. The Performance Measures aimed to meet the District's goals are shown below.[39]

Figure 36 | Safety Performance Measures

National Goal(s)	DDOT Goal	Metric
Goal 4: Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network	Safety	Improve safety for all users
Performance Measures	**Data Source**	**Timeframe**
Number of crashes involving trucks	DDOT	Annually

[39] ddot.dc.gov/page/vision-zero-initiative

Number of fatalities in crashes involving trucks	DDOT	Annually
Number of serious injuries in crashes involving trucks	DDOT	Annually

1.23.4. Security Goal

The District, as the seat of power for the United States, has special security requirements. These security needs are taken into consideration through established planning processes and careful coordination with the many agencies responsible for security and preparedness in the region. The development of this freight plan update included coordination with District security agencies, including the Metropolitan Police Department (MPD) and the District's Homeland Security and Emergency Management Agency (DC HSEMA). DDOT has an ongoing partnership with MPD and DC HSEMA, who implement the security protocols to assess and manage potentially hazardous freight movement across all modes while ensuring reliable goods movement for District businesses and residents. The proposed Security Performance Measure is shown in the table below.

Figure 37 | Security Performance Measures

National Goal(s)	DDOT Goal	Metric
Goal 2: Improve the safety, security, efficiency, and resiliency of multimodal freight transportation	Security	Secure movement of goods. Consistent data sharing with public security agencies.

Performance Measures	Data Source	Timeframe
Number of hazardous material incidents involving truck, water, or rail	DDOT	Annually

1.23.5. Management & Operations Goal

Infrastructure is aging across the nation and adds to the budgetary challenges to funding decisions. There is a need for investing in maintenance and operations to ensure that the primary freight routes and transportation system can achieve a state of good repair. The proposed Preservation Freight Performance Measures are shown in the below table.

Figure 38 | Management and Operations Performance Measures

National Goal(s)	DDOT Goal	Metric
Goal 3: Achieve and maintain a state of good repair on the National Multimodal Freight Network	Management & Operations	Maximize reliability for all District transportation infrastructure by investing in maintenance and asset management
Goal 5: Improve the economic efficiency and productivity of the national multimodal freight network	Management & Operations	Provide reliable available curb space for deliveries by good management of the loading zone program.
Performance Measures	**Data Source**	**Timeframe**
Percent of bridges on primary freight routes in fair or better condition	DDOT	Annual
Percent of primary freight route pavement in good condition	DDOT	Annual
Number of emerging technology pilots implemented	DDOT	Annual
Number of operational loading zone spaces	DDOT	Annually
Timeframe to install or relocate loading zones by request	DDOT	Annually

1.23.0. Equity Goal

DDOT recognizes that there are inequities in transportation policy, planning, and project delivery in Washington, D.C. Deep-rooted structural injustices and inequities have contributed to the disparate access to safe, affordable, and efficient transportation that provides access to economic opportunities, housing, and services for communities across the District. DDOT acknowledges these inequities have disproportionately and negatively impacted environmental and health outcomes in our under-resourced communities. There

is a need to identify and address environmental justice and equity considerations arising from freight movements within transportation investments and decision-making. The proposed Equity metrics and Performance Measures are shown below.

Figure 39 | Equity Performance Measures

National Goal(s)	DDOT Goal	Metric
Goal 9: Reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network	Equity	Reduce negative freight impacts in communities of greatest need; Seek to listen, learn, and address historical inequities arising from freight movements

Performance Measures	Data Source	Timeframe
Number of projects assessed for equity	DDOT	Annual

1.23.1. Performance Measures Summary

The necessary data for the measures will come almost exclusively from DDOT sources with one identified measure coming from the National Performance Measure Research Data Set (NPMRDS). The timeframe for data analysis will be both annually and quarterly depending upon current collection frequency and need for analysis and timely corrective actions (for example a spike in crashes on certain roadways that would benefit from increased enforcement or improved signage).

Figure 40 | Performance Measures Summary

Performance Measure Category	Number of Potential Measures
Sustainability	3
Mobility	8
Safety	3
Security	1
Management & Operations	5
Equity	1