

Appendix Addendum

In response to the review of the Draft Master Plan and the accompanying Airport Layout Plan Drawing Set, the Runway 13R/31L Safety Area Mitigation Program has been review by various FAA Divisions. A copy of the Air Traffic Control Manager's response (dated June 26, 2001) is provided on the following two pages. The comments in this response have been taken into consideration in the revisions made the Airport Layout Plan Drawing Set included in this Revised Draft Master Plan document. In addition, the comments related to taxiway markings, hold line markings, administration of agreements, and the letter of agreement will be adhered to in the implementation of the Safety Area Mitigation and Runway Use Program improvements.

It should be noted that in consideration of comments received from the FAA, the Taxiway X-Ray (X) designation referred to in this Appendix, has been changed to Taxiway Zulu (Z).

Post-It® Fax Note	7671	Date	6/28/01	# of pages	2
To	MARIL McFARLAND	From	John C. Sillard		
Co./Dept.	KCIA	Co.	KCIA		
Phone #		Phone #			
Fax #		Fax #			

6005
 CPT
 620-mail
 CC: A D C



U. S. Department
 of Transportation
**Federal Aviation
 Administration**

Memorandum

Subject: Response to FAA Study Number 00-SEA-297-NRA,
 King County International Airport Layout Plan

Date: JUN 26 2001

From: Air Traffic Division Manager, ANM-500

Reply to
 Attn. of:

To: Manager, Airports Division, ANM-600

SAFETY AREA

This response addresses only the proposed establishment of an 880-foot non-standard runway surface at the approach end of Runway 13R at King County International Airport, Boeing Field (BFI). The Air Traffic Division does not object to the establishment of this non-standard area, which has been designated as the Prior Permission Required Pavement (PPRP). However, we do have concerns regarding the implementation and use of the PPRP. This memorandum details the impacts to BFI operations that we envision will result from the establishment of the PPRP, as well as issues that need to be resolved prior to the approved use of the new surface.

- Part 77 Surfaces.** 14 CFR, Part 77.21(a) establishes standards for determining obstructions to air navigation. Part 77.21(b) states the primary surface extends 200 feet beyond the end of the runway. It also states "At those airports...having a defined landing and takeoff area with no defined pathways for the landing and taking off of aircraft, a determination shall be made as to which portions of the landing and takeoff area are regularly used as landing and takeoff pathways. Those pathways so determined shall be considered runways and an appropriate runway surface as defined in 77.25(c) will be considered as being longitudinally centered on each runway so determined and each end of that primary surface shall coincide with the corresponding end of that runway." Advisory Circular 150/5325-4A, Runway Length Requirements for Airport Design, Chapter 1, paragraph 2, defines regular use as at least 250 operations per year. Planned use of the PPRP indicates more than 300 operations per year, which meets this definition. Therefore, the primary surface must be reestablished and depicted on the Airport Layout Plan (ALP).
- Verification of taxiway centerline markings.** Several configurations have been considered and it is our recommendation that the markings for Taxiway B remain in their present configuration. This is to help ensure unauthorized aircraft do not taxi beyond Taxiway B1 to the PPRP. The taxiway centerline markings should not be continuous from Taxiway B into Taxiway X. Taxiway B markings should terminate at taxiway B1 and Taxiway X markings should not begin until substantially north of Taxiway B1.

3. Verification of required Taxiway/Runway Holding Position markings. Location of the hold line is critical. The three options we recommend, in priority preference, are as follows:

a. Place the hold line coincidental with the runway safety area. This will facilitate the ability of controllers to clear aircraft to the PPRP. If placing the hold line at this location raises the approach minimums for the ILS Runway 13R approach, then option "b." becomes the preferred option.

b. Place the hold line at the point the Part 77 approach surface crosses Taxiway X (about 400 feet north of Taxiway B1). If this is not feasible due to any approach and/or airport surfaces, option c) is acceptable.

c. Place the hold line at the end of Taxiway B, as currently depicted on the ALP. It is important that all parties understand that if this is determined to be the best location for the hold line, it will be necessary to increase the arrival spacing to provide a 15 to 30 mile "slot" to accommodate each PPRP departure. This will result in substantial delays for both aircraft departing on the PPRP and for aircraft arriving on Runway 13R. This, in turn, will create a marked increase in controller workload and coordination for Boeing ATCT and Seattle TRACON.

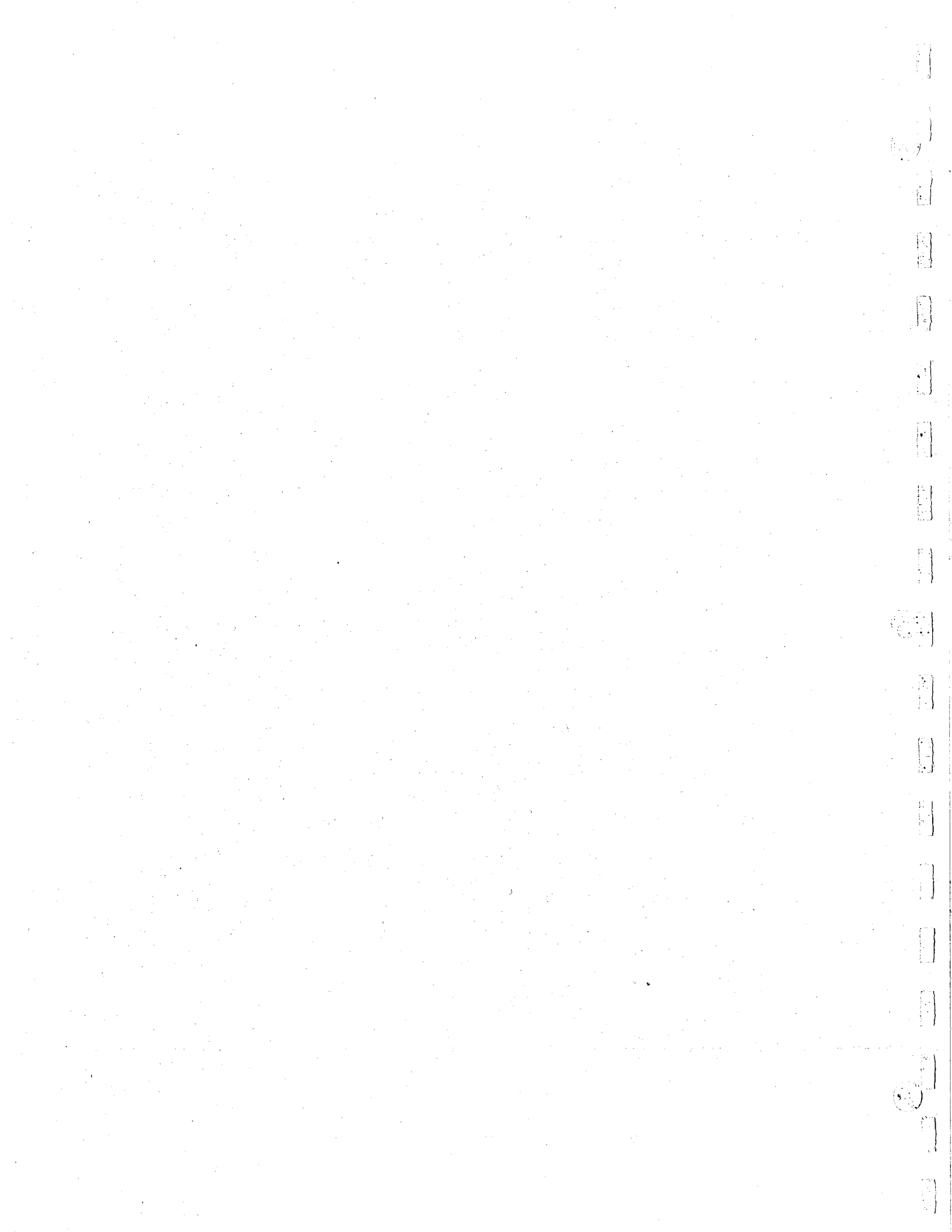
4. Administration of agreements. Ensuring adherence to any agreement entered into by the airport and The Boeing Company shall not be the responsibility of the FAA. Air Traffic Control responsibilities are to ensure safe and efficient operations. Controllers will not question pilots who state they are authorized to utilize the PPRP of the runway. Additionally, FAA personnel should not respond to complaints regarding the existence and/or use of the PPRP; that will be the responsibility of King County International Airport/Boeing.

5. Letter of Agreement (LOA). A Letter of Agreement will be established between Boeing ATCT and King County International Airport to define the operating procedures for the use of the PPRP and Runway 13R. Items 1 through 4 above will need to be resolved prior to the establishment of this LOA.

Procedures must be established, and operational personnel trained in the use of those procedures. Therefore, Air Traffic will require definitive resolution to all of the above issues and concerns, as well as the impact of the construction equipment, no later than 90 days prior to planned use of the PPRP.

If there are additional Airport Layout Plan issues that must be addressed, please advise our Airspace Branch Manager, Carla Mawhorter, at extension 2520.


David B. Johnson



King County International Airport / Boeing Field

Runway 13R/31L Safety Area Mitigation And Runway Use Program

Table of Contents

Runway 13R/31L Safety Area Mitigation	2
Runway Improvements	2
Taxiway System Improvements.....	3
Impacts of Taxiway Separation to Boeing Company	3
Environmental Mitigation.....	4
MAP - Future Change in DNL Noise Level	6
Runway Use Program	7
Introduction and Purpose	7
Criteria for Use of Special Use Area – Runway 13R	8
Approval	8
Public Notice.....	8
Sample PPR Authorization Request Form.....	9
Memorandum of Agreement.....	10
How this Proposal Would Work.....	13
Operation.....	13
Lighting.....	14
Signage.....	14
Pavement Markings	14
Procedures at Other Airports as Examples for Boeing Field.....	16
Approved Procedures Already in Use Elsewhere.....	17

King County International Airport Runway 13R/31L Safety Area Mitigation

The runway safety area on the south end of the King County International Airport's main runway (approach end of Runway 31L) does not meet current FAA standards. It has also been documented that maintaining a 10,000 foot takeoff runway length is a vital component necessary to support some of the operational activity at the airport (primarily the Boeing flight test program and the AWACS modification and maintenance program).

Runway Improvements

A system of improvements is recommended to bring the safety area up to FAA standards, maintain the 10,000-foot takeoff runway length, and minimize potential effects on surrounding land uses. The first component of this system of recommendations is to shift the start-point for Runway 13R departures (departures to the south) approximately 880 feet to the north. The basic improvement is to construct approximately 880 feet of pavement on the north end of the main runway plus the required blast pad (400 feet in length). This new 880 feet of pavement will only be utilized by those aircraft that require a takeoff Accelerate Stop Distance Available (ASDA) length which exceeds 9,120 feet or require a takeoff runway length beyond 9,120 feet for special operations such as aircraft testing (e.g., the Boeing flight test program and the AWACS modification/maintenance program). Due to the new pavement's limited use for special operations, it will be referred to as the **Special Use Area – Runway 13R**. Based on master plan forecast, we conservatively estimate about 322 operations a year would require the use of the Special Use Area – Runway 13R by the end of the planning period (2017).

The second component of the system is to implement FAA's declared distances criteria, which defines the usable runway length in consideration of required safety area standards. Declared distances allow an airport operator to light and mark the runway in a manner that designates where landing thresholds are located and where the takeoff roll begins and ends. The recommended system of improvements provide the following operational characteristics:

1. The landing threshold on the north end of the runway remains in its existing location. In consideration of the safety area available, there is 9,120 feet of length declared available for aircraft landing on Runway 13R.
2. The landing threshold on the south end of the runway will be displaced approximately 80 additional feet to the north (the threshold was displaced 800 feet for the implementation of a new Instrument Landing System Approach to Runway 31L in 1998). In consideration of safety area available, there are (and will be in the future) 9,120 feet declared available for aircraft landing on Runway 31L.
3. For south departures, aircraft that require a takeoff ASDA beyond 9,120 feet or require a takeoff runway length beyond 9,120 feet for special operations such as aircraft testing (e.g., the Boeing flight test program and the AWACS modification/maintenance program), can begin their take-off roll 880 feet to the north of the existing landing threshold on the

proposed new pavement designed for this special use. Those aircraft that do not need an ASDA beyond 9,120 feet will utilize the existing runway end, south of the landing threshold, for the beginning of their takeoff roll.

4. For departures to the north, aircraft will continue to operate as they do now. They will utilize the existing southern runway end for the beginning of their takeoff roll. In consideration of declared distances, north departures will have a 10,000-foot takeoff runway length available.

Note that the new pavement on the north end of the runway will not be available for landing or takeoff to the north (i.e., operations on Runway 31L).

Taxiway System Improvements

The existing taxiway system at the airport provides efficient routing for taxiing aircraft between the runway system and various airport parking areas on the airport in consideration of present activity levels. The airport currently has full parallel taxiway systems serving the southwest side of the main runway and the northeast side of the secondary runway.

Taxiway access to the new pavement on the north end of the main runway is to be provided by an extension of the existing parallel Taxiway Bravo (B) which will be designated as Taxiway X-ray (X). Because the new runway pavement will receive only limited use as described above, the new taxiway pavement has been given a different name. The different designation of the new taxiway pavement will allow air traffic control tower personnel to more easily direct taxiing aircraft to the proper position for the start of the takeoff roll. In addition, the new taxiway pavement will be signed, marked, and lighted to indicate its limited use role.

Taxiway X will be constructed with a 325-foot taxiway to runway centerline separation, allowing an adequate Taxiway Object Free Area (TOFA) to be maintained between the taxiway and the Boeing Company's test stall A-6. A primary concern is the FAA standard 400 ft runway/taxiway centerline separation for new construction. However, a separation of more than the existing 325 feet will be very costly because the northwest side is extensively developed. Considering the very high cost to The Boeing Company of modifying test stall A-6 (\$3-3.5 million), Taxiway X has been designed to minimize impacts to the Boeing Company leasehold while maintaining the current level of safety.

Impacts of Taxiway Separation to Boeing Company

The Boeing Company's Facilities Asset Management organization has been supporting the airport runway relocation effort through their West Region Planning Office. Working with KCIA management, it has reviewed a number of suggested taxiway configurations and developed estimates of physical and economic impact for each. Even the best alternative exacts a cost. The worst choices were so expensive as to make the project impractical.

The minimum impact to The Boeing Company is reflected in the present proposal, a straight extension of the present west taxiway ("Bravo") to serve the new Special Use Area - Runway 13R. In maintaining the existing 325-foot runway-taxiway centerline separation, Boeing estimates its cost will be about \$500,000. This provides for new blast fence and sound wall construction along the proposed new taxiway to protect the North Field Labs area located north of the "A" parking concourse, and some minor blast fence revisions on the east corner of stall A-6 (nearest the taxiway.) There would be minimal impact to parking stalls except when very large airplanes are parked in A-6, such as the 777. In that case, to honor the new TOFA, the airplanes could be oriented slightly more westward to meet clearance requirements.

If the west taxiway were extended with a separation exceeding 325 feet, the encroachment onto Boeing "A" concourse stalls becomes severe. As before, it would require new blast fence/sound wall construction along the taxiway for the North Field Labs. It would also force significant realignment of the "A" parking stalls with probable loss of stall A-4 used for 737 and 757 aircraft. The "A" stalls are usually busy even without major test programs, so this is a substantial operating hindrance. All parking stalls have in-pavement service for utilities, aircraft power, and computer data buss. Such realignments would require new underground utility vaults for 400 Hz electric power, air and water, and relocation of four crew shelters. This has been estimated to cost approximately \$3.5 million. This cost, along with the loss of one of six parking stalls, would be an unacceptable burden. Undoubtedly, The Boeing Company would want to reconsider the relative impact of the overall runway project. It would be forced to strongly consider operating with a shortened runway or conducting some or all of its flight operations elsewhere. The accompanying job impacts could adversely impact the region's economy.

Environmental Mitigation

Over the past several years the King County International Airport has been involved in preparing an Airport Master Plan. During the planning process, it was recognized that the existing Runway Safety Area for Runway 13R/31L does not meet the FAA's current airport design standards, a requirement under Federal Aviation Regulation Part 139. After all prudent and feasible alternatives were reviewed, it was determined that only two primary alternatives existed which would allow the airport to meet the required standards: shift the runway about 880 feet to the north or shorten the runway by about 880 feet.

It was determined that the shortening of the runway will create significant effects on the operational capability of the airport and adversely affect the capabilities of its tenants, primarily the Boeing Company and its customers such as the military AWACs. For these operators, aircraft testing and maintenance would be adversely affected.

Therefore, the decision was made to shift the runway northward about 880 feet to maintain the departure runway length of 10,000 feet.

However, other factors complicated the northward shift. The Georgetown Steam Plant (the Steam Plant), a National Historic Landmark, is located at the Airport. It is the last working example of vertical Curtis turbines and is an example of the innovative fast-track design and construction method pioneered by Frank Gilbreth, a nationally recognized efficiency engineer.

The Steam Plant is owned by the City of Seattle, which leases the facility to a museum foundation whose purpose is to preserve the historical integrity of the Georgetown Steam Plant.

The Georgetown Steam Plant is located approximately 1,200 feet from the existing runway end and taxiway and will be about 420 feet away from the proposed runway shift.

Preliminary noise analysis showed that full use of the new pavement would have an unacceptable impact on the Steam Plant (an increase in noise by 1.5 DNL). Therefore the county began consultation with the FAA to develop a means of meeting the needs of the airport's tenants while preserving the integrity of the historic Steam Plant.

The Special Use Area of Runway 13R and its access Taxiway X emerged from a year long consultation with the FAA, the Boeing Company and other governmental agencies and airport users. To minimize aircraft noise impacts to the Steam Plant, the County proposed that only the aircraft that demonstrate the need for a runway in excess of 9,120 feet would use the additional pavement. Under this scenario, forecasters conservatively anticipate about 322 operations a year (about 1 per day) would require this length by 2017. This is expected to consist of primarily two subsonic aircraft: AWACs, Boeing aircraft testing, and on rare occasions, other aircraft operators requiring a longer runway.

A noise analysis conducted for the State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS) for the airport master plan, which now reflects the construction of the new pavement (Special Use Area - Runway 13R), found that the limited use of the new pavement would not create a significant noise impact on the Steam Plant, as defined by FAA Order 5050.4A, and that no noise mitigation is warranted. The Georgetown Steam Plant would receive less than 1.0 DNL change as a result of the County's proposal. The map below shows the area of potential effect of the proposed development of the runway shift (Special Use Area - Runway 13R). Because the project noise level change is not considered significant to the Steam Plant or to other off-airport locations, as defined by the FAA's Order 5050.4A *Airport Environmental Handbook* (Paragraph 47e(1)(d)2), no other mitigation is warranted.

