



Winter Operations Snow and Ice Control Plan Review

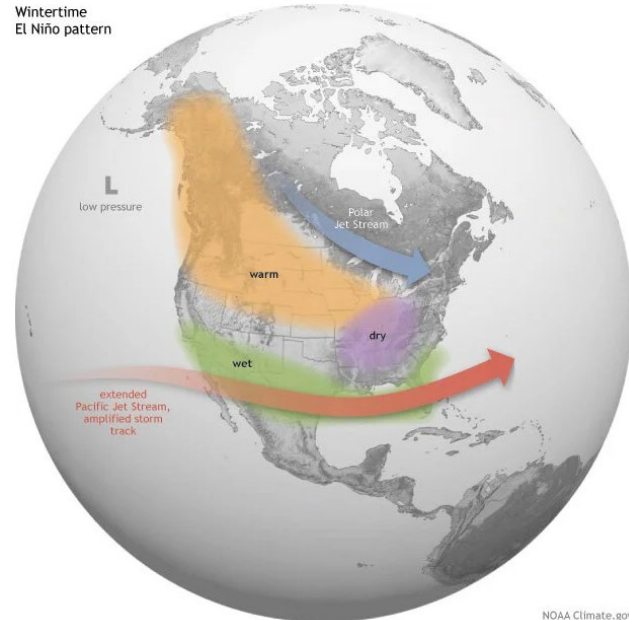
2023-2024



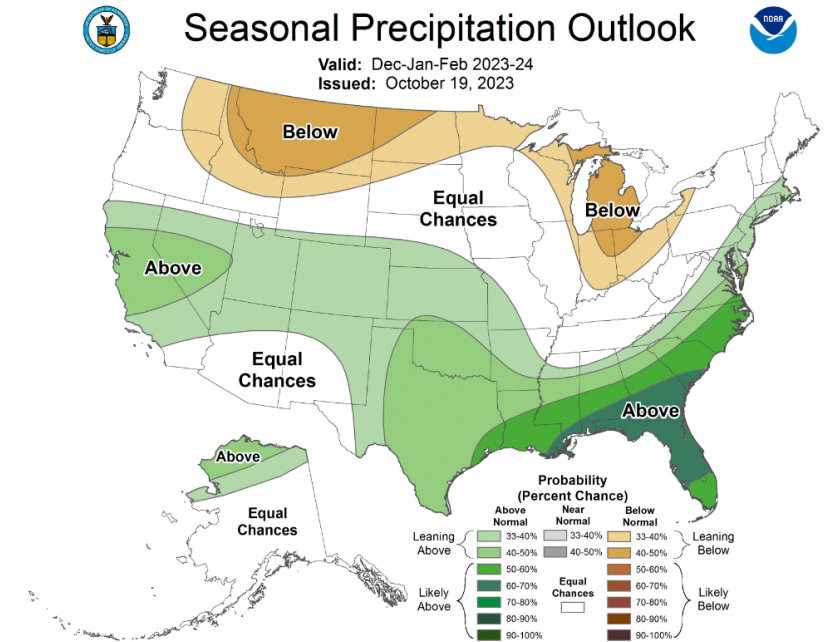
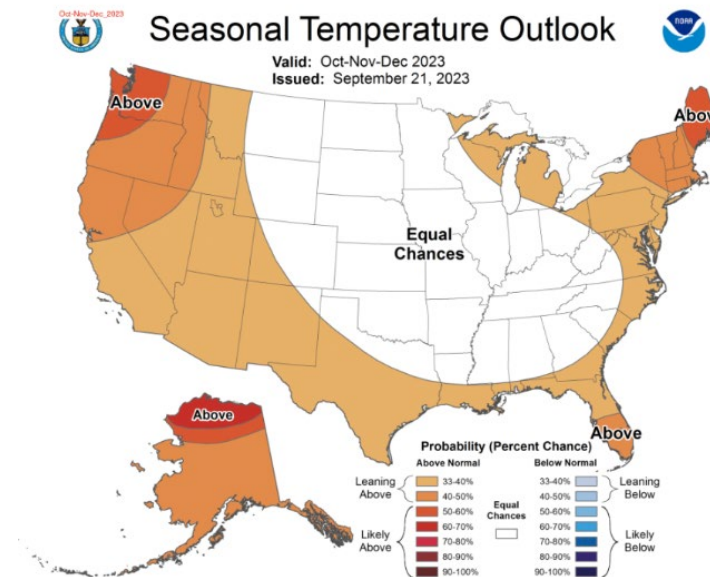
2023-2024 Winter Outlook

- NOAA says 71% strong El Nino outlook until summer of 2024
 - NOAA forecasting normal to above-normal temps across northern states
 - NOAA forecasting equal chances of above normal or below normal precipitation (Wester half of WA)
- The PNW has the best chance for above-avg temps through Dec
- Old Farmer's Almanac calls for a dry winter
 - Coldest temps mid Nov – mid Jan

Wintertime
El Niño pattern

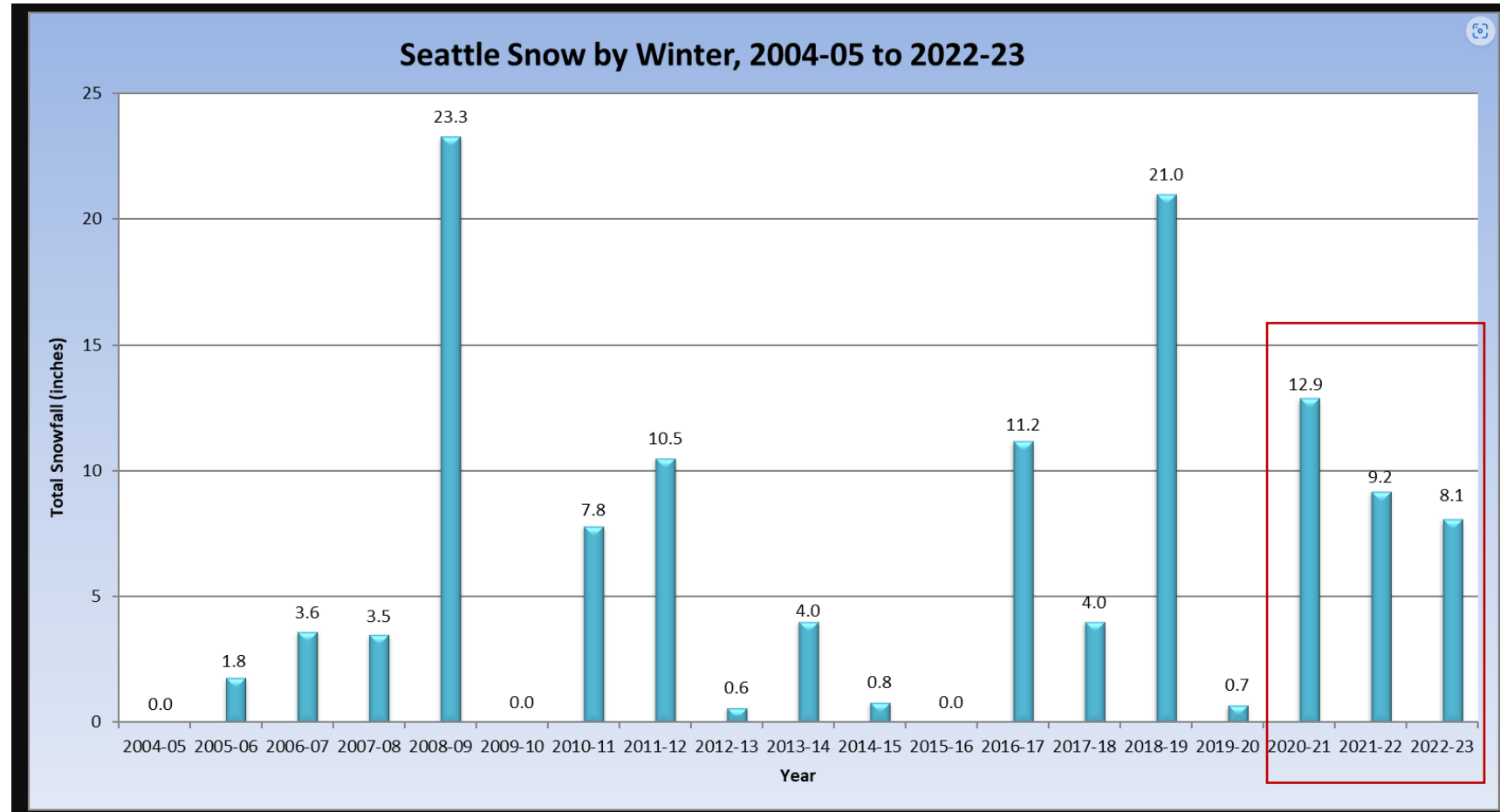


NOAA Climate.gov



2023-2024 Winter Outlook

- Downward accumulation trend
- Last year; 8.1 inches of snow
- Measurements taken at SeaTac Airport





SICP Pre-Season Actions

- Airport management Meetings
 - *Start in October*
 - *Readiness, materials, repairs, staffing, budget, training...*
- Personnel Training
- Equipment Preparation
- Snow and Ice Control Committee (SICC)





SICP

Pre-Season Actions

- Airport management Meetings
 - *October*
- Personnel Training
 - *Operations, Maintenance, Administration, ARFF*
 - *OPS: VERICOM/CFME, LOA, NOTAM/FICONS, RCAM, SICP*
 - *AFM: Equipment, movement, SICP*
 - *Admin: As needed, SICP*
- Equipment Preparation
- Snow and Ice Control Committee (SICC)



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Pre-Season Actions

- Airport management Meetings
 - *October*
- Personnel Training
- Equipment Preparation
 - Operations, Maintenance, FBO's...
 - *OPS: Equipment calibration*
 - *AFM: Equipment maint. & supplies*
 - *FBO: Adequate deicing fluid, landside preparedness/contracts*
 - **FAA Approved only for airside; SAE AMS 1431/Solid, SAE AMS 1435/Fluid**
- Snow and Ice Control Committee (SICC)





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Pre-Season Actions

- Airport management Meetings
 - October
- Personnel Training
- Equipment Preparation
- Snow and Ice Control Committee (SICC)
 - Feedback/Recommendations prior to Winter
 - *Chaired by ADM, Airport MGMT, Airport MX, Engineering, FAA, Air/Cargo carriers, FBOs*



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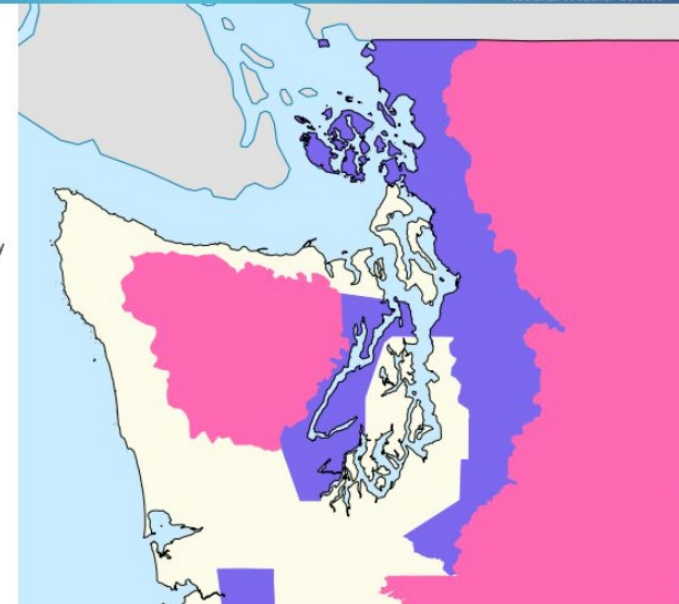
Snow Removal Action Criteria

- Activating Snow Removal Personnel
 - *NWS warning*
 - *Airport enters emergency stage*
 - *Staffing is designated/called out*
 - *Safety briefing*
- Weather Forecasting
- Chain of Command
- Triggers for Initiating Snow Removal
- Personnel Responsible
- Snow Control Center
- Airfield Clearing Priorities
- Airfield Clearing Times

Winter Watches Warnings and Advisories



- Winter Storm Warning
- Winter Weather Advisory
- Winter Storm Watch



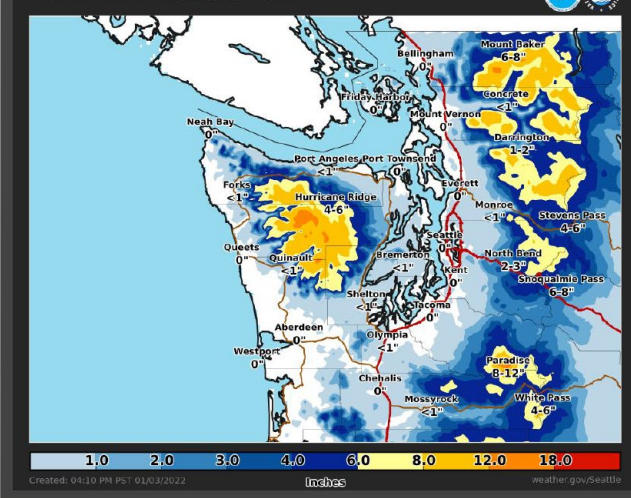
Snow Forecast

CONFIDENCE (Lowlands): **MODERATE**

- Snow levels:
 - Tonight/Tuesday: 500-1000 feet
 - Snow levels could briefly lower to near sea-level with heavy showers however widespread significant accumulations in the lowlands is unlikely.
- Dangerous avalanche conditions continue
 - Check www.nwac.us for details

Monday Night - Tuesday Snow Forecast

Expected Snowfall - Official NWS Forecast
01/03/2022 04:00 PM - 01/04/2022 10:00 AM PST



SICP Snow Removal Action Criteria

- Activating Snow Removal Personnel
- Weather Forecasting by NOAA
 - *NWS is an agency of NOAA*
 - *24 Hour office in King County/Live briefings*



National Weather Service
National Oceanic and Atmospheric Administration

Weather Forecast Office
Seattle, WA
Saturday, Dec 4, 2021

Mountain Snow and Potential for Mixed Wintry Lowland Precipitation

Next Update: 7:00 AM Sunday, December 5, 2021

KEY POINTS

- A cooler weather pattern will remain in place for the next 7 days with lower snow levels.
- Weather systems are expected to move through the area today and Sunday night into Monday.
- Potential for at least a lowland rain/snow mix exists, especially with the Sunday night-Monday weather system.
- Mountain snow with accumulating snow for the Passes through the next week.

WEATHER RISK OUTLOOK

Risk levels incorporate potential impacts from weather hazards and likelihood of occurrence.

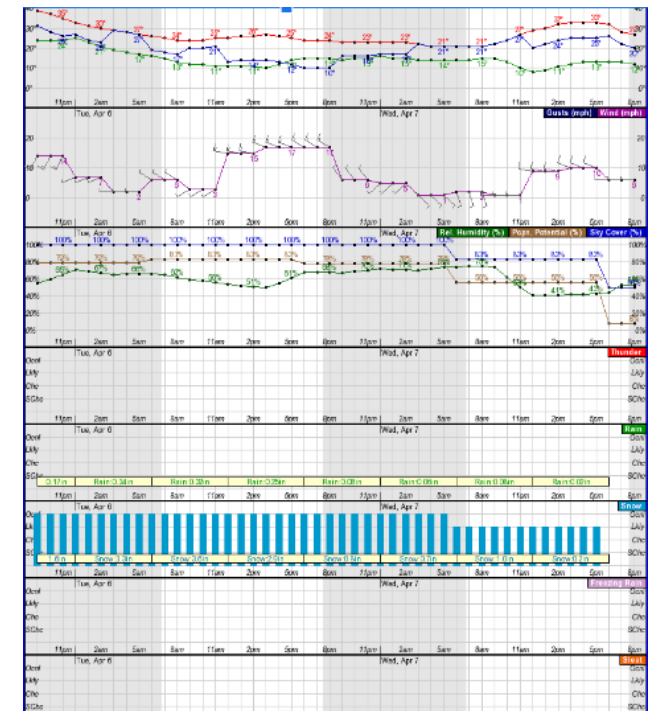
Sat 12/4	Sun 12/5	Mon 12/6	Tue 12/7	Wed 12/8	Thu 12/9	Fri 12/10
Mountain and Possible Lowland Snow Minor Coastal Flooding	Mountain and Possible Lowland Snow Minor Coastal Flooding	Mountain and Possible Lowland Snow Breezy Minor Coastal Flooding		Mountain Snow	Mountain Snow	

Risk Levels	Little to None	Minor	Moderate	Major	Extreme
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TAF

Forecast for: **KMKE (MILWAUKEE, WI, US)**
 Text: **KMKE 072338Z 0800/0906 02025G35KT P6SM VCSH BKN008 OVC013**
 Forecast period: 0000 to 0800 UTC 08 April 2010
 Forecast type: FROM: standard forecast or significant change
 Winds: from the NNE (20 degrees) at 29 MPH (25 knots; 13.0 m/s) gusting to 40 MPH (35 knots; 18.2 m/s)
 Visibility: 6 or more miles (10+ km)
 Ceiling: 800 feet AGL
 Clouds: broken clouds at 800 feet AGL
 overcast cloud deck at 1300 feet AGL
 Weather: VCSH (showers in vicinity)
 Text: **TEMPO 0800/0802 5SM RA BR SCT008 OVC013**
 Forecast period: 0000 to 0200 UTC 08 April 2010
 Forecast type: TEMPORARY: The following changes expected for less than half the time period
 Visibility: 5 miles (8 km)
 Ceiling: 1300 feet AGL
 Clouds: scattered clouds at 800 feet AGL
 overcast cloud deck at 1300 feet AGL
 Weather: RA BR (light rain, mist)
 Text: **FM080800 02020G29KT 2SM -SN OVC006**
 Forecast period: 0800 to 1300 UTC 08 April 2010
 Forecast type: FROM: standard forecast or significant change
 Winds: from the NNE (20 degrees) at 23 MPH (20 knots; 10.4 m/s) gusting to 33 MPH (29 knots; 15.1 m/s)
 Visibility: 2.00 miles (3.22 km)
 Ceiling: 600 feet AGL
 Clouds: overcast cloud deck at 600 feet AGL
 Weather: SN (light snow)
 Text: **FM081300 35020G30KT 5SM -SN OVC008**
 Forecast period: 1300 to 1600 UTC 08 April 2010
 Forecast type: FROM: standard forecast or significant change
 Winds: from the N (330 degrees) at 23 MPH (20 knots; 10.4 m/s) gusting to 35 MPH (30 knots; 15.6 m/s)
 Visibility: 2 miles (3 km)
 Ceiling: 800 feet AGL
 Clouds: overcast cloud deck at 800 feet AGL
 Weather: -SN (light snow)

Hourly Forecast Breakdown





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Snow Removal Action Criteria

- Activating Snow Removal Personnel
- Weather Forecasting
- Chain of Command
 - *Airport Duty Manager and/or Airport Maintenance, Supervisor, Operations Manager, Deputy & Airport Director*
- Triggers for Initiating Snow Removal
- Personnel Responsible
 - *ADM Activate SICP and notify Leadership, MX*
 - *ADM Coordinates w/ATCT for friction testing*
 - *ADM Coordinate staffing for Snow Control Center*
 - *MX Sup coordinate equipment and supply inventory*
 - *Leadership ensure compliance and adherence of established procedures*





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Snow Removal Action Criteria

- Activating Snow Removal Personnel
- Weather Forecasting
- Chain of Command
- Triggers for Initiating Snow Removal
 - *Commence at 1/8th snow accumulation*
 - *Immediately for Ice/FZ rain*
 - *Beforehand for anticipated event*
- Personnel Responsible
- Snow Control Center
- Airfield Clearing Priorities
- Airfield Clearing Times



Slush- Partially melted snow/ice. Water will drain when picked-up

Wet Snow- Well compacted snow ball can be made. No water when squeezed.

Dry Snow- Snow will not stick together.

Ice/FZ rain- Ice, previously a liquid solidified by falling surface or air temps. FZ RA- a liquid, freezing upon making contact with surface.



SICP

Snow Removal Action Criteria

- Activating Snow Removal Personnel
- Weather Forecasting
- Chain of Command
- Triggers for Initiating Snow Removal
- Personnel Responsible
 - Snow Control Center
 - AKA Snow Desk
 - *Normally a secondary ADM or airfield specialist or airport staff*
 - *Gather's all information. Makes notifications. Makes Decisions. Communication link between all users/staff.*
 - *Coordinates with ATCT during adverse weather conditions requiring runway closures*
- Airfield Clearing Priorities
- Airfield Clearing Times





SICP

Snow Removal Action Criteria

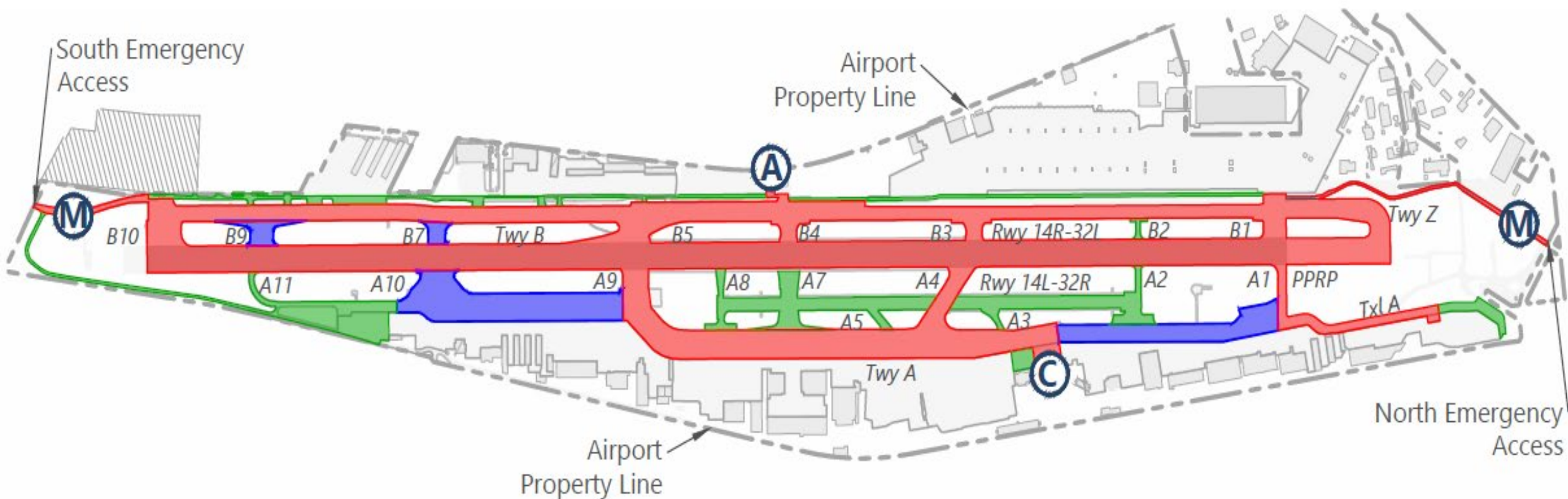
- Activating Snow Removal Personnel
- Weather Forecasting
- Chain of Command
- Triggers for Initiating Snow Removal
- Personnel Responsible
- Snow Control Center
- Airfield Clearing Priorities
 - Priority 1, 2, 3
 - Priority 1 most critical
- Airfield Clearing Times



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Airfield Clearing Priorities

- Priority 1-**RED**, Priority 2-**BLUE**, Priority 3-**GREEN**
- M = Mutual Aid, A = ARFF, C = Terminal





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Snow Removal Action Criteria



King County

International Airport Boeing Field

- Activating Snow Removal Personnel
- Weather Forecasting
- Chain of Command
- Triggers for Initiating Snow Removal
- Personnel Responsible
- Snow Control Center
- Airfield Clearing Priorities
- Airfield Clearing Times
 - *Per FAA AC 150-5200-30 = 30 min for Priority 1*

BFI Operations 2021 = 169,569

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>

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)].

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.



SICP Snow Equipment



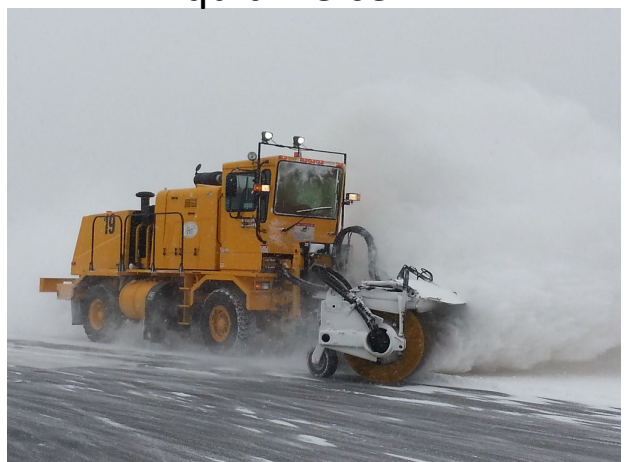
Staggered Formation



Liquid Deicer



Plow



Broom



Blower



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New Snow Equipment



King County
International Airport Boeing Field



Multi-Tasking Equipment (MTE)

- Partial use this season/trial
- Full integration 2024-25
- Priority Route change for 2024-25



Continuous Friction Measuring Equipment (CFME)

- Faster, accurate, less mental/physical subjection to driver

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Snow Clearing and Ice Prevention; Ramps



King County

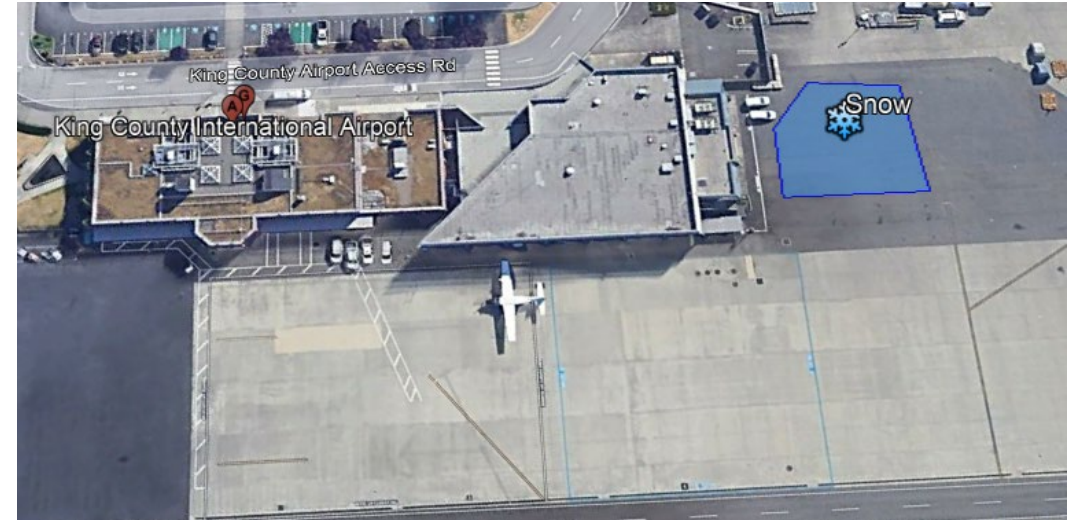
International Airport Boeing Field

- Airport Ops will coordinate with main terminal tenants
- All other tenants are responsible for removing snow and/or ice from their leased (airside/landside) space and notify airport operations of their plans
- Assistance is available with notification and when resources become available
 - *Coordination must be made in advance during route clearing*



Snow Disposal

- Main Terminal
 - *South-East end near vehicle gate*
- Airfield
 - *North of B1 along Boeing Blast fence*
 - *North or South Airfield*
 - *Outside of OFA's*





Service Road Restriction

- Vehicle service road North of B1
 - *Hot Spot*
 - *Limited Space for Snow Equipment transit*
 - *Only route for snow equipment*
 - *Boeing equipment awareness*





SICP

Continuous Surveillance

- Continuous surveillance inspections conducted when contaminate begins to accumulate on movement surfaces
 - *Braking PIREPs, Temps, WX patterns, Friction tests, Self-Inspections...*
 - *Operations/Maintenance assess situation to determine steps for treatment*
- 14R-32L will be cleared 10,000 X 200' or 150'
- Operations will report conditions throughout the event to include:
 - *Pavement contaminants, snowbanks, windrows, deicer type*
 - *Reports will be updated as conditions change, following each deicing/ anti-icing events, contaminant type*
- Removal efforts will continue until pavement areas, runway signs, edge lights and markings are clear of contaminates



Air Temp

Surface Temp





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Methods for Surface Ice Control and Removal- Chemicals



King County

International Airport Boeing Field

- FAA Approved Liquid and Solid De-Icers on Airside only
 - *Liquid: Potassium Acetate*
 - *Solid: Sodium Formate*
- Applied Before precipitation, during or after mechanical removal.
- Tenants; use **FAA approved** chemicals on **airside** ramps **only**
 - *FAA approved chemicals follow SAE standards*
- **Salt approved for Landside only**

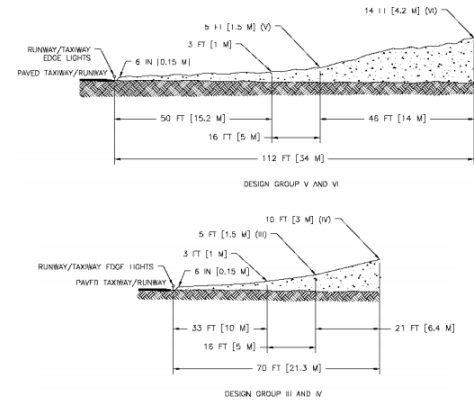
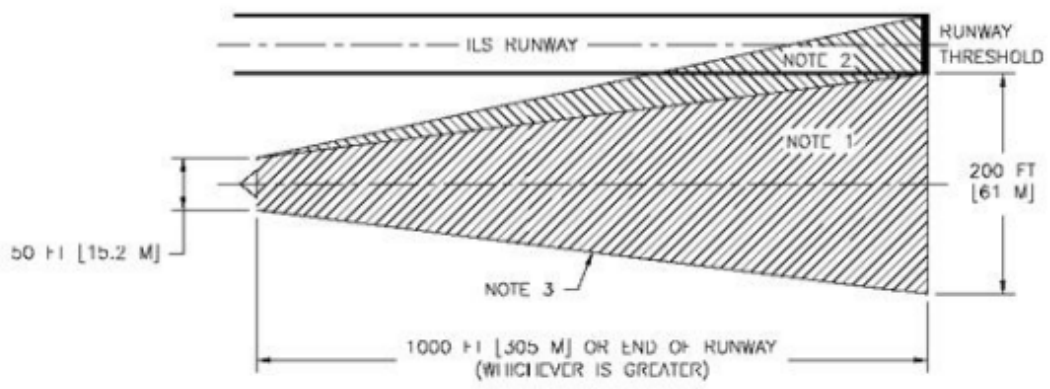




SICP

Snow Clearing and Ice Prevention; Snow Banks/Snow Drifts

- Reported and mitigated as soon as possible
- Those that can't be moved will be kept in accordance with FAA Figure 4-1 and users will be notified by NOTAMs
- Snow Drifts are removed promptly
- Snow Disposal
- NAVAIDS
 - *Visual obscured*
 - *Electronic signal loss/scattering*



SICP

Surface Incident/Runway Incursion Mitigation Procedures

- All personnel required to complete airport driver training
 - *Reviewed pre-season*
- Tabletop exercise conducted prior to snow season to simulate procedures/practices
- All vehicles equipped with an airfield map
- Vehicles marked/lighted in accordance with AC150-2510-5
- Airport Operations and/or Maintenance coordinate with ATCT
 - *All vehicles will ensure functional VHF radios*
- Failed Radio Communication Training
- Low Visibility and Whiteout Conditions
 - *Extreme Caution/ Suspend*
- Driver Fatigue
 - *2X 12 hour shifts*



King County

International Airport Boeing Field



SICP

NOTAMS/FICONS

NOTAM. Notice to Air Missions (previously notice to airmen)

- Issued to broadcast the status of a surface such as CLOSED, RESTRICTION, UNSAFE, NON-STANDARD, WORK IN PROGRESS ETC.
- **BFI 01/001 BFI RWY 14R/32L CLOSED 2209011400-2209011500**
 - Long term for utility runway (14L-32R)/Priority 2/3 surfaces
 - Short term for main runway (14R-32L)

FICON. Field Condition

- Issued to report surface contaminants on runways, taxiways, and apron/ramps
- **BFI 01/002 BFI RWY 14R FICON 5/5/5 100 PCT 1/8IN DRY SN OBS AT 2209011500-2209021500**
- **BFI 01/003 BFI RWY 14R FICON 5/5/5 100 PCT 1/8IN DRY SNOW DEICED SOLID 2209011500-22090121500**
- Only runway FICONS have RCCs (runway condition codes) but require < 25% SFC contaminant
 - Can be read in reverse
- Closed surfaces do not have FICONS.

- NOTAMs can be grouped ie **TWY A2, A3, A5 CLSD**
- NOTAMS/FICONS issued in Zulu Time. Seattle is currently 7 hours behind Zulu ie 1400Z = 0700am Local
- We strive to maintain 'no worse than wet' condition



Surface Assessment and Reporting

Conducting Surface Assessments =Mu:



NEW CFME

- Full length of runway, can be interrupted.
 - Direction of Landing runway
 - Speed up to 40 MPH
 - 20' from the centerline
- Only valid under the following conditions;
- Runway contaminated more than 25% Ice or wet ice at any depth
 - Compacted snow at any depth
 - Dry snow less than 1 inch
 - Wet snow or slush 1/8th inch or less



VERICOM 4000 (Backup)

- Requires a stop and go action in any truck.
 - Portable system
- Requires 9 total readings
 - X3 (Touchdown, Midpoint, Rollout) = MU value



Surface Assessment and Reporting Pilot Reported Braking Action (PIREP)

- Provided by pilots for other pilots Good:
 - Good to Medium:
 - Medium:
 - Medium to Poor:
 - Poor:
 - *Two Poor reports after a Good/Medium, conduct assessment*
- Nil:
 - *By Pilot or Airport Ops, closes surface automatically*
- $\frac{1}{2}$ " Slush or 2" Dry Snow closes RWY

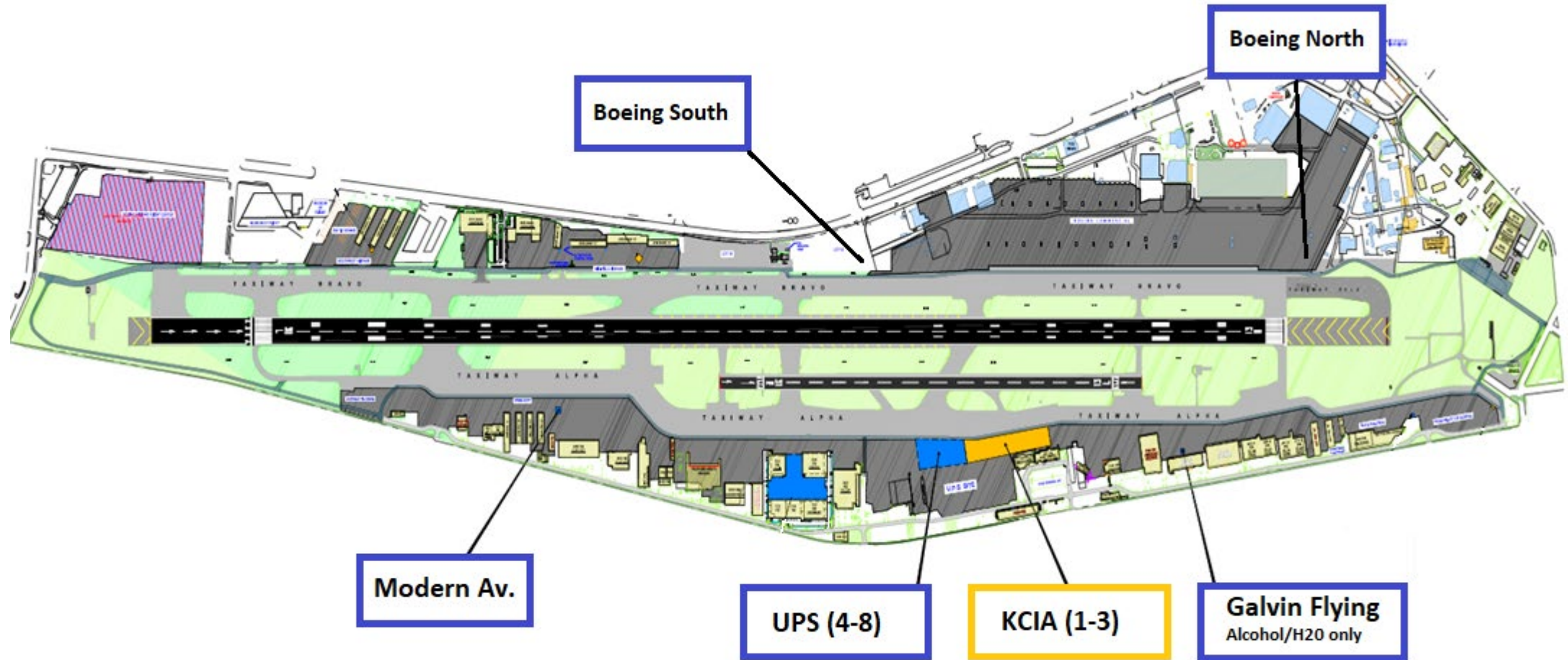


Aircraft Deicing



King County

International Airport Boeing Field



- KCIA gates 1-3 are a first come first serve basis
 - *Do not block Customs Blue Box*
- Reminder; KCIA must collect the total number of gallons used of aircraft deicer



Post Event/Season Actions

- After each significant snow event,
 - 4th Quarter (Oct-Dec)
- During Snow season
- Post Season,
 - 2nd Quarter (April)



End. Any questions?

- Airport Operations/Snow Desk
 - Tel; 206-296-7334 -24HR
 - Alt 206-915-1415
 - Email; airportops@kingcounty.gov
 - Presentation available on KCIA's web page *under Info for Tenants -> Inclement Weather Operations*
- NOTAM/FICON
 - Notams.faim.faa.gov/notamsearch
 - ATIS 127.75
 - ASOS 206-763-6904
- FBO sponsored airfield webcam
 - www.wasar.org/webcams/



King County

International Airport Boeing Field

