

MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT CERTIFICATION MANUAL
Snow and Ice Control Plan



Snow and Ice Control Plan (SICP)



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SECTION #1

Pre and Post Winter Season Topics

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Chapter 1. Pre-Season Actions

1.1 Airport Preparation

1.1.1 Airport Management Meetings

As designated by the executive leadership team of the Metropolitan Airports Commission (MAC), which owns and operates the Minneapolis - Saint Paul International Airport (MSP), the MAC Airside Operations Department will initiate and conduct meetings with MAC Field Maintenance management team to discuss snow removal equipment, repair needs, material inventory, staffing, budget, training, issues identified from the previous snow season, and any other topics associated with this Snow and Ice Control Plan (SICP).

1.1.2 Personnel Training

All MAC Airside Operations and Field Maintenance personnel with access to the movement area shall receive initial training prior to performing any duties in compliance with the SICP and must complete recurrent training at least once every 12 consecutive calendar months (CCM) thereafter. This training is conducted by the Airside Operations Winter Operations Program with oversight from MAC's Manager, Technical Training and Administration. Training records are maintained for 24 CCM by the Manager, Technical Training and Administration.

Training will be updated each summer based on the previous post-season critique recommendations and any policy/procedure changes that will be implemented for the next snow season. Training is delivered through MAC's Learning Management System (LMS), and are detailed as follows:

1.1.2.1 Airside Operations Personnel

Complete Part 139 Winter Operations Training through the LMS.
Training topics include:

- Field Maintenance assignments
- Communication
- Snow removal runway inspections/closures
- Runway plowing configurations
- Runway closure/opening procedures
- NIL braking action reports
- RCAM
- Snow Control Center (SCC) and airfield positions/responsibilities
- MSP/FAA Letters of Agreement (LOA) pertinent to the SICP
- Priority feeders
- Winter CFME procedures
- Aircraft Deicing configurations/operations
- Review of MSP SICP, highlighting any changes.

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1.1.2.2 Maintenance Personnel

Complete training through the MAC's LMS, classroom training, and hands-on equipment training. Training topics include:

- Runway incursion prevention
- Airfield familiarization
- SMGCS
- Communications
- Updates to the SICP
- Equipment familiarization and usage
- Airfield assignments
- Scenario based plowing configuration training
- Airfield access points and routes

1.1.2.3 Contractor Personnel

Complete training through instructor lead classroom training, and hands-on equipment training. Training topics include:

- Equipment familiarization and usage
- Airfield familiarization
- SICP
- SMGCS
- Runway incursion prevention
- Movement area training

1.1.3 **Equipment Preparation**

The MAC owns and operates multiple Continuous Friction Measuring Equipment (CFME) vehicles. Properly trained Airside Operations personnel calibrate these CFME vehicles at least bi-weekly or whenever a measuring tire is changed, as per manufacturer's specifications. In addition, CFME is inspected and certified annually by the manufacturer's representative.

Required fluids, replacement parts, and snow removal equipment components will be inventoried and stockpiled.

1.2 **Snow and Ice Control Committee (SICC) Meetings**

The MAC has established a SICC to provide feedback and recommendations to snow and ice removal operations and MSP's SICP. The SICC is chaired by the Assistant Director of Integrated Operations, or their designee, and typically includes representatives from:

- MAC:
 - Airside Operations
 - Field Maintenance
 - Fleet Services

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- Trades
- Safety Management System (SMS)
- Emergency Management
- Terminal Operations/Facilities
- Landside Operations
- Environment
- Risk Management
- Operations Optimization
- Technical Training
- Federal Aviation Administration (FAA)
 - MSP Air Traffic Control Tower (MSP ATCT)
 - MSP Terminal Radar Approach Control Facility (TRACON - M98)
 - Minneapolis Air Route Traffic Control Center (ARTCC - ZMP)
- Airlines operating at MSP
- MSP Tenants
- Snow Removal Contractor

Prior to the snow season, the SICC Chair, or their designee, will initiate notifications to airport stakeholders to review the SICP for discussion at the preseason kick-off meeting which is held each fall. SICC meeting recordings and/or minutes will be made available to any party, upon request through the Airside Operations department.


The following topics are examples of subject matter for discussion for the preseason kick-off meeting:

- Airport clearing operations discussion topics:
 - Airfield clearing priorities
 - Preplanned closures
 - New airfield infrastructure
 - Snow and ice removal tactics and field condition assessments
 - Irregular Operations (IROPS)
 - Pilot and vehicular runway incursions or incidents, documentation, and reporting
 - Staff requirements and qualifications/training programs
 - Streamline decision making processes
 - Response time to keep runways, taxiways and apron areas operational
 - Communication, terminology, frequencies, and procedures
 - Weather and pavement surface monitoring
 - Dissemination of Field Conditions (FICONS) and surface closures
 - Equipment inventory
 - Status of procurement contracts, including storage of materials
 - Validation of deicer certification letters from vendors (if applicable)
 - Procedures for storm water runoff mitigation
 - New runoff requirements for containment or collection

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- Status of snow removal contractor staffing and equipment
- Pilot Reports (PIREPs), snow pile locations, snow melting procedures, wingtip restrictions, snow hauling
- Air Carrier ground deicing/anti-icing programs:
 - Assessing all air carriers deicing programs by reviewing airport surface flow strategies; reviewing ground time and takeoff clearances after deicing; analyzing and adjusting aircraft deicing plans
 - Maximizing efficiency of operations during icing conditions by identifying locations for airplane deicing; planning taxi routes to minimize ground times; developing rates for deiced departures; allocating departure slots; determination of airport deicing crew needs; verifying communications
 - MSP Aircraft Deicing Field Rule
 - MSP Deice Procedures, to include widebody deicing locations/procedures

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Chapter 2. Post-Event/Season Actions

2.1 Post Event

At a minimum, after the first 1" + snow event of the season and after any 6"+ snow event, the SCC will conduct a post event "snow critique" meeting to discuss any issues from the event. If timing of storms (back-to-back) do not allow for a separate critique meeting, one will be held as soon as possible following the storm(s). A post event snow critique can also be requested by any member of the SICC after any snow event, regardless of perceived impact. The SICC chair, or their designee, will schedule and host the critiques.

2.2 Post Season

After each winter season a post season SICC Meeting will be initiated and facilitated by the SICC Chair, typically in May, to review the snow season and offer recommendations for changes. The same topics discussed at the Pre-Season SICC meeting will be covered at the post-season meeting.

MAC Airside Operations and Field Maintenance will also have ongoing internal post season tasks that include, but are not limited to, reviewing and updating training, winter procedures, and the SICIP. The SICIP will be reviewed and updated annually by Airside Operations, with input from other members of the SICC.

MAC Field Maintenance will also inspect, repair, and prepare equipment for seasonal storage.

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Chapter 3. Snow Removal Action Criteria

3.1 Activating Snow Removal Personnel

MAC Airside Operations and Field Maintenance will monitor weather forecasts leading up to snow and ice events. Assistant Director, Field Maintenance is responsible for having an appropriate level of sufficiently trained personnel on-airport to conduct snow and ice control operations during forecasted winter weather events. Field Maintenance personnel assigned to snow and ice control duties include full-time, seasonal, temporary, part-time on-demand heavy equipment operators, and contracted airside and landside equipment operators. All personnel conducting AOA snow removal operations are employees who have received applicable training, including AOA driver's training, testing, and licensing.

Manager, Airside Operations or their designee will formulate a staffing plan for the Airside Operations Department and ensure the following roles are filled, as necessary, throughout the duration of the event:

Positions in SCC

- SCC Duty Manager
- SCC Runways*
- SCC Taxiways/Aprons (North)*
- SCC Taxiways/Aprons (South)*
- SCC Support *
- SCC Liaison*

Positions on Airfield

- CFME Operator
- Runway Inspector*
- Taxiways/Aprons (North) Inspector*
- Taxiways/Aprons (South) Inspector*

*These roles may be combined during minor events (forecasted <3" in 12 hours) or during overnight hours.

Further discussion of Airside and Field Maintenance staffing and roles is contained in paragraphs 3.2.1 and 3.2.2.

3.1.1 Weather Forecasting

The SCC Duty Manager is ultimately responsible for monitoring current and forecasted weather conditions to include, but not limited to, air/surface temperatures, winds, precipitation type and intensity using the following services/resources:

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The National Weather Service (NWS) Twin Cities (Chanhassen, MN) is the MAC's primary resource and partner for monitoring current and forecasted weather conditions and helping make decisions as it relates to winter weather at MSP. NWS Twin Cities partners closely MAC Airside Operations to provide 24/7/365 access to NWS forecasters, custom forecast websites, as well as participation in pre- and post-winter weather stakeholder meetings. NWS also provides long-range forecasts during the Preseason SICC meeting and a post snow season recap at the Postseason SICC meeting. MAC Airside Operations and Field Maintenance personnel will participate in conference calls with NWS Twin Cities to receive updates as needed.

Vaisala Navigator displays past, present, and forecasted pavement surface and subsurface temperatures and conditions via map, table or graphical formats through in-pavement sensors on all four MSP runways. This tool helps detect ice, chemical, and precipitation on the pavement. This tool also helps make informed decisions on when to chemically treat airfield surfaces and when and what type of snow removal techniques may be best. This tool is available 24-hours a day, 7-days a week.

Weather Sentry –Airport Operations Edition (DTN) provides a custom forecast for MSP four times daily, which includes hourly type of precipitation, winds, surface temps, dew point, amount, and probability of precipitation. Also included is a forecast outlook and synopsis. Airside Operations personnel and Field Maintenance Management have the option to contact DTN to get details on changes or forecasts. DTN also provides radar services and automated email/text notifications for lightning in the vicinity of MSP. This weather resource is available 24-hours a day, 7-days a week.

Praedictix is a weather service the MAC contracts with to provide on-site meteorologists in the SCC to help monitor, inform, and help make real-time weather decisions in active winter weather events.

Weather Watch provides three daily forecasts as well as daily and monthly climatological reports.

3.1.2 Chain of Command

The Assistant Director, Integrated Operations has the overall responsibility for MSP's snow removal operation. The Manager, Airside Operations is responsible for creating the staffing plan for the Airside Operations Department, who staffs the SCC and airfield condition monitoring positions in winter events. Airside Operations Assistant Managers (AMs) are responsible for physically inspecting and monitoring the airfield in accordance with procedures outlined in this SICP. AMs will continuously monitor airfield conditions whenever winter precipitation is actively observed or reported by MSP's ASOS station. When conditions are other than dry, AMs will call up field conditions (FICONs) to the SCC, who will issue timely FICON NOTAMs.

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Leading up to winter events, the Manager, Airside Operations or their designee will advise the Field Maintenance management of impending weather events where snow or freezing precipitation may accumulate on any airport surfaces.

Field Maintenance management is then responsible to ensure that there is enough Field Maintenance employees on site to fulfill duties required under this SICP. If additional personnel are needed, they will initiate a callout utilizing an automated call back/text back software application. The automated call alert will be initiated prior to the commencement of the winter event. A full crew call will be initiated to request a 100% call in of maintenance personnel for any forecasts of snow over 1” or any forecast accumulation of ice. If the forecast is for less than 1”, a partial crew (less than full crew) may be called in. If any forecast necessitates the need for pre-treating/or sanding after a freeze/thaw cycle, the appropriate number of employees will be held over or called in. MAC Field Maintenance will also typically call-in airside and landside contract snow removal for forecasts of snow over 1”.

3.1.3 Triggers for Initiating Snow Removal Operations

Snow:

Snow and ice control operations will begin when there is contaminant on the airfield reported at the following depths:

Precipitation	Depth in Inches
Slush	1/4”
Wet Snow	1/2”
Dry Snow	1/2”
Ice or Freezing Rain	Any amount

Freezing Rain or Ice:

When freezing precipitation is imminent, Airside Operations and Field Maintenance will determine when and which runways and taxiways will be pre-treated.

The Manager, Airside Operations or their designee and Field Maintenance management will consider the following factors when determining what methods and procedures will be used in any type of pre-treatment or snow removal operation:

- Forecasted Precipitation Type
- Forecasted Precipitation Amount
- Forecasted Runway Configuration
- Current/Forecasted Air/Surface Temperature
- Anticipated Duration of Event
- Anticipated Airport Throughput

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3.1.4 Surface Closure Criteria

During an active event, movement area surfaces must be closed once the following thresholds are met:

<u>Surface</u>	<u>Precipitation Type</u>	<u>Depth in Inches</u>
Taxiway	Slush	Greater than 1”
Taxiway	Wet Snow	3”
Taxiway	Dry Snow	6”
Runway	Slush	Greater than ½”
Runway	Wet Snow	1.5”
Runway	Dry Snow	2”

In addition to the accumulation thresholds noted above, surfaces will also be closed when the following criteria are met:

- During active snowfall, if surface(s) have not been inspected in the preceding three hours
- During active freezing precipitation, if surface(s) have not been inspected in the preceding two hours
- NIL braking action report is received on the surface(s)

3.2 Personnel Responsible

3.2.1 Airside Operations Department

Manager, Airside Operations

- Responsible for the overall management of winter events at MSP. This includes the planning, multi-agency coordination, delegation of assignments/duties within the Airside Operations Department, and general oversight of the entire operation to ensure compliance with this document and Part 139.

SCC Duty Manager

- Responsible for ensuring safe, compliant and effective execution of SICP during their shift
- Ensures SICP coordination and alignment of efforts with stakeholders

SCC Runway Position

- Responsible for communicating runway closure times with airfield staff, including any adjustments to runway closure timing
- Ensures documentation is completed for anything related to MSP’s runways
- Works directly with Airfield CFME operator and Runway Inspector to ensure inspection requirements are met and documented

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SCC Taxiway/Apron (North) Position

This position will alternatively be called the SCC Taxiway/Apron East Position when the airport is in a straight 4-22 or 17-35/4-22 configuration

- Coordinates directly with the Airfield Taxiway/Aprons (North or East) Inspector
- Responsible for keeping documentation required of this Plan current for all taxiways, aprons, and deice pads North of Runway 12R-30L. Alternatively, responsible for all aforementioned surfaces East of Runway 4-22 in a straight 4-22 or 17-35/4-22 configuration.

SCC Taxiways/Aprons (South) Position

This position will alternatively be called the SCC Taxiway/Apron West Position when the airport is in a straight 4-22 or 17-35/4-22 configuration

- Coordinates directly with the Airfield Taxiway/Aprons (South or *West*) Inspector
- Responsible for keeping documentation required of this Plan current for all taxiways, aprons, and deice pads South of Runway 12R-30L. Alternatively, responsible for all aforementioned surfaces *West* of Runway 4-22 in a straight 4-22 or 17-35/4-22 configuration.

SCC Phones/ Miscellaneous Position

- Primarily responsible for the SCC main phone line and communicating pertinent information to other SCC staff
- Assists other SCC positions as necessary

SCC Liaison Position

- Supports SCC Duty Manager
- Coordinates with other departments and agencies as required

Airfield CFME Operator

- Conducts airfield friction evaluations as necessary or requested during winter events or whenever winter contaminants are present on the airfield.
- Reports friction evaluations over the radio and/or digitally to the SCC

Airfield Runway Inspector

- Conducts inspections of MSP's runways and runway feeder taxiways during closures, and if necessary, in between traffic
- Provides runway contaminant type, depth, and coverage percentage to the SCC Runway position for documentation
- Monitors Local Control frequency for Pilot reported braking action reports, and passes them along to the SCC

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Airfield Taxiways/Aprons North Inspector

This position will alternatively be called the Airfield Taxiway/Apron East Inspector when the airport is in a straight 4-22 or 17-35/4-22 configuration

- Conducts inspections of taxiways, aprons, and deice pads North of Runway 12R-30L. Alternately, East of Runway 4-22 in a straight 4-22 or 17-35 configuration.
- Provides contaminant type, depth, and coverage for all their surfaces to the SCC Taxiways/Apron North (or *East*) Position
- Monitors Ground Control Frequency associated with their surfaces for Pilot reported braking action reports, and passes them along to the SCC

Airfield Taxiways/Aprons South Inspector

This position will alternatively be called the Airfield Taxiway/Apron West Inspector when the airport is in a straight 4-22 or 17-35/4-22 configuration

- Conducts inspections of taxiways, aprons, and deice pads South of Runway 12R-30L. Alternately, *West* of Runway 4-22 in a straight 4-22 or 17-35 configuration.
- Provides contaminant type, depth, and coverage for all their surfaces to the SCC Taxiways/Apron North (or *West*) Position
- Monitors Ground Control Frequency associated with their surfaces for Pilot reported braking action reports, and passes them along to the SCC

3.2.2 Field Maintenance Department

Assistant Director, Field Maintenance

- Responsible for the mechanical and chemical removal of contaminants on runways, taxiways, and ramp areas.
- The Assistant Director, or designee, is responsible for the planning, coordinating, and directing maintenance staff through the SCC, throughout the duration of the event.

Field Maintenance Manager, Operations and/or Planning

- The Field Maintenance Manager, Operations and/or Planning will monitor and supervise the overall activities of the Field Maintenance department. For each shift, the manager will provide staffing to meet the needs of snow removal.
- This position may be in the SCC in Airside Operations as a maintenance liaison.

Field Maintenance Manager, Fleet

- The Field Maintenance Manager, Fleet will be responsible for the planning, coordinating, and directing fleet staff for normal and emergency repairs on snow removal fleet.

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Field Maintenance Duty Manager

- There may be up to three runway/taxiway teams on the airfield. One Duty Manager will be assigned for the responsibility of the control and direction of runway/taxiway teams. The Field Maintenance Duty Manager reports to the Field Maintenance Manager, Operations and/or Planning.

Assistant Manager of Fleet Services

- There may be up to 2 shifts in the equipment shop. Each shift will be under the control of an Assistant Manager of Fleet Services.

Working Foreman

- Working Foreman will be assigned the responsibility for directing the ramp clearing at Terminal 1 & Terminal 2. This position will work directly with Contractor, Airline representatives and the SCC for timely contaminant removal at aircraft gates.

3.2.3 Contractor

If the Contractor is used, the Contractor will be responsible for snow clearing on the ramps at Terminal 1 & Terminal 2, as well as the 30R, 30L and Humphrey Remote Deice Pads. The contractor will coordinate snow removal activities with the Duty Manager and/or Working Foreman, airline representatives and/or the SCC. If the Contractor is not used, MAC personnel will perform these functions (generally, if forecasted snow is less than 1")

3.3 Snow Control Center (SCC).

During snow and ice control events, the MAC Airside Operations department acts as the MSP Snow Control Center (SCC) with this function taking place in the Airside Operations Center (AOC). The SCC coordinates airport snow removal activities, surface closures/openings, and issues NOTAMs and FICONs. The SCC is also responsible for all coordination and information sharing with ATCT, air carriers, and other airport users.

The SCC Duty Manager has authority during snow and ice control emergencies to implement formal activation of Incident Command procedures, and delegate tactical decision making to the Incident Commander.

3.4 Airfield Clearing Priorities.

MSP's airfield clearing priorities are created taking into consideration many different factors; including, but not limited to, maximizing operational safety and efficiency, runway usage and flows, personnel, fleet mix, MSP ATCT needs, and air carrier needs.

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Sections 3.4.1 through 3.4.3 below list the airfield clearing priorities, based on runway flow. For a visual representation of these priorities, reference the diagrams in Appendices 1, 2, and 3.

3.4.1 12s or 30s Flow

Priority 1 Surfaces

- Runways: 12R-30L
- Aprons: T1 Apron, T2 Apron, HHH Remote Apron (north of Taxiway S3)
- Deice Pads: 12R Deice Pad, 12L Deice Pad, 30R Deice Pad, 30L Deice Pad, 17 Deice Pad, HHH Remote Apron Deice Pad
- Access Roads: ARFF Station 1 (perpendicular to Twy D), ARFF Station 2 (perpendicular to Twy B)
- Mutual Aid Access Points: Gate 222, Gate 439
- Taxiways: A, A1, A10, B, Q, S1, S3, W1, W10, Z
- Taxiway Segments: P btn P2 & P10, P10 btn P & Q, M btn A & P, D btn A & P, W btn W1 & Z, Y btn K & W, K btn N & Z, S btn K & S3, D btn S & W

Priority 2 Surfaces

- Runways: 12L-30R, 4-22 btn 12L-30R & W (used as a taxiway)
- Taxiways: A2, A3, A4, A5, A7, A8, A9, B8, C5, C6, H, K3, L3, L5, M6, N, P1, P2, P3, P4, P8, P9, T, W2, W3, W5, W6, W7, W8, W9
- Taxiway Segments: L btn L3 & L6, L6 btn W. Cargo Apron & L, D btn K & S, C btn HHH Remote Apron & 12L-30R, M btn W & A, D btn W & A, G btn 12L-30R & P, M btn 12L-30R & P, P10 btn 12L-30R & P

Priority 3 Surfaces

- Runways: 17-35, 4-22 SW of Twy W, 4-22 NE of Rwy 12L-30R
- Aprons: W. Cargo Apron, L5 Apron, Infield Cargo Apron, HHH Remote Apron (south of Twy S3)
- Taxiways: L7, L9, L10, K1, K2, K6, K8, K10, C1, C2, M2, S2, S4, J, G1, G2, C9, C10, R, R3, R4, R5, R6, R7, R8, R9, R10
- Taxiway Segments: L6 btn 17-35 & L, L btn L6 & L10, K btn K1 & N, K btn Z & K10, Y btn 17-35 & K, W btn K10 & Z, S south of S3, M btn S & W, G btn 12L

3.4.2 12s/17 or 30s/35 Flow

Priority 1 Surfaces

- Runways: 12R-30L
- Aprons: T1 Apron, T2 Apron, HHH Remote Apron (north of Taxiway S3)
- Deice Pads: 12R Deice Pad, 12L Deice Pad, 30R Deice Pad, 30L Deice Pad, 17 Deice Pad, HHH Remote Ramp Deice Pad

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- Access Roads: ARFF Station 1 (perpendicular to Twy D), ARFF Station 2 (perpendicular to Twy B)
- Mutual Aid Access Points: Gate 222, Gate 439
- Taxiways: A, A1, A10, B, Q, S1, S3, W1, W10, Z
- Taxiway Segments: P btn P2 & P10, P10 btn P & Q, M btn A & P, D btn A & P, W btn W1 & Z, Y btn K & W, K btn N & Z, S btn K & S3, D btn S & W

Priority 2 Surfaces

- Runways: 12L-30R, 17-35, 4-22 btn 12L-30R & W (used as a taxiway)
- Taxiways: A2, A3, A4, A5, A7, A8, A9, B8, C5, C6, H, K1, K3, K8, L3, L5, M6, N, P1, P2, P3, P4, P8, P9, T, W2, W3, W5, W6, W7, W8, W9
- Taxiway Segments: L btn L3 & L6, L6 btn W. Cargo Apron & L, D btn K & S, C btn HHH Remote Apron & 12L-30R, K btn K 1 & K3, K btn Z & K10, M btn W & A, D btn W & A, G btn 12L-30R & P, M btn 12L-30R & P, P10 btn 12L-30R & P, W btn K10 & Z

Priority 3 Surfaces

- Runways: 4-22 SW of Twy W, 4-22 NE of Rwy 12L-30R
- Aprons: W. Cargo Apron, L5 Apron, Infield Cargo Apron, HHH Remote Apron (south of Twy S3)
- Taxiways: L7, L9, L10, K2, K6, K10, C1, C2, M2, S2, S4, J, G1, G2, C9, C10, R, R3, R4, R5, R6, R7, R8, R9, R10
- Taxiway Segments: L6 btn 17-35 & L, L btn L6 & L10, K btn K3 & N, Y btn 17-35 & K, S south of S3, M btn S & W, G btn 12L-30R & C, C btn 12L-30R & C10

3.4.3 4/35 Flow

Priority 1 Surfaces

- Runways: 4-22
- Aprons: T1 Apron, T2 Apron, HHH Remote Apron (north of Taxiway S3)
- Deice Pads: 12R Deice Pad, 12L Deice Pad, 30R Deice Pad, 30L Deice Pad, 17 Deice Pad, HHH Remote Ramp Deice Pad
- Access Roads: ARFF Station 1 (perpendicular to Twy D), ARFF Station 2 (perpendicular to Twy B)
- Mutual Aid Access Points: Gate 222, Gate 439
- Taxiways: A10, B, C10, Q, S1, S3, W10, Z
- Taxiway Segments: K btn S & Z, Y btn K and W, S btn K and S3, D btn S & P, M btn S & P, W btn D & Z, A btn A3 & A10, A3 btn A & B, P btn P2 & P10, C btn P & C10

Priority 2 Surfaces

- Runways: 17-35
- Taxiways: B8, C5, C6, C9, G, H, K1, K2, K3, K6, K8, K10, L5, M6, N, T, W6

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- Taxiway Segments: C btn HHH Remote Apron & P, D btn K & S, K btn K1 & S, K btn Z & K10, L btn L3 & L6, L6 btn W. Cargo Apron & L, W btn K10 & Z, W btn W5 & D, W5 btn W & Signature Apron, Y btn 17-35 & K

Priority 3 Surfaces

- Runways: 12L-30R, 12R-30L
- Aprons: W. Cargo Apron, L5 Apron, Infield Cargo Apron, HHH remote Apron (south of Twy S3)
- Taxiways: A1, A2, A3, A4, A5, A7, A8, A9, C1, C2, G1, G2, J, L7, L9, L10, M2, P1, P2, P3, P4, P8, P9, R, R3, R4, R5, R6, R7, R8, R9, R10, S2, S4, W1, W2, W3, W7, W8, W9
- Taxiway Segments: L btn L6 & L10, L6 btn 17-35 & L, S south of S3, W btn W1 & W5, W5 btn 12R-30L & W, P btn P1 & P2, M btn 12L-30R and P, P10 btn 12L-30R and P

3.5 Airfield Clearance Times.

As a commercial service airport with more than 40,000 annual operations, MSP has personnel, equipment, and procedures in place to clear 1” of snow from all Priority 1 surfaces within 30 minutes, in accordance with Table 1-1 from Advisory Circular (AC) 150/5200-13, Airport Field Condition Assessments and Winter Operations Safety, and reprinted below.

Table 1-1. Clearance Times for Commercial Service Airports

<i>Annual Airplane Operations (includes cargo operations)</i>	<i>Clearance Time¹ (hour)</i>
<i>40,000 or more</i>	<i>½</i>
<i>10,000 – but less than 40,000</i>	<i>1</i>
<i>6,000 – but less than 10,000</i>	<i>1½</i>
<i>Less than 6,000</i>	<i>2</i>
<p><i>General: Commercial Service Airport means a public-use airport that the U.S. Secretary of Transportation determines has at least 2,500 passenger boardings each year and that receives scheduled passenger airplane service [reference Title 49 United States Code, Section 47102(7)].</i></p> <p><i>Footnote 1: These airports should have sufficient equipment to clear 1 inch (2.54 cm) of falling snow weighing up to 25 lb/ft³ (400 kg/m³) from Priority 1 areas within the recommended clearance times.</i></p>	

3.6 Snow Equipment List.

The complete list of winter equipment deployed at Minneapolis-St. Paul International Airport is shown in Appendix 18.

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3.7 Storage of Snow and Ice Control Equipment.

All snow and ice removal equipment are stored at the heated airport maintenance facilities, located at either the north side or the west side of the airfield.

3.8 Definitions.

3.8.1 Airside Urea.

(Otherwise known as “Carbamide”) The approved specifications are SAE AMS 1431, Compound, Solid Runway and Taxiway Deicing/Anti-Icing, and MIL SPEC DOD-U-10866, Technical Urea. Agricultural grade urea that meets any of these specifications, called airside urea, is acceptable.

3.8.2 Approved Chemical.

A chemical, either solid or liquid, that meets a generic SAE or MIL specification.

3.8.3 Ash.

A grayish-white to black solid residue of combustion normally originating from pulverized particulate matter ejected by volcanic eruption.

3.8.4 Compacted Snow.

Snow that has been compressed and consolidated into a solid form that resists further compression such that an airplane will remain on its surface without displacing any of it. If a chunk of compressed snow can be picked up by hand, it will hold together or can be broken into smaller chunks rather than falling away as individual snow particles.

Note: A layer of compacted snow over ice must be reported as compacted snow only.

Example: When operating on the surface, significant rutting or compaction will not occur. Compacted snow may include a mixture of snow and embedded ice; if it is more ice than compacted snow, then it should be reported as either ice or wet ice, as applicable.

3.8.5 Contaminant.

A deposit such as frost, any snow, slush, ice, or water on an aerodrome pavement where the effects could be detrimental to the friction characteristics of the pavement surface.

3.8.6 Contaminated Runway.

For purposes of generating a runway condition code and airplane performance, a runway is considered contaminated when more than 25 percent of the runway surface area (within the reported length and the width being used) is covered by frost, ice, and any depth of snow, slush, or water.

When runway contaminants exist, but overall coverage is 25 percent or less, the contaminants will still be reported. However, a runway condition code will not be generated.

While mud, ash, sand, oil, and rubber are reportable contaminants, there is no associated airplane performance data available, and no depth or Runway Condition Code will be reported.

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Exception: Rubber is not subject to the 25 percent rule and will be reported as Slippery When Wet when the pavement evaluation/friction deterioration indicates the averaged Mu value on the wet pavement surface is below the Minimum Friction Level classification specified in Table 3-2 of FAA Advisory Circular 150/5320-12.

3.8.7 Dry (Pavement).

Describes a surface that is neither wet nor contaminated.

3.8.8 Dry Runway.

A runway is dry when it is neither wet, nor contaminated. For purposes of condition reporting and airplane performance, a runway can be considered dry when no more than 25 percent of the runway surface area within the reported length and the width being used is covered by:

- Visible moisture or dampness, or
- Frost, slush, snow (any type), or ice.

A FICON NOTAM must not be originated for the sole purpose of reporting a dry runway. A dry surface must be reported only when there is need to report conditions on the remainder of the surface.

3.8.9 Dry Snow.

Snow that has insufficient free water to cause it to stick together. This generally occurs at temperatures well below 32° F (0° C). If when making a snowball, it falls apart, the snow is considered dry.

3.8.10 Eutectic Temperature/Composition.

A deicing chemical melts ice by lowering the freezing point. The extent of this freezing point depression depends on the chemical and water in the system. The limit of freezing point depression, equivalent to the lowest temperature that the chemical will melt ice, occurs with a specific amount of chemical. This temperature is called the eutectic temperature, and the amount of chemical is the eutectic composition. Collectively, they are referred to as the eutectic point.

3.8.11 FICON (Field Condition Report).

A Notice to Air Missions (NOTAM) generated to reflect Runway Condition Codes, vehicle braking action, and pavement surface conditions on runways, taxiways, and aprons.

3.8.12 Fluid Deicer/Anti-Icers. The approved specification is SAE AMS 1435, Fluid, Generic Deicing/Anti-icing, Runways and Taxiways.

3.8.13 Frost.

Frost consists of ice crystals formed from airborne moisture that condenses on a surface whose temperature is below freezing. Frost differs from ice in that the frost crystals grow independently and therefore have a more granular texture.

Note: Heavy frost that has noticeable depth may have friction qualities similar to ice and downgrading the runway condition code accordingly should be considered. If driving a vehicle

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over the frost does not result in tire tracks down to bare pavement, the frost should be considered to have sufficient depth to consider a downgrade of the runway condition code.

3.8.14 Generic Solids.

The approved specification is SAE AMS 1431, Compound, Solid Runway and Taxiway Deicing/Anti-Icing.

3.8.15 Ice.

The solid form of frozen water to include ice that is textured (i.e., rough or scarified ice). A layer of ice over compacted snow must be reported as ice only.

3.8.16 Layered Contaminant.

A contaminant consisting of two overlapping contaminants. The list of layered contaminants has been identified in the RCAM and include:

- Dry Snow over Compacted Snow
- Wet Snow over Compacted Snow
- Slush over Ice
- Water over Compacted Snow
- Dry Snow over Ice
- Wet Snow over Ice

3.8.17 Mud.

Wet, sticky, soft earth material.

3.8.18 Multiple Contaminants.

A combination of contaminants (as identified in the RCAM) observed on paved surfaces. When reporting multiple contaminants, only the two most prevalent / hazardous contaminants are reported. When reporting on runways, up to two contaminant types may be reported for each runway third. The reported contaminants may consist of a single and layered contaminant, two single contaminants, or two layered contaminants. The reporting of “multiple contaminants” represents contaminants which are located adjacent to each other, not to be confused with a “layered contaminant” which is overlapping. For example:

- Single contaminant and Layered contaminant.
‘Wet’ and ‘Wet Snow over Compacted Snow’
- Single contaminant and Single contaminant.
‘Wet Snow’ and ‘Slush’
- Layered contaminant and Layered contaminant.
‘Dry Snow over Compacted Snow’ and ‘Dry Snow over Ice’

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3.18.19 Patchy

A description that can be associated with a contaminant covering 25 percent or less of the reported portions of a taxiway, apron, or heliport. Patchy cannot be used to describe contaminants on any runway.

3.8.20 Oil.

A viscous liquid, derived from petroleum or synthetic material, especially for use as a fuel or lubricant.

3.8.21 Runway (Primary and Secondary).

3.8.20(a) Primary.

Runway(s) being actively used or expected to be used under the existing or anticipated adverse meteorological conditions, where the majority of the takeoff and landing operations will take place.

3.8.20 (b) Secondary.

Runway(s) that supports a primary runway and is less operationally critical. Takeoff and landing operations on such a runway are generally less frequent than on a primary runway. Snow removal operations on these secondary runways should not occur until Priority 1 surfaces are satisfactorily cleared and serviceable.

3.8.22 Runway Condition Assessment Matrix (RCAM).

The tool by which an airport operator will assess a runway surface when contaminants are present.

3.8.23 Runway Condition Code (RwyCC).

Runway Condition Codes describe runway conditions based on defined contaminants for each runway third. Use of RwyCCs harmonizes with ICAO Annex 14, providing a standardized “shorthand” format (E.g.: 4/3/2) for reporting. RwyCC (which replaced Mu values) are used by pilots to determine landing performance calculations.

3.8.24 Sand.

A sedimentary material, finer than a granule and coarser than silt.

3.8.25 Slush.

Snow that has water content exceeding a freely drained condition such that it takes on fluid properties (e.g., flowing and splashing). Water will drain from slush when a handful is picked up. This type of water-saturated snow will be displaced with a splatter by a heel and toe slap-down motion against the ground.

3.8.26 Slush over Ice.

See individual definitions for each contaminant.

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3.8.27 Slippery When Wet Runway.

A wet runway where the surface friction characteristics would indicate diminished braking action as compared to a normal wet runway.

Slippery When Wet is only reported when a pavement maintenance evaluation indicates the averaged Mu value on the wet pavement surface is below the Minimum Friction Level classification specified in Table 3-2 of FAA Advisory Circular 150/5320-12. Some contributing factors that can create this condition include rubber buildup, groove failures/wear, pavement macro/micro textures.

3.8.28 Water.

The liquid state of water. For purposes of condition reporting and airplane performance, water is greater than 1/8-inch (3mm) in depth.

3.8.29 Wet Ice.

Ice that is melting, or ice with a layer of water (any depth) on top.

3.8.30 Wet Runway.

A runway is wet when it is neither dry nor contaminated. For purposes of condition reporting and airplane performance, a runway can be considered wet when more than 25 percent of the runway surface area within the reported length and the width being used is covered by any visible dampness or water that is 1/8-inch or less in depth.

3.8.31 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.

3.9 Snow and Ice Control Recordkeeping

MAC Airside Operations will document the following snow and ice control management activities:

- Begin and end times of continuous monitoring
- Surface assessments results and times
- Runway treatment type and times
- Runway and taxiway closure and opening times
- Dissemination of airport condition information to ATC and other stakeholders
- Pilot braking action reports received from ATC as they deteriorate or improve

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Chapter 4. Snow Clearing Operations and Ice Prevention

4.1 Snow Clearing Principals.

4.1.1 Apron and Terminal

At MSP, Terminal 1 and Terminal 2 Aprons are categorized as Priority 1 surfaces. As Priority 1 surfaces, these two aprons will have sufficient numbers of maintenance personnel and equipment, as determined by Field Maintenance Management.

Field Maintenance will have working foremen supervising the snow and ice removal effort on the Terminal 1 and Terminal 2 Aprons.

MAC Field Maintenance and Trades/Electricians personnel will ensure that all airport signage is visible to the maximum extent possible.

If less than 1" of forecasted snow, Field Maintenance teams will remove snow and contaminants by pushing out from the terminals to the islands. Any large snow piles will be communicated to the SCC. Snow removal crews will load and haul excess accumulation of snow. Any contaminated snow will be deposited at pre-approved snow storage locations as designated by the MAC Environment Department. The tenant airline will be responsible for moving equipment and cleaning terminal door entries and/or hand shoveling.

Airside Operations will monitor wingtip clearance issues as snow is pushed away from gates out towards taxiway islands along TWYs A, D, and P. Taxiway restrictions and closures will be enforced if piles are too high as defined in AC150/5200-30, current edition.

A snow removal contractor will generally be called in whenever 1"+ of snow is forecasted. The contractor will be responsible for snow removal on the non-movement area only, and their standard procedure will be to move snow within the non-movement area to open gates, where a snow-melter is pre-positioned. Placement of the snow-melter will be coordinated with the tenant airlines on an event-by-event basis. Snow will be loaded into the melter, with the water going directly into designated storm sewers.

All other parking aprons at MSP are classified as Priority 3 surfaces. These aprons will be maintained by a combination of contractors and Field Maintenance on an as needed basis. The SCC will continually monitor these surfaces during an active winter event and Field Maintenance will have a working foreman assigned to these aprons.

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4.1.2 Runways

Careful monitoring of changing airfield conditions and dissemination of that information about those conditions in a timely matter to airport users is critical. Equally critical is the deployment of equipment for snow and ice control on runways and taxiways. Many factors are considered prior to the commencement of snow and ice control such as type of precipitation, rate, wind, air temperature and pavement temperature.

The Field Maintenance Duty Manager will oversee the deployment of runway and taxiway teams. The runway teams will be responsible for clearing runways, runway feeder taxiways, and designated taxiways. The teams can break off into subgroups to maximize clearing efforts on taxiways.

During snow removal operations, Field Maintenance will typically utilize multifunction equipment (MFE) to remove snow according to pre-determined factors. A combination of brooms, plows and blowers will assist in the removal of the contaminant. Deicer trucks may be utilized to apply liquid deicer as well as solid chemical/sand trucks where needed.

Types of equipment and uses:

- MFEs containing a combination of broom, air blowers and plows will be used as primary equipment of the snow team.
- Airfield plows and front mounted brooms will be used as secondary equipment to the MFEs.
- High speed airfield blowers will be used to remove wind rows from airfield pavement.
- Airfield deicer trucks will apply liquid deicer determined by weather and pavement conditions.
- Airfield solid chemical/sand trucks will apply sand and/or solid chemical to the surface of the runway determined by weather and pavement conditions.
- All other equipment utilized is listed in Appendix 18.

Runway snow and ice control operations commence when dry or wet snow reaches a depth of 1/2", when slush reaches a depth of 1/4", or immediately upon the onset of freezing rain or freezing drizzle. In addition, snow and ice control operations will take place when surface inspections and/or friction tests indicate corrective action is necessary to provide safe aircraft operational services.

All open runways will be inspected at least once every three hours during active snowfall and at least once every two hours during active freezing precipitation at MSP.

It is standard operating procedure to plow a runway full-length and full width. MFEs and or front mounted brooms and plows plow the snow from the runway

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centerline to runway edge in an echelon or ‘conga-line’ formation. Rubber-bladed plows and brooms operate on runways equipped with in-pavement lighting. High speed airfield blowers throw the snow from the runway edge over edge lights and into islands between runways and taxiways.

Airside Operations inspects runway safety areas to ensure aircraft propeller, engine pod and wingtip clearance. If snowbank heights do not meet requirements under figure 4-1 for Advisory Circular 150/5200-30, a NOTAM will be issued, and MSP ATCT will be notified of appropriate clearance restrictions. The NOTAM will remain in effect until snowbank heights meet AC criteria. Snow stored in safety areas not meeting AC criteria will be hauled away as soon as practicable.

Usually, one down and back runway plowing operation with assigned equipment is sufficient to clear the runway edge-to-edge. Under strong wind conditions, it may be necessary to move the snow from one runway edge to the other edge. Simultaneous sanding and/or chemical applications will be conducted as conditions warrant.

Standard procedure for treating icy surfaces is to spread a combination of sand and chemicals. Use of these products may be suspended due to low temperatures and/or high wind when the application of these products is ineffective.

Priority feeder taxiways connecting the runway with the parallel taxiways are then cleared by working snow back from the radius and then plowing in a diagonal manner from one corner to the opposite corner. This method leaves snow uniformly distributed at the taxiway edges with no heavy deposits at the radius. Field Maintenance Management is responsible for reporting to the CFME operator when all equipment is clear of the runway. Radio communications and required visual inspections help ensure that all vehicles are clear of the runway.

A post-snow removal surface friction test utilizing CFME is normally conducted after all snow and ice control equipment is clear of the runway. The CFME operator will typically be assigned to open the runway on the appropriate MSP ATCT local control frequency. Surface conditions, including contaminant type and depth, as well as Runway Condition Codes (as appropriate) are relayed to the MSP ATCT upon opening the runway.

4.1.3 Airfield Signage

Airfield Signage is regularly obscured by snow and ice buildup at MSP during active snowfall events. MAC Airside Operations will be responsible for continuously inspecting the legibility of all airfield signage on open surfaces during active events. If signage is determined to be obscured, Airside Operations will immediately issue a Lighted Sign Status – Obscured NOTAM for all affected surfaces/signs and advise ATC via phone or radio. MAC Trades/Electricians will be the primary agency responsible for clearing obscured signage in active events.

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Field Maintenance will be primary agency responsible for clearing obscured signage during clean-up efforts.

This SICP identifies airfield sign clearing priorities based on active runway configuration/flow, preplanned closures, and with a focus on mitigating runway incursions. In active snow and ice events, there will be a focus on mandatory instruction signs. Priority 1 signs will be mandatory runway, ILS holding, and approach holding position signs associated with open and active runways where aircraft can be expected to cross or proceed onto these runways or critical areas. Priority 2 mandatory runway holding position signs will be associated with open and active runways where feeder taxiway/crossing will be closed and not used, or where aircraft are expected to exit the runway only. Priority 3 mandatory runway holding position signs are associated with closed runways. The one exception to these rules is the 'north field' mandatory runway holding position signs, north of Rwy 12L-30R, will be Priority 3 as all these taxiways will be closed in active snow and ice events. All other signage on the airfield (i.e., non-mandatory instruction signage) will be addressed during cleanup operations and therefore not labeled or listed in this paragraph or associated diagrams. Appendices 13-17 provide a visual diagram of the sign clearing priorities as laid out below.

12s / 17 Flow

Priority 1 Mandatory Sign Locations:

- Rwy 17: K3, L3, K10, L10, N
- Rwy 12R: A1, W1, D, C, 4-22, M, A10, W10
- Rwy 12L: P10
- ILS Critical Area: 12R GS (Twy W btn W8/W9, Twy W btn W10/Z, Twy Y)

Priority 2 Mandatory Sign Locations:

- Rwy 17: K1, K2, K6, L6, Y, L7, K8, L9
- Rwy 12R: A2, W2, A3, W3, A4, A5, W5, A8, W8, A9, W9
- Rwy 12L: P1, P2, P3, P4, G (S of 12L), P8, C (S of 12L), 4-22 (S of 12L), M, P9

Priority 3 Mandatory Sign Locations

- Rwy 12L: G (N of 12L), C (N of 12L), R9, R10
- Rwy 4-22: All feeder taxiways

30s / 35 Flow

Priority 1 Mandatory Sign Locations:

- Rwy 35: K1, L3, K2, N, L10, K10
- Rwy 30L: A1, W1, D, C, 4-22, M, A10, W10
- ILS Critical Area: 30L GS (Twy W btn W2/W3)
- Rwy 30R: P1

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Priority 2 Mandatory Sign Locations:

- Rwy 35: K2, K6, L6, Y, L7, K8, L9
- Rwy 30L: A2, W2, A3, W3, A4, A5, W5, A7, W7, A8, W8, A9, W9
- Rwy 30R: P2, P3, P4, G (S of 30R), P8, C (S of 30R), 4-22 (S of 30R), M, P9, P10

Priority 3 Mandatory Sign Locations:

- Rwy 12L: G (N of 12L), C (N of 12L), R9, R10
- Rwy 4-22: All feeder taxiways

4 / 35 Flow

Priority 1 Mandatory Sign Locations:

- Rwy 4: L, S, T, W, A, B, C6, M6, Q, P
- Rwy 35: K1, K3, L3, N

Priority 2 Mandatory Sign Locations

- Rwy 4: K, C2, M2, H, C9, C10
- Rwy 35: K2, K6, L6, Y, L7, K8, L9, K10, L10

Priority 3 Mandatory Sign Locations

- Rwy 30L: All feeder taxiways
- Rwy 30R: All feeder taxiways

Straight 4 Flow

Priority 1 Mandatory Sign Locations:

- Rwy 4: K, S, T, W, A, B, C6, M6, Q, P
- Rwy 4 APCH Hold: Twy C (east of Twy S), Twy C (west of Twy S), Twy S (btn Twys K & M), Twy M (NE of Twy S)

Priority 2 Mandatory Sign Locations

- Rwy 4: L, C2, M2, H, C9, C10

Priority 3 Mandatory Sign Locations

- Rwy 12R-30L: All feeder taxiways
- Rwy 12L-30R: All feeder taxiways
- Rwy 17-35: All feeder taxiways

Straight 22 Flow

Priority 1 Mandatory Sign Locations:

- Rwy 22: C10, C9, R, R3, P, Q, C6, M6, B, A, W, T, S, L
- Rwy 22 APCH Hold: Twy C (SW of C9), Twy G (SE of C)

Priority 2 Mandatory Sign Locations

- Rwy 22: H, C2, M2, K
-

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Priority 3 Mandatory Sign Locations

- Rwy 12R-30L: All feeder taxiways
- Rwy 12L-30R: All feeder taxiways
- Rwy 17-35: All feeder taxiways

4.1.4 Taxiways

If less than one inch of snow is forecasted, snow removal from Terminal 1 and Terminal 2 aircraft parking positions is accomplished simultaneously with adjacent taxiway snow removal. Equipment pushes snow from aircraft parking positions to a point where snow piles can be collected by larger snow removal equipment. Standard procedure is to move the snow to a taxiway edge, to the side of an apron or to a designated snow storage area. Airfield snow blowers throw the snow into islands between taxiways or runways, or to an area clear of aircraft parking aprons.

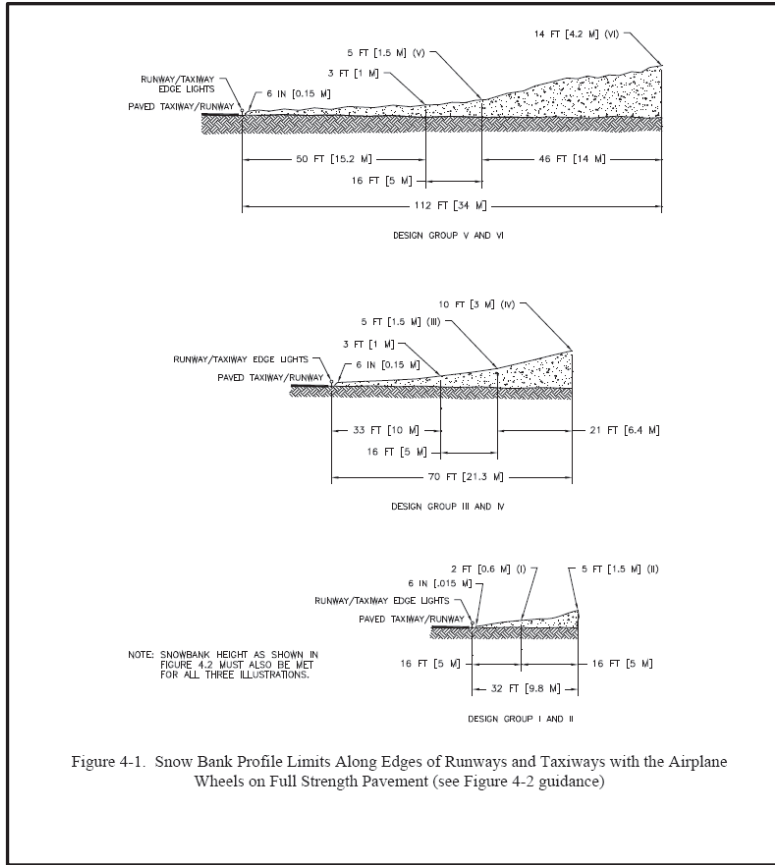
MAC Field Maintenance and Trades/Electrician personnel will ensure that all airport signage is visible to the maximum extent possible.

Airside Operations inspects taxiway safety areas to ensure aircraft propeller, engine pod and wingtip clearance. If snowbank heights do not meet requirements under figure 4-1 for Advisory Circular 150/5200-30, a NOTAM will be issued, and MSP ATCT will be notified of appropriate clearance restrictions. The NOTAM will remain in effect until snowbank heights meet AC criteria. Snow stored in safety areas not meeting AC criteria will be hauled away as soon as practicable. Snow pile heights will be monitored, and snow hauling will be scheduled as soon as practicable to preclude runway to taxiway visibility obstructions. Snow is relocated to designated snow storage locations or is hauled to AOA snow melting facilities.

When a NIL braking action report is received or any other perceived unsafe hazard or condition exists, the surface will be immediately closed until the hazard or condition no longer exists, as detailed in Section 5.7.

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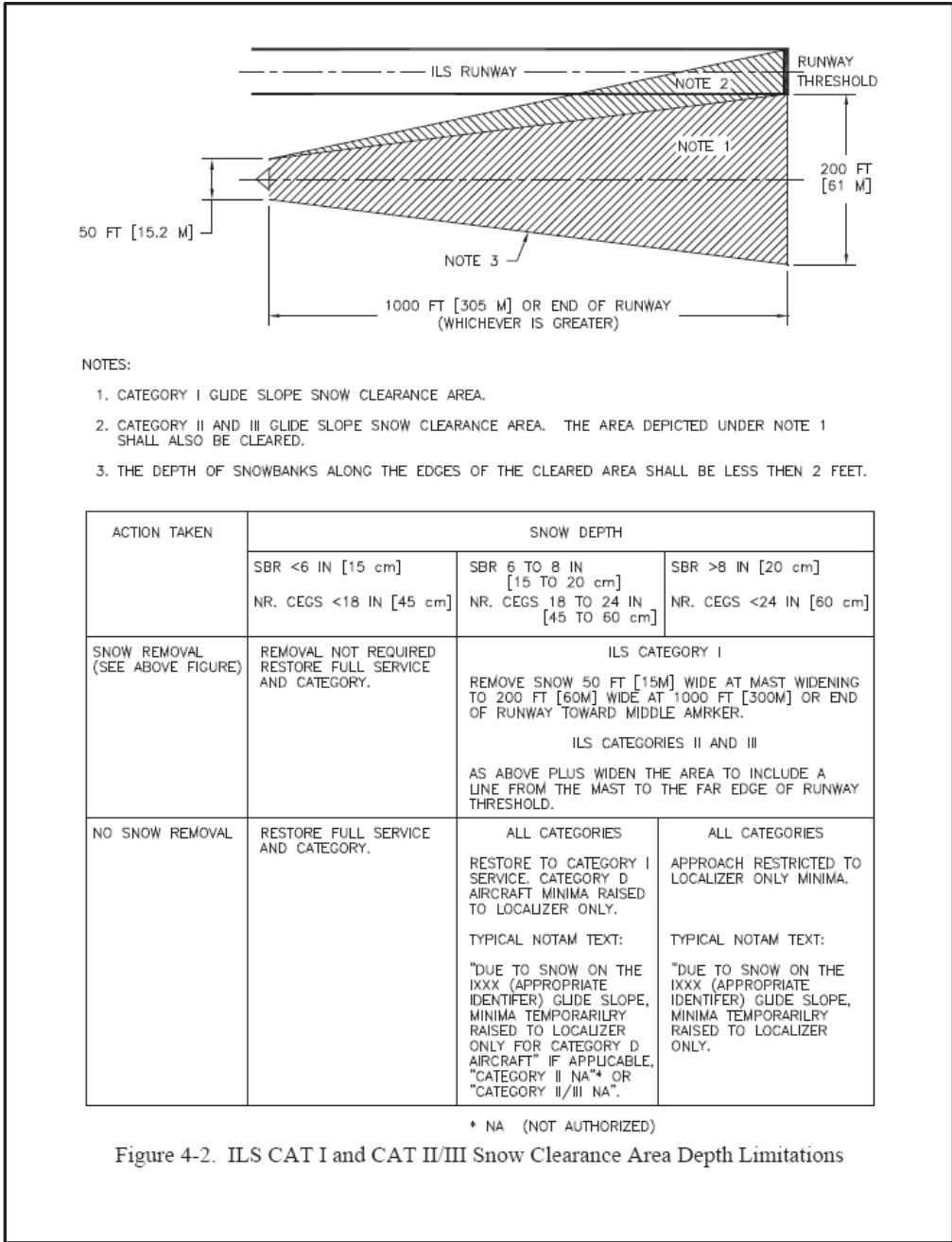


4.1.5 NAVAIDS

Close coordination is maintained with appropriate FAA Technical Operations personnel to ensure operation of equipment critical to the National Airspace System. If snow levels exceed depth limitations as listed in figure 4-2 of AC 150/5200-30, current edition, Airport Winter Safety and Operations, a request from FAA Technical Operations personnel for snow removal from around NAVAIDS and from ILS critical areas will be routed through the SCC to Field Maintenance Management.

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4.2 Controlling Snow Drifts

During and after snow events the potential for snow drifts is high. Airside Operations will be responsible for the continuous monitoring of snow drifts. The SCC will issue NOTAMs until Field Maintenance can remove the drifts.

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4.3 Snow Disposal

The SCC Duty Manager will coordinate with Field Maintenance Duty Managers to determine the best course of action to remove excess snow on the airfield. If there are snowbanks that result in runway, taxiway, or apron restrictions Airside Operations will create a priority list so that the snowbanks causing the most impact are removed first.

Snow will be disposed of by either hauling it to one of the airfield snowmelters or to a designated snow storage area on the airport campus. These snow storage areas have identified height limits to prevent snow from infringing on any Part 77 surfaces.

4.4 Methods for Ice Control and Removal—Chemicals

Liquid De-icer. Field Maintenance utilizes approximately 500,000 gallons of runway deicer on the airfield annually. The current specifications call for potassium acetate-based fluid, specially formulated with inhibitors, to anti-ice and de-ice airport runways and taxiways.

Solid De-icer. A pelletized solid airfield deicer is available for use on compacted snow and ice areas of the airfield. Sodium Formate and Sodium Acetate and a Sodium Formate/Acetate blend are the three (3) solid deicers available. These products meet FAA specifications. Approximately 40 metric tons are kept on hand for use during ice storms or compacted snow and ice problem areas.

In the event there are potential or anticipated shortages of deicing products (liquid or solid) available from the manufacturers who are supplying the airport industry, the MAC will seek to procure alternative de-icing products that meet FAA specifications for effective treatment of the airfield runways and taxiways.

The deicer fluid is applied to runways, taxiways, deice pads and occasionally ramps to prevent the formation of ice and snow bonding to the pavement and to facilitate melting. The efficiency of the deicer is determined by ambient temperature, solar action, and aircraft movement.

Consequently, deicer is not as effective in well below freezing temperatures. However, deicer fluid's snow melting abilities below freezing temperatures during the day are enhanced by the solar energy. Certain liquid deicer products can remain on the pavement surfaces longer than others due to their chemical composition; this requires the SCC to report runways as wet due to deicing contamination.

4.5 Sand (for the purposes of treating a winter surface)

Sand is applied on the airfield surfaces on an as-needed basis. Field Maintenance will ensure the sand used meets FAA gradient standards Sand used on AOA surfaces meets criteria as established in tables 4-2 of AC 150/5200-30, current edition, Airport Winter Safety and Operations. Sand spreading equipment provides the option of “pre-wetting” the

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sand with liquid chemical if conditions warrant that type of application. At MSP, sand used on the airfield is stored in an indoor, heated facility.

Table 4-2. Standard Gradation for Sand

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

4.6 Surface Incident/Runway Incursion Mitigation Procedures.

As a function of the SICC, any issues, incidents, and concerns from MSP’s stakeholders are communicated and reviewed. A plan of action will then be discussed and implemented to prevent future occurrences. All vehicle operators conducting snow removal operations on the movement area must possess a valid, movement area driver’s license. Personnel are trained, tested and licensed annually. Movement area driver’s training curriculum includes driver and vehicle requirements, airport layout, non-movement area operating requirements, movement area operating requirements, runway incursion prevention including a review of previous incidents, special driving conditions, signs and markings, lighting and navigational aids, communications, aircraft identification and AOA Driving Ordinance requirements.

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

4.6.1 Radio Communication

All MAC and contractor snow removal vehicles operating on the movement area are equipped with radios capable of direct communication with the MSP ATCT. All MAC snow removal vehicles operating in the movement area have call signs that are numbered in a manner identifying the type of equipment to MSP ATCT personnel. All MAC and contractor snow removal vehicles are also equipped with two-way radios to provide vehicle-to-vehicle and vehicle-to-base communications. Personnel are trained to operate radio equipment with proficiency.

All vehicles operating on the movement area will monitor the appropriate ATC frequency or will be under escort from a lead vehicle that is monitoring the appropriate frequency.

4.6.2 Failed Radio Communication

Personnel operating on the Movement Area are trained to clear the movement areas immediately if they lose the ability to monitor the MSP ATCT radio in their

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vehicle. Personnel are further trained to use the MAC 800 MHz radio system to communicate to their supervisor and/or the SCC if they experience any radio issues. If both the MSP ATCT and 800 MHz radios fail, personnel will utilize cell phones to contact their supervisor and/or the SCC.

4.6.3 Low Visibility and Whiteout Conditions

Conditions and restrictions as listed in the MSP Surface Movement Guidance Control System (SMGCS) Plan apply during snow/ice control operations. Vehicle movements on the movement area, with the exception for the purpose of emergency response, are prohibited when runway visual range (RVR) is below 300 feet.

All personnel that operate on the movement area have been trained to stop and immediately contact MSP ATCT if they lose situational awareness on the airfield due to whiteout conditions, or other conditions that cause visibility to suddenly decrease.

4.6.4 Driver Fatigue

During all but minor snow and ice events, the full complement of Field Maintenance personnel will normally be on duty conducting snow and ice control operations. Field Maintenance Management will schedule routine breaks, meal breaks and rest periods. During extended snow and ice control events, crews will rotate in and out of rest and/or sleep periods. The MAC provides food, drink, rest facilities and sleeping quarters to Field Maintenance personnel to mitigate fatigue and to address other human performance factors.

Airside Operations shifts are normally 10 to 12 hours and will not exceed 14 hours, ensuring at a minimum 8 hours between shifts. Airside staff are rotated between positions in the SCC and the airfield.

Field Maintenance has established limits personnel can work to prevent driver fatigue based on work schedule and circadian rhythm. Field Maintenance staff, and contracted staff, generally work sixteen (16) hour shifts during snow and ice control operations. There may be times when airfield conditions necessitate employees working longer shifts.

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Chapter 5. Surface Assessment and Reporting

MAC SCC and airfield inspectors will monitor all open paved surface conditions to plan and carry out appropriate maintenance actions in accordance with the SICP. MSP strives to maintain a ‘no worse than wet’ surface condition, with the understanding that is not always possible.

In complying with Part 139.339, MSP will utilize NOTAM Manager for the collection and dissemination of NOTAM information to air carriers, and other airport users.

The SCC issues FICONS through the NOTAM Manager and will utilize the Runway Condition Assessment Matrix (RCAM) as appropriate. Air carriers and other airport tenants may also obtain current FICONS by referencing MSP’s Aerobahn Airport Status Dashboard or by contacting the SCC. FICONS are issued as soon as practicable after each open runway, taxiway, or apron surface inspection/assessment is completed.

5.1 Conducting Surface Assessments (Runways, Taxiways, and Aprons)

During an active winter weather event, Airside Operations will continuously inspect all open movement and non-movement area surfaces and update their FICONS— except for exclusive leasehold areas.

While continuous monitoring is in effect, the goal will be that each individual open surface will be inspected at least every two hours during active snow events and every one hour during active freezing precipitation events. These inspection intervals will never exceed three hours for active snow events or two hours for freezing precipitation events.

If a surface cannot be inspected within these inspection intervals the surface must be closed until it is treated and/or inspected. Closed surfaces must be inspected with a new FICON issued prior to opening.

The continuous inspection of open movement and non-movement areas will be documented through a Cityworks inspection. Each inspection will have appropriate NOTAMs linked to document the FICONS that were attributed to each surface during continuous monitoring.

5.2 Applying the Runway Condition Assessment Matrix (RCAM)

5.2.1 Determining Runway Conditions

Airside Operations personnel will determine contaminant type, depth and percentage of coverage present on runway surfaces during runway closures, or during continuous monitoring physical inspections. This contaminant information will be input into the NOTAM Manager to determine Runway Condition Codes (RwyCCs) as stated in the following steps. The Runway Condition Assessment Matrix (RCAM) is included as Appendix 12 to this document.

Step 1: Runway Condition Code (RwyCC) Applicability:

If 25 percent or less of the overall runway length and width or cleared width is covered with contaminants, RwyCCs must not be applied, or reported. The SCC

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will report the contaminant percentage, type and depth for each third of the runway, to include any associated treatments or improvements.

Or

If the overall runway length and width coverage or cleared width is greater than 25 percent, RwyCCs must be assigned, and reported, informing airplane operators of the contaminant present, and associated codes for each third of the runway. (The reported codes will serve as a trigger for all airplane operators to conduct a takeoff and/or landing performance assessment).

Step 2: Apply Assessment Criteria

Based on the contaminants observed, the associated RwyCC for each third of the runway will be assigned.

Step 3: Validating Runway Condition Codes

If the observations by MSP determine that RwyCCs assigned accurately reflect the runway conditions and performance, no further action is necessary, and the RwyCCs generated may be disseminated.

5.2.3 Downgrade Assessment Criteria

When observations indicate a more slippery condition than generated by the RCAM, MSP may downgrade the RwyCC(s). When applicable, the downgrade of RwyCCs may be based on friction (μ) readings, vehicle control, pilot reported braking action, temperature or rate of precipitation.

NOTE: Temperatures near and above freezing (e.g., at negative 26.6° F (-3° C) and warmer) may cause contaminants to behave more slippery than indicated by the runway condition code given in the RCAM. At these temperatures, MSP will exercise a heightened awareness of airfield conditions, and should downgrade the RwyCC if appropriate.

5.2.4 Upgrade Assessment Criteria Based on Friction Assessments

RwyCCs of 0 or 1 may only be upgraded when the following requirements are met:

1. All observations, judgment, and vehicle braking action support the higher RwyCC, and
2. Mu values of 40 or greater are obtained for the affected third(s) of the runway by a CFME that is operated within allowable parameters.
3. This ability to raise the reported RwyCC to no higher than a code 3 can only be applied to those runway conditions listed under code 0 and 1 in the RCAM. (See footnote 2 on the RCAM.)

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4. The SCC will continually monitor the runway surface as long as the higher code is in effect to ensure that the runway surface condition does not deteriorate below the assigned code.
 - a. The extent of monitoring must consider all variables that may affect the runway surface condition, including any precipitation conditions, changing temperatures, effects of wind, frequency of runway use, and type of aircraft using the runway.
 - b. If sand or other approved runway treatments are used to satisfy the requirements for issuing the higher runway condition code, the monitoring program must confirm continued effectiveness of the treatment.

5.3 Runway Friction Surveys, Equipment, and Procedures

MSP will use Continuous Friction Measuring Equipment (CFME) to conduct runway friction tests. The current CFME vehicles in the fleet are:

- OPS52 – SARSYS SFT
- OPS53 – SARSYS SFT
- OPS55 – Halliday RT3

5.3.1 Conditions Acceptable to Use CFME to Conduct Runway Friction Surveys

The data obtained from such runway friction surveys are only considered to be reliable when the surface is contaminated under any of the following conditions:

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

5.3.2 When to Conduct

Runway friction tests will be performed when the following conditions occur:

1. After anti-icing, deicing, sanding or snow/ice removal operations.
2. When pilot braking reports, surface sensor data and field observations indicate that runway surface friction levels are approaching minimum operating values (as detailed in Sections 4.1b and 5.30)
3. After an aircraft accident/incident occurs on a runway when surface friction could be a contributing factor.
4. Prior to opening a runway on which an aircraft accident/incident has occurred.
5. At any time, the SCC determines that runway surface friction information will be useful for the safe operation at the airport.

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5.3.3 How to Conduct

Standard practice is to conduct a one-way friction run on a closed runway, 10 feet on the right side of the runway centerline at a preferable speed of 40 mph. Safety considerations might require friction runs be done at less than 40mph.

The runway will be closed, or remain closed for additional treatment when a friction run identifies an area of less than:

- 20 μ for any continuous 500-foot section of a runway, or
- 10 μ at any point on a runway

In either case, the runway will remain closed until a friction test indicates no 500-foot sections of runway with continuous readings less than 20 μ and no point on the runway below 10 μ .

5.3.4 Calibration

All CFMEs are inspected and certified annually by the manufacturer's representative.

The SARSYS SFTs are also calibrated bi-weekly by trained Airside Operations personnel. Halliday RT3s have their measuring tires' air pressure checked weekly. Additionally, both CFME vehicle types have their measuring tires' air pressure checked prior to a winter event.

5.4 Surface Condition Reporting

Airside Operations field inspectors will monitor and report changing airfield conditions to the SCC, who will issue FICONs via NOTAM Manager. FICONs are issued as soon as practicable upon completion of a surface inspection when reportable contaminants are observed.

5.4.1 Runways

Runway FICONs and their associated RwyCCs will be updated as soon as practicable after every physical inspection of a runway, if reportable contaminants are observed. In active snowfall, FICONs must be updated at least every three hours. In active freezing precipitation FICONs must be updated at least every two hours. If a reportable contaminant is still present on a runway when it is no longer precipitating, the FICON must be updated at least every 12-hours.

The term 'DRY' is used to describe a surface that is neither wet nor contaminated. While a FICON NOTAM is not generated for the sole purpose of reporting a dry runway, a dry surface will be reported when there is need to report conditions on the remainder of the surface. (For example: snow is present on the first two thirds of the runway.)

5.4.2 Taxiway and Aprons

Taxiway, apron, and deice pad FICONs will be updated as soon as practicable after every physical inspection of the surface(s), if reportable contaminants are

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observed. In active snowfall, FICONs must be updated at least every three hours. In active freezing precipitation FICONs must be updated at least every two hours. If a reportable contaminant is still present on a taxiway, apron, deice pad when it is no longer precipitating, the FICONs must be updated at least every 24 hours or as conditions change.

5.5 Reportable Contaminants without Performance Data.

If present, unable to be removed, and posing no hazard, mud will be reported with a measured depth. Ash, oil, sand, and rubber contaminants will be reported without a measured depth. These contaminants will not generate a RwyCC.

5.6 Slippery When Wet Runway.

For runways where a friction survey (for the purposes of pavement maintenance) indicates the averaged Mu value at 40 mph on the wet pavement surface failed to meet the minimum friction level classification specified in AC 150/5320-12, MSP will report via NOTAM Manager a RwyCC of '3' for the entire runway (by thirds: 3/3/3) when the runway is wet.

A runway condition description of 'Slippery When Wet' will be used for this condition.

If it is determined by MSP that a downgrade is necessary, the downgrade will be made to all three runway thirds match (i.e., 3/3/3, 2/2/2, 1/1/1).

The NOTAM will be cancelled when the minimum runway friction level classification has been met or exceeded.

5.7 Preplanned Closures

The SICC has developed preplanned airfield closures, dependent on runway flow, to be activated in larger storms when snow accumulations reach one inch. The goal of these closures is to help snow removal crews and airfield inspectors focus their efforts on higher priority airfield surfaces that allow MSP to continue to operate safely even during winter's most severe storms.

Shown below is a list of the preplanned surface closures, as related to standard runway flows/configurations. For visual depiction of these closures, please reference diagrams in Appendices 4, 5, 6, 7, 8, 9, 10, and 11.

5.7.1 Straight 12s Flow

Runways

- 17-35
- 4-22 (Exception: open for taxi between Rwy 12L & Twy W)

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Taxiways (west to east)

- L btn L3 & L5, L btn L6 & L10
- L3, L6 btn 17-35 & L, L7, L9, L10
- K btn K1 & N, K btn Z & K10
- K1, K2, K3, K6, Y btn 17-35 & K, K8, K10
- W btn K & Z, D btn K & S, M btn S & T
- C1, C2 btn 4-22 & C, M2, S2
- W2, W7, W8, W9
- A2 btn 12R & A, A5, A7, A8, A9 btn A & B, J
- P2, P8, M btn 12L & P
- G, G1, G2
- C btn P & C10, C9, C10
- R, R3, R4, R5, R6, R7, R8, R9, R10

5.7.2 Straight 30s Flow

Runways

- 17-35
- 4-22 (Exception: open for taxi between Rwy 30R & Twy W)

Taxiways

- L btn L3 & L5, L btn L6 & L10
- L3, L6 btn 17-35 & L, L7, L9, L10
- K btn K1 & N, K btn Z & K10
- K1, K2, K3, K6, Y btn 17-35 & K, K8, K10
- W btn K & Z, D btn K & S
- M btn S & T, S south of S3
- C1, C2 btn 4-22 & C, M2, S2, S4
- W2, W3, W5 btn 30L & W, W7, W9
- A3 btn 30L & A, A4, A5, A7, A9, B8, J
- P3, P4, G btn 30R & P, P9
- G btn 30R & C, G1, G2
- C btn 30R & C10, C9, C10
- R, R3, R4, R5, R6, R7, R8, R9, R10

5.7.3 12s/17 Flow

Runways

- 4-22 (Exception: open for taxi between Rwy 12L & Twy W)

Taxiways (west to east)

- L6 btn 17-35 & L, L7, L9

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- K2, K6, Y btn 17 & K, K8, M btn T & S
- C1, C2 btn 4-22 & C, M2, S2
- W2, W7, W8, W9
- A2 btn 12R & A, A5, A7, C btn 12R & A, A8, A9 btn A & B, B8, J
- P2, G, P8, C btn P & C10, M btn 12L & P
- G1, G2, C9, C10, R, R3, R4, R5, R6, R7, R8, R9, R10

5.7.3 30s / 17 Flow

Runways

- 4-22 (Exception: open for taxi btn Rwy 30R & Twy W)

Taxiways (west to east)

- L6 btn 17-35 & L, L7, L9
- K2, K6, Y btn 17 & K, K8
- M btn S & T
- C1, C2 btn 4-22 & C, M2, S2
- W2, W3, W7, W8, W9
- A3 btn 30L & A, A4, A7, A8, A9, B8, J
- P3, P4, G, C btn Twy P & C10, P9
- G1, G2, C9, C10, R, R3, R4, R5, R6, R7, R8, R9, R10

5.7.4 30s / 35 Flow

Runways

- 4-22 (Exception: open for taxi btn Rwy 30R & Twy W)

Taxiways

- L6 btn 17-35 & L, L7, L9
- K1, K2, K6,
- K btn K1 & N, M btn S & T
- C1, C2 btn 4-22 & C, M2, S2
- W2, W3, W7, W9
- A3 btn 30L & Twy A, A4, A7, A8, A9, B8, J
- P3, P4, G, C btn P & C10, P9
- G1, G2, C9, C10, R, R3, R4, R5, R6, R7, R8, R9, R10

5.7.5 4 / 35 Flow

Runways

- 12L-30R
- 12R-30L

Taxiways (west to east)

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- L btn L6 & L10
- L6 btn 35 & L, L7, L9, L10
- K btn K3 & N, K6, S2, S4,C1, C2 btn 4-22 & M, M2
- W2, W3, W5 btn 30L & W, W7, W8, W9
- A2 btn 30L & A, A3 btn 30L & A, A4, A5, A7, A8, A9
- B btn B8 & A10, A10 btn A & B
- H, J, M btn 30R & P
- P1, P2, P3, P4, P8, P9, P10
- G, G1, G2, C9,R, R3, R4, R5, R6, R7, R8, R9, R10

5.7.6 Straight 4 Flow

Runways

- 12L-30R
- 12R-30L
- 17-35

Taxiways (west to east)

- L btn L6 & L10, L btn L3 & L5
- L3, L6 btn 35 & L, L7, L9, L10
- K btn K1 & K3, K btn Z & K10
- K1, K2, K3, K6, Y btn 17-35 & K, K8, K10
- W btn K10 & Z, S2, C1, C2 btn 4-22 & C, M2
- W2, W3, W5 btn 30L & W, W7, W8, W9
- A2 btn 30L & A, A3 btn 30L & A, A4, A5, A7, A8, A9
- B btn B8 & A10, A10 btn A & B
- H, J, M btn 30R & P
- P1, P2, P3, P4, P8, P9, P10
- G, G1, G2, C9,R, R3, R4, R5, R6, R7, R8, R9, R10

5.7.7 Straight 22 Flow

Runways

- 12L-30R
- 12R-30L
- 17-35

Taxiways (west to east)

- L btn L6 & L10
- L6 btn 35 & L, L7, L9, L10
- K btn K1 & N, K btn Z & K10
- K1, K2, K6, Y btn 17-35 & K, K8, K10
- W btn K10 & Z, S2, C1, C2 btn 4-22 & C, M2
- W2, W3, W5 btn 30L & W, W7, W8, W9



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- A2 btn 30L & A, A3 btn 30L & A, A4, A5, A7, A8, A9
- B btn B8 & A10, A10 btn A & B
- H, J, M btn 30R & P
- P1, P2, P3, P4, P8, P9, P10
- G1, G2, R3, R4, R5, R6, R7, R8, R9

5.8 Continuous Monitoring and Deteriorating Conditions.

Continuous monitoring procedures will be implemented for the entire airfield when active precipitation is reported *and* any airfield surface FICON is reported as worse than wet. All open runways, taxiways, aprons, and deice pads will be inspected at least every three hours in active snowfall and at least every two hours in active freezing precipitation. These inspection timers will be monitored by the SCC by referencing the last FICON observation time for each surface and keeping the airfield inspectors cognizant of any surfaces approaching these timer thresholds. If an open surface is not inspected within these timers, the SCC must immediately inform the airfield inspector to close the surface(s) over appropriate ATC frequency until it can be inspected.

If any airfield surface receives back-to-back BA poor PIREPs, MAC airfield inspectors must inspect that surface as soon as possible and advise the SCC and ATC if the surface needs a closure and/or treatment. For back-to-back runway BA poor PIREPs, the SCC must coordinate with ATC to form a Build-a-Gap (BAG) runway inspection as soon as possible to determine if the runway needs to be closed and treated. For taxiway, deice pads, or apron BA poor PIREPs, the airfield inspector must inspect those reported surfaces as soon as possible.

If BA NIL PIREPs are reported by ATC to the SCC or overheard on frequency, the airfield inspector responsible for that surface must immediately close the affected surface over the appropriate frequency and not allow any more aircraft operations on that surface until treated, inspected, and re-opened.

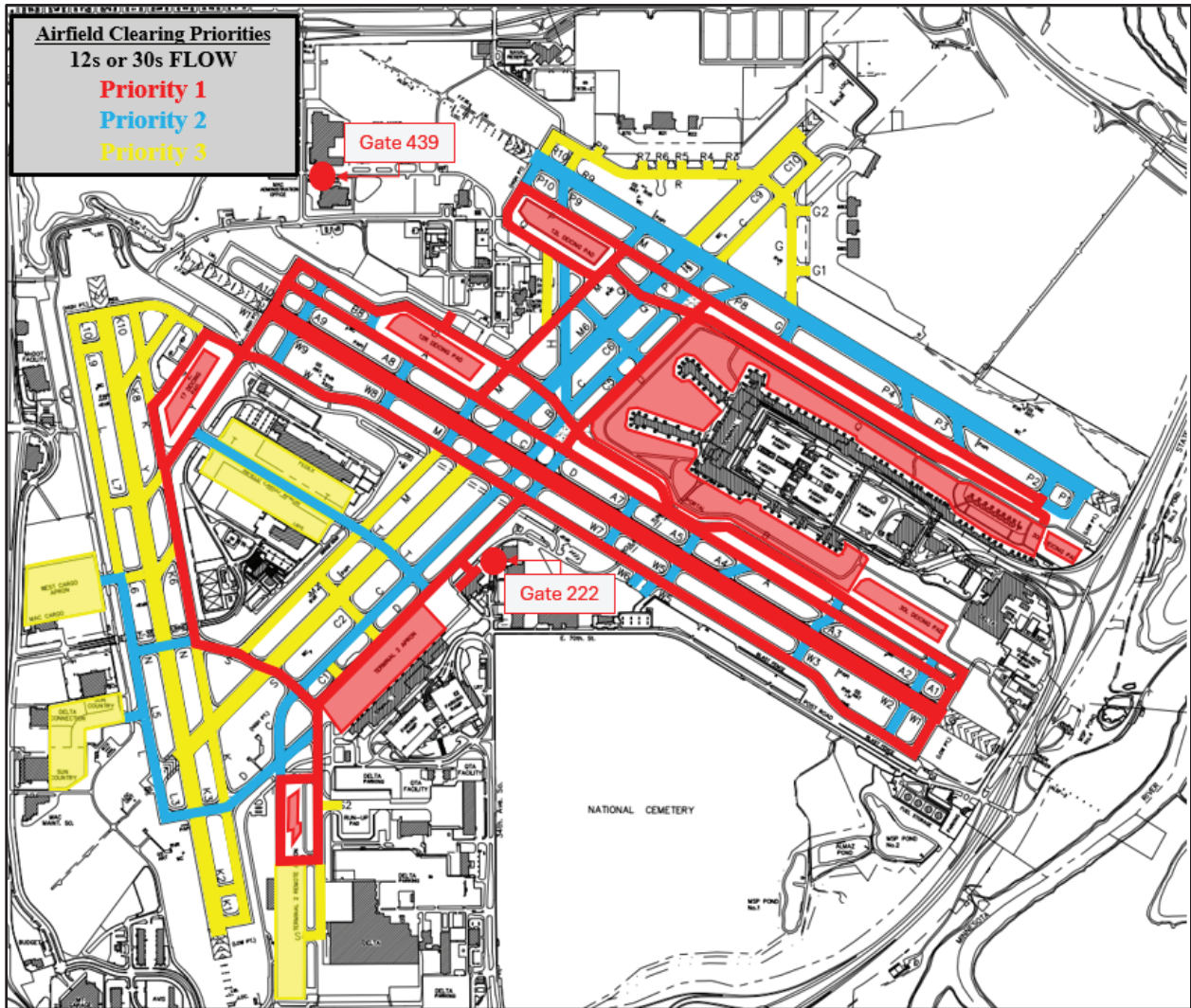
Under deteriorating conditions, the SCC and airfield inspectors will take all reasonable steps using available equipment and materials that are appropriate for the condition to improve the braking action.

Deteriorating conditions include, but are not limited to:

- Frozen or freezing precipitation.
- Falling air or pavement temperatures may cause a wet runway to freeze.
- Rising air or pavement temperatures that may cause frozen contaminants to melt.
- Removal of abrasives previously applied to the runway due to wind or airplane effects.
- Frozen contaminants blown onto the runway by wind.

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Appendix 1: Airfield Clearing Priorities – 12s/30s Flow



Original Date: 12/09/04

Revision Date: 09/09/24

Exhibit 313-1, page 47

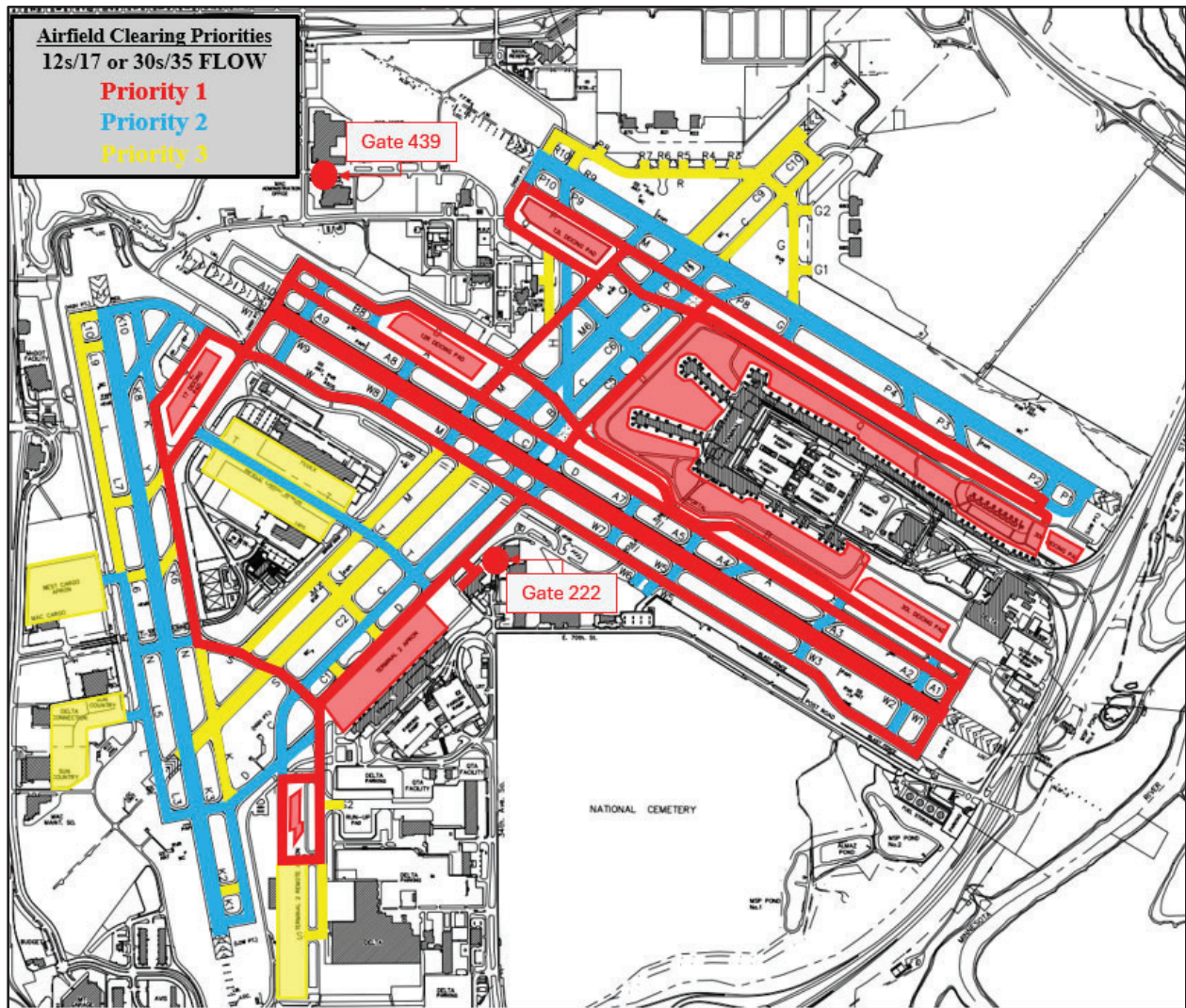
FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 2: Airfield Clearing Priorities – 12s/17 or 30s/35 Flow



Original Date: 12/09/04

Revision Date: 09/09/24

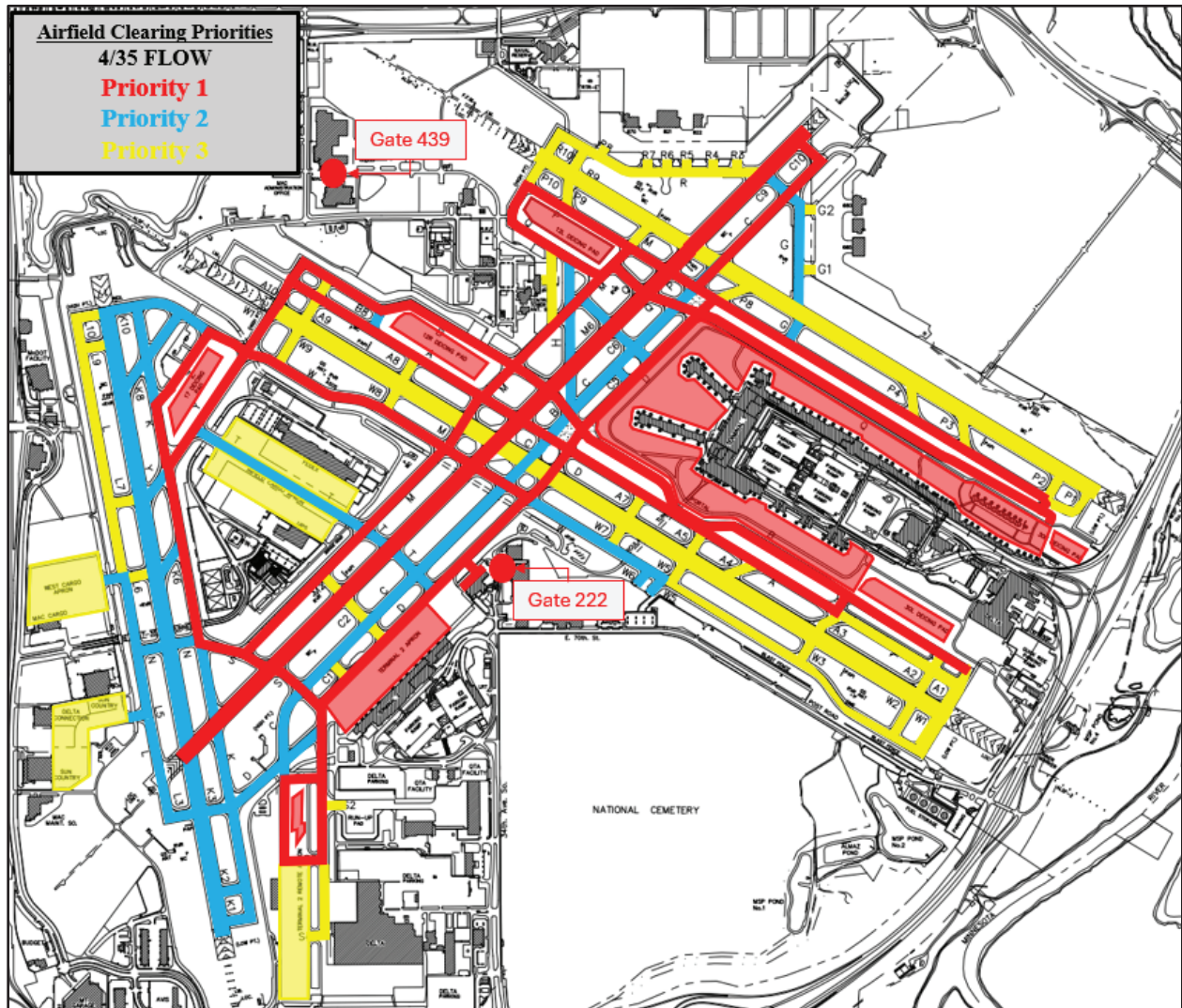
Exhibit 313-1, page 48

FAA Approval: *Penick*
FAA Airports Date: Sep 27 2024

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Appendix 3: Airfield Clearing Priorities – 4/35 Flow



Original Date: 12/09/04

Revision Date: 09/09/24

Exhibit 313-1, page 49

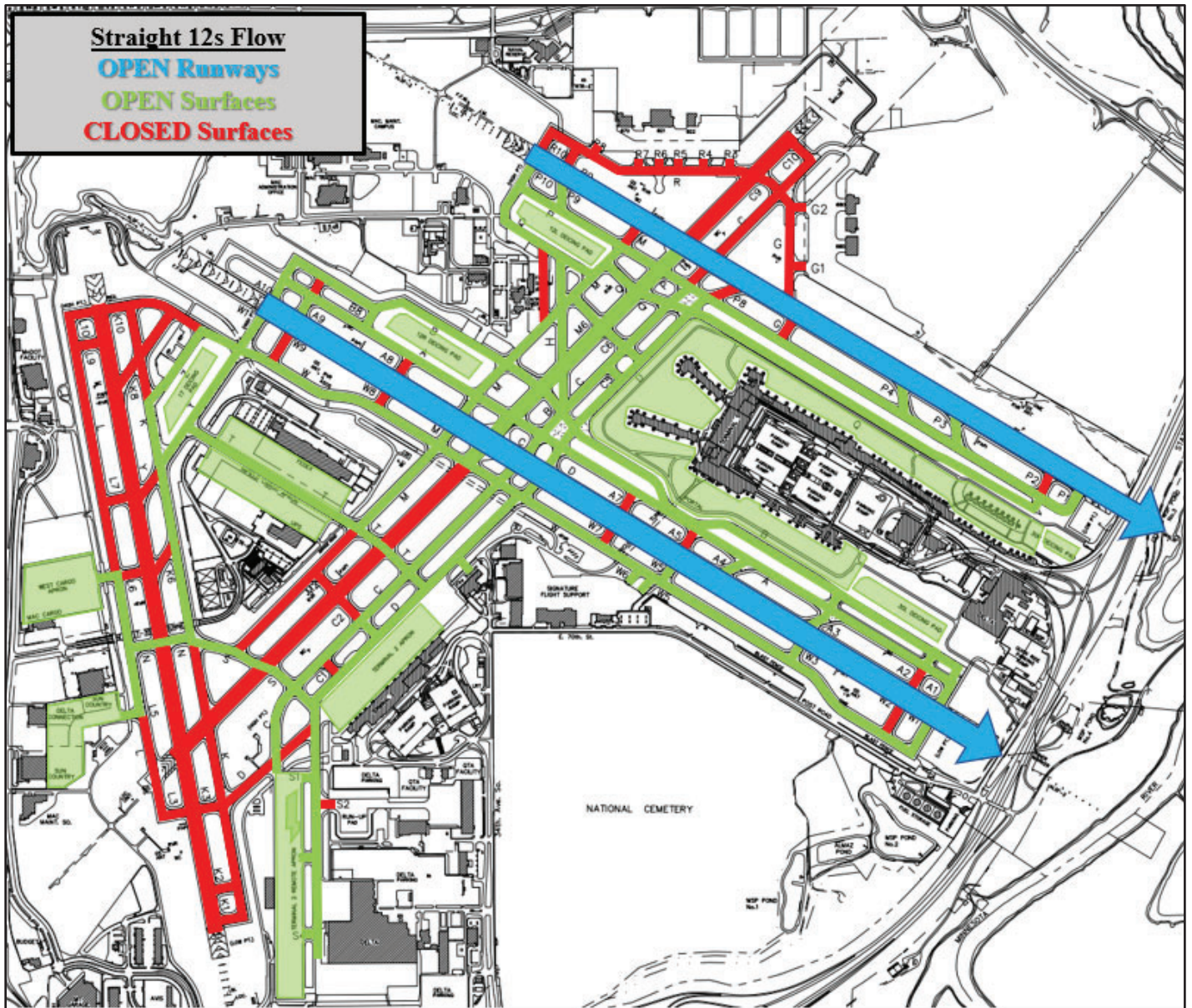
FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 4: Preplanned Closures – Straight 12s Flow



Original Date: 12/09/04

Revision Date: 09/09/24

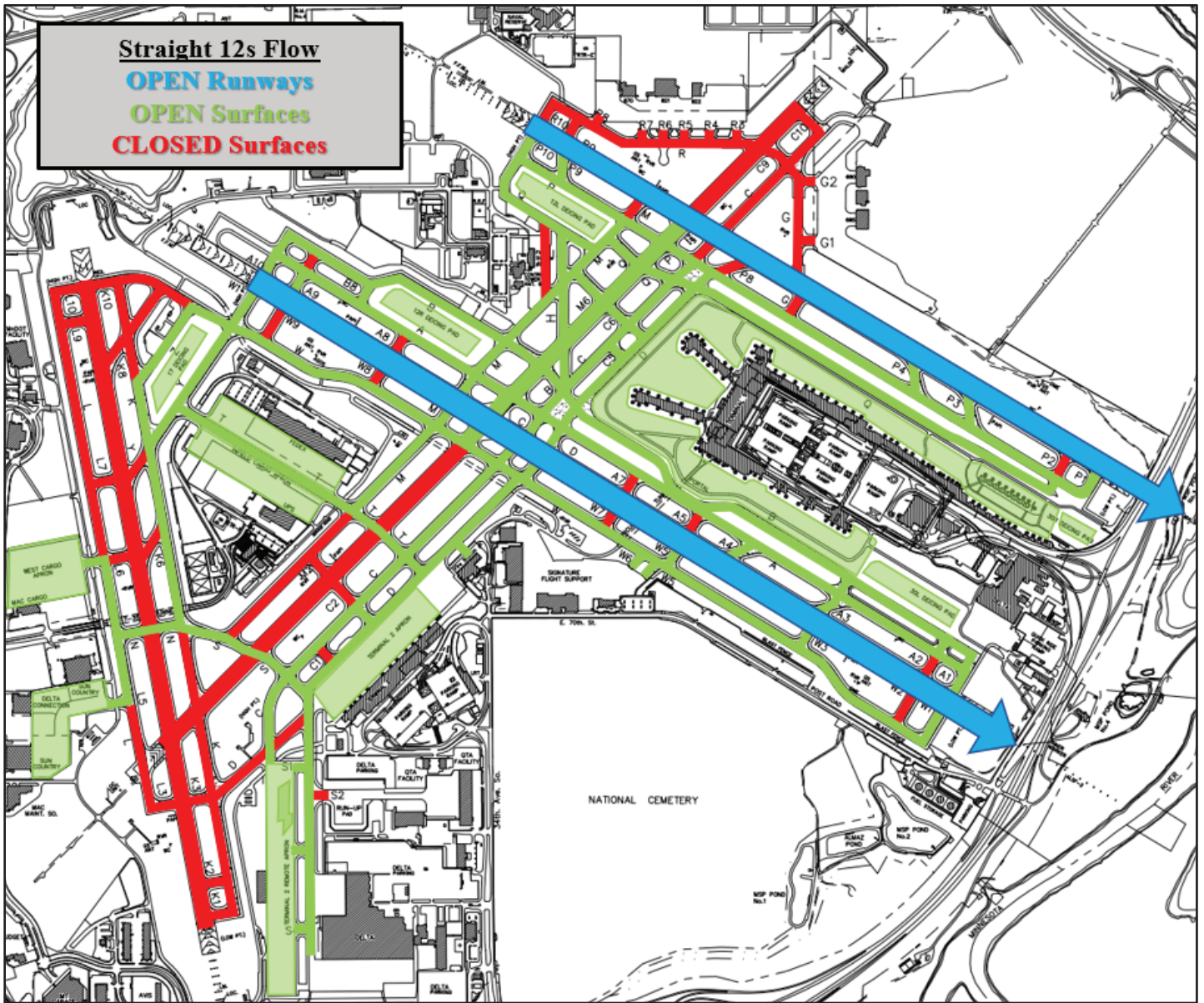
Exhibit 313-1, page 50

FAA Approval: *Pennington*
FAA Airports Date: Sep 27 2024

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Appendix 5: Preplanned Closures – Straight 30s Flow



Original Date: 12/09/04

Revision Date: 09/09/24

Exhibit 313-1, page 51

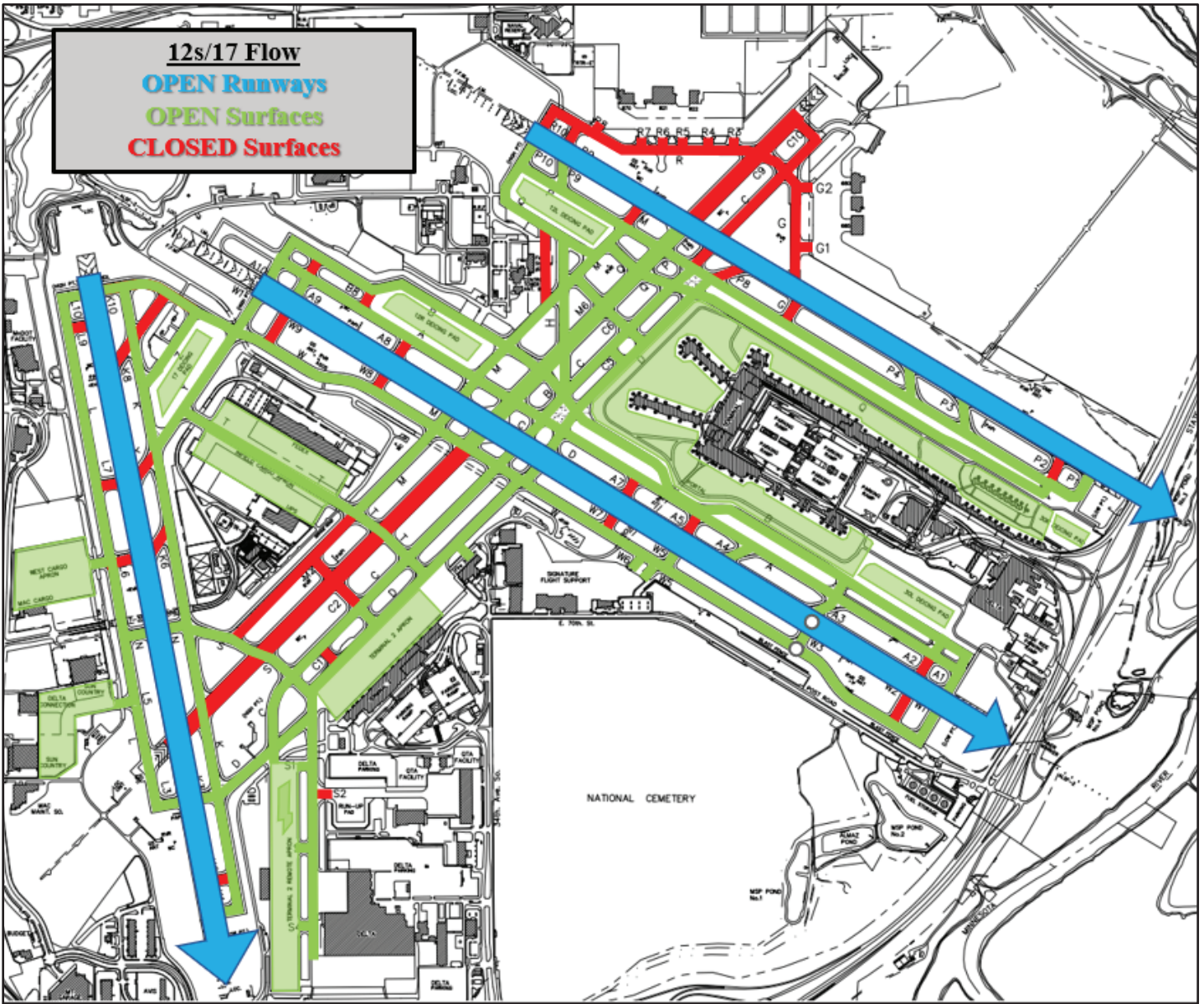
FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 6: Preplanned Closures – 12s/17 Flow



Original Date: 12/09/04

Revision Date: 09/09/24

Exhibit 313-1, page 52

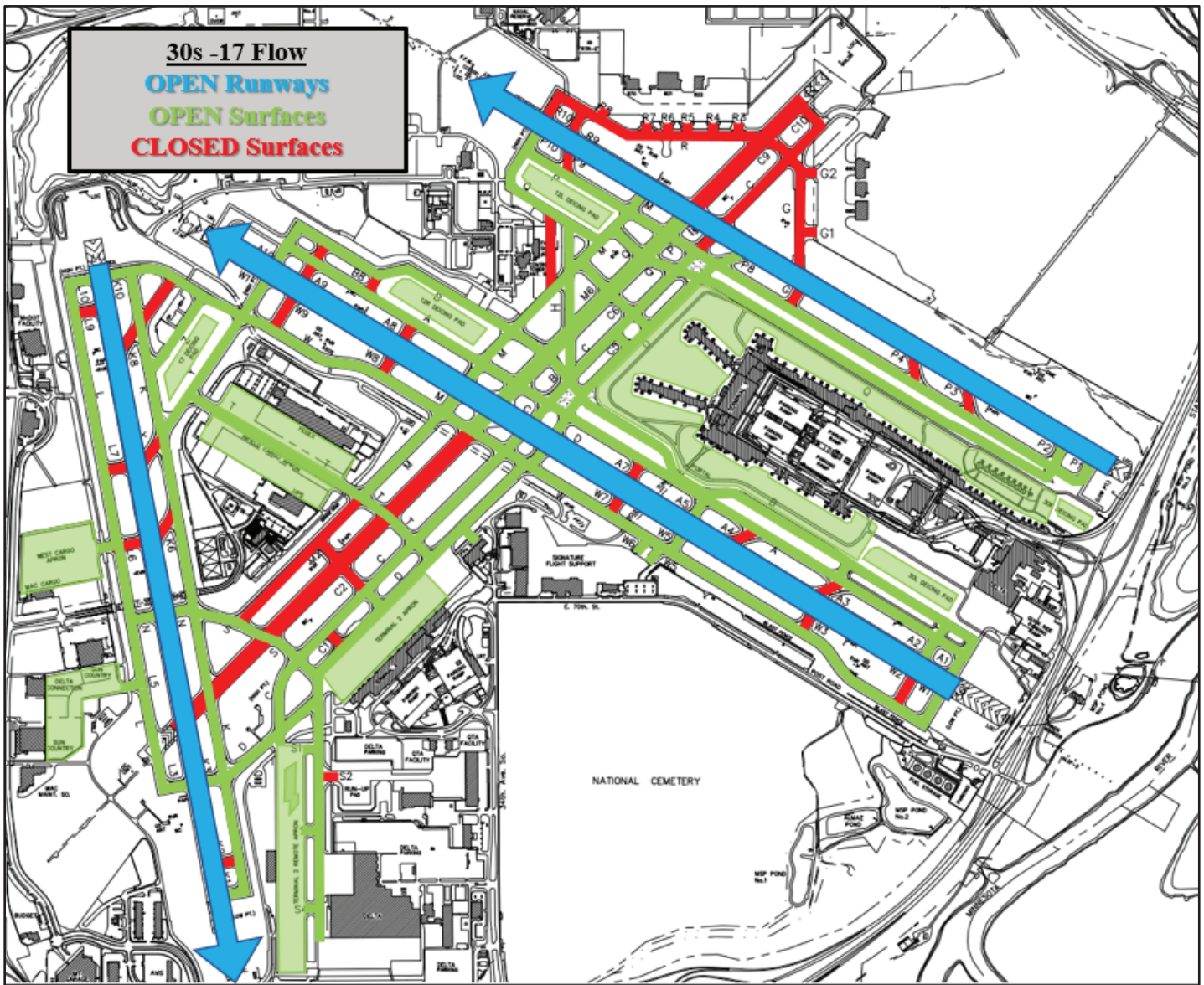
FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 7: Preplanned Closures – 30s/17 Flow



Original Date: 12/09/04

Revision Date: 09/09/24

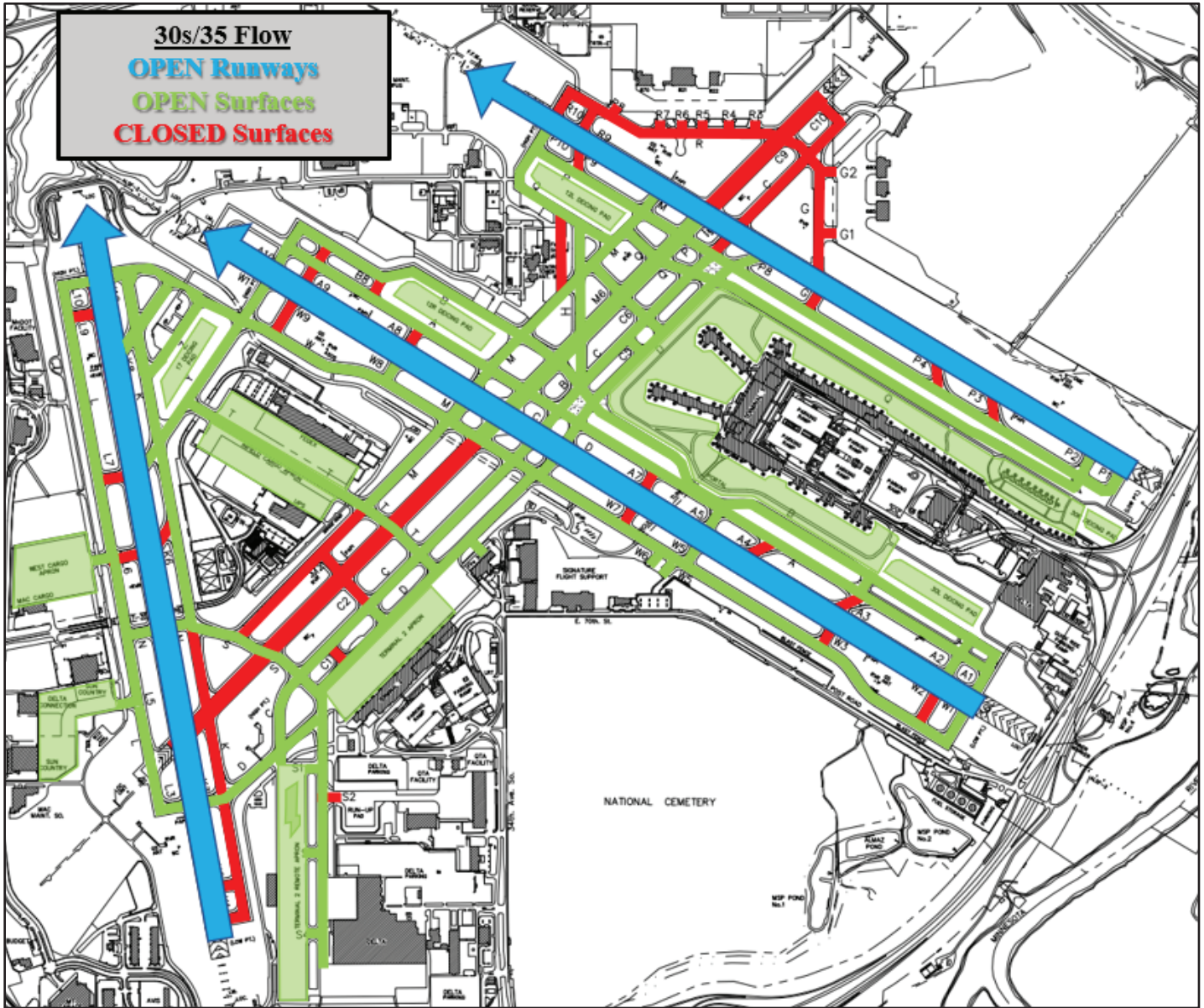
Exhibit 313-1, page 53

FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 8: Preplanned Closures – 30s/35 Flow



Original Date: 12/09/04

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Exhibit 313-1, page 54

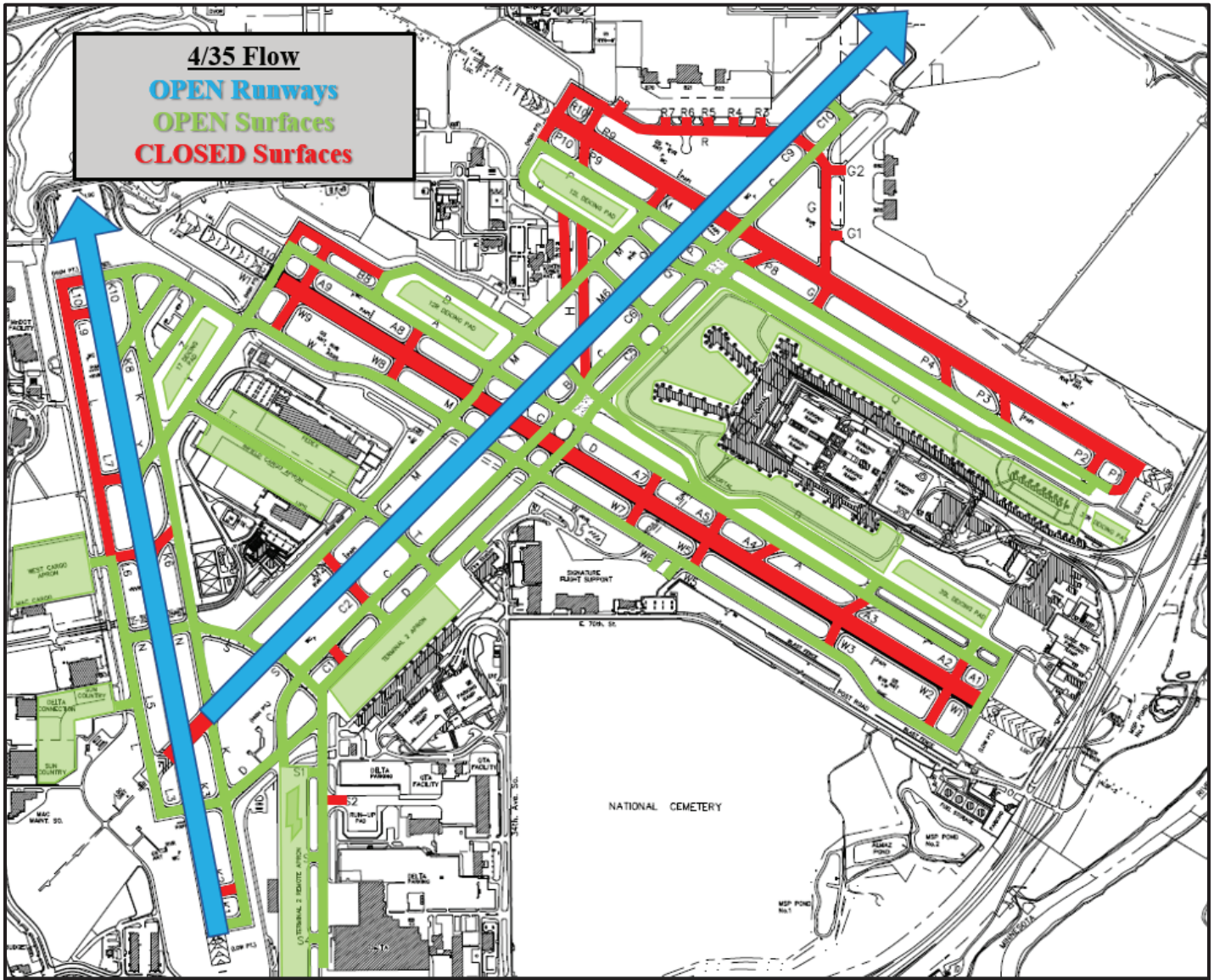
FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 9: Preplanned Closures – 4/35 Flow



Original Date: 12/09/04

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Exhibit 313-1, page 55

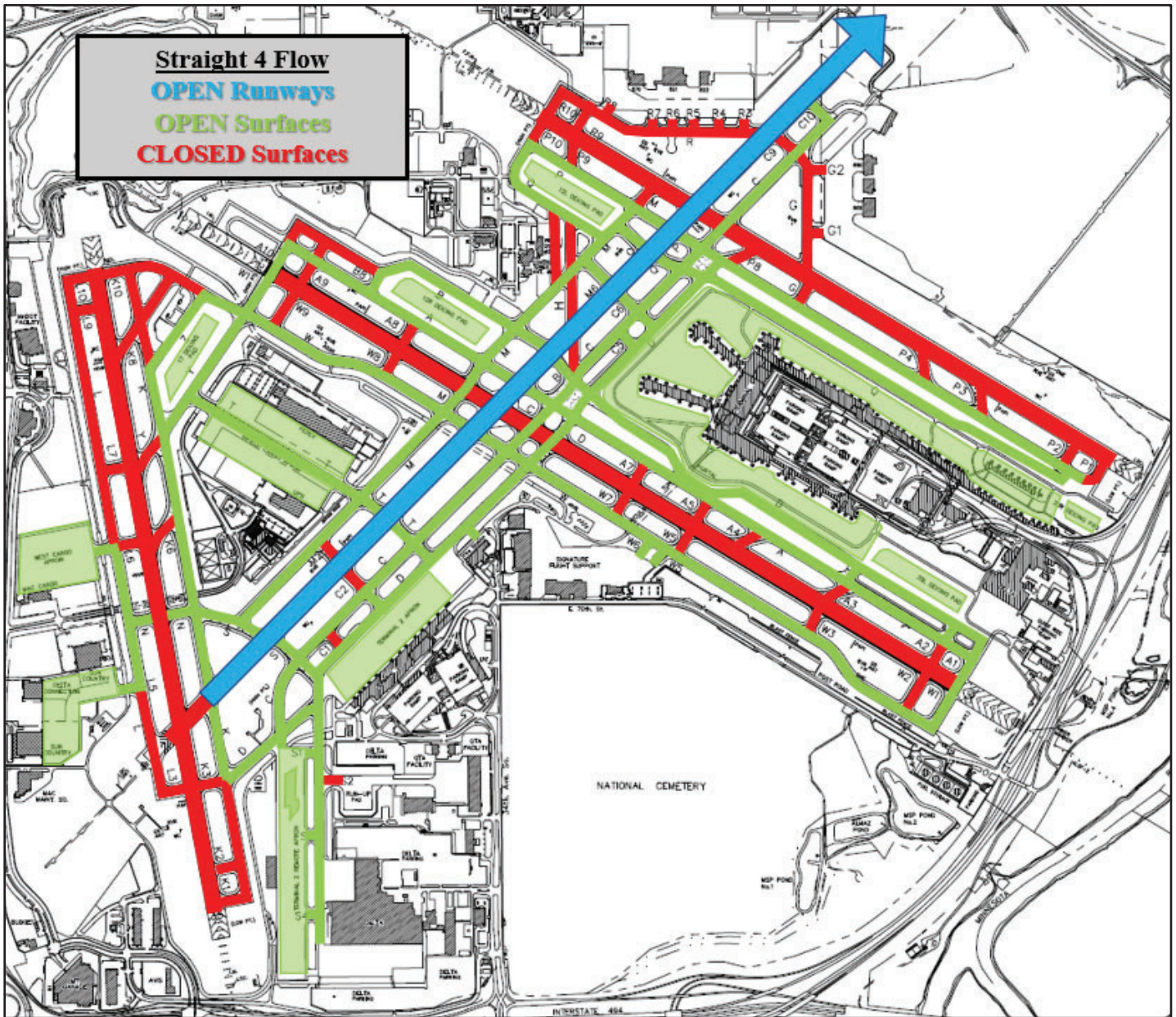
FAA Approval: *Penick*
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Appendix 10: Preplanned Closures – Straight 4 Flow



Original Date: 12/09/04

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Exhibit 313-1, page 56

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Appendix 12: Runway Condition Assessment Matrix (RCAM)

Assessment Criteria		Downgrade Assessment Criteria		
Runway Condition Description	Code	Mu (μ) ¹	Vehicle Deceleration or Directional Control Observation	Pilot Reported Braking Action
<ul style="list-style-type: none"> Dry 	6	40 or Higher	---	---
<ul style="list-style-type: none"> Frost Wet (Includes Damp and 1/8 inch depth or less of water) <p>1/8 inch (3mm) depth or less of:</p> <ul style="list-style-type: none"> Slush Dry Snow Wet Snow 	5		Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good
<p>5° F (-15°C) and Colder outside air temperature:</p> <ul style="list-style-type: none"> Compacted Snow 	4	39	Braking deceleration OR directional control is between Good and Medium.	Good to Medium
<ul style="list-style-type: none"> Slippery When Wet (wet runway) Dry Snow or Wet Snow (Any depth) over Compacted Snow <p>Greater than 1/8 inch (3mm) depth of:</p> <ul style="list-style-type: none"> Dry Snow Wet Snow <p>Warmer than 5° F (-15°C) outside air temperature:</p> <ul style="list-style-type: none"> Compacted Snow 	3	to 30	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium
<p>Greater than 1/8 (3mm) inch depth of:</p> <ul style="list-style-type: none"> Water Slush 	2	29	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor
<ul style="list-style-type: none"> Ice² 	1	to 21	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	Poor
<ul style="list-style-type: none"> Wet Ice² Slush over Ice² Water over Compacted Snow² Dry Snow or Wet Snow over Ice² 	0	20 or Lower	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	Nil

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Revision Date: 09/09/24

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- ¹ The correlation of the Mu (μ) values with runway conditions and condition codes in the Matrix are only approximate ranges for a generic friction measuring device **and are intended to be used only to downgrade a runway condition code; with the exception of circumstances identified in Note 2.** Airport operators should use their best judgment when using friction measuring devices for downgrade assessments, including their experience with the specific measuring devices used.
- ² In some circumstances, these runway surface conditions may not be as slippery as the runway condition code assigned by the Matrix. The airport operator may issue a higher runway condition code (but no higher than code 3) for each third of the runway if the Mu value for that third of the runway is 40 or greater obtained by a properly operated and calibrated friction measuring device, **and all other observations, judgment, and vehicle braking action support the higher runway condition code. The decision to issue a higher runway condition code than would be called for by the Matrix cannot be based on Mu values alone; all available means of assessing runway slipperiness must be used and must support the higher runway condition code.** This ability to raise the reported runway condition code to a code 1, 2, or 3 can only be applied to those runway conditions listed under codes 0 and 1 in the Matrix.
- The airport operator must also continually monitor the runway surface as long as the higher code is in effect to ensure that the runway surface condition does not deteriorate below the assigned code. The extent of monitoring must consider all variables that may affect the runway surface condition, including any precipitation conditions, changing temperatures, effects of wind, frequency of runway use, and type of aircraft using the runway. If sand or other approved runway treatments are used to satisfy the requirements for issuing this higher runway condition code, the continued monitoring program must confirm continued effectiveness of the treatment.

Caution: Temperatures near and above freezing (e.g., at 26.6° F (-3°C) and warmer) may cause contaminants to behave more slippery than indicated by the runway condition code given in the Matrix. At these temperatures, airport operators should exercise a heightened level of runway assessment, and should downgrade the runway condition code if appropriate.

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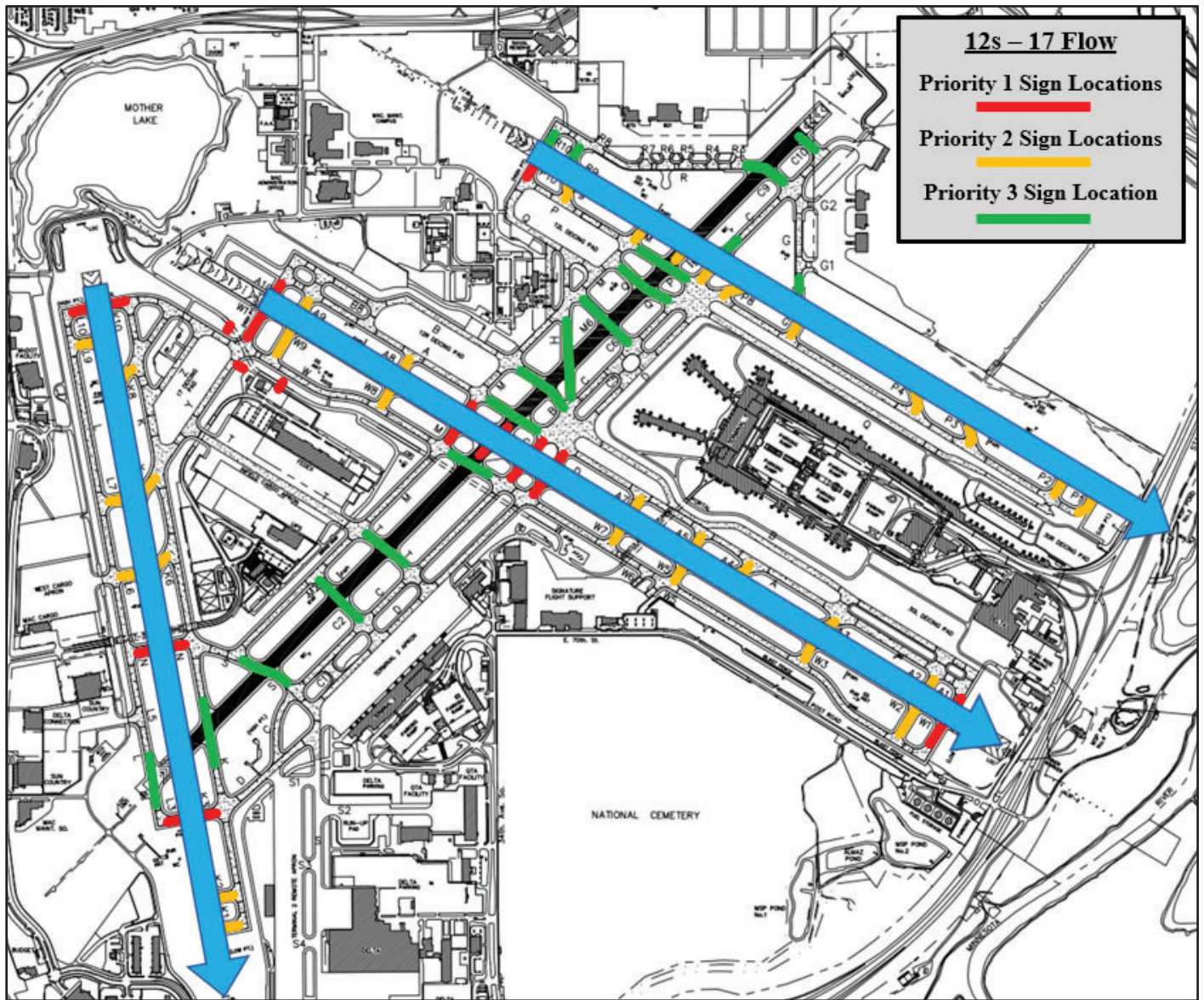


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Appendix 13: Runway Holding Position Sign Cleaning Priority Map – 12s/17 Flow



Original Date: 12/09/04

Revision Date: 09/09/24

Exhibit 313-1, page 60

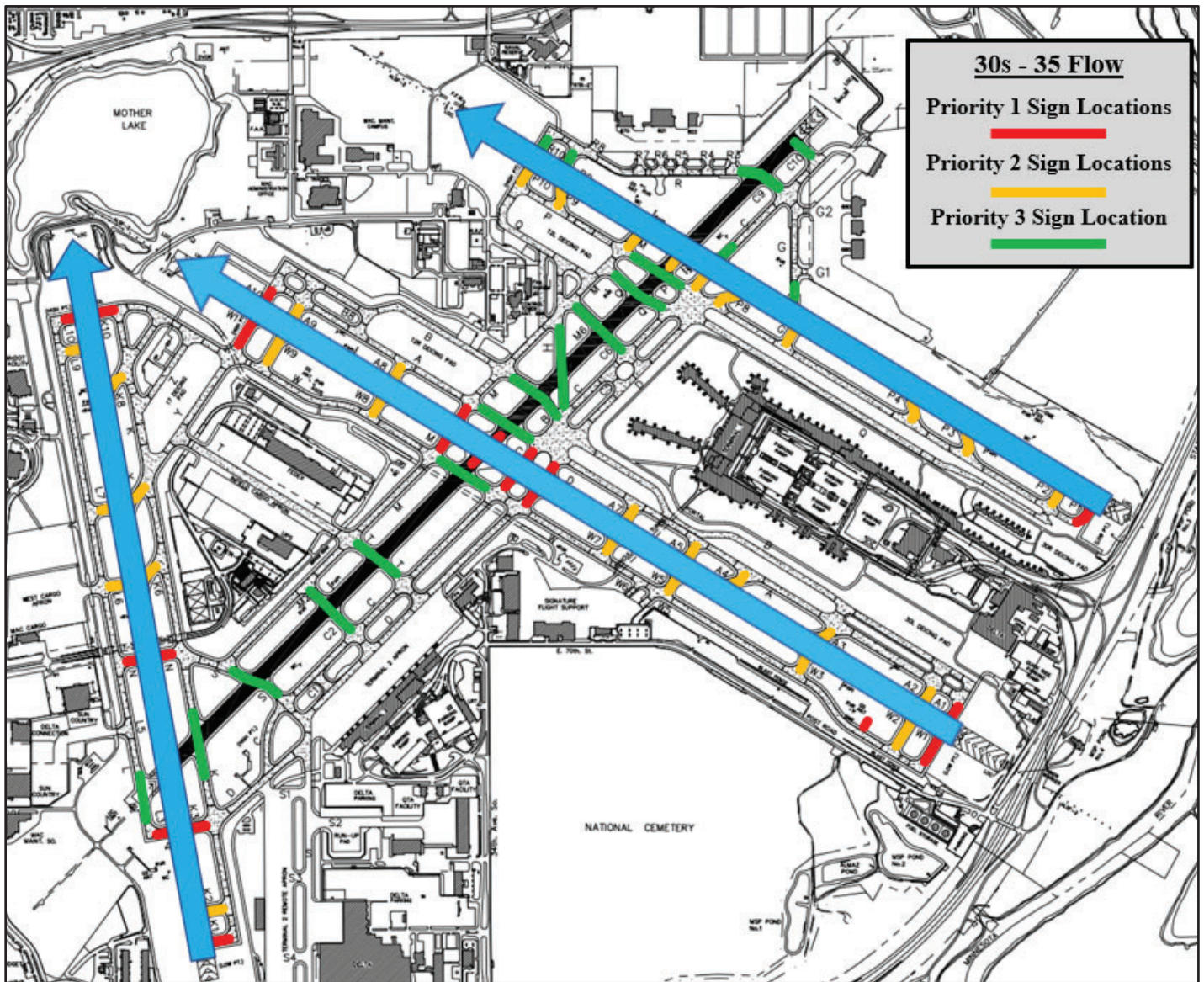
FAA Approval: *Richard*
Date: Sep 27 2024



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Appendix 14: Runway Holding Position Sign Cleaning Priority Map – 30s/35 Flow



Original Date: 12/09/04

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Exhibit 313-1, page 61

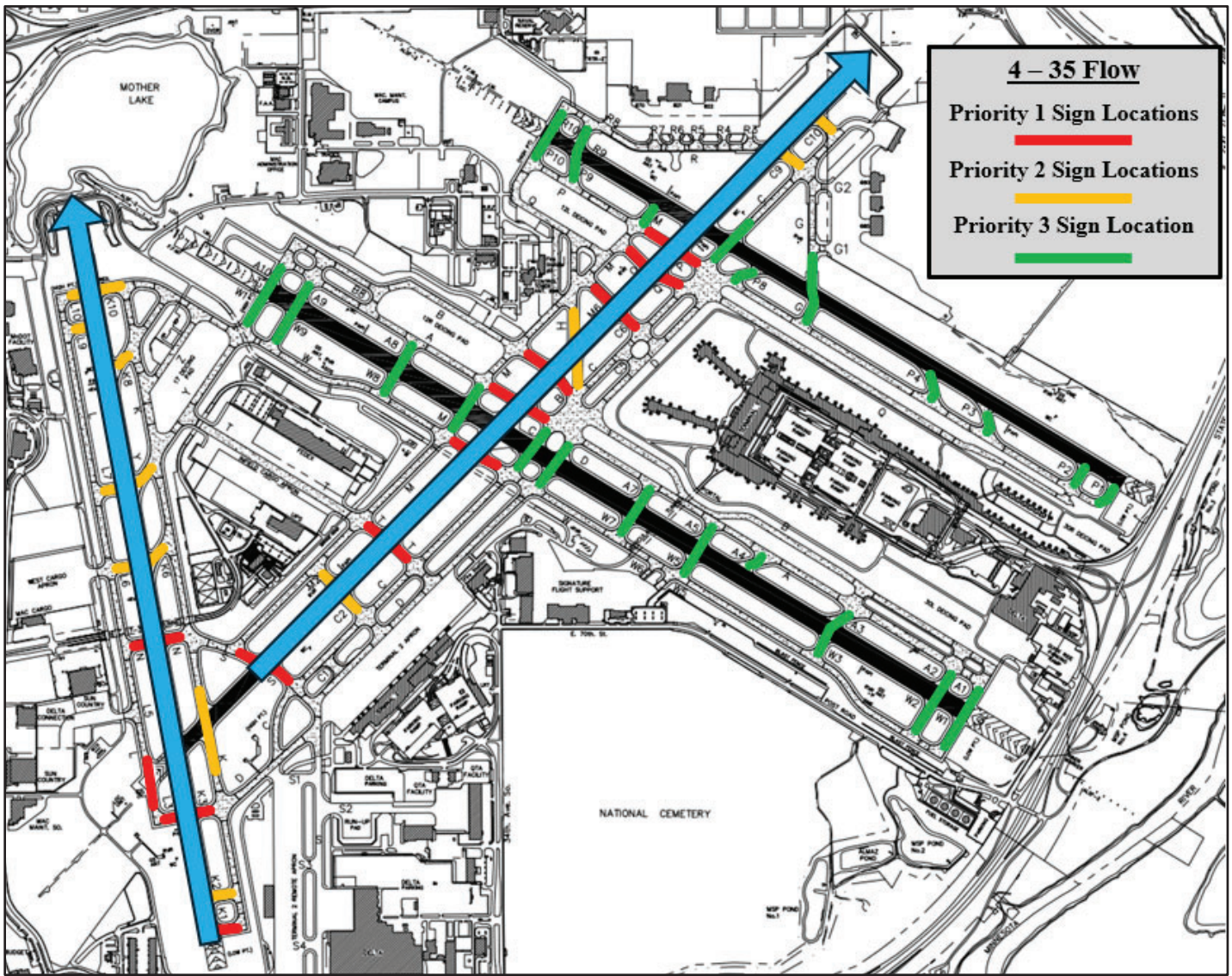
FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 15: Runway Holding Position Sign Cleaning Priority Map – 4/35 Flow



Original Date: 12/09/04

Revision Date: 09/09/24

Exhibit 313-1, page 62

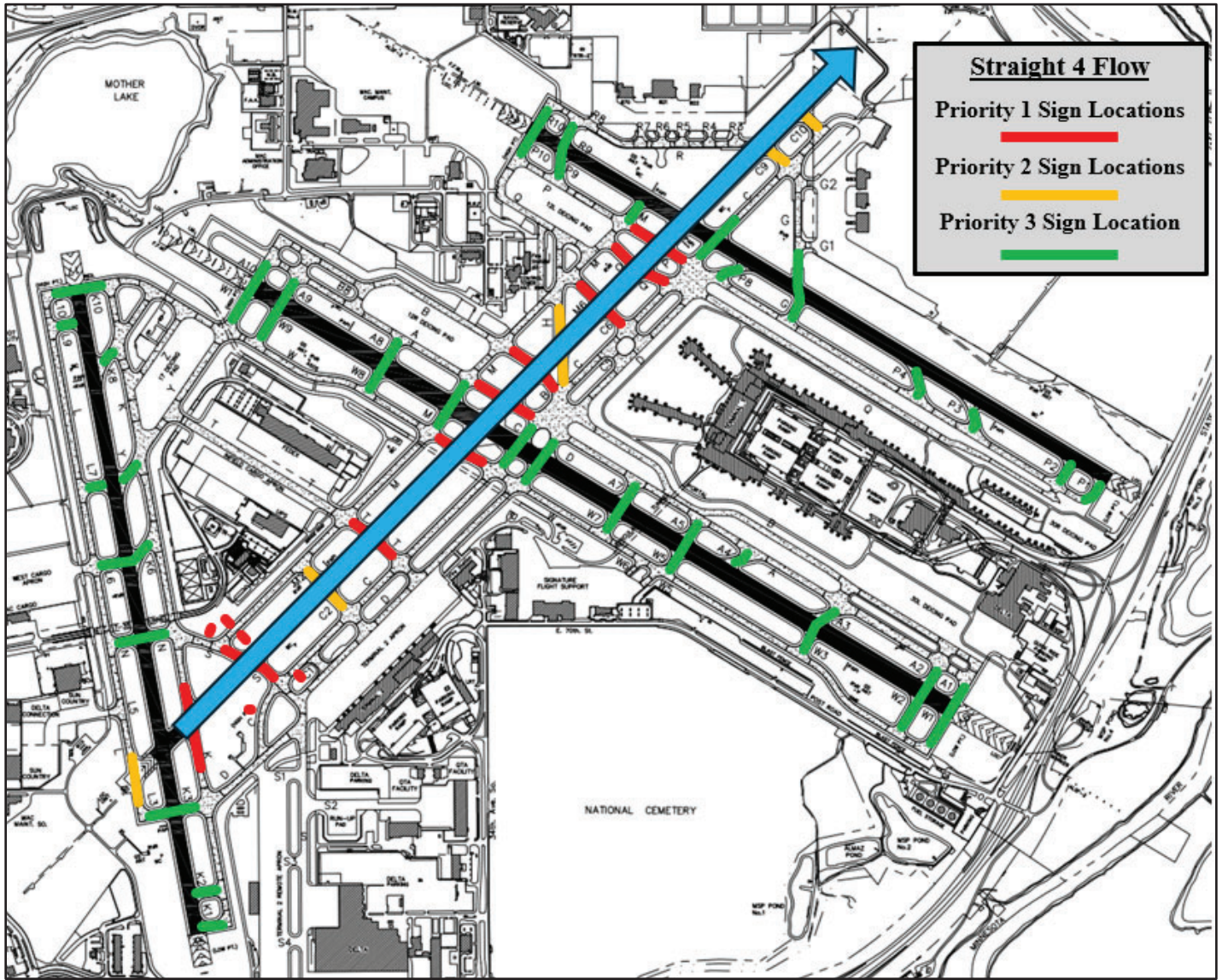
FAA Approval: *Penick*
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Appendix 16: Runway Holding Position Sign Cleaning Priority Map – Straight 4 Flow



Original Date: 12/09/04

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Exhibit 313-1, page 63

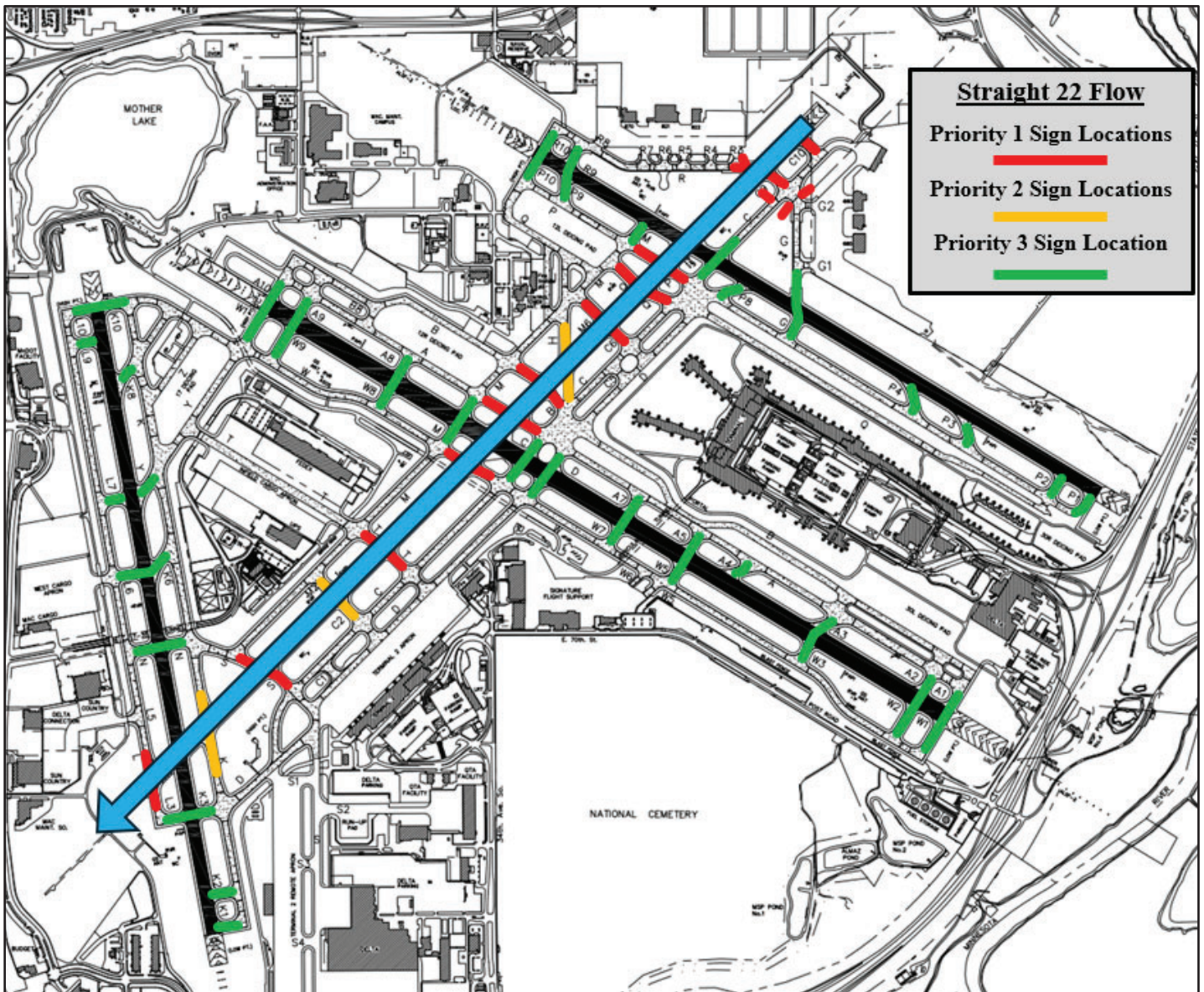
FAA Approval: *Penick*
Date: Sep 27 2024



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Appendix 17: Runway Holding Position Sign Cleaning Priority Map – Straight 22 Flow



Original Date: 12/09/04

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Exhibit 313-1, page 64

FAA Approval: *Pennington*
FAA Airports Date: Sep 27 2024

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Appendix 18: MAC Snow Removal Equipment List

MULTI-FUNCTION EQUIPMENT (MFEs)

• 2008	OSHKOSH	616-1038	• 2008	OSHKOSH	616-1595
• 2010	OSHKOSH	616-1098	• 2008	OSHKOSH	616-1597
• 2012	OSHKOSH	616-1153	• 2008	OSHKOSH	616-1599
• 2014	OSHKOSH	616-1213	• 2008	OSHKOSH	616-1601
• 2015	OSHKOSH	616-1271	• 2008	OSHKOSH	616-1603
• 2015	OSHKOSH	616-1273	• 2008	OSHKOSH	616-1605
• 2015	OSHKOSH	616-1306	• 2008	OSHKOSH	616-1607
• 2015	OSHKOSH	616-1308	• 2008	OSHKOSH	616-1609
• 2017	OSHKOSH	616-1373	• 2008	OSHKOSH	616-1611
• 2017	OSHKOSH	616-1375	• 2024	MB	616-1746
• 2018	OSHKOSH	616-1441	• 2024	MB	616-1747
• 2018	OSHKOSH	616-1457	• 2024	MB	616-1748
• 2020	OSHKOSH	616-1506	• 2024	MB	616-1749
• 2008	OSHKOSH	616-1593	• 2024	MB	616-1750

SNOWPLOWS

• 1998	OSHKOSH	616-679	• 2001	OSHKOSH	616-785
• 1999	OSHKOSH	616-739	• 2008	OSHKOSH	616-1039
• 1999	OSHKOSH	616-746	• 2015	OSHKOSH	616-1312
• 2000	OSHKOSH	616-774	• 2015	OSHKOSH	616-1313

SNOW BLOWERS - up to 5,000 Tons per Hour

(4-wheel drive rotary snow blower, with approximately 200' cast)

• 1998	OSHKOSH	616-683	• 2018	OSHKOSH	616-1439
• 1998	OSHKOSH	616-684	• 2018	OSHKOSH	616-1440
• 1999	OSHKOSH	616-736	• 2018	OSHKOSH	616-1465
• 2006	OSHKOSH	616-937	• 2024	MB	616-1751
• 2006	OSHKOSH	616-938	• 2024	MB	616-1752
• 2009	OSHKOSH	616-1046	• 2024	MB	616-1753
• 2010	OSHKOSH	616-1097	• 2024	MB	616-1754
• 2014	OSHKOSH	616-1221	• 2024	MB	616-1755

SAND/SOLID DEICER SPREADERS

(12-yard capacity)

• 2017	FREIGHTLINER	616-1335	• 2019	FREIGHTLINER	616-1454
• 2017	FREIGHTLINER	616-1336	• 2021	FREIGHTLINER	616-1543
• 2017	FREIGHTLINER	616-1344			

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SAND/SOLID/LIQUID DEICER/SPREADER

(10-yard capacity, 2,000-gallon capacity)

- 2006 FREIGHTLINER 616-939
- 2006 FREIGHTLINER 616-941
- 2014 FREIGHTLINER 616-1183
- 2015 FREIGHTLINER 616-1217

LIQUID CHEMICAL SPREADER

(4,000-gallon capacity)

- 2000 STERLING 616-779
- 2016 FREIGHTLINER 616-1281
- 2016 FREIGHTLINER 616-1327
- 2019 FREIGHTLINER 616-1461
- 2019 FREIGHTLINER 616-1462
- 2021 FREIGHTLINER 616-1545

LIGHT & SIGN PLOW

- 2016 HAGIE 616-1276
- 2020 HAGIE 616-1548

LOADERS

- 2024 CATERPILLAR 620-100
- 2024 CATERPILLAR 620-101
- 2024 CATERPILLAR 620-102
- 2024 CATERPILLAR 602-103
- 2024 CATERPILLAR 620-104
- 2024 CATERPILLAR 620-105
- 2024 CATERPILLAR 620-106
- 2024 CATERPILLAR 620-107
- 2024 CATERPILLAR 620-108
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- 2024 CATERPILLAR 620-121
- 2024 CATERPILLAR 620-122
- 2024 CATERPILLAR 620-123
- 2024 CATERPILLAR 620-124
- 2024 CATERPILLAR 620-125
- 2024 CATERPILLAR 620-126
- 2024 CATERPILLAR 620-127
- 2024 CATERPILLAR 620-128

RUNWAY BROOMS

- 1999 OSHKOSH/MB 616-744
- 2001 OSHKOSH/MB 616-812
- 2014 OSHKOSH 616-1194
- 2017 OSHKOSH 616-1334
- 2018 OSHKOSH 616-1446
- 2018 OSHKOSH 616-1466
- 2018 OSHKOSH 616-1467
- 2020 OSHKOSH 616-1508

GRADER

- 2020 CATERPILLAR 620-129

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TRACTORS WITH SNOWBLOWERS

- 2012 JOHN DEERE 616-1151
- 2014 JOHN DEERE 616-1188

TRACTORS WITH BROOMS

- 2009 JOHN DEERE 616-1080
- 2009 JOHN DEERE 616-1081
- 2009 JOHN DEERE 616-1082
- 2009 JOHN DEERE 616-1083

TRACTORS WITH PUSHERS

- 2009 JOHN DEERE 616-1084
- 2009 JOHN DEERE 616-1085
- 2010 JOHN DEERE 616-1103
- 2010 JOHN DEERE 616-1104
- 2017 JOHN DEERE 616-1337
- 2017 JOHN DEERE 616-1338
- 2017 JOHN DEERE 616-1339
- 2018 JOHN DEERE 616-1377
- 2019 JOHN DEERE 616-1447
- 2019 JOHN DEERE 616-1448
- 2019 JOHN DEERE 616-1449

TRIAXLE DUMP TRUCK

- 2002 FREIGHTLINER 616-825
- 2002 FREIGHTLINER 616-826
- 2002 FREIGHTLINER 616-827
- 2002 FREIGHTLINER 616-828
- 2002 FREIGHTLINER 616-829
- 2016 FREIGHTLINER 616-1277
- 2016 FREIGHTLINER 616-1278
- 2016 FREIGHTLINER 616-1279

SKIDSTEERS

- 2006 BOBCAT 616-946
- 2007 BOBCAT 616-972
- 2010 BOBCAT 616-1095
- 2014 BOBCAT 616-1218

TOOLCATS

(UTV with front bucket/broom and dump bed)

- 2018 BOBCAT 616-1469
- 2018 BOBCAT 616-1470
- 2018 BOBCAT 616-1471
- 2018 BOBCAT 616-1472

ROAD PLOWS

- 2014 FREIGHTLINER 616-1184
- 2014 FREIGHTLINER 616-1185
- 2015 FREIGHTLINER 616-1219
- 2019 FREIGHTLINER 616-1445
- 2019 FREIGHTLINER 616-1463
- 2019 FREIGHTLINER 616-1464

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