



Mark Begich, Mayor

---

# **Anchorage Street Deicer and Snow Disposal: 2003 Best Management Practices Guidance**

Document No. WMS CPg03001

**MUNICIPALITY OF ANCHORAGE  
WATERSHED MANAGEMENT SERVICES**

OCTOBER 2003







Mark Begich, Mayor

---

# Anchorage Street Deicer and Snow Disposal 2003 Best Management Practices Guidance

MUNICIPALITY OF ANCHORAGE  
WATERSHED MANAGEMENT SERVICES

**October 2003**

**Document No.:**

**WMS CPg03001**

**WMS Project No.:**

**95004**

Prepared for:

Watershed Management Services  
Project Management and Engineering  
Department of Public Works  
Municipality of Anchorage

Prepared by:

MWH  
4100 Spenard Road  
Anchorage, AK 99517

**OCTOBER 2003**





# Contents

Section	Page
<b>SUMMARY</b> .....	<b>1</b>
<b>INTRODUCTION</b> .....	<b>3</b>
Project Purpose .....	3
Project Background .....	3
Permit Reference .....	3
Previous Studies.....	4
Report Organization.....	5
<b>2002/2003 STREET DEICING PRACTICES</b> .....	<b>7</b>
2002/2003 Street Deicing BMP Performance .....	7
2002/2003 Street Deicing Monitoring Findings .....	7
2002/2003 Sand and Deicer Inventory .....	8
Discussion of Findings.....	13
<b>SNOW DISPOSAL SITE PRACTICES</b> .....	<b>15</b>
2002/2003 Snow Disposal Site BMP Performance .....	15
Discussion of Findings.....	15
<b>GUIDANCE</b> .....	<b>19</b>
2003/2004 Street Deicing Guidance.....	19
2003/2004 Snow Disposal Guidance .....	19
<b>REFERENCES</b> .....	<b>21</b>
<b>LIST OF PREPARERS</b> .....	<b>23</b>

## List of Figures

Figure 1 SMD Street Deicer and Sand Inventory Areas .....	9
Figure 2 M&O Street Deicer and Sand Inventory Areas .....	11
Figure 3 Snow Disposal Sites and Service Areas.....	17

## List of Tables

Table S1 Winter Chloride Application , 1998/1999 Through 2002/2003 .....	2
Table 1 2001/2002 Winter Sand and Deicer Application on Streets.....	8
Table 2 2001/2002 Chloride Application on Streets .....	13
Table 3 Winter Application, 1998/1999 through 2001/2002 .....	13
Table 4 Winter Chloride Application, 1998/1999 through 2001/2002.....	14

## Acronyms and Abbreviations

ADEC Alaska Department of Environmental Conservation

ADOT/PF	Alaska Department of Transportation and Public Facilities
BMP	best management practice
CBD	Central Business District
EPA	U.S. Environmental Protection Agency
kg	kilogram
M&O	Maintenance and Operations
MOA	Municipality of Anchorage
NPDES	National Pollutant Discharge and Elimination System
SMD	Street Maintenance Division
WMS	Watershed Management Section

---

## Summary

The Municipality of Anchorage (MOA) and the State of Alaska Department of Transportation and Public Facilities (ADOT&PF) are responsible for National Pollutant Discharge Elimination System (NPDES) Permit No. AKS05255-8. The U.S. Environmental Protection Agency requires that the permittees, MOA and ADOT&PF, “examine, assess, and implement procedures of deicing to ensure that there are no adverse impacts on water quality.” Permittees are also required to submit annual updates to any deicing management and monitoring plans with annual permit reports per Part IIA.1.c(1). This guidance document responds to the annual documentation requirements of the NPDES Permit.

In winter of 2001/2002, the MOA Street Maintenance Department (SMD) and ADOT&PF Maintenance and Operations (M&O) performed deicing practices in general conformance with permit requirements. Data collection and analysis were completed by the MOA Watershed Management Section of Project Management and Engineering to assess the effectiveness of these practices in reducing pollutants during street deicing and snow disposal to the maximum extent practicable. A material application inventory for winter 2002/2003, and comparison to inventory data from previous years, has been performed. In addition, street and snow disposal site monitoring studies were performed, including sampling and observations of operations at all snow sites. This information is summarized here and provides the basis for changes to MOA deicing practices guidance for winter 2003/2004.

The materials inventory documents sand and chloride-based chemical deicers that SMD and M&O used to treat streets during winter 2002/2003. SMD added sodium chloride to street sand at approximately 8 percent by weight of sand and M&O added 12 percent by weight of sand. Approximately 91 percent of all chloride applied to streets was from sodium chloride in sand or applied directly. Magnesium chloride brine was used to pre-wet sand applied to streets, and in direct street deicing applications. SMD also increased use of potassium acetate as a deicer. Comparison of winter seasons from 1998/1999 through 1999/2000 showed little difference between the years in total chloride applied to Anchorage streets. During winter 2000/2001, chloride application increased approximately 74 percent, compared to winter 1999-2000 (Table S1). From the 2000-2001 through the 2001-2002 winters, chloride applications remained relatively constant. For winter 2002-2003, chloride application increased by 7 percent.

To better control street waste, a street waste disposal plan was written in 2002 and accepted by SMD and M&O. Implementation planning is proposed for 2004.

**Table S1 Winter Chloride Application , 1998/1999 Through 2002/2003**

English Units					Metric Units		
Winter Season	Sand (tons)	Salt (NaCl) (tons)	Brine (MgCl <sub>2</sub> ) (gallons)	Liquid Deicer (Potassium Acetate) (gallons)	Salt (NaCl) (kg of Cl)	Brine (MgCl <sub>2</sub> ) (kg of Cl)	Total Cl (kg)
98/99	30,330	1,850	309,500	0	1,018,060	281,030	1,299,990
99/00	34,530	2,000	212,730	0	1,100,600	193,160	1,293,760
00/01	34,480	3,380	434,810	18,000	1,860,010	394,810	2,254,820
01/02	48,820	3,670	324,000	71,800	2,019,610	294,190	2,313,800
02/03	37,070	4,110	252,460	56,430	2,261,810	229,500	2,491,310

Key:

Cl – chloride

kg – kilograms

**MgCl<sub>2</sub> – magnesium chloride**

**NaCl – sodium chloride**

The Halligan Snow Site service area continues to be incorporated into the Tudor Snow Disposal Site service area. The Halligan Snow Site is no longer available for use as a snow disposal area.

Based on 2002/2003 findings for snow disposal sites, SMD and M&O propose the following guidance and action plan for winter 2003/2004 street deicer use:

- Continue current SMD and M&O street deicing practices and inventory as described in WMP APg98001, APg98002, and CPg00003 (Wheaton et al., 1998c; WMS, 1999; WMS, 2000a).
- Implement the street waste management plan formed in 2002.
- Provide increased controls in sand/salt mixing operations.
- Continue to implement a long-term action plan to build covered storage for street sand.
- Continue pursuit of funding for covered sand storage by SMD and M&O, with tentative implementation scheduled as follows:
  - SMD: Constructed and operational sand storage by 2006.
  - M&O: Constructed and operational sand storage by 2006.

In accordance with data collection efforts from 1998 through 2003 and subsequent findings, the following activities should be performed at all snow disposal sites:

- Incorporate snow disposal site siting, construction, and operational best management practices implementation as described in draft design criteria submitted in 2002 and as accepted by the MOA Project Management and Engineering for implementation.



---

## Introduction

The Municipality of Anchorage (MOA) and the State of Alaska Department of Transportation and Public Facilities (ADOT&PF) are responsible for National Pollutant Discharge Elimination System (NPDES) Permit No. AKS05255-8. The U.S. Environmental Protection Agency (EPA) requires that the permittees, MOA and ADOT&PF, “examine, assess, and implement procedures of deicing to ensure that there are no adverse impacts on water quality.” Permittees are also required to submit annual updates to any deicing management and monitoring plans with annual permit reports per Part IIA.1.c(1). This guidance document responds to the annual documentation requirements of the NPDES Permit.

Project purpose and background are discussed in terms of the MOA NPDES Permit and MOA Watershed Management Services (WMS) information needs.

## Project Purpose

Assessing streets and snow disposal systems is part of an overall MOA strategy to improve understanding of local receiving waters and how they are impacted by various practices. Results of improved understanding of these systems are applied through implementing more efficient and cost-effective best management practices (BMPs). This 2002 guidance is intended to follow the results of past year’s guidance reports, which have addressed the following questions in detail:

- What were the concentrations of select pollutants on area streets for winter 2001/2002 and spring 2002?
- What was the effectiveness of BMPs implemented at snow disposal sites for winter 2001/2002?
- What were the relative concentrations of select pollutants during various times in the snow disposal site melting process?

## Project Background

Project background is discussed in the following sections, including a description of the permit reference for the study, summaries of previous WMS work performed at snow disposal sites, and an explanation of the report organization.

## PERMIT REFERENCE

Assessment of MOA street deicing and snow disposal systems began in 1998 and 1999, driven by NPDES Permit conditions. These conditions were stated in Part II, Section A, Paragraph 1.c., of the NPDES Permit, and were first developed in 1996 through negotiation

with the EPA and Alaska Department of Environmental Conservation (ADEC) concerning expected storm water management program information needs. Program implementation is an implicit requirement of the NPDES Permit. Attachment A of the MOA NPDES Permit identifies street deicer impacts, which are a particular focus of the program. Section 4.1.1 of the attachment identifies the need to “*Quantify potential impacts of chemical substitutes for winter sand on receiving water quality and uses and provide management guidance for application of typical chemical street deicers.*”

## **PREVIOUS STUDIES**

In early 1998, WMS reviewed issues associated with meltwater from streets and snow disposal sites, concentrating its efforts first on chloride loading, and then on developing a systematic approach to investigating potential health and ecosystem impacts. Through this review, WMS identified snowmelt chloride loading as a critical element for representation in field investigations (Wheaton, 1998).

Street Studies. An inventory system was created to quantify the amounts of sand, salt, and deicer applied to area streets, and an inventory was performed annually. Street buildup and washoff before and after sweeping events were also determined by field surveys (WMS, 1999) and modeled to develop buildup and washoff rates for different street types. Oil/grit separator and street sweeping performances were also modeled.

Snow Disposal Site Studies. Data gathered by WMS in 1998 indicated an initially high chloride concentration that decreased prior to peak meltwater flows (Wheaton and Bischofberger, 1998). Through this study, interim BMPs were formulated for all 10 snow disposal sites in an attempt to manipulate the magnitude of chloride discharge. Interim BMPs included structural improvements, such as drainage control and/or detention ponds. Other BMPs included operational measures, such as limitations on collecting snow from certain areas for specific snow sites, sequencing and placement of snow site fill, and changes to the on-site location for placement of waste soil from street sweepings or other activities (Wheaton et al., 1998).

In early 1998, WMS performed further data collection and analysis to verify previous collection efforts and evaluate interim BMPs at the Tudor and North Mountain View Snow Disposal Sites (Wheaton, 1998; Wheaton and Bischofberger, 1998). Results indicated limited success.

The Tudor Snow Disposal Site was chosen to implement other interim BMPs for the 2000 evaluation. These BMPs included: realigning the north entrance perimeter, installing traffic barriers, reconstructing and armoring discharge channels, reconstructing sedimentation structures in the east channel, and installing setback flagging along the inner perimeter of the

snow pad berm (Wheaton et al., 1998). BMPs for the Tudor Snow Disposal Site outlined in the 1999 guidance document were incorporated. In 2000 and 2001, the Tudor Snow Disposal Site was additionally evaluated for V-pad effectiveness, a BMP that was observed to be significantly more effective at decreasing turbidity in one area of the Tudor Snow Disposal Site. Data in 2002 continued to confirm various BMP effectiveness at the Tudor Snow Disposal Site.

Data collection and analysis in 2000 also focused on pollutant discharge. The 2000 study found that sand and deicer concentrations varied significantly. Exploratory sampling of polynuclear aromatic hydrocarbons, fecal coliform, and cyanide showed no violations of EPA water quality criteria. Metals concentrations varied throughout the melt cycle.

## **REPORT ORGANIZATION**

This guidance document summarizes the results of previous monitoring and BMP development efforts for Anchorage street deicer and snow disposal through the winter and spring of 2001/2003 and provides guidance and criteria for implementing snow disposal site BMPs. Text has been organized as described below.

**Introduction.** Summarizes the context of the 2003 Street Deicer and Snow Disposal Site guidance, presents the background of the project, and describes the organization of this document.

**Street Deicing Practices.** Describes 2002/2003 BMP performance.

**Snow Disposal Site Practices.** Describes 2002/2003 BMP performance.

**Guidance.** Provides guidance for the 2003/2004 winter season.

**References.** Contains the references cited in this report.

All figures and tables follow the written text in which they were referenced. Draft design criteria for snow disposal sites are appended.

(intentionally blank)

## 2002/2003 Street Deicing Practices

Street deicing practices for 2002/2003 are discussed below, including BMP performance and findings from monitoring.

### 2002/2003 Street Deicing BMP Performance

The MOA Street Maintenance Department (SMD) and ADOT&PF Maintenance and Operations (M&O) share responsibility for street deicing within the MOA. Overall, the methods and practices performed by each agency have not significantly change from the 1998/1999-winter season (Wheaton et al., 1998).

In 2002, a plan was also written for managing street sweepings. Note that details of this plan required negotiation with ADEC.

In 2000, the SMD proposed an action plan that would decrease overall chloride loading on area streets. The BMPs proposed, to be implemented in tandem, were:

- Reduce salt load to 1 percent by weight in sand.
- Store sand piles in storage buildings, which provide better control over the amount of salt mixed with sand.

Reducing salt load would significantly decrease the amount of chloride applied on streets. Storing sand in storage buildings provides better control over the amount of salt mixed with sand, which would also help significantly reduce chloride applications. Because these storage units would have significant capital and operational costs, funding must be obtained by SMD and M&O and sites determined. The following revised schedule from 2002 is proposed:

- SMD - Constructed and operational sand storage shelters by 2004.
- M&O - Constructed and operational sand storage shelters by 2006.

### 2002/2003 Street Deicing Monitoring Findings

Findings from monitoring elevated metals in meltwater at snow disposal sites in 2000 suggest that dissolved metals might also be elevated in street meltwater. Data collected in other studies confirm the presence of metals in street sediment and runoff; however, current stream data do not show elevated concentrations (WMS, 2000b).

## 2002/2003 Sand and Deicer Inventory

SMD and M&O collected sand and deicer application inventory data for 2002/2003. SMD and M&O divided the MOA into inventory areas (Figures 1 and 2) and an inventory was performed within each area. SMD typically services streets with low traffic volumes, such as those in residential areas, and the central business district (CBD). M&O services the majority of larger-volume streets and highways.

Sand, magnesium chloride, and sodium chloride information was summarized for all service area divisions (Table 1). Inventory data suggested that approximately 8 percent total salt by weight was applied to SMD sand, and 12 percent total salt by weight was applied to M&O sand for the season. Table 2 compares the different applications in terms of chloride. As shown, approximately 2,491,310 kilograms (kg) of chloride were applied to Anchorage streets during the 2002/2003 winter season. Approximately 229,500 kg of chloride were from magnesium chloride brine application and approximately 2,261,810 kg of chloride were from salt (sodium chloride). Salt (sodium chloride) contributed 91 percent of total chloride load applied to streets.

Potassium acetate was also applied by SMD during the 2002/2003 winter season, and a limited amount was used in sweeping during the spring (Table 1). Approximately 47,655 gallons were used during the winter by SMD in the CBD area, and 8,775 gallons were used during sweeping activities, for a total of 56,430 gallons.

Magnesium chloride deicer was applied by two methods: prewet and direct application. Prewet application refers to the process of spraying the sand with magnesium chloride prior to street application. Past data from SMD suggest that prewet applications only account for 3 percent of all deicer applied, while M&O prewet applications account for 20 percent of all its deicer applied (WMS, 2001). For 2002, the same assumptions were made, for prewet applications.

**Table 1 2001/2002 Winter Sand and Deicer Application on Streets**

Service Area	Sand (tons)	Salt Sodium Chloride (tons)	Brine Magnesium Chloride (gallons)	Liquid Deicer Potassium Acetate (gallons)
SMD	7,160	560	168,800	56,430
M&O	29,910	3,550	83,660	None
Total	37,070	4,110	252,460	56,430

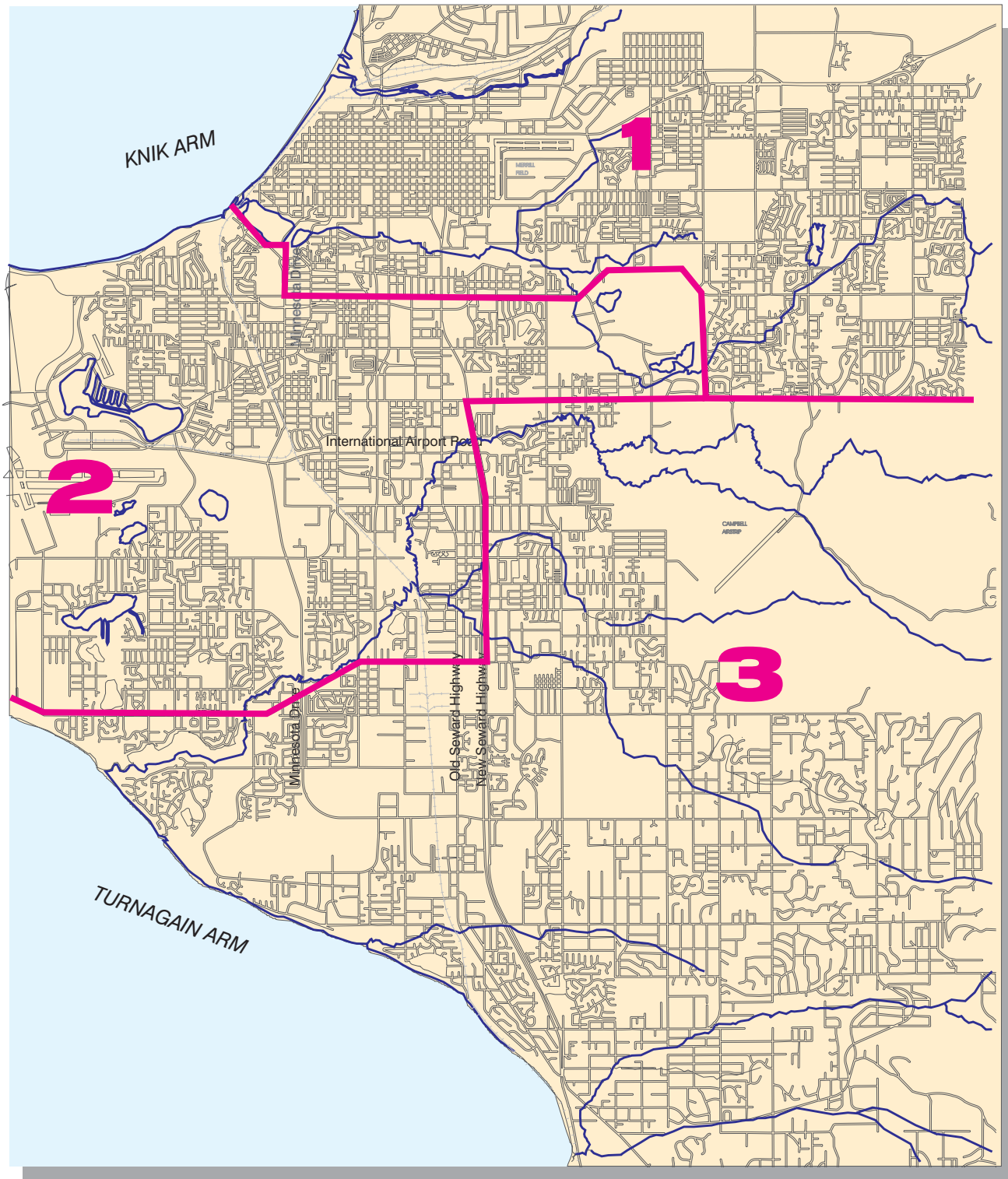
Key:

M&O – Alaska Department of Transportation and Public Facilities Maintenance and Operations  
SMD – Municipality of Anchorage Street Maintenance Division

Notes:

Information summarized from the 2003 Sand and Deicer Inventory (WMS, 2003) and totals rounded to nearest 10 units.

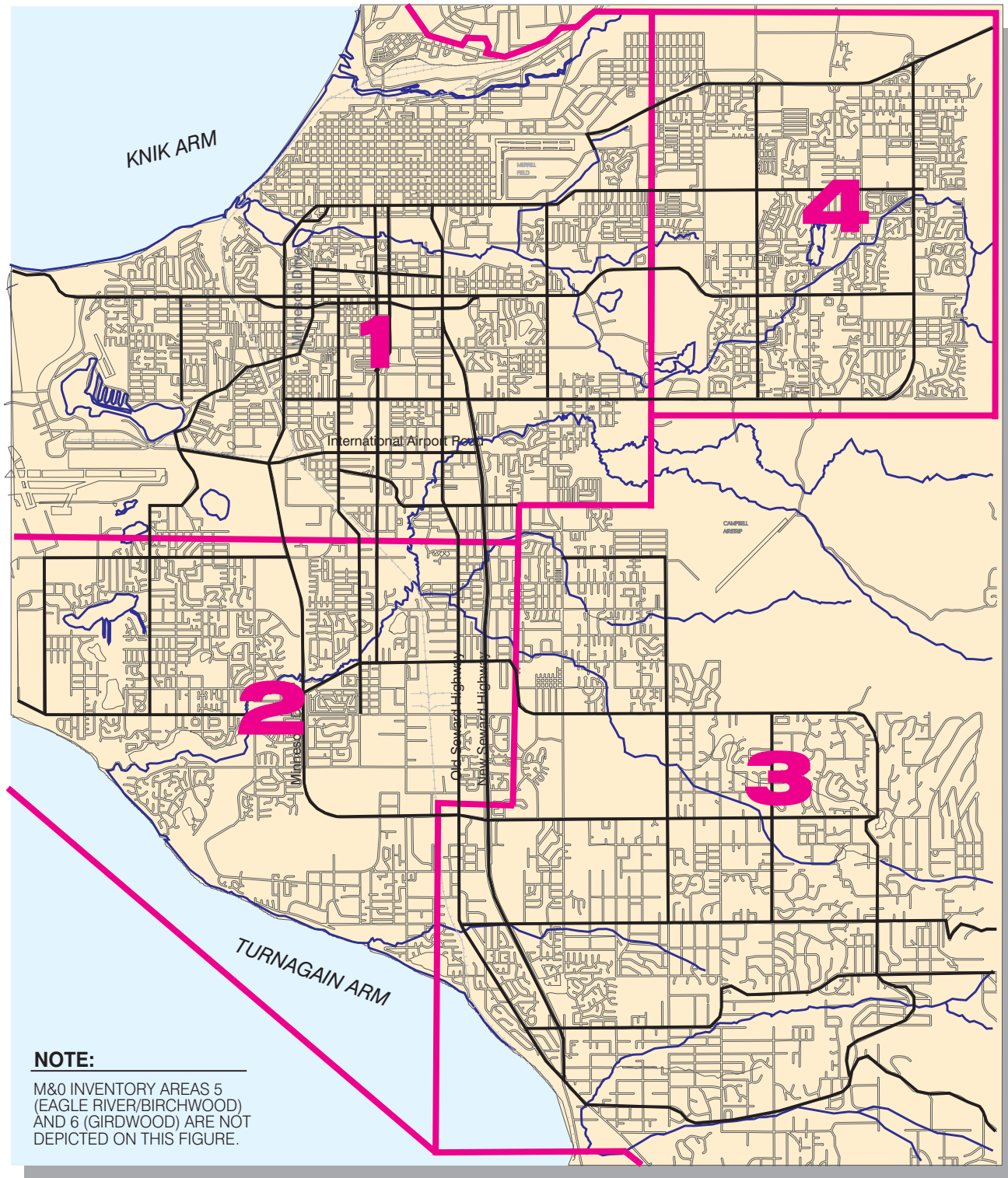
Values include brine used in spring street sweeping.



D:\w\2002Rpts\snw\_deicer\guidance\draft\fig01.cdr







**NOTE:**

M&O INVENTORY AREAS 5 (EAGLE RIVER/BIRCHWOOD) AND 6 (GIRDWOOD) ARE NOT DEPICTED ON THIS FIGURE.



**Table 2 2001/2002 Chloride Application on Streets**

	<b>Salt Sodium Chloride (kg Chloride)</b>	<b>Brine Magnesium Chloride (kg Chloride)</b>	<b>Total Chloride (kg Chloride)</b>	<b>Liquid Deicer Potassium Acetate (kg)</b>
SMD Total	308,180	153,240	461,420	18,270
M&O Total	1,953,630	76,260	2,029,890	0
Total Chloride for Winter Season	2,261,810	229,500	2,491,310	18,270

Key:

kg - kilograms

M&O - Alaska Department of Transportation and Public Facilities Maintenance and Operations

SMD - Municipality of Anchorage Street Maintenance Division

Notes:

Information summarized from the 2003 Sand and Deicer Inventory, and totals rounded to nearest 10 units.

Values include brine used in spring street sweeping.

## Discussion of Findings

Findings from data collection efforts in 2003 focused on inventory of sand and deicer applied to streets. From analysis of the data, the following interpretation can be made:

- There was a increase in the amount of chloride deposited on the streets in 2002/2003 compared to the previous year.

Chloride application to streets was evaluated from the 2002/2003 inventory compared to the previous year (Table 3). Results indicate that there was a 7 percent increase in the amount of total applied chloride deposited on streets in 2002/2003, a 22 percent decrease in magnesium chloride brine contribution, and an 11 percent increase in salt contribution (Table 4).

However, current use of chloride still reflects a significant increase above uses in previous years.

**Table 3 Winter Application, 1998/1999 through 2001/2002**

<b>Winter Season</b>	<b>Sand (tons)</b>	<b>Salt - Sodium Chloride (tons)</b>	<b>Brine - Magnesium Chloride (gallons)</b>
<b>SMD</b>			
98-99	10,230	380	200,010
99-00	12,330	470	154,270
00-01	17,000	830	305,670
01-02	17,100	650	213,000
02-03	7,160	560	168,800
<b>M&amp;O</b>			
98-99	20,100	1,470	109,490
99-00	22,190	1,530	58,460
00-01	22,480	2,550	129,140
01-02	31,720	3,020	111,000
02-03	29,910	3,550	83,660

**Table 3 (cont.) Winter Application, 1998/1999 through 2001/2002**

Winter Season	Sand (tons)	Salt - Sodium Chloride (tons)	Brine - Magnesium Chloride (gallons)
<b>Combined Totals</b>			
98-99	30,330	1,850	309,500
99-00	34,530	2,000	212,730
00-01	39,480	3,380	434,810
01-02	48,820	3,670	324,000
02-03	37,070	4,110	252,460

Key:

M&amp;O - Alaska Department of Transportation and Public Facilities Maintenance and Operations

SMD - Municipality of Anchorage Street Maintenance Division

Note: Totals are rounded to the nearest unit of 10.

**Table 4 Winter Chloride Application, 1998/1999 through 2001/2002**

Winter Season	Salt Sodium Chloride (kg Chloride)	Brine Magnesium Chloride (kg Chloride)	Total Chloride (kg Chloride)
<b>SMD</b>			
98-99	209,110	181,610	390,720
99-00	258,640	140,080	398,720
00-01	456,750	277,550	734,300
01-02	357,700	193,400	551,100
<b>M&amp;O</b>			
98-99	808,940	99,420	908,360
99-00	841,960	53,080	895,040
00-01	1,403,270	117,260	1,520,530
01-02	1,661,910	100,790	1,762,700
<b>Combined Totals</b>			
98-99	1,018,050	281,930	1,299,980
99-00	1,100,600	193,160	1,293,760
Percent Change from previous year	+8%	-32%	-0.4%
99-00	1,100,600	193,160	1,293,760
00-01	1,860,020	394,810	2,254,830
Percent Change from previous year	+ 69%	+104%	+74%
00-01	1,860,010	394,810	2,254,830
01-02	2,019,610	294,190	2,313,800
Percent Change from previous year	+8%	-25%	+3%
01-02	2,019,610	294,190	2,313,800
02-03	2,261,810	229,500	2,491,310
Percent Change from previous year	+11%	-22%	+7%

Key:

kg - kilograms

M&amp;O - Alaska Department of Transportation and Public Facilities Maintenance and Operations

SMD - Municipality of Anchorage Street Maintenance Division

Notes:

Information summarized from Table 2 using conversions listed in the 2003 Sand and Deicer Inventory (WMS, 2003).

---

## Snow Disposal Site Practices

Snow fall during the winter 2002/2003 was extremely low, with little snow hauled. No snow disposal sites were chosen for observation or sampling. This section contains BMP performance and discussion of findings.

### 2002/2003 Snow Disposal Site BMP Performance

Performance and interim BMP preparation were generally performed as recommended in the 1998 guidance document and as modified through the 2002 guidance document. Figure 3 shows snow service and hauling areas, including locations of all snow disposal sites within the Anchorage Bowl for the 2003/2004 winter season. Compared to last year, there will be no service or haul area changes for snow disposal for the 2003/2004 winter season.

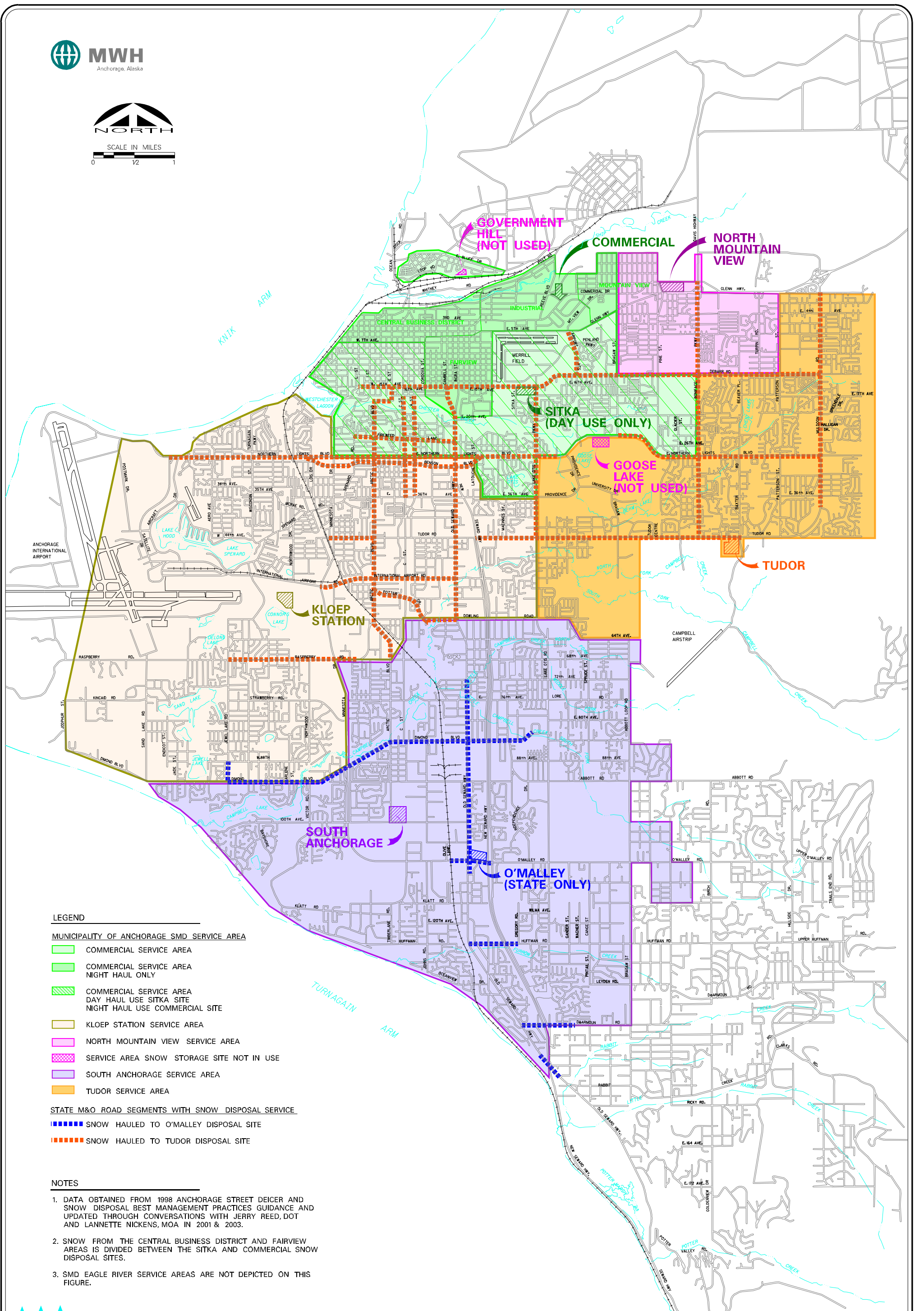
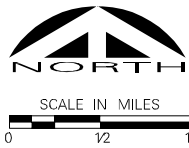
In 2001, draft snow disposal site design criteria were created. These criteria have been submitted for review and inclusion into MOA's Design Criteria Manual. These criteria are also planned to be incorporated into the Tudor Snow Disposal Site rehabilitation.

### Discussion of Findings

Findings from data collection efforts in 2003 focused on inventory of sand and deicer applied to streets. From analysis of the data, the following interpretations can be made:

- How sand and deicer are applied, as influenced by climate, may significantly impact the distribution of chloride (i.e., how much of these materials have remain on the streets, are sidecast, or are hauled to snow disposal sites). Although little snow fell in Anchorage for the 2002/2003 winter season, chloride loading was similar to previous years. Distribution of chloride, however, varies. There was a significant decrease in the magnitude of the chloride peak in breakup waters of 2000 through 2002, compared to the breakup waters of 1998 and 1999 at the Tudor Snow Disposal Site. Observed chloride decreases appear not to be related to the total amount of sand and deicer applied, but rather to how the materials are applied, as influenced by climate. If a significant portion of sand and deicer was applied early in the season, or at other times when there was little snow to be hauled, little of the material would be incorporated into snow and hauled to snow disposal sites. This method of application could result in greatly decreased chloride and sand loading at snow disposal sites, but could increase loads on or near streets.
- New site design criteria will be implemented at Tudor Snow Disposal Site. A design study is continuing plans for retrofitting the Tudor Snow Disposal Site.
- Findings in general support previous guidance and BMP observations, including the following:

- Sedimentation basins provide only marginal treatment of fine-grained sediments.
- On-pad controls can make a significant difference in decreasing the amount of pollutant discharge from melting snow.
- Operations are critical to the successful implementation of any BMP plan.



**LEGEND**

**MUNICIPALITY OF ANCHORAGE SMD SERVICE AREA**

- COMMERCIAL SERVICE AREA
- COMMERCIAL SERVICE AREA NIGHT HAUL ONLY
- COMMERCIAL SERVICE AREA DAY HAUL USE SITKA SITE NIGHT HAUL USE COMMERCIAL SITE
- KLOOP STATION SERVICE AREA
- NORTH MOUNTAIN VIEW SERVICE AREA
- SERVICE AREA SNOW STORAGE SITE NOT IN USE
- SOUTH ANCHORAGE SERVICE AREA
- TUDOR SERVICE AREA

**STATE M&O ROAD SEGMENTS WITH SNOW DISPOSAL SERVICE**

- SNOW HAULED TO O'MALLEY DISPOSAL SITE
- SNOW HAULED TO TUDOR DISPOSAL SITE

**NOTES**

1. DATA OBTAINED FROM 1998 ANCHORAGE STREET DEICER AND SNOW DISPOSAL BEST MANAGEMENT PRACTICES GUIDANCE AND UPDATED THROUGH CONVERSATIONS WITH JERRY REED, DOT AND LANNETTE NICKENS, MOA IN 2001 & 2003.
2. SNOW FROM THE CENTRAL BUSINESS DISTRICT AND FAIRVIEW AREAS IS DIVIDED BETWEEN THE SITKA AND COMMERCIAL SNOW DISPOSAL SITES.
3. SMD EAGLE RIVER SERVICE AREAS ARE NOT DEPICTED ON THIS FIGURE.



**FIGURE 3**

MUNICIPALITY OF ANCHORAGE  
 ANCHORAGE STREET DEICER & SNOW DISPOSAL: 2003 GUIDANCE REPORT  
**SNOW DISPOSAL SITES  
 AND SERVICE AREAS**





---

## Guidance

Guidance for 2003/2004 consists of activities for street application of deicing material, action plans for future tasks, and specific activities for snow disposal sites.

### 2003/2004 Street Deicing Guidance

In accordance with the 2003 data collection effort and subsequent findings, the following guidance is suggested for street deicing activities:

1. Continue current SMD and M&O deicing activities and composition specifications for sand, salt, magnesium chloride, and potassium acetate for winter 2003/2004.

Data suggest that current practices are generally suitable for protecting the environment.

2. Continue documenting SMD and M&O deicing materials, operations, maintenance procedures, and schedules.

This documentation is a key component in quantifying operations and amounts of deicer applied in the MOA for impact assessment.

3. Provide increased controls in sand/salt mixing operations.

Inventory suggests that salt use is increasing from 2001/2002 to 2002/2003.

4. Continue to implement a long-term action plan to build covered storage for street sand.

Preliminary findings from 2000 suggest the need to control and decrease chloride application on streets. Elevated chloride concentrations in snow disposal site meltwater increase metals mobilization. Monitoring analysis at snow disposal sites suggests that metal concentration standards could be exceeded in small receiving waters. A predominant source of chloride in street application is from salt in sand. Additionally, salt does not contribute to hardness to mitigate the effects of elevated chloride levels in increasing dissolved metals concentrations (WMS, 2000a).

The following revised schedule from 2000 is proposed:

- SMD - Constructed and operational sand storage by 2006.
- M&O - Constructed and operational sand storage by 2006.

### 2003/2004 Snow Disposal Guidance

In accordance with the 2002 data collection effort and subsequent findings, the guidance below is suggested for snow disposal site activities.

1. Perform the following activities at all snow disposal sites:
  - Continue current SMD and M&O operational practices for winter 2002/2003 using the 1998 guidance document (Wheaton et al., 1998).
  - Keep hauled snow incorporated into a single, large snowmass.
  - Keep snowmass sides as steep as possible.
  - Maintain drainage channels to prevent channel erosion.
  - Continue to place all street sweeping material as shown in the 1998 guidance document and in the 2000 guidance document for Sitka, Tudor, and South Anchorage Snow Disposal Sites.
  - Use set-back staking from berms for snow placement.
  
2. Incorporate the following new snow disposal site design criteria concepts:
  - Discuss design concepts with operations staff for consideration in ongoing city and state snow disposal for ongoing designs.
  - Incorporate criteria into the MOA's Design Criteria Manual.
  
3. Incorporate basic siting, design, and operations criteria in current programs and current snow site designs and establish pilot monitoring program, as below:
  - Incorporate basic criteria in Tudor Snow Disposal Site rehabilitation design.

---

## References

- Watershed Management Section (WMS). 1999. Anchorage Bowl OGS Performance Modeling. Document No. WMP APr98002. Municipality of Anchorage, Watershed Management Section, Project Management and Engineering: 34 and Attachments. November.
- WMS. 2000a. Anchorage Street Deicer and Snow Disposal Investigation: 2000 Best Management Practices Guidance. Document No. WMP CPg00003. Municipality of Anchorage, Watershed Management Section, Project Management and Engineering: 34 and Attachments. November.
- WMS. 2000b. Street Sediment and Adsorbed Pollutants: Data Report. Document No. WMP APr00003. Municipality of Anchorage, Watershed Management Section, Project Management and Engineering: 34 and Attachments. December.
- WMS. 2001. Anchorage Street Deicer and Snow Disposal Investigation: 2000 Data Report. Document No. WMP APr01004. Municipality of Anchorage, Watershed Management Section, Project Management and Engineering: 34 and Attachments. November.
- WMS. 2003. Anchorage Street Sand, Salt, and Deicer Inventory: 2003 Data Report. Document No. WMS APr03006. Municipality of Anchorage, Watershed Management Section, Project Management and Engineering: 31 and Attachments. November.
- Wheaton, S. 1998. Magnesium Chloride Deicer in Snow Disposal Sites at Anchorage, Alaska: Assessment Design. Document No. WMP APd98001. WMS Municipality of Anchorage, Anchorage, AK. Municipality of Anchorage, Department of Public Works, Project Management and Engineering, Watershed Management Section. 19 pages and Appendices.
- Wheaton, S. and K. Bischofberger. 1998. Magnesium Chloride Deicer in Snow Disposal Sites at Anchorage, Alaska: Data Report. Document No. WMP APr98001. WMS Municipality of Anchorage and W.Q. Department of Health and Human Services, Anchorage, AK, Municipality of Anchorage, Department of Public Works, Project Management and Engineering, Watershed Management Section: 15 and Tables and Appendices.
- Wheaton, S., et al. 1998. Anchorage Street Deicer and Snow Disposal 1998 Best Management Practices Guidance. Document No. WMP APg98001. Municipality of Anchorage, Watershed Management Section, Street Maintenance Division: 41 and Attachments.

(intentionally blank)

## List of Preparers

Principal Author:

William Rice, P.E., Water Resource Engineer  
MWH  
(907) 248-8883

(intentionally blank)