

**THE DISTRICT’S DRAFT SPENDING PLAN
FOR VOLKSWAGEN SETTLEMENT FUNDS
(DRAFT BENEFICIARY MITIGATION PLAN)**

1. Introduction

The District of Columbia (District) will receive \$8.125 million as a result of the civil enforcement case, *Volkswagen “Clean Diesel” Marketing, Sales, Practices, and Products Liability Litigation*. The settlement stems from Volkswagen’s (VW) use of a defeat device in its diesel vehicles, which allowed the vehicles to emit much higher levels of oxides of nitrogen (NO_x) than allowed by the U.S. Environmental Protection Agency (EPA). The settlement funds are primarily intended to reduce NO_x emissions from diesel vehicles.

To use the VW settlement funds, the District must develop a mitigation plan that describes how the District intends to use its allotted funds to offset the air quality impacts, primarily NO_x pollution, that occurred due to the defeat devices on VW vehicles. Mayor Bowser selected the District’s Department of Energy and Environment (DOEE) to serve as the lead agency to coordinate the use of the District’s VW settlement funds. DOEE is asking for public input on the District’s Draft Spending Plan for Volkswagen Settlement Funds (“Draft Spending Plan” or “Draft Beneficiary Mitigation Plan” or “Draft”) and will consider the feedback in developing the final plan.

DOEE is soliciting input on this Draft from all interested parties. This document does not constitute a Request for Proposal (RFP) or Request for Application (RFA), or a promise to issue a RFP or RFA in the future. DOEE will not pay for any information or administrative costs incurred in response to this Draft; all costs associated with responding to this Draft will be solely at the interested party’s expense. Not responding to this Draft does not preclude participation in any future RFP or RFA.

A person may obtain a copy of this Draft Spending Plan by any of the following means:

- **Download** from DOEE’s website: <https://doee.dc.gov/page/volkswagen-settlement>.
- **Email** a request to alexandra.catena@dc.gov with “RE: Draft Spending Plan” in the subject line.
- **Pick up a copy in person** from DOEE’s reception desk, located at 1200 First Street NE, 5th Floor, Washington, DC 20002.

Public Information Open House: Wednesday, February 21, from 5:30 to 7:30 p.m., at 4058 Minnesota Ave NE (Department of Employment Services Community Room #1), conveniently located next to the Minnesota Avenue Metro station on the Orange Line. The public can submit comments and provide input during the Open House.

The deadline for public comments is Monday, March 12, 2018 at 5:00 p.m. Input should be submitted via e-mail (preferred) or mail to the address below. Mail should be postmarked by **March 12, 2018.**

Email: alexandra.catena@dc.gov

Written Correspondence:

Department of Energy and Environment
Attn: Alexandra Catena, Environmental Protection Specialist
Air Quality Division
1200 First Street NE, Fifth Floor
Washington, DC 20002

Comments received will be considered when developing the final Spending Plan. All comments received are considered public documents. DOEE expects to release the final Spending Plan for the District in Spring 2018. After the final Spending Plan is released, DOEE will conduct public outreach about the opportunity to apply for funds and the process for doing so.

2. Background

Air Pollution Emissions in the District

The principal air pollutants of concern in the District are NO_x, fine particles (PM_{2.5}), ozone, greenhouse gases (GHG), and air toxics. Although the VW Settlement is primarily focused on reducing NO_x emissions, the District has also decided to consider reduction of PM_{2.5}, GHGs, and air toxics in developing this spending plan. Air pollutants contribute to a variety of health ailments and threats to the environment, described in more detail below.¹

Air pollutants in the District originate from a variety of sources. The total inventory of emissions of an air pollutant is typically subdivided into four types of sources: area, off-road vehicles, on-road vehicles, and point. Area sources include small, disperse sources such as small boilers and

¹ All data in this section other than the GHG data is sourced from EPA's National Emissions Inventory database. GHG data is sourced from DOEE forthcoming publication.

emergency generators. Off-road sources use both gasoline and diesel and include construction and lawn/garden equipment, portable generators, locomotives and marine engines. On-road sources use both gasoline and diesel, and include any highway vehicles. Stationary industrial sources, also known as point sources, are larger sources that emit pollution from a single location, such as industrial facilities and power plants.

Past research has shown higher levels of some air pollutants near heavily traveled roads and highways, leading to higher levels of lung and heart diseases, particularly in children and adolescents.² Tailpipe standards have become more strict and the levels of air pollutants from vehicles are decreasing. The near-road monitor in the District shows levels of nitrogen dioxide, PM2.5, and carbon monoxide only slightly above the levels at other District monitors (air toxics are not measured at the near-road site).

NOx: One component of NOx is nitrogen dioxide (NO₂). Breathing air with high levels of NO₂ can irritate airways. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, and difficulty breathing). Longer exposures to high levels of NO₂ may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. NOx emissions also lead to higher ozone levels. Breathing ozone can trigger chest pain, coughing, throat irritation, and airway inflammation. It also can reduce lung function and harm lung tissue. Ozone can worsen bronchitis, emphysema, and asthma.

The total amount of NOx emitted in the District in 2014, the most recent year for which comprehensive data is available, was 8,606 tons. On-road and off-road vehicles together were the largest source of NOx emissions in the District, emitting 6,518 tons or 76 percent of total NOx emissions in 2014.

NOx emissions from diesel vehicles totaled 3,909 tons, which accounted for 60 percent of the NOx emissions from all vehicles. Gasoline vehicles accounted for the remaining 2,609 tons of vehicle NOx emissions in 2014. Figure 1 represents the distribution of NOx emissions between different types of **diesel** vehicles in 2014.

² See Appendix 3 for District of Columbia traffic volume map.

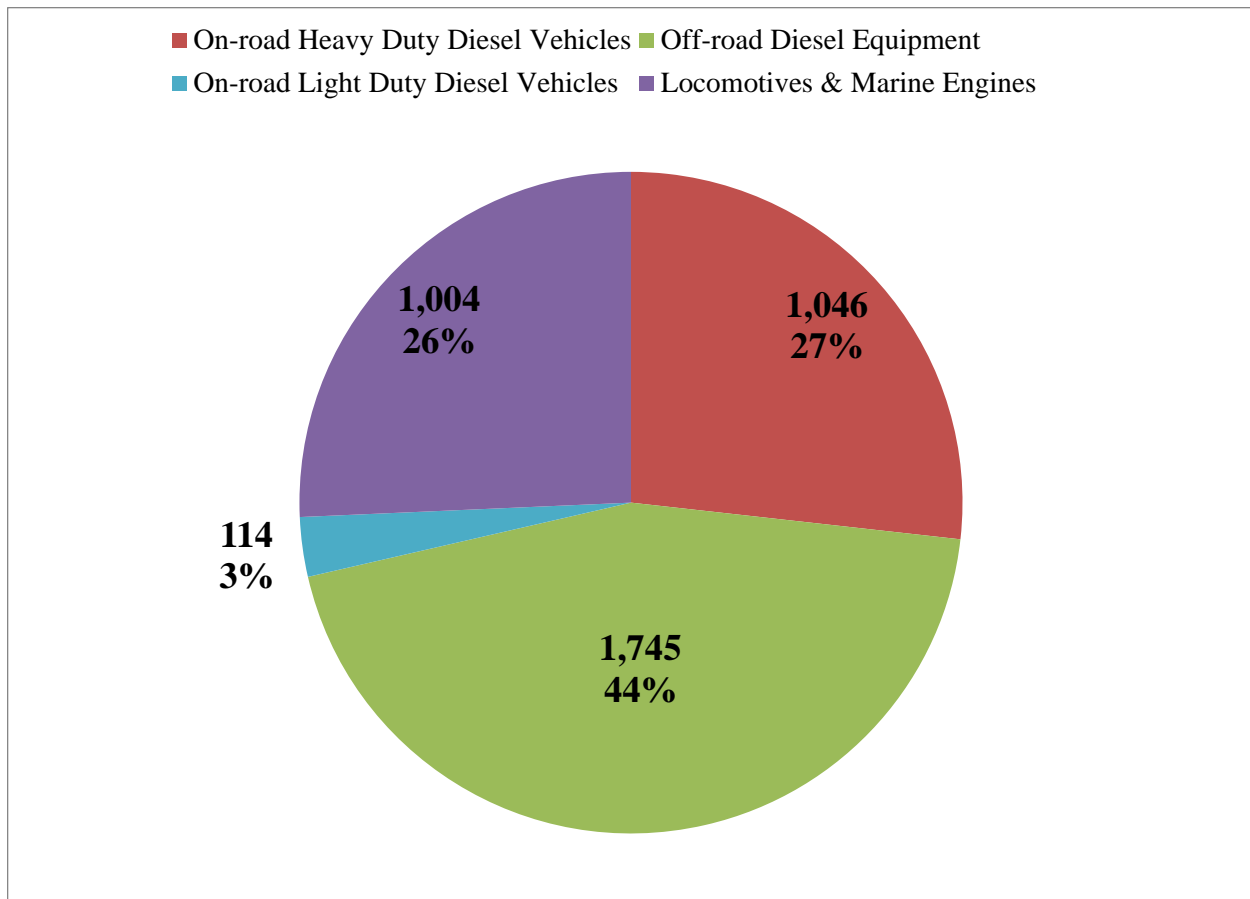


Figure 1: 2014 NOx Emissions from Diesel Vehicles in the District in tons (Total: 3,909 tons/year)

PM2.5: Particulate matter is solid and liquid particles suspended in air, such as dust, soot, pollen, and smoke; it results from both human activity and naturally. The smaller the particle (PM2.5), the more dangerous it is for human health, as it can travel deep into the respiratory system and bloodstream. Repeated inhalation of these particles can lead to serious lung and heart health problems. PM2.5 is primarily emitted from on-road and off-road vehicles. Diesel exhaust is mostly composed of particulate matter.

In 2014, emissions of PM2.5 from all sources in the District totaled 1,219 tons. Of that, emissions from all types of on-road and off-road vehicles was 322 tons. Diesel vehicles (on-road and off-road) accounted for 214 tons of PM2.5 emissions, with gasoline and other alternatively fueled vehicles accounting for the remaining 115 tons.

GHGs: Gases that trap heat in the atmosphere are called greenhouse gases (GHGs) and include carbon dioxide, methane, nitrous oxide (N2O), and fluorinated gases. GHGs contribute to climate change, which is predicted to cause extreme heat waves, rising sea levels, changes in

precipitation resulting in flooding and droughts, intense hurricanes, and degraded air quality, all of which can directly and indirectly affect the physical, social, and psychological health of humans. The District is doing its best to reduce the impact of global warming. Note that N₂O is also one of the compounds that make up NO_x.

The latest GHG emission inventory from 2015 estimated a total of 8,844,152 tons of GHG emissions in the District. Diesel vehicle (on-road and off-road) emissions accounted for 126,085 tons or 1.4 percent of the total of GHG emissions in the District.

Air Toxics: Air toxics, also known as toxic air pollutants or hazardous air pollutants (HAPs), are those pollutants that cause or may cause cancer and other serious health effects, such as reproductive effects or birth defects. The Clean Air Act identifies 187 HAPs that EPA and states are required to control to protect public health. Although the District does not have high levels of air toxics, they are emitted from diesel engines. In 2014, diesel vehicles accounted for 117 tons out of the total 815 tons (14 percent) of HAPs emissions in the District.

Vulnerable Communities and Asthma Rates in the District

The VW settlement requires each beneficiary, including the District, to describe how our proposed projects will benefit areas of the city that bear a disproportionate share of the air pollution burden. To identify the areas of the city that are the most vulnerable and impacted by air pollution, we have looked at asthma rates in the District and disadvantaged neighborhoods as defined by income levels.

Asthma Rates in the District:

The current citywide rate of asthma among adults is 11.5%.³ Asthma rates in the District reflect national trends,⁴ with African-American adults, adults with lower incomes, and adults who didn't finish high school disproportionately impacted by asthma. African-American adults in the District had twice the rate of asthma (15.4%) than Caucasian adults (7.6%). Asthma was also more prevalent among District adults with annual incomes below \$15,000 (25.7%) and among those with less than a high school education (20.9%).⁵

³ Government of the District of Columbia Department of Health (DOH), *Behavioral Risk Factor Surveillance System (BRFSS) Annual Health Report, 2014*, District of Columbia: DOH, 39, <https://doh.dc.gov/node/1190347> (accessed November 20, 2017).

⁴ U.S. Department of Health and Human Services (HHS), Centers for Disease Control and Prevention (CDC). *Asthma Facts—CDC's National Asthma Control Program Grantees*. Atlanta, GA: HHS, CDC, 2013, https://www.cdc.gov/asthma/pdfs/asthma_facts_program_grantees.pdf (accessed November 20, 2017).

⁵ Government of the District of Columbia Department of Health, *Behavioral Risk Factor Surveillance System (BRFSS) Annual Health Report, 2014*, 39.

Geographic disparities in asthma prevalence are also evident in the District. Current asthma rates among District adults are highest in Ward 7 (17.6%) and Ward 8 (16.9%), followed by Ward 5 (14%) (Figure 2).

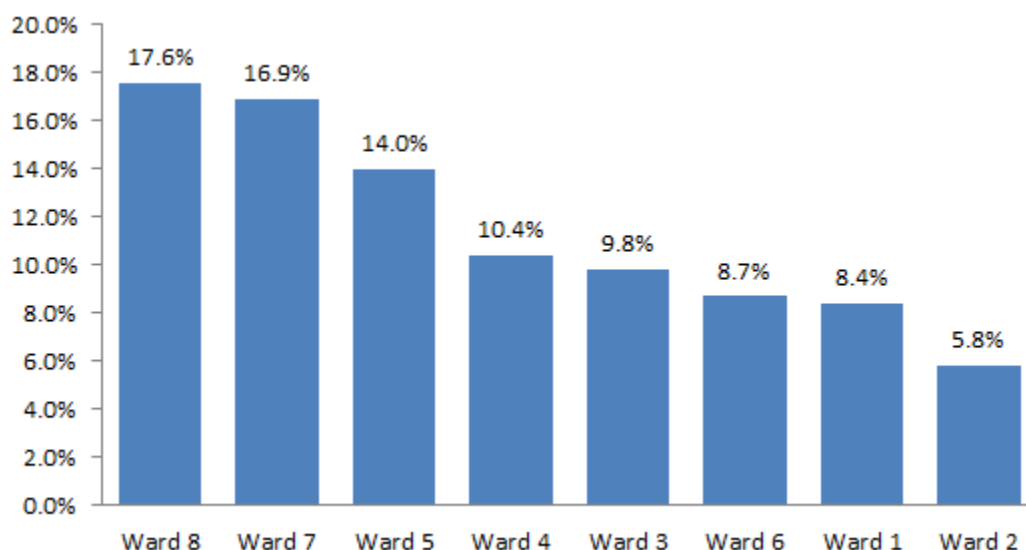


Figure 2: Current Asthma Rate Among District Adults, Ranked by Ward, BRFSS, 2014⁶

Current asthma rates are higher among children in the District than among children nationwide. An estimated 15.5% of District children 0–17 years of age currently have asthma, compared with 8.8% of children in the same age range nationwide.⁷ Similarly, while 22.8% of high school students nationwide have ever been told by a doctor or nurse that they had asthma, District students in middle and high school have a lifetime prevalence of asthma of 25.9% and 30.8%, respectively.⁸

A higher burden of asthma is also borne by youth of color in the District. African-American students in the District’s middle and high schools have much higher lifetime asthma rates (at 28.8% and 32.6%, respectively) than their Caucasian counterparts (at 14.0% and 19.0%,

⁶ Ibid.

⁷ National Survey of Children's Health. NSCH 2011/12. Data query from the Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health website. Retrieved November 20, 2017 from <http://www.childhealthdata.org/browse/survey/results?q=2400&r=1&r2=10>.

⁸ Sowole-West, Omotunde and Scholl, Kelley (2016) *2015 District of Columbia Youth Risk Behavior Survey Surveillance Report*. Office of the State Superintendent of Education: Washington, DC, 56 and 68, <https://osse.dc.gov/sites/default/files/dc/sites/osse/publication/attachments/2015%20YRBS%20Report.pdf>

(Accessed November 20, 2017).

respectively).⁹ Lifetime asthma rates are also higher among middle and high school students classified as Hispanic, Other, or Multiple Races, ranging from 21.3% to 35.6%.¹⁰

Figure 3 represents the asthma-related emergency room visits for residents of all ages, by Ward.¹¹ According to the DC Hospital Association, the highest rates of asthma-related emergency room visits are in Ward 8, 7, and 5.

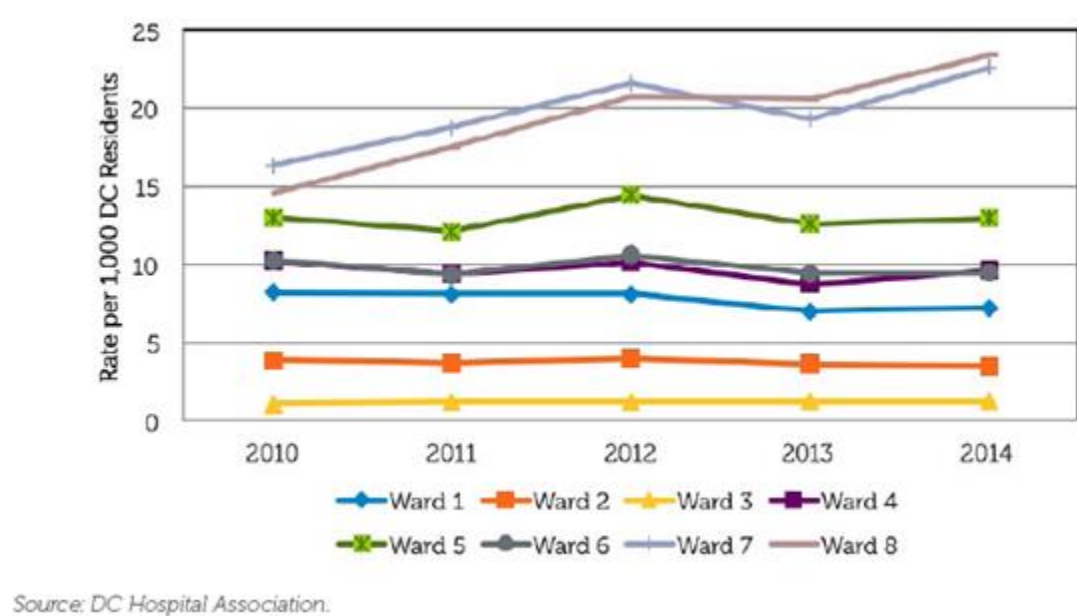


Figure 3: Emergency Room Visit Rate for Asthma by Ward, 2010-2014

Disadvantaged neighborhoods:

According to 2016 Census estimates, the overall racial/ethnic makeup of District residents is 47.7% African-American, 36.4% Caucasian, 10.9% Hispanic/Latino, and 4.1% Asian.¹² The District's Office of Planning reports that 25.9% of the District's African-American residents, or

⁹ Ibid.

¹⁰ Ibid.

¹¹ District of Columbia Community Health Needs Assessment, June 2016, By Chaya Merrill, DrPH; Linda Cottrell, MPH; and, Kimberle Searcy, MPH, http://www.dchealthmatters.org/content/sites/washingtondc/2016_DC_CHNA_062416_FINAL.pdf (Accessed on November 20, 2017).

¹² U.S. Bureau of the Census. QuickFacts: District of Columbia, U.S. Government Printing Office, Washington, DC, July 1, 2006, <https://www.census.gov/quickfacts/DC>, (Accessed on November 20, 2017) <https://www.washingtonian.com/2016/09/21/the-dc-area-has-the-highest-median-income-in-the-us-again/> https://www.washingtonpost.com/local/dc-losing-black-residents-west-of-the-anacostia-census-data-show/2016/09/30/b74279e8-8725-11e6-92c2-14b64f3d453f_story.html?utm_term=.fafaef883a7c

nearly 80,000 individuals, were living in poverty in 2014.¹³ Roughly 47% of the District's African-American population lives east of the Anacostia River, specifically in Wards 7 and 8, where the median income is less than half of the District's \$75,000 median income.¹⁴

Geographically, the highest poverty rates in the city are in Wards 7 and 8, where more than 90% of the residents in both wards are African-American. The percentage of families living below the poverty level in Wards 7 (25%) and 8 (29%) is nearly twice the citywide average of 18.5%, and about 15 times higher than in Ward 3 (2%).¹⁵ Rates of childhood poverty are also higher than average in these communities, at 39.9% in Ward 7 and 49.6% in Ward 8 (Table 1).¹⁶

Table 1. District Children < 5 Years, by Population, Race/Ethnicity, and Poverty, by Ward								
Ward	1	2	3	4	5	6	7	8
Total Population	4,723	2,174	4,241	5,565	5,743	4,804	5,204	7,870
% Hispanic/Latino	39%	17%	16%	31%	19%	11%	5%	3%
% African-American	28%	4%	4%	46%	63%	29%	94%	91%
Child Poverty ¹	24%	6%	3%	16%	21%	17%	40%	50%
¹ Percent of children under 18 years living below 100 percent of the federal poverty level. Source: The Annie E. Casey Foundation, KIDS COUNT Data Center, http://datacenter.kidscount.org . Accessed April 17, 2017. From U.S. Census Bureau, 2010 Decennial Census, 2011-2014 ACS 5-Year Estimates.								

DOEE plans to prioritize VW settlement funds for projects that take place within disadvantaged neighborhoods and in areas of the city that have high asthma rates. Specifically, DOEE plans to prioritize projects taking place in Wards 5, 7, and 8.

3. Public Outreach to Date and Themes that Emerged

In June 2017, DOEE issued a Request for Information (RFI) to solicit public input on the potential uses of the District's VW settlement funds. DOEE received 16 responses to the RFI. Summaries of the responses are posted on the District's VW settlement webpage, <https://doee.dc.gov/node/1257131>.

¹³

https://planning.dc.gov/sites/default/files/dc/sites/op/page_content/attachments/Poverty%20in%20DC%202014_1.pdf

¹⁴ DC Fiscal Policy Institute. DC's Black Residents Increasingly Live East of the Anacostia River, September 28, 2016, By Claire Zippel, <https://www.dcfpi.org/all/dcs-black-residents-increasingly-live-east-of-the-anacostia-river/> (Accessed on January 3, 2018)

¹⁵ District of Columbia Community Health Needs Assessment, June 2016, By Chaya Merrill, DrPH; Linda Cottrell, MPH; and, Kimberle Searcy, MPH, http://www.dchealthmatters.org/content/sites/washingtondc/2016_DC_CHNA_062416_FINAL.pdf (Accessed on November 20, 2017).

¹⁶ https://planning.dc.gov/sites/default/files/dc/sites/op/page_content/attachments/Key%20Indicators%202011-2015_0.pdf

DOEE also invited the public to complete a short survey on how the District should spend the VW settlement funds. DOEE received feedback from 170 residents across all eight Wards. Figures 4 and 5 illustrate the survey responses. A fuller summary of the survey responses is posted on the District's VW settlement webpage, <https://doee.dc.gov/node/1257131>.

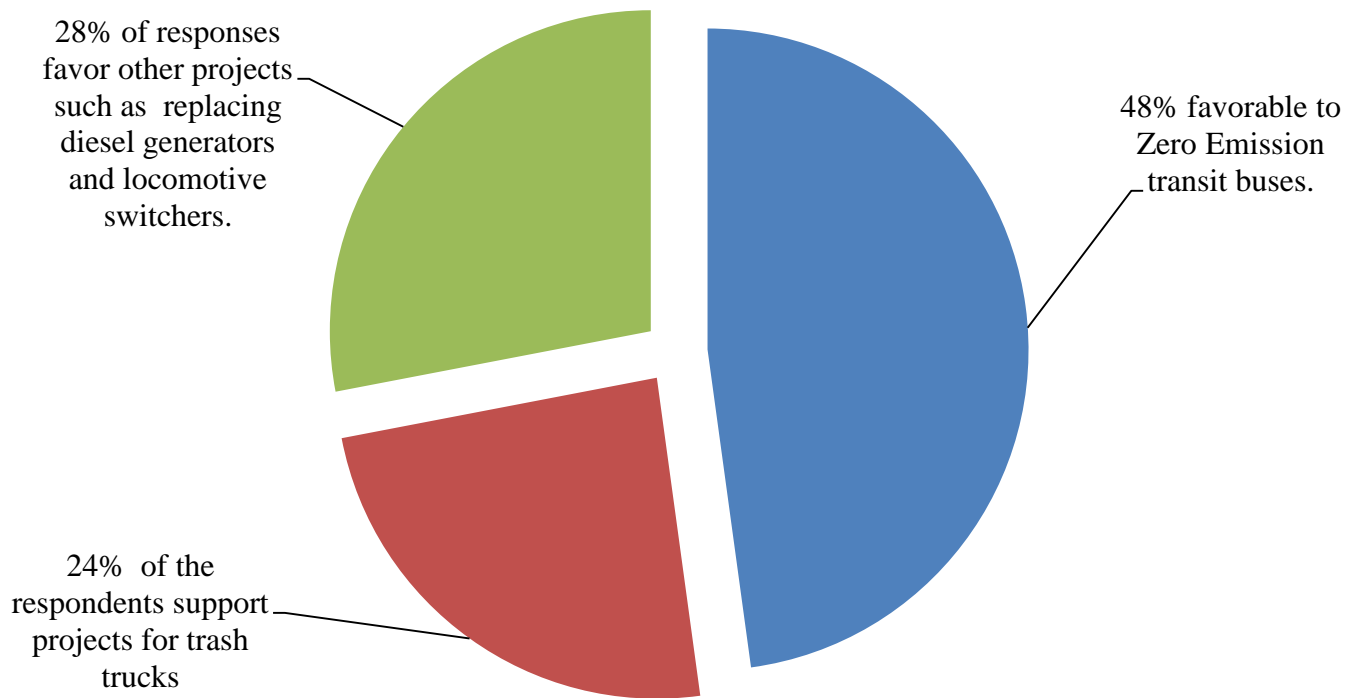


Figure 4: VW Proposed Projects Survey Results

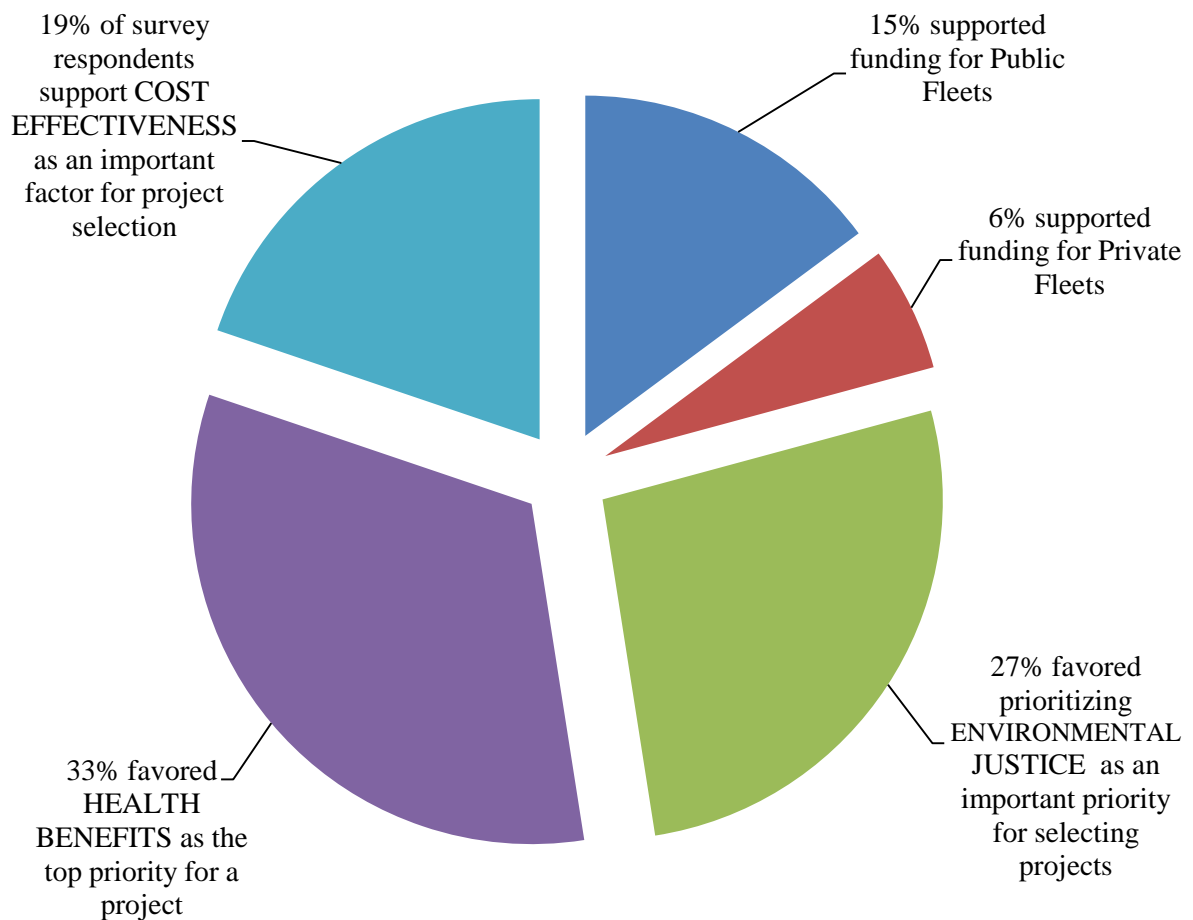


Figure 5: VW Project Selection Criteria in the Survey Results

On July 13, 2017, DOEE held a Public Information Open House on the VW settlement funds. Approximately 25 members of the public participated and talked with DOEE staff about the settlement.

DOEE staff also met with interested entities and individual stakeholders upon request, and held discussions with other District Government agencies to gather their input.

While DOEE received comments on a wide variety of topics, several themes emerged:

- **Public transportation, specifically zero-emission buses.** The survey allowed respondents to rank their top three favorite project ideas, with 48 percent favoring transit buses (WMATA and Circulator) (Figure 4). Additionally, 717 residents signed a Sierra Club petition requesting the Mayor to convert the Circulator bus fleet from diesel to electric through the use of VW settlement funds.
- **Trash trucks.** 24 percent of survey respondents favored lower-emitting trash trucks.

- **Reduce related pollutants (which include greenhouse gases, particulate matter (PM2.5), and air toxics) in addition to reducing NOx.** The survey allowed respondents to rank their top three factors to consider in project selection, with 33 percent of survey voters favoring this goal (Figure 5).
- **Prioritize vulnerable communities/environmental justice.** 27 percent of survey respondents and 2 RFI commenters supported this goal.
- **Cost-effectiveness is an important but not deciding factor.** 19 percent of survey respondents and 5 RFI commenters supported this goal.

4. Goals of the Draft Mitigation Plan

Based on public input, the District selected and will implement mitigation actions that will achieve the following overarching goals:

- **Health:** Positively impact the health of District residents by reducing emissions from diesel engines, such as NOx and PM2.5 emissions that contribute to lung and heart problems; GHG emissions that will increase temperature, flooding, and disease; and air toxics that contribute to cancer and birth defects.
- **Environmental Justice (EJ):** To ensure that all communities receive the same degree of protection from environmental and health hazards, prioritize VW funds to address air pollution in geographic areas of the most vulnerable and impacted populations, including disadvantaged communities and neighborhoods with high asthma rates.
- **Zero Emissions and Alternative Fuels:** Prioritize funds to drive the greatest possible reduction in emissions by catalyzing the adoption of zero-emission and alternative fuel vehicles.

5. Methodology for Project Selection

In evaluating potential projects to implement, we asked the following questions:

1. Is it an eligible project per the VW settlement?¹⁷
2. How much will it reduce NOx emissions?
3. What other pollutants will be reduced and by how much?
4. What is the cost-effectiveness of the project? (dollars per ton of pollutant reduction)
5. Can external funds be used to add to the VW settlement funds for the project?

¹⁷ <https://www.vwcourtsettlement.com/wp-content/uploads/documents/DOJ/Approved%20Appendix%20D-2.pdf>

6. Will the project provide a direct health benefit to vulnerable and impacted populations? For example, will the replacement vehicles be physically routed in areas of the city that have historically borne a disproportionate high share of air pollution?
7. Will the overall mix of projects cost-effectively contribute to NOx emission reductions while also helping to catalyze the adoption of zero emission and alternative fuel vehicles in the District?

6. Proposed Spending Plan

Table 2: District's Proposed Spending Plan for VW Settlement Funds

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	Cumulative Total:
Locomotive Switcher Engine Replacement	-	\$520,000	\$520,000	\$520,000	\$520,000	\$520,000	\$520,000	\$3,120,000
District Electrification And Low-NOx Program	-	\$4,205,000	-	-	-	-	-	\$4,205,000
Idling Reduction Rebates		\$95,000						\$95,000
DOEE Administrative Costs	\$30,000	\$125,000	\$125,000	\$125,000	\$100,000	\$100,000	\$100,000	\$705,000
Total	\$30,000	\$4,945,000	\$645,000	\$645,000	\$620,000	\$620,000	\$620,000	\$8,125,000

The District proposes to spend the \$8.125 million of VW settlement funds as follows:

- **Locomotive Switcher Engine Replacement:**

DOEE plans to allocate 38 percent of the District's VW settlement funds (approximately \$3.1 million) to upgrade and repower six very old diesel-powered switcher locomotives at Union Station with new, much cleaner diesel engines over six years (starting in FY 2019 through FY 2024).¹⁸ Switcher locomotives are railcars that switch or assemble trains in the railyard. They operate under high load conditions and are powered by diesel engines; some are over 50 years old. Switchers are high polluting sources because they operate every day (more than 8,000 hours per year) and solely in the railyards that run between Ivy City and Union Station in Wards 5 and 6, respectively, which creates a hotspot for NOx and other pollutant emissions in this area. This

¹⁸ DOEE investigated the feasibility of purchasing electric or alternative fuel switcher engines, but these technologies are not yet available for switcher locomotives.

investment is a very cost-effective way to reduce NOx emissions; this project alone will lead to approximately 1 percent reduction of total NOx emissions in the District.

We have chosen to fund this project through the Diesel Emissions Reduction Act (DERA) grant. The DERA option provides additional funding for certain VW mitigation actions through a yearly grant provided by EPA to invest in cleaner vehicular technology and ultimately reduce emissions from diesel vehicles. This project will utilize DERA grant funds and Amtrak funds, in addition to the VW settlement funds. Amtrak must contribute 60 percent of the cost of the project.

It is important to note that the DERA grant is not funded consistently on a year-by-year basis; historically the District has received a range of funds from \$70,000 to \$235,000. The total amount of VW funds to be used for the switcher replacement project will depend upon the amount of DERA grant funds available. DERA grant funds, if available in Fiscal Years 2019 through 2024, will reduce the VW settlement fund's contribution towards the purchase of new switchers.

In addition to the amount of the DERA grant funds obtained, EPA will provide additional bonus funding equal to 50 percent of the grant amount. As such, if the District were to receive \$100,000 from the DERA grant, a total of \$150,000 made up of DERA grant funds and the EPA bonus will be available to be used for each switcher replaced. However, for the purposes of conservatively estimating the cost of implementing this project, DERA grant funds are not included in Table 2. If the DERA grant funds become available, the unspent VW funds allocated for this project will be moved to the District Electrification And Low-NOx Program described below.

- **The District Electrification And Low-NOx Program (DEAL Program):**

The DEAL Program, to be managed by DOEE, will provide public entities in the District with the means to overcome the high incremental cost of purchasing alternative fuel fleet. We are defining public entities as District, regional, or federal government entities located within the District of Columbia, including independent District agencies.

DOEE will allocate 52 percent of VW settlement funds (approximately \$4.2 million) to the DEAL Program in FY19. Any DEAL Program funds remaining available at the end of FY19 will be carried over to subsequent years until all funds are spent. DOEE may increase the funding amount allocated for the DEAL Program in future years if funds allocated to other projects become available. Conversely, DOEE may reduce the funding amount allocated for the DEAL program to other projects if there is insufficient demand.

The DEAL Program only covers the following technologies: electric transit buses and infrastructure, electric refuse trucks and infrastructure, and CNG refuse trucks. The funds will cover approximately 80 percent of the incremental cost of purchasing electric vehicle technologies, and 55 percent of the incremental cost of purchasing CNG technologies, when

compared with the cost of purchasing a new diesel vehicle.¹⁹ Although the DEAL Program will not cover 100 percent of the incremental cost, savings made through fuel and maintenance will help cover the remaining costs and provide overall long term savings through the life cycle of the new vehicle.

The DEAL Program is modeled on successful vehicle voucher and rebate programs implemented in other jurisdictions,²⁰ which capped incentives at 80 percent of the incremental cost or up to a designated amount, usually no greater than \$150,000. These programs have demonstrated that covering a portion of the incremental cost of the new vehicle provides the vehicle owner with a significant financial savings over the lifetime of the vehicle. The DEAL Program approach is supported by the District's climate and energy action plan, Clean Energy DC, which states that zero-emission buses have a significant role to play in reducing transit GHG emissions. Clean Energy DC recommends that the District pursue funding options to subsidize the purchase of electric transit vehicles and electric charging infrastructure.²¹

Service Conditions and Vehicle Funding

Public entities interested in participating in the DEAL Program will be responsible for meeting the following service conditions:

Electric Transit buses:

Service Conditions	Funding Amount per Vehicle
Requirements: <ul style="list-style-type: none"> • In order to be eligible for funds, the public entities must prove that the vehicle and infrastructure will serve Wards 5, 7, or 8 for at least 75 percent of the service time or 75 percent of stops over an 8 year period. • The vehicle will have signage displaying the health benefits of the vehicle, including that it was purchased in part with VW settlement funds. • Public entities receiving funds must provide at least five asthma outreach/educational events over a five-year period, irrespective of the number of vehicles purchased. 	\$155,000
Bonus: If the vehicle and infrastructure serves Wards 7 or 8 for at least 75 percent of the service time or 75 percent of stops over an eight-year period, the vehicle will be eligible for additional funding.	\$270,000
Total available if all service conditions are met:	\$425,000

¹⁹ Please refer to Table A6 in the Appendix for cost comparison between electric, CNG, and new diesel refuse truck and transit bus replacements.

²⁰ including California, Oregon, New York, Maryland, and Chicago

²¹ DOEE forthcoming publication of final Climate Energy DC Plan.

Electric and CNG refuse trucks:

Service Conditions	Funding Amount per Vehicle for Electric Refuse Trucks	Funding Amount per Vehicle for CNG Refuse Trucks
Requirements: <ul style="list-style-type: none">• The vehicle and infrastructure purchased with these funds must be used for routes in Wards 7 and 8. The vehicle can also be used for routes outside Wards 7 and 8.• The vehicle will have signage displaying the health benefits of the vehicle, including that it was purchased in part with VW settlement funds.• Public entities receiving funds must provide at least five asthma outreach/educational events over a five-year period, irrespective of the number of vehicles purchased.	\$240,000	\$50,000
Total available if all service conditions are met:	\$240,000	\$50,000

DEAL Program Framework

Public entities will be allowed to plan for their fleet replacement in future years by “reserving” a portion of the allotment on a “first come, first served” basis. However, the amount reserved must be used within two years or the funds will be reallocated to the next request in line.

DOEE will establish either a rebate or voucher system to transfer the DEAL Program funds to public entities purchasing eligible technologies. DOEE will establish agreements with each public entity that will delineate the timing and the process for the funds transfer and reporting requirements. As a condition of receiving DEAL Program funds, public entities will be required to supply proof for the scrapped vehicle they are replacing.

- **Idling Reduction Rebates:**

DOEE plans to allocate 1 percent (approximately \$95,000) of the VW settlement to provide rebates to public and private fleet owners to retrofit older diesel shuttle buses, transit buses, and Class 5-8 medium and heavy duty trucks with idling reduction technologies. Idling reduction technologies are inexpensive, ranging from approximately \$1,500 to \$8,000, and are widely available in the market. Eligible idling reduction technologies are included in EPA’s approved

list²². Only on-road vehicles with model years 1995 to 2009 will be eligible for rebates²³; off-road vehicles are not eligible.

Through a third-party vendor, DOEE will provide rebates that will cover 25 percent of the cost of idling reduction technology, up to \$1,000 per vehicle. The VW settlement (DERA option) requires fleet owners to cover 75 percent of the cost. In order to be eligible for a rebate, vehicles must be operating exclusively within the District. DOEE may adjust the funding amount for idling reduction rebates if excess funds allocated to other projects become available. Funds will be available to qualified vehicles on a first come first serve basis.

- **Project Administration:**

DOEE plans to allocate 9 percent (approximately \$705,000) for administrative purposes. These funds will cover the costs of program outreach, soliciting and reviewing project applications, issuing rebates, verifying project completion, accounting, audits, legal compliance, recordkeeping, reporting and related costs. DOEE anticipates that some of these functions, such as issuing rebates and verifying the destruction of engines, may be outsourced to private contractors or grantees through a competitive process.

7. Estimated Emission Benefits

DOEE has estimated the emission reduction benefits that could be achieved from the Locomotive Switcher Engine Replacement project, DEAL Program, and Idling Reduction Rebates at the proposed funding levels. The estimates for the DEAL Program were prepared using a hypothetical mix of vehicle categories, model years, fuel types, and charging station capacities. Emission reduction data was modeled using the Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool from Argonne National Laboratory and EPA's Diesel Emissions Quantifier. Actual emission benefits will vary depending on the specifics of the projects approved for funding.

The total emission benefits resulting from the projects proposed in this spending plan are shown in Table 3. This data is based on conservative estimates; the table does not include any funding from the DERA grant for the switchers and it covers 80 percent of the incremental costs for the EV transit buses and refuse trucks from their diesel counterpart.

²² <https://www.epa.gov/verified-diesel-tech/smartway-verified-list-idling-reduction-technologies-irts-trucks-and-school>

²³ Vehicles with model years 2006-2009 will not be eligible for Auxiliary Power Unit installation.

Table 3: Potential Emission Benefits for All Projects²⁴

Project	NOx Reduction (tons/year)	PM2.5 Reduction (tons/year)	GHG Reduction (tons/year)	Cost (in millions)
Switcher Engine Replacement	75-85	0.1-2	125-145	~\$3.1
DEAL Vehicle Projects	6-47	0.1-2	390-1,124	~\$4.2
Idling Reduction Rebates	2.5-5.5	0.1-0.5	155-330	~\$0.0095
Total	83.5-137.5	0.3-4.5	670-1,599	~\$7.3

8. Equipment That the District Has Decided Not To Fund

There are other types of equipment eligible for VW settlement funds, for which the District has elected not to fund:

Electric vehicle charging infrastructure for light duty vehicles: The District is not allocating VW settlement funding for supply equipment, such as electric vehicle charging stations, for light duty zero emissions vehicles. The primary beneficiaries of this type of infrastructure would be private owners of electric vehicles. Instead, the District has opted to prioritize vehicle types that provide a direct benefit to a greater number of residents. Separately from the VW effort, the District is involved in ongoing work to leverage private funding to invest in private vehicle charging infrastructure in the District. Additionally, Electrify America is planning to install ZEV charging stations in the DC metropolitan area in the next 24 months.

Biofuels: Biofuel repowering was not chosen due to the Department of Public Works' interest in using soybean oil. When evaluating biofuels developed from soybean oil, a life cycle analysis shows the land use for growing the soybean is not sustainable and could be as harmful to the environment as the use of fossil fuels in regards to GHG emissions. The benefits of using the necessary land for food production rather than for fuel production are also a subject of debate.²⁵ Another concern revolves around the issue that biodiesel fuel could increase NOx emissions compared to petroleum diesel, possibly as much as 10 to 12 percent.²⁶ There has been development of control technologies that has successfully mitigated the increased NOx

²⁴ This information was calculated from Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool and EPA's Diesel Emissions Quantifier Tool

²⁵ <http://www.raeng.org.uk/publications/reports/biofuels>

²⁶ <https://elibrary.asabe.org/abstract.asp?aid=20475>

emissions but these technologies have resulted in decreased engine efficiency and have shown an increase in other harmful pollutants, such as carbon monoxide and hydrocarbons.²⁷

New diesel trucks and buses: DOEE decided not to fund new diesel trucks and buses mainly due to environmental factors. Although new diesel vehicles have greatly reduced their NOx emissions, use of diesel powered vehicles still results in relatively high GHG and air toxics emissions. DOEE also wants to incentivize more zero-emission vehicles, and the continued purchase of diesel vehicles would inhibit the incentive to move toward zero emission technology.

CNG buses: It appears that there is not much interest by District agencies to invest in any CNG buses due to the successful deployment of EV buses in other cities and the growing network of EV buses across the market area. Table A6 also shows that CNG buses will result in higher GHG emissions over an EV bus.

School buses: The Office of the State Superintendent of Education (OSSE) is currently replacing older diesel school buses with new gasoline vehicles. Gasoline vehicle replacement is not eligible for funding under the VW Settlement Appendix D-2; therefore, the VW funds could not be utilized for this project.

²⁷ <http://www.sciencedirect.com/science/article/pii/S0196890413004305>

APPENDICES

Appendix 1: Description of Locomotive Switcher Engine Replacement

Table A1: Locomotive Switcher Engine Replacement

Project Description:	Replace the engines of six remaining older diesel switchers with new GenSet diesel engines that are compliant with US EPA's Tier 4 emission standards. The switchers operate between Ivy City in Ward 5 and the Union Station Rail Terminal.
Implementing Agency:	Amtrak
Timeline for Implementation:	Six years
Project Cost:	<p>Cost per switcher: \$1.3 million Total project cost (for six switchers): \$7.8 million</p> <p>The District's cost share is conservatively estimated to be \$520,000 per switcher, or a total of \$3.12 million for six switchers paid for with VW settlement funds.</p>
Leveraging: Will the project leverage outside funds?	Yes. This project will use US Environmental Protection Agency (US EPA) Diesel Emissions Reduction Act (DERA) grant funds and Amtrak funds, in addition to VW settlement funds. Through the DERA option, Amtrak must contribute 60 percent of the cost of the project over the six year period.
Anticipated Benefits:	<ul style="list-style-type: none"> • NOx reduction: 12.9 tons per year • PM2.5 reduction: 0.33 tons per year • GHG reduction: 138.4 tons of CO2 per year • Increased reliability and reduced maintenance and fuel costs
EJ considerations	The switchers operate solely in the railyards that run between Ivy City and Union Station in Wards 5 and 6, respectively. Please refer to Figures A1 and A2 for a map of the railyard where the switchers are located. Comparing Figures A1 and A2 with Figure 3, the railyards are located adjacent to and just upwind from the Wards with the highest asthma rates. As the prevailing wind direction flows toward the southeast, the emissions from the railyard will flow through Wards 5, 7, and 8.

Table A2: Cost Benefit Analysis of a Switcher Replacement²⁸

	tons of NO _x Reduced/ yr	tons of PM _{2.5} Reduced/ yr	tons of CO ₂ Reduced/ yr	Cost of new switcher	\$/ton of NO _x Reduced	\$/ton of PM _{2.5} Reduced	\$/ton of CO ₂ Reduced
New Diesel Switcher Engines	12.9	0.33	138.4	\$1,300,000	\$104,284	\$3,951,368	\$9,393

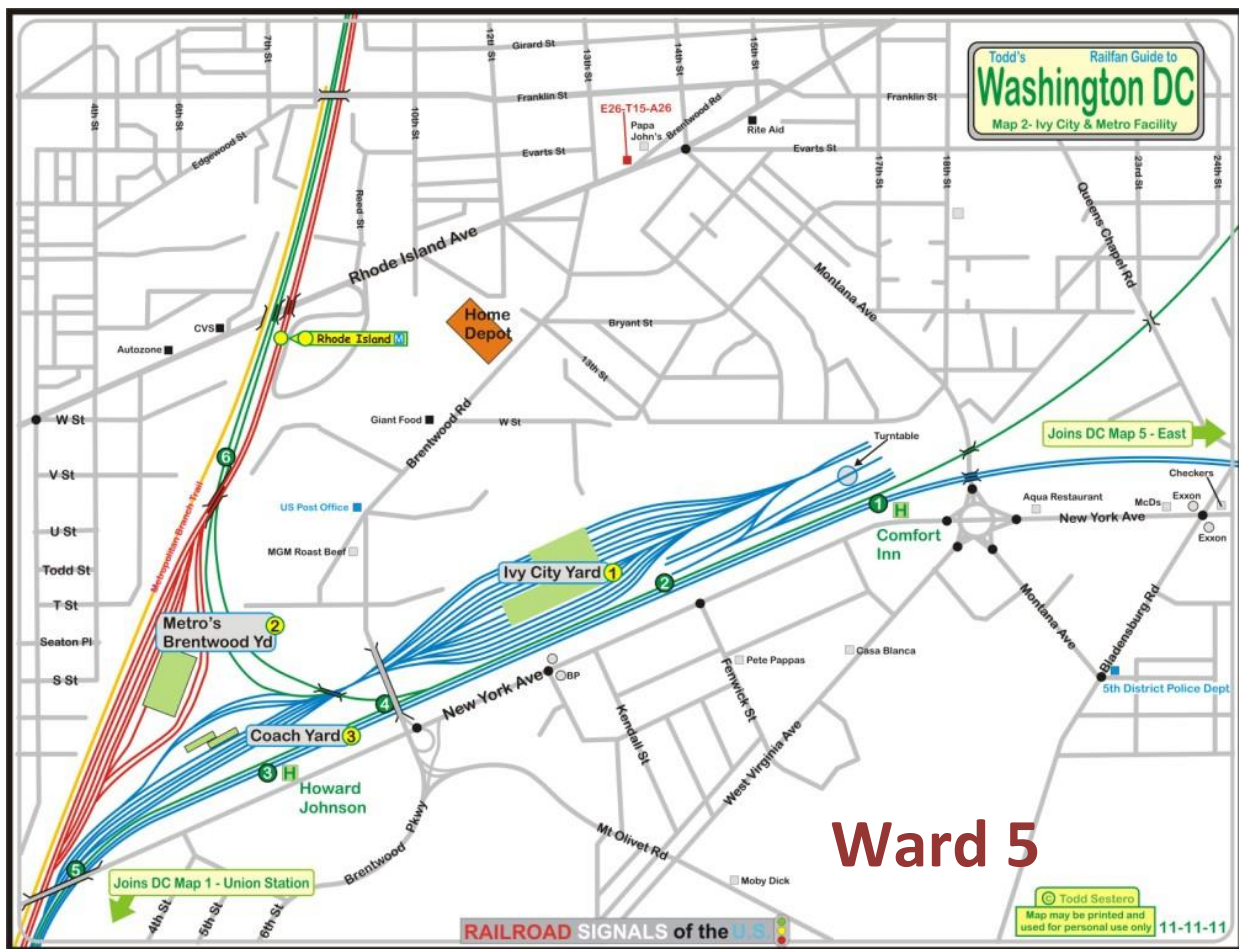


Figure A1: Map of the Ivy City rail yard in Ward 5. The rail yard is depicted as the blue lines.²⁹

²⁸ This information was calculated from EPA's Diesel Emissions Quantifier Tool. Cost estimates are based on the engine replacement cost of \$1,300,000 and do not include maintenance/repair, fuel, infrastructure, etc.

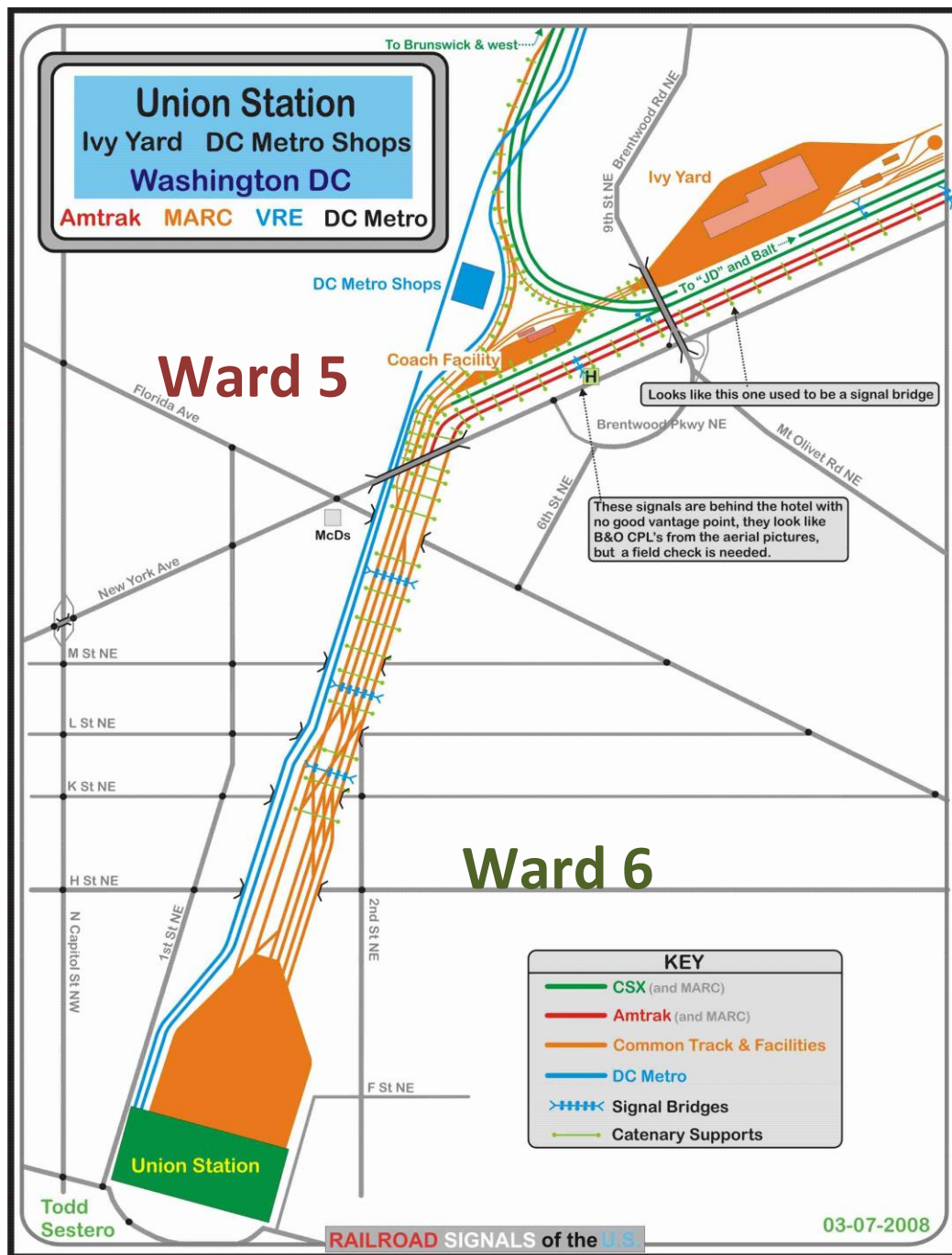


Figure A2: Map of the Union Station railyard and its connection to the Ivy City railyard (both in orange color).³⁰

²⁹ <http://www.railfanguides.us/dc/map2/index.htm>

³⁰ <http://www.railfanguides.us/dc/map2/index.htm>

Appendix 2: Description of DEAL Program

TableA3: Electric Refuse Truck Replacement

Project Description:	The DEAL Program funds enable public entities to replace older diesel refuse trucks by covering a portion of the incremental cost for new electric refuse trucks and infrastructure.
Implementing Agency:	To be determined.
Timeline for Implementation:	Starting in FY19, until funds run out.
Project Cost:	A new electric refuse truck is estimated to cost \$450,000, and the infrastructure cost for one electric refuse truck is an additional \$50,000 to \$60,000. ³¹ The DEAL Program will fund up to \$240,000 towards the cost of a new electric refuse truck and infrastructure. This amount (\$240,000) corresponds to 80 percent of the difference between the cost of purchasing a new electric refuse truck (and associated electric infrastructure) and the cost of purchasing a new diesel refuse truck.
Leveraging: Will the project leverage outside funds?	Yes. The public entity purchasing the vehicle will cover the remaining costs as part of the DEAL Program.
Anticipated Benefits: ³²	<ul style="list-style-type: none"> • NOx reduction: 0.47 tons • PM2.5 reduction: 0.021 tons • GHG reduction: 56.2 tons • Noise reduction and reduced maintenance and fuel costs
EJ considerations	The vehicle and infrastructure purchased with these funds must be used for routes in Wards 7 and 8. The vehicle and infrastructure can also be used for routes outside Wards 7 and 8. The vehicle will have signage displaying the health benefits of the vehicle, including that it was purchased in part with VW settlement funds. Additionally, public entities receiving funds must provide at least five asthma outreach/educational events over a five-year period,

³¹ Source: AFLEET

³² This information was calculated from Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool and EPA's Diesel Emissions Quantifier Tool

	irrespective of the number of vehicles purchased.
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TableA4: DEAL Program-- CNG Refuse Truck Replacement

Project Description:	The DEAL Program funds enable public entities to replace older diesel refuse trucks by covering a portion of the incremental cost for new CNG refuse trucks.
Implementing Agency:	To be determined
Timeline for Implementation:	Starting in FY19, until funds run out.
Project Cost:	A new CNG refuse truck is estimated to cost \$300,000. The DEAL Program will fund up to \$50,000 towards the cost of a new CNG refuse truck. This amount (\$50,000) corresponds to 55 percent of the difference between the cost of purchasing a new CNG refuse truck and the cost of purchasing a new diesel refuse truck. (CNG fueling station infrastructure costs are not eligible for VW settlement funds.)
Leveraging: Will the project leverage outside funds?	Yes. The public entity purchasing the vehicle will cover the remaining costs as part of the DEAL Program.
Anticipated Benefits: ³³	<ul style="list-style-type: none"> • NOx reduction: 0.470 tons • PM2.5 reduction: 0.021 tons • GHG reduction: 39.7 tons • Noise reduction
EJ considerations	The vehicle purchased with these funds must be used for routes in Wards 7 and 8. The vehicle can also be used for routes outside Wards 7 and 8. The vehicle will have signage displaying the health benefits of the vehicle, including that it was purchased in part with VW settlement funds. Additionally, public entities receiving funds must provide at least five asthma outreach/educational events over a five-year period, irrespective of the number of vehicles purchased.

Table A5. Cost Benefit Analysis of a Refuse Truck Replacement³⁴

³³ This information was calculated from Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool.

	tons of NOx Reduced/yr	tons of PM2.5 Reduced/yr	tons of GHG Reduced/yr	Cost of Vehicle	\$/ton of NOx Reduced	\$/ton of PM2.5 Reduced	\$/ton GHG Reduced
Electric	0.47	0.02	56.2	\$450,000	\$955,414	\$21,276,596	\$8,007
CNG	0.47	0.02	39.7	\$300,000	\$638,978	\$14,598,540	\$7,557

TableA6: DEAL Program—Electric Transit Bus Replacement

Project Description:	The DEAL Program funds enable public entities to replace older diesel transit buses by covering a portion of the incremental cost for new electric transit buses and infrastructure.
Implementing Agency:	To be determined.
Timeline for Implementation:	Starting in FY19, until funds run out.
Project Cost:	The estimated cost of a new electric transit bus is \$770,000, and the infrastructure cost for one electric transit bus is an additional \$50,000 to \$60,000. ³⁵ The DEAL Program will fund up to \$425,000 of the cost of a new electric transit bus and infrastructure. This amount (\$425,000) corresponds to 80 percent of the difference between the cost of purchasing a new electric transit bus (and associated electric infrastructure) and the cost of purchasing a new diesel transit bus.
Leveraging: Will the project leverage outside funds?	Yes. The public entity purchasing the vehicle will cover the remaining costs as part of the DEAL Program.
Anticipated Benefits: ³⁶	<ul style="list-style-type: none"> • NOx reduction: 0.462 tons • PM2.5 reduction: 0.010 tons • GHG reduction: 24 tons • Noise reduction and reduced maintenance and fuel costs
EJ considerations	As a minimum requirement, the public entities must prove

³⁴ This information was calculated from Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool. Cost estimates are based on the purchase price of a new electric or CNG refuse truck and do not include maintenance/repair, fuel, infrastructure, etc.

³⁵ Source: AFLEET

³⁶ This information was calculated from Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool.

	<p>that the vehicle and infrastructure will serve Wards 5, 7, or 8 for at least 75 percent of the service time or 75 percent of stops over an eight-year period. The vehicle will have signage displaying the health benefits of the vehicle, including that it was purchased in part with VW settlement funds. Additionally, public entities receiving funds must provide at least 5 asthma outreach/educational events over a 5 year period, irrespective of the number of vehicles purchased.</p> <p>If the vehicle and infrastructure serves Wards 7 or 8 for at least 75 percent of the service time or 75 percent of stops over an eight-year period, the vehicle will be eligible for additional funding.</p>
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Table A7: Cost Benefit Analysis of a Transit Bus Replacement³⁷

	tons of NOx Reduced/ yr	tons of PM2.5 Reduced /yr	tons of GHG Reduced /yr	Cost of Vehicle	\$/ton of NOx Reduced	\$/ton of PM2.5 Reduced	\$/ton GHG Reduced
Electric	0.46	0.01	24.1	\$770,000	\$1,666,667	\$74,038,462	\$31,950

³⁷ This information was calculated from Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool. Cost estimates are based on the purchase price of a new electric transit bus and do not include maintenance/repair, fuel, infrastructure, etc.

Table A8: Project Comparisons between Refuse Truck and Transit Bus Replacements³⁸

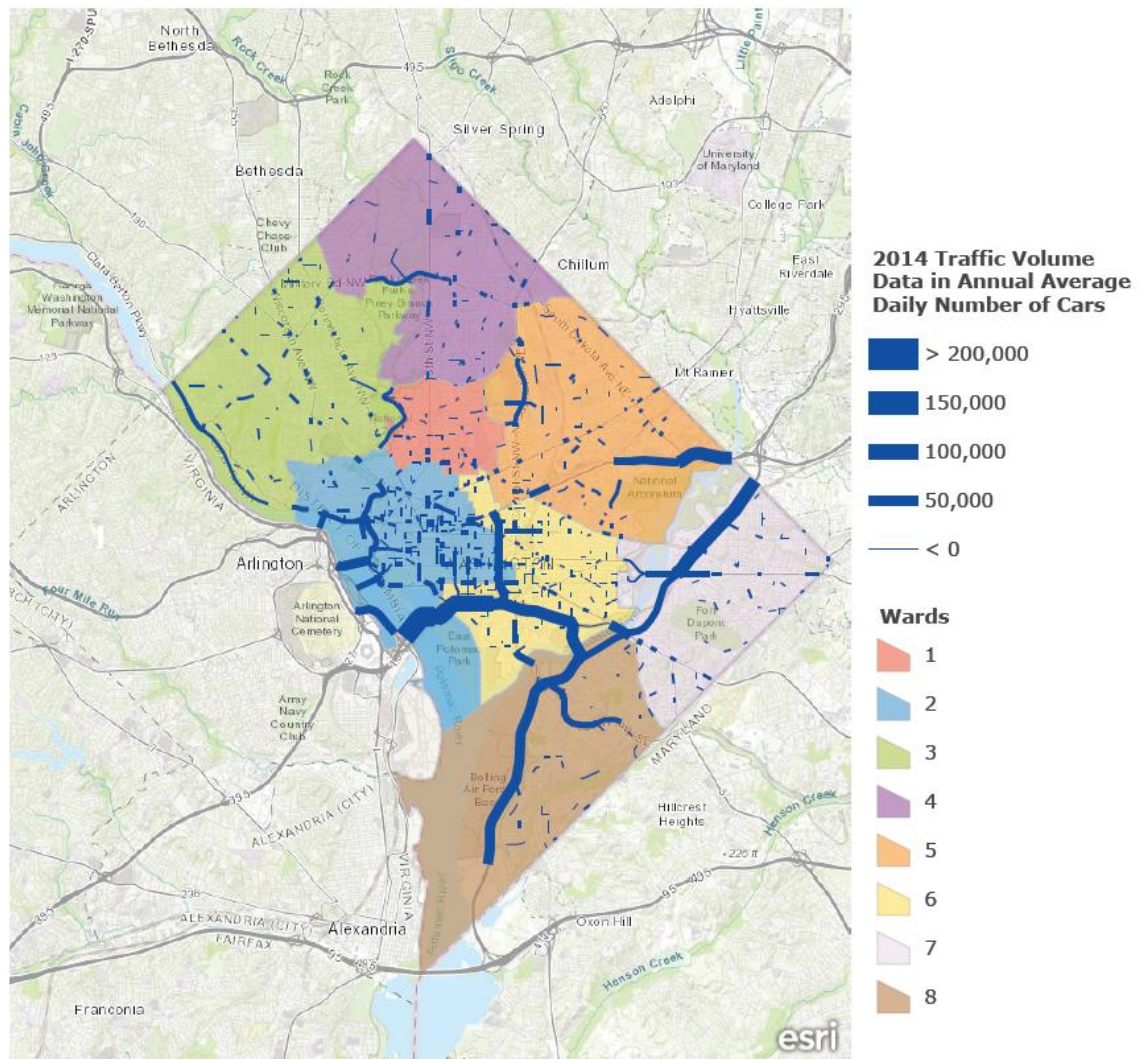
Vehicle Type	Vehicle Purchase Cost³⁹	NOx Emissions (total tons emitted per year)	PM 2.5 Emissions (total tons emitted per year)	GHG Emissions (total tons emitted per year)	Air Toxics Emissions (total tons emitted per year)
Electric Refuse Truck	\$450,000	0	0	139	NONE
CNG Refuse Truck	\$300,000	0.001	0.001	156	MEDIUM
New Diesel Refuse Truck	\$210,000	0.029	0.001	196	HIGH
Electric Transit Bus	\$770,000	0	0	64	NONE
CNG Transit Bus	\$360,000	0.0013	0.001	72	MEDIUM
New Diesel Transit Bus	\$300,000	0.027	0.001	88	HIGH

³⁸ This information was calculated from Argonne National Laboratory Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool and EPA's Diesel Emissions Quantifier Tool

³⁹ Please note that the cost for the vehicle does not include the infrastructure cost of charging or fueling station.

Appendix 3: Traffic Volume Data

Table A9: Daily Traffic Volume Data in the District



Sources: M-NCPPC, VITA, Esri, HERE, Garmin, Intermap, USGS, NGA, EPA, USDA, NPS