



SAINT LOUIS DOWNTOWN AIRPORT

(KCPS)

AIRPORT CERTIFICATION MANUAL, APPENDIX B:

SNOW & ICE CONTROL PLAN

BI-STATE DEVELOPMENT AGENCY

OF THE

MISSOURI – ILLINOIS METROPOLITAN DISTRICT

dba METRO

JUNE 26, 2008

A handwritten signature in black ink, appearing to read "Robert L. McDaniel", written over a horizontal line.

ROBERT L. McDANIEL

Airport Director

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Phase #1

PRE AND POST-WINTER SEASON TOPICS

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Chapter 1

Pre-Season Actions

1.1 Airport Preparation

a. Airport Management Meetings. The Airport Director will typically initiate a meeting the month of October to discuss equipment and material inventory, repair needs, staffing, budget, training, previous years issue's, and any other topics associate with snow and ice control and its plan.

b. Personnel Training. All Airport Management, Maintenance and Fire Department personnel will receive annual, recurrent snow removal training. Training records are maintained by the Fire Chief. Training provided is in accordance with Part 139 Training, 303.313, Snow and Ice Control training module and test.

c. Equipment Preparation. The airport's Bowmonk Friction Tester will be calibrated, updated and certified annually, no later than September of each year.

At least thirty days prior to snow season the Airport Maintenance Manager will inspect and prepare each piece of snow removal equipment. Required fluids, replacement parts, and snow removal equipment components will be inventoried and stockpiled.

1.2 Snow and Ice Control Committee (SICC) Meetings

The Airport has developed a Snow and Ice Control Committee (SICC) to provide feedback and make recommendations to snow and ice removal operations and Snow and Ice Control Plan (SICP) updates at St. Louis Downtown Airport. The SICC is chaired by the Airport Director and includes the Maintenance Operations staff, Fire Department staff, Air Traffic Control Tower Manager, a representative from Ideal Aviation and Jet Aviation. Representatives from all airport tenants are encouraged to attend.

During the month of September, the Airport will begin notifying tenants and airport users to review and provide comments to be discussed each season at a kick-off meeting which will be held during the month of October.

The following topics should be discussed in the SICC:

- Airport Clearing Operations Discussion Topics
 - Clearing operations and follow-up airfield assessments
 - Potentials for pilot or vehicular runway incursions or incidents
 - Staff requirements and qualifications (training)
 - Update training program

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- Streamline decision making process
 - Response time to keep runways, taxiways and ramp areas operational
 - Communication, terminology, frequencies, and procedures
 - Monitoring and updating of runway surface conditions
 - Issuance of NOTAMS and dissemination to ensure timely notification
 - Equipment inventory
 - Status of procurement contracts, including storage of materials
 - Procedures for storm water runoff mitigation
 - Snow hauling/disposing, snow dumps
 - New runoff requirements for containment or collection
 - Changes to contract service for clearing ramps
-
- Any requirements for containment/collection of deicing/anti-icing.

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Chapter 2

Post Event/Season Actions

2.1 Post Event

After each significant snow event, airport management will host a meeting and invite Air Traffic to discuss any issues that have arisen from the event. All members of the SICC will be encouraged to provide feedback to airport management before, during or following each snow event.

2.2 Post Season

After each snow season a SICC meeting will be held, typically in April to review the snow season issues and recommendations for changes. The same topics as pre-season should be reviewed.

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Phase #2

Winter Storm Actions and Procedures

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Chapter 3

Snow Removal Action Criteria

3.1 Responsibilities and Supervision

The Airport Director or his designated representative is responsible for the following:

- (1) Determining when snow removal operations shall begin based upon evaluation of present and forecast weather conditions.
- (2) During snow and/or ice storms, maintaining a continual check of runway conditions for depth of snow, ice, slush, and braking conditions.
- (3) Disseminating airport information by informing the air traffic control tower and publishing a Notice to Airmen (NOTAM) for any of the following conditions:
 - a. prior to commencing snow removal operations
 - b. when braking action is estimated to be fair to poor or is measured below 40 mu on any portion of the landing runway using the Bowmonk friction testing meter (If braking action is verified to be nil or below 26 mu, the runway shall be closed to air carrier operations.)
 - c. when ridges or windrows of snow remain on or adjacent to the operational areas
 - d. when any conditions exist that could present a hazard to aircraft operations or when conditions change from those previously reported
 - e. when the Bowmonk friction tester is inoperative

NOTE: If runway conditions are not monitored during potentially changing overnight conditions, the last runway condition NOTAM published should include “runway surface conditions not monitored hmmm to hmmm” to alert pilots that the runway conditions may have changed since the last report. NOTAMs must be canceled when conditions return to normal.

All fixed base operators and major tenants will be responsible for snow and ice control on their designated ramp areas.

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a. Triggers for Initiating Snow Removal Operations

Snow removal operations will begin when:

Precipitation	Depth in Inches
Slush	1/2"
Wet Snow	1/2"
Dry Snow	1"
Ice or Freezing Rain	any

These measurements are typical for aircraft operating at this airport.

3.2 Snow Control Center (SCC)

When snow, sleet, or icy conditions occur or are anticipated, the Airport Director will designate a Snow Control Center Supervisor (SCCS) to monitor the changing weather and runway conditions and monitor and assist with weather response activities. SCCS duties may be assigned to the Airport Director, Maintenance Manager, ARFF Chief, or another responsible individual designated by the Airport Director for any given period of time and may be rotated from one individual to another depending on the duration of the winter response activities and other duties of the individual.

When winter weather is anticipated and all preparations have been completed, all personnel may stand by at off-airport locations until called to action. The SCCS may remain off-airport while closely monitoring the forecast and communicating with air traffic control, FBO, and other on-airport personnel. When deemed appropriate, the SCCS shall recall needed personnel and activate and direct a Snow Control Center (SCC) located at the Airport Administration and Maintenance Facility, ARFF Station, or from a mobile vehicle, as deemed appropriate for the situation.

Winter SCCS duties shall include the following activities:

- Coordinate with ATC to ensure they are reminded to notify Airport Management of changing runway conditions and pilot reports of “poor” or “nil” braking action or rapidly changing conditions (visit tower cab occasionally)
- Monitor weather reports and forecasts and assist the Maintenance Manager in planning weather response activities
- Coordinate with ATC, FBOs, and tenants, as appropriate
- Monitor activities of snow removal crews and act as a safety observer (e.g., monitor ATC frequencies and air traffic activities when snow removal crews are operating on an open runway)

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- Drive around and look for problems (e.g., snow drifts or berms in hazardous places, obscured signs, or anything that needs attention to ensure safe operations.)
- Generally be the “go-for” supplying food and hot drinks, transportation, and assisting with whatever is needed
- Monitor runway conditions-take Bowmonk runway friction readings and measure and report the precipitation type and depth on the runways after it exceeds one-eighth of an inch
- Publish NOTAMs as applicable; cancel previous NOTAMS when updated NOTAM information is published
- If a runway MU reading is .26 or less, repeat the test to confirm results. If a second test confirms a MU reading of .26 or less publish a NOTAM that states “Rwy 12R/30L closed to air carrier operations.” Cancel the NOTAM when conditions improve
- If a pilot reports braking action is “nil,” confirm the report was accurate by taking MU readings or driving the runway. If “nil” braking action is confirmed with a MU reading of .26 or less, close the runway to air carrier operations and publish a NOTAM
- If weather response activities cease during the night, the last runway condition NOTAM should include the following “airfield surface conditions not monitored hmmm to hmmm” to alert pilots that the runway conditions may have changed since the last report
- If runway snow removal operations are conducted when the tower is closed, the SCCS shall call TRACON to check for inbound traffic and NOTAM the runway closed. If possible, do not close the runway for longer than one-hour periods when the weather is good enough for pilots to be flying. (i.e., if weather is above ILS minimums of 200 ft ceiling and ½ mile visibility. Flying is not normally done during periods of freezing rain.)
- SCCS duties shall not preclude being a part of the weather response activities. (e.g., The SCCS may operate snow removal equipment and be a major part of the response effort, however, SCCS duties shall not be neglected.)

3.3 Airfield Clearing Priorities

A color-coded map is located as Appendix 1, which describes the airfield clearing priorities at St. Louis Downtown Airport.

a. Priority 1

Snow removal operations on the active runway, associated parallel taxiway, taxiways connecting the active runway to the aircraft parking apron, and emergency response perimeter access gate located east of 6200 Archview Drive will receive Priority 1. The standard procedure will be:

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- (1) The initial and subsequent plow cuts will be along and parallel to the runway centerline moving the snow to both sides of the runway.
- (2) When wind conditions dictate, it may be advantageous to plow the snow in one direction (i.e., start plowing on the up-wind side of the runway and plow the snow to the down-wind side of the runway.) This procedure is very slow and will be used only under severe and unusual wind conditions.
 - a. Runway 12R/30L (Based on snowfall, simultaneous snow clearing on Runway 12R/30L and taxiway “B” may be accomplished in a continuous-circuit pattern if it will not delay use of Runway 12R/30L.
 - b. From the ARFF station to taxiways and runways.
 - c. Taxiway “B” from taxiway “B1” to the West Ramp
 - d. Taxiway “B” and taxiways “B1” and “B7” between taxiway “B” and Runway 12R/30L (if not previously cleared)
 - e. Taxiway “B5” from Runway 12R/30L and taxiway “B”
 - f. Taxiway “A” from West Ramp to Hangar 18/19
 - g. Taxiway “B3” from taxiway “B” to Hangar 9 ramp
- (3) The emergency response perimeter access gate will be inspected and function tested during the morning and evening airfield self inspections during snow and/or icing conditions. If the gate is found to be inoperable, corrective mitigation will be taken to return the gate to normal operating status.

b. Priority 2

Once Priority 1 areas have been cleared, snow removal operations will commence concurrently on the airport emergency access gates and routes, the aircraft parking ramp, and all remaining runways and taxiways. Ensure access to Runway 12R/30L from hangars I, V, VI, VIII, X, XIV, XVIII, are cleared.

While work progresses in these other areas, the condition of the active runway will be kept under close surveillance. If the continuing snowfall necessitates replowing, all work in other areas will be suspended and the plows will be diverted to replot the active runway as frequently as necessary to maintain safe operating conditions.

c. Priority 3

Airport access roads, auto parking lots, and service areas will be plowed only after all essential aircraft operational areas have been cleared of snow. This is Curtiss Steinberg Drive and Vector Drive, and all remaining runways, taxiways, taxi lanes between T-hangars, and ramp areas as needed.

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3.4 Snow Equipment List

<u>Year</u>	<u>Make/Model</u>	<u>Description</u>
1999	Freightliner	Tandem dump truck w/ 12' blades
2001	Freightliner	Tandem dump truck w/ 12' blades
1995	(703)	4-wheel drive, ¾ ton pickup w/ 8' snow blades
2007	(751)	4-wheel drive, ¾ ton pickup w/ 8' snow blades (1 equipped w/ spreader)
2006	John Deere	244J and loader with 2 yard bucket
2006	New Holland	8110 loader-backhoe 1-1/2 yard bucket
2008	Bobcat	Skid steer with 1 yd. Bucket and snowblower attachment
1991	Model 80	20' Sweepster broom & blower combo
2001	Model 5510	5510 with 10' rear blade
2005	Chevy Trailblazer	SUV (5300)
2006	Chevy Trailblazer	SUV (702)
2005	(710)	Pickup truck

3.5 Storage of Snow and Ice Control Equipment

All trucks, tandem, loader/backhoe and loader is stored and maintained in a heated garage inside of the Airport Administration Maintenance building.

The bobcat, bucket, 5510 tractor, and snowblower are located in an unheated pole barn located on airport grounds. A 20' broom is located outside.

3.6 Definitions

a. Contaminant. Any substance on a runway, for the purpose of this SICP contaminant is snow, slush, ice or standing water.

b. Dry Snow. Snow that insufficient free water to cause cohesion between individual particles. If when making a snowball, it falls apart, the snow is considered dry.

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c. Wet Snow. Snow that has grains coated with liquid water, which bonds the mass together, but that has no excess water in the pore spaces. A well-compacted, solid snowball can be made, but water will not squeeze out.

d. Compacted Snow. Snow that has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up.

e. Slush. Snow that has water content exceeding its freely drained condition, such that it take a fluid properties (.e.g. flowing and splashing). Water will drain from slush when a handful is picked up.

f. Patchy Conditions. Areas of bare pavement showing through snow and/or ice covered pavements.

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Chapter 4

Snow Clearing Operations and Ice Prevention

4.1 Snow Clearing Principals

a. Ramp and Terminal

Snow removal operations should commence when snow begins to accumulate on the paved surfaces. Caution shall be exercised by all equipment operators to prevent damaging or burying runway and taxiway lighting. Depending on the depth and type of snow, the snow team leader will determine whether it is more advantageous to follow the snow plows with the power broom or lead with the broom to create a furrow that can then be plowed.

Airport tenants may hire private contractors to provide snow removal service in non-movement areas, if desired. Any tenant who uses a snow removal contractor is responsible for (1) ensuring all contract personnel understand and comply with applicable airport Rules and Regulations, (2) supervising contract snow removal operations, and (3) notifying airport management that contract snow removal personnel are operating on the airport. At no time will contractors' personnel, vehicles or equipment be permitted to operate beyond the limits of the existing ramp areas without first being cleared by airport management personnel and accompanied by a radio-controlled vehicle. All snow removal vehicles must be equipped with flashing or rotating beacons and appropriate running lights during night operations.

4.2 Controlling Snow Drifts

The following principles regarding snow removal and positioning shall be adhered to in maintaining safe operating conditions on airport operational areas.

1. Drifted or piled snow shall be promptly removed from runway, taxiway, and ramp surfaces. All movement areas are plowed full width.
2. In the event of sizable snow accumulation, snow banks shall be positioned off usable runway, taxiway, and ramp surfaces in heights allowing all aircraft propellers, engine pods, and wing tips to clear snowdrifts and snowbanks when the aircraft's landing gear is located on any point of the runway, taxiway, or

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ramp pavement. Ensure the area approaching the runway threshold beyond the runway end is clear of all drifts and snow piles.

3. In the event that the snow removal crew is unable to comply promptly with the requirements stated above, the Airport Director or his designated representative shall publish a NOTAM to describe the existing conditions, and shall promptly notify the Air Traffic Control Tower, tenants and other airport users.

4.3 Snow Disposal

Ramp snow is plowed and disposed of off the ramp, far enough in the grass to not become an aircraft obstacle when taxiing.

Snow along the runway/taxiways is pushed out along, but past the lights into the grass area, far enough to not become an aircraft obstacle when taxiing. Snow clearing activities should not allow snow banks, mounds, or ridges exceeding 2 feet to be placed along the edges of the snow clearance areas.

Do not place snow banks off the approach ends of any runway.

4.4 Methods for Ice Control and Removal-Chemicals

Agricultural grade, airside urea is applied with a salt spreader, when needed.

4.5 Sand

Granular material provides a roughened surface on ice and thereby improves directional control and braking performance. Sand will be applied when chemicals are no longer effective due to excessively cold temperatures or excessively thick ice. The sand is unheated, not chemically treated and meets the Standard Gradation for Sand, conforming to AC 150/5200-30C (see Table 4.1).

Table 4-1. Standard Gradation for Sand

Sieve Designation	Percent by Weight Passing
8	100
80	0-2

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4.6 Surface Incident/ Runway Incursion Mitigation Procedures

Vehicles will be marked and lighted in accordance with AC 150/2510-5, *Painting, Marking and Lighting of Vehicles Used on an Airport*.

a. Radio Communication

All snow removal vehicles operating on any aircraft movement area must be equipped with a two-way radio which must be monitored by the vehicle operator at all times.

1. **When the Control Tower is operating**, vehicle operators should monitor “Ground Control” on 121.8 unless directed by the controller to monitor an alternate frequency. Ask and receive “Ground Control” approval prior to operating on any taxiway or runway.
2. **When the Control Tower is closed:** Operation on the runways when the tower is closed requires extreme vigilance. Aircraft may suddenly appear on short final out of low ceilings and may takeoff or land at any time without talking to anyone. Common Traffic Advisory Frequency (CTAF) is “Tower” frequency 119.925. Although pilots are encouraged to announce their intentions on CTAF, it is not mandatory.

When the control tower is closed and runway snow clearing operations are required, the runway should be NOTAM’d closed for brief periods of snow clearing operations as necessary. All vehicle operators should monitor 119.925 when operating on the runways when the tower is closed. (Vehicles equipped with scan-capable radios should activate the scan feature so as to monitor both ground and tower frequencies simultaneously.) **Prior to driving/plowing on runway 12R/30L when the tower is closed**, the snow team leader shall accomplish all of the following actions:

(a.) Call St. Louis Terminal Radar Approach Control (TRACON) at 1-314-890-1018, identify yourself and ask if there are any aircraft inbound for the airport. If there are no aircraft inbound state the following:

“Runway 12R/30L will be closed for plowing for approximately the next ___ (minutes or hours) and I will be publishing the NOTAM. Snow crews will be monitoring CTAF 119.925. If necessary we can reopen the runway on 10 minutes notice. I can be reached by cellphone at _____ (if you have a cellphone.) I will call you when plowing is completed.”

(b.) Call the Fort Worth Automated Flight Service Station at 1-877-487-6867 and state the following:

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“This is _____ (state your name) at St. Louis Downtown Airport. Runway 12R/30L is closed for plowing from now until _____. I can be reached by cellphone at _____ (*if you have a cellphone.*) I will call you when plowing is completed.”

When runway plowing is completed, call the numbers above to cancel the NOTAM and notify TRACON and AFSS that the runway is open and provide the current runway conditions.

b. Failed Radio Communication

If radio communication fails between the snow team and/or the Air Traffic Control Tower, personnel will use their cell phone to dial the Air Traffic Control Tower at 618-337-5660 or 618-337-2589.

c. Low Visibility and Whiteout Conditions

If visibility suddenly drops or a whiteout condition exists, all personnel will stop where they are, contact the Air Traffic Control Tower to inform them of their whiteout condition and receive instructions on moving off the movement area. They will wait at that position until the whiteout condition improves and allows them to safely continue snow removal operations or remain clear of the field.

d. Driver Fatigue

The Airport Maintenance Director shall modify normal work schedules as necessary and develop a work/rest schedule that ensures all members of the snow removal crew are adequately rested to safely perform their duties.

Maintenance staff duty hours adjustment in anticipation of a winter storm: When a winter storm is anticipated to begin after 12 noon and snow crews are expected to be needed through the night, the Maintenance Manager may direct any or all members of the airport maintenance staff to stay home until called.

When placed in delayed reporting status, individuals should remain home, sleep in and avoid strenuous activities so they can be rested and ready for extended work hours when called.

Individuals placed in delayed reporting status shall ensure they are available by telephone and shall report for work as soon as safely practical when called. The purpose of this delayed reporting policy is to enhance safety and extend the period workers can work before becoming excessively fatigued.

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On-duty Firefighters will assist with snow removal when air carrier operations are not anticipated, at the direction of the Airport Director in coordination with the Maintenance Manager and ARFF Chief.

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Chapter 5

Runway Surface Assessment Reporting

5.1 Runway Condition Reporting

Runway condition reporting is provided whenever the pavement condition is worse than bare and wet.

Runway conditions are required to be updated any time a change to the runway surface conditions occurs, which could be any of the following:

- active snow event
- plowing/brooming/deicing/sanding
- rapidly rising or falling temperatures
- rapidly changing conditions

When deemed necessary, Airport Director and/or his designee can monitor the following:

- Maintaining a regular program of friction testing to identify trends in runway traction.
- Monitoring runway physical conditions including air/surface temperatures, contaminant types and depths.
- Monitoring pilot communications
- Monitoring weather patterns

When estimating the quality of braking action, use the terms "Good, "Fair", "Poor" or "Nil." When previous PIREPs have indicated GOOD or FAIR braking action, two consecutive POOR PIREPs should be taken as evidence that surface conditions may be deteriorating and require the airport operator to conduct a Bowmonk friction test.

1. When braking action on any portion of the landing runway is estimated at less than “good,” accurate measurements should be taken using the Bowmonk friction testing device.
2. When braking action on any portion of the landing runway is estimated at “nil,” the runway shall be closed to air carrier operations until conditions improve.

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Airport management should initiate a NOTAM to communicate information to the users of the airport. Airport management should initiate a NOTAM when the friction-measuring device is out-of-service.

5.2 Runway Friction Surveys and Equipment

St. Louis Downtown Airport uses a AFM2 Mk3 Bowmonk Friction Testing Decelerometer device.

a. Conditions

Airport management should conduct runway friction tests whenever it is thought that the information will be helpful in the overall snow/ice removal effort, and the conditions are within the parameters below:

- Ice or wet ice
- Compacted snow at any depth
- Dry snow 1 inch or less
- Wet snow or slush 1/8 inch or less

b. When to Conduct

Friction assessments should be conducted if any of the following occurs:

- When the central portion of the runway, centered longitudinally along the runway centerline, is contaminated 500 feet or more.
- After any type of snow removal operations or chemical application (including sanding)
- Immediately following any aircraft incident or accident on the runway.

c. Calibration

The friction equipment is calibrated annually, performed usually in August. The Assistant Director is responsible for ensuring the equipment is properly packaged and sent for calibration.

d. How to Conduct

When using the Bowmonk friction testing device:

1. Follow the operating instructions and quick reference checklist provided with the device.
2. Runway length is divided into three equal zones: touchdown, midpoint, rollout.

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3. Three braking tests are now required in each zone to determine friction value. This means you are required to do nine separate braking tests (3 in the touchdown zone, 3 in the midpoint zone and 3 in the rollout zone).
4. Average each zone to come up with one bowmonk reading per zone. Example, you obtain three Mu reading in the touchdown zone: 25, 27 and 31. Average these readings to 27.6 and round the reading to 28. This is what you report to tower.
5. Do this making only one pass down the runway, driving the same direction as the arriving aircraft. Vehicle speed should be 20 mph.

e. Friction Assessment Reporting

Friction values will be reported when:

- Compacted snow and/or ice are present on the center portion of the runway, and friction values are 40 or below on any zone of the runway.
 - Rise above 40 on all zones of any active runway that previously have a friction value below 40.
1. When the MU value for any one-third zone of an active runway is 40 or less, a report should be given to ATC and a NOTAM should be published. (Do not report if all 9 readings are 40 or higher. MU readings of 40 or higher equate to “good” braking conditions.)
 2. The report must identify the runway, the type of friction measuring device used (Bowmonk), MU values for each zone, the depth (thin, 1/4 inch, 1/2 inch, 3/4 inch, and 1-inch multiples thereafter) and type of contaminant (wet snow, dry snow, slush, deicing chemicals, etc.), and the date and time of the measurement (add 6 hours to local time to report in Z-time,) Measurements for each one-third runway zone will be given in the direction of takeoff and landing.
 3. A typical runway braking action NOTAM is broken into two NOTAMs to FSS:

NOTAM #1: “CPS RWY 30L BOW MU 40/40/28”

NOTAM #2: “1/2 IN LSR WEF 0812010700”

In the first NOTAM, this means that at 0700Z on December 1, 2008, the first third and middle third of runway 30L had a coefficient of friction of 40. The last third of runway 30L measured 28.

In the second NOTAM, 1/2 IN LSR means there is one-half inch of loose snow on the runway. (See FAA Advisory Circular 150/5200-28B for additional information on NOTAM procedures.)

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If readings lower than 40 have been reported, a report should also be given when MU values rise above 40 in all zones of the runway in use and the NOTAM should be cancelled.

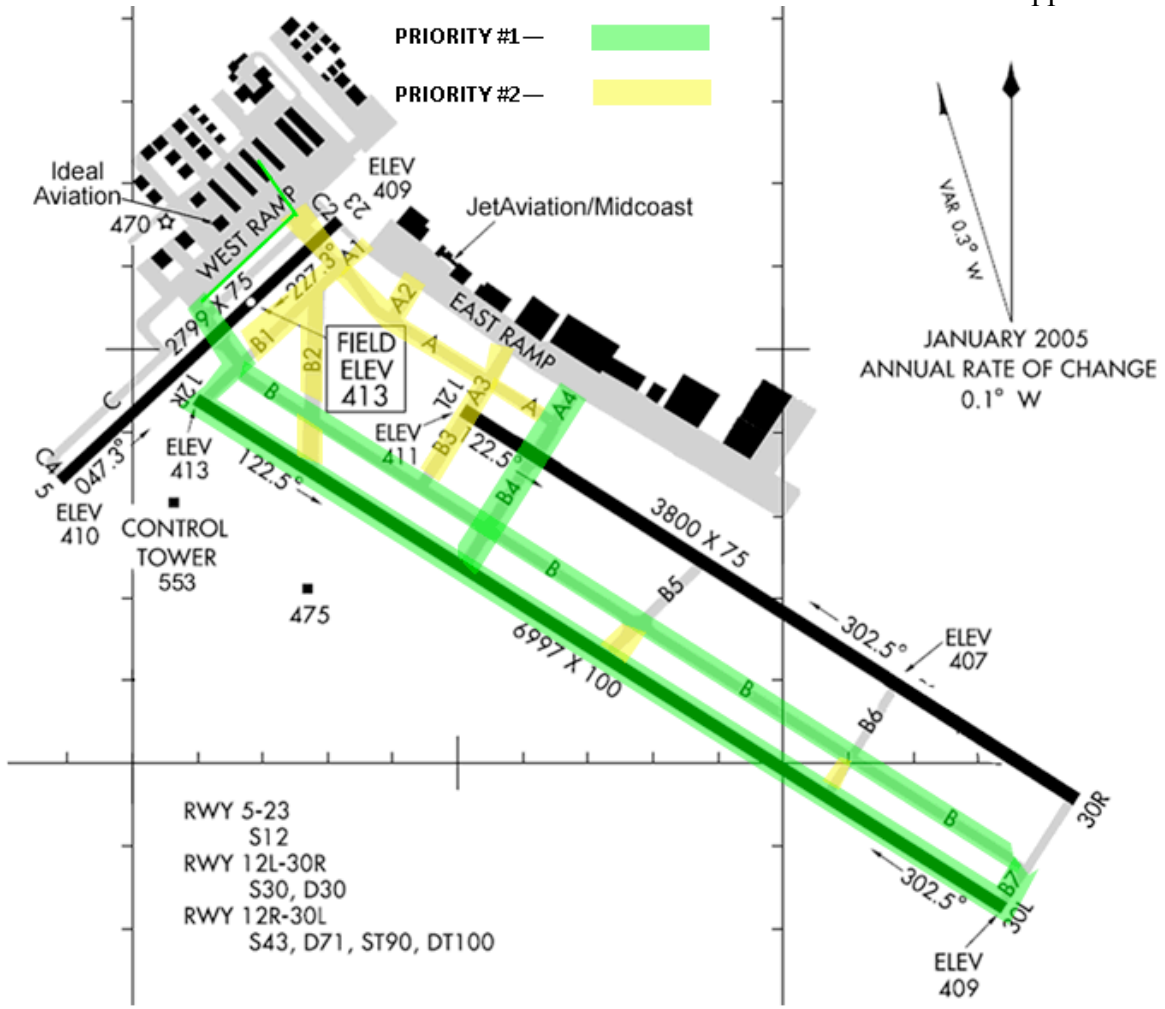
f. Out-of-Service Equipment

A NOTAM will be issued whenever the Bowmonk is out-of-service. This NOTAM will remain until the Bowmonk is available for service.

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Snow Removal Priorities
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