DEICER REPORT

California Department of Transportation

Fiscal Year 2010/2011

California Department of Transportation
District 3
703 B Street
Marysville, CA 95901

California Department of Transportation

DISTRICT 3
DEICER REPORT

Fiscal Year
2010/2011

OCTOBER 1, 2011

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National Pollutant Discharge Elimination System
California Department of Transportation
Order No. 99-06-DWQ
NPDES No. CAS000003

DEICER REPORT

For Fiscal Year 2010/2011
Caltrans District 3

October 1, 2011

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is true, accurate, and complete to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. [40 CFR 122.22(d)]

Jody Jones

JODY JONES
District Director

Date: 9/26/11

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EXECUTIVE SUMMARY

The California Department of Transportation (Department) continuously evaluates the effectiveness of Best Management Practices (BMPs) used to recover abrasive and deicing materials, and evaluates the impacts of abrasive and deicing materials on surface waters within the Lake Tahoe Hydrologic Unit (HU). This report describes the use of abrasive and deicing materials within the Lake Tahoe HU. Also contained in this report are the results of abrasive and deicing materials chemical and physical analyses, and annual results of the abrasive recovery program activities within the Lake Tahoe HU.

INTRODUCTION

Pursuant to the Federal Water Pollution Control Act (Clean Water Act) section 402(p), stormwater permits are required for discharges from a municipal separate storm sewer system (MS4) serving a population of 100,000 or more. USEPA defines an MS4 as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) owned or operated by a State (40 CFR 122.26(b)(8)).

The California Department of Transportation (Caltrans) is responsible for the design, construction, management, and maintenance of the State highway system, including freeways, bridges, tunnels, Caltrans' facilities, and related properties. Caltrans' discharges consist of stormwater and non-stormwater discharges from State owned right-of-ways.

Before July 1999, stormwater discharges from Caltrans' stormwater systems were regulated by individual NPDES permits issued by the Regional Water Boards. On July 15, 1999, the State Water Board issued a statewide permit (Order No. 99-06-DWQ) which regulated all stormwater discharges from Department owned MS4s, maintenance facilities and construction activities. The existing permit (Order No. 99-06-DWQ) is currently being revised, and it is scheduled to be adopted and replaced in approximately one year.

Provision L.10.a of the current permit required a monitoring program proposal to evaluate the effectiveness of BMPs used to recover abrasives and deicing materials and their impacts on surface waters within the Lake Tahoe Hydrologic Unit. The Department submitted a Load Assessment Report on November 23, 1999.

Provision L.10.b of the Permit requires submittal of an annual Deicer Report for the Tahoe Basin that describes the results of the abrasive and deicing materials analyses. The Permit requires the Deicer Report to be submitted with the Annual Report. However, April 1 of each year is too early of a reporting date for the Department to report the deicing activities during the reporting period. The Lahontan Regional Water Quality Control Board (RWQCB) agreed to accept the report by October 1 of each year. The report provides a summary of the Department's portion of the Capital Improvement Program (CIP) activities within the Tahoe Basin. In April of 2001, the Tahoe Regional Planning Agency (TRPA) adopted the Environmental Improvement Program (EIP). The intent of the EIP is to achieve the environmental goals for the Lake Tahoe Basin. The CIP has been absorbed by the EIP.

Future reporting requirements are expected to substantially change with the new MS4 permit adoption and the Lake Tahoe Total Maximum Daily Load (TMDL) for Clarity which was fully adopted by the United States Environmental Protection Agency on August 16, 2011.

MONITORING PROGRAM RELATING TO SURFACE WATER IMPACTS

The Department submitted a Load Assessment Report as part of the annual update of the Storm Water Management Plan on November 23, 1999. This report describes the following:

1. The Department's water quality database and the methodology used in deriving typical values of Department runoff from various types of Department facilities

2. The Department's direct loadings into each Hydrologic Sub Area (HSA) where they occur

3. The Department's aggregate loadings in each HSA

4. The total Department's loading in each of the nine Water Quality Control Regions

Data collected from the Department's monitoring activities has been analyzed to determine the concentrations used in assessing the Department's contribution to pollutant loads in each HSA in the State. Constituent concentrations were determined for three types of the Department facilities -- freeways, maintenance yards, and park and ride lots. Multiple storms were monitored at 174 sampling sites statewide. Loads for each sub area, which were calculated for all constituents, were provided in this Load Assessment Report. This information is available by contacting:

Division of Environmental Analysis, Stormwater Unit
California Department of Transportation
P.O. Box 942874, MS-27
Sacramento, CA 94274-0001
Email: hq_stormwater@dot.ca.gov

The District requires that traction sand be clean washed, free from clay and organic material and must conform to the following grading as measured by Caltrans Test Method (CTM) 202:

SIEVE SIZE	% PASSING
1/4"	100%
#84	0% - 80%
#16	15% - 70%
#50	0% - 20%
#200	0% - 3%

Traction sand must also meet the following requirements:

TEST	METHOD	VALUE
Sand Equivalent (SE)	CTM 217	75 min
Durability Fine (DF)	CTM 229	55 min
Soluble Phosphorous [1] (P)	EPA 365.2	<10 ppm

During the 2010-2011 fiscal year, the Department completed a study on products from various commercial sources for use as traction abrasives in the Lake Tahoe area. The purpose of the study was to identify abrasives that met the Department's requirements and show potential to reduce the load of ultrafine particles (<16 μm) in highway runoff. Samples of twenty-two abrasives products were obtained from suppliers within approximately a 100-mile radius of Truckee and South Lake Tahoe. Each product was divided into two subsamples, and one subsample was pulverized to simulate the effects of traffic on roadways. The original product and pulverized samples were then analyzed for ultrafine particle and nutrient content.

Products had varying concentrations of ultrafine particles, total phosphorus, and total nitrogen. In general, pulverized samples had higher numbers of ultrafine particles per gram. Total phosphorus concentrations were similar before and after pulverization for most products. Many products had no detectable concentration of total nitrogen. No relationships between particle and nutrient concentrations were observed.

The products were then ranked based on the ultrafine particle and nutrient concentrations observed in the sample results. The two products currently used by the Department in the Lake Tahoe Basin had higher ultrafine particle and total phosphorus concentrations than most of the products tested. However; the currently used products do have among the lowest concentrations of total nitrogen.

Use of different products may decrease ultrafine particle loads in runoff while keeping the total phosphorus content at a similar level. The lower ultrafine particle content could help meet Lake Tahoe TMDL requirements, however; the products with low ultrafine particle contents may have higher total nitrogen concentrations.

Feasibility and/or cost-benefit analyses are being performed to identify those sources with the highest potential to serve as alternative materials. Further testing of the more promising products is being considered to confirm the study results, evaluate consistency of the sources and determine compliance with the Department's specifications.

1. Total Phosphorus in traction sand at all known sources has consistently been above 10 ppm since 2000. The Department conducted tests at two local sources and found the Total Phosphorus (TP) ranging from 200 to 500 ppm. This constituent has little to no value in evaluating the environmental impacts because the method of detection requires total digestion of the abrasive. The ambient conditions of the environment will never be as corrosive as the pursulfate digestion in the laboratory and the TP will remain intact and have little effect. This is why UC Davis has ignored TP as an indicator in their Total Maximum Daily Load (TMDL) clarification model. Dissolved Ortho Phosphate (soluble phosphorus) is a more realistic parameter to measure potential available phosphorus loading to the lake.

BEST MANAGEMENT PRACTICE EFFECTIVENESS

The Department uses snowplows and motor graders to clear snow from the road surface. Deicing salt is the primary agent for ice melting and breaking the bond between the snow pack and the pavement. An abrasive, such as sand, is spread in order to provide better vehicle tire traction. The primary strategy for minimizing the impacts of sand and salt usage is through the implementation of the following Best Management Practices (BMPs):

1. Communications

    a. California Highway Information Network (CHIN)
    b. Winter Operation Information and Live Traffic Cameras on the Internet at:
    http://www.dot.ca.gov/dist3/departments/mtce/controlmp.htm
    http://video.dot.ca.gov/
    c. Highway Advisory Radios (HAR)
    d. Changeable Message Signs (CMS)

2. Weather Forecasting

    a. Road Weather Information Systems (RWIS)

3. Chain Control Restrictions

4. Brine Solution Application

SNOW AND ICE CONTROL PROCEDURES

Because salt, deicing chemicals, and abrasives could pollute stormwater runoff, the Department uses the minimum necessary amount of these materials for effective snow and ice control. This report includes information on the Department's Snow and Ice Control Best Management Practices (BMPs), and information on storm management procedures unique to the Lake Tahoe Basin.

The BMPs for snow and ice control are intended to minimize the discharge of pollutants generated during snow and ice control. Snow removal and ice control practices include all work in connection with snow removal, drift prevention, installation and maintenance of snow fences, and snow pole installation and removal. The use or nonuse of deicing agents is based on driver safety, traffic delay, geographic location, weather and total cost. Other activities include:

- Opening of drains covered by snow and ice to prevent flooding and freezing

- Mechanical spreading of abrasive and deicing agents (In areas of the Tahoe Basin where significant amounts of an abrasive are required, the Department will increase the sweeping frequency to remove the accumulated abrasive, as allowed by availability of equipment and personnel.)

- Mechanical removal of snow and abrasives from the travel way

Proper implementation of these practices will reduce the discharge of deicing agents and sediment to storm water drainage systems or watercourses.

BMP Implementation

These bulleted BMPs provide guidance to maintenance personnel who are involved in snow and ice removal activities. See "Snow Removal and Deicing Agents" (Section 2.27 of the *Statewide Storm Water Quality Practices Guidelines, May 2003*) at:
http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/management_ar_wp/CTSW-RT-02-009.pdf

- Inspect snow and ice control vehicles and equipment for fuel or oil leaks prior to using.
- Where necessary, sweep after storms to remove sand.
- Routinely calibrate spreader to avoid the over application of deicing agents or abrasive. Use no more than is necessary for effective snow and ice control. Consider using alternative deicing agents where runoff from roads discharges directly to sensitive watercourses.
- Maintain accurate records of the locations of salt application and the quantities of salt used.
- Store deicing agents (e.g. salt) in appropriate areas, bunkers, or storage buildings. Do not store deicing agents where they will come into contact with stormwater runoff.
- Abrasive agents (e.g. sand) can be stored in bunkers or storage buildings. Abrasive agents stored outdoors must be managed in accordance with the requirements of the Stockpile Management BMP.
- Use only road abrasive agents that have been washed, screened or graded to reduce silt and clay to insignificant levels.
- Avoid blowing, pushing or dumping snow into a watercourse.

Storm Management Procedures in the Lake Tahoe Basin

Snow removal and storm management procedures in the Lake Tahoe Basin differ somewhat between the North and South shores due to geography, Annual Daily Traffic (ADT), population density (urbanization), and the availability of supplemental forces from nearby Maintenance facilities. The general snow removal practices common to both shores are presented first, with location specific details following to clarify the differences between the two shores.

Snow removal and storm management procedures fall under two different chronological headings: "Beginning and During Storm" and "End of Storm". The procedures used are as follows:

Beginning and During Storm

1. Anti-Icing (application of salt or other deicing agents)

2. Plowing and Sanding (removal of snow accumulation and increase tire traction)

3. Grading (removal of snow pack and push back shoulders and turnouts)

4. Rotary Blowing (clear turnouts and shoulders to promote drainage and maintain travel way width)

End of Storm

1. Grading (removal of snow pack and push back shoulders and turnouts)

2. Rotary Blowing (clear travel way, turnouts and shoulders to promote drainage and maintain travel way width)

3. Snow Hauling

During the winter season, the Department has snow removal crews on duty seven days a week, 24 hours per day. These snow removal crews are deployed when snow is forecast, and the anti-icing activity starts as soon as snow begins to fall. Plowing and sanding operations start once snow begins to accumulate on the pavement, and graders are used to remove developed snow pack. Rotary blowers are utilized to clear the travel way, turnouts, and shoulders.

Snow haul is used only within urban areas, and takes place only after the snowfall stops. All snow that can be collected and removed is hauled away, unless another storm requires postponement of snow haul.

Snow haul is generally employed when there are berms present in the center turn lanes of urban areas, such as the City of South Lake Tahoe, Kings Beach and Tahoe City. The snow haul commences when all gutters are pulled (cleaned); turn pockets are cleared, and ready to load into trucks. For light storms, Department Maintenance personnel perform the snow haul operations once the snowfall ceases. For heavy storms, commercial contract personnel and equipment are utilized during storms.

In the South Shore area, snow haul operations are conducted according to the following protocol:

- State Route 50 (SR 50) from Meyers to Stateline must be cleared first.

- Snow must first be moved to the center lane of the downtown area, and the drainages must be cleared. This is an ongoing activity throughout the snow event. Snow haul will be scheduled to start as soon as practical to expedite the removal of all of the accumulated snow.

- It is preferred to conduct snow haul operations in a manner that does not cause traffic congestion. Snow haul operations will begin as soon as necessary to mitigate the accumulation of snow in the urban area of SR 50.

- State Route 89 (SR 89) is a secondary route and will be cleared from the SR 50/SR 89 intersection to Luther Pass.

The snow haul operation is preferred at night to minimize traffic congestion. Snow blowers operate at a specific removal rate and speed. The efficiency and effectiveness of these machines decreases in stop-and-go traffic. Additionally, the trucks hauling the snow to the snow storage areas are delayed in the traffic. There is also a safety consideration involved. Snow blowers and large trucks can be a nuisance to motorists during periods of heavy traffic. Snow blowers pick up whatever is present in the snow, including bottles, cans, rocks, tire chains, and other debris. This debris may damage the blower, causing it to stop in traffic. The potential for disrupting daytime traffic is a factor that must be considered when conducting snow haul operations during the day.

In the North Shore area, snow haul takes place in the Kings Beach and Tahoe City areas. This activity is normally accomplished using Department equipment. Personnel and equipment may be borrowed from the Kingvale Maintenance Station (on Interstate 80) or contracted to supplement snow removal operations.

Occasionally, snow removal operations are impacted by uncontrollable variables. These include weather patterns, equipment failure, traffic congestion, and limits on available personnel. Changes in practices and resources implemented to reduce these impacts include:

- Discontinued practice of slushing (rapid snow-pack melting from vehicular traffic)
- Implementation of the Road Weather Information System (RWIS)
- Added equipment and personnel dedicated to the Tahoe Basin
- Use of brine solution as a deicing agent
- Installation of air and surface temperature sensors on sand trucks
- Comprehensive retrofit of the Department's drainage systems in the Lake Tahoe Basin to enhance the ability to collect, treat, and convey storm water runoff

The Department continues to also investigate further options to make Snow and Ice Control operations more effective.

ENVIRONMENTAL IMPROVEMENT PROGRAM (EIP)

On July 26, 1997, President Bill Clinton issued Executive Order 13057 and declared the Lake Tahoe Region an "area of national concern." That order created a federal partnership involving five cabinet-level agencies, and called for a Memorandum of Agreement between the Federal Partnership, the States of California and Nevada, the Tahoe Regional Planning Agency (TRPA) and the Washoe Tribal Government. The following year TRPA, adopted the 1,000-project Environmental Improvement Program (EIP) for the Lake Tahoe Basin (then estimated at $908 million) designed at protecting this valuable treasure. Since state highways ring Lake Tahoe's shores, roadside projects aimed at improving water quality are an important component of this comprehensive effort.

California Department of Transportation has current and future construction projects planned in the Tahoe Basin with estimated costs in excess of $376 million. This estimated costs and data in the following summary were current as of September 23, 2011 and are subject to change.

TAHOE BASIN PROJECT SUMMARY

EA	CO	RTE	FROM PM	TO PM	DESCRIPTION	EST. CAPITAL COST	EST. CONST. START (MS500)	EST. CONST. END (MS700)
29090	PLA	028	10.2	11.0	Kings Beach to State Line Water Quality Improvements	$ 3,733,000	05/04/2007	10/30/2009
0C930	PLA	028	9.2	10.3	Kings Beach Commercial Core Improvement Project	$ 34,043,000	10/01/2012	07/02/2015
0E800	ED	050	52.3	70.2	ED-50 Plant Establishment and Protection	$ 500,000	04/01/2006	06/30/2014
0E810	ED	089	0.0	8.6	ED-89 Plant Establishment and Protection	$ 500,000	05/01/2006	06/30/2016
0E830	PLA	267	3.8	9.9	Northstar to Route 28 Plant Establishment and Protection	$ 500,000	06/1502009	12/01/2013
0E990	PLA	267	4.9	6.7	Northstar Slope Stabilization Plant Establishment and Protection	$ 4,331,000	12/08/2010	12/01/2012
1A731	ED	050	67.6	72.9	Gateway to the Tahoe Basin Water Quality Improvements	$ 11,217,000	03/01/2013	12/15/2014
1A732	ED	050	73.7	75.4	Airport to Y Junction Water Quality Improvements	$ 9,195,000	03/02/2013	01/02/2015
1A73U	ED	050	77.3	79.3	Trout Creek to Ski Run Water Quality Improvements	$ 23,500,000	03/01/2011	12/15/2013
1A734	ED	050	79.3	80.4	Ski Run to State Line Water Quality Improvements	$ 3,571,000	08/01/2012	12/01/2014
1A841	ED	089	0.0	8.6	Alpine Co to Route 50 Water Quality Improvements	$ 25,856,000	07/01/2009	02/01/2013
1A842	ED	089	8.6	13.8	Route 50 to Cascade Rd Water Quality Improvements	$ 16,915,000	12/01/2013	12/01/2015
1A843	ED	089	13.8	18.0	Cascade Rd to Eagle Falls Viaduct Water Quality Improvements	$ 13,391,000	12/15/2015	12/15/17
1A844	ED	089	18.0	24.9	Eagle Falls Viaduct to Meeks Creek Water Quality Improvements	$ 16,408,000	03/01/2013	12/01/2016
1A845	ED	089	24.9	27.4	Meeks Creek to Placer Co. Water Quality Improvements	$ 10,151,000	09/15/2014	12/15/2018
1C111	PLA	089	8.6	10.8	Route 28 Tahoe Basin Traffic Operation System	$ 4,073,000	5/15/2008	07/01/2011
1C971	PLA	267	8.7	9.9	Stewart Way to Route 28 Water Quality Improvements	$ 8,683,000	04/06/2009	12/01/2011
1C972	PLA	267	7.4	8.1	Hold-and-Release Detention Basin Pilot	$ 2,728,000	04/03/2007	07/01/2011
1E14U	ED	050	66.6	67.8	Echo Summit Rockwall Stormwater Mitigation	$ 3,615,000	02/24/2011	08/01/2012
1E330	ED	050	79.8	80.4	Realign US 50 @ Stateline	$ 27,303,000	07/18/2015	04/17/2018
2A920	PLA	089	0.0	8.6	ED Co Line to Route 28 Drainage Improvements	$ 40,912,000	05/15/2012	11/01/2016
2A921	PLA	089	8.6	13.7	Route 28 to Squaw Valley	$ 15,201,000	02/06/2008	07/01/2016
2A940	PLA	028	0.8	11.0	Tahoe City to Kings Beach Drainage Improvements	$ 50,755,000	06/05/2008	12/01/2012
2C930	ED	050	75.4	75.4	Modify Intersection	$ 1,181,000		
3A760	PLA	089	7.5	9.4	Operational Improvements Realignment; Bike/Ped. Improvements	$ 20,300,000	08/01/2014	08/01/2018
3C380	ED	050	75.4	77.3	U.S. 50 Phase 2 Water Quality Improvement	$ 25,794,000	01/15/2014	12/01/2017
3E360	ED	089	17.5	17.6	Emerald Bay Rock Slide Repair	$ 240,000	12/28/2007	01/19/2010
4C250	ED	089	16.6	16.7	Emerald Bay Barrier Wall	$ 1,459,000	12/07/2006	03/04/2009

SAND USAGE

The Department Maintenance Manual states the following:

Abrasives will ordinarily be applied at 1,000 lbs. (454 kilograms) or less per lane mile (1.6 kilometers). Up to 2,000 lbs. (907 kilograms) per lane mile may be required on super elevations or under unusual conditions. Applications should be repeated as necessary.

In an effort to minimize impacts on Lake Tahoe and its tributaries, the Department has established a modified practice of applying traction sand at 600 lbs. per lane mile within the Tahoe Basin. Certain areas that have heavy traffic, super elevations, or steep grades may receive up to 1,000 lbs. per lane mile as required to maintain a safe roadway. The practice has resulted in a trend decrease in the amount of sand applied over the past 18 snow seasons. The amount of sand applied in the Lake Tahoe HU by section of highway within the Tahoe Basin is presented in ***Table 1***. Chemical and physical analyses for sand are found in ***Appendices A and C*** of this report.

SAND AND SEDIMENT RECOVERED

Once sand is applied to highways, the Department incorporates BMPs to recapture this traction sand. These BMPs include the following:

- Immediate sweeping of the traveled way and shoulders
- Annual cleaning of sand traps and catch basins including vactor operations at drainage facilities

In the Lake Tahoe HU, a total of 3,865 ton of sand was applied during the 2010/2011 snow season. During this season, 4,761 ton of sand and sediment was recovered. This represents a recapture rate of 123%.

Factors which may contribute to the high/low recovery spikes include:

- A dedicated stormwater maintenance crew and specialized equipment created in 2001/2002 and a second district stormwater maintenance crew was created in 2005/2006. (This is in addition to standard maintenance procedures for sand and sediment recovery.)
- Sand recovery information coincides with the fiscal year (July 1-June 30). Although sand recovery operations continue year-round, snow seasons with a high snowfall total late into spring delays recovery until the following fiscal year.
- Budgetary constraints frequently prevent specialized crews from traveling and/or performing annual operations.

The recapture rate includes recovered sediment from the sand traps and catch basins, which is depicted in ***Table 2.*** ***Figure 1*** show the total sand applied contrasted to the total sand and sediment recovered in the Lake Tahoe HU during the past 16 snow seasons.

TABLE 1
SAND APPLIED PER SECTION OF HIGHWAY
IN THE TAHOE BASIN

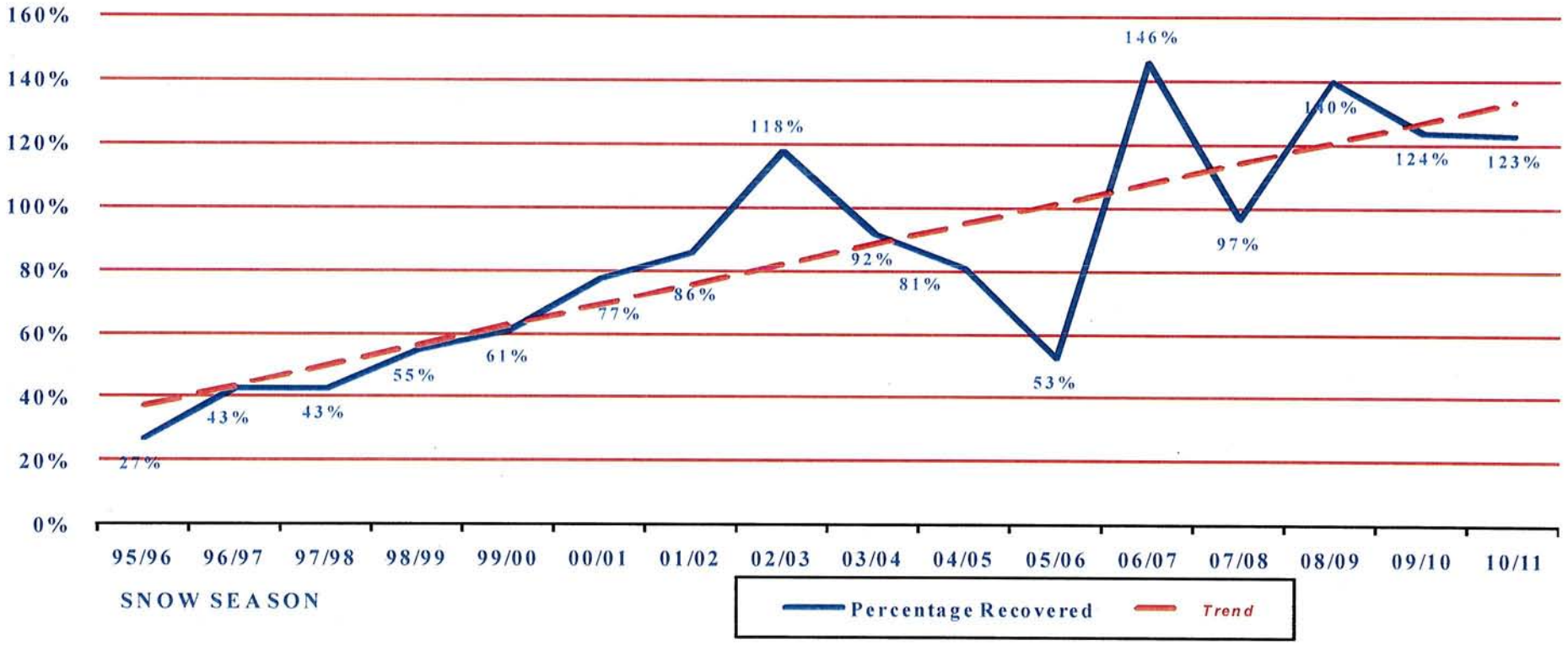
Snow Season	PLA-28 PM 0.0 – 11.03 (Tons)	ED-50 PM 66.5 – 80.4 (Tons)	ED-89 PM 0.0 – 8.5 (Tons)	ED-89 PM 8.5 – 17.2 (Tons)	ED-89 PM 17.2 –27.4 (Tons)	PLA-89 PM 0.0 – 12.2 (Tons)	PLA-267 PM 6.6 – 9.9 (Tons)	Total Sand Applied (Tons)
10/11	401	1,286	487	329	188	329	845	**3,865**
09/10	366	1,861	786	583	288	453	649	**4,986**
08/09	244	1,301	511	378	203	301	485	**3,423**
07/08	646	1,845	775	495	351	589	560	**5,261**
06/07	488	1,518	611	399	292	581	367	**4,256**
05/06	946	3618	1298	893	681	1332	734	**9,502**
04/05	662	1,336	397	514	479	812	696	**4,896**
03/04	1,045	2,502	637	531	544	1,478	495	**7,232**
02/03	986	1,539	598	398	793	1,380	713	**6,407**
01/02	994	2,474	742	433	1,084	1,516	711	**7,954**
00/01	1,311	2,205	2,045			1,593	837	**7,991**
99/00	2,013	3,823	3,630			2,413	787	**12,666**
98/99	3,075	3,616	4,310			3,296	1,225	**15,465**
97/98	3,212	4,930	5,971			4,194	1,508	**19,815**
96/97	2,352	2,731	3,915			2,961	837	**12,796**
95/96	2,631	3,591	4,654			4,791	1,092	**16,759**
94/95	4,410	5,362	6,094			5,366	1,375	**22,678**
93/94	2,402	3,350	4,843			3,384	861	**14,840**

TABLE 2
SAND APPLIED VS. SAND AND SEDIMENT RECOVERED IN THE TAHOE BASIN

Snow Season	Total Amount of Sand Applied (Tons)	Total Amount of Sand and Sediment Recovered (Tons)	Percent Sand and Sediment Recovered*
10/11	3,865	4,761	**123%**
09/10	4,986	6,197	**124%**
08/09	3,423	4,788	**140%**
07/08	5,261	5,124	**97%**
06/07	4,256	6,214	**146%**
05/06	9,502	5,053	**53%**
04/05	4,896	3,983	**81%**
03/04	7,232	6,623	**92%**
02/03	6,407	7,564	**118%**
01/02	7,954	6,821	**86%**
00/01	8,712	6,708	**77%**
99/00	12,666	7,741	**61%**
98/99	15,465	8,568	**55%**
97/98	19,815	8,604	**43%**
96/97	12,796	5,542	**43%**
95/96	16,759	4,535	**27%**

***Sand and sediment in the Tahoe Basin has been recaptured since approximately 1990; however, records were not kept before 1995.**

FIGURE 1
ANNUAL PERCENTAGE OF SAND AND SEDIMENT
RECOVERED IN THE TAHOE BASIN



DEICING SALT USAGE

Deicing salt that is used in the Tahoe Basin is kiln dried and is free of anti-caking agents, YPS (Sodium ferrocyanid).

The Department applies deicing salt in one of two ways -- either granular or liquid form (brine). During the 2010/2011 snow season, 1,541 tons of granular sea salts were used in conjunction with sand and 14.3 tons were used to produce 14,300 gallons of brine. ***Table 3*** shows the historic use of salt in the Tahoe Basin for the past 18 snow seasons.

TABLE 3
SALT USAGE IN THE TAHOE BASIN

Snow Season	Total Salt Applied (Tons)
10/11	1,555
09/10	1,315
08/09	979
07/08	1,101
06/07	821
05/06	1,497
04/05	1,600[4]
03/04	1,109
02/03	731
01/02	1,190
00/01	1,020
99/00	863
98/99	1,541
97/98	2,257
96/97	1,365
95/96	1,406
94/95	1,634
93/94	1,072

SAND AND SALT USAGE TRENDS

Sand and salt usage data for the past 23 snow seasons is shown in ***Figures 2 and 3***. These Figures also show the respective trend lines for annual sand and salt usage.

[4] This number includes 596 ton of the alternative deicing salt used in the test area along SR 50 from the intersection of SR 89 to the State Line in South Lake Tahoe in 2004/2005.

FIGURE 2

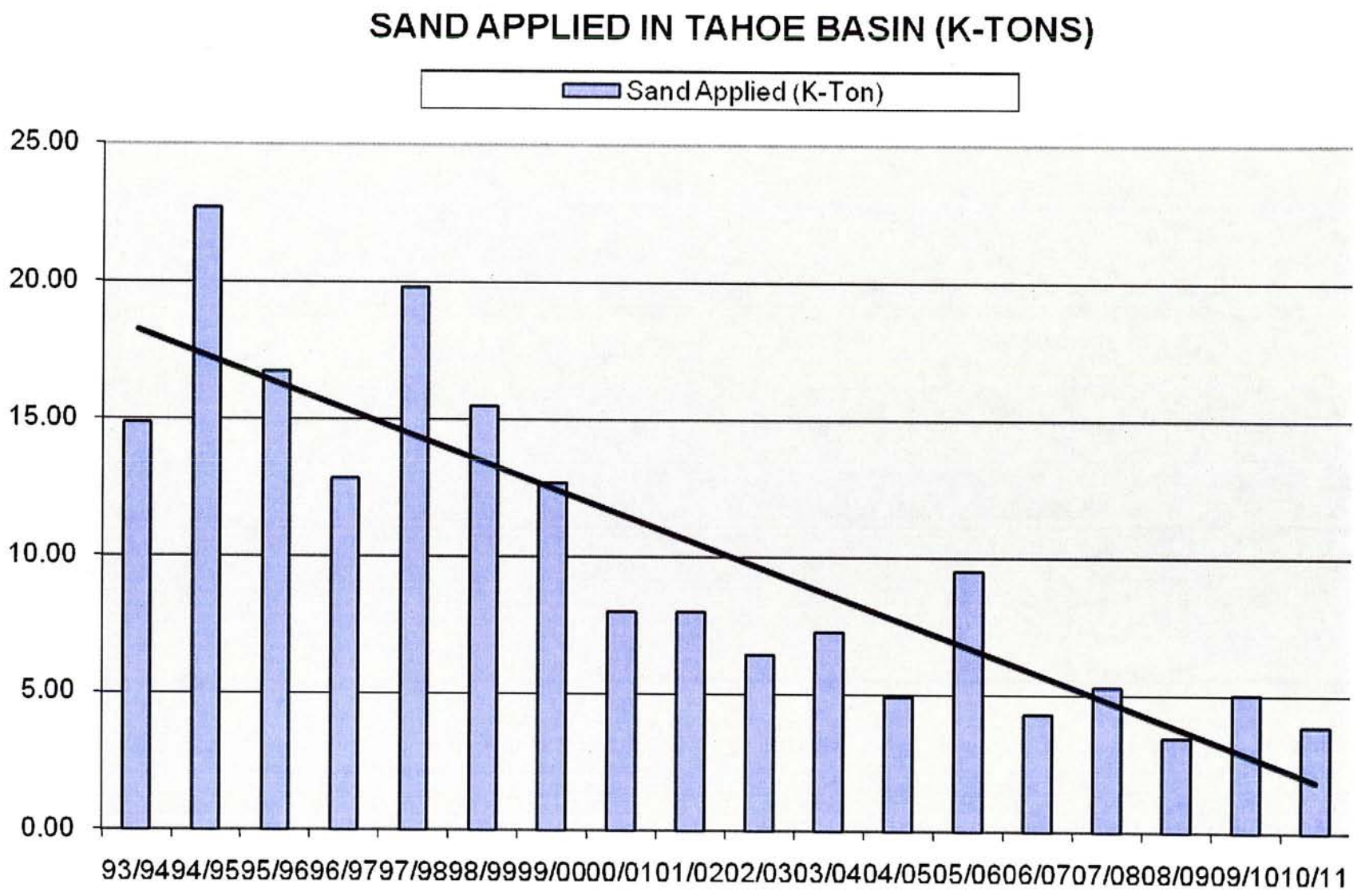
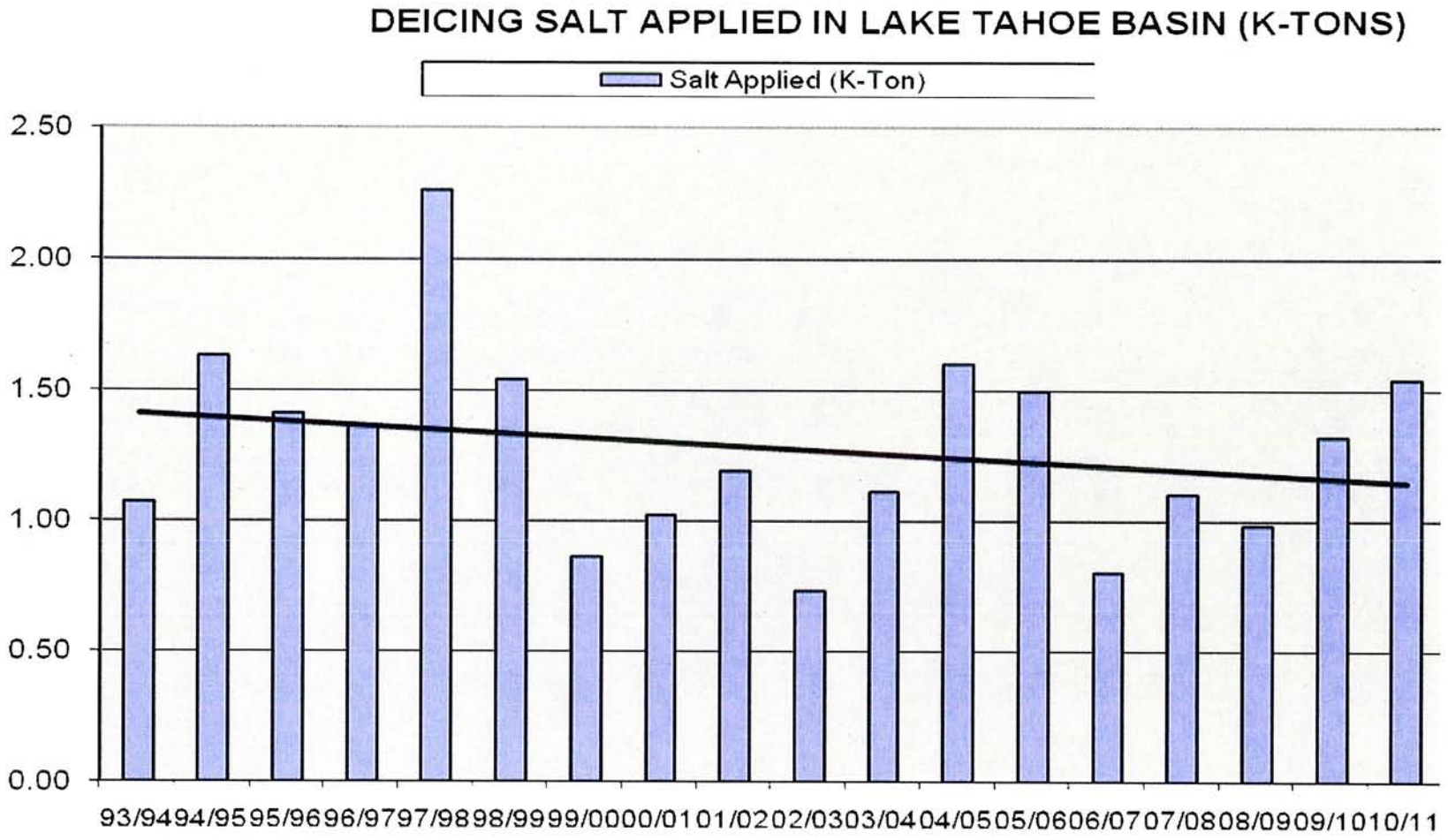

SAND APPLIED IN TAHOE BASIN (K-TONS)
Sand Applied (K-Ton)
25.00
20.00
15.00
10.00
5.00
0.00
93/94
94/95
95/96
96/97
97/98
98/99
99/00
00/01
01/02
02/03
03/04
04/05
05/06
06/07
07/08
08/09
09/10
10/11

FIGURE 3


DEICING SALT APPLIED IN LAKE TAHOE BASIN (K-TONS)
Salt Applied (K-Ton)
2.50
2.00
1.50
1.00
0.50
0.00
93/94
94/95
95/96
96/97
97/98
98/99
99/00
00/01
01/02
02/03
03/04
04/05
05/06
06/07
07/08
08/09
09/10
10/11

STORMWATER MAINTENANCE OPERATIONS

The Department's District 3 Maintenance Division has two Stormwater Crews. The first crew was created in the 2001/2002 fiscal year and is stationed at Furneaux Road south of Marysville. This crew is primarily responsible for the Caltrans geographic area known as Sutter-Sierra Region. The second crew, created in January 2006, is stationed at Rosin Court in the Northgate area of Sacramento. This crew is primarily responsible for the Caltrans geographic area known as Sunrise Region.

One of the major activities of these crews is to inspect and maintain the Best Management Practice (BMP) facilities throughout the District's eleven counties -- along the highways, at park and ride lots, rest areas, vista points, and material and equipment storage sites. The crews also conduct certain soil stabilization and erosion control measures. The data is input to

The Maintenance Stormwater Crews are annually scheduled to clean and inspect drains and drop inlets for each BMP location. The crews record information as the work is conducted and submit the forms to the Maintenance Stormwater Coordinator. The data is transferred to a database for reporting and resource purposes.

Sweeper operations are conducted by local Maintenance crews. Their objectives are to remove litter and debris from the travel way and shoulder, to prevent the collection of materials in drain inlets, reduce the sediment loading of culverts, reduce traffic hazards and improve aesthetics. The personnel that conduct these sweeper operations record the information as the work is conducted and submit the forms to the Maintenance Stormwater Coordinator. The data is transferred to a database for reporting and resource purposes.

Appendix A

Chemical Analyses for
Sand

Chemical Analysis for Abrasives - 2010-11 Season

Source	Maintenance Station	Date Sampled	Iron * (mg/kg)	Orthophosphate as P (Dissolved)* (mg/kg)	Phosphorus, Total as P* (mg/kg)	Nitrite (as N)* (mg/kg)	Nitrate (as N)* (mg/kg)	Total Kjeldahl Nitrogen* (mg/kg)	Total Volatile Solids* (%)	Organic Content* (%)	% Moisture *
Teichert	724 Truckee	2/9/2011	20000	1.04	742	0.5	0.5	24	0.8	0.6	3.1
Teichert	724 Truckee	3/22/2011	23000	0.72	617	0.5	0.5	0.5	0.7	0.4	3.8
Teichert	724 Truckee	4/5/2011	21000	2.11	331	0.5	0.5	0.5	0.7	0.2	3.2
Teichert	724 Truckee	4/19/2011	22000	0.86	643	0.5	0.5	26	0.3	0.3	3.2
Teichert	724 Truckee	5/6/2011	22000	0.72	413	0.5	0.5	0.5	0.3	0.7	2.5
Teichert	736 Tahoe City	2/9/2011	15000	0.86	618	0.5	0.5	3.9	0.8	0.8	4.4
Teichert	736 Tahoe City	3/22/2011	23000	0.89	550	0.5	0.5	0.5	0.4	0.7	4.1
Teichert	736 Tahoe City	4/5/2011	7400	0.67	8.0	0.5	0.5	0.5	0.7	0.3	2.7
Teichert	736 Tahoe City	4/19/2011	6800	0.50	18.1	0.5	0.5	0.5	0.6	0.1	3.6
Teichert	736 Tahoe City	5/6/2011	6500	0.50	41.3	0.5	0.5	0.5	0.4	0.6	1.7
Bing	631 Meyers (SLT)	2/9/2011	19000	0.63	358	0.5	0.5	22	0.6	0.4	5.9
Bing	631 Meyers (SLT)	3/22/2011	18000	0.50	343	0.5	0.5	0.5	0.5	0.4	6.2
Bing	631 Meyers (SLT)	4/5/2011	16000	0.68	480	0.5	0.5	0.5	0.3	0.2	5.6
Bing	631 Meyers (SLT)	4/19/2011	19000	0.50	520	0.5	0.5	0.5	0.4	1.5	5.4
Bing	631 Meyers (SLT)	5/6/2011	17000	0.50	241	0.5	0.5	0.5	0.7	0.4	4.0
Bing	661 Echo	2/9/2011	19000	0.64	422	0.5	0.5	0.5	0.4	0.4	6.1
Bing	661 Echo	3/22/2011	17000	0.50	233	0.5	0.5	0.5	0.4	1.0	6.4
Bing	661 Echo	4/5/2011	15000	0.50	530	0.5	0.5	0.5	0.7	0.6	6.1
Bing	661 Echo	4/19/2011	19000	1.05	407	0.5	0.5	0.5	0.6	0.0	5.0
Bing	661 Echo	5/6/2011	27000	0.50	312	0.5	0.5	0.5	0.4	0.7	5.0

All results are in dry-weight basis

Moisture content and organic content analyzed by CDM Geotechnical Engineering Laboratory. All other constituents analyzed by Pat-Chem Laboratories.

*

Constituent	Method	Reporting Limit
Iron	EPA 6010B	5 mg/kg
Orthophosphate (as P)	EPA 365.2	0.5 mg/kg
Total Phosphorus (as P)	EPA 365.2	0.5 mg/kg
Nitrite (as N)	EPA 300.0	0.1 mg/kg
Nitrate (as N)	EPA 300.0	0.1 mg/kg
Total Kjeldahl Nitrogen	EPA 351.4	0.1 mg/kg
Volatile Solids	EPA 160.4	0.1 percent
Percent Organic Matter	ASTM D-2974	0.1 percent
% Moisture		

Appendix B

Chemical Analyses for
Salt

Chemical Analysis for Deicers - 2010-11 Season

Source	Maintenance Station	Date Sampled	Iron* (mg/kg)	Phosphorus, Total as P* (mg/kg)	Nitrite* (as N) (mg/kg)	Nitrate* (as N) (mg/kg)	Total Kjeldahl Nitrogen* (mg/kg)	NaCL* (% by weight)	Sodium* (mg/kg)	Chloride* (mg/kg)
Cargill	724 Truckee	2/9/2011	5.8	0.7	0.5	0.5	86	99.6	417000	604000
Cargill	724 Truckee	4/5/2011	8.6	0.5	0.5	0.5	0.5	97.8	414000	594000
Cargill	724 Truckee	4/19/2011	13	0.5	0.5	0.5	0.5	95.1	399000	577000
Cargill	724 Truckee	5/6/2011	28	0.5	0.5	0.5	8.1	97.7	398000	593000
Cargill	736 Tahoe City	2/9/2011	5.0	1.5	0.5	0.5	44	99.6	402000	604000
Cargill	736 Tahoe City	4/5/2011	5.3	0.5	0.5	0.5	0.5	95.9	412000	581000
Cargill	736 Tahoe City	4/19/2011	5.0	0.5	0.5	0.5	0.5	97.6	390000	592000
Cargill	736 Tahoe City	5/6/2011	9.0	0.5	0.5	0.5	10	97.4	386000	591000
Cargill	631 Meyers (SLT)	2/9/2011	22	0.9	0.5	0.5	37	99.3	394000	602000
Cargill	631 Meyers (SLT)	4/5/2011	5.0	0.5	0.5	0.5	0.5	96.3	392000	584000
Cargill	631 Meyers (SLT)	4/19/2011	5.0	0.5	0.5	0.5	18	97.3	401000	590000
Cargill	631 Meyers (SLT)	5/6/2011	9.8	0.5	0.5	0.5	8.7	98.5	381000	597000
Cargill	661 Echo	2/9/2011	9.3	0.8	0.5	0.5	0.5	99.5	417000	604000
Cargill	661 Echo	4/5/2011	5.0	0.5	0.5	0.5	170	97.0	406000	588000
Cargill	661 Echo	4/19/2011	5.0	0.5	0.5	0.5	18	96.6	381000	586000
Cargill	661 Echo	5/6/2011	5.0	0.5	0.5	0.5	0.5	97.0	376000	589000

All results are in dry-weight basis

All samples were analyzed by Pat-Chem Laboratories.

*

Constituent	Method	Reporting Limit
Iron	EPA 6010B	5 mg/kg
Orthophosphate (as P)	EPA 365.2	0.5 mg/kg
Nitrite (as N)	EPA 300.0	0.1 mg/kg
Nitrate (as N)	EPA 300.0	0.1 mg/kg
Total Kjeldahl Nitrogen	EPA 351.4	0.1 mg/kg
NaCl (by wt)	ASTM D-632	0.1 percent
Sodium	EPA 6010	25 mg/kg
Chloride	SM 4500-Cl	50 mg/kg

Appendix C

Physical Analysis for Sand

DATE SAMPLED	CALTRANS FACILITY	SOURCE	SIEVE SIZE								SAND SPECIFICATION	
			6.35 mm (1/4")	4.75 mm (#4)	2.36 mm (#8)	1.18 mm (#16)	0.600 mm (#30)	0.300 mm (#50)	0.150 mm (#100)	0.075 mm (#200)	SE*	DF**
	Operating Range (O.R.) % Passing		93-100	---	40-80	15-70	---	0-20	---	0-3	>75%	>55%
02/14/11	Echo	BCJ	100	100	76	59	35	12	4	2.5	78	75
02/28/11	Echo	BCJ	100	100	75	42	18	5	2	1.4	91	89
12/10/10	Meyers	BCJ	100	98	80	62	37	16	5	2.0	86	91
02/23/11	Meyers	BCJ	100	99	66	36	17	6	2	1.6	93	87
02/28/11	Meyers	BCJ	100	99	71	40	16	4	2	1.3	93	95
02/28/11	Meyers	BCJ	100	99	62	35	17	5	2	1.6	91	93
03/10/11	Meyers	BCJ	100	98	79	59	32	11	3	1.3	89	87
11/30/10	Tahoe City	Atlas	99	89	46	24	13	7	3	1.9	97	85
12/27/10	Tahoe City	WNT	100	96	63	35	20	10	5	2.8	90	83
02/23/11	Tahoe City	BCJ	100	99	67	49	30	9	3	2.1	86	90
03/30/11	Tahoe City	BCJ	100	99	66	32	11	3	1	0.8	95	93
03/31/11	Tahoe City	BCJ	100	99	68	32	18	2	1	0.6	95	91
04/01/11	Tahoe City	BCJ	100	99	66	32	11	3	1	0.8	98	93
11/26/10	Truckee	Atlas	99	92	55	29	16	8	4	2.1	100	82
11/26/10	Truckee	Atlas	99	92	55	29	16	8	4	2.1	100	82
12/08/10	Truckee	WNT	100	95	60	34	19	10	4	2.3	90	79
12/08/10	Truckee	Gopher	100	100	83	50	28	12	5	2.7	91	84
12/08/10	Truckee	Teichert Martis	100	99	56	21	9	4	3	2.2	95	74
12/09/10	Truckee	Teichert Martis	100	99	62	24	10	5	3	2.5	95	80
12/09/10	Truckee	Gopher	100	100	77	41	20	8	4	2.2	95	89
12/14/10	Truckee	Gopher	100	100	82	48	27	12	5	2.3	95	
12/16/10	Truckee	WNT	100	95	64	36	19	10	5	3.5	95	81
12/21/10	Truckee	WNT	99	91	52	32	18	10	5	3.2	80	84
12/22/10	Truckee	WNT	99	91	57	34	18	10	5	3.0	96	83
12/23/10	Truckee	WNT	99	93	56	33	18	9	4	2.9	94	84
12/20/10	Truckee	WNT	100	96	66	36	20	11	5	2.1	93	88
01/10/11	Truckee	WNT	100	95	61	32	17	8	4	2.1	95	81
01/27/11	Truckee	WNT	100	95	61	33	18	10	5	2.8	93	80
01/14/11	Truckee	WNT	100	95	62	33	17	7	4	2.0	95	86
02/21/11	Truckee	WNT	100	95	63	35	18	8	4	2.0	95	90
02/22/11	Truckee	WNT	100	94	59	31	15	7	3	1.4	95	83
02/23/11	Truckee	WNT	100	94	59	32	16	8	3	2.2	88	86
02/24/11	Truckee	WNT	100	94	58	31	16	9	4	2.3	92	88
03/03/11	Truckee	WNT	100	96	51	25	14	6	4	2.6	93	77
03/04/11	Truckee	WNT	100	95	51	25	14	7	4	2.6	93	79
03/14/11	Truckee	WNT	100	95	66	37	18	8	7	0.4	95	85
03/15/11	Truckee	WNT	100	96	63	35	18	8	3	2.0	95	93
03/22/11	Truckee	WNT	100	95	63	35	18	9	4	2.3	95	90
03/31/11	Truckee	WNT	100	97	63	33	16	8	4	2.9	92	71
04/01/11	Truckee	WNT	100	96	52	27	14	14	4	3.0	91	78
04/07/11	Truckee	WNM	100	98	62	33	18	9	5	3.2	93	85
04/08/11	Truckee	WNM	100	95	53	26	15	7	4	2.5	95	85

* Sand Equivalent

** Durability Fine