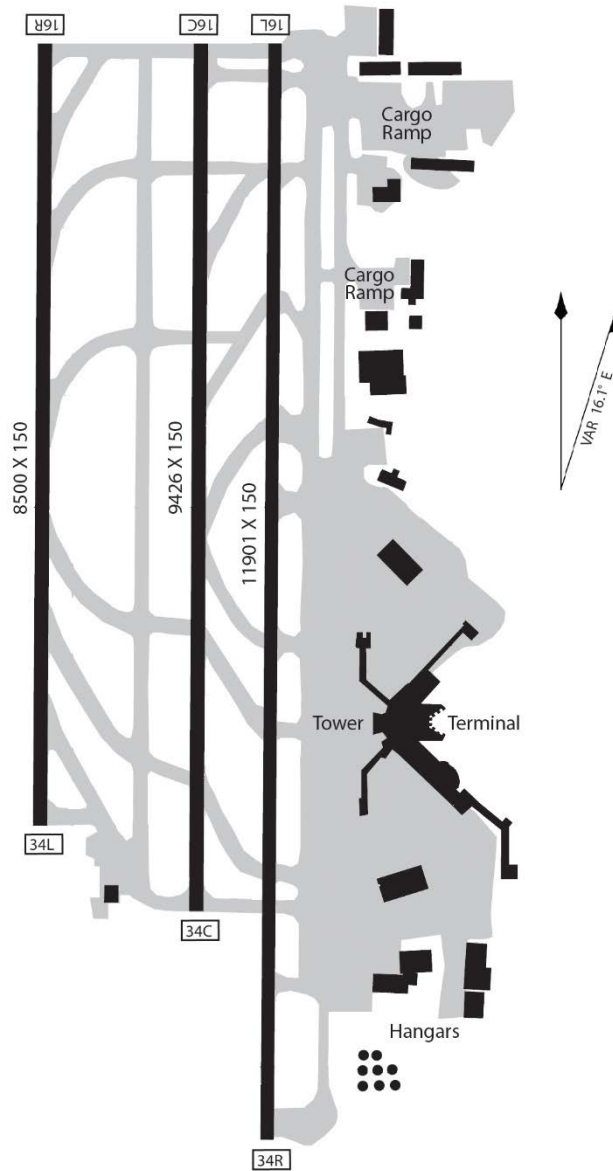


# Airport Capacity Profile: Seattle-Tacoma International Airport



*Airport capacity profile estimates were created using a standard set of performance characteristics and do not take into account non-runway constraints, unless otherwise noted. The capacity estimates developed for this report are not intended to replace the results of any detailed analysis that would precede an environmental, investment, or policy decision.*

*The list of Future Improvements and their expected effects on capacity does not imply FAA commitment to, or approval of, any item on the list.*

# Seattle-Tacoma International Airport Overview

## About this Airport Capacity Profile

- The capacity profile shows the hourly throughput that an airport is able to sustain during periods of high demand, represented as the range between the model-estimated capacity and the ATC facility-reported rate (called rate). Each weather condition has a capacity rate range.
- For each weather scenario, capacity estimates are based on information provided by ATC, including reported arrival and departure rates.
- A Marginal North Flow configuration was not included in this profile because it is not frequently used.

## Recent Capacity Improvements at SEA

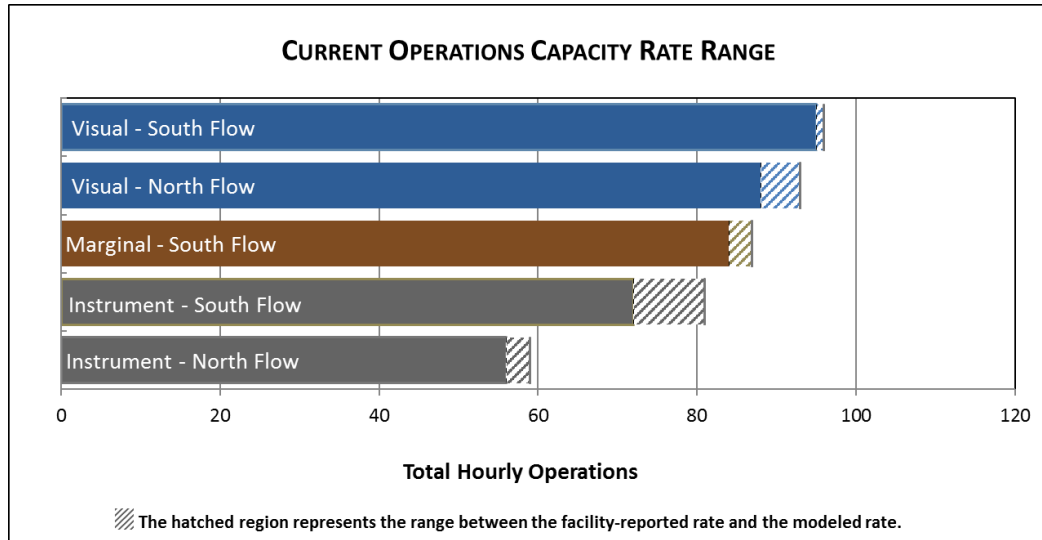
- Time-Based Flow Management (TBFM) helps to improve the flow of arrivals to the runways.
- Reduced Diagonal Spacing for arrivals of 1NM for runways with centerline spacing of 2,500 feet or greater provides an increase in arrival capacity.

## Future Improvements at SEA

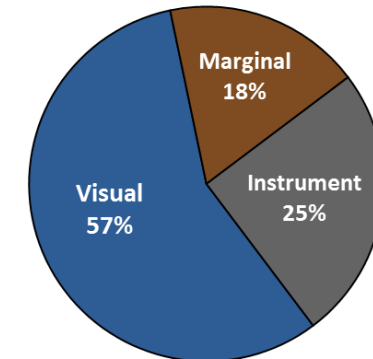
- Improved Runway Delivery Accuracy: The combined effects of several new capabilities, including Automatic Dependent Surveillance-Broadcast (ADS-B) Out, Cockpit Display of Traffic Information (CDTI), and Terminal Sequencing and Spacing (TSAS) in the terminal area, will improve the ability of controllers to deliver aircraft to the runway with the desired separation from the preceding aircraft. This will reduce the average spacing between arrivals and boost arrival capacity.
- Wake Recategorization Phase 2 assigns aircraft to new wake turbulence classifications based on their wake turbulence characteristics, such as wake generation, wake decay, and encounter effects. This results in closer longitudinal separation for certain aircraft types without sacrificing safety.

# Seattle-Tacoma International Airport Overview - 2

## Current Operations Capacity Rate Range



## Annual Weather Conditions



### Visual Conditions:

- Ceiling and visibility allow for visual approaches: at least 5000 feet ceiling and 5 miles visibility

### Marginal Conditions:

- Ceiling and visibility below visual approach minima but better than Instrument conditions

### Instrument Conditions:

- Ceiling and visibility below 3000 feet ceiling or 3 miles visibility
  - Criteria reflect operational practice at SEA

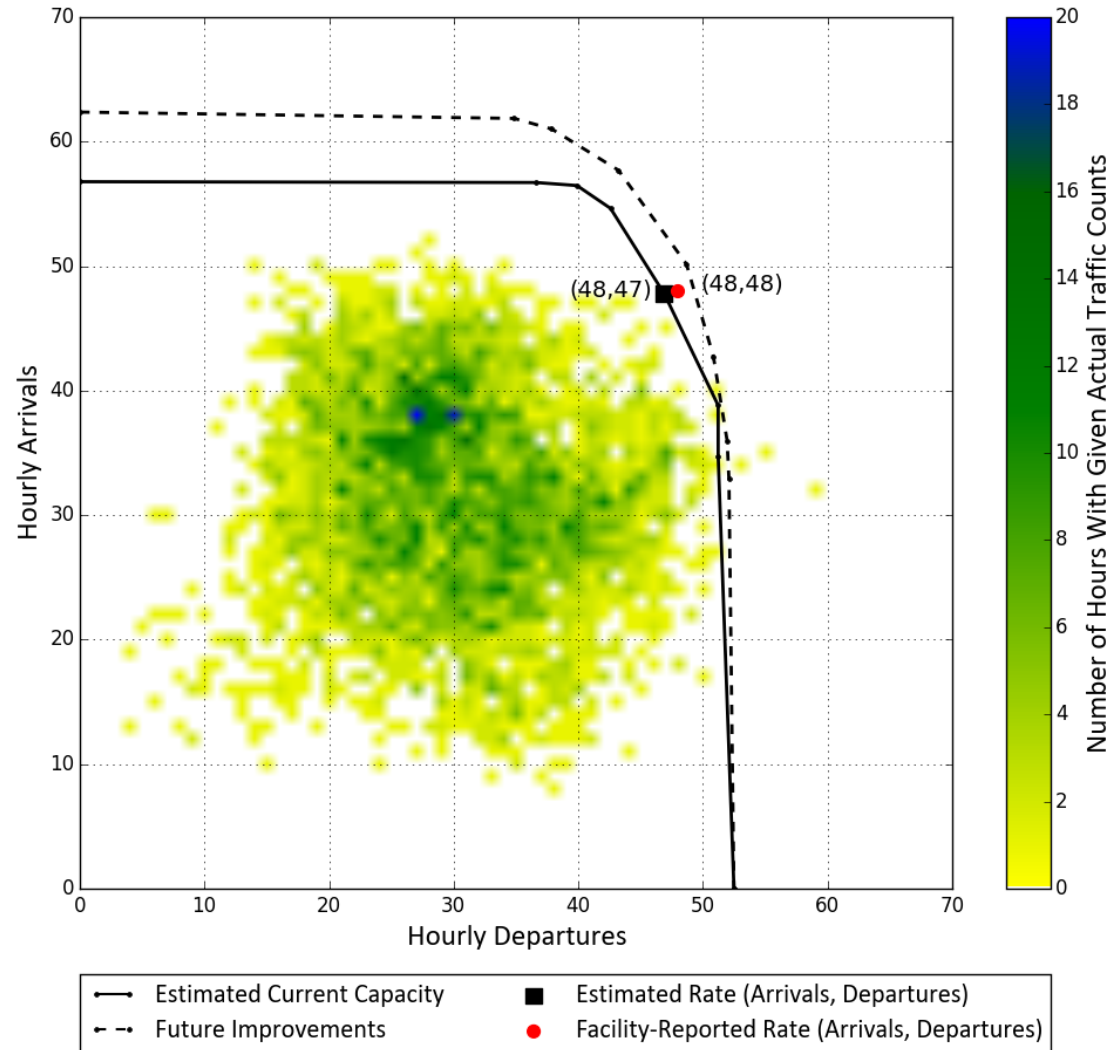
## Data Sources

- Throughout the profile, actual hourly SEA operations, weather and configuration data were obtained from the FAA ASPM database, and represent operational hours from 7am to 11pm local time for December 15 2015 through December 14 2016. Actual configuration usage is determined by multiple operational factors, including weather conditions.
- Facility-reported rates were provided by ATC personnel at SEA.
- Model-estimated rates are derived from operational information provided by ATC.

Type Operations	Arrival Runways	Departure Runways	Hourly Rate	
			ATC Facility-Reported	Model-Estimated
Current Operations	16L, 16R	16C, 16L	96	95
Future Improvements	16L, 16R	16C, 16L	N/A	99

- **Future improvements:** Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Visual conditions in South flow is currently 95-96 operations per hour.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity; limited departure fanning is conducted from Runways 16C and 16L for non-jet aircraft.
- Additional spacing between arrivals to Runway 16L and between departures on Runways 16C and 16L may be employed in order to allow taxiing aircraft to cross the runways.

### Visual Weather Conditions

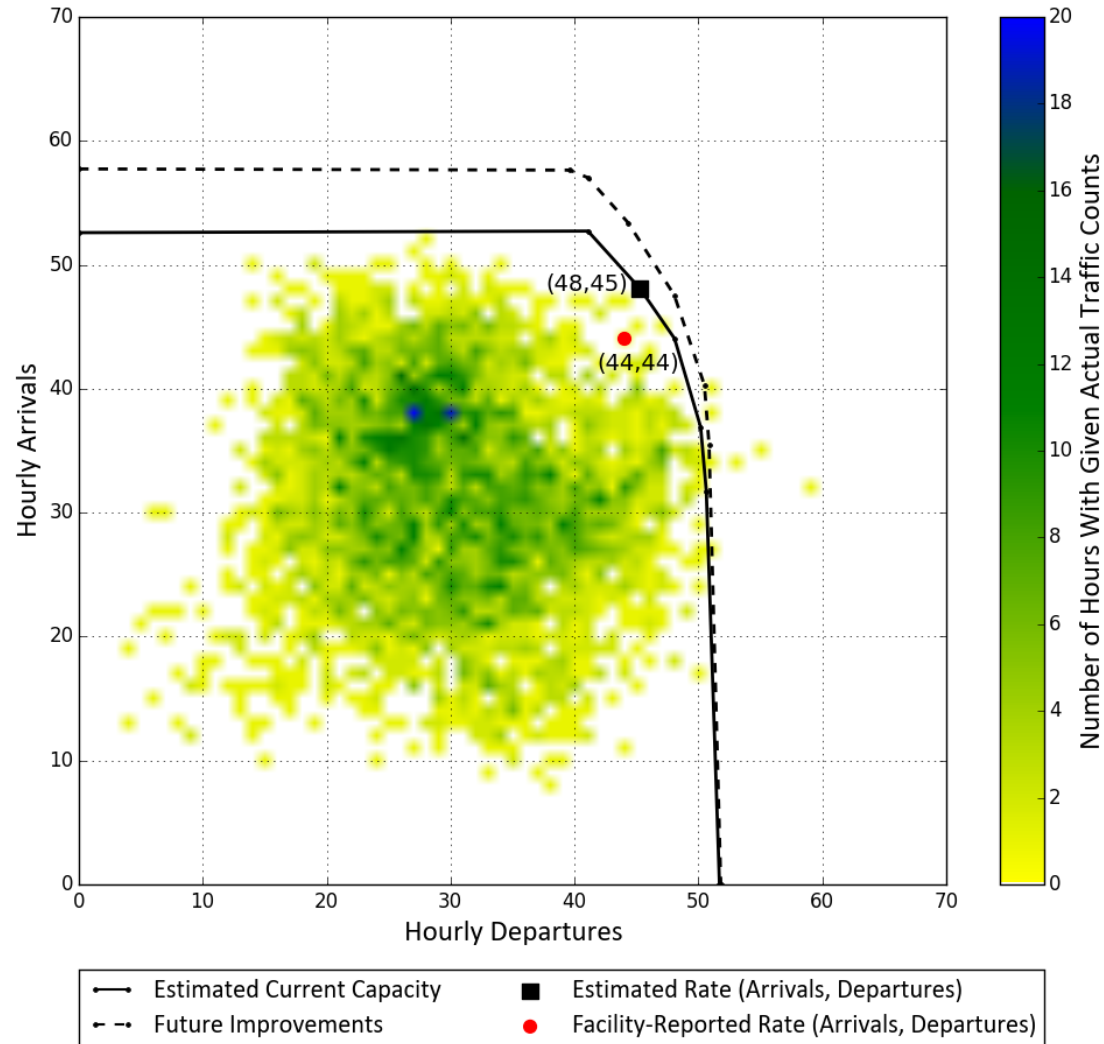


Actual traffic counts shown are for all Visual hours, all configurations.  
For data source information, see page 3.

Type Operations	Arrival Runways	Departure Runways	Hourly Rate	
			ATC Facility-Reported	Model-Estimated
Current Operations	34L, 34R	34C, 34R	88	93
Future Improvements	34L, 34R	34C, 34R	N/A	96

- **Future improvements:** Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Visual conditions in North flow is currently 88-93 operations per hour.
- Use of Runway 34C for departures is limited due to lack of queueing space.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity; Limited departure fanning is conducted from Runways 34C and 34R for non-jet aircraft.
- Additional spacing between arrivals to Runway 34R and between departures on Runways 34C may be employed in order to allow taxiing aircraft to cross the runways.

### Visual Weather Conditions



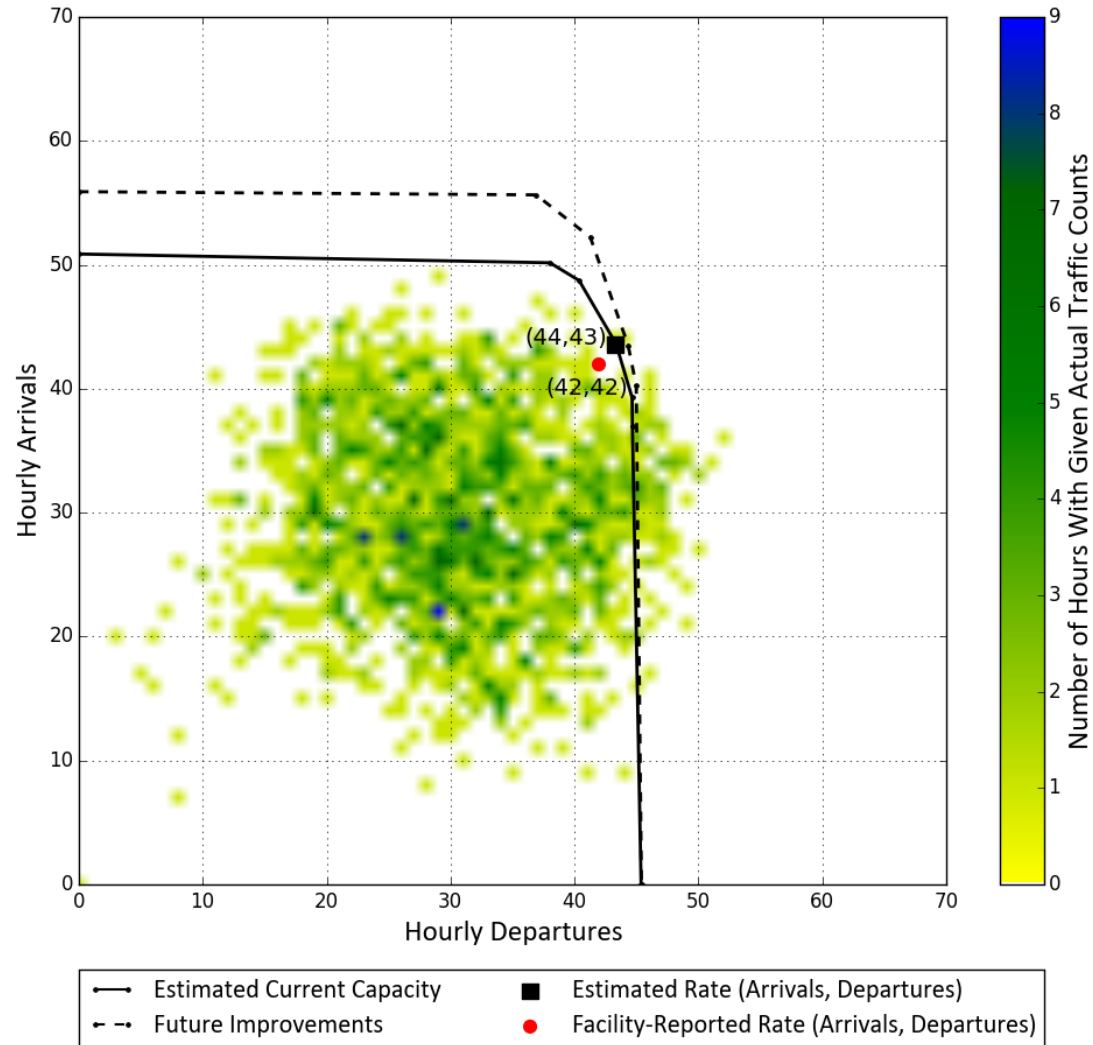
Actual traffic counts shown are for all Visual hours, all configurations.  
For data source information, see page 3.

Type Operations	Arrival Runways	Departure Runways	Hourly Rate	
			ATC Facility-Reported	Model-Estimated
Current Operations	16L, 16R	16C, 16L	84	87
Future Improvements	16L, 16R	16C, 16L	N/A	88

- **Future improvements:** Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Marginal conditions in South flow is currently 84-87 operations per hour.
- Reduced separation (2.5 NM) between arrivals is authorized for instrument approaches to Runway 16R.
- Arrivals to Runways 16L and 16R are dependent and staggered by 1.0 NM diagonally.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity.
- Additional spacing between arrivals to Runway 16L and departures on Runways 16C and 16L may be employed in order to allow taxiing aircraft to cross the runways.



### Marginal Weather Conditions

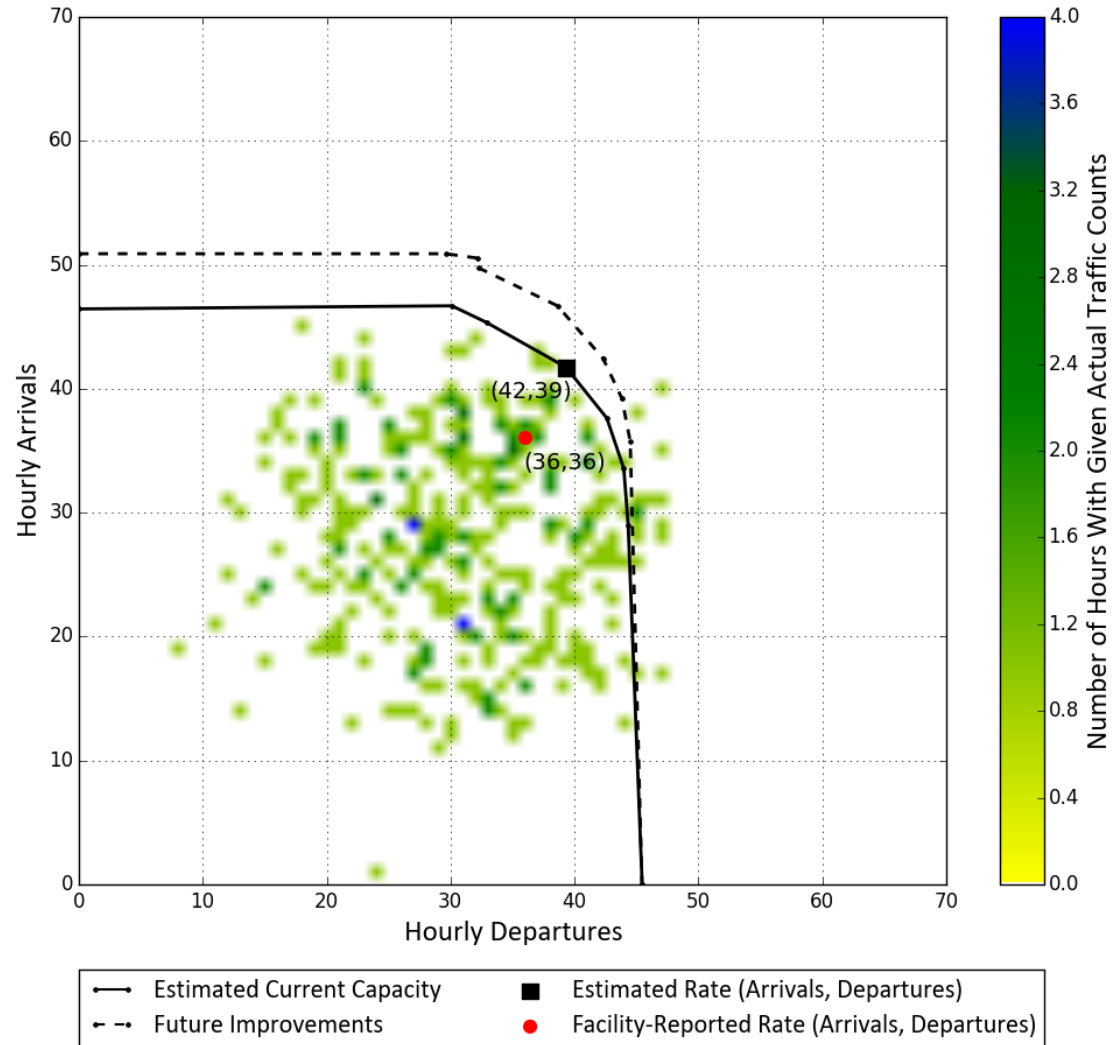


Actual traffic counts shown are for all Marginal hours, all configurations.  
For data source information, see page 3.

Type Operations	Arrival Runways	Departure Runways	Hourly Rate	
			ATC Facility-Reported	Model-Estimated
Current Operations	16L, 16R	16L	72	81
Future Improvements	16L, 16R	16L	N/A	84

- **Future improvements:** Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Instrument conditions in South flow is currently 72-81 operations per hour.
- Reduced separation (2.5 NM) between arrivals is authorized for instrument approaches to Runway 16R.
- Arrivals to Runways 16L and 16R are dependent and staggered by 1.0 NM diagonally.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity.
- Additional spacing between arrivals to Runway 16L may be employed in order to allow taxiing aircraft to cross Runway 16L.

### Instrument Weather Conditions

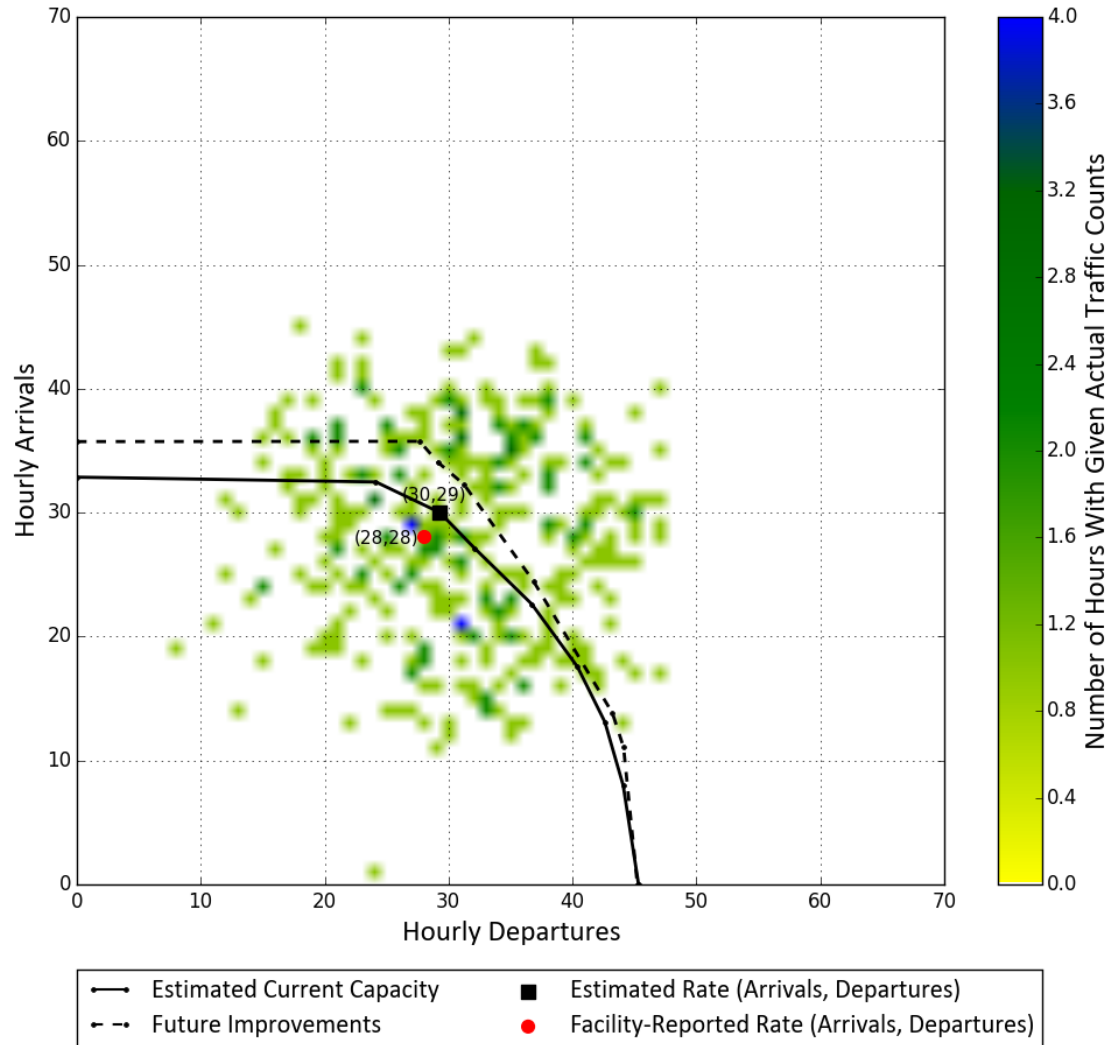


Actual traffic counts shown are for all Instrument hours, all configurations.  
For data source information, see page 3.

Type Operations	Arrival Runways	Departure Runways	Hourly Rate	
			ATC Facility-Reported	Model-Estimated
Current Operations	34L, 34R	34R	56	59
Future Improvements	34L, 34R	34R	N/A	63

- **Future improvements:** Improved Runway Delivery Accuracy, Wake Recategorization Phase 2.
- The capacity rate range in Instrument conditions in North flow is currently 56-59 operations per hour.
- The adversely staggered thresholds between Runways 34R and 34L cause departures and arrivals on the runways to operate dependently.
- Reduced separation (2.5 NM) between arrivals is authorized for instrument approaches to Runway 34L.
- Arrivals to Runway 34R are limited to aircraft requiring additional runway length for operational necessity.
- Consecutive departures are generally restricted to a single flow for noise abatement, which limits operational capacity.
- Additional spacing between arrivals to Runway 34R may be employed in order to allow taxiing aircraft to cross the runway.

### Instrument Weather Conditions



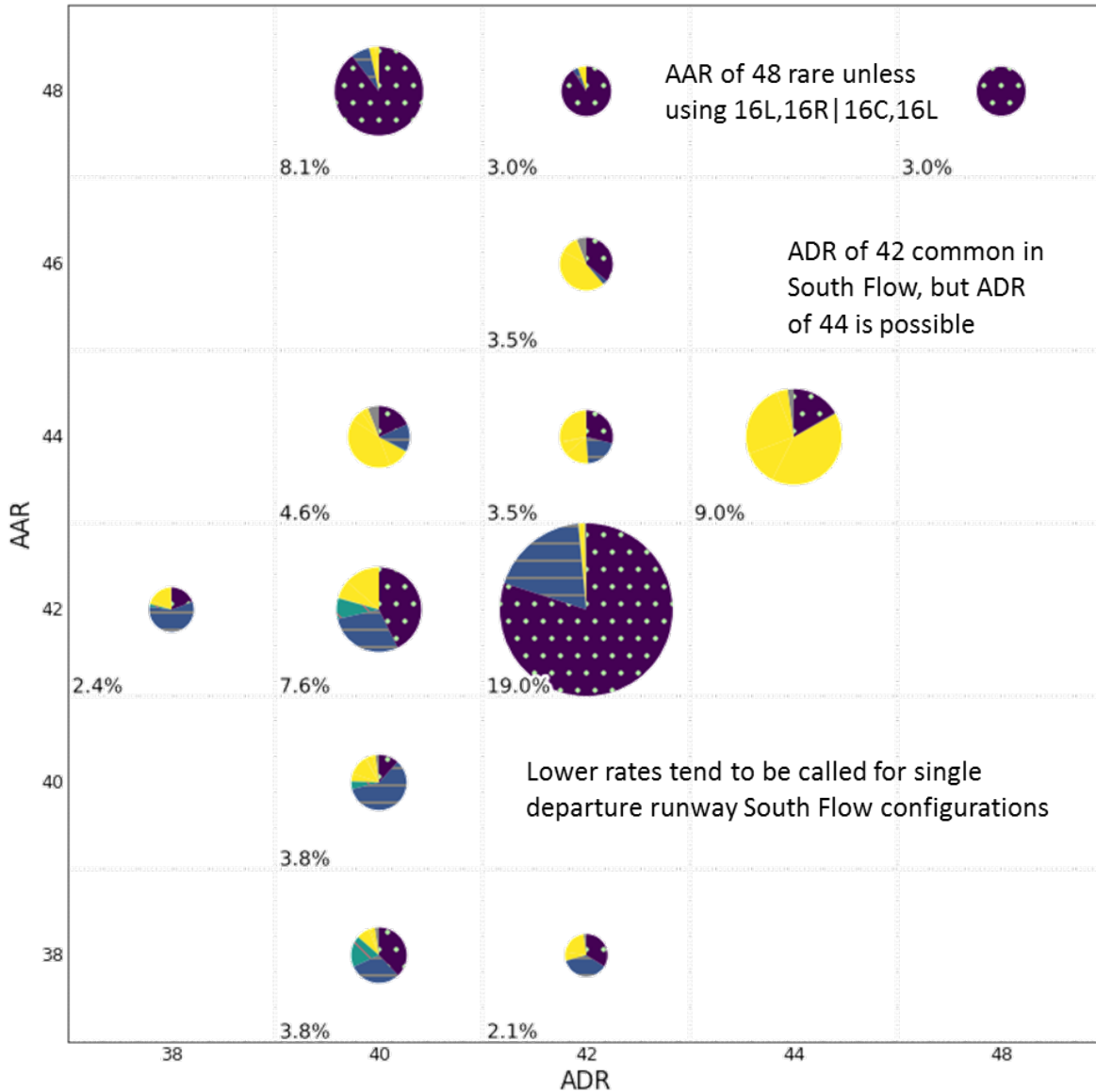
Actual traffic counts shown are for all Instrument hours, all configurations.  
For data source information, see page 3.

# Historical Called Rate and Configuration Usage by Flow

# HISTORICAL USAGE – SOUTH FLOW

## Called Rates

Wide range of rates called in South Flow



Other rates: 26.6%

Rates for all hours regardless of configuration, minimum 2% of time

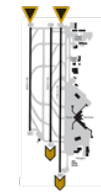
SOUTH FLOW FACILITY REPORTED RATES		
48,48 (VMC)	42,42 (MMC)	36,36 (IMC)*

\*36,36 called 0.6% of time

All data for hours from 15 Dec 2015 – 14 Dec 2016, 7 AM to 11 PM. Excludes variable winds and missing or incomplete data. Only shows rates called at least 2% of all hours.

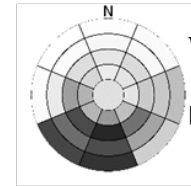
## Configuration Usage

### 16L,16R|16C,16L (50%)



#### RATES

- 42,42 (31%)
- 48,40 (15%)
- 42,40 (7%)
- 48,48 (6%)
- 48,42 (6%)



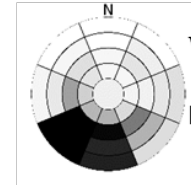
WIND & WEATHER  
VMC: 59%  
MMC: 38%  
IMC: 4%

### 16L,16R|16L (18%)



#### RATES

- 42,42 (20%)
- 40,40 (13%)
- 42,40 (12%)
- 42,38 (8%)
- 38,40 (7%)



WIND & WEATHER  
VMC: 48%  
MMC: 42%  
IMC: 10%

### Other South Flow > 2%

- 16C,16R|16C

### North Flow Configurations

### Other Configurations

## Key

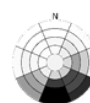
### Arrivals|Departures (percent of time in configuration)



#### RATES

90,90 (90%) Rates called at least 5% of time when configuration used

#### WIND & WEATHER



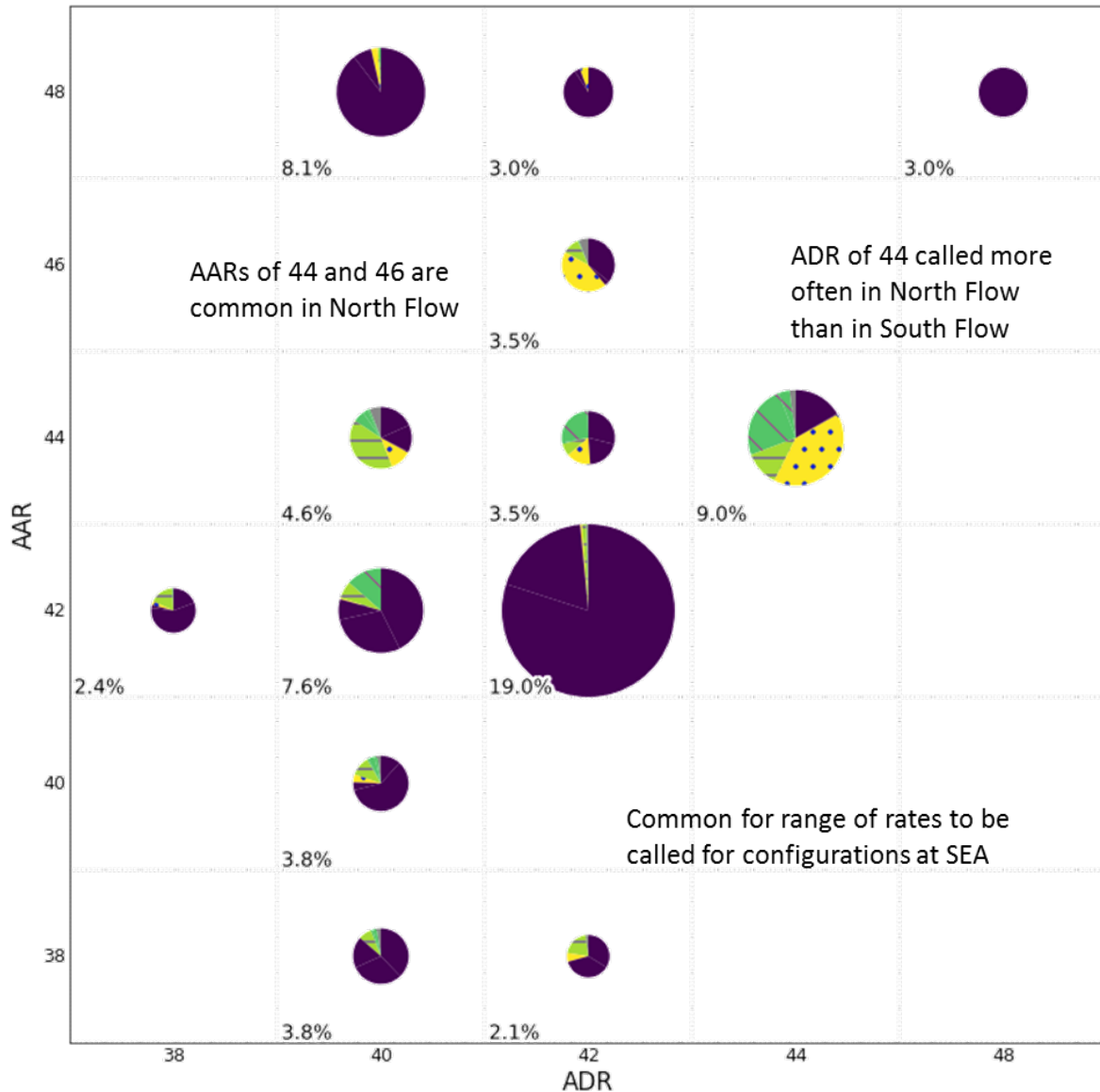
Wind speeds increase away from center (3 knot increments)

More common winds are darker

Percent of time spent in VMC/MMC/IMC when configuration used

# HISTORICAL USAGE – NORTH FLOW

## Called Rates



Other rates: 26.6%

Rates for all hours regardless of configuration, minimum 2% of time

NORTH FLOW FACILITY REPORTED RATES	
44,44 (VMC)	28,28 (IMC)*

\*28,28 called 0.1% of time

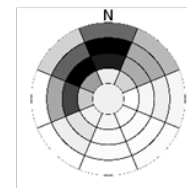
All data for hours from 15 Dec 2015 – 14 Dec 2016, 7 AM to 11 PM. Excludes variable winds and missing or incomplete data. Only shows rates called at least 2% of all hours.

## Configuration Usage

### 34L,34R|34C,34R (9%)



- RATES**
- 44,44 (41%)
  - 46,42 (17%)
  - 46,44 (9%)
  - 46,40 (7%)
  - 44,42 (6%)
  - 44,40 (6%)



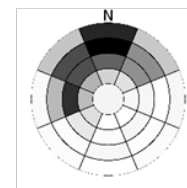
**WIND & WEATHER**

VMC: 97%  
MMC: 3%  
IMC: 0%

### 34L,34R|34R (9%)



- RATES**
- 44,40 (22%)
  - 44,44 (13%)
  - 44,36 (12%)
  - 42,40 (6%)
  - 38,42 (5%)



**WIND & WEATHER**

VMC: 89%  
MMC: 10%  
IMC: 1%

### Other North Flow > 2%

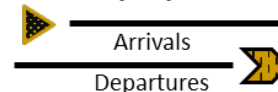
- 34C,34L|34R
- 34C,34L|34C,34R
- 34C,34L|34C

### South Flow Configurations

### Other Configurations

## Key

Arrivals|Departures (percent of time in configuration)



### RATES

90,90 (90%) Rates called at least 5% of time when configuration used

### WIND & WEATHER

Wind speeds increase away from center (3 knot increments)

More common winds are darker

Percent of time spent in VMC/MMC/IMC when configuration used