



# Standards for Deicing Products, 2017 Edition

## Liquid Products

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\*Attachments 5A and 5B are separate files in Excel format, and are included as a PDF printout as well in this attachment packet.

This standard applies to all liquid deicing products as used by CDOT. This includes premanufactured complete products, additives, and products finished or prepared by CDOT.

## Attachment #1

### General Specifications and Deicer Category for Liquid Deicing Products

1. The materials specified in this bid are those magnesium chloride based products, which are modified with additives such that the product will not freeze above a defined effective temperature as quoted by the manufacturer in bid submission. These specifications will also apply to sodium chloride brine products as used by CDOT.
2. Products used may not exceed the following CDOT Product Maximum Allowable Limits for the indicated constituent materials. For Test Methods reference Attachment #2.

Constituent Material	CDOT Product Maximum Allowable Limits	Test Method
Arsenic	5.0 ppm	9
Barium	10.0 ppm	9
Cadmium	0.20 ppm	9
Chromium	1.0 ppm	9
Copper	1.0 ppm	9
Lead	1.0 ppm	9
Mercury	0.05 ppm	10
Selenium	0.300 ppm	9
Zinc	10.00 ppm	9
Phosphorus	25.000 ppm	7
Cyanide	0.125 ppm	8
Corrosion Rate	30.000 %	5
Percent MgCl or NaCl	Variable %	1
Molybdenum	15.000 ppm	9
Ammonia	5.000 ppm	24

3. Products must be listed on the Pacific Northwest Snowfighters (PNS) Qualified Products List (QPL) and the CDOT Approved Products List (APL) at the time of award
4. Products shall have a Corrosion Value of at least 70% less than that of Sodium Chloride (salt) as demonstrated by the National Association of Corrosion Engineers (NACE) Standard TM0169- 95, as modified by the PNS.
5. Product specific gravity must match (within 5%) the specified specific gravity for the specific concentration and temperature on the chart provided with bid submittal.
6. Product must contain no less than 1% magnesium chloride below the product concentration as bid. This may be verified using Test Method 1 or field hydrometer testing of specific gravity. Loads found not in compliance with field testing may be rejected or subjected to additional testing.
7. Product will contain the corrosion control inhibitor in quantities not less than those indicated by the bidder. The finished deicing product, including corrosion inhibitors, must be completely accomplished at the original manufacturing plant location. For magnesium chloride products, post adding of corrosion inhibitors or any other

ingredients and splash mixing after the product has left the original manufacturing plant is unacceptable without the prior approval from CDOT. Mixing of ingredients for sodium chloride brines shall be determined by CDOT personnel.

8. The pH must be 6.0-9.0
9. This Liquid Deicer product shall not contain greater than 1.0% (V/V) total Settleable Solids and shall have Ninety-nine percent (99.0%) of the Solids Passing through a Number 10 sieve after being stored at -17.8°C +/- -1°C (1°F +/- 2°F) for 168 hours (seven days).
10. The manufacturer of the product shall maintain a quality control program for deicing products, including testing every 10,000 gallons produced. Test results must be available for CDOT inspection upon request and provided to CDOT on a monthly basis. CDOT will conduct sampling and testing every 100,000 gallons of a given product.

## Attachment #2

### Test Methods for Deicing Products

#### 1. Percent Concentration of Active Ingredient in the Liquid

Test Method: Atomic Absorption or Inductively Coupled Plasma Spectrophotometry as described in "Standard Methods for the Examination of Water and Waste Water", APHA/WWA-WPCF is acceptable. Test Method "A" in Appendix "A" of the Pacific Northwest Snowfighters' publication *Snow and Ice Control Chemical Products Specifications and Test Protocols* Revision 12-10 is used to determine percent concentration of Calcium Chloride or Magnesium Chloride by Atomic Absorption. The operator should be aware that the high solids content of the samples can present special considerations when conducting the analysis.

#### 2. Weight Per Gallon

Test Method: Specific Gravity by ASTM D 1429 Test Method A - Pycnometer at 20°C ±1°C.

#### 3. Corrosion Control Inhibitor Presence and Concentration

Test Method: The Materials Laboratory may use the test procedures provided by the bidder or manufacture for testing quantitative concentrations of additives. These same tests can then be used to verify that materials being delivered are the same as those previously tested and approved in the bid process.

#### 4. pH

Test Method: ASTM D 1293 except a dilution shall be made of 1 part chemical product to 4 parts distilled water before attempting a reading.

#### 5. Corrosion Rate

Test Method: NACE Standard TM0169-95 (1995 Revision) as modified by PNS. This procedure is listed as Test Method "B" in Appendix A of the Pacific Northwest Snowfighters' publication *Snow and Ice Control Chemical Products Specifications and Test Protocols* Revision 12-10.

#### 6. Percent Total Settleable Solids and Percent Solids Passing a 10 Sieve

Test Method: This procedure is listed as Test Method "C" in Appendix A of the Pacific Northwest Snowfighters' publication *Snow and Ice Control Chemical Products Specifications and Test Protocols*, Revision 12-10.

#### 7. Total Phosphorus

Test Method: Total Phosphorous as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

## 8. Total Cyanide

Test Method: Total Cyanide as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

## 9. Total Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Selenium, Zinc, and Molybdenum.

Test Method: Atomic Absorption Spectrophotometry or Plasma Emission Spectroscopy as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

## 10. Total Mercury

Test Method: Cold Vapor Atomic Absorption Spectrophotometry as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

## 11. Milliequivalents OR "meq"

Test Method: This is a measure of the amount of unreacted base in the product. "meq" means milliequivalents or the milligrams of acetic acid to neutralize 1 gram of unreacted base. Method for measuring unreacted base is a standard acid/base titration procedure. A fixed volume of acid (30 ml of 0.1 N HCl) is added to 1 gram sample of CMA. The excess acid is titrated with a standard base (0.1 N NaOH) to phenolphthalein endpoint, pH of 8.6.

## 12. Moisture Content Of Solid Chemical Products.

Test Method: According to ASTM E 534

## 13. Gradation (Granular material only)

Test Method: Gradation shall be ran according to ASTM D 632. The sample size shall be a minimum of 300 grams and be hand shaken through each sieve until the sample has been adequately processed.

Caution: Care should be used when running the gradation test, as the salt is very soft and can be resized by over shaking. Salts that contain sticky organic matter inhibitors may require additional attention with a rubber policeman to insure that the sample passes the screens correctly as the sticky inhibitors will tend to clump up smaller particles of salt and prohibit them from being analyzed correctly.

## 14. Visual Inspection and Field Observations.

Test Method: Visual inspection and field observations to assure that the material remains clean and free of extraneous matter, free from hard caking, does not segregate, and remains suitable for the intended purpose and as otherwise outlined in Section IV of the Pacific Northwest Snowfighters' publication *Snow and Ice Control Chemical Products Specifications and Test Protocols*, Revision 12-10.

NOTE: Purchaser may use any laboratory test method necessary to verify conclusions from visual inspections.

#### 15. Toxicity Test

Test Method: According to "Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms", Third Edition, EPA-600/4-91/002.

#### 16. Ammonia - Nitrogen

Test Method: Ammonia as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

#### 17. Total Kjeldahl Nitrogen

Test Method: Total Kjeldahl Nitrogen as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

#### 18. Nitrate and Nitrite as Nitrogen

Test Method: Nitrate and Nitrite as Nitrogen as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

#### 19. Biological Oxygen Demand

Test Method: Biological Oxygen Demand as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

#### 20. Chemical Oxygen Demand

Test Method: Chemical Oxygen Demand as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

#### 21. Frictional Analysis

Test Method: Frictional Analysis shall be conducted on products that have been applied at the prescribe application rate to a pavement surface within a sealed and controlled humidity chamber. The frictional coefficient shall be measured on pavement surface as the humidity in the chamber is lowered and raised over the course of time. The data shall show a plot of the humidity curve and a plot of the coefficient of friction curve over time. The device that measures the friction coefficient shall be calibrated and certified prior to use on the sample analysis.

#### 22. Insoluble Material

Test Method: ASTM E534 "Standard Test Methods for Chemical Analysis of Sodium Chloride". The method shall be modified by dissolving 100 grams of the sodium chloride sample into the prescribed volume and filtering the entire solution through a Whatman No. 541(or equal), 125 mm diameter filter paper seated in a Buchner Funnel.

#### 23. Chloride

Test Method: Chloride as described in "Standard Methods for the examination of Water and Waste Water", APHA-AWWA-WPCF.

**24. Ammonia - Nitrogen**

Test Method: "Determination of Ammonia Nitrogen by Semi-Automated Colorimetry",  
EPA 350.1.

**25. Metals Digestion**

Digestion for metals as described in "Standard Methods for the examination of Water  
and Waste Water", APHA-AWWA-WPCF.

## Attachment #3

### Field Inspection, Unloading, Sampling and Testing for Deicing Products

The following procedures and requirements have been adapted for CDOT use from the Pacific Northwest Snowfighters' (PNS) Field Inspection, Unloading, Sampling and Testing Procedures.

All material is subject to field inspection, sampling and testing on an as delivered basis. Sampling and field testing is the prerogative of CDOT. The Vendor shall not unload any material without affording CDOT an opportunity to conduct the field inspection, sampling and testing. This may include allowing CDOT access to the Vendor's stockpile at the Vendor Distribution Location for sample collection, prior to Vendor delivering product. Unloading of material without affording CDOT an opportunity to conduct said work shall deem the delivered material non-compliant and is subject to total rejection. The Vendor shall only unload material without field inspection, testing and sampling by CDOT when the CDOT representative grants prior approval to unload.

Field Inspections may be limited by CDOT's snowstorm response. CDOT reserves the right to waive field inspection and sampling and testing in these circumstances. Waiver of field inspection(s) and sampling and testing shall not relieve the Vendor of the responsibility to provide quality materials in conjunction with the requirements stated in this IFB.

#### A. Field Inspection [FOR INFORMATION ONLY]

Before allowing any product to be unloaded, CDOT personnel will adhere to the following procedures:

1. Document and maintain records on all deliveries, including those that are rejected.
2. Check to assure that the product is being delivered according to the terms of the contract. This may include but is not limited to the following:
  - a. Date of the order.
  - b. Date and time of delivery.
  - c. Verification of advance delivery notification.
  - d. Delivered within allowable times.
  - e. Name of Delivery Company and license plate numbers.
  - f. Is any price adjustment assessments required?
  - g. Is the product being delivered what you ordered?
  - h. Document all procedures prior to unloading of product.
  - i. Verify that all papers required of a delivery are present, complete, and legible.
    - Accurate, complete, and legible bill of lading and/or delivery instruction sheet with information as required in Attachment #4A, Delivery Requirements..
    - Legible and current Safety Data Sheet.
    - Certified weight slip (CDOT may waive during periods when weight scales are closed outside of normal business hours).
3. Verify separation or non-separation of product.
4. Visually inspect the load to determine if there are any obvious reasons why the load should be rejected (i.e. excess moisture, extraneous materials, visible caking).



5. No precipitate or flocculation in liquid products shall be allowed in excess of the specification limits. Material portraying these or other uncharacteristic traits when delivered may be immediately rejected at the option of CDOT or CDOT staff at the delivery location.
6. Any problems must be noted at the point of delivery by CDOT personnel, documented, and relayed to the Maintenance Superintendent for action.

**B. Unloading [FOR INFORMATION ONLY]**

1. Provided that all the required information is in place and the material appears to be the correct material as ordered, document the amount of product currently in storage prior to unloading and begin the unloading process.
2. Delivered material must be clean and free of extraneous debris. The supplier is to verify that product does not become contaminated when initial loading occurs and that product is loaded into clean delivery trucks.
3. Visually inspect the delivered product again while unloading. If problems are noted that are a cause for rejection of the load, immediately halt the unloading process. Take photos if applicable and record any pertinent information. Conduct the following procedures if the material is to be rejected.
  - a. If material fails the field inspection or testing, reload the product and reject the load.
  - b. Document all information needed to identify the sample and the reason for rejecting the product. Be sure to record Supplier, Product Name, Date and Time of sample collection, bill of lading/delivery order sheet number and any additional information that is relevant.
  - c. If reloading can't be done, (mixed with previous material) note the amount of product (liquid only) pumped into the tank and total product now present in the tank.
  - d. Circulate the tank and then pull two one-gallon (4 Liter) samples of the contaminated chemical material now in the tank
  - e. Check and record the specific gravity of the samples.
  - f. Take appropriate action as needed to assure the integrity of product on hand if possible. Will all products on hand have to be removed?
  - g. Send samples to section storeroom, who will then ship for third-party testing.
  - h. Immediately advise the Maintenance Superintendent of any ordering, delivery, storage, or product quality issues.

**C. Sampling and Testing [FOR INFORMATION ONLY]**

One sample of the liquid or dry product being delivered may be taken from the delivered shipment for laboratory testing after the shipment has passed the initial inspection and is approved for unloading. This sample will be used for testing and/or fingerprinting at CDOT's expense to ensure product quality. Clearly label samples for identification. Send the sample to section storeroom for 3rd party testing. Be sure the Transmittal form is placed in the box and contains at least the following information; Manufacture or bidder's name, name of product, lot number of product, shipping date, date received, name of delivery point,

quantity of material delivered, and name and phone number of person who received the load and took the samples. Acceptance samples are tested by a third party testing facility in accordance with Attachment 1 and Attachment 2. Test Results are provided to CDOT Division of Highway Maintenance for review and documentation.

1. If the load is liquid, a one-gallon sample will be taken from the transfer hose in three equal parts. Each part will be compositely mixed together with the other parts to make up the one-gallon sample that will be submitted to the laboratory for testing. The samples will be collected during unloading as the first third, the second third and the last third of the product that is being delivered. If the trailer or pup has compartments the three equal samples shall be taken from only one of the compartments to complete the sample. Check and record the specific gravity of the samples.
2. If the load is solid, the delivery truck shall unload the solid material in a windrow. Samples of the windrow materials should be obtained from the complete cross section of the windrow. Portions of the sample shall be taken from the top, center, and bottom in proportion to the cross section area at that point and well within the stack each time. It is best practice to cut completely through the stack if practical. Fine material sifts to the bottom. Care should be taken to obtain a complete and representative sample. The sample shall be placed into a wide mouth 1-gallon container with a screw top lid as soon as the sample has been taken to avoid exposing the sample unduly to atmospheric moisture.
3. Acceptance samples that are out of specification limits as documented in Attachment 1 will be subject to Price Adjustments as detailed in Attachment 6 (Price Reductions and Remedies)
4. In addition, CDOT may also take random samples at any time. The supplier agrees that the test procedures as documented in Attachments 1 and 2, and the results obtained thereof, are a reasonable means to determine compliance with the specifications. Random samples will be used for informational purposes.
5. If an acceptance or random sample fails to meet specifications requirements of this Price Agreement the supplier must demonstrate that appropriate action has been taken to remedy the problem which caused the material to be out of specification before any future deliveries are made to the site(s). Such corrective action shall be documented in writing by the vendor as requested by CDOT.

## Attachment #4A

### Requirements for Delivery to CDOT Facilities of Deicing Products

CDOT operates 365 days per year, 7 days per week, 24-hours per day.

Supplier must be able to deliver 7 days a week - including weekends and holidays, 24 hours a day from November 1st through April 30th.

#### A. Delivery Locations

Delivery will be to multiple locations in 35 zones, state wide. Vendor is responsible for delivery to exact delivery location as determined in conjunction with CDOT. Vehicles shall not be operated on any roadway in excess of the legal weight limitation. The contractor shall be responsible for any and all fines incurred for being overloaded as well as any other safety or moving violations. Overweight trucks will not be accepted or unloaded.

CDOT reserves the right to request samples prior to beginning deliveries and may also take random samples at any time. Samples will be tested in accordance with the enclosed specifications. CDOT test results will be the final authority in accepting/rejecting or price reducing material.

All equipment must comply with city, county, state and DOT rules, regulations, requirements, etc. which apply. All operators must be properly licensed for the type of equipment being operated. CDOT reserves the right to reject any load that is delivered by improperly licensed equipment or operator.

#### B. Field Delivery of Orders

The dated Bill of Lading/Delivery Instruction Sheet and Invoice must contain the following information:

1. Name of Product.
2. Supplier and Manufacturer of Product.
3. Destination of Delivery.
4. CDOT Order Tracking Number.
5. Total volume will be by certified meter ticket.
6. Vendor's Lot Number of Product being delivered. The lot number must enable the purchaser to track a delivered product back to its manufacture point, date of manufacture and specific batch, which can also be utilized to determine destination of delivered load(s) with the same lot number.
7. Transport information--Name of transporting company, tank, trailer, or rail car number, point and date of origin.

8. For liquid products, include the Percent Concentration and Specific Gravity. Percent concentration and specific gravity gives CDOT confirmation that the correct concentration has been delivered and specific gravity is accurate.

The dated invoice must include all of the above and the following information:

1. CDOT Order Tracking Number, each delivery.
2. Date of delivery.
3. Contract Unit of Measure.
4. Contract Unit Price for Product Delivered.
5. Total Price for Units Delivered.
6. A Copy of the Original Bill of Lading/Delivery Instruction Sheet.

CDOT WILL NOT PROCESS INVOICES FOR PAYMENT UNTIL THE BIDDER HAS MET ALL REQUIREMENTS UNDER THIS SECTION:

- a. Bidder will be responsible for all necessary equipment to transfer liquid deicers to CDOT's storage tanks.
- b. CDOT's storage tanks will be fitted with a three (3) inch male pipe fitting to allow for unloading of product.
- c. CDOT may take acceptance samples and random samples for 3<sup>rd</sup> party testing at any time.
- d. Each shipment shall be accompanied by a current and clearly legible SDS.
- e. An anti-foaming agent will be available from the supplier for use as needed, at no additional charge to the State, to control foaming during loading, unloading, and agitation of liquid deicers.
- f. All material is subject to inspection and analysis as delivered. No precipitate or flocculation in liquid products shall be allowed in excess of the specification limits. Material portraying these or other uncharacteristic traits when delivered may be immediately rejected at the option of the buyer or their representative at the delivery location. All products may be assessed price adjustments for late deliveries or poor quality.

**C. Deicer Order Form Instructions (See Attachment 5A) [FOR INFORMATION ONLY]**

- 1) CDOT completes the required information in the first section at the top of the form as indicated for each separate order. Separate order forms should be completed for different deicer products even if the products are available from the same supplier. Yellow highlighted fields request order specific information such as order date/time, expected delivery date, product information/price, special instructions, etc. and will need to be completed for each individual order placed. For orders of granular products, the maximum quantity of material that can be accepted in a given day should be included. Product should be ordered in full load

increments of 4500 gallons +/- 50 gallons for liquid as this practice assures the best pricing from suppliers. The requested number of days for start of delivery as per the pricing agreement with the specific supplier should be noted with the corresponding expected delivery date. Orders will be placed for five and ten calendar day deliveries, with the maximum acceptable delivery time frame of ten calendar days.

The Order Tracking Number field (highlighted in blue) is formatted as follows: four digit patrol number - date (mmddy) format - two digit sequential order number for each day of order placement. These last two digits represent the sequential order number for a particular date from a patrol and are assigned consecutively regardless of supplier or product being ordered.

The order sheet with the completed first section is then emailed or faxed to the supplier for confirmation. All orders must be sent to the appropriate fax or email address for each vendor.

- 2) The second section is reserved for the supplier to confirm product, quantity and delivery dates for the order placed by CDOT. The information completed in this section "Supplier's Order Confirmation" of the order form will be considered a 'Proper Advance Notification' method. The supplier should provide the requested order confirmation within eight (8) business hours (business day is defined as 8:00 a.m. to 5:00 p.m. Monday through Friday) and return the sheet to the CDOT email address or fax #, as provided in the top section of the form. The order placement date shall be the date of the fax transmittal or email if received by the supplier before 2:00 p.m. and the next day if received by the supplier after 2:00 p.m. The supplier will indicate the start and end dates for product delivery of the requested order. This information is requested as a large order may take several days to deliver and a realistic expectation of the delivery time frame is needed for planning purposes. Vendor will fax or email back to the buyer a confirmation of receipt a within eight (8) business hours.
- 3) The last section at the bottom of the form, "Delivery Information" is for reporting of the actual delivery of product to the CDOT facility. All product delivered should be identified with the Order Tracking Number for every delivery. Deliveries should not be accepted unless the Order Tracking Number assigned at the time of order placement can be verified. Multiple entry fields are provided to record delivery of product when more than one load is delivered until an entire order has been completed.

If a sample is taken for testing purposes, this should be indicated in the Notes/Comments field along with the trucking firm making the delivery and date of test sampling. A copy of the order form should also be provided with the sample when transmitted to Staff Maintenance for testing. The Order Tracking Number should also be recorded on the "Deicer Chain of Custody" form that is submitted with the sample. All price adjustments determined for out of tolerance material will be tracked and communicated to the Section and affected vendor by Staff Maintenance throughout the winter season.

- 4) Note to Suppliers - Invoices should be mailed to the address listed in the "Invoice in Triplicate" portion of the Purchase Order. All invoices shall list both the PO number and the Order Tracking Number. Suppliers must invoice within thirty (30) days of order delivery and provide a monthly statement for each Invoice address.

#### **D. Delivery Requirements**

Deliveries shall be made during normal working hours (Monday through Friday between the hours of 8:00 am and 4:00 pm), unless otherwise requested or agreed to by purchaser.

Vendor shall deliver no more than the maximum quantity listed of granular products on a given day. If an order exceeds that locations maximum delivery quantity, the delivery shall be made on the following day or as otherwise coordinated with CDOT personnel.

The order confirmation, bill of lading and invoice documents for each shipment must reflect the Order Tracking Number designated by CDOT on the original "CDOT Deicer Product Order Form" (Attachment 6A) which is unique to each order placed and consistent on all subsequent documents for each order. Liquid product quantities will be ordered in full load increments of 4,500 gallons (i.e., 4,500; 9,000; 13,500; etc.). If any of these documents does not reflect the tracking number, the order will be deemed invalid and the load may be rejected or payment refused at the option of CDOT.

All orders will be placed by fax or email using the "CDOT Deicer Product Order Form" (Attachment #5A) and are required to be delivered within the ordering time frame for that product and supplier in that zone. The supplier will fax or email confirmation of the order back to CDOT indicating the confirmed delivery date and quantity to be delivered within 8 business hours. CDOT may, at its own discretion, waive the fax process and place orders by telephone.

## Attachment #4B

### Requirements for Pickup at Vendor Facility

#### A. Pick Up Location

Pick up of deicer products from locations designated by the Vendor will be accomplished via CDOT transport vehicles.

#### B. Pick Up of Orders

The dated Bill of Lading for material being picked up and Invoice must contain the following information:

1. Name of Product.
2. Supplier and Manufacturer of Product.
3. Pick up location.
4. CDOT Pick Up Tracking Number.
5. Total quantity transferred to the CDOT transport vehicle as confirmed by certified scale or meter ticket.
6. Vendor's Lot Number of Product being picked up. The lot number must enable the purchaser to track any product back to its manufacture point, date of manufacture and specific batch, which can also be utilized to determine final destination of any product with the same lot number.

The dated invoice must include all of the above and the following information:

1. CDOT Pick Up Tracking Number
2. Date of Pick Up
3. Contract Unit of Measure.
4. Contract Unit Price for Product picked up.
5. Total Price for Units picked up.
6. A Copy of the Original Bill of Lading.

#### **CDOT will not process invoices for payment until the bidder has met all requirements under this section:**

- A. Bidder will be responsible for all necessary equipment to transfer granular deicer products to CDOT's transport vehicles.
- B. CDOT may request acceptance samples or random samples be provided by the Vendor for 3<sup>rd</sup> party testing at any time. Granular material samples shall be collected from the Vendor's stockpile. The Vendor shall provide all necessary equipment and labor to collect requested samples at time of material pick-up to ensure representative

sampling of product, which will be witnessed by CDOT personnel. CDOT will provide one or two gallon Ziploc type bags or sample containers, double bagged, for sample collection and the CDOT Deicer Chain of Custody. The Chain of Custody will be completed by CDOT, requiring that the vendor sign and date the VENDOR VALIDATION OF SAMPLE COLLECTION Statement.

- C. A current and clearly legible SDS will be provided for each product picked up by CDOT.
- D. All material is subject to inspection and analysis. Material portraying these or other uncharacteristic traits when picked up may be rejected at the option of the buyer or their representative at the pickup location.

**C. Deicer Pick Up Form Instructions (See Attachment 5B) [FOR INFORMATION ONLY]**

- 1) CDOT completes the required information in the first section at the top of the form as indicated for each separate pick up order. Separate order forms should be completed for different deicer products even if several products are available at the same supplier location. Several fields request order specific information such as order date/time, expected pick up date, product information/price, special instructions, etc. and will generally need to be completed for each individual order placed.

Specific information regarding the CDOT pickup vehicle will also be documented on the CDOT Pick Up order form.

The Pick Up Tracking Number field (highlighted in blue) is formatted as follows: PU four digit patrol number - date (mmddy) format - two digit sequential order number for each day of order placement. These last two digits represent the sequential order number for a particular date from a patrol and are assigned consecutively regardless of supplier or product being ordered.

The order sheet with the completed first section is then emailed or faxed to the supplier for confirmation.

- 2) The second section is reserved for the supplier to confirm product, quantity and pick up dates for the order placed by CDOT. The information completed in this section "Supplier's Order Confirmation" of the order form will be considered a 'Proper Advance Notification' method. The supplier should provide the requested pick up order confirmation within 8 business hours (business day is defined as 8:00 a.m. to 5:00 p.m. Monday through Friday) and return the sheet to the CDOT email address or fax #, as provided in the top section of the form. The supplier will confirm the start and end dates for product pick up as acceptable. This information is provided as a large order may take several days to pick up and a realistic expectation of the pick-up time frame is estimated for planning purposes. Vendor will fax or email back to the buyer a confirmation of receipt and the agreed order Pick Up date(s) within eight (8) business hours.

If the confirmation information regarding pick up dates and/or product quantity provided by the supplier is unacceptable or if confirmation is not given, the order may be cancelled by CDOT by printing "VOID" across the form and either emailing



- or faxing a response back to the supplier. Do not reuse a Pick Up Tracking Number which has been assigned to a voided order.
- 3) The last section at the bottom of the form, “Pick Up Information” is for reporting of the actual pick up of product. All product picked up should be identified by the Pick Up Tracking Number. Multiple entry fields are provided to record pick up of product when more than one load is picked up until an entire order has been completed.
- If a sample is taken for testing purposes, this should be indicated in the Notes/Comments field along with the vehicle number making the pick-up and date of test sampling. A copy of the order form should also be provided with the sample when transmitted to Staff Maintenance for testing. The Pick Up Tracking Number should also be recorded on the “Deicer Chain of Custody” form that is submitted with the sample. All price adjustments determined for out of tolerance material will be tracked and communicated to the Section and affected supplier by Staff Maintenance and Operations on a monthly basis throughout the winter season.
- 4) Note to Suppliers - Invoices should be mailed to the address listed in the “Invoice in Triplicate” portion of the Purchase Order. All invoices shall list both the PO number and the Pick Up Tracking Number. Suppliers must invoice within 30 days of order pick up and provide a monthly statement for each Invoice address.

#### **D. Pick Up Requirements**

The order confirmation, bill of lading and invoice documents for each pick up order must reflect the Pick Up Tracking Number designated by CDOT on the original “CDOT Deicer Product Pick Up Form” which is unique to each order placed and consistent on all subsequent documents for each order.

The Vendor is responsible for loading the ordered quantity of product into the CDOT vehicle and shall provide equipment as necessary to safely accomplish this including certified meters/scales to accurately dispense the ordered product quantity. The Vendor shall be responsible for accurately loading the quantity ordered into the CDOT vehicle and as reflected on the bill of lading.

All loading/transfer equipment must comply with city, county, state and DOT rules, regulations, requirements, etc. which apply. All operators must be properly licensed for the type of equipment being operated to load CDOT transport vehicles at the Vendor’s facility.

**CDOT DEICER PRODUCT ORDER FORM (2017 Ed.)**

Vendor Name		CDOT Purchase Order #	
<b>Order Tracking Number (Four Digit Patrol # -date-XX )</b>		<b>Expected Delivery Date/ Number of Days for Delivery</b>	
<b>Order Date and Time</b>		<b>CDOT Delivery Contact Name and Phone number</b>	
Patrol Delivery Address		CDOT Order Contact Name, email, fax # for confirmation	
Delivery Days/Hours		CDOT Delivery Location Name and Zone Number	
<b>LIQUID PRODUCTS</b>		<b>GRANULAR PRODUCTS</b>	
Product and Price		Product and Price	
Quantity (gallons)		Quantity (tons or bags)	
After hours delivery?	Yes                  No	Type of Equipment (end-dump; bottom dump, flatbed, etc)	
CDOT location locked?	Yes                  No	Maximum daily delivery amount?	
CDOT personnel have to be on- site for after hours delivery?	Yes                  No	Forklift Available to offload pallets?	Yes                  No
<b>Special Delivery Instructions:</b>			

**SUPPLIER'S ORDER CONFIRMATION**

Vendor Contact Name:		Vendor Contact Phone:	
Product to be Delivered		Quantity to be Delivered	
Confirmed Delivery start date		Confirmed Delivery end date	
<b>Confirmation Notes or Comments:</b>			

**DELIVERY INFORMATION**

Product Delivered:		CDOT Representative:	
Actual Delivery date(s)	Actual Qty. Delivered	Actual Delivery date(s)	Actual Qty. Delivered
1		8	
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	
<b>Delivery Notes or Comments:</b> (Product Sampled for Testing    Yes    No)			

**ATTACHMENT 5B****CDOT Standards for Deicing Products****CDOT DEICER PRODUCT PICK UP FORM (2017 Ed.)**

Vendor Name		CDOT Purchase Order #	
Pick Up Tracking Number (Four Digit Patrol # -date-XX )	PU	Expected Pick Up Date(s)	
Order Date and Time		CDOT Pick Up Contact Name and Phone number	
Vendor Facility Address		CDOT Order Contact Name, email, fax # for confirmation	
Facility Days/Hours of Operation		Vendor Pick Up Location Name	

**PRODUCTS (LIQUID AND GRANULAR)**

Product Name	Price		
Quantity	Unit of Measure: Gallons, Tons, Each, Bags		
After hours Pick Up?	Yes	No	
Type of Transport: Tandem, Mid Range, Tanker, Single Axle, Pup			
Special Pick Up Instructions:			

**SUPPLIER'S ORDER CONFIRMATION**

Vendor Contact Name:		Vendor Contact Phone:	
Product to be Picked Up		Quantity to be Picked Up	
Confirmed Pick Up Start Date		Confirmed Pick Up End Date	
Confirmation Notes or Comments:			

**PICK UP INFORMATION**

Product Picked Up:		Vendor Representative:	
Actual Pick Up date(s)	Actual Qty. Picked Up	Actual Pick Up date(s)	Actual Qty. Picked Up
1		8	
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

Pick Up Notes or Comments: (Product Sampled for Testing	Yes	No)
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## Attachment #6

### Price Reductions and Remedies for Deicing Products

NOTE: In the event of a storm event, CDOT reserves the right to accept and use any concentrations of product delivered and apply deductions as defined. This shall not be construed as CDOT's waiver of all other specifications and deductions.

#### A. BASED ON PRIMARY CONSTITUENT CONCENTRATIONS

Acceptance samples taken of the delivered liquid deicer will be tested for percent Magnesium Chloride concentration according to Attachment #2, Test Procedure 1. The test results will be compared to the Bidder Quoted Concentration (BQC) of the Bid Submittal sample, as detailed on the IFB Product Sample Check List Page. Any element of compound that is not specific to the product being bid will not count towards BQC. For example, if a sample is submitted under the category of Magnesium Chloride, credit will be given for Magnesium Chloride content only. No credit shall be given for trace materials such as Calcium Chloride, Sodium Chloride, etc.

If the test results are out of specification, the supplier will be subject to a price reduction based on the invoice amount of the respective shipment as described below.

#### Percent Deduction for Deicer samples below the minimum concentrations:

% Deviation from BQC	% Deduction
2.0-1.1%	20 %
3.0-2.1%	50 %
5.0-3.1%	75 %
>5%	100 %

#### B. BASED UPON OUT OF SPECIFICATION CONSTITUENTS AND CORROSION RATES

Attachment 1 documents the constituent materials, for which maximum levels are specified. Price Reductions shall be assessed for all materials found to be in excess of the limits set forth in these specifications, as follows:

% Over Specified Limit	% Deduction
0% to 10%	0%
10.0% to 20.9%	10%
21% to 39.9%	20%
40% to 74.9%	30%
75% to 99.9%	40%
100% to 199.9%	50%
200% to 300%	75%
Over 300%	100%

**Deductions are additive for each constituent found to be over the specified limit.**

In the event that an acceptance sample is found to be out of specification, CDOT may:

1. Reject the delivered material and/or cancel the Award after the 3<sup>rd</sup> occurrence.
  - a. Prior to such cancellation, the Vendor may be allowed one resample for retesting. If the resample is permitted, the supplier will be advised as to where and when the resample will be taken and is invited to meet CDOT at the time such resample is taken. Resample may be split with the supplier, who is free to obtain independent lab tests; however, CDOT's third party test results will be the final authority for determining specification compliance
2. Reject the delivered material and allow the Vendor to make adjustments to his operation.
3. Where lab results are not known at time of delivery, price reduction as specified above will be assessed based upon the lab results.
4. Cumulative price adjustments for out of tolerance material for the season will be determined and a billing provided to each affected Vendor prior to June 30<sup>th</sup> at the end of each winter season. The Vendor shall remit payment to CDOT for the billed amount.

**C. BASED ON MOISTURE CONTENT (GRANULAR ONLY)**

The amount of salt to be paid for, when moisture exceeds Maximum Moisture Content (MWC) as listed in Attachment #1 (for appropriate category) shall be computed as follows:

Pay Weight Excessive Moisture =

$((100 + \text{MWC} \times 100) \times \text{Wet Wt. of Salt})$  divided by  $(100 + \text{Percent of Moisture})$

**D. BASED ON INSOLUBLE MATERIAL (GRANULAR ONLY)**

Insoluble residue in excess of Maximum Insoluble Material Content (MIMC) as listed in Attachment #1 (for appropriate category) dry salt weight will not be paid for. The amount of salt to be paid for, when the insoluble residue exceeds 10.0% shall be computed as follows:

Pay Weight Insoluble Residue =

$((100 + \text{MIMC} \times 100) \times \text{Dry Wt. of Salt})$  divided by  $(100 + \text{Percent Insoluble Residue})$

Acceptance Sample test results that are out of specification will be used in the calculations above to adjust the weight to be paid. Price Adjustments will be made to invoiced price of the delivered product. Cumulative price adjustments for out of tolerance material for the season will be determined and a billing provided to each affected Vendor prior to June 30<sup>th</sup> at the end of each winter season. The Vendor shall remit payment to CDOT for the billed amount.

**E. DELIVERY**

Any deliveries made without proper advance notification or outside of the established delivery times (unless otherwise authorized in advance) will be assessed an initial price adjustment of 10% of the purchase price of the product.

All orders placed by CDOT, shall be processed as per the procedure for order and confirmation described above. For ordered quantities of 9,000 gallons or more, a minimum of 9,000 gallons of product shall be delivered by the confirmed delivery date to the designated location, with an additional 9,000 gallons delivered each calendar day thereafter until the full order amount has been delivered. If the actual delivery date is later than the order delivery date, a deduction of 10% per calendar day of delay shall be reflected on the invoice submitted to CDOT for the affected daily product quantity (i.e., 9,000 gallons or lesser quantity as applicable).

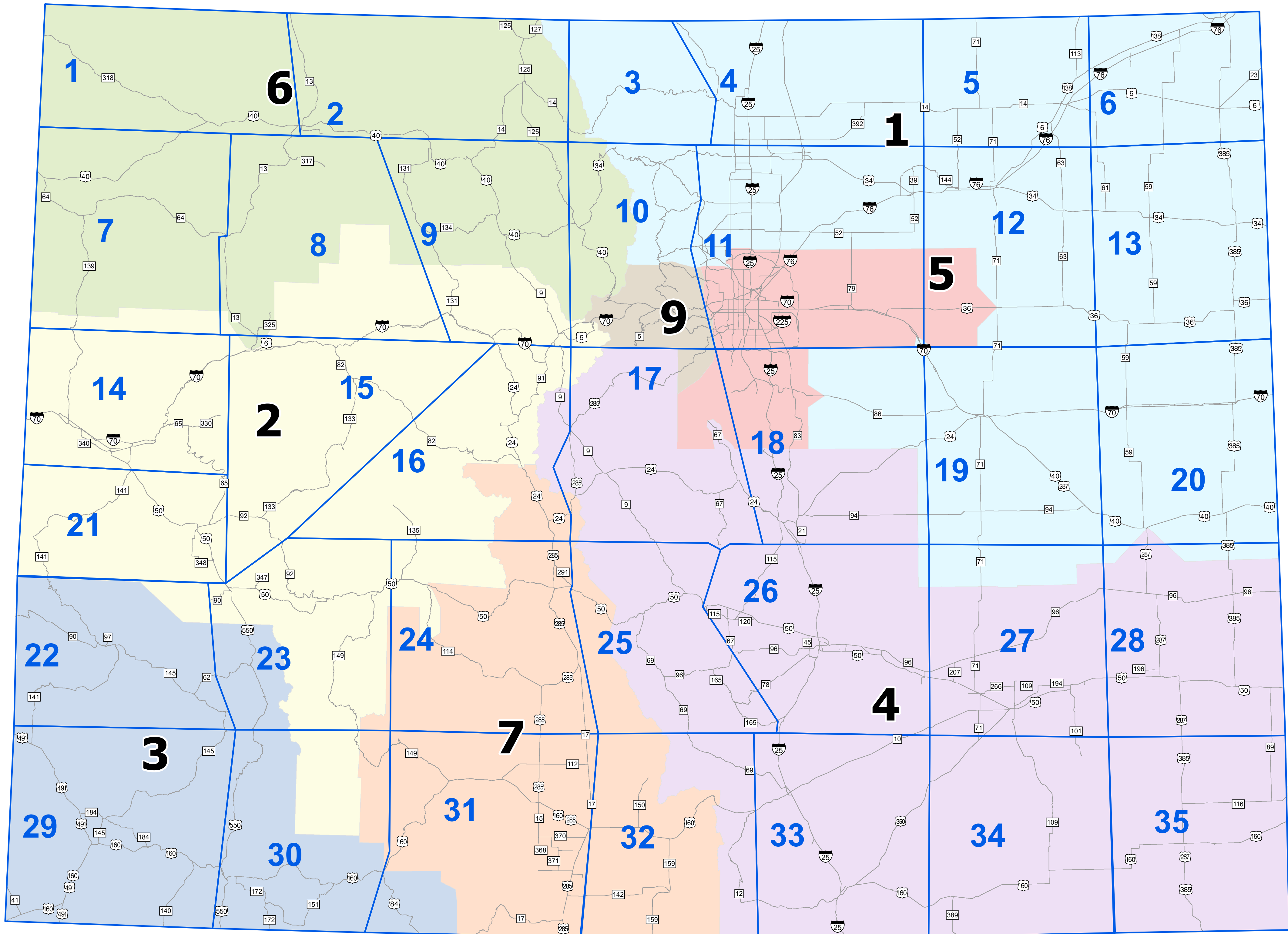
Deliveries made in excess of the maximum daily delivery amount (granular only) will be assessed an initial price adjustment of 10% of the purchase price of the product.

Price adjustments determined for late deliveries shall be addressed with the respective vendor representative prior to payment.

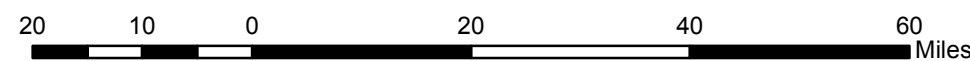
#### **F. REMEDIES**

The Vendor shall be responsible for all removal, clean up expenses and replacement of any product contaminated with non-specific material that are cause for environmental, safety and product performance concerns. This includes but is not limited to removal and clean up measures as needed for the following: storage facility, yard, equipment, and roadside. CDOT's personnel will establish the amount of product contaminated.

The Vendor shall be liable for causing any unanticipated extraordinary damages to equipment used in the storage or distribution of the chemical products. Extraordinary damages as identified by CDOT will be determined on a case by case basis.



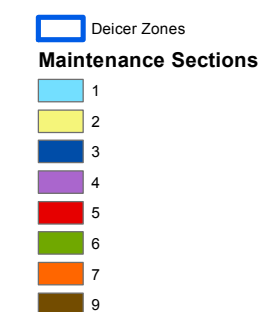
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