

Study Resource Committee (SRC) Meeting

T. F. Green Airport Master Plan Update

Capacity Constrained Forecast Scenarios

January 24, 2002

5:30 p.m.



Rhode Island Airport Corporation



Landrum & Brown Team

Capacity Constraining Scenarios

- **Scenario 1 - No new flights**
 - Potential ways to limit future activity to year 2000 levels
- **Scenario 2 - Reduced facilities**
 - Considers future activity if the current facilities are reduced
- **Scenario 3 - No new/additional facilities**
 - Considers future activity if current facilities are not expanded
- **Scenario 4 - Some level of facility improvement**
 - Considers future activity with various facility improvements



Summary of Capacity Constrained Scenarios

Scenario	2020 Million Annual Passengers	Annual Operations	Major Findings
Existing Role Medium Case Forecast Demand	10.8	229,130	n/a
No New Flights	5.4 (Achievability has not been established)	155,600 (Achievability has not been established)	While it may be possible to restrict activity to some extent at T. F. Green, it would be difficult and expensive and require years of study.
Shorten Runway 16-34	10.4	210,600-215,400	Runway 16-34 offers benefits in terms of noise reduction, wind coverage, controller flexibility, and use as a back-up runway.
Close Runway 5L-23R	10.8	219,500-224,300	The Runway Incursion Action Team recommends the closure of this runway to reduce the potential for runway incursions.
Existing Airfield Facilities	10.8	221,400-225,200	Passengers would experience high delays but most demand could be served
Existing Terminal Facilities	9.8	214,330	Passengers would experience high delays but most demand could be served
Existing Landside Facilities	9.5	203,600	Passengers would experience high delays but most demand could be served
Some Level of Facility Improvement	10.8	229,130	Marginal improvements would allow all demand to be served, but high delays and congestion would result with under-developed facilities.



Where Are We Today?

Airport Element	Current Capacity (Passengers)	Current Demand (Passengers)	Approximate Utilization
Airfield	9,307,900	5,430,900	58%
Terminal	6,701,400	5,430,900	81%
Landside	7,997,600 ^{1/}	5,430,900	68%

1/ Based on key airport intersections along Post Road.

- The Medium growth Case Existing Role forecast, was used for purposes of comparing demand to capacity for all scenarios.**



Scenario 1 - No New Flights

- **Limits future activity to year 2000 levels (5.4 million annual passengers and 155,600 annual aircraft operations)**
- **Would not allow any additional air service**
- **Airlines will not voluntarily stop adding new service**
- **Potential ways to stop growth:**
 - **Government limitations**
 - **Airport/airport operator limitations**



Scenario 1 - No New Flights Summary

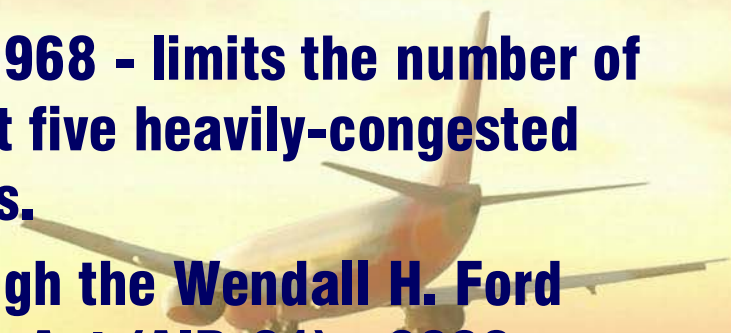
Scenario 1 - No New Flights

- **Government** - State would have to go through FAR Part 161 process
- **Jurisdiction** - RIAC may have jurisdiction to restrict (but not prohibit) flights to some degree.
- **Growth** - Restrictions generally have minor impact on growth.
- **Lead time** - Attempting to implement restrictions would require years to study.
- **Precedent** - Three airport are pursuing restrictions.



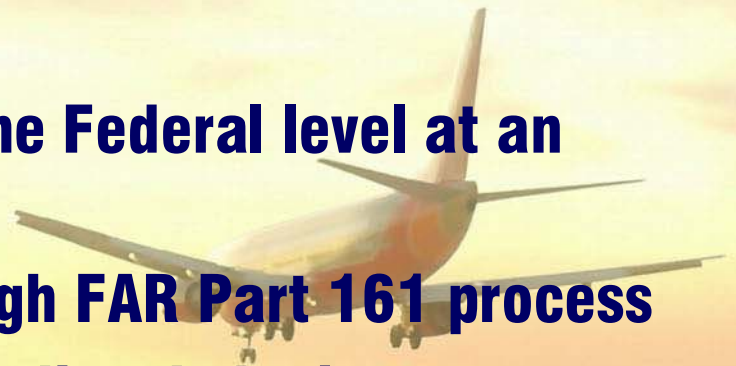
Scenario 1 - Government Limitations

- **Two types - Federal and State/Local**
- **Federal government regulation**
 - **Federal government had jurisdiction to regulate domestic fares, routes and schedules from the 1930s to 1978**
 - **Airline Deregulation Act of 1978 - Eliminated regulatory functions of the Federal government domestically in order to promote a competitive market for airline services.**
 - **High Density Rule (slot rule) - 1968 - limits the number of operations during peak hours at five heavily-congested airports to regulate traffic flows.**
 - **Elimination of slot system through the Wendall H. Ford Aviation Investment and Reform Act (AIR-21) - 2000**



Scenario 1 - Government Limitations

- **Example of local government regulations - Long Beach - cap on daily departures (1981)**
- **State/local government must now go through the FAR Part 161 process enacted in 1991 to be able to enact such restrictions**
- **What would need to be done to achieve government restrictions?**
 - **Never been done before on the Federal level at an airport such as T.F. Green**
 - **State would have to go through FAR Part 161 process**
 - **Precedent - None at small/medium hub airports**



Scenario 1 - Airport/Airport Operator Limitations

- **Peak period pricing**
 - Aims to spread activity more evenly throughout the day
 - Does not limit total daily activity
- **General aviation activity**
 - No legal jurisdiction to exclude general aviation
 - Some restrictions have been upheld
 - Raise landing fees
 - Limit facilities (T-hangers)
 - **Conclusion - a small portion of one component might be discouraged**



Scenario 1 - Airport/Airport Operator Limitations

- **Encourage use of other airports**
 - **On-going regionalization strategies**
 - **Fly New England**
 - **Regional System Plan**
 - **MASSPORT's regionalization strategy**
 - **Currently encourage use of T.F. Green as an alternative to Boston Logan**
 - **It is unlikely that a significant amount of demand will shift to other air carrier airports**
 - **Area general aviation airports do not have the necessary facilities to accommodate passenger activity**
 - **Boston Logan, Manchester Airport, Worcester Airport, or Hanscom Field**



Scenario 1 - Airport/Airport Operator Limitations

- **Noise restrictions - Part 150**

- **Voluntary process provides recommendations on how to mitigate and prevent noise**
- **Does not enable airport to limit activity**
- **At best, a small portion of traffic may choose another airport**



Scenario 1 - Airport/Airport Operator Limitations

- **Noise restrictions - Part 161**
 - **Conduct an Environmental Assessment and hold public meetings**
 - **The restriction must not create an undue burden on interstate, foreign commerce, or the national aviation system**
 - **Undertake a rigorous benefit-cost analysis (in terms of noise reduction)**
 - **Benefits to the neighborhoods surrounding T.F. Green would need to be compared to the impacts at other airports.**
 - **In the 11 years since FAR Part 161 has been established, there have been six such studies evaluating minor restrictions.**
 - **Three airports cancelled studies before completion**
 - **Three studies are currently underway**



Scenario 1 - Summary

- **Government** - State would have to go through FAR Part 161 process
- **Jurisdiction** - RIAC may have jurisdiction to restrict (but not prohibit) flights to some degree.
- **Growth** - Restrictions generally have minor impact on growth.
- **Lead time** - Attempting to implement restrictions would require years to study.
- **Precedent** - Three airport are pursuing restrictions.



What is Capacity?

- **The processing capability of a facility over a period of time.**
- **Based on delay or levels of service**
- **It is unlikely that growth will stop once a theoretical capacity limit is reached.**
- **Capacity determinations are best used for planning purposes but are less useful in defining limitations on growth.**



What is Delay?

- **Average time in minutes per aircraft operation**
- **As delays increase, airlines react by altering flying habits and fleet mix choices.**
- **No universal standard of acceptable delay**
 - **FAA considers an airport to be congested if average delay/operation exceeds five minutes.**
 - **The American Association of Airport Executives (AAAE) considers four to six minutes of average delay/operation to be highest level of acceptable delay.**
- **Many U.S. airports are currently experiencing delays in excess of these levels.**
- **Six minutes of average delay per operation is used as the maximum acceptable delay level for purposes of defining limitations on growth.**



Scenario 2 - Reduced Facilities

- **How could reducing existing facilities limit traffic?**
 - **Runway 16-34 - Reduce length to meet current FAA design standards for Runway Safety Areas (RSA)**
 - 25-50 percent reduction in general aviation activity
 - 5,100 annual air carrier/commuter cancellations
 - **Runway 5L-23R - Close Runway 5L-23R to reduce the potential for runway incursions**
 - 25-50 percent reduction in general aviation activity
 - No change in passenger and cargo activity



Scenario 2 - Runway 16-34

- **Runway 16-34 could be reduced to approximately 4,500 feet in order to provide full RSAs.**
- **Use would be limited to Cape Air, small cargo, and general aviation aircraft.**
- **All other traffic would be forced to use Runway 5R-23L.**
- **Airfield capacity would be reduced to single runway capacity due to the runway length limitations .**
- **2020 demand exceeds airfield capacity.**



Scenario 2 - Runway 16-34

- **Effect on general aviation:**
 - **When delays increase, general aviation and military operations typically decrease.**
 - **Corporate general aviation operators would be more likely to tolerate delay; single-engine private pilots will be less tolerant of increases in delay.**
 - **Single-engine aircraft will make up 30 percent of the general aviation/military fleet in 2020.**
 - **General aviation single-engine operations would be reduced between 25-50 percent in 2020.**



Scenario 2 - Runway 16-34

- **Effect on passenger and cargo activity**
 - Reducing Runway 16-34 forces passenger and cargo operations to Runway 5R-23L.
 - Eliminates the capability to use Runway 16-34 as a crosswind runway and back-up runway during periods of maintenance and snow removal.
 - Runway 5R-23L alone does not provide the required wind coverage for all aircraft types.
 - The Part 150 study found that increased use of Runway 16-34 offers “significant noise benefits”.
 - A crosswind runway provides flexibility for air traffic controllers.
 - Result - 5,100 annual cancellations in 2020 due to the shortening of Runway 16-34



Scenario 2 - Runway 16-34 Activity

- Shortening Runway 16-34 could result in a 25-50 percent reduction in general aviation activity and 5,100 annual air carrier/commuter cancellations by 2020.
- Resulting delays would be within acceptable range.

	Annual Passengers	Passenger and Cargo Operations	General Aviation/ Military Ops.	Annual Operations
Medium Forecast	10,822,700	164,900	64,230	229,130
<u>Reduced Length 16-34</u>				
25% GA Reduction ^{1/}	10,407,500	159,800	59,400	219,200
50% GA Reduction ^{1/}	10,407,500	159,800	54,600	214,400

^{1/} Represents a 25 and 50 percent reduction in general aviation/military single-engine piston aircraft activity.

- The FAA will allow temporary improvements without upgrading the RSAs in order to allow RIAC study the issue further.



Scenario 2 - Runway 5L-23R

- **FAA Runway Incursion Action Team (RIAT) recommends closure of Runway 5L-23R in order to reduce the potential for runway incursions.**
- **Runway 5L-23R:**
 - **Only used during daytime visual conditions by small aircraft**
 - **Provides an additional two to three operations per hour beyond the capacity of a single runway during those conditions**
 - **Therefore, there is no limit on commercial traffic.**
- **General aviation single-engine aircraft would be reduced between 25-50 percent in 2020 because general aviation is sensitive to increases in delay.**



Scenario 2 - Runway 5L-23R Activity

- Closing Runway 5L-23R could result in a 25-50 percent reduction in general aviation activity in 2020; no change in passenger and cargo activity would likely occur.

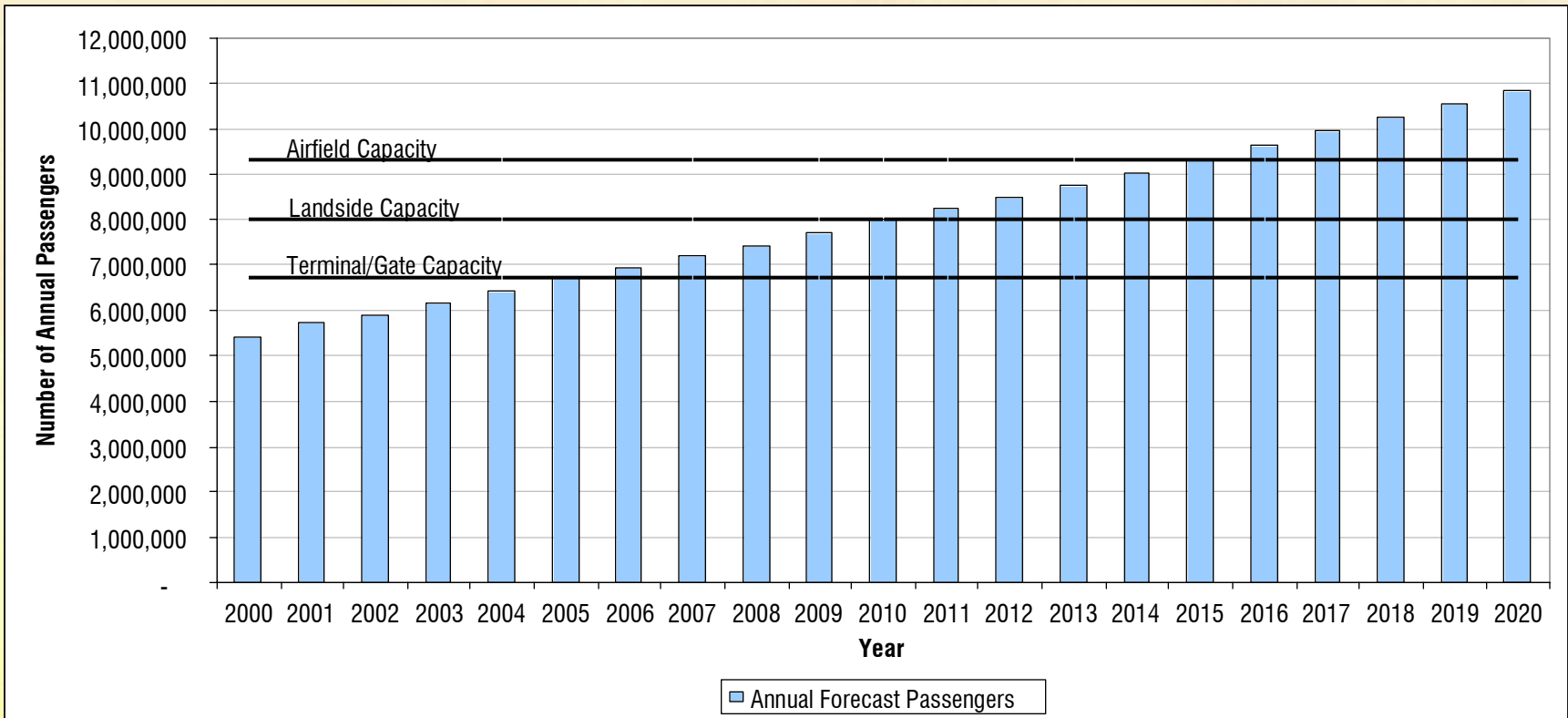
	<u>Annual Passengers</u>	<u>Passenger and Cargo Operations</u>	<u>General Aviation/ Military Ops.</u>	<u>Annual Operations</u>
Medium Forecast	10,822,700	164,900	64,230	229,130
<u>Without Runway 5L-23R</u>				
25% GA Reduction ^{1/}	10,822,700	164,900	59,400	224,300
50% GA Reduction ^{1/}	10,822,700	164,900	54,600	219,500

1/ Represents a 25 and 50 percent reduction in general aviation/military single-engine piston aircraft activity.



Scenario 3 - No New/Additional Facilities

- What effect could limiting facilities at T.F. Green have on activity?



Note: Landside capacity is determined based on key intersections along Post Road.



Scenario 3 - No New/Additional Facilities

- **Capacity is dynamic**
 - **The airlines, general aviation pilots, and passengers generally react to increasing delays.**
 - **These restrictions can increase or decrease capacity.**
 - **General aviation activity may decrease in response to high delays.**
 - **This results in a more uniform size aircraft fleet mix which increases capacity.**
- **Each of the three airport components are evaluated independently (airfield, terminal, and landside).**



Scenario 3 - Summary

- **No additional airfield facilities:**
 - General aviation would be reduced by 20 to 40 percent
- **No additional terminal facilities:**
 - Passengers would be reduced 10 percent
 - Operations would be reduced by 7 percent
- **Landside facilities:**
 - Passengers would be reduced 15 percent
 - Cargo, general aviation would be reduced by 20 percent



Scenario 3 - Airfield Facilities

- **Similar to Runway 5L-23R scenario**
- **Only difference is level of general aviation - only users of Runway 5L-23R**
- **General aviation would be reduced by 20 to 40 percent from 2020 forecasts due to increased delays (slightly less than Runway 5L-23R scenario because 5L-23R is available in this scenario).**
- **Passengers would experience higher delays than today but within acceptable range.**

	<u>Annual Passengers</u>	<u>Passenger and Cargo Operations</u>	<u>General Aviation/ Military Ops.</u>	<u>Annual Operations</u>
Medium Forecast	10,822,700	164,900	64,230	229,130
<u>No New Airfield Facilities</u>				
20% GA Reduction ^{1/}	10,822,700	164,900	60,300	225,200
40% GA Reduction ^{1/}	10,822,700	164,900	56,500	221,400
1/ Based on a 20 and 40 percent reduction in general aviation/military single-engine piston aircraft activity.				



Scenario 3 - Terminal Facilities

- **Passengers per gate method**
- **246,900 annual passengers per gate processed in 2000**
- **491,900 annual passengers per gate likely in 2020**
- **Average annual passengers per gate for top 10 airports (446,100) used as the maximum threshold for T.F. Green**



Scenario 3 - Terminal Facilities

- **Passengers would be reduced 10 percent from the Medium forecast levels.**
- **Operations would be reduced by 7 percent from the Medium forecast levels.**
- **No expansion to the terminal would result in higher congestion with a decreasing level of service.**
- **Cargo, general aviation, and military activity would remain unchanged.**

	<u>Annual Operations</u>	<u>Passenger Operations</u>	<u>Other Operations</u>	<u>Total Operations</u>
Medium Forecast	10,822,700	158,700	70,430	229,130
No New Terminal Facilities	9,814,200	143,900	70,430	214,330



Scenario 3 - Landside Facilities

- **Criteria based on six levels of service (LOS A to LOS F).**
- **LOS D - considered acceptable**
- **Eight intersections (six are signalized) will be LOS E or F by 2020.**
- **Some delays are commuter based not airport based.**
- **Roads can function at LOS F (Boston or Atlanta).**



Scenario 3 - Landside Facilities

- **As roads approach LOS F:**
 - **Some airport passengers, as well as local traffic, may begin looking for alternative routes or modes of getting to the airport.**
 - **The additional congestion would lead to increased automobile emissions effecting the air quality.**
- **Traffic habits would likely start to change after 2015 when six intersections are at LOS F and Post Road would be approaching LOS F**



Scenario 3 - Landside Facilities

- **Passengers would experience high delays but most of the total demand could be served.**
- **Passengers would be reduced 15 percent from the Medium forecast levels.**
- **Cargo, general aviation would be reduced by 20 percent due to roadway congestion.**

	<u>Annual Operations</u>	<u>Passenger Operations</u>	<u>Other Operations</u>	<u>Total Operations</u>
Medium Forecast	10,822,700	158,700	70,430	229,130
No New Landside Facilities	9,500,000	147,300	56,300	203,600



Scenario 4 - Some Level of Facility Improvement

- **What effect could providing some level of facilities at T.F. Green have on Activity?**
- **Airfield facilities**
 - **Not expanding airfield results in a small level of unserved passengers and operations.**
 - **Marginal capacity improvements would allow T.F. Green to accommodate unconstrained demand, but still at high delay levels.**
 - **Runway extensions would allow airlines to better service passengers by providing non-stop service to long-haul destinations.**
 - **Providing two parallel runways of the necessary length would allow T.F. Green to serve forecast demand at reasonable delay levels - high level of service for passengers.**



Scenario 4 - Terminal and Landside

- **Terminal facilities**
 - Forecast demand could be served with three additional gates although at high levels of delay.
 - Additional gates would improve level of service.
- **Landside facilities**
 - Forecast demand could be served if improvements to key intersections are made although passengers would still experience high delays.
 - Additional improvements would improve passenger experience and reduce delay and congestion.



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