Anchorage MS4 Street Sweeping Report for 2016

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Project Management & Engineering Department

ANCHORAGE MS4 STREET SWEEPING REPORT FOR 2016

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1. Purpose

Alaska Pollutant Discharge Elimination System (APDES) Permit No. AKS-052558, Article II, Part B, Section 4.d(ii)-(v) requires the permittees, the Municipality of Anchorage (MOA) and the State of Alaska Department of Transportation and Public Facilities (ADOT&PF): to inventory and designate arterial and residential streets and large parking lots within the Anchorage Municipal Separate Storm Sewer System (MS4) for sweeping maintenance; to record and report sweeping performed along these systems on an annual basis; and to annually assess these sweeping practices relative to minimization of pollutant discharges from these systems into receiving waters. Specifically, permittees are required to submit:

- Sweeping maps: Each year permittees must submit maps of the streets and parking lots that have been designated for sweeping that year and their proposed sweeping frequency relative to the frequencies specified in this permit. Permittees must also designate those streets that they deem 'technically infeasible' for sweeping.

- Sweeping records: Permittees must submit annual records of the sweeping practices used, and the curb miles and volumes of materials swept for street and parking lots organized by sweeping event, and sweeping frequency class. Analyses of particle size distributions for samples representative of swept materials must also be submitted.

- Sweeping assessment: Permittees must annually prepare an assessment on the basis of submitted sweeping records of the effectiveness of MS4 sweeping completed that year in minimizing pollutant discharges to storm drains and receiving waters.

The permittees have completed and compiled these inventories, records and assessments and submit summaries of these data and findings in this report in compliance with this permit part. The report is organized into five major sections. Section 1.0 summarizes the purpose of this report. Section 2.0 identifies 2016 swept streets and large public parking lots as well as those streets designated infeasible for sweeping. Section 3.0 summarizes sweeping records for 2016. Section 4.0 summarizes an assessment of the permittees' sweeping effectiveness for this year. Section 5.0 includes maps and additional summary tables described in Sections 2.0 through 4.0.

2. Streets and Parking Lots Designated for Sweeping

Permit Part 3.4.5.1 requires permittees to map all streets and large public parking lots to be swept in the coming year and designate their assigned sweeping frequency relative to permit requirements. Additionally, Part 3.4.5.3 requires that permittees designate streets that are technically infeasible for sweeping, specify why, and document other trash/litter control techniques to minimize pollutant discharges to the MS4 and receiving waters. Finally, Part 3.4.5.1 requires that permittees annually "identify any significant changes" in mapping of "residential, arterial, and public parking lots" subject to regular sweeping under the permit. The following section summarizes this information. Section 2.1 identifies types of streets deemed technically infeasible for sweeping by the permittees. Section 2.2 identifies streets designated for sweeping within each of the permittees' jurisdictions. Section 2.3 identifies the public parking lots designated as large and swept by the permittees. Any changes in swept features and the basis for those changes are summarized in Sections 2.2 and 5.2.4.

2.1. Technical Feasibility for Sweeping

The permittees specify the technical infeasibility of regularly sweeping a street based on two factors: surface type and cases where the combined character of speed, access and drainage type make regular sweeping unnecessary, disruptive and/or dangerous.

Unpaved road surfaces are not technically feasible for sweeping. Such surfaces include dirt and gravel roads and also the roads that have been treated with applications of chemicals, asphaltic, or other mixtures to create a smooth, temporarily hardened surface. Treatment typically results in only a short-term hardening of the road surface with a primary intent of smoothing the road surface for traffic over the summer season. However, the treatment also serves to temporarily bind particles to reduce dust and erosion. Sweeping can speed deterioration of these surfaces and increase mobilization of fines during runoff. Therefore, these roads are not swept but may be periodically re-graded or re-treated to reduce erosion and dust generation.

High-speed, high-traffic roadways (freeways and expressways), where access is limited and drainage is provided by open channels on both sides of the road, are also not regularly swept. Regular sweeping along these street segments is considered both technically infeasible and unnecessary. Regular sweeping is technically infeasible along these roadway segments because of the speed and volume of the traffic. Regular sweeping activity along these segments would present unpredictable danger to traffic as a slow-speed obstruction. It would also limit, for prolonged periods of time, the utility of these roadways as high-speed throughways. From a more practical standpoint, regular sweeping along these segments is also generally unnecessary. Winter traction sand applications along these segments is less frequently done, significantly reducing sediment loading on the roadway. The sediment that does accumulate is rapidly removed by high-speed traffic along these segments. Wind and wheel energy generated by traffic very effectively move particulates off the paved surface and onto vegetated shoulder and median areas where these materials are collected on a seasonal or as-needed basis during shoulder maintenance.

2.2. Designated Streets for 2016 Sweeping

Permittees are required to identify and map all streets designated for sweeping and provide maps of streets swept in an annual report of these activities (3.4.5.4.1). Any changes in swept features and the basis for those changes must also be summarized. Sweeping for different parts of the Anchorage MS4 is performed by different operators, based on the jurisdictions of the MS4 owners (ADOT&PF and MOA) and the maintenance authorities assigned to different operators by the owners. Initial maps of Anchorage MS4 streets and public parking were compiled and submitted in the permittees' document 'Street Sweeping Management Plan: Anchorage MS4, May 2016', Appendix A (hereinafter, MS4 Sweeping Plan or Sweeping Management Plan).

Through various means, MOA and ADOT&PF assign maintenance administrative authorities for the Anchorage MS4 to different agencies. Each maintenance administrative agency is assigned a specific geographic area covering different portions of the Anchorage MS4 and public parking facilities. ADOT&PF assigns maintenance authority for its entire Anchorage MS4 jurisdiction to its Maintenance & Operations Division, Central Region (ADOT&PF). MOA assigns maintenance authorities for various portions of its MS4 jurisdiction to different roads and drainage 'service areas', or to particular segments of streets and roads, through Municipal administrative and Assembly-codified authorizations. The primary maintenance administrative authorities (maintenance operators) for the Anchorage MS4 facilities regulated under 3.4.5 include:

- The MOA Public Works Maintenance & Operations Division (ARDSA)
- The MOA Chugiak Eagle River Rural Road Service Area (CBERRRSA)
- The MOA Public Works Administration Division (PWA)
- The MOA Anchorage School District (ASD)
- The MOA Parks and Recreation Department (Parks).

Individual maintenance administrative authorities may further divide their assigned regions into smaller operational areas. Each maintenance authority also designates streets within its region for sweeping (based on guidelines provided by the MS4 owners and as required by the MS4 storm water permit). Operational areas are shown in Figure 5-1 and streets that were designated for sweeping in 2016 are shown in Figures 5-2 through 5-8 in Section 5.1 for each of the primary maintenance administrative agencies for the Anchorage MS4.

Changes in mapping of streets designated for sweeping have been made during the 2016 reporting period reflecting changes in features swept. Changes in streets swept are tabulated in Table 5-8 in Section 5.2.4 and are summarized below.

In 2016 ARDSA reported no changes to their inventory of streets designated for sweeping from the 2015 reporting period.

In 2016 CBERRRSA reported 44 street segments had a change in sweep practice in 2016 in order to increase overall sweeping efficiency. All 44 of those segments were swept using kick brooms in 2015, and were swept using mechanical sweepers and tandem vacuum trucks in 2016 (and will remain on CBERRRSA's pick up broom sweep list in

future years). Sweeping these street segments using mechanical sweepers and tandem vacuum trucks (rather than using kick brooms) should allow for additional sediment removal from the street surfaces and may translate to less maintenance of open channel drainage ditches adjacent to these street segments.

*Any changes to ADOT&PF management practices or streets designated for sweeping for the 2016 reporting period will be addressed in separate ADOT&PF sweeping report (Appendix E-2).

2.3. Designated Large Public Parking Lots

Section 3.4.5 specifies that permittees must identify and designate those large parking lots for sweeping that serve schools, cultural facilities, plazas, sports and event venues and similar facilities. The permittees have interpreted a large public parking lot to be any such lot that has a total exposed parking footprint within a single parcel or a complex of closely associated parcels of 2 acres or larger (see the Anchorage MS4 Sweeping Plan, p. 5).

MOA identified 62 large public lots meeting these criteria. Maps showing location of these lots are included as Appendix C in the MS4 Sweeping Plan. The designated MOA large public parking lots serve 51 schools, 9 parks, one cultural facility and one events venue. The median size of all 62 designated MOA large public parking lots is 2.5 acres. The largest lot is approximately 13.3 acres in size, with only four lots 10 acres or larger in size. Four of the designated lots are between 5 and 10 acres in size, 15 lots are 3 to 5 acres in size, and 39 lots are 2 to 3 acres in size. No changes were made to the large parking lot sweeping list for 2016. Table 2-1 below lists all large public parking lots currently identified by the permittees.

Table 2-1 Large Public Parking Lots (MOA)

Name	Type	Area, ft^2
Hilltop Ski Area	Park	88000
Ravenwood Elementary	School	89075
Girdwood K-8 School	School	89969
Davis Park	Park	90000
Muldoon Elementary	School	92049
Turnagain Elementary	School	93900
Susitna Elementary	School	94200
Harry J. McDonald Memorial Center	Park	95000
Mountain View Elementary	School	95101
Huffman Elementary	School	95228
Ruth Arcand Park	Park	96000
Rogers Park Elementary	School	96305
Polaris K-12 School	School	97293
Wonder Park Elementary	School	97567
Williwaw Elementary	School	97956
O'Malley Elementary	School	98189
Bear Valley Elementary	School	98474
Rabbit Creek Elementary	School	99865
Far North Bicentennial/ Hillside Park	Park	100500

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Name	Type	Area, ft^2
Mears Middle School	School	102000
Alpenglow Elementary	School	102825
Trailside Elementary	School	103834
Campbell Elementary	School	104000
Eagle River Lion's Club	Park	104000
Gladys Wood Elementary	School	104344
Bowman Elementary	School	106000
Spring Hill Elementary	School	106000
Lake Otis Elementary	School	106173
North Star Elementary	School	106780
Bayshore Elementary	School	106792
Northern Lights ABC School	School	108974
Albrecht Field	Park	113300
Lake Hood Elementary	School	114600
Central Middle School/Chugach Optional Elementary	School	116792
Northwood ABC Elementary	School	118491
Birchwood ABC Elementary	School	119236
Kasuun Elementary	School	119441
Tyson Elementary	School	120690
Willow Crest Elementary	School	124285
Russian Jack Elementary	School	128685
South Anchorage Sports Park	Park	140000
Chugiak Elementary	School	140875
Loussac Library	Cultural	141000
King Career Center	School	144663
Kincaid Park	Park	145000
Gruening Middle School	School	150000
Kincaid Elementary	School	152789
Clark Middle School	School	168224
Hanshew Middle School	School	169175
Romig Middle/ West High Schools	School	176826
Begich Middle School	School	177442
Wendler Middle School	School	193293
Goldenview Middle School	School	201993
Mirror Lake Middle School	School	203260
Eagle River High School	School	275595
Chugiak High School	School	325000
South High School	School	340669
Bartlett High School	School	412961
Sullivan/Boeke Arenas	Events	457000
East High School	School	459000
Service High School	School	473795
Dimond High School/Chinook Elementary	School	580883

3. 2016 Sweeping Performance Reports

Permit Part 3.4.5.4 requires permittees to report sweeping performance annually in terms of specific factors and to assess sweeping effectiveness in minimizing discharge of pollutants to storm drains and creeks based on those factors. Sweeping performance reports must at minimum identify and map the actual streets and parking lots that were swept in the reporting year. In addition, permittees must compile and report specific sweeping performance factors including:

- Sweeping practices used,
- Dates of sweep,
- Volume or weight of swept materials, and
- Particle size distributions of representative swept materials.

The permit specifies that sweeping performance information is to be organized and reported, in some respect, by date and sweeping 'frequency category' (defined in the permit as Arterial or Residential streets, and Parking). However, whatever the exact organizational structure elected by the permittees for the performance report information, all these factors are specifically to be used in assessing the effectiveness of MS4 sweeping on limiting discharge of pollutants to the MS4 and receiving waters. This section summarizes sweeping performance records sorted by maintenance agency for both streets (Subsection 3.1) and parking (Subsection 3.2). Subsection 3.3 describes particle size distribution measures for street materials collected during the 2016 sweep periods. In Section 4, we use these performance records, along with other information, to assess effectiveness of the 2016 MS4 sweeping program.

3.1. Street Sweeping Performance Reports for 2016

The permittees have organized their sweeping performance data to reflect both significant differences in drainage types across the MS4 and variations in street sediment loading between those drainage types. As described in their MS4 Sweeping Plan, the permittees may use different sweeping practices for streets having curb and gutter (CG) drainage as opposed to those having open channel (OC) or ditch drainage. For streets with curb and gutter drainages, sediments are concentrated along the gutter pan and readily available for mobilization in wash-off events. For these streets, swept materials are always collected during sweeping, and the removed volumes can be readily inventoried. Conversely, sediments from streets with open channel drainages tend to become concentrated onto the adjacent vegetated shoulders where runoff events are much less likely to mobilize them. Along these streets common sweeping practices are ones that 'kick' the sediments left on the street pavement onto the same vegetated shoulder (to be removed during later shoulder maintenance and ditch 'dressing'). As a result, inventories of the volumes of sediment swept from a portion of open channel street segments are usually not available, at least not as part of sweeping performance records.

Given these practices, reporting sweeping information for curb miles alone, is problematic. Reporting only those streets having 'curb miles' (i.e., curb and gutter type streets) as specified in the permit would obviously bias measurement of total Anchorage MS4 sweeping performance. Similarly, using total street miles when assessing the total volume of swept materials will bias loading and efficiency estimates when the only swept

sediment volumes recorded are for curb and gutter streets but open channel street miles are included in the analysis. Finally, potential for biasing analysis is even further compounded considering differences in sediment loading between drainage types (and sweeping frequency categories).

To control for these sweeping practices and characteristics, sweeping performance information for Anchorage MS4 streets is collected and sorted by a number of factors. These include sweeping frequency type and drainage type, the MS4 maintenance operator, and the sweeping event (measured by the sweeping completion date range; spring, summer, fall). Sweeping frequency types include 'arterial' and 'residential' categories as already described in the permittees MS4 Sweeping Plan.

Sweeping performance information reported for the Anchorage MS4 includes total swept volumes (in cubic yards) referenced to "Street Miles", "Curb Miles", and/or "Pick Up Miles". "Street Miles" for all designated swept streets are included in this performance report and are calculated as the total centerline lengths of swept street segments. Where a "kick" type of sweeping practice is used along open channel roads (i.e., swept sediments are not collected), total swept volume will not be known and Street Miles is the only sweeping information reported. Any estimate of swept volumes for these streets must be calculated using the swept mileage and an estimate of street sediment loading present at the time of the sweeping event for the particular sweeping frequency category (arterial or residential). Because sweep practices that collect swept material (i.e., swept volumes are inventoried) are used on both curb and gutter and open channel drainage type roads, the term "Pick Up Miles" is more appropriate and used in place "Curb Miles" for this report. Pick Up Miles optimally represent the total actual length of road shoulder swept, for the case of open channel road segments, and the actual length of curbed drainage swept, for curb and gutter road segments. Where this is not known, Pick Up Miles are estimated as twice the length of the swept streets along which the sediments are collected. Where possible, the Anchorage MS4 sweeping performance report also includes an estimate of the unit swept volume (cubic yards per Pick Up Mile) for each combination of frequency type and drainage type.

2016 sweeping performance records for the principle Anchorage MS4 street maintenance operators (ADOT&PF, ARDSA, and CBERRRSA) are summarized for all three sweeping events in Table 3-1 below. Note that the two tandem sweeps required for arterial frequency category streets are summarized under the single spring event shown. Operational areas for these maintenance operators are as described in Section 2.2 and shown in Figure 5-1. More detailed sweeping summary tables for ARDSA and CBERRRSA are included in Section 5.2, including all required permit reporting elements. *Note: details specific to ADOT&PF sweeping and performance can be found in Appendix E-2 of the 2016 APDES report.

In general in 2016 all Anchorage MS4 operators completed sweeping of designated streets in accordance with permit requirements using the various practices as described in the previously published MS4 Sweeping Management Plan (see detailed records for each operator in Section 5.2).

Table 3-1 Anchorage MS4 Sweeping Summary, 2016

Spring 2016						
	EPA Category	Drainage Type	Street Miles	PickUp Miles	Total Volume* (cyds)	Unit Volume* (cyds/mile)
DOT	Arterial	OC	8.1	31.3	135.0	4.3
		CG	43.9	198.8	2756.0	13.9
		Mixed	48.5	188.2	3150.0	16.7
		Total	100.5	418.3	6041.0	14.4
	Residential	OC	54.8	144.4	745.0	5.2
		CG	3.1	20.3	159.0	7.8
		Mixed	26.9	107.7	499.0	4.6
		Total	84.7	272.4	1403.0	5.2
ARDSA	Arterial	Mixed	45.8	91.6	2961.0	32.3
	Residential	Mixed	580.6	1161.3	2445.0	2.1
CBERRRSA	Residential	OC	93.1	122.1	570.0	4.7
		CG	21.7	43.3	522.0	12.0
		Mixed	79.9	160.3	375.0	2.3
		Total	194.6	325.7	1467.0	4.5
Summer 2016						
	EPA Category	Drainage Type	Street Miles	PickUp Miles	Total Volume* (cyds)	Unit Volume* (cyds/mile)
DOT	Arterial	OC	8.1	31.3	35.0	1.3
		CG	43.9	198.8	581.0	2.9
		Mixed	48.5	188.2	548.0	2.9
		Total	100.5	418.3	1164.0	2.8
	Residential	OC	54.8	144.4	220.0	1.5
		CG	3.1	20.3	41.0	2.0
		Mixed	26.9	107.7	144.0	1.3
		Total	84.7	272.4	405.0	1.5
ARDSA	Arterial	Mixed	45.8	91.6	60.0	0.7
	Residential	Mixed	580.6	*	20.0	*
CBERRRSA	Residential	OC	93.1	122.1	No Data Reported	
		CG	21.7	43.3	No Data Reported	
		Mixed	79.9	160.3	No Data Reported	
		Total	194.6	325.7	No Data Reported	

*ARDSA and CBERRRSA Residential roads were swept on an "as-needed" basis to maintain a "visually clean" standard during the summer sweep period

Fall 2016	EPA Category	Drainage Type	Street Miles	PickUp Miles	Total Volume* (cyds)	Unit Volume* (cyds/mile)
DOT	Arterial	OC	8.1	31.3	40.0	1.3
		CG	43.9	198.8	788.0	4.0
		Mixed	48.5	188.2	754.0	4.0
		Total	100.5	418.3	1582.0	3.8
	Residential	OC	54.8	144.4	273.0	1.9
		CG	3.1	20.3	62.0	3.1
		Mixed	26.9	107.7	193.0	1.8
		Total	84.7	272.4	528.0	1.9
ARDSA	Arterial	Mixed	45.8	91.6	60.0	0.7
	Residential	Mixed	580.6	1161.3	820.0	0.7
CBERRRSA	Residential	OC	93.5	132.0	201.0	1.5
		CG	18.3	36.5	81.0	2.2
		Mixed	87.7	174.8	183.0	1.0
		Total	199.4	343.3	465.0	1.4

* Volumes represent only swept materials collected along reported/estimated Curb/PickUp Miles
OC = Open Channel Drainage
CG = Curb and Gutter Drainage

For 2016, CBERRRSA reported 100% completeness for the spring and fall sweep periods according to the procedures described in the Street Sweeping Management Plan, with no reported road segments or operational areas falling below permit requirements. For the 2016 summer sweep period, CBERRRSA reported that roads were swept "as needed" (as prescribed in the Street Sweeping Management Plan) and did not report any volumes of swept materials. This suggests that only open channel type roads swept with kick broom type sweepers were swept in the summer period. CBERRRSA reported their roads typically required 6 passes for those roads swept with kick brooms, and 5 to 6 passes with a tandem sweeper configuration for roads where swept material is collected and disposed of. All roads were swept until they were deemed 'visually clean' by a CBERRRSA supervisor, including additional passes with the sweeper train if necessary to meet the standard. CBERRRSA reported a callback rate of approximately 1 in 20 road segments needing an average of one additional pass to meet the 'visually clean' standard. Supervisors took before and after sweeping photos on certain roads to further qualify their 'visually clean' assessment. CBERRRSA also reported conducting additional spot sweeps as necessary after the fall sweep period to deal with fallen leaves. ARDSA reported a sweeping completeness of 100% for designated streets within its administrative authority for all sweep periods in 2016. All ARDSA roads were swept according to the procedures described in the Street Sweeping Management Plan and were inspected by ARDSA supervisors to ensure they were deemed "visually clean" before being marked off as "swept" for each sweep period. ARDSA reported an average of 4 passes with two tandem trains for arterial type roads for the spring sweep period and an average of two passes for residential roads in the spring and all roads types for the

summer and fall sweep periods. Additional passes were performed as necessary to maintain the "visually clean" standard and were usually focused hills and heavily trafficked intersections were sediment was more heavily applied in the winter. ARDSA also reported doing additional spot sweeps (beyond what is described in the Street Sweeping Management Plan) for excess leaves and organics, as necessary, during the fall sweep period. These additional spot sweep efforts were identified in the report "Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation" (Appendix E-2 of the 2013 APDES report) as a suggested means to accomplish the post-sweep sediment load goals identified in the report, and were incorporated into the permittees most recent Street Sweeping Management Plan version. In 2016, operators for the Girdwood Service Area (GSA) reported a total of 6 cubic yards of sediment collected for all sweeping operations in 2016. GSA sweeps 2.3 miles of curb and gutter drainage type streets and 1.6 miles of open channel drainage streets using a tandem pick up broom configuration consisting of at least one mechanical sweeper and one vacuum sweeper. GSA also sweeps 3 miles of open channel drainage streets and 3.5 miles of bike trails using kick brooms. GSA's sweeping contract requires at least 4 passes per sweep, with additional passes as needed until the road surface is clean. All roads within GSA jurisdiction are of the residential category.

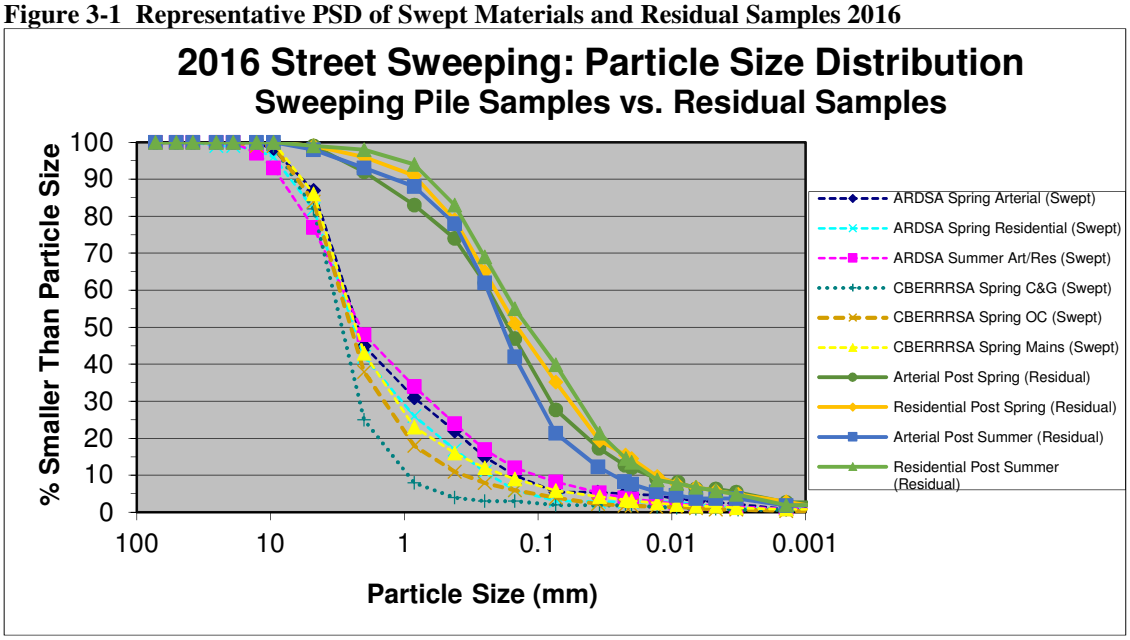
3.2. Parking Lot Sweeping Performance Report for 2016

Sweeping performance was reported by the Anchorage School District for all 51 public schools on the large public parking lot list as designated in Section 2.3, for a completion of 100%. No basis for changes in number of swept school parking lots was otherwise submitted. Exact sweeping dates were not reported, though separate volumes of swept material were reported for two sweeping periods, spring and fall, indicating that each of the 51 school lots were swept twice in 2016. Reported total swept volumes for individual parking lots ranged from 6 to 90 cubic yards per lot, for a total of 1156 cubic yards collected during 2016 sweeping efforts (roughly 6.1 cubic yards per acre of parking lot area for the year). Detailed sweeping reports for the large school parking lots are included in Section 5.2. No other reports were submitted for sweeping performed in 2016 for the other large public parking lots as listed in Table 2-1.

3.3. Particle Size Distributions for Swept Materials

Permit requirements in section 3.4.5.4.2 require that particle size distribution be evaluated for a representative sample of swept materials. Representative samples of swept street materials (no samples were available from parking lots) were collected by subsampling temporary sweeping storage piles built up by MS4 operators and the samples were then submitted to a certified laboratory for analysis. Particle size distributions representative of samples collected during 2016 sweeping events are included in Figure 3-1 below.

Figure 3-1 Representative PSD of Swept Materials and Residual Samples 2016



In 2010 and 2011, samples were collected from street surfaces before and after each sweeping event, in order to compare pre- and post-sweep street conditions. In 2013, samples were collected from street surfaces after spring and summer sweeps in order to further analyze and quantify post-sweep residual loading. Analysis of data suggests reduced sweeping practices efficiency in removing the mid-range fine particles—from about 75 to 1000 microns. Available data for estimation of sweeping efficiencies for very fine particles (finer than 75 micron) does suggest that current sweeping practices may have limited competency at removing particles smaller than 75 microns. In 2016, a select number of roads were sampled after they were deemed 'visually clean' for the spring and summer sweep periods, as per the Street Sweep Monitoring Plan, in order to help assess residual dirt amounts and overall sweeping practice efficiency. The results and conclusions of these sampling efforts are contained in Sections 4-1 and 4-3.

Figure 3-1 includes particle size distributions (PSDs) of samples collected from temporary storage piles generated from street sweeping in 2016 (curves labeled as "Swept") as well as PSDs for post-sweep samples collected from street surfaces in 2016 (curves labeled as "Residual"). Particle size distributions for 2016 swept materials, collected from street sweeping temporary storage piles, show similar data ranges and appear to be grouped somewhat by operator, though the overall range of distribution was smaller without an ADOT&PF sample to analyze (which usually contains the highest concentration of fine particles). Dirt from CBERRRSA's piles appears to have the highest proportion of coarse grained materials, though ARDSA's swept material showed a similar distribution. The ARDSA summer sweep sample contained the highest proportion of fine grained materials, likely due to additional traffic milling of finer particles left on the road surfaces after the spring sweep period. Analysis of the particle size distributions for the post-sweep samples again suggests that sweeping practices are less efficient at removing mid-range fine and finer particles, with all 2016 post-sweep samples having at least 83% by weight finer than 1000 microns.

4. 2016 Sweeping Performance Assessment

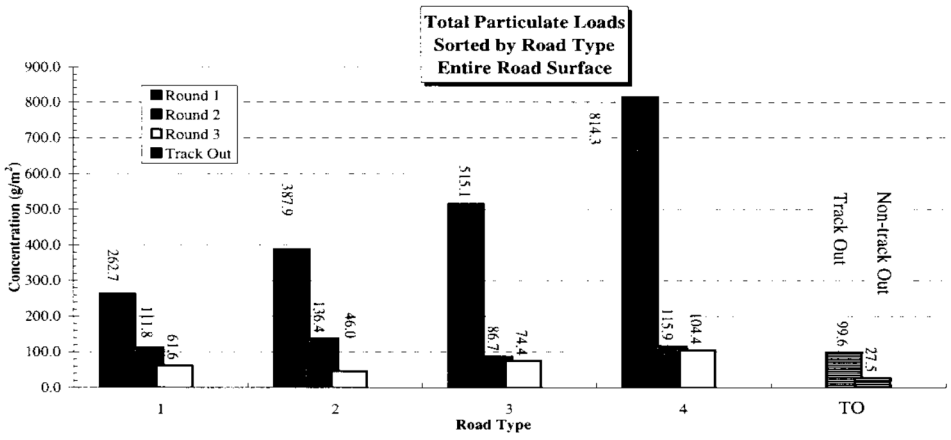
Sweeping effectiveness and performance were analyzed in the 2013 report "Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation", and recommendations to increase effectiveness and performance from the report were incorporated into the permittee's Street Sweeping Management Plan. APDES permit part 3.4.5.4 requires the permittees to "perform annual assessments of street sweeping effectiveness to minimize pollutant discharges to storm drains and creeks" on the basis of the performance factors required to be reported under the permit. To help in this assessment, the permittees completed additional sampling of street sweeping activities in 2010, 2011, 2013, and 2016 and reviewed sampling efforts and studies performed under earlier Anchorage MS4 permit terms and in other areas nationwide. Section 4.1 summarizes these additional efforts relative to the permittee's 2016 street sweeping performance. Section 4.2 provides a comparison of unit loads (cubic yards per pick up mile and pounds per pick up mile) for swept dirt for the past three years (2014-2016). Based on both this additional information and current performance reports, Section 4.3 summarizes the effectiveness of the permittees' 2016 sweeping program as required under Part 3.4.5.4.

4.1. Summary of Findings from 2016 & Previous Sweeping Assessments

Street sediment loading data collected in 2011, 2013, and 2016 and in previous Anchorage permit terms were used to support assessment of sweeping effectiveness in 2016 for the Anchorage MS4. These additional data are briefly summarized in this section.

Figure 4-1 Anchorage Street Sediment Loading Data: 1996

Road Type	Sampling Round 1	2	3	TO	All Roads
1	262.7 (7)	111.8 (8)	61.6 (8)		115.9 (23)
2	387.9 (5)	136.4 (6)	46.0 (6)		175.7 (17)
3	515.1 (4)	86.7 (6)	74.4 (5)		136.5 (15)
4	814.3 (4)	115.9 (3)	104.4 (5)		162.3 (12)
Track Out				99.6 (5)	99.6 (5)
Non Track Out				27.5 (5)	27.5 (5)
All Rounds	431.1 (20)	109.5 (23)	65.2 (24)		136.5 (67)



Road type: 1-Residential, 2-Collector, 3-Minor Arterial, 4-Major Arterial; all curb & gutter
Rounds: 1-winter initial load, 2-post spring sweep, 3-mid-summer
From: "MOA Street Sediment Loading Assessment", WMP APr97001, 1997

The permittees have collected significant data characterizing street sediment loading (at similar street strata) and street sweeping performance (at the resolution of overall local practices). Significant street sediment sampling efforts were conducted in 1996 (WMS document WMP APr97001, "MOA Street Sediment Loading Assessment") and again in 2000 (WMS document WMP APr00003, "Street Sediments and Adsorbed Pollutants") during the permittees' first permit term. Later analyses of these data by the permittees specifically addressed street sediment buildup rates and effectiveness of Anchorage street sweeping performance (WMS document WMP APr02002, 2002, "Anchorage OGS and Street Sweeping as Storm Water Controls"). Sampling in all earlier studies was performed only along curb and gutter type drainages and no data was collected for open channel roads. Nevertheless, data for curb and gutter drainage types was thorough and no significant changes have been made in application rates or practices for street sanding since these studies were completed. The sediment loading results reported in the 1996 study is summarized in Figure 4-1. Street sediment loading values in pounds per pick up mile can be approximated by multiplying the gm/m^2 values in Figure 4-1 by 51.2 for residential and collector streets and 77.7 for arterial streets.

The Watershed Management Services section of the Municipality performed additional sampling during 2010 and 2011 to supplement the earlier street sediment loading data and to complement the detailed sweeping performance data collected by the MS4 maintenance operators. Sampling program goals were to approximately quantify sweeping efficiencies and sediment buildup rates between scheduled sweeping events. The sampling strategy applied was to characterize the initial street sediment loading conditions prior to any seasonal sweeping and then estimate sediment loads remaining after each of the seasonal sweeps (relative to each of the major road and drainage type categories).

To achieve this, during the 2010 and 2011 sweeping season, WMS sampled transects across select MS4 streets at a total of 118 stations. The stations were selected to broadly represent street frequency category and drainage types (arterial open channel, arterial curb & gutter, collector open channel, collector curb & gutter, residential open channel and residential curb & gutter) from the jurisdictions of all the Anchorage MS4 maintenance operators.

At each station, WMS swept transects 1.5 feet wide across the paved road and gutter/paved shoulder surfaces from centerline, or median curb, to outside curb or edge of paved shoulder, (i.e., one-half of the full curb-to-curb road width at the station) and collected and bagged the materials for later analysis. A systematic photographic record was also made of conditions at each site. Sampling was scheduled at each station immediately prior to initial spring sweeping (to capture the entire winter sediment load remaining on the street after breakup), and then shortly after each of the spring, summer and fall sweep events to measure the sediment load remaining on the street surfaces after

sweeping had been completed (based on volumetric analysis of mineral and organic content).

Sampling was performed under dry conditions, to the extent possible, to minimize water content of the collected transect samples. Street sediment samples collected from each swept transect were analyzed by transferring the sample to a graduated cylinder, consolidating the sample by lightly tapping the cylinder, and measuring the total sample volume, in milliliters. After the initial volumetric measurement was made, samples were gently shaken in the cylinder to promote gravimetric separation of any fibrous organics from mineral constituents. Measurements were then made of the volumes of separated fractions of organic and mineral materials. Select samples and composited samples of collected street sediments were also submitted for laboratory testing for coarse- and fine-grain particle size distribution and organic content (by ignition). All results were tabulated and digitally archived.

Quality control review of all data suggests a reasonably comparable, complete, and representative data set was obtained. However, sample populations were small for some street categories, weakening inferences drawn from analyses of a fraction of the collected data. Specifically, small sample populations for some street and drainage categories resulted from a variation in sample collection protocols for these streets. As a result, some of the total sample counts ('n') were significantly reduced for some event/categories (Table 4-1). Specifically, the arterial curb and gutter category for all events is represented by a small sample population count of 7. As a result of the low sample counts, the arterial curb and gutter data may not be adequate to resolve the normal character of street sediment for this street category. Otherwise, sample populations for all other sweeping event/street categories are considered adequate to provide reasonably representative information at the exploratory level of this investigation.

Summary statistics of the sampling results are tabulated in Table 4-1 below. Original WMS street dirt sampling data is in units of milliliters per 1.5 foot transect sample collected across one-half the curb-to-curb road width at the sample station. However, for ease of comparison to the permittees' street sweeping performance statistics (Section 3) these measurements have been normalized to a 'unit load' in the table in terms of pounds per pick up mile. Normalization was done by assuming a porosity for the samples of 0.26 and a specific gravity for the solid materials of 2.67, and then adjusting for the sampled transect area using the following formulas:

(**mL sample/1.5' transect**)(0.74)(2.67gm/cm^3)(cm^3/ml)(1lb/454gm) **= lbs sample/1.5' transect**

$\triangleright$ (**lbs sample/1.5' transect**)(5280'/pick up mile) $\cong$ **lbs/pick up mile**

Similarly, cubic yards/pick up mile as reported in the performance summary in the preceding section can be approximately converted to pounds per pick up mile, correcting for voids and neglecting the weight of any water content, as follows:

(**cyd/pick up mile**)(27ft^3/1cyd)(2.67)(0.74)(62.4lbs/ft^3) **= lbs/pick up mile**.

Table 4-1 2011 Street Sediment Loading Sampling Results

			Spring Pre-Sweep	Spring Post-Sweep	Summer Post-Sweep	Fall Post-Sweep
		Unit Load	*Lbs/pu mile*	*Lbs/pu mile*	*Lbs/pu mile*	*Lbs/pu mile*
ARTERIAL	**OC**	*Min*	704	168	0	0
		Max	37531	5361	1348	2420
		Median	13021	2022	352	827
		n	23	23	19	23
	C&G	*Min*	2052	337	459	337
		Max	51900	6280	7812	7353
		Median	8885	995	1470	1876
		n	7	8	8	8
		Unit Load	*Lbs/pu mile*	*Lbs/pu mile*	*Lbs/pu mile*	*Lbs/pu mile*
COLLECTOR	**OC**	*Min*	612	0	0	0
		Max	15012	827	1011	1271
		Median	7582	444	260	321
		n	16	16	16	16
	C&G	*Min*	2757	367	0	0
		Max	24510	2634	2144	1041
		Median	9421	1087	467	390
		n	*18*	24	24	24
		Unit Load	*Lbs/pu mile*	*Lbs/pu mile*	*Lbs/pu mile*	*Lbs/pu mile*
RESIDENTIAL	**OC**	*Min*	0	0	0	0
		Max	17463	2022	2236	1654
		Median	2451	781	643	474
		n	*24*	24	24	24
	C&G	*Min*	2068	0	0	122
		Max	16544	3768	3829	1960
		Median	5821	1041	919	643
		n	*21*	21	21	21

Sampling units – ml sediment/(1.5' wide transect)(½ width curb-to-curb); Unit load – pounds/pu mile; n – sample count

Note that the sediment load per pick up miles presented here is generally as described earlier, representing the total sediment present along a road segment, relative to the total length of curb or paved shoulder present along that road segment. For our sampling we make the assumption that the total length of curb or paved shoulder along our sampled roads is twice the length of the road (i.e., only two curbs are present along the road). Also note that the term "pick up mile" in our sampling is used as a generic term to refer to both Curb Miles and Pick Up Miles defined earlier for curb and gutter and open channel drainage types, respectively. Finally note that we have not controlled for pavement width (for example, the number of traffic lanes, parking lanes, turn-out lanes,

median lanes, etc.) except for that that is inherent in the sweeping frequency categories used (arterial or residential). However, at the scale of this analysis (areawide and at two levels of traffic load), we believe these data to be usefully representative.

In 2013, sampling of street sediment was conducted to estimate sediment loading and the character of particulates on Anchorage streets, relative to street sweeping practices. Ten 300-500ft long arterial stations and fifteen 300ft long residential stations were selected from amongst swept streets in the Anchorage Bowl. Stations were divided up into 1ft transect intervals and ten 0.5ft transects along each station were selected at random for sampling. At each transect street sediment samples were collected, from centerline to curb (half the total curb to curb width), using a high velocity backpack mounted vacuum with a custom nozzle modified to collect material from a 0.5ft swath. Sample materials collected were labeled and bagged and transported to a local certified material testing laboratory to be dried and weighed. Using the laboratory data, unit loading (grams/meter^2) and liner loading (pounds/full width curb mile) were then calculated. Arterial stations were sampled 3 times and residential stations were sampled 4 times through out the 2013 sweep season, with transects selected at random for each event.

Results of the 2013 sampling efforts showed median values for 2013 post-sweep loadings were approximately 2300 lbs/full width curb mile for residential streets and 4100 lbs/full width curb mile for arterial streets (total sediment load across entire curb to curb width for one linear mile of road surface). In terms of the post-sweep loading units more commonly used in this and previous sweeping reports, this equates to 1150 lbs/pick up mile for residential streets and 2050 lbs/pick up mile for arterial streets. Results of the 2013 sampling also suggest that the vast majority of sediment is concentrated along the curb and within the first 4ft of roadway adjacent to the curb. For more information regarding the 2013 sampling program and results please see WMS document WMP Apr14001, "Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation" (Appendix E-2 of the 2013 APDES report).

Table 4-2 2013 and 2016 Street Sweep Residual Sampling Averages

	2013 Residual[1]	2013 Proposed	2016 Residual[2]
Sweep Period and Category	(lbs/pu mile)	(lbs/pu mile)	(lbs/pu mile)
Post Spring Arterial	2238	313	508
Post Spring Residential	1189	252	974
Post Summer Arterial	791	175	286
Post Summer Residential	925	218	550
[1]values from Table 3, *Anchorage Street Sweeping and Strom Water Controls: 2013 Performance Evaluation*			
[2]values from 2016 residual sampling			

In 2016 sampling of post-sweep residual sediment was conducted according to the procedures described in the Street Sweeping Monitoring Plan. Four streets (2 arterial and 2 residential) were selected and 10 transects for each sampling event (post-spring and post-summer) were marked, evenly distributed along 200ft of each street. At each transect location residual sediment samples were collected and composited for lab analysis of weight, volume, and particle size distribution. Streets were sampled as soon as was practical after the streets had received their final spring and summer passes and

were deemed “visually clean”. Samples for each street and sweep period were transported to a local soil lab for dry weight and uncompacted volume. The samples were then combined for like sweep periods and street categories, and the resulting composite samples were analyzed for particle size distribution utilizing ASTM D422. PSD results from residual samples can be seen plotted with PSD results from swept material samples in Figure 3-1.

Results of the 2016 sampling efforts showed an average post spring sweep loading rates of 508 lbs/pick up mile for arterial streets and 974 lbs/pick up mile for residential streets. Average post summer sweep loading rates were 286 lbs/pick up mile for arterial streets and 550 lbs/pick up mile for residential streets. Table 4-2 shows post sweep loading rates results from both the 2013 and 2016 sampling efforts, as well as the proposed goals for post sweep loading presented in the Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation.

4.2. Unit Load Comparison 2014-2016

Swept volume data, collected over the past three years, have been analyzed and, where possible, have been converted to unit load values (cubic yards/pick up mile), to give a measure of what volume of dirt is being swept up per pick up mile for each different operator, sweep frequency category, and drainage type. Cubic yards per pick up mile can then be converted to pounds per pick up mile using the formula described in Section 4.1. Table 4-3 shows unit load in cubic yards per pick up mile for the spring, summer, and fall sweep periods for 2014, 2015, and 2016.

Table 4-3 2014-2016 Unit Load Comparison

Spring			Spring 2016	Spring 2015	Spring 2014
Operator	EPACategory	DrainageType	UnitVolume(cyds/mile)	UnitVolume(cyds/mile)	UnitVolume(cyds/mile)
DOT	Arterial	OC	4.3	10.7	11.8
		C&G	13.9	24.7	25.1
		Mixed	16.7	24.0	24.9
		All	14.4	23.8	24.1
	Residential	OC	5.2	5.6	8.1
		C&G	7.8	16.7	18.7
		Mixed	4.6	8.6	8.8
		All	5.2	7.3	9.0
ARDSA	Arterial	Mixed	23.3	21.5	21.0
	Residential	Mixed	2.1	8.5	10.5
CBERRRSA	Residential	OC	4.7	4.1	3.0
		C&G	12.0	6.3	8.0
		Mixed	2.3	1.7	2.5
		All	4.5	3.8	3.7
Summer			Summer 2015	Summer 2015	Summer 2014
Operator	EPACategory	DrainageType	UnitVolume(cyds/mile)	UnitVolume(cyds/mile	UnitVolume(cyds/mile)
DOT	Arterial	OC	1.3	1.7	3.7
		C&G	2.9	5.4	5.1
		Mixed	2.9	4.2	5.0
		All	2.8	4.8	5.0
	Residential	OC	1.5	6.4	7.2
		C&G	2.0	11.8	10.9
		Mixed	1.3	6.6	8.3
		All	1.5	6.8	7.8
ARDSA	Arterial	Mixed	0.7	2.5	1.0
	Residential	Mixed	-	0.2	0.3
CBERRRSA	Residential	OC	-	-	-
		C&G	-	-	-
		Mixed	-	-	-
		All	-	-	-
Fall			Fall 2015	Fall 2015	Fall 2014
Operator	EPACategory	DrainageType	UnitVolume(cyds/mile)	UnitVolume(cyds/mile	UnitVolume(cyds/mile)
DOT	Arterial	OC	1.3	3.7	3.7
		C&G	4.0	6.6	6.2
		Mixed	4.0	7.0	6.6
		All	3.8	6.7	6.2
	Residential	OC	1.9	6.8	6.8
		C&G	3.1	13.6	11.5
		Mixed	1.8	7.8	8.4
		All	1.9	7.5	7.7
ARDSA	Arterial	Mixed	0.7	1.3	2.4
	Residential	Mixed	0.7	2.2	4.6
CBERRRSA	Residential	OC	1.5	0.3	0.0
		C&G	2.2	2.4	1.2
		Mixed	1.0	0.2	0.3
		All	1.4	0.3	0.3

For the 2016 spring sweep CBERRRSA reported a higher unit load for all street types and ARDSA reported a higher unit load for arterial streets than for the same categories over the past two years. CBERRRSA also reported a higher unit load average for the 2016 fall sweep period than in the previous two years. All other operators and street categories (including all DOT street categories) had 2016 unit loads that were lower than in 2014 and 2015. See Appendix E-2 for additional information regarding DOT sweeping operations and results.

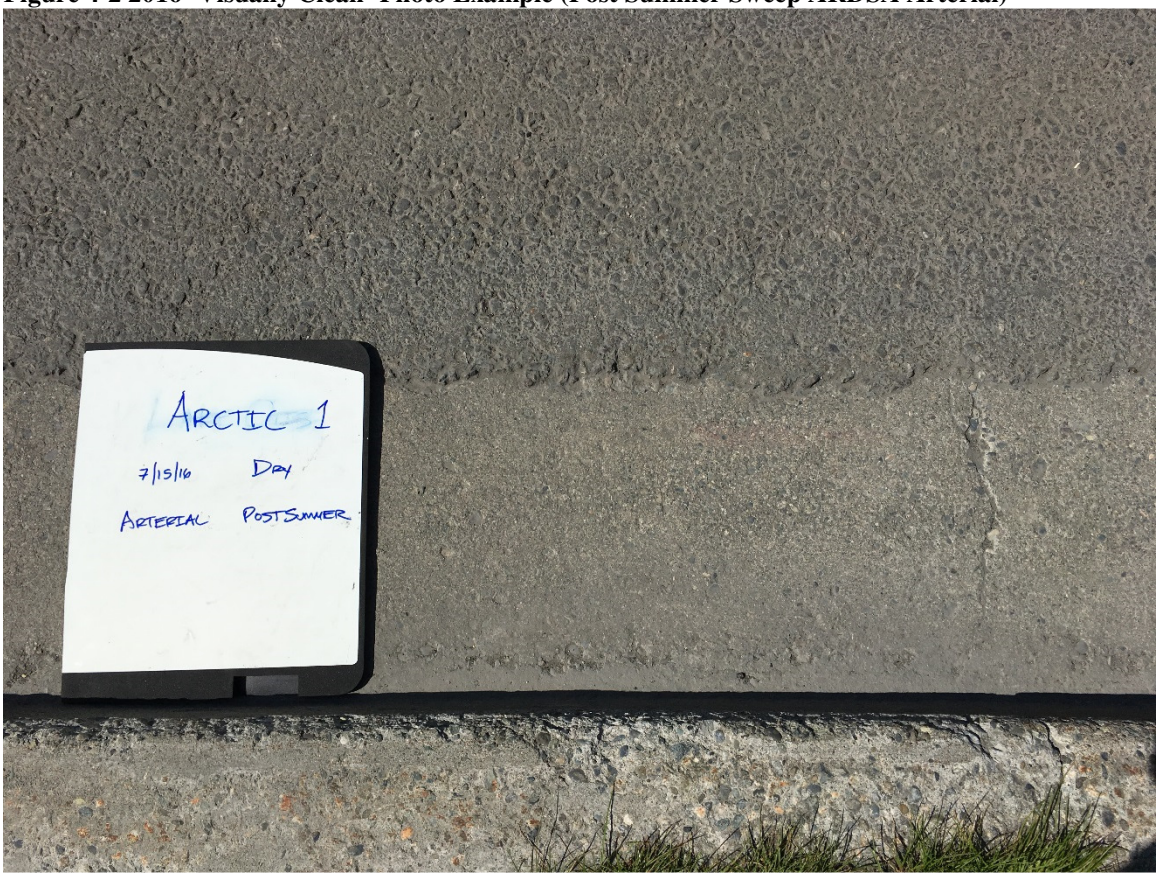
4.3. Sweeping Effectiveness Assessment for 2016

Sweeping effectiveness can be related to potential for receiving water impact by a number of relationships illustrated by this data and other data presented in this report. The spatial relationship of street drainage to receiving waters and to the total sediment load present on those streets is an important factor. Performance records summarized in Section 3.1 along with operation maps included in Section 5 provide insight to the potential for street sediment loads to wash off into Anchorage storm drains and receiving waters based on these spatial relationships. Of the three reporting MS4 operators, ARDSA sweeps the most street miles at approximately 626 miles (about 580 miles of residential streets and 46 miles of arterial streets), with CBERRRSA second at 200 street miles (all residential), and ADOT&PF third with about 184 street miles (100 miles arterial and 84 miles residential). Distribution of these contributing surfaces varies even more significantly between the operators. ADOT&PF and CBERRRSA streets are spread across large geographic areas. For ADOT&PF jurisdiction, streets extend across the entire Municipality and most of its watersheds. Despite its relatively small streets inventory, CBERRRSA's operational areas also cross a large number of watersheds. However ARDSA's operational area, although including the largest street inventory, is significantly more compact, with the result that ARDSA streets drain across a much smaller number of watersheds than either of the other two primary Anchorage MS4 operators.

Street sweeping operators have instituted new tools and modified existing procedures in order to increase the overall effectiveness of street sweeping operations. Street maintenance supervisors physically inspect the streets after sweeping and certify them as "visually clean" before marking them as done for that sweep period. In some instances, before and after sweeping photos were collected to further qualify the "visually clean" assessment (see Figure 4-2). Both CBERRRSA and ARDSA reported increased "spot" sweeps above and beyond procedures described in the Street Sweeping Management Plan in order to meet the "visually clean" standard. These extra sweeps were typically focused on the gutter where the majority of sediment accumulates, and were typically more frequent in the summer and fall sweep periods. Additional spot sweeps and emphasizing sweeping along the gutter and first 4 feet of street adjacent to the gutter, where the majority of sediment is present, represent changes to sweeping procedures that that were recommended in the report, "Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation". Operators also included increased public outreach to inform the public of the status of sweeping operations and encourage people to move vehicles parked on the street and other obstructions, in order to maximize the street surfaces available for sweeping. In neighborhoods with less off street parking available,

ARDSA increased their use of temporary no parking signs, sweeping east-west oriented streets and north-south oriented streets on different days, which benefitted both sweeping operations and residents. Similarly, both ARDSA and CBERRRSA schedule sweeping operations around trash pickup days to minimize street obstructions. ARDSA utilizes online mapping to inform residents of day-to-day sweeping operations and track progress, and CBERRRSA is starting to develop a similar mapping program. ARDSA has also started including the 'visually clean' standard into its dealings with construction contractors, requiring that a newly constructed road meet the standard before accepting the road into their inventory. DOT efforts to increase street sweeping effectiveness are detailed in Appendix E-2.

Figure 4-2 2016 'Visually Clean' Photo Example (Post Summer Sweep ARDSA Arterial)



Overall, sweeping efficiencies are high for the spring sweep period. These high efficiencies are believed to be due to the high sediment loadings on the street surfaces. This is particularly notable for the spring sweeps when initial loads are the highest, representing traction sanding loads accumulated over the entire winter. As a result, spring sweeping efficiencies historically exceed 90 percent. The results of 2013 residual sampling reflected a removal rate of approximately 95% for arterial streets and 70% for residential streets for the 2013 spring sweep period. Results from the 2016 residual sampling reflect a removal rate of approximately 99% for ARDSA arterial roads and 86% for ARDSA residential roads. These higher removal rates suggest that changes to sweep practices, including those suggested in the report "Anchorage Street Sweeping and Storm

Water Controls: 2013 Performance Evaluation" have increased the efficiency of sweeping operations. Residuals loading rates for 2016 were overall much smaller than when they were sampled in 2013, though not quite down to the standards proposed in the "Anchorage Street Sweeping and Storm Water Controls: 2013 Performance Evaluation" (see Table 4-2).

Sweeping efficiencies for later events are somewhat reduced but include sweeping removal rates that still reflect relatively large sediment loads varying from approximately 0.7 to 4.0 cubic yards per pick up mile for arterial streets and 0.7 to 3.1 cubic yards per pick up mile for residential/collector streets for the 2016 summer and fall sweeps. This shows a lower range of variability in late season sediment loads than in 2014 or 2015. CBERRRSA streets tend to have the lightest concentration of sediment on them, producing unit load numbers that are lower than those of ARDSA and ADOT&PF for almost all sweep frequency categories and sweep periods, a pattern that has been fairly consistent over the past three years. This may be due to differences in the street patterns of the areas maintained by these two street maintenance groups. The primary residential area served by CBERRRSA lies in a relatively flat, newer subdivision area served by lollipop and looped streets linked by a single collector, with adjacent yards having few trees. As a result fewer intersections are present and the need for winter sanding may be significantly reduced. On the other hand, ARDSA and ADOT&PF serve much older and highly urbanized Anchorage areas where streets are laid out on a grid block basis, requiring many more collectors and a larger number of controlled intersections where more sanding may be needed to maintain safe winter trafficking. These older neighborhoods are also well-treed, which may lead to the higher fall street particulate load observed. The spring unit load for ARDSA residential streets in 2016 provided a notable exception to the trend of CBERRRSA streets typically having the lightest sediment loads. The ARDSA residential unit load for the 2016 spring sweep was 2.1 cubic yards per pick up mile, down from 8.5 cubic yards per mile in 2015 and 10.5 cubic yards per mile in 2014.

The winter of 2015-16, similar to the previous winter, brought several uncharacteristic mid-winter freeze/thaw cycles that required additional sanding events due to icy road conditions. The winter of 2015-2016 also saw much less snow than is typical for an Anchorage winter, resulting in much less winter plowing. Less mid-winter snow plowing and hauling results in less traction sediment being removed during snow removal operations and could explain why spring sweep unit loads reported for CBERRRSA streets and ARDSA arterial streets were higher than in previous years. Evaluation of sweep operator practices suggests that past years swept volume measurement may have been biased high due to inaccurate measurement techniques for determining volume of sediment from typically wet slurries delivered by the street sweepers. For this reason, in 2016 ARDSA changed their swept volume measurement technique from counting sweeper hopper loads to geometric measurements of swept material piles. This is believed to be a more accurate way to estimate total quantities of swept material removed, and likely accounts for some of the variability in ARDSA volume data between 2016 and previous years.

5. 2016 Maps and Data Tables

Section 5 contains maps and detailed data tables supporting summary information and the sweeping assessment presented in Section 2 through 4 above. Section 5.1 contains maps of swept streets and operational areas. Section 5.2 contains detailed sweeping performance records for Anchorage MS4 operators.

5.1. Designated Streets and General Location Maps

This section contains maps of Anchorage MS4 streets designated for sweeping by each of the principle street maintenance operators listed in Section 2.0. The first map in this section, Figure 5-1, provides an overview of all operational areas for all operators. More detailed maps of individual operator's areas and designated streets are presented in the following figures.

Figure 5-1 Anchorage MS4 Sweeping 'General Locations' 2016

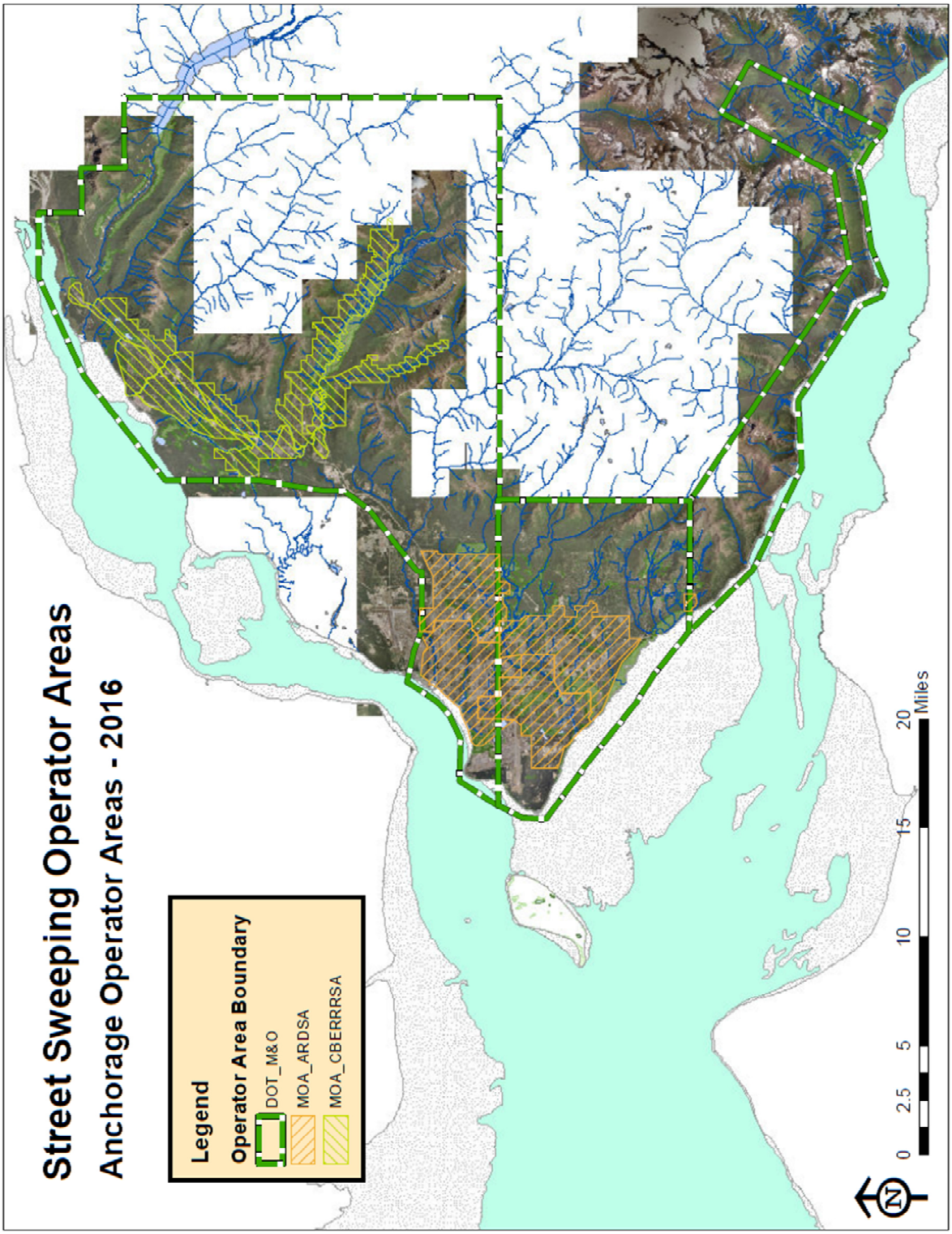


Figure 5-2 MOA_ARDSA, Units 3& 4 (South)—2016 Designated Swept Streets

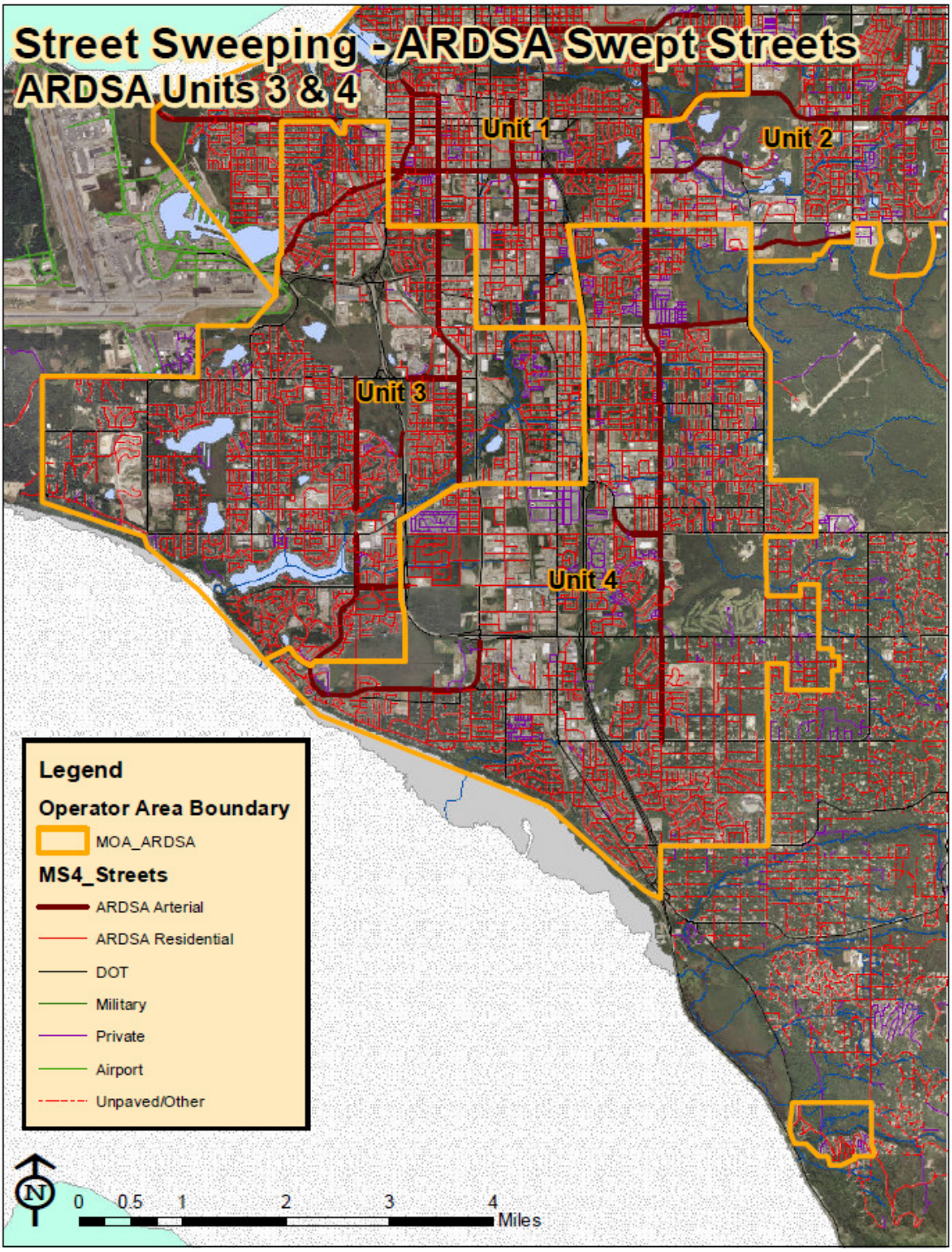


Figure 5-3 MOA_ARDSA, Units 1 & 2 (North)—2016 Designated Swept Streets

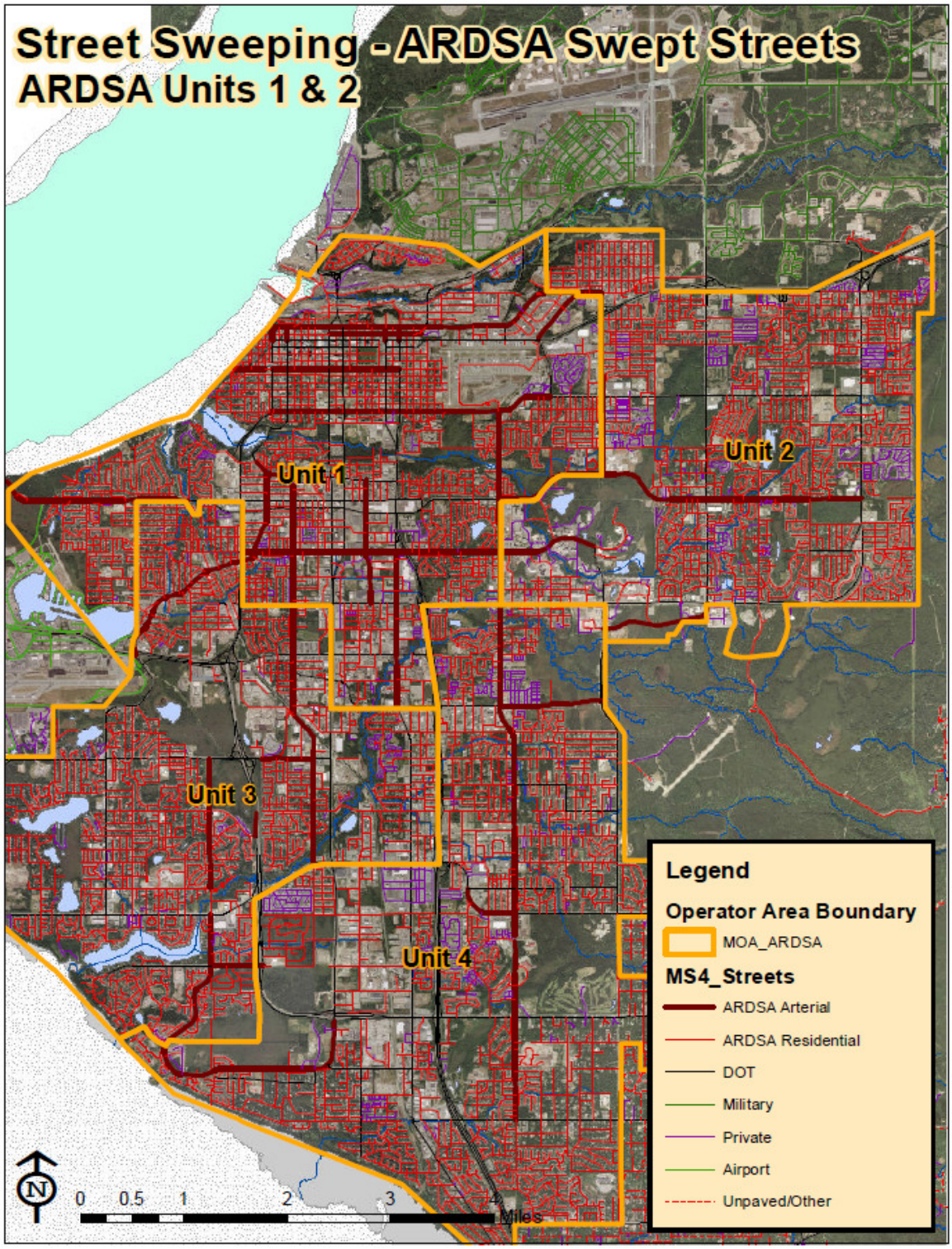


Figure 5-4 CBERRRSA, North—2016 Designated Swept Streets

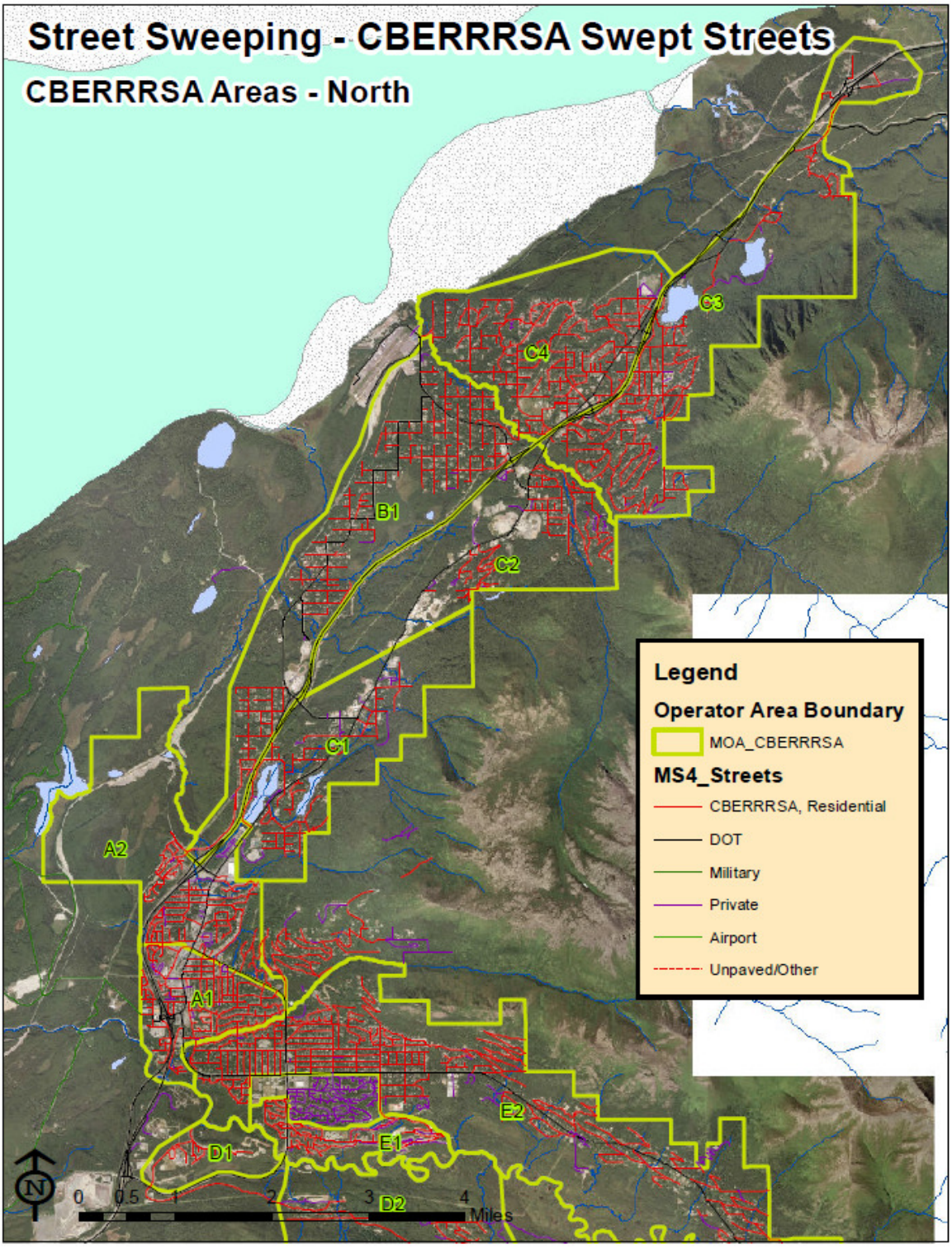


Figure 5-5 CBERRRSA South—2016 Designated Swept Streets

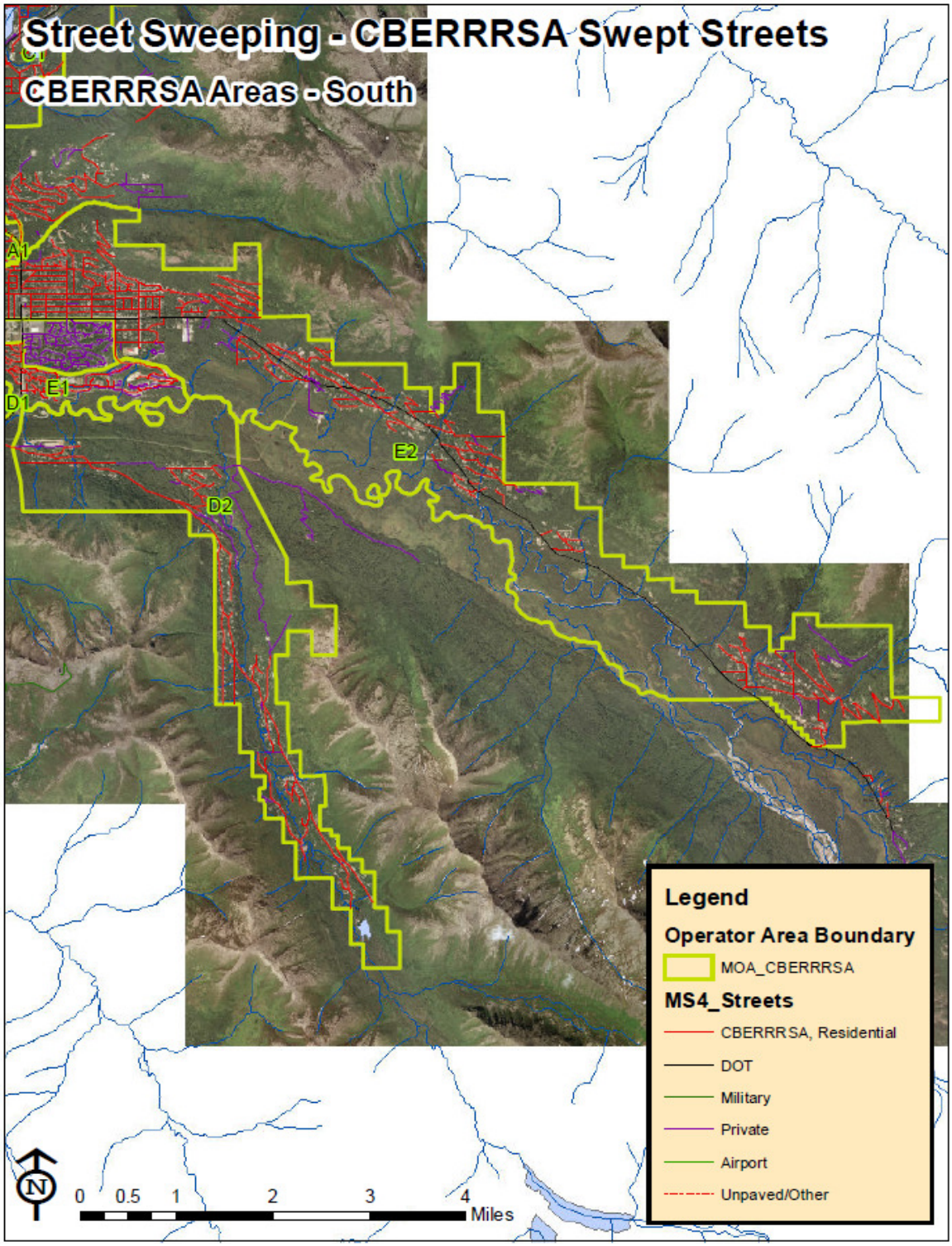


Figure 5-6 ADOT&PF Area A—2016 Designated Swept Streets

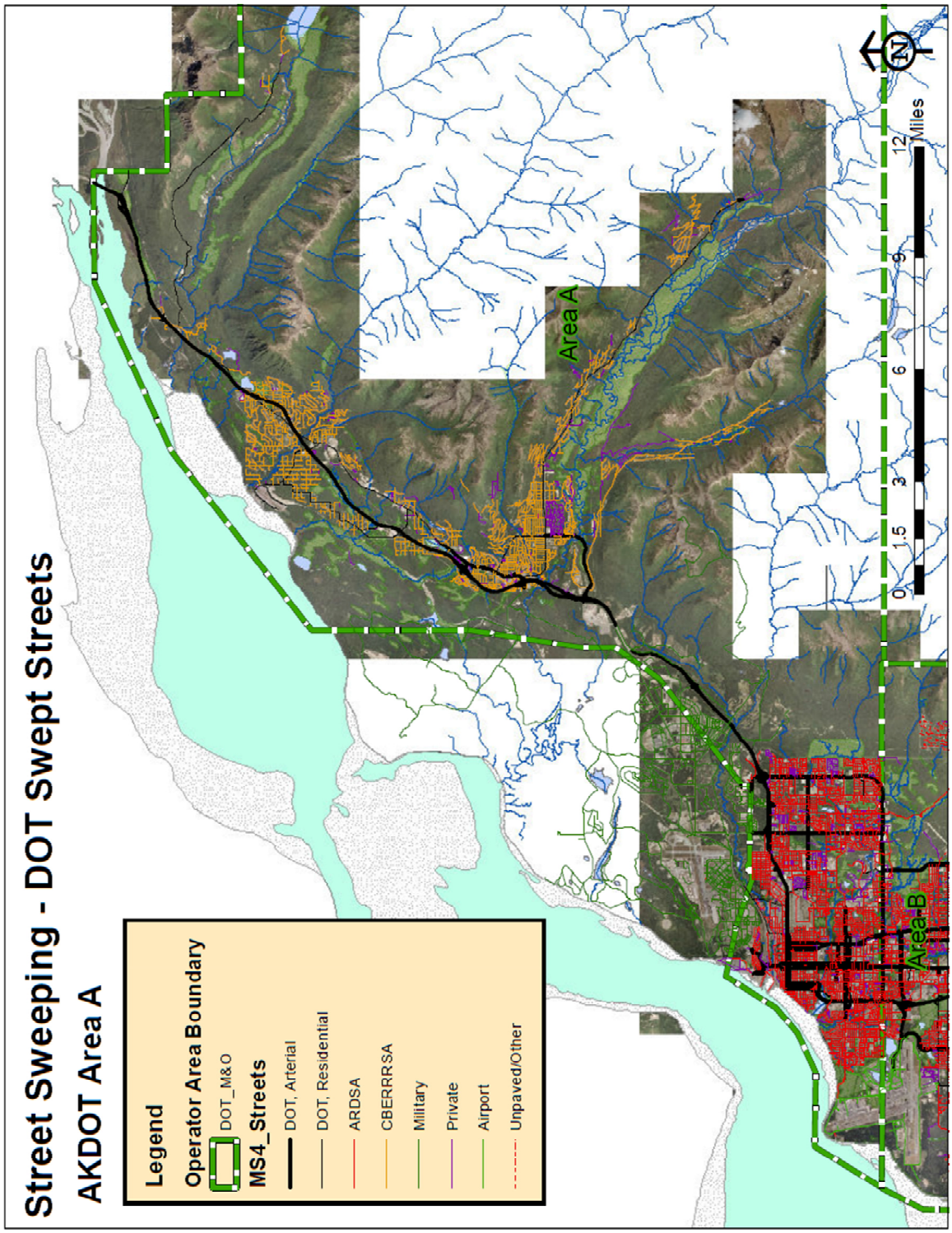


Figure 5-7 ADOT&PF Area B—2016 Designated Swept Streets

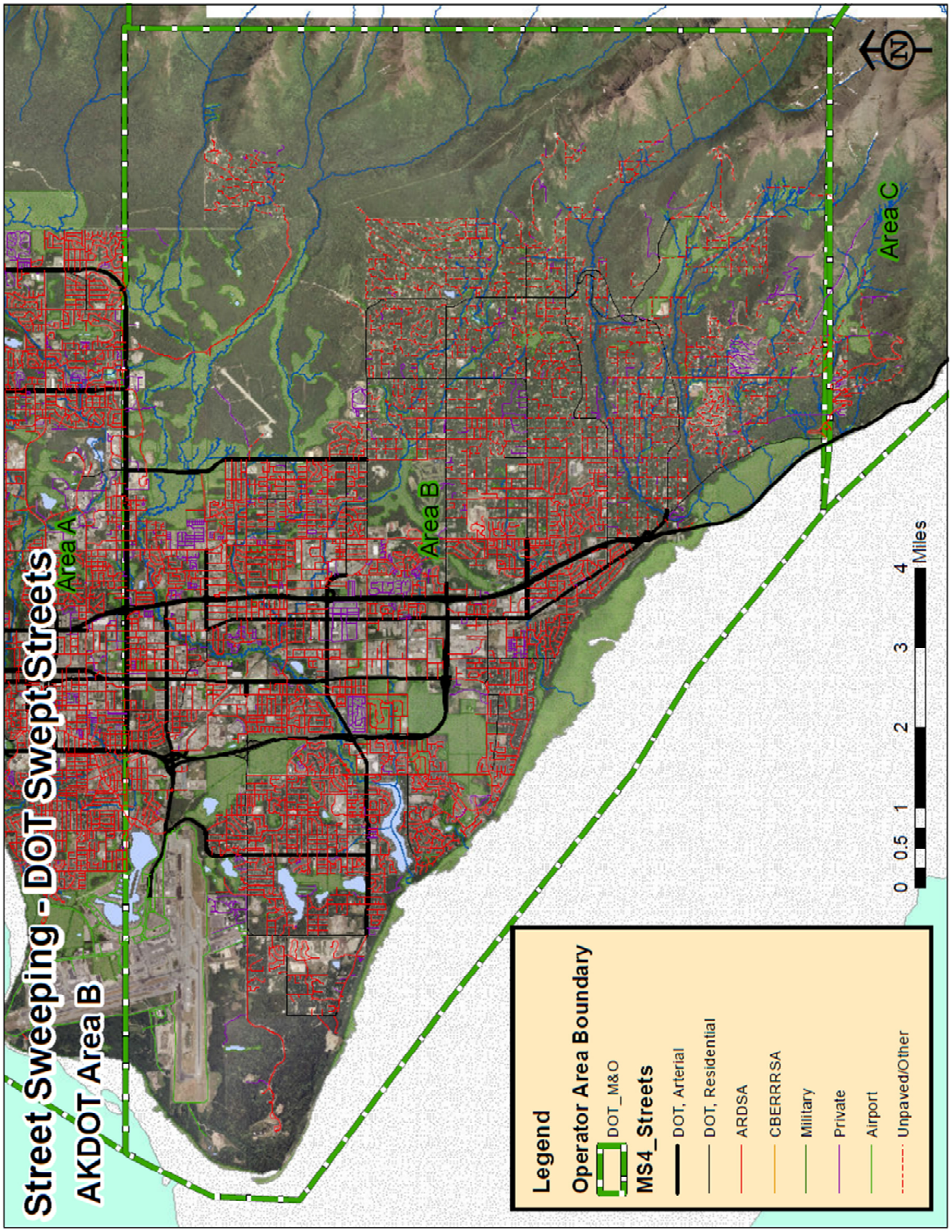


Figure 5-8 ADOT&PF Area C—2016 Designated Swept Streets

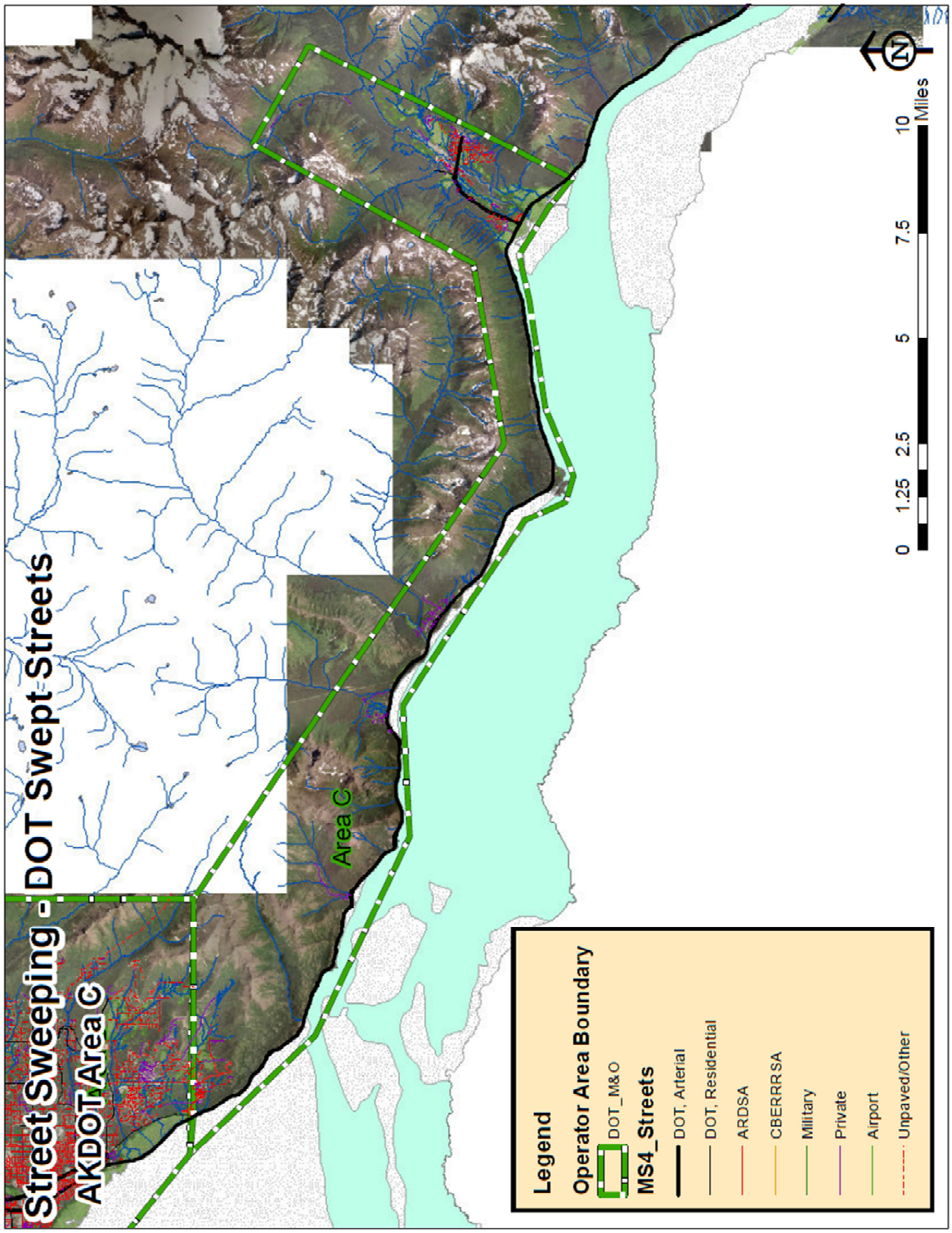
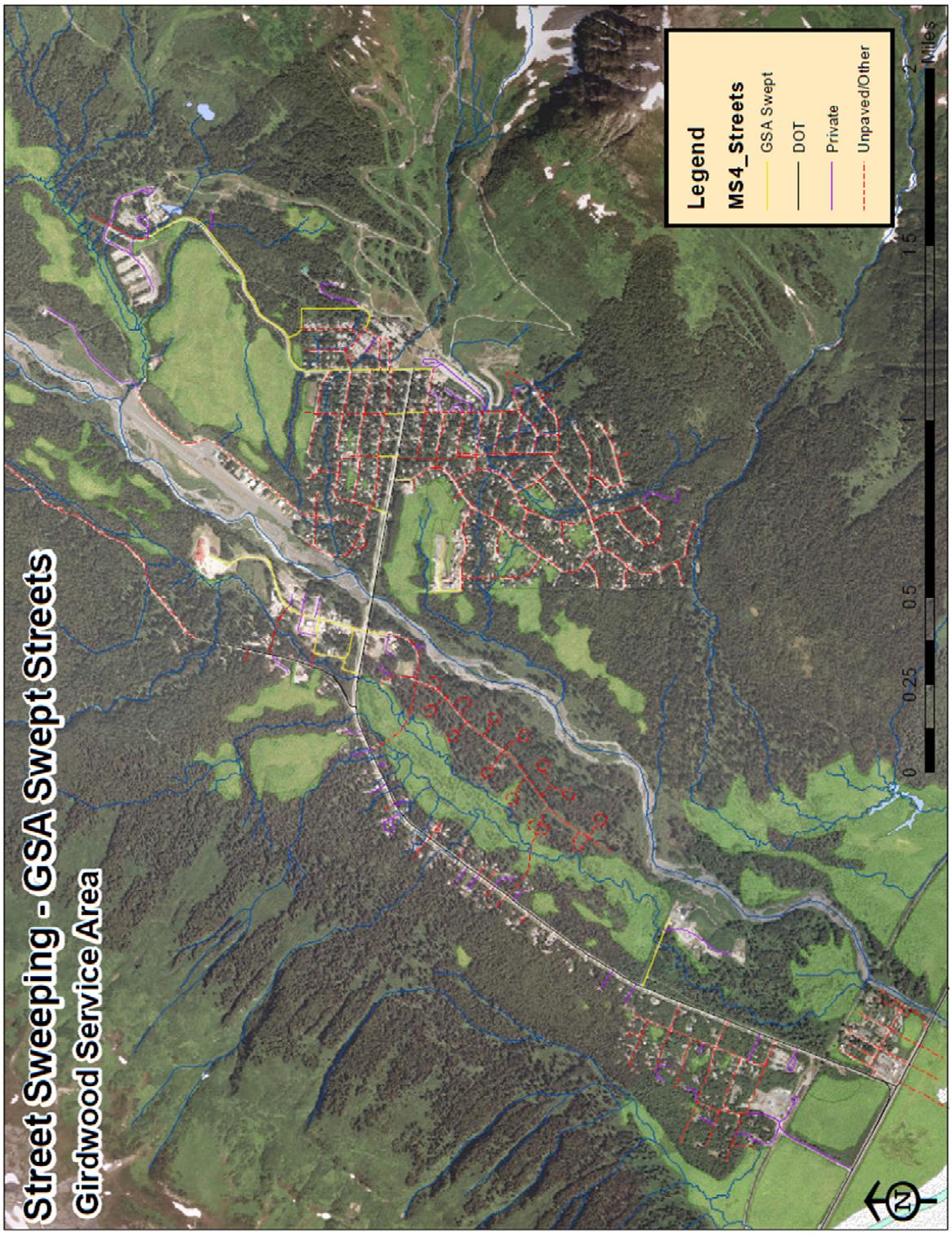


Figure 5-9 Girdwood Service Area (GSA) —2016 Designated Swept Streets



5.2. Anchorage MS4 Detailed Sweeping Records for 2016

Section 5.2 contains detailed sweeping records for 2016 for Anchorage MS4 maintenance agencies. Records for each agency are summarized in a separate subsection. *For more information regarding DOT sweep records for 2016 refer to Appendix E-2.

5.2.1. ADOT&PF 2016 Detailed Sweeping Reports

Table 5-1 ADOT&PF Spring 2016 Sweeping Report

Completion Range: 4/06/2016 - 6/15/2016							
Area A	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.5	16.1	86	5.3	
		CG	29.6	137.0	1907	13.9	
		Mixed	17.2	81.4	801.0	9.8	
	Residential	OC	24.4	60.1	347.0	5.8	
		CG	1.1	3.4	54	16.1	
		Mixed	11.2	54.9	310	5.7	
Totals			86.0	352.8	3505.0		
Area B	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.6	9.4	44	4.7	
		CG	14.3	61.8	849	13.7	
		Mixed	31.3	106.8	2349	22.0	
	Residential	OC	30.4	84.3	398	4.7	
		CG	1.9	17.0	105	6.2	
		Mixed	15.7	52.9	189	3.6	
Totals			96.2	332.0	3934		
Area C	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.9	5.9	5	0.9	
Totals			2.9	5.9	5		

Table 5-2 ADOT&PF Summer 2016 Sweeping Report

Completion Range: 6/23/2016 - 7/21/2016							
Area A	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.5	16.1	20	1.2	
		CG	29.6	137.0	408	3.0	
		Mixed	17.2	81.4	155	1.9	
	Residential	OC	24.4	60.1	99	1.6	
		CG	1.1	3.4	17	5.1	
		Mixed	11.2	54.9	80	1.5	
Totals			86.0	352.8	779.0		
Area B	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.6	9.4	12	1.3	
		CG	14.3	61.8	173	2.8	
		Mixed	31.3	106.8	393	3.7	
	Residential	OC	30.4	84.3	121	1.4	
		CG	1.9	17.0	24	1.4	
		Mixed	15.7	52.9	64	1.2	
Totals			96.2	332.0	787.0		
Area C	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial*	OC	2.9	5.9	3	0.5	
Totals			2.9	5.9	3		

Table 5-3 ADOT&PF Fall 2016 Sweeping Report

Completion Range: 8/22/2016 - 9/23/2016							
Area A	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.5	16.1	28	1.7	
		CG	29.6	137.0	535	3.9	
		Mixed	17.2	81.4	160	2.0	
	Residential	OC	24.4	60.1	138	2.3	
		CG	1.1	3.4	20	5.9	
		Mixed	11.2	54.9	108	2.0	
Totals			86.0	352.8	989.0		
Area B	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.6	9.4	12	1.3	
		CG	14.3	61.8	253	4.1	
		Mixed	31.3	106.8	594	5.6	
	Residential	OC	30.4	84.3	135	1.6	
		CG	1.9	17.0	42	2.5	
		Mixed	15.7	52.9	85	1.6	
Totals			96.2	332.0	1121.0		
Area C	EPA Category	Drainage	Street_Miles	Curb/Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (cyds/PU Mile)	Completeness (%)
	Arterial	OC	2.9	5.9	0	0.0	
Totals			2.9	0.0	0		

5.2.2. CBERRRSA 2016 Detailed Sweeping Reports

Table 5-4 CBERRRSA Spring 2016 Sweeping Report

2016 Spring CBERRRSA							
Completion Range 4/11/2016 - 5/12/2016							
Area A	EPA Category*	Drainage	Street Miles	Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (Cubic Yds /Mile)	Completeness (%)
	Residential	OC	15.7	29.8	102.0	3.4	100.0
		CG	8.0	16.1	213.0	13.3	100.0
		Mixed	10.5	21.1	132.0	6.3	100.0
Totals			34.3	66.9	447.0	6.7	100.0
Area B	EPA Category	Drainage	Street Miles	Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (Cubic Yds /Mile)	Completeness (%)
	Residential	OC	1.4	2.8	3.0	1.1	100.0
		CG	*See Mixed	*See Mixed	*See Mixed		100.0
		Mixed	6.8	13.7	9.0	0.7	100.0
Totals			8.2	16.5	12.0	0.7	100.0
Area C	EPA Category	Drainage	Street Miles	Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (Cubic Yds /Mile)	Completeness (%)
	Residential	OC	36.5	48.7	228.0	4.7	100.0
		CG	0.9	1.8	9.0	5.0	100.0
		Mixed	22.6	45.6	156.0	3.4	100.0
Totals			60.0	96.1	393.0	4.1	100.0
Area D	EPA Category	Drainage	Street Miles	Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (Cubic Yds /Mile)	Completeness (%)
	Residential	OC	7.1	0.0	0.0		100.0
		CG	2.1	4.1	33.0	8.0	100.0
Totals			9.2	4.1	33.0	8.0	100.0
Area E	EPA Category	Drainage	Street Miles	Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (Cubic Yds /Mile)	Completeness (%)
	Residential	OC	31.1	38.4	228.0	5.9	100.0
		CG	10.7	21.4	267.0	12.5	100.0
		Mixed	11.3	22.5	48.0	2.1	100.0
Totals			53.1	82.3	543.0	6.6	100.0
Mixed Area	EPA Category	Drainage	Street Miles	Pickup Miles	Total Pick up (Cubic Yards)	Unit Pick up (Cubic Yds /Mile)	Completeness (%)
	Residential	OC	1.2	2.5	9.0	3.6	100.0
		CG	*See Mixed	*See Mixed	*See Mixed		100.0
		Mixed	28.7	57.4	30.0	0.5	100.0
Totals			29.9	59.9	39.0	0.7	100.0

***Note: CBERRRSA Operational area Contains no Arterial Street Segments**

Table 5-5 CBERRRSA Summer 2016 Sweeping Report

2016 Summer CBERRRSA							
Completion Range 6/15/2016 - 9/15/2016							
Area A	**EPA Category***	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	15.7	29.8	Swept As Needed		
		CG	8.0	16.1	Swept As Needed		
		Mixed	10.5	21.1	Swept As Needed		
Totals			34.3	66.9	No Data Reported		
Area B	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	1.4	2.8	Swept As Needed		
		CG	*See Mixed	*See Mixed	Swept As Needed		
		Mixed	6.8	13.7	Swept As Needed		
Totals			8.2	16.5	No Data Reported		
Area C	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	36.5	48.7	Swept As Needed		
		CG	0.9	1.8	Swept As Needed		
		Mixed	22.6	45.6	Swept As Needed		
Totals			60.0	96.1	No Data Reported		
Area D	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	7.1	0.0	Swept As Needed		
		CG	2.1	4.1	Swept As Needed		
Totals			9.2	4.1	No Data Reported		
Area E	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	31.1	38.4	Swept As Needed		
		CG	10.7	21.4	Swept As Needed		
		Mixed	11.3	22.5	Swept As Needed		
Totals			53.1	82.3	0.0		
Mixed Area	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	1.2	2.5	Swept As Needed		
		CG	*See Mixed	*See Mixed	Swept As Needed		
		Mixed	28.7	57.4	Swept As Needed		
Totals			29.9	59.9	No Data Reported		
***Note: CBERRRSA Operational area Contains no Arterial Street Segments**							

*For the 2016 summer sweep period CBERRRSA reported that roads were swept 'as needed' (as per the Street Sweeping Management Plan) and did not report any volumes of swept materials. This suggests that only open channel type roads swept with kick broom type sweepers were swept in the summer period.

Table 5-6 CBERRRSA Fall 2016 Sweeping Report

2016 Fall CBERRRSA							
Completion Range 9/6/2016 - 9/29/2016							
Area A	**EPA Category***	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	8.9	16.1	27.0	1.7	100.0
		CG	5.5	10.9	30.0	2.7	100.0
		Mixed	22.0	43.0	48.0	1.1	100.0
Totals			36.3	70.0	105.0	1.5	100.0
Area B	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	8.6	10.8	30.0	2.8	100.0
		CG	*See Mixed	*See Mixed	*See Mixed		100.0
		Mixed	8.3	16.6	18.0	1.1	100.0
Totals			16.9	27.4	48.0	1.8	100.0
Area C	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	33.4	49.4	93.0	1.9	100.0
		CG	*See Mixed	*See Mixed	*See Mixed		100.0
		Mixed	28.0	56.5	57.0	1.0	100.0
Totals			61.5	106.0	150.0	1.4	100.0
Area D	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	11.9	10.5	9.0	0.9	100.0
		CG	1.7	3.5	9.0	2.6	100.0
		Mixed	0.0	0.0	0.0		
Totals			13.6	14.0	18.0	1.3	100.0
Area E	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	29.9	43.6	39.0	0.9	100.0
		CG	9.4	18.8	36.0	1.9	100.0
		Mixed	14.5	29.1	33.0	1.1	100.0
Totals			53.8	91.4	108.0	1.2	100.0
Mixed Area	**EPA Category**	**Drainage**	**Street Miles**	**Pickup Miles**	**Total Pick up (Cubic Yards)**	**Unit Pick up (Cubic Yds /Mile)**	**Completeness (%)**
	Residential	**OC**	0.8	1.6	3.0	1.9	100.0
		CG	1.7	3.4	6.0	1.8	100.0
		Mixed	14.8	29.7	27.0	0.9	100.0
Totals			17.3	34.6	36.0	1.0	100.0

***Note: CBERRRSA Operational area Contains no Arterial Street Segments**

5.2.3. ASD 2016 Detailed Sweeping Reports

Table 5-7 ASD 2016 Sweeping Report

ASD Parking Lot Sweep Summary 2016				
			2016 Sweeps	
ASD SiteCode	Site	Area (sqft)		Swept Total Qty (cyds)
335	Ravenwood Elementary School	89,075		20
220	Girdwood K-8 School	89,969		12
270	Muldoon Elementary School	92,049		12
380	Turnagain Elementary School	93,900		6
364	Susitna Elementary School	94,200		13
260	Mountain View Elementary School	95,101		16
237	Huffman Elementary School	95,228		10
340	Rogers Park Elementary School	96,305		8
450	Polaris K-12 School	97,293		17
410	Wonder Park Elementary School	97,567		16
390	Williwaw Elementary School	97,956		16
320	O'Malley Elementary School	98,189		16
118	Bear Valley Elementary School	98,474		20
330	Rabbit Creek Elementary School	99,865		11
112	Alpenglow Elementary School	102,825		28
363	Trailside Elementary School	103,834		15
130	Campbell Elementary School	104,000		16
418	Gladys Wood Elementary School	104,344		18
125	Bowman Elementary School	106,000		11
362	Spring Hill Elementary School	106,000		10
250	Lake Otis Elementary School	106,173		7
280	North Star Elementary School	106,780		16
116	Bayshore Elementary School	106,792		19
290	Northern Lights ABC School	108,974		15
248	Lake Hood Elementary School	114,600		15
300	Northwood ABC Elementary School	118,491		16
120	Birchwood ABC Elementary School	119,236		23
242	Kasuun Elementary School	119,441		19
384	Tyson Elementary School	120,690		11
400	Willow Crest Elementary School	124,285		17
345	Russian Jack Elementary School	128,685		14
170	Chugiak Elementary School	140,875		14
760, 850	West High/ Romig Middle School	176,826		57

ASD Parking Lot Sweep Summary 2016

			2016 Sweeps	
ASD SiteCode	Site	Area (sqft)		Swept Total Qty (cyds)
700, 160	Central Middle/ Chugach Elementary	116,792		25
805	King Career Center	144,663		29
730	Gruening Middle School	150,000		23
246	Kincaid Elementary School	152,789		27
750	Mears Middle School	156,806		20
710	Clark Middle School	168,224		22
740	Hanshew Middle School	169,175		16
785	Begich Middle School	177,442		22
770	Wendler Middle School	193,293		25
780	Goldenview Middle School	201,993		30
755	Mirror Lake Middle School	203,260		28
865	Eagle River High School	275,595		34
810	Chugiak High School	325,000		44
860	South High School	340,669		41
800	Bartlett High School	412,961		40
830	East High School	459,000		40
840	Service High School	473,795		66
820, 150	Dimond High/ Chinook Elementary	580,883		90
	Total	8,256,362		**1156**
	Unit Pick Up (cyds/acre)			**6.1**

5.2.4. 2016 Changes to Sweeping and Basis for Changes

Table 5-8 CBERRRSA 2016 Changes to Swept Streets

2016 - SWEEP CHANGES FOR CBERRRSA										
Area	Change Type	Name_ID	Street From	Street To	Frequency Category	Drainage Type	StMiles	PUMiles	Sweep Practice	Change Type
D	1	SUN VALLEY DRIVE	HILAND ROAD	LT9, BLK 3,SUN VALLEY SUB	Residential	Open Channel	0.90	1.80	Kick to Pick Up	Moved from Kick Brrom to Pick Up
E	1	WILDFLOWER CIRCLE	BERRYHILL ROAD	CUL DE SAC END	Residential	Open Channel	0.74	1.48	Kick to Pick Up	Moved from Kick Brrom to Pick Up
E	1	EAGLE GLACIER LOOP	EAGLE RIVER ROAD MI. 4.2	EAGLE RIVER ROAD MI. 4.5	Residential	Open Channel	1.40	2.80	Kick to Pick Up	Moved from Kick Brrom to Pick Up
E	1	COLUMBIA GLACIER LOOP	EAGLE GLACIER LOOP	EAGLE GLACIER LOOP	Residential	Open Channel	0.38	0.76	Kick to Pick Up	Moved from Kick Brrom to Pick Up
E	1	MYRTLE DRIVE	EAGLE RIVER ROAD MI. 4.2	WALLACE STREET	Residential	Open Channel	0.90	1.80	Kick to Pick Up	Moved from Kick Brrom to Pick Up
E	1	WALLACE STREET	MYRTLE DRIVE	DEAD END	Residential	Open Channel	0.16	0.32	Kick to Pick Up	Moved from Kick Brrom to Pick Up
E	1	GLACIER VIEW DRIVE	MYRTLE DRIVE	LOT 7, BLK 2 PARDSIDE SUB	Residential	Open Channel	2.94	5.88	Kick to Pick Up	Moved from Kick Brrom to Pick Up
E	1	MILE HI AVENUE	EAGLE RIVER ROAD MI. 3.6	LOWER CANYON DRIVE	Residential	Open Channel	1.12	2.24	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	STEFFES STREET 2	TARIKA AVENUE	NORTH BLM LOT 107	Residential	Open Channel	0.46	0.92	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	KAREN AVENUE 1	PILOTS ROAD	STEFFES STREET	Residential	Open Channel	0.22	0.44	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	NEWTON COURT	STEFFES STREET	END OF 22043 NEWTON	Residential	Open Channel	0.08	0.16	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	WHITE BIRCH ROAD 1	TARIKA AVENUE	NORTH END BLM LOT 129	Residential	Open Channel	0.18	0.36	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	UPPER BOWERY LANE 1	TARIKA AVENUE	NORTH TO KAREN AVENUE	Residential	Open Channel	0.38	0.76	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	KAREN AVENUE 2	UPPER BOWERY LANE	LOT 125A, RUSS HARMON SUB.	Residential	Open Channel	0.16	0.32	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	UPPER BOWERY LANE 2	TARIKA AVENUE	SOUTH TO TENADA AVENUE	Residential	Open Channel	0.12	0.24	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	SCENIC DRIVE 1	JAYHAWK DRIVE	NORTH MCKINLEY VIEW R-O-W	Residential	Open Channel	0.24	0.48	Kick to Pick Up	Moved from Kick Brrom to Pick Up
B	1	SCENIC DRIVE 2	JAYHAWK DRIVE	TENADA AVENUE	Residential	Open Channel	0.60	1.20	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	DARN DRIVE	CHAMBER LANE	BLM LOTS 56 & 57	Residential	Open Channel	0.10	0.20	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	STARNER STREET	BERNIE AVENUE	STARNER BRIDGE	Residential	Open Channel	0.38	0.76	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	JEHOVAHJIREH STREET	OBERG ROAD	20616 JEHOVAHJIREH STREET	Residential	Open Channel	0.14	0.28	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	HOMESTEAD RD 2 (@ OBERG W.	OBERG ROAD	LOT 24, BETH HEIGHTS SUB.	Residential	Open Channel	0.10	0.20	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	YARNOT AVENUE	OBERG ROAD	CUL DE SAC END	Residential	Open Channel	0.36	0.72	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	JILL STREET	YARNOT AVENUE	MIDDLE OF 21420 JILL STREET	Residential	Open Channel	0.12	0.24	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	DEER PARK CIRCLE	DEER PARK DRIVE	END OF CUL DE SAC	Residential	Open Channel	0.14	0.28	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	FAWN LANE	DEER PARK DRIVE	END LT 1/BLK 2 DEER PARK SUB.	Residential	Open Channel	0.14	0.28	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	ARMAS DRIVE	DEER PARK DRIVE	21925 & 21928 ARMAS DRIVE	Residential	Open Channel	0.22	0.44	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	DEER CIRCLE	FAWN LANE	22107 DEER CIRCLE	Residential	Open Channel	0.12	0.24	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	URSA MAJOR CIRCLE	RANKIN ROAD	CUL DE SAC END	Residential	Open Channel	0.34	0.68	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	JUDD DRIVE	KNIK VISTA STREET	RANKIN ROAD	Residential	Open Channel	0.76	1.52	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	JUDD CIRCLE	JUDD DRIVE	CUL DE SAC END	Residential	Open Channel	0.06	0.12	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	REBECCA CIRCLE	JUDD DRIVE	CUL DE SAC END	Residential	Open Channel	0.10	0.20	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	ALDER LEAF COURT	KNIK VISTA STREET	INLET VISTA DRIVE	Residential	Open Channel	0.22	0.44	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	GRASSER ROAD	KNIK VISTA DRIVE	CUL DE SAC END	Residential	Open Channel	0.40	0.80	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	MAYTAG STREET	GRASSER ROAD	22228 MAYTAG STREET	Residential	Open Channel	0.24	0.48	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	PEG STREET	GLACIER ROAD N & S	BLM LOTS 13 & 32	Residential	Open Channel	0.30	0.60	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	MIRROR DRIVE	OLD GLENN HIGHWAY	LT 6A, BLK 1, EKLUTNA HTS.	Residential	Open Channel	0.22	0.44	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	MOUNT EKLUTNA DRIVE 1	OLD GLENN HIGHWAY	LT 1,BLK 1, EKLUTNA HEIGHTS	Residential	Open Channel	0.22	0.44	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	MILLER ROAD	LAKE HILL DRIVE	REESE ROAD	Residential	Open Channel	0.50	1.00	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	GRACE STREET	OLD GLENN HIGHWAY	LAKE HILL DRIVE	Residential	Open Channel	0.38	0.76	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	RAMBLER ROAD	LAKE HILL DRIVE	LOT 6, ROBINDALE SUB.	Residential	Open Channel	0.60	1.20	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	ROBINSON ROAD	REESE ROAD	RAMBLER ROAD	Residential	Open Channel	0.30	0.60	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	LEO'S ROAD	LAKE HILL DRIVE	END OF LOTS 6 & 11, LEO'S SUB.	Residential	Open Channel	0.18	0.36	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	ELSIE PLACE	OBERG ROAD	21024 & 22813 ELSIE PLACE	Residential	Open Channel	0.10	0.20	Kick to Pick Up	Moved from Kick Brrom to Pick Up
C	1	DALLON COURT	ELSIE PLACE	22916 DALLON COURT	Residential	Open Channel	0.08	0.16	Kick to Pick Up	Moved from Kick Brrom to Pick Up

Change Type Key
1 = Road segment was transferred form Kick Broom inventory to Pick Up inventory
2 = Road segment was transferred from Pick Up inventory to Kick Broom inventory
3 = Road segment added to Kick Broom inventory in 2014
4 = Road segment added to Pick Up inventory in 2014
5 = Gravel road segment (infeasible for sweeping)

ARDSA reported no changes to their list of swept streets for the 2016 sweeping periods. For changes to DOT swept streets in 2016 see Appendix E-2.