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1 SNOW AND ICE REMOVAL PLAN 2021

During the 2019 and 2020 reporting years, DOEE designed a pilot test to evaluate different strategies to reduce road salt use in the management of snow and ice within the District. DOEE coordinated with the District of Columbia Department of Public Works (DPW) with a goal of testing alternative treatment scenarios that could be incorporated into standard snow removal practices within the District. While the pilot project was anticipated to run during the 2019-2020 winter season, the District of Columbia only received 0.6 inches of snow during that time period and therefore was unable to deploy the pilot testing treatments. During the 2020-2021 winter season, the District experienced public safety emergencies (COVID, increased public protests and riots, and security protocols around the Presidential inauguration) that required many DPW partners to be detailed for emergency response operations. In addition, there were no qualifying snow events to implement the pilot. DOEE communicated these issues to EPA in February 2021 and received permission to implement the pilot in the 2021-2022 winter season.

Since last winter, DOEE and DPW have made considerable progress to ensure implementation in the 2021-2022 winter season (weather permitting):

- DOEE and DPW have held bi-weekly planning meetings since early September 2021.
- DPW had expressed concerns about staffing the data collection component of the pilot (observing and recording road conditions post-application of the three different products), so DOEE secured contractor support to cover those responsibilities.
- DOEE, Tetra Tech, and DPW held a virtual kickoff meeting on October 1, 2021 to review and refine Tetra Tech's responsibilities.
- DOEE and Tetra Tech participated in a field run on October 21, 2021 to confirm all data collection sites on each of the pilot's six snow routes and to review all data collection requirements.
- DPW secured temperature sensors for determining road temperatures during data collection.
- DPW held an in-person training for the truck drivers detailed to this pilot on November 19, 2021.

The following page provides a current overview of the road salt pilot as of the date of this report's submission.

District of Columbia Deicing Alternatives Pilot Overview “Road Salt Reduction Pilot”

Background: The 2018 District of Columbia Government Municipal Separate Stormwater Sewer System (MS4) Permit requires the District to pilot salt alternatives and incorporate its findings into the District’s snow removal strategy. This Road Salt Reduction Pilot will be implemented during the FY22 Snow Season, provided favorable weather conditions occur.

Goal: DOEE will compare the effectiveness of alternative deicing practices including the use of a salt alternative, Calcium Magnesium Acetate (CMA) and the use of a pre-wetting technology to wet road salt as it is being applied, with the existing deicing practice of dry road salt application (control scenario).

Selection of Alternatives: The deicing alternatives that were selected for this study represent treatment options that have shown success at reducing salt use in other jurisdictions. Calcium Magnesium Acetate (CMA) has been shown to be an environmentally friendly alternative to road salt, while still protecting public safety in deicing operations. The use of saddle tanks to prewet road salt has also shown the ability to reduce the use of salt in deicing operations. By prewetting road salt, the salt granules are less likely to bounce off the road. In addition, prewetting allows the salt to melt ice faster than no-prewetted salt.

Qualifying Events: To best target the effectiveness of each deicing treatment scenario, the pilot will only be deployed during events where plowing will not be needed. The qualifying weather conditions are listed below:

- Ice, freezing rain, slush, and winter mix
- Trace to 2 inches of snow

Test Design: DOEE and DPW have identified 6 snow plow routes (specifically the primary road portions of these routes) to execute the pilot testing during winter weather events. The three treatment scenarios (Control, Pre-wetting, and CMA) will be run in duplicate for each event. It is anticipated that this pilot test will be deployed on the identified routes during as many qualifying events as feasible during the 2021-2022 snow season. It is the goal of this project to deploy and evaluate the treatment scenarios described in this pilot plan during at least 3 events beyond the initial “test” event. Limitations such as quantity of deicing chemicals and qualifying events will ultimately determine the total number events captured by this pilot.

Evaluation of Alternatives: DOEE anticipates using a variety of data points collected during the pilot test to evaluate the effectiveness of each treatment alternative including:

- Cost of treatment
- Weather and road conditions after product application
- District Snow Team - Road Conditions Rating after application
- Feedback on implementation procedures and product effectiveness from snow plow drivers, Tetra Tech staff, and the public

2 EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM

The District's MS4 Annual Report, Section 4.6, requires a data synthesis of programmatic and watershed indicators.

4.6.1 Programmatic Indicators

The Permittee shall evaluate the effectiveness of the SWMP using multiple programmatic indicators linked to the requirements in Part 3 of this permit. The Annual Reporting Template in Appendix A of this permit identifies the programmatic indicators used to evaluate the success of implementing stormwater control measures.

As required by Section 4.6.1, the effectiveness of the Stormwater Management Program is evaluated using the programmatic indicators found in Part 3 of the MS4 Permit. The Annual Report describes implementation of these programs in this reporting year. In interest of doing a complete synthesis, indicators are being reviewed over the life of multiple permit terms. As seen in the text and figures below, major program indicators have seen a steady progression in implementation.

Catch Basin Cleaning Activities (Section 3.3.4)

Through the development of the DC Water Catch Basin Cleaning App, DOEE has increased the resolution at which it can report catch basin cleaning within the District. In previous permit terms DOEE was limited to reporting the number of catch basins cleaned over the entire jurisdiction. Now DOEE is able to report the number of catch basins that were cleaned specifically within the area of the city serviced by the MS4. Using data from the DC Water Catch Basin Cleaning App, DOEE has determined that there are 15,357 DC Water owned catch basin and 17,073 total catch basins within the MS4 area of the District. The number of catch basins cleaned in the MS4 area of DC was 12,473 in reporting year 2020 and 11,859 in reporting year 2021. These values represent the number of unique catch basins that were cleaned, not the number of cleaning events. It should be noted that some catch basins were cleaned more than once during the reporting year, which is not reflected in the numbers reported. The reduction in the number of catch basins cleaned in reporting year 2021 is due to a temporary pause in cleanings due to Covid-19.

Construction Activities (Section 3.5)

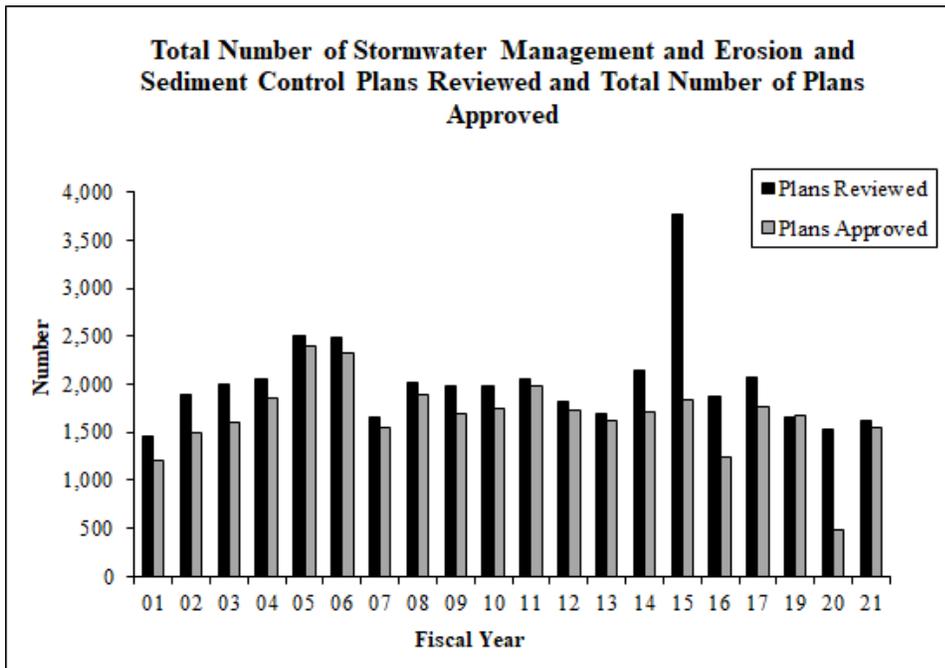


Figure 1 Total Number of Stormwater Management and Erosion and Sediment Control Plans Reviewed and Total Number of Plans Approved Over Time

Targeted Trash and Litter Pollutant Controls (Section 3.7)

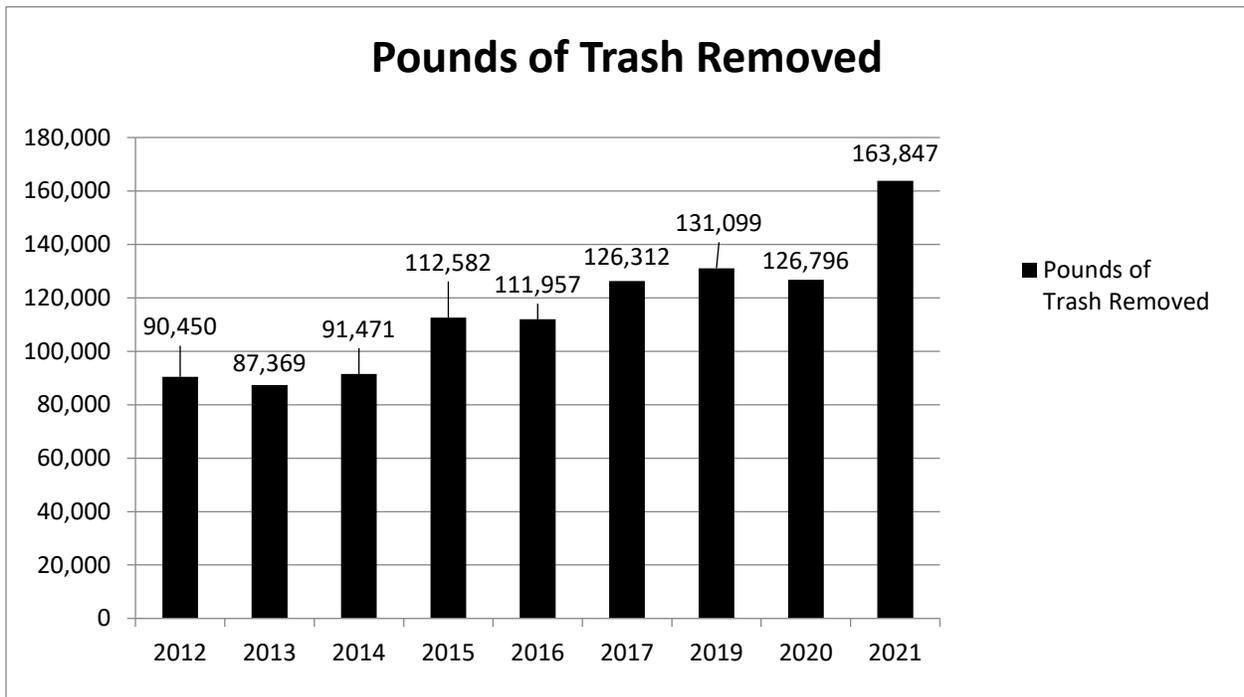


Figure 2 Annual Pounds of Trash Removed Over Time

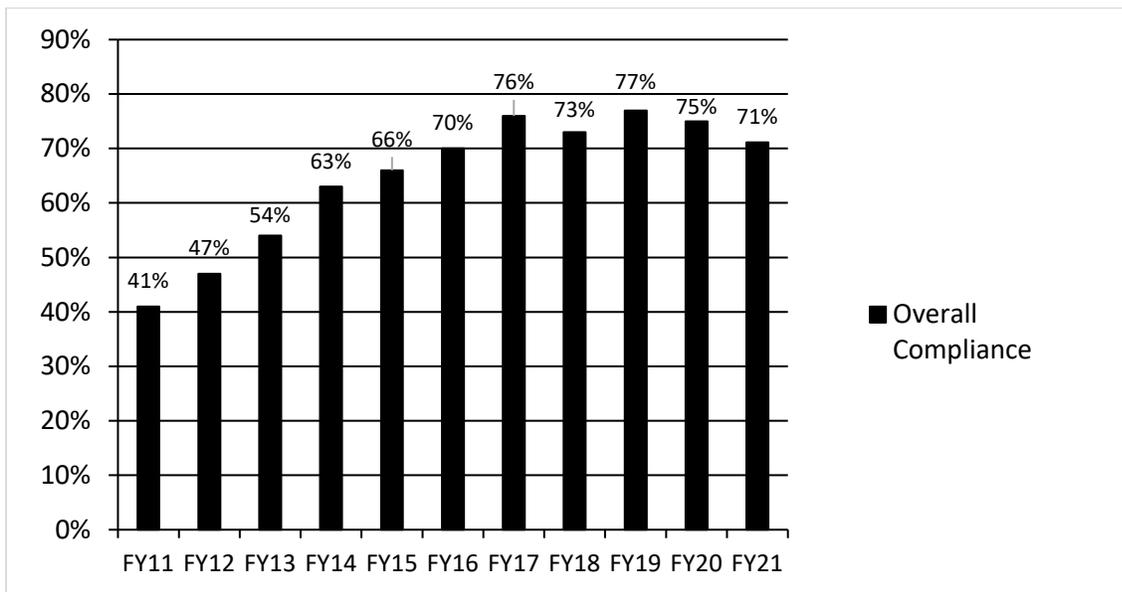


Figure 3 Bag Law Compliance Rates Over Time

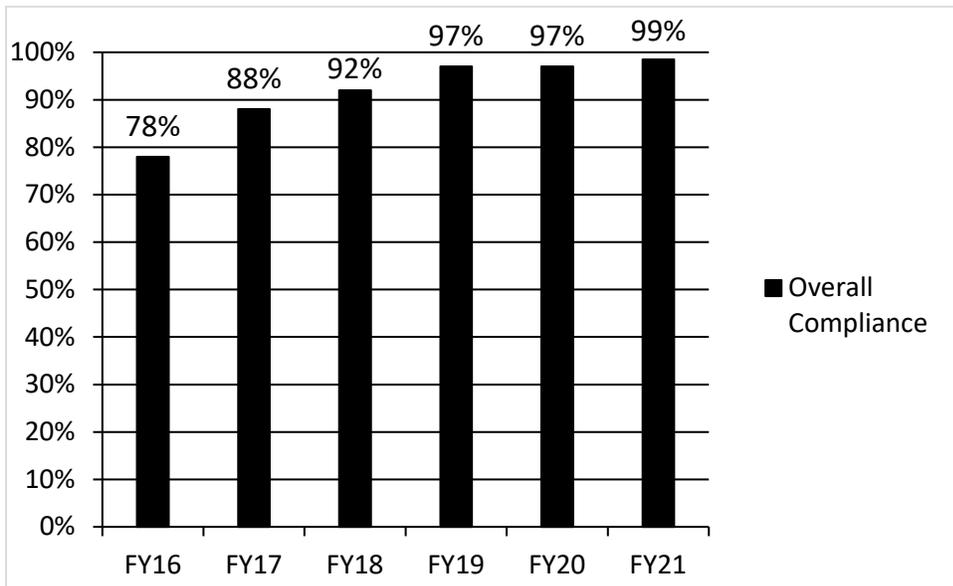


Figure 4 Foam Ban Compliance Rates

Table 1 Coal Tar Pavement Sealant Ban Inspections and Compliance Rates

Fiscal Year	Inspections	Positive CT Field Tests	Overall Compliance (%)
FY11	36	13	66.7
FY12	79	2	96.21
FY13	163	6	97.6
FY14	190	9	99.48
FY15	83	1	100
FY16	60	0	100
FY17	64	4*	100
FY18	60	6*	100
FY19	63	1	100
FY20	63	0	100
FY21	45	0	100
TOTALS:	737	32	

4.6.2 Watershed Indicators

The Permittee shall also evaluate the effectiveness of the SWMP using multiple watershed indicators linked mostly to the assessment requirements of Part 4 of this permit, and the synthesis of those data through analysis and modeling.

In the 2021 reporting year, DOEE continued implementing the Receiving Waters Assessment Program as required in Section 4.3 of the District’s MS4 Permit. As part of this program, DOEE has developed a Rapid Stream Assessment. The intent of the Rapid Stream Assessment (RSA) is to collect information to provide a high-level overview of the entire wadeable stream network within the District. This information can help identify potential issues as well as locations that may warrant follow-up inspections or more in-depth evaluations. The information from the RSA can also serve as a baseline with which to compare information from these assessments in the future. All data collected as part of this program is housed in ArcGIS.

DOEE has assessed a total of 86.486 miles of streams within the District. DOEE field teams surveyed approximately 13 miles in the 2019 reporting period and 45 miles in the 2020 reporting period. Due to the Covid-19 pandemic, the spring 2020 field season was suspended. Training and field season resumed during the 2021 reporting period. DOEE and partners completed 12 days of surveys within the 2021 reporting period. Figure 5 shows the total number of miles assessed from 2018 through 2021. DOEE will continue surveying the remaining wadable streams in reporting year 2022.

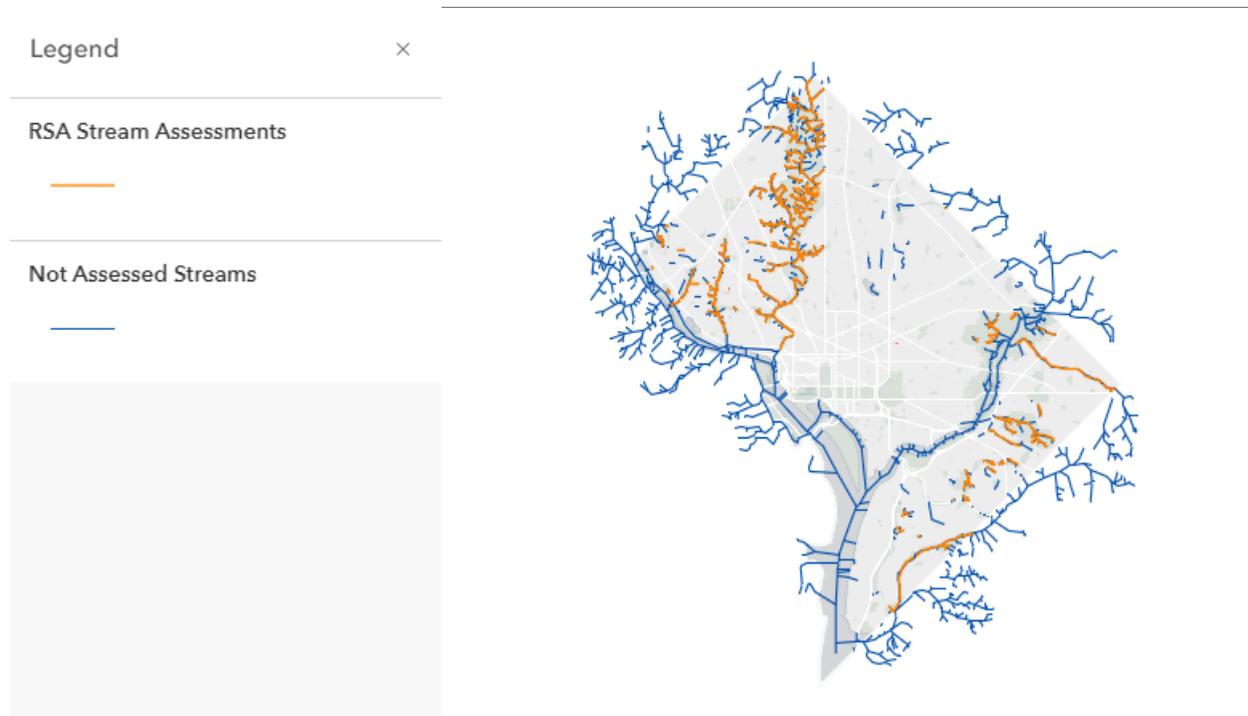


Figure 5 Rapid Stream Assessment Achievements

4.6.2.1 Estimate Annual Cumulative Pollutant Loadings

The Permittee shall estimate annual cumulative pollutant loadings for all pollutants listed in Table 7 of this permit.

DOEE continues to implement a wet weather monitoring program at representative outfalls, Table 2. The wet weather sampling summary data for the required monitoring parameters is detailed in Table 3, Table 4, and Table 5. The geometric mean for each parameter was calculated to represent the event mean concentration (EMC).

Table 2 Monitoring Site Information

Site	Outfall	Watershed
SW1	Outfall 999 - Gallatin	Anacostia
SW2	Outfall 124* - Oxon Run	Potomac
SW3	Outfall 851 - Soapstone Creek	Rock Creek
SW4	Outfall 1035 - Kenilworth and Douglas	Anacostia
SW5	Outfall 260 - 53 rd and Dix Street	Anacostia
SW6	Outfall 950 - Potomac Tributary	Potomac
SW7	Outfall 103 - Oxon Run	Potomac
SW8	Outfall 825 - Tilden and Reno	Rock Creek
SW9	Outfall 901 - Tributary to Pinehurst Br.	Rock Creek

*Outfall 124 has been reported as Outfall 123 in past annual reports (typographical error).

Table 3 Potomac Watershed Wet Weather Sampling Data 2020-2021, geometric mean

Potomac River Watershed				
Parameter	Unit	SW2	SW6	SW7
E. Coli	MPN/100ml	1,600	1,836.36333	1,600
Cadmium	mg/L	0.00039	0.00042	0.00087
Copper	mg/L	0.03142	0.01260	0.02788
Lead	mg/L	0.00950	0.00179	0.00154
Zinc	mg/L	0.11023	0.04388	0.12350
Total Suspended Solids	mg/L	16.15549	5.25600	36.49658
Phosphorus, Total	mg/L	0.38949	0.17218	0.56921
Nitrogen, Total	mg/L	2.95449	2.89482	2.68701

n=3

Note: where value is < (less than) or non-detect, the Detection Limit (DL) value is used

Table 4 Anacostia Watershed Wet Weather Sampling Data 2020-2021, geometric mean

Anacostia River Watershed				
Parameter	Unit	SW1	SW4	SW5
E. Coli	MPN/100ml	692.99128	1836.51514	1,836.51514
Cadmium	mg/L	0.00025	0.00025	0.00033
Copper	mg/L	0.00715	0.00888	0.00635
Lead	mg/L	0.00192	0.00462	0.00199
Zinc	mg/L	0.04192	0.04868	0.03881
Total Suspended Solids	mg/L	8.52151	11.64775	24.44985
Phosphorus, Total	mg/L	0.22731	0.10973	0.30479
Nitrogen, Total	mg/L	2.31213	4.27321	3.98125

n=3

Note: where value is < (less than) or non-detect, the Detection Limit (DL) value is used

Table 5 Rock Creek Watershed Wet Weather Sampling Data 2020-2021, geometric mean

Rock Creek Watershed				
Parameter	Unit	SW3	SW8	SW9
E. Coli	MPN/100ml	1836.36333	1600.00000	1967.57719
Cadmium	mg/L	0.00025	0.00042	0.00024
Copper	mg/L	0.02105	0.01210	0.01720
Lead	mg/L	0.00616	0.00222	0.00210
Zinc	mg/L	0.06619	0.05182	0.03810
Total Suspended Solids	mg/L	22.80234	13.28748	19.56528
Phosphorus, Total	mg/L	0.46796	0.27642	0.38171
Nitrogen, Total	mg/L	3.62579	1.80852	1.61043

n=3 except SW3, which is n=1

Note: where value is < (less than) or non-detect, the Detection Limit (DL) value is used

Table 6 provides the annual cumulative pollutant load occurring in the three main watersheds within the District.

Table 6 Annual Cumulative Pollutant Load in Each Watershed

	Rock Creek	Anacostia River	Potomac River	Total	Units
Total Suspended Solids	808,000	222,000	1,032,000	2,062,000	pounds
Total Nitrogen	116,222.8	67,797.7	127,173.9	311,194	Pounds
Total Phosphorous	16,687.9	4,102.6	17,063.4	37,854	Pounds
Copper	745.1	292.8	1,404.9	2,443	Pounds
Lead	203.1	95.9	425.1	724	Pounds
Zinc	2,442.9	477.6	4,014	6,935	Pounds
Cadmium	9.7	7.8	17.8	35	Pounds
E. coli	3.19E+14	1.91E+14	3.4E+14	8.50E+14	MPN/100ml

DOEE calculated the potential pollutant load and volume reductions achieved through the annual BMP implementation, Table 7. The load and volume reduction estimates were developed using the District’s Implementation Plan Modeling Tool (IPMT). With the permit’s green roof installation requirement being met this reporting period, DOEE has also included the square footage of green roofs installed in each watershed to date, Table 8.

Table 7 Pollutant Load Reductions, 07/01/2020 - 06/30/2021

Watershed	Runoff Retained (gallons)	TN (lbs)	TP (lbs)	TSS (lbs)	E. coli (Billion MPN)	Copper (lbs)	Lead (lbs)	Cadmium ¹ (lbs)	Zinc (lbs)
Anacostia	53,430,153	1,590	184	36,255	30,034	25.35	7.79	8.53	58.55
Rock Creek	19,785,876	576	67	9,752	10,811	9.15	2.80	3.07	17.69
Potomac River	13,603,983	406	47	5,658	7,581	6.39	1.97	2.16	12.35
Total	86,820,012	2,572	298	51,665	48,426	40.9	12.6	13.8	88.59

¹ An EPA report (402-R-99-004B- linked below) that reviewed several studies with varied site conditions has documented mean partition coefficients for metals. DOEE used these metal-specific partition coefficients (Kd) and associated particle associated fraction (fp) values to model pollutant reduction for these metals through BMP implementation. Since many of the relevant low impact development (LID) practices have similar removal rates for lead and cadmium, the relationship between these two metals, their fp values, and the areas retrofitted were used to

estimate cadmium reductions achieved through the Retrofit Program. DOEE will continue to use this methodology to estimate the pollutant load reduction for cadmium in Annual Reports.

EPA Report: <http://www.epa.gov/sites/production/files/2015-05/documents/402-r-99-004b.pdf>

2. Note that summations include MS4, Direct Drainage, and CSS areas.

Table 8 Square Feet of Green Roofs Installed in Each Watershed

	2018-2019	2019-2020	2020-2021	Total
Anacostia	89,378	214,551	257,529	561,458
Rock Creek	15,895	217	101,182	117,294
Potomac	62,912	60,754	53,643	177,309
Total	168,185	275,522	412,354	856,061

As required, DOEE has attached all WLA benchmarks to this annual report, Table 11. This table provides a watershed scale summary that includes load reductions MS4 and direct drainage area for each non-CSS watersheds. The color coding indicates whether the Wasteload Allocation (WLA) has been achieved for that waterbody/pollutant combination, Table 10.

Table 9 Table Key

Green cells indicate that the WLA has already been achieved for that waterbody and pollutant combination.
Blue cells indicate that the benchmark load reduction was achieved or exceeded for that waterbody and pollutant combination.
Orange cells indicate that the benchmark load reduction was not achieved for that waterbody and pollutant combination.
Grey cells indicate that there is no MS4 WLA for that waterbody and pollutant combination, and therefore no benchmark has been established. Load reductions are provided for informational purposes only.

Table 10 Overall Summary of WLA Benchmark Achievements, 07/01/2020 - 06/30/2021

WLA Achieved	32
Benchmark Achieved	51
Benchmark Not Achieved	124
No WLA or benchmark	849

Table 11 Pollutant Load Reductions from BMP Implementation with WLA Benchmarks, 07/01/2020 to 06/30/2021

Watershed	Runoff Retained (gallons)	TN (lbs)	TP (lbs)	TSS (lbs)	Fecal Coliform (billion MPN)	BO D (lbs)	Oil and Grease (lbs)	Arsenic (lbs)	Copper (lbs)	Lead (lbs)	Cadmium ¹ (lbs)	Mercury (lbs)	Zinc (lbs)	Chlordane (lbs)	DDD (lbs)	DDE (lbs)	DDT (lbs)	Dieldrin (lbs)	Heptachlor Epoxide (lbs)	PAH1 (lbs)	PAH2 (lbs)	PAH3 (lbs)	TPC B (lbs)	E. coli (Billion MPN)
Anacostia	33,123,536	999.42	115.90	22,811.6	18,846	10,109	1,156.9	4.6 E-01	1.6 E+01	4.9 E+00	5.4E+00	5.6 E-02	3.7 E+01	2.8 E-03	9.0 E-04	4.1 E-03	1.0 E-02	8.0 E-05	2.6 E-04	1.8 E-01	1.2 E+00	8.3 E-01	2.4E-02	7,563.7
Anacostia Lower	15,461,603	463.95	53.89	10,715.8	8,839	4,705	498.4	2.1 E-01	7.4 E+00	2.3 E+00	2.5E+00	2.6 E-02	1.7 E+01	1.3 E-03	4.2 E-04	1.9 E-03	4.9 E-03	3.7 E-05	1.2 E-04	8.5 E-02	5.6 E-01	3.9 E-01	1.1E-02	3,547.3
Anacostia Upper	17,661,933	535.47	62.01	12,095.8	10,007	5,404	658.5	2.4 E-01	8.4 E+00	2.6 E+00	2.8E+00	3.0 E-02	2.0 E+01	1.5 E-03	4.8 E-04	2.2 E-03	5.5 E-03	4.3 E-05	1.4 E-04	9.7 E-02	6.4 E-01	4.4 E-01	1.3E-02	4,016.4
ANATF_DC	29,197,242	593.83	70.18	13,903.0	11,371	5,750	773.9	2.7 E-01	9.5 E+00	3.0 E+00	3.3E+00	3.4 E-02	2.2 E+01	1.6 E-03	5.4 E-04	2.5 E-03	6.2 E-03	4.5 E-05	1.5 E-04	1.0 E-01	7.0 E-01	5.1 E-01	1.4E-02	4,563.7
ANATF_MD	4,522,845	69.18	7.76	1,487.1	1,224	650	64.5	3.0 E-02	1.0 E+00	3.2 E-01	3.5E-01	3.7 E-03	2.4 E+00	1.8 E-04	5.8 E-05	2.6 E-04	6.7 E-04	5.1 E-06	1.7 E-05	1.2 E-02	7.7 E-02	5.4 E-02	1.6E-03	491.1

Battery Kemble Creek	133,451	3.70	0.42	46.9	69	31	3.7	1.7 E-03	5.9 E-02	1.8 E-02	1.9E-02	2.1 E-04	1.1 E-01	1.1 E-05	3.3 E-06	1.5 E-05	3.8 E-05	3.2 E-07	1.1 E-06	7.3 E-04	4.6 E-03	3.0 E-03	9.0E-05	27.7
Broad Branch	3,406,843	97.6 9	11.3 2	1,772 .0	1,823	673	140.8	4.5 E-02	1.5 E+00	4.7 E-01	5.2E-01	5.5 E-03	3.0 E+00	2.8 E-04	8.8 E-05	3.9 E-04	1.0 E-03	8.2 E-06	2.7 E-05	1.9 E-02	1.2 E-01	8.0 E-02	2.4E-03	731.8
C&O Canal	757,234	21.1 7	2.42	265.9	392	177	21.2	9.7 E-03	3.3 E-01	1.0 E-01	1.1E-01	1.2 E-03	6.4 E-01	6.2 E-05	1.9 E-05	8.4 E-05	2.2 E-04	1.8 E-06	6.0 E-06	4.2 E-03	2.6 E-02	1.7 E-02	5.1E-04	157.4
Dalecarlia Tributary	2,313,777	65.9 4	7.58	841.8	1,228	542	68.7	3.0 E-02	1.0 E+00	3.2 E-01	3.5E-01	3.7 E-03	2.0 E+00	1.9 E-04	5.9 E-05	2.6 E-04	6.8 E-04	5.6 E-06	1.8 E-05	1.3 E-02	8.1 E-02	5.4 E-02	1.6E-03	492.7
Dumbarton Oaks	397,497	11.0 2	1.26	197.4	206	79	13.8	5.1 E-03	1.8 E-01	5.3 E-02	5.8E-02	6.3 E-04	3.4 E-01	3.3 E-05	1.0 E-05	4.4 E-05	1.1 E-04	9.6 E-07	3.2 E-06	2.2 E-03	1.4 E-02	8.9 E-03	2.7E-04	82.6
Fenwick Branch	265,870	8.27	0.95	156.3	156	53	9.2	3.8 E-03	1.3 E-01	4.1 E-02	4.5E-02	4.6 E-04	2.6 E-01	2.3 E-05	7.5 E-06	3.4 E-05	8.6 E-05	6.4 E-07	2.1 E-06	1.5 E-03	9.7 E-03	7.0 E-03	2.0E-04	62.8
Fort Chaplin Tributary	87,197	2.55	0.29	53.4	45	26	2.7	1.1 E-03	3.8 E-02	1.2 E-02	1.3E-02	1.4 E-04	8.8 E-02	7.2 E-06	2.2 E-06	9.7 E-06	2.5 E-05	2.1 E-07	7.0 E-07	4.8 E-04	3.0 E-03	2.0 E-03	5.9E-05	18.1
Fort Davis Tributary	71,630	2.16	0.24	43.8	37	21	2.2	9.2 E-04	3.2 E-02	9.5 E-03	1.0E-02	1.1 E-04	7.2 E-02	5.9 E-06	1.8 E-06	8.0 E-06	2.0 E-05	1.7 E-07	5.7 E-07	3.9 E-04	2.5 E-03	1.6 E-03	4.8E-05	14.9
Fort Dupont Tributary	71,837	2.19	0.24	44.0	37	22	2.2	9.2 E-04	3.2 E-02	9.6 E-03	1.0E-02	1.1 E-04	7.3 E-02	5.9 E-06	1.8 E-06	8.0 E-06	2.1 E-05	1.7 E-07	5.7 E-07	3.9 E-04	2.5 E-03	1.6 E-03	4.8E-05	14.9
Fort Stanton Tributary	572,525	24.4 7	2.87	635.5	486	172	17.4	1.1 E-02	3.9 E-01	1.3 E-01	1.4E-01	1.4 E-03	9.5 E-01	5.5 E-05	2.3 E-05	1.1 E-04	2.6 E-04	1.4 E-06	4.6 E-06	3.2 E-03	2.6 E-02	2.3 E-02	5.8E-04	195.0
Foundry Branch	45,990	1.27	0.15	16.1	24	11	1.3	5.9 E-04	2.0 E-02	6.1 E-03	6.7E-03	7.3 E-05	3.9 E-02	3.8 E-06	1.2 E-06	5.1 E-06	1.3 E-05	1.1 E-07	3.7 E-07	2.5 E-04	1.6 E-03	1.0 E-03	3.1E-05	9.6
Hickey Run	2,821,331	89.4 3	10.9 8	2,150 .8	1,748	858	174.9	4.2 E-02	1.5 E+00	4.6 E-01	5.0E-01	5.1 E-03	3.4 E+00	2.4 E-04	8.3 E-05	3.8 E-04	9.6 E-04	6.9 E-06	2.3 E-05	1.6 E-02	1.1 E-01	7.8 E-02	2.2E-03	701.4
Kingman Lake	460,936	14.6 0	1.68	338.7	276	138	14.5	6.6 E-03	2.3 E-01	7.2 E-02	7.9E-02	8.2 E-04	5.4 E-01	3.9 E-05	1.3 E-05	6.0 E-05	1.5 E-04	1.1 E-06	3.7 E-06	2.5 E-03	1.7 E-02	1.2 E-02	3.5E-04	110.9
Klingle Valley Run	36,475	1.01	0.12	18.1	19	7	1.3	4.7 E-04	1.6 E-02	4.9 E-03	5.3E-03	5.8 E-05	3.1 E-02	3.0 E-06	9.1 E-07	4.0 E-06	1.0 E-05	8.8 E-08	2.9 E-07	2.0 E-04	1.3 E-03	8.2 E-04	2.5E-05	7.6
Lower Beaverdam Creek																								
Luzon Branch	4,656,308	129. 83	14.8 9	2,327 .7	2,422	920	167.8	6.0 E-02	2.1 E+00	6.2 E-01	6.8E-01	7.4 E-03	4.0 E+00	3.8 E-04	1.2 E-04	5.2 E-04	1.3 E-03	1.1 E-05	3.7 E-05	2.6 E-02	1.6 E-01	1.0 E-01	3.1E-03	972.0
Melvin Hazen Valley Branch	879,167	24.8 6	2.85	448.4	464	174	30.5	1.1 E-02	3.9 E-01	1.2 E-01	1.3E-01	1.4 E-03	7.6 E-01	7.2 E-05	2.2 E-05	1.0 E-04	2.6 E-04	2.1 E-06	7.0 E-06	4.8 E-03	3.1 E-02	2.0 E-02	6.0E-04	186.3
Nash Run	3,284,499	96.0 6	11.0 7	2,179 .8	1,814	1,015	109.7	4.4 E-02	1.5 E+00	4.7 E-01	5.1E-01	5.5 E-03	3.5 E+00	2.7 E-04	8.7 E-05	3.9 E-04	1.0 E-03	8.0 E-06	2.6 E-05	1.8 E-02	1.2 E-01	7.9 E-02	2.3E-03	728.1
Normanstone Creek	131,618	3.72	0.43	67.4	70	26	4.6	1.7 E-03	5.9 E-02	1.8 E-02	2.0E-02	2.1 E-04	1.1 E-01	1.1 E-05	3.4 E-06	1.5 E-05	3.8 E-05	3.2 E-07	1.1 E-06	7.2 E-04	4.6 E-03	3.0 E-03	9.0E-05	28.0
Northwest Branch	3,985,451	119. 33	13.5 4	2,614 .5	2,181	1,212	121.6	5.3 E-02	1.8 E+00	5.6 E-01	6.2E-01	6.6 E-03	4.3 E+00	3.3 E-04	1.0 E-04	4.7 E-04	1.2 E-03	9.7 E-06	3.2 E-05	2.2 E-02	1.4 E-01	9.5 E-02	2.8E-03	875.2
Oxon Run	3,383,154	100. 74	11.5 1	1,290 .3	1,854	821	99.3	4.5 E-02	1.6 E+00	4.8 E-01	5.3E-01	5.6 E-03	3.0 E+00	2.8 E-04	8.9 E-05	4.0 E-04	1.0 E-03	8.2 E-06	2.7 E-05	1.9 E-02	1.2 E-01	8.2 E-02	2.4E-03	743.9
Pinehurst Branch	342,414	9.82	1.12	174.6	181	68	11.9	4.5 E-03	1.5 E-01	4.7 E-02	5.1E-02	5.5 E-04	3.0 E-01	2.8 E-05	8.7 E-06	3.9 E-05	1.0 E-04	8.3 E-07	2.7 E-06	1.9 E-03	1.2 E-02	7.9 E-03	2.3E-04	72.5

Piney Branch	13,207	0.37	0.04	6.6	7	3	0.5	1.7 E-04	5.8 E-03	1.8 E-03	1.9E-03	2.1 E-05	1.1 E-02	1.1 E-06	3.3 E-07	1.5 E-06	3.8 E-06	3.2 E-08	1.1 E-07	7.3 E-05	4.6 E-04	3.0 E-04	8.9E-06	2.7
Pope Branch	163,319	4.56	0.52	100.0	85	49	5.0	2.1 E-03	7.2 E-02	2.2 E-02	2.4E-02	2.6 E-04	1.6 E-01	1.3 E-05	4.1 E-06	1.8 E-05	4.7 E-05	4.0 E-07	1.3 E-06	9.0 E-04	5.7 E-03	3.7 E-03	1.1E-04	33.9
Portal Branch	45,990	1.39	0.15	22.8	24	9	1.6	5.9 E-04	2.0 E-02	6.1 E-03	6.7E-03	7.3 E-05	3.9 E-02	3.8 E-06	1.2 E-06	5.1 E-06	1.3 E-05	1.1 E-07	3.7 E-07	2.5 E-04	1.6 E-03	1.0 E-03	3.1E-05	9.6
Potomac Lower	4,854,710	141.55	16.18	1,807.0	2,616	1,166	140.5	6.4 E-02	2.2 E+00	6.8 E-01	7.4E-01	7.9 E-03	4.3 E+00	4.0 E-04	1.3 E-04	5.6 E-04	1.4 E-03	1.2 E-05	3.9 E-05	2.7 E-02	1.7 E-01	1.1 E-01	3.4E-03	1,049.7
Potomac Middle	601,308	22.96	3.17	359.1	463	141	75.1	1.0 E-02	3.8 E-01	1.3 E-01	1.4E-01	1.3 E-03	7.5 E-01	5.3 E-05	2.1 E-05	1.0 E-04	2.4 E-04	1.5 E-06	4.8 E-06	3.3 E-03	2.4 E-02	2.2 E-02	5.5E-04	185.7
Potomac Upper	6,178,435	179.72	20.64	2,312.0	3,341	1,448	180.0	8.2 E-02	2.8 E+00	8.7 E-01	9.5E-01	1.0 E-02	5.4 E+00	5.1 E-04	1.6 E-04	7.2 E-04	1.8 E-03	1.5 E-05	4.9 E-05	3.4 E-02	2.2 E-01	1.5 E-01	4.3E-03	1,340.8
POTTF_DC	22,964,241	450.63	52.46	7,614.6	8,473	3,245	523.7	2.1 E-01	7.1 E+00	2.2 E+00	2.4E+00	2.5 E-02	1.4 E+01	1.3 E-03	4.1 E-04	1.8 E-03	4.7 E-03	3.6 E-05	1.2 E-04	8.2 E-02	5.4 E-01	3.8 E-01	1.1E-02	3,400.7
POTTF_MD	2,448,559	25.73	2.96	329.1	471	200	27.9	1.1 E-02	4.0 E-01	1.2 E-01	1.3E-01	1.4 E-03	7.7 E-01	7.1 E-05	2.3 E-05	1.0 E-04	2.6 E-04	2.1 E-06	6.8 E-06	4.7 E-03	3.0 E-02	2.1 E-02	6.0E-04	189.2
Rock Creek Lower	2,194,284	74.68	9.24	1,562.2	1,505	520	76.0	3.5 E-02	1.2 E+00	4.0 E-01	4.4E-01	4.3 E-03	2.5 E+00	1.9 E-04	7.0 E-05	3.3 E-04	8.2 E-04	5.3 E-06	1.8 E-05	1.2 E-02	8.6 E-02	6.9 E-02	1.8E-03	604.1
Rock Creek Upper	12,180,614	346.33	39.80	6,240.3	6,451	2,407	451.3	1.6 E-01	5.5 E+00	1.7 E+00	1.8E+00	2.0 E-02	1.1 E+01	1.0 E-03	3.1 E-04	1.4 E-03	3.6 E-03	2.9 E-05	9.7 E-05	6.7 E-02	4.3 E-01	2.8 E-01	8.3E-03	2,589.1
Soapstone Creek	764,794	24.01	2.75	446.8	448	151	26.5	1.1 E-02	3.8 E-01	1.2 E-01	1.3E-01	1.3 E-03	7.3 E-01	6.5 E-05	2.1 E-05	9.7 E-05	2.5 E-04	1.9 E-06	6.1 E-06	4.2 E-03	2.8 E-02	2.0 E-02	5.7E-04	179.7
Texas Avenue Tributary	47,766	1.34	0.15	29.2	25	14	1.5	6.1 E-04	2.1 E-02	6.4 E-03	7.0E-03	7.6 E-05	4.8 E-02	3.9 E-06	1.2 E-06	5.3 E-06	1.4 E-05	1.2 E-07	3.8 E-07	2.6 E-04	1.7 E-03	1.1 E-03	3.2E-05	9.9
Tidal Basin	76,122	2.11	0.24	26.7	39	18	2.1	9.8 E-04	3.4 E-02	1.0 E-02	1.1E-02	1.2 E-04	6.4 E-02	6.2 E-06	1.9 E-06	8.5 E-06	2.2 E-05	1.8 E-07	6.1 E-07	4.2 E-04	2.6 E-03	1.7 E-03	5.1E-05	15.8
Washington Ship Channel	512,500	20.50	2.89	327.9	417	120	72.6	9.2 E-03	3.4 E-01	1.1 E-01	1.2E-01	1.1 E-03	6.8 E-01	4.6 E-05	1.9 E-05	9.0 E-05	2.2 E-04	1.2 E-06	4.1 E-06	2.8 E-03	2.1 E-02	2.0 E-02	4.9E-04	167.3
Watts Branch	1,643,782	48.27	5.58	1,053.8	883	493	64.9	2.2 E-02	7.5 E-01	2.3 E-01	2.5E-01	2.7 E-03	1.7 E+00	1.4 E-04	4.3 E-05	1.9 E-04	4.9 E-04	4.0 E-06	1.3 E-05	9.0 E-03	5.8 E-02	3.9 E-02	1.1E-03	354.5
Watts Branch - Lower	925,380	26.77	3.19	614.1	511	278	43.0	1.2 E-02	4.3 E-01	1.3 E-01	1.5E-01	1.5 E-03	1.0 E+00	7.7 E-05	2.5 E-05	1.1 E-04	2.8 E-04	2.2 E-06	7.4 E-06	5.1 E-03	3.3 E-02	2.2 E-02	6.5E-04	205.2
Watts Branch - Upper	718,402	21.50	2.40	439.7	372	215	21.9	9.2 E-03	3.2 E-01	9.6 E-02	1.0E-01	1.1 E-03	7.3 E-01	5.9 E-05	1.8 E-05	8.0 E-05	2.1 E-04	1.7 E-06	5.7 E-06	3.9 E-03	2.5 E-02	1.6 E-02	4.8E-04	149.3
CSS - Anacostia	20,306,617	590.30	68.44	13,443.2	11,188	6,218	717.2	2.7 E-01	9.5 E+00	2.9 E+00	3.2E+00	3.4 E-02	2.2 E+01	1.7 E-03	5.4 E-04	2.4 E-03	6.2 E-03	4.9 E-05	1.6 E-04	1.1 E-01	7.3 E-01	4.9 E-01	1.4E-02	4,490.2
CSS - Potomac	1,969,530	62.08	7.20	1,179.9	1,161	389	74.8	2.8 E-02	9.7 E-01	3.1 E-01	3.4E-01	3.4 E-03	1.9 E+00	1.7 E-04	5.5 E-05	2.5 E-04	6.4 E-04	4.8 E-06	1.6 E-05	1.1 E-02	7.2 E-02	5.3 E-02	1.5E-03	466.1
CSS - Rock Creek	5,410,978	155.00	17.69	1,949.7	2,855	1,270	156.7	7.1 E-02	2.4 E+00	7.4 E-01	8.1E-01	8.7 E-03	4.6 E+00	4.5 E-04	1.4 E-04	6.1 E-04	1.6 E-03	1.3 E-05	4.3 E-05	3.0 E-02	1.9 E-01	1.2 E-01	3.7E-03	1,145.7

Note that summations include MS4 and Direct Drainage areas. There is no distinction between runoff draining into a water body and runoff that is conveyed in collection system within the three CSS segments.

"" indicates no reductions resulted from BMP implementation.

1. An EPA report (402-R-99-004B- linked below) that reviewed several studies with varied site conditions has documented mean partition coefficients for metals. DOEE used these metal-specific partition coefficients (K_d) and associated particle associated fraction (f_p) values to model pollutant reduction for these metals through BMP implementation. Since many of the relevant low impact development (LID) practices have similar removal rates for lead and cadmium, the relationship between these two metals, their f_p values, and the areas retrofitted were used to estimate cadmium reductions achieved through the Retrofit Program. DOEE will continue to use this methodology to estimate the pollutant load reduction for cadmium in Annual Reports. <http://www.epa.gov/sites/production/files/2015-05/documents/402-r-99-004b.pdf>.

4.6.2.2 Estimate Progress Towards all Numeric Limits

The Permittee shall estimate annual progress towards all numeric limits in Subsection 1.5.3.1 of this permit for acres managed and pounds of trash in the Anacostia River.

The District continues to implement and enforce its Stormwater Management Program in accordance with the MS4 Permit and the Revised Stormwater Management Plan. This reporting year, the District has made progress towards achieving the numeric limits of section 1.5.3.1 of the District’s MS4 Permit (Table 13, Table 17). Based on current implementation rates, DOEE expects to achieve or surpass the requirements by the end of this permit term.

DOEE has made progress towards the Acres Managed requirements of Section 1.5. Table 12 shows the acres managed reported in the previous reports. Table 13 shows the updated acres managed numbers for all three reporting years. The 2019 and 2020 acres managed increased by 129 acres and 107 acres, respectively. This is due to newly added or updated BMP records that previously had been excluded from analysis. For example, trees installed as part of the RiverSmart Homes program had not been entered into the Surface and Groundwater System (SGS) for several years. Rerunning the model with these newly added BMPs increased the acres managed for 2019 and 2020. In addition, EPA approved DOEE’s stream restoration equivalent acres managed methodology in November 2021, which resulted in additional increases in 2019 and 2021. The progress achieved during this reporting period is outlined in Table 14. Table 15 outlines the updated progress toward acres managed for the 2020 reporting period. Table 16 shows the updated progress toward acres managed for the 2019 reporting period.

Table 12 Original Acres Managed Table (As Published in Previous MS4 Annual Reports)

Reporting Year	2019	2020	2021	2022	2023
Date Range	10/01/17-06/30/2019	07/01/19 - 06/30/20	07/01/20 - 06/3/21		
Anacostia River	119	81			
Rock Creek	26	23			
Potomac River	82	36			
Public Right- of-Way	7	97			
Total	233	237			

Table 13 Revised Acres Managed Table

Reporting Year	2019	2020	2021	2022	2023
Date Range	10/01/17-06/30/2019	07/01/19 - 06/30/20	07/01/20 - 06/3/21		
Anacostia	148	86	81		
Rock Creek	55	24	36		
Potomac River	134	126	39		
Public Right-of-Way	25	108	19		
Total	362	344	176		

Table 14 Annual Progress Towards Numeric Limits of the MS4 Permit for Acres Managed, 07/01/2020 - 06/30/2021

Major Drainage Basin	Sewershed	Regulated PROW (square feet)	Regulated Non-PROW Parcels (square feet)	Voluntary Retrofits (square feet)	Total (square feet)	Total (acres)	TMDL IP Target (acres)
Anacostia	CSS	245,030	2,076,261	367,428	2,688,719	62	
	MS4	663,803	2,650,187	888,413	4,202,404	96	110
	MS4 + CSS	908,833	4,726,448	1,255,842	6,891,123	158	
Rock Creek	CSS	19,453	312,049	344,602	676,104	16	
	MS4	2,016	1,073,969	495,804	1,571,789	36	30
	MS4 + CSS	21,469	1,386,018	840,406	2,247,893	52	
Potomac	CSS	9,830	223,282	60,793	293,905	7	
	MS4	174,413	905,698	799,590	1,879,702	43	67
	MS4 + CSS	184,244	1,128,980	860,383	2,173,607	50	
TOTAL	CSS	274,313	2,611,592	772,823	3,658,728	84	-
	MS4	840,232	4,629,854	2,183,807	7,653,894	176	208
	MS4 + CSS	1,114,546	7,241,446	2,956,631	11,312,623	260	-

Table 15 Annual Progress Towards Numeric Limits of the MS4 Permit for Acres Managed, 07/01/2019 - 06/30/2020

Major Drainage Basin	Sewershed	Regulated PROW (square feet)	Regulated Non-PROW Parcels (square feet)	Voluntary Retrofits (square feet)	Total (square feet)	Total (acres)	TMDL IP Target (acres)
Anacostia	CSS	727,035	2,494,569	676,268	3,897,872	89	
	MS4	184,450	2,943,193	1,473,297	4,600,940	106	110
	MS4 + CSS	911,485	5,437,762	2,149,565	8,498,813	195	
Rock Creek	CSS	471,870	1,613,312	298,394	2,383,576	55	
	MS4	2,833,729	241,283	1,227,236	4,302,248	99	30
	MS4 + CSS	3,305,600	1,854,595	1,525,629	6,685,824	153	
Potomac	CSS	146,836	250,074	390,284	787,194	18	
	MS4	509,443	5,202,178	384,843	6,096,464	140	67
	MS4 + CSS	656,279	5,452,252	775,127	6,883,658	158	
TOTAL	CSS	1,345,742	4,357,954	1,364,946	7,068,642	162	-
	MS4	3,527,622	8,386,654	3,085,376	14,999,653	344	208
	MS4 + CSS	4,873,364	12,744,609	4,450,321	22,068,294	507	-

Table 16 Annual Progress Towards Numeric Limits of the MS4 Permit for Acres Managed, 10/1/2017 - 06/30/2019

Major Drainage Basin	Sewershed	Regulated PROW (square feet)	Regulated Non-PROW Parcels (square feet)	Voluntary Retrofits (square feet)	Total (square feet)	Total (acres)	TMDL IP Target (acres)
Anacostia	CSS	137,224	3,459,475	895,614	4,492,313	103.13	
	MS4	882,142	4,288,673	2,177,371	7,348,185	168.69	110
	MS4 + CSS	1,019,366	7,748,148	3,072,984	11,840,498	271.82	
Rock Creek	CSS	488,901	1,134,972	491,841	2,115,715	48.57	
	MS4	51,868	1,894,974	616,521	2,563,363	58.85	30
	MS4 + CSS	540,770	3,029,947	1,108,362	4,679,078	107.42	
Potomac	CSS	52,384	597,453	90,762	740,599	17.00	
	MS4	41,509	3,281,355	2,534,410	5,857,274	134.46	67
	MS4 + CSS	93,893	3,878,808	2,625,172	6,597,873	151.47	
TOTAL	CSS	678,509	5,191,901	1,478,217	7,348,626	168.70	-
	MS4	975,520	9,465,002	5,328,301	15,768,823	362.00	208
	MS4 + CSS	1,654,028	14,656,903	6,806,518	23,117,449	530.70	-

Table 17 Annual Progress Towards Numeric Limits of the MS4 Permit for Trees Planted, Green Roofs Installed, and Trash Removed

Numeric Requirement	Achievement During Reporting Year	Percent Complete	Achievement During Permit Term
Achieve a minimum net increase of 33,525 trees in the MS4 Permit Area	8,218 trees	79.6%	26,686 trees
Install 350,000 square feet of green roofs within the MS4 Permit area	412,354 square feet	236.12%	826,411 square feet
Remove 108,347 pounds of trash annually from the Anacostia River	163,847 lbs	NA	Meeting annual trash reduction goal

4.6.2.3 Multi-faceted Suite of Indicators

Using all other data and information collected per the water quality assessment requirements of Part 4 of this permit, the Permittee shall establish a multi-faceted suite of indicators to be reported over multiple permit terms. These indicators shall address discharge quality as well as receiving water quality. These indicators shall balance current status with long-term trends in order to determine elements of the program that are effective and those needing additional improvement. This suite of indicators shall be developed in consultation with EPA and other stakeholders and finalized with submittal of the updated SWMP submitted to EPA as part of the application package for permit renewal per Section 2.10 of this permit. These indicators shall be established as long-term metrics for the SWMP and may be included as requirements in future permits.

DOEE is on track to meet this permit requirement and will be working with EPA and stakeholders to develop a multi-faceted suite of indicators that address discharge and receiving water quality.

4.6.3 Synthesis of Strengths and Areas of Improvement

In each annual report the Permittee shall provide a short synthesis of areas of the program deemed effective with ongoing effort, and areas where additional strategies are needed to effectively address certain pollutants or sources, supported by interpretation of both programmatic and watershed indicators. Conclusions shall be based on interpretations of the indicators.

Strengths

DOEE has had continued success implementing many stormwater management programs. Notable achievements include:

1. Since the expiration of the last permit and through the end of this reporting period, the District has retrofitted 637 acres in the MS4 Permit area.
2. The District has installed 412,354 square feet of green roof this reporting year.
3. Installed a sum total of 826,411 square feet of green roof in the MS4 area during this permit term.
4. Planted 8,218 net trees in MS4 area during this reporting period (accounting for mortality).
5. The 8,218 trees planted in MS4 area during this reporting period keeps the District on track to achieve the District's 40% tree canopy goal.
6. Installed 22.5 acres of green infrastructure through the Stormwater Retention Credit (SRC) Price Lock Program, with another 1.2 acres in design, permitting, and/or construction.
7. Continued the targeted trash and litter source control programs that include any food service product designed for single use, which includes foam and straws.
8. Steady increase in compliance rates for bag law, foam ban, and coal tar ban inspections.
9. Watershed Protection Division has created an MOU with Department of General Services to fund one FTE who assists with stormwater management maintenance operations.

Areas of Improvement

DOEE has identified several program areas that could be improved: interagency coordination, pollution prevention, and fertilizer law enforcement.

The District has a number of mechanisms in place to ensure that coordination across all agencies with responsibilities to implement Permit provisions occurs. However, with the increasing complexity of the Stormwater Management Program DOEE has identified a need for increased sister agency coordination. Previous coordination activities included monthly Technical Working Group meetings and quarterly Director level meetings with other agencies. To improve, DOEE has elevated interagency coordination to include the following;

1. Working with the City Administrator, Deputy Mayor for Operations and Infrastructure (DMOI), and Executive Office of the Mayor to leverage funding, support, and set priorities.
2. Holding regular BMP maintenance meetings between DOEE, DDOT, and DPW staff.
3. Increasing sister agency coordination for pollution prevention measures and compliance at District facilities.
4. Since the last permit, DOEE has made large strides in District Pollution Prevention implementation. All District critical source facilities but two have an approved SWPPP. As of the end of the reporting year, the two critical source facilities were in the process of developing SWPPPs. However, not all sister agencies are meeting all compliance requirements. Strategies that DOEE is using to improve this program are: O&M report cards, increased interagency coordination, targeted Stormwater Pollution Prevention Plan development efforts, and increased municipal staff training.
5. The District has been implementing the outreach components of the Anacostia River Clean Up and Protection Fertilizer Act of 2012. DOEE created a website and outreach materials for retailers, distributors, and lawn care professionals. DOEE is currently updating delegations of authority that will assign the inspection and compliance component internally.

3 EPA CONSENT AGREEMENT REPORTING

As required, DOEE is posting the Consent Order Status Report concurrently with the MS4 Annual Report. This report will be posted to DOEE's website on December 23, 2021 and will be found at: <https://doee.dc.gov/publication/ms4-discharge-monitoring-and-annual-reports>.

4 DISTRICT DEPARTMENT OF TRANSPORTATION PUBLIC RIGHT OF WAY OPTIMAL DESIGNS

Section 2.4 Public Right-of-Way Optimal Design

With the 2021 Annual Report, for PROW projects that do not include a design process, the Permittee shall submit a determination of standardized designs that optimize cost, performance, community palatability, climate resilience and other relevant factors.

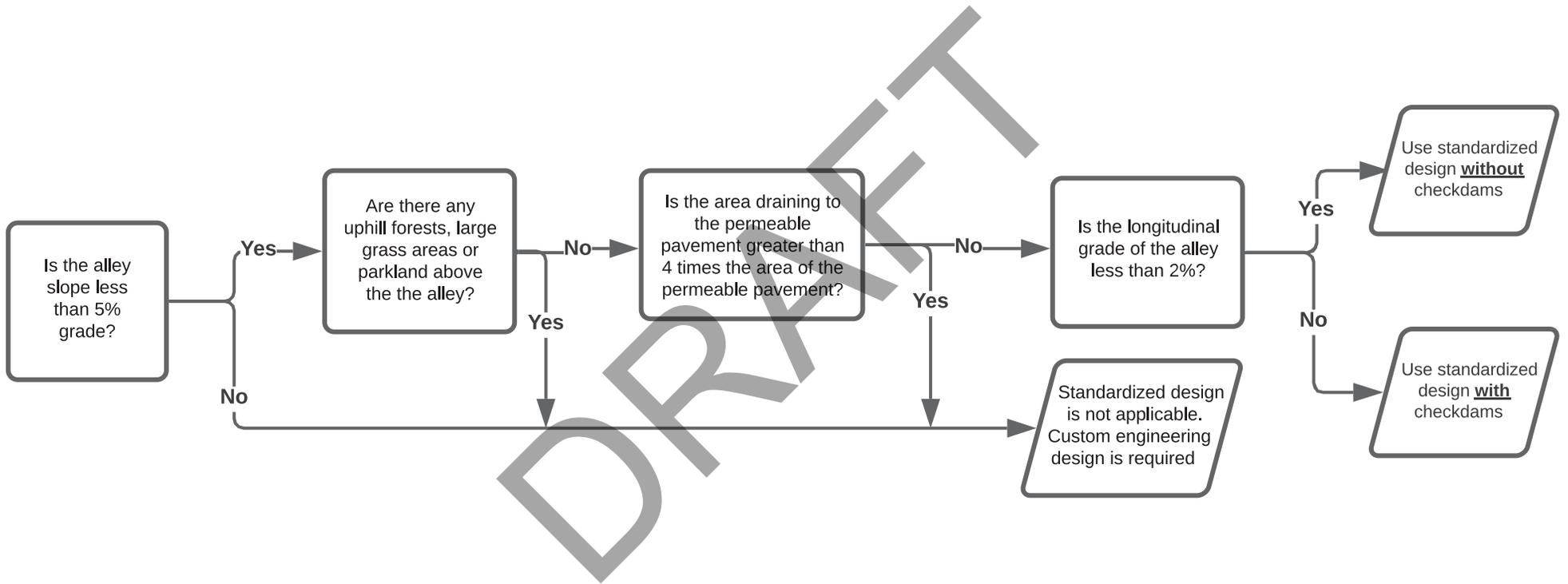
The [DDOT Green Infrastructure Standards \(2014\)](#) includes supplemental standard drawings and specifications for green infrastructure. DDOT also provides design guidance for green infrastructure in the public right of way (ROW) in the [2019 Design and Engineering Manual](#). DDOT is utilizing the existing standards to develop standardized designs for green infrastructure in the ROW. The standardized designs are intended to reduce the time and cost required for design, such that the standardized design can be used for construction quickly while being customized to local site conditions.

To do this, DDOT has identified target best management practices to standardize and has identified how the existing standards can be grouped and simplified further to minimize/eliminate design. Methods to streamline the design includes developing flow charts, tables, and companion worksheets. The standardized designs include approximate stormwater retention volume, area treated, volume treated, and the draw-down time for each BMP.

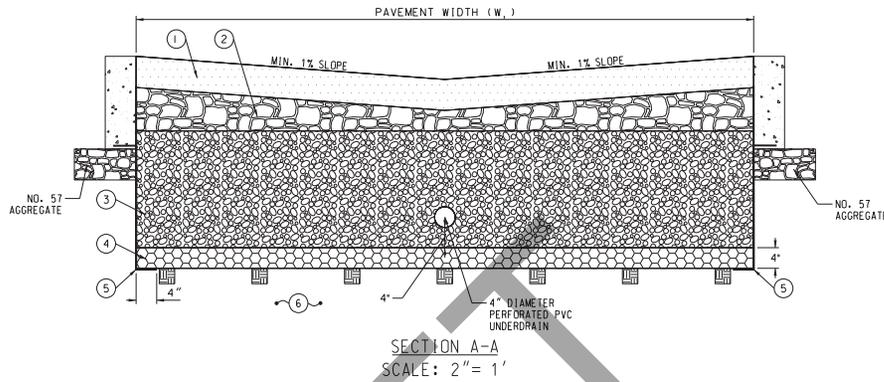
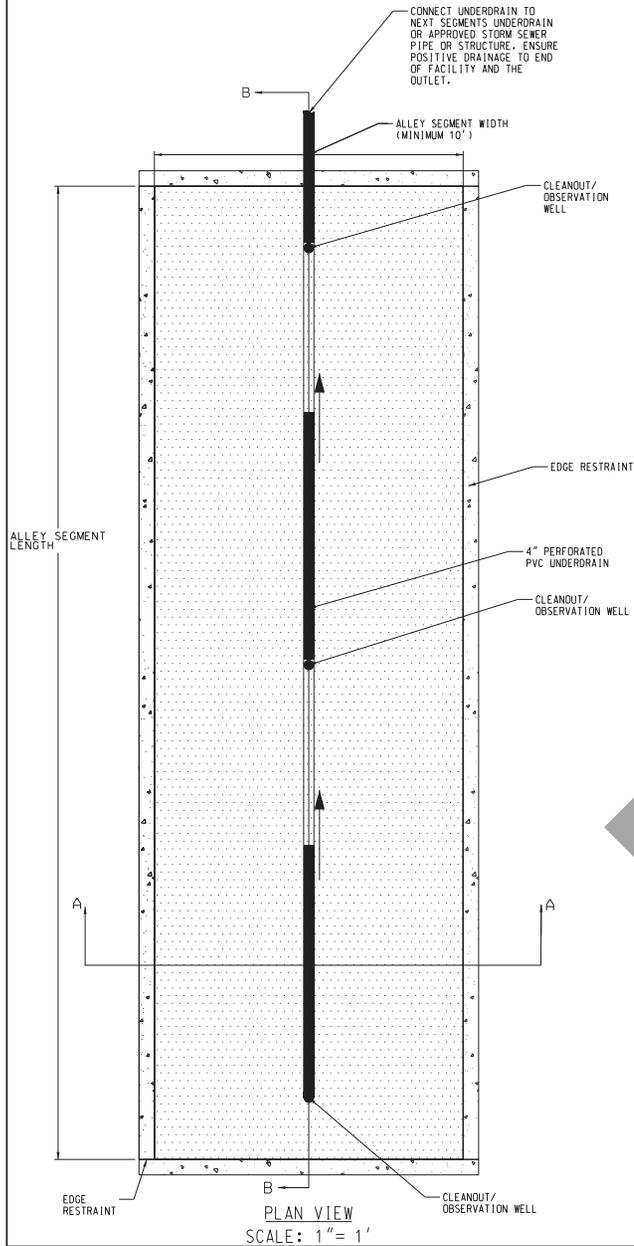
A list of deliverables is defined below, the project is at 90% design phase and will be completed by March 2022.

The deliverables for this task include but are not limited to the following:

1. List of scenarios where standardized designs can be applied
2. Standardized designs including drawings, decision trees, calculations, excel files and all files in PDF and digital formats (.dgn, .xlsx, etc.)
3. Standardized design report outlining the methodology utilized in preparing the designs, the basis for the designs and when/where each design applies. The Consultant shall prepare an outline of the report for DDOT's review and approval.



FED.	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
3	D.C.			XX

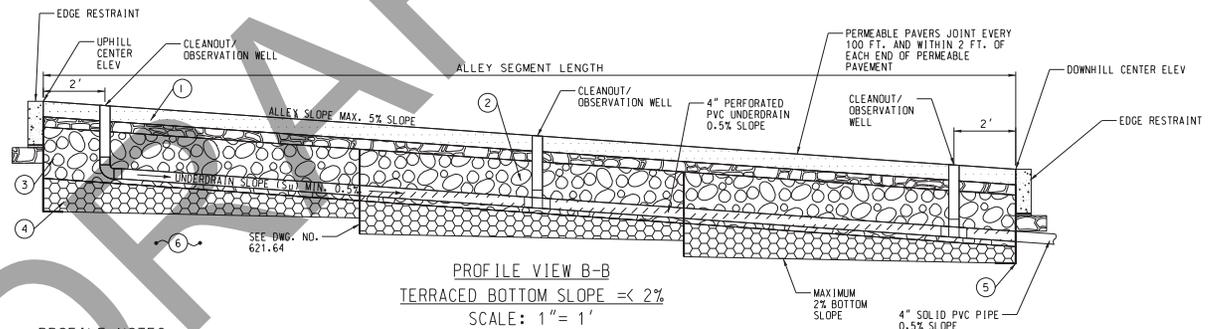


LEGEND:

- ① PERMEABLE PAVEMENT AS DIRECTED
- ② BEDDING/BASE AND/OR CHOKER LAYER
- ③ RESERVOIR LAYER, AASHTO #3
- ④ FILTER LAYER, AASHTO #8
- ⑤ GEOTEXTILE CLASS 2 OR IMPERMEABLE LINER AS DIRECTED, LOCATED ON SIDES OF PRACTICES ONLY
- ⑥ UNCOMPACTED SUBGRADE

SECTION NOTES:

1. REFER TO DC WATER GREEN INFRASTRUCTURE UTILITY PROTECTION GUIDELINES FOR UTILITY CLEARANCE DETAILS



PROFILE NOTES:

1. BOTTOM SLOPE TO BE PARALLEL TO TOP SLOPE AND GRADED NO GREATER THAN 2% LONGITUDINALLY, PER DESIGN PLANS. ENGINEER TO DESIGN SYSTEM TO ACHIEVE STORAGE, DRAW-DOWN AND STRUCTURAL REQUIREMENTS.
2. TRANSVERSE BOTTOM SLOPES AND CROSS SLOPES SHALL BE GRADED LESS THAN 3%.
3. CHECK DAMS TO BE USED FOR INSTALLATION WITH BOTTOM SLOPES GREATER THAN 2% LONGITUDINALLY.
4. DISTANCE BETWEEN STEPS IS DETERMINED BY THE SLOPE OF THE PAVEMENT TO ACHIEVE A STEP NO MORE THAN 12" TALL.

Dimension	Value	Units
Alley Segment Length		FT
Alley Segment Minimum Width		FT
Pavement Surface Type/Detail		
Surface Material Thickness		IN
Bedding/base Min. Layer Thickness		IN
Choker Layer Minimum Thickness	4	IN
Reservoir Layer Minimum Thickness	6	IN
Filter Layer Minimum Thickness	4	IN
Alley Slope		%
Maximum Bottom Slope		%
# of Check Dams		
Check Dam Spacing		FT
Check Dam Type/Details		
Impermeable Liner on Sides?		
Impermeable Liner on Bottom?		

NO.	DESCRIPTION	NAME	DATE

REVISIONS

DWG. NO.

DISTRICT OF COLUMBIA
DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE PROJECT MANAGEMENT DIVISION

PERMEABLE PAVEMENT IN ALLEY

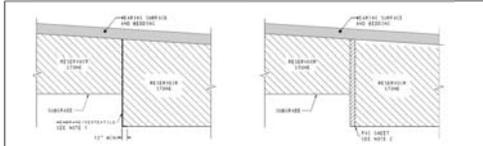
PLAN, PROFILE, AND SECTION

PROJECT ENL. _____
DESIGNED BY _____
CHECKED BY _____
DRAWN BY _____
PROJECT MGR. _____

DIVISION CHIEF _____

DATE _____
FILE _____
SHEET _____ OF _____

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
3	D.C.			XX



MEMBRANE/TEXTILE CHECK DAM
 PVC SHEET CHECK DAM

NOTES:
 1. MATERIALS MEMORANDUM ON USE OF MEMBRANE/TEXTILE PERMEABILITY IN ALLEYS IN 2020.
 2. SHALL BE AS SHOWN, UNLESS NOTED OTHERWISE.

DESIGNED BY	APPROVED BY	DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION DWG. NO. 207.04
DRAWN BY	CHECKED BY	

ALTERNATE PERMEABLE PAVEMENT CHECK DAMS

DRAFT

DWG. NO.

DISTRICT OF COLUMBIA
 DEPARTMENT OF TRANSPORTATION
 INFRASTRUCTURE PROJECT MANAGEMENT DIVISION

PERMEABLE PAVEMENT IN ALLEY

DETAILS

NO.	DESCRIPTION	NAME	DATE

PROJECT ENGR. _____
 DESIGNED BY _____
 CHECKED BY _____
 DRAWN BY _____
 PROJECT MGR. _____
 DIVISION CHIEF _____
 DATE _____
 FILE _____
 SHEET _____ OF _____