Winter Operations

at Keflavik Airport

HB700 05 - 3

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Adverse Weather Operations at Keflavik Airport

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1 Background

This document describes in brief the preparedness for winter operations at Keflavik International Airport. In accordance with EU regulation no.139/2014, aerodromes shall develop and implement a snow plan that prepares the airport for exposure to winter conditions. The snow plan documentation for Keflavik International Airport in compliance with the regulation is set out in the Icelandic AIP publication.

The current document elaborates further on the winter operation procedures, including the apron winter service.

2 Organisation and resources

2.1 Organisation

Airport Operations department (AO) is responsible for aircraft rescue and firefighting services (ARFF) on the airport, as well as the winter service on runways, taxiways, and aprons. The AO shift manager oversees the total operation while an assisting shift manager called the Snowking is responsible for the winter service in the whole aircraft

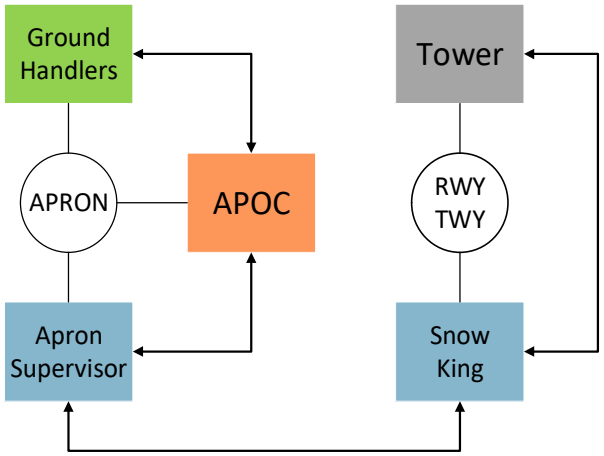


Figure 1 Organization and communication lines of the winter service.

manoeuvring area. A second assisting shift manager, Fire Command, takes the role of an Apron Supervisor during snow removal operations on the apron. Thereby the Snowking can pay his full attention to the runways and taxiways, while the Apron Supervisor takes care of the apron and aircraft stands. The Airport Operations Center (APOC) handles communication between AO and other apron staff, including ground handlers.

2.2 Equipment

AO department is well equipped in terms of machines for snow removal and anti-skid treatment on the airport surfaces:

- **11 PSB Snow machines (3 in 1 Ploughing – Blowing – Sweeping vehicles)**
- **5 Anti-skid spreaders (solid chemical or winter grit)**
- **2 De-icing liquid spreaders**
- **9 Payloaders**
- **4 Snow blowers**
- **1 Grader**

2.3 Manpower

Our work force consists of four shift groups of 18 men working 12 hrs shifts 24/7, and 2 shift groups of five men each, working 12 hrs daytime shifts seven days a week. ARFF duties exclude 4 to 6 men from winter service tasks at any time.

Based on the weather forecast, additional staff is mobilised to boost the snow team´s capacity when needed. Additional workers are thereby mobilised from the passenger transport division, in addition to regular shift workers being called in on their off days, and even mechanics from the maintenance workshop.

We have agreement with contractors to undertake special winter service tasks on the apron and service roads.

2.4 Materials

We use both solid and liquid de-icing chemicals on the aircraft manoeuvring area. Grit is used on the apron and taxiways when the conditions are suitable for that.

- **Liquid chemical: Potassium formate (KFOR)**
- **Solid chemical: Sodium formate (NAFO)**
- **Grit (sand): Crushed and washed aggregate, 0.25 - 4.75 mm**

When no longer needed, grit is carefully cleared from the manoeuvring area to reduce the risk of jet engine ingestion.

Solid chemical is mainly used on the apron and taxiways as a preventive treatment against black ice formation. Liquid chemical is spread on the runways and used as well as a prewetting agent for solid chemical and grit.

Common road salt, NaCl, is only used on service roads, including apron roads not crossing aircraft taxi lines.

3 Procedures

3.1 Winter service priorities

The following priorities have been established for the clearance of the movement area at Keflavik Airport:

1. **Active runway.**
    - **Service target: RWYCC 4 or higher, cleared runway width ≥ 45 m**
2. **Taxiways connecting active runway including rapid exit. Aircraft stands. Apron service roads. Access routes for emergency vehicles to active runway.**
    - **Priority task #2 is equivalent to task #1**
    - **Rapid exits taxiways are not cleared unless friction on RWY roll-out end is adequate**
3. **East apron and adjacent taxiways S-1 and N-1. Apron stands 101-111, 116-123.**

During snowfall, the snow team is focused on prioritising tasks with respect to safety and the overall aerodrome efficiency. Users may expect runways, taxiways and aprons, to be partly or completely covered by snow, still being in an operable condition. Even if grit is applied to the aircraft stand to improve friction, passengers should be warned of slippery conditions on the apron.

Keflavik Airport is a two-runway aerodrome. Depending on weather situation, the snow team is often faced with major challenges to maintain the usability of runways and taxiways. Users must not expect both runways to be always available.

- **Situations like prolonged snowfall, snow-drifting or freezing rain make it impossible to attend both runways at the same time.**
- **The second runway is then cleared as soon as possible.**

- **The second runway is however serviced as necessary to maintain a maximum delivery time of 30 minutes, should an unexpected event call for urgent change of active runway**

Prioritised taxiway configurations during winter conditions are found in chapter 0 Runway snow clearing scenarios.

3.2 Inspection, communication, and reporting

3.2.1 Preparing for wintry conditions

For any inquiries, requests or reports concerning winter operations please contact APOC, apoc@kefairport.is or by telephone +354 425 6200.

We have defined a winter condition index (WinCon) to establish a common ground for communicating winter operations preparedness. A scale from 1 to 4 is defined in terms of expected winter weather impact on winter service and aerodrome operations in general, see

Table 1. A Wincon forecast for the next 24 hrs is updated every 12 hrs before the regular APOC daily briefings.

The WinCon forecast is based on the weather forecast and/or current weather development. Different WinCon situations are associated with particular action items and recommendations. Examples are:

- **Call out additional staff**
- **Intensified surface condition assessment**
- **Stowing of ground handling equipment**
    - **Place chocks and cones outside the reach of snow removal equipment**
    - **Park GH vehicles frontward in the aircraft stand**
- **Removal of compacted snow or ice preparing for weather changes**

It should be noted that different WinCon classes may lead to different surface conditions. It should not be expected that a particular WinCon guarantees any given surface condition on the movement area, as defined under section 3.2.3**Error! Reference source not found.**. Surface condition may also have deteriorated without any WinCon being announced simultaneously, as contamination may sustain on the ground for days during constant weather conditions.

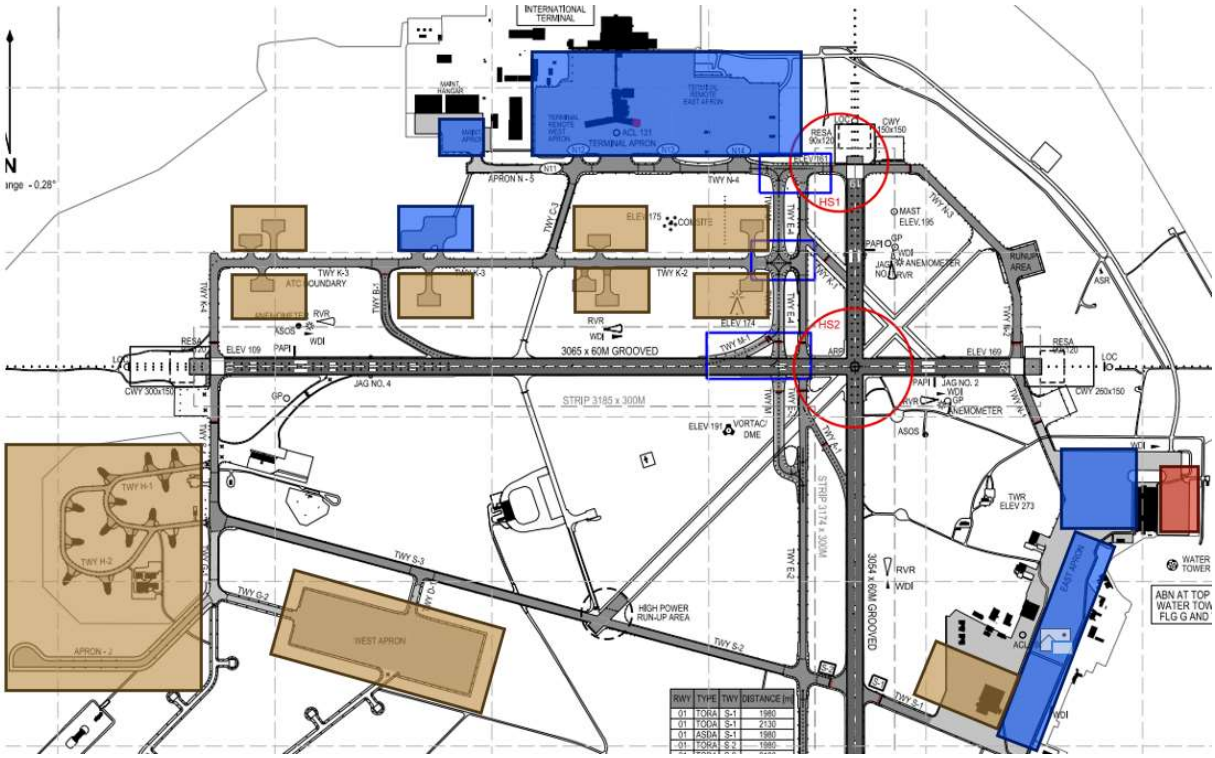
Table 1. Winter condition classification, version 06 of October 22th 2024. (https://www.kefairport.is/fyrirtaekid/vedurupplysingar)

KEF WinCon definition Ver. 06 – 241022

Winter condition class	Expected impact on service and priorities	Indicative weather forecast Examples of forecasted weather phenomena and intensities for each WinCon *(One or more of the conditions apply)*
WinCon 1 Light	Winter service expected to keep up with weather. Surface conditions may deteriorate slightly No need for snow clearing due to snow fall instantaneously melting on ground, or insignificant amount Normal operation on runways and apron foreseen **CAUTION**: Possible risk of black ice on untreated areas	**Surface frost / ice:** • Wet surface, rain or showers, temperature falling below zero • Surface frost (rime): Temperature below -2°C, mean wind less than 8KT, clear sky, high humidity RH>85% **Snowfall / snow drifting** • Insignificant or no snowfall expected • Dry and cold snow drifting with insignificant accumulation in the movement area
WinCon 2 Moderate	Mostly normal operation with slower periods in between. Waiting for snow removal on apron or operating on snow covered surfaces may be expected. Temporarily: Expect minimum operating surfaces in snow clearance, RWY RETs not available	**Surface frost / ice:** • n/a **Snowfall / snow drifting** • Light snowfall or showers -SN or - SHSN for 2hrs or longer • Drifting snow forecasted, DRSN (no blowing snow BLSN) **Visibility** • Visibility less than 2000 m due to snowfall
WinCon 3 Heavy	Expect Winter service on Apron to be delayed, single stand at a time. Expect TWYs snow covered Expect minimum operating surfaces in snow clearance, RWY RETs not available Expect ATC to request aircraft holdings or increased separation	**Surface frost / ice:** • Rain or wet snowfall, on frozen ground **Snowfall / snow drifting** • Moderate snowfall SN and wind 22G30KT to 30G41KT (mean wind 10 – 15 m/s) • Heavy snowfall +SN • Blowing snow BLSN forecasted **Visibility** • Visibility less than 800 m expected • Vertical visibility less than 300 ft expected
WinCon 4 Extreme	RWY crosswind, visibility. and surfaced condition may affect operation Expect only RWY winter service All Ramp operations difficult or impossible due visibility, gust strength and snowdrift accumulation Aircraft may line up on TWYs Apron stands not serviced Runway friction might be impossible to improve above RWYCC 3	**Surface frost / ice:** • Freezing rain forecasted FZRA or FZDZ **Snowfall / snow drifting** • Any snowfall, -SHSN up to +SN, and wind above 30G41KT (mean wind higher than 15 m/s) • Heavy snowfall in periods, TEMPO +SN • Blowing snow BLSN forecasted **Visibility** • Visual range and vertical visibility severely degraded, runway operation extremely difficult • Airport navigation systems clogged due to wet snow and wind

3.2.2 Runway inspection and reporting

Surface condition assessment and reporting on the movement area is a necessary part of the aerodrome winter services. Runway assessment and reporting follows GRF, the Global Reporting Format. The principles of GRF are explained in the AIP. The runway condition is reported whenever significant changes occur, the reports are submitted by SNOWTAM and via ATIS (https://www.isavia.is/en/corporate/c-preflight-information/snowtam).



3.2.3 Apron inspection and reporting

The SNOWTAM message is primarily aimed at air crews and flight dispatchers. To ensure that ground handlers can prepare for winter conditions on the aircraft stand, we have adopted our own assessment and reporting system for the apron. Our aim is that all aircraft stands have been inspected and reported before use.

Aircraft stands are inspected and treated as needed within the operational capacity of the snow team according to flight schedule. The Apron Supervisor of the AO snow removal team is responsible for assessing and reporting the surface condition on individual aircraft stands. The apron surface conditions are categorised according to the scheme presented in Table 2. The current condition for all stands is on display on a dedicated web-page where stakeholders with daily operations on the apron can access the information. The site has access control, contact APOC for information.

Due to less traffic in wintertime than during summer, we organise the aircraft stand allocation to maximize the efficiency of winter service. We do this by shutting down parts of the apron space in winter. **Error! Reference source not found.** shows what arrangement is valid for the winter.

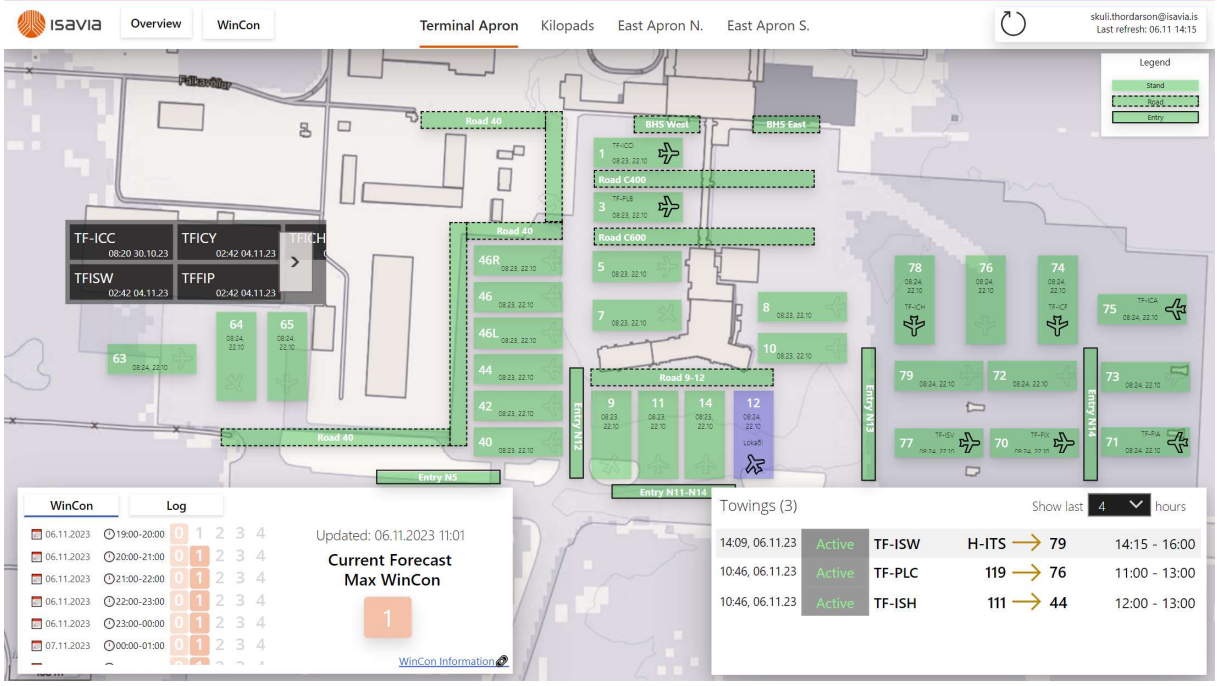


Figure 2 The aircraft stand surface condition web-page („APRON-app“).

Table 2. Surface condition classification system for winter conditions on the apron

Color code	Surface condition class	Advice
Green	Clear	Normal winter operation
Yellow	Access with caution	
Orange	Unreliable	Use stand with great care
Red	Inoperable	No handling advised

Details on the surface condition classification are available in the Apron surface assessment guide[1].

3.3 Recommandations to ground handlers

During wintry conditions, as always, all members of the airport community are responsible for contributing to safe operation, focusing on passenger experience. To minimize the impact of winter conditions on apron operations, including aircraft handling, efficient snow removal and friction improving measures are necessary. To facilitate this, keep in mind that according to the aerodrome Safety Rules, the winter service machines have priority over other vehicles on the apron. Good housekeeping practices to enable efficient winter service includes:

- **Park your GSE in the assigned places and as far front at the stand as possible**
- **Stow wheel chocks and cones in the designated crates when not in use**

[1] LINK , https://www.youtube.com/watch?v=dmznEjhdFsY

- **Remove cars, baggage trolleys and other GSE items from the stand, if snow removal machines or anti-skid spreaders are expected**
    - **This is important both when requested by APOC for a pre-planned service action, and when stands are to be treated just in time for aircraft handling**
- **Inform APOC if you find the announced surface condition for your stand not according to expectations**
- **Help yourselves to the grit bins positioned at all stands when needed.**
- **Respect that AO may need some time, depending on the circumstances, to respond to service requests**
- **Keep updated on current weather and forecasts https://www.kefairport.is/fyrirtaekid/vedurupplysingar**

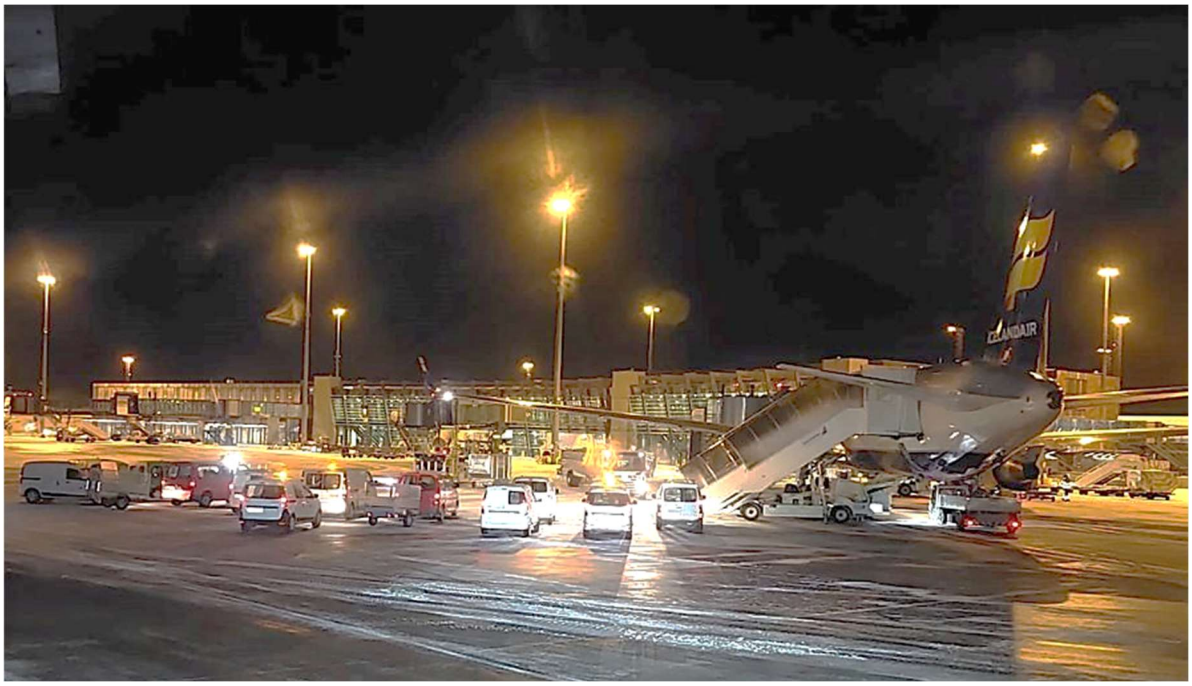


Figure 3 Ground handling in wintertime.

3.4 Aircraft de-icing

Aircraft de-icing is conducted at the aircraft stand. Ground handling companies provide the service upon direct contact.

3.5 Winter service landside

Winter service in the terminal area on footpaths, parking lots and roads is carried out by external contractor. All inquiries and complaints are welcomed by APOC, apoc@kefairport.is or by telephone +354 425 6200.

Appendix

A. Chemical / grit consumption and snowfall amount

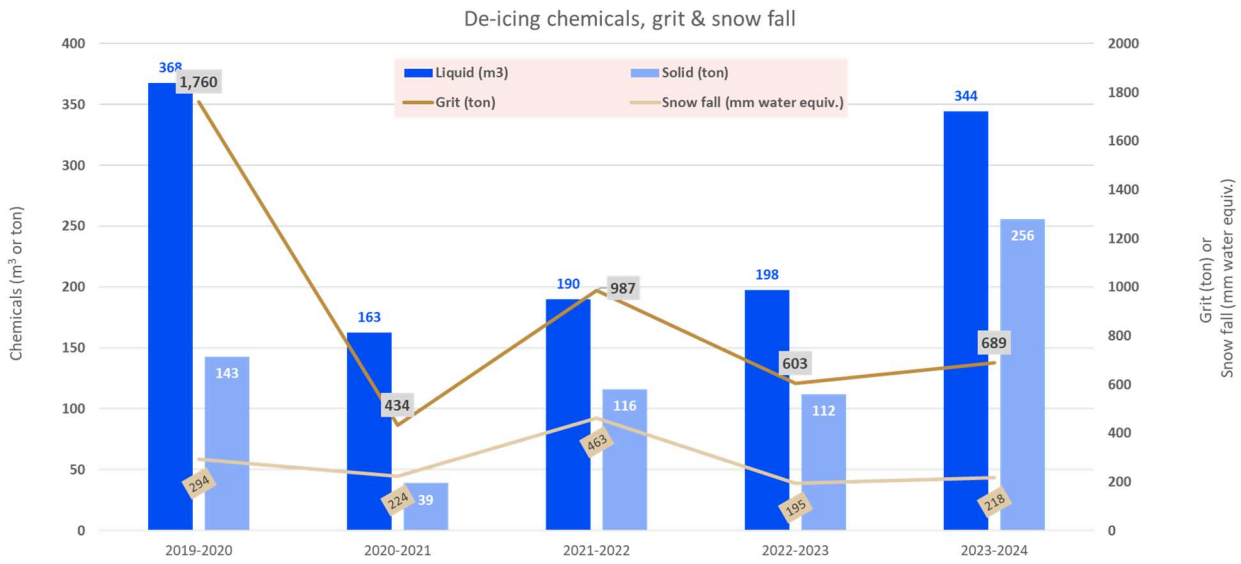


Figure 4 Annual snowfall in Keflavik Airport is very variable.

B. Runway snow clearing scenarios

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Snow clearing scenario - RWY 01
WinCon 2 or 3

Priority taxiways:

E1 – E2 – E3 – E4 – N4

Estimated cycle time: 36 minutes



Snow clearing scenario - RWY 01
WinCon 1 or 1.5 hrs after snow fall ends

Priority taxiways:

E1 – E2 – E3 – E4 – N4
A1 – M – C3 – K2

Estimated cycle time: 65 minutes

- Snow clearing scenarios are service aims and are therefore only indicative of the possible available taxiways during certain Winter Conditions (WinCons 1, 2, 3, 4)
- Airport Operations and ATC Tower decide the scenario in effect.
- A higher service level scenario will be adopted as soon as possible considering weather situation.
- Regardless of scenario in use, ATC will instruct aircrews on available and recommended routes on the ground
- Service route cycle times are indicative. Turnarounds in junctions for full width snow clearance may add to this time

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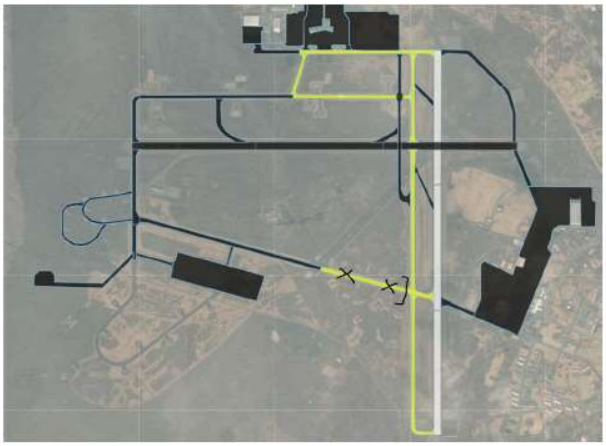


Snow clearing scenario - RWY 19
WinCon 2 or 3

Priority taxiways:

E1 – E2 – E3 – E4 – N4

Estimated cycle time: 36 minutes



Snow clearing scenario - RWY 19
WinCon 1 or 1.5 hrs after snow fall ends

Priority taxiways:

E1 – E2 – E3 – E4 – N4
S2 – C3 – K2

Estimated cycle time: 48 minutes

- Snow clearing scenarios are service aims and are therefore only indicative of the possible available taxiways during certain Winter Conditions (WinCons 1, 2, 3, 4)
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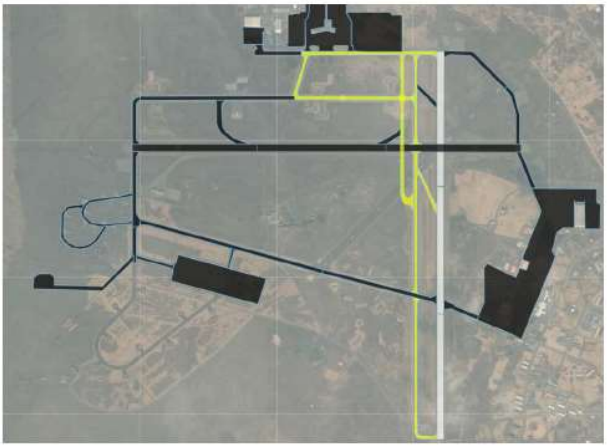


Snow clearing scenario - RWY 01
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Priority taxiways:

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Estimated cycle time: 36 minutes



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WinCon 1 or 1.5 hrs after snow fall ends

Priority taxiways:

E1 – E2 – E3 – E4 – N4
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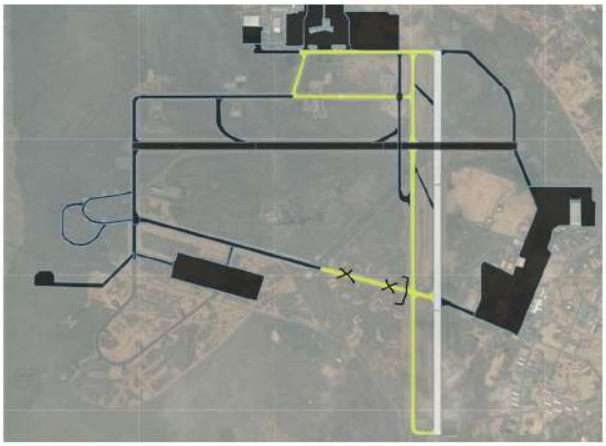


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