THE PORT AUTHORITY OF NY & NJ

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January 8, 2002

Mr. Guillermo Felix
Airports Division
Federal Aviation Administration
One Aviation Plaza
Jamaica, NY 11434-4809

Dear Mr. Felix,

Enclosed please find applications for modification of various airport design standards at John F. Kennedy International Airport (JFK). These modifications describe a plan for accommodating the Airbus A380 at JFK, with an acceptable level of safety.

As you may be aware, Air France has indicated to us that they expect to have an A380 in operation at JFK beginning September 2006. In addition to Air France, Virgin Atlantic, and Federal Express have also indicated their intention to operate this aircraft out of JFK. While we fully support, and are closely following Federal Aviation Administration (FAA) research on the degree of large aircraft deviation from taxiway centerline, we also realize that the publication of the conclusions of these studies is still years away.

Unfortunately, at JFK we must act soon to be in position to accept the A380 in 2006, as the airfield changes necessary to accommodate this aircraft take years to program and construct. We are now in the middle of our taxiway and runway overlay cycle with the rehabilitation of Taxiway Alpha having been originally scheduled for 2001. This and other work has been postponed pending guidance on what type of modifications will be necessary to allow the A380 to operate at less than group VI airports.

Over 67% of Taxiway Alpha pavements have been classified as having a Pavement Condition Index (PCI) of 60. Our typical standard for beginning rehabilitation of runway and taxiway pavements is a PCI of 70. By next year these pavements will have deteriorated further and rehabilitation work will be required. As the design of significant changes to taxiways can take as much as one year, we need approval on the acceptability of the concept embodied within the enclosed Modifications to Standards by June 2002, in order to begin rehabilitation of Taxiway Alpha next year.

These Modifications to Standards are based on the taxiway centerline deviation studies and collision risk model analyses conducted to date, and also reflect our experience in obtaining similar Modifications to Standards in the past, most recently at LaGuardia Airport for the 767-400.

We are available to discuss these Modifications to Standards at your earliest convenience. Thanks for your help in assisting us in this important project for John F. Kennedy International Airport.

Sincerely,

Kevin B. Bleach
Manager,
Aeronautical &
Technical Services Division

CC: D. Bennett, FAA
P. Brito, FAA
R. Louis, PANYNJ
W. Dupont, Airbus

RUNWAY TO PARALLEL TAXIWAY SEPARATION

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT:	2. LOCATION(CITY,STATE):	3. LOC ID:
John F. Kennedy International Airport	New York, New York	JFK

4. EFFECTED RUNWAY/TAXIWAY:	5. APPROACH (EACH RUNWAY):	6. AIRPORT REF. CODE (ARC):
RW 4L-22R, 13L-31R, 13R-31L See Figure 1	_X_ PIR ___ NPI ___ VISUAL	D-V

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY):

Airbus A380

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Group VI Runway to Parallel Taxiway Separation, AC 150/5300-13, AIRPORT DESIGN, Table 2-2

9. STANDARD/REQUIREMENT:

600 feet, in accordance with Table 2-2, Group VI

10. PROPOSED:

400 feet for Taxiway Bravo/Runways 4L-22R, 13L-31R, 13R-31L
450 feet for Taxiway Kilo/Runway 4L
550 feet for Taxiway Papa from Papa Echo to Papa Alpha/ Runway 13R

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):

Relocation of Runways 13R/31L, 13L/31R and 4L/22R and adjacent taxiways would be required for compliance with full Group VI separation standards. Relocation of 13R/31L and 4L/22R would encroach on Gateway National Park and face daunting environmental and political opposition. Relocation of 13L/31R would significantly impact the airport cargo handling capability. Runway 4R/22L is only 8,400' long and access to a crosswind runway is necessary for the airport to safely accommodate the A380. In addition, even assuming that the necessary environmental approvals could be obtained, the cost of moving runways and taxiways as necessary to conform to Group VI Separation standards would require the investment of hundreds of millions of dollars.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):

No other viable alternatives.

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY (FAA ORDER 5300.1E):

SEE ATTACHED

ATTACH ADDITIONAL SHEETS AS NECESSARY – INCLUDE SKETCH/PLAN

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION:	LOCATION:	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR:	15. ORIGINATOR'S ORGANIZATION:	16. TELEPHONE:
17. DATE OF LATEST FAA SIGNED ALP:		
18. ADO RECOMMENDATION:	*19. SIGNATURE:*	20. DATE:
21. FAA DIVISIONAL REVIEW (AT, AF, FS):		

ROUTING SYMBOL	*SIGNATURE*	*DATE*	CONCUR	NON-CONCUR

COMMENTS:

22. AIRPORTS' DIVISION *FINAL ACTION:*

[ ] UNCONDITIONAL APPROVAL	[ ] CONDITIONAL APPROVAL	[ ] DISAPPROVAL
DATE:	*SIGNATURE:*	TITLE:

CONDITIONS OF APPROVAL:

SUPPLEMENT TO
FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

Proposed modification to runway to parallel taxiway separation.

13. State why modification would provide an acceptable level of safety.

Three Runways have parallel taxiways at JFK: 4L/22R, 13R/31L and 13L/31R (see figure 1). The distance between these runways and the parallel taxiways varies depending upon the taxiway. Taxiway Bravo, which is adjacent to all three runways and the prime parallel taxiway at JFK, is separated from adjacent runways by 400 feet. Taxiway Kilo is separated from Runway 4L by 450 feet and Taxiway Papa (from Papa Echo to Papa Alpha) is separated from 13R by 550 feet. The A380 will be restricted to a designated taxi route at JFK. Taxiway Alpha will be used as the prime route for maneuvering the A380 around the Central Terminal Area, and the A380 will be prohibited from utilizing Taxiway Bravo.

The only runway end, of the runways at issue, with an instrument approach greater than CAT I is Runway 13L, which has a CAT II approach. The parallel taxiway adjacent to Runway 13L is Taxiway Bravo. The *Runway Object Free Zone* (ROFZ) for a CAT II approach by the A380 was calculated for this runway based on guidance published within FAA Advisory Circular 150/5300-13, Change 5 (Para 306). These calculations indicated that the tail of a 747-400 would penetrate this ROFZ surface by approximately 5 feet (see figure 2).

The ROFZ calculation required for CAT I approaches was performed for the remaining approaches adjacent to Taxiway Bravo. This calculation indicated that, for CAT I approaches, there would be no penetration of the ROFZ by the 747-400 (see figure 3).

Runway 4L is a CAT I approach and Taxiway Kilo is separated by 450 feet from the southern portion of 4L. Calculations of the ROFZ for this runway/parallel taxiway combination with an A 380 on approach indicate no penetration of the ROFZ for a 747-400 and a one-foot penetration of the ROFZ for an A380 (see figure 4).

Taxiway Papa (from Papa Echo to Papa Alpha) is separated from Runway 13R by 550 feet. Calculations of the ROFZ for this runway/parallel taxiway combination with an A380 on approach indicate no penetration of the ROFZ for a 747-400 or the A380 (see figure 5).

Modifications of Group VI Runway to Taxiway separation standards for CAT I runway approaches adjacent to Taxiway Bravo would provide an acceptable level of safety as an airport operational restriction will be established to prevent the A380 from operating on Taxiway Bravo and calculations of the ROFZ indicate no penetration of this zone by the 747-400.

Modifications of Group VI Runway to Taxiway separation standards for Runway 13 R adjacent to Taxiway Papa (from Papa Echo to Papa Alpha) would provide an acceptable level of safety as an airport operational restriction will be established to prevent the A380 from operating on Taxiway Papa and Quebec simultaneously and calculations of the ROFZ indicate no penetration of this zone by the A380.

Given that an operational restriction will be established to prevent the A380 from taxiing on Taxiway Bravo, only two conditions would result in penetrations of the ROFZ when an A380 is on approach to JFK: the presence of a 747-400 on a parallel taxiway adjacent to a CAT II runway (13L), and the presence of an A380 on Taxiway Kilo while an A380 is on approach to 4L.

A two-year study conducted by the Federal Aviation Administration of the collision risk presented by an A380 on autoland approach indicated limited wingtip deviation from runway centerline. The simulation studies found that for autoland approaches, the maximum wingtip deviation (based on a probability of one in ten million) from the runway centerline was 164 feet indicating that an aircraft like the A380 would have a maximum deviation from centerline of approximately 33 feet (see figure 6). A summary of the simulation study is attached as reference. Adjusting the Runway Obstacle Free Zone to reflect the maximum aircraft deviation found in the study and recalculating the inner-transitional Obstacle Free Zone demonstrates that the tail of a 747-400 would not penetrate the 5:1 slope required for assessing CAT II/III conditions (see figure 7). In addition, it is considered highly unlikely that an operating specification for such an aircraft would allow for a landing conducted under Flight Director mode during adverse weather conditions.

Applying the same analysis to an A380 on Taxiway Kilo also results in no penetration of the inner-transitional Obstacle Free Zone. As Taxiway Kilo is adjacent to a CAT I runway, until further study is completed for manual land approaches, the A380 would be required to conduct landings in autoland.

ATTACHMENT F TO THE REPORT ON AGENDA ITEM 4

NEW LARGER AEROPLANES - INFRINGEMENT OF THE OFZ

OPERATIONAL MEASURES AND AN AERONAUTICAL STUDY

For runway-to-taxiway separation, the dimensions of the obstacle free zone (OFZ) relate to collision risk assessment for the baulked landing assuming protection for ILS critical and sensitive areas. If the OFZ surface is penetrated from the operations of new larger aeroplanes (NLA), there are alternative operational measures that may be implemented, such as:

a) proper sequencing on taxiway, e.g., no NLA on parallel taxiway when another NLA is on approach or departing;

b) holding the critical aircraft at the ramp area when NLA is on approach;

c) use of outermost runway for NLA arrivals; and

d) installing NLA hold sign outside of the Category II ILS sensitive area. Guidance material on dimensions of ILS critical and sensitive areas is contained in Attachment C to Part I of Annex 10, Volume I.

A State may need to conduct an aeronautical study at an existing aerodrome/runway complex when the operation of Code F (NLA) aircraft is contemplated. An example of one State's study is shown below.

NEW LARGER AEROPLANES BALKED LANDING SIMULATION STUDY

Introduction

1. A two-year study was conducted by the United States Federal Aviation Administration (FAA) investigating the balked landing scenario for New Larger Aeroplanes (NLA) using the B747-400 aircraft technology. The FAA Balked Landing Study Program specifically focused on the risk analysis/probability of collision during a balked landing by an NLA. The outcome of the study consisted of:

a) iso-probability contours used to assess the impact of obstacles based on their distance from the runway centre line at any specific point along the length of the runway;

b) data projecting excursions (lateral displacement from centre line) for NLA based on a wide range of flight profiles;

c) how to address airport elevation; and

d) other elements that may be identified as operationally pertinent to the risk analysis of existing airports.

This attachment contains a summary of the report of that study.

2. Over 200 000 computer simulations were conducted using the FAA Airspace Simulation

and Analysis for Terminal Instrument Procedures (TERPS) (ASAT). ASAT was developed to investigate missed approach procedures in the terminal airspace using highly accurate computer representations of the aircraft and the airspace/airport environment. A complete integrated aircraft configuration simulation model of the B747-400 was obtained from the Boeing Airplane Systems Laboratory in support of the study. (The model is the engineering version of the flight simulator data package, as provided to the simulator vendors, and satisfies all criteria for the qualification of flight simulators as specified in the ICAO *Manual of Criteria for the Qualification of Flight Simulators* (Doc 9625)).

3. The study followed the outline for an aeronautical study as prescribed in section 1.2.32 of this manual in support of the consideration for the probability of collision. The purpose of this study was to assess the impact of the balked landing on the definition of the obstacle free zone (OFZ) for aircraft with a wing span up to 80 metres using collision risk methodology. In accord with the ICAO collision risk model (CRM), the value of 10^{-7} defined the Target Level of Safety (TLS) and was, therefore, the criterion used to define the risk of collision between an aircraft on the approach and another aircraft, vehicle, or object on the ground. Iso-probability contours of 10^{-7} were constructed from the simulation flight track data to serve as a basis for evaluating the OFZ definition. The iso-probability contours were constructed at various locations along the flight path of a balked landing beginning at some range point before runway threshold (e.g. 4 200 metres) and continuing along the length of the runway after threshold (e.g. 200 metres past threshold). A detailed report is available upon request.

Simulator Session on the NASA Ames B747-400 Flight Simulator

1. Flight Simulator sessions were conducted at the NASA Ames Research Center in a full-motion, B747-400 simulator. Airline pilots were monitored as they performed balked landing procedures under controlled experimental conditions. For these tests, the go-arounds were initiated by one of the following situations:

a) simulated air traffic control command issued when the aircraft reached a specified height;

b) runway incursion by another aircraft at the holdbar;

c) vehicle/pedestrian deviation; and

d) active arriving and departing traffic on the runway

All landing scenarios used a strong crosswind component. By testing airline pilots under extreme operational conditions, it was hoped that one could generalize the study results to balked landings outside the testing environment. Pilot response time data was used as input to Monte Carlo simulations.

2. Examination of the NASA Ames simulator data suggested that the Monte Carlo computer simulation should focus on autopilot controlled balked landings. Compared to manual control with flight director, the autopilot controlled balked landings exhibited smaller lateral deviation from the runway centre line at all airport elevations considered in the simulator study, namely, at sea level, 760 metres, 1 600 metres, and 2 240 metres. The (Monte Carlo) computer simulations conducted the balked landings at two airport elevations, namely, at sea level (4 metres) and at 1 980 metres to correspond to the piloted simulator study. All approaches in the Monte Carlo simulation were conducted in autoland mode utilizing the pilot response time distributions as determined from examination of NASA Ames B747-400 Flight Simulator Data.

Construction of 10^{-7} Iso-probability Contours

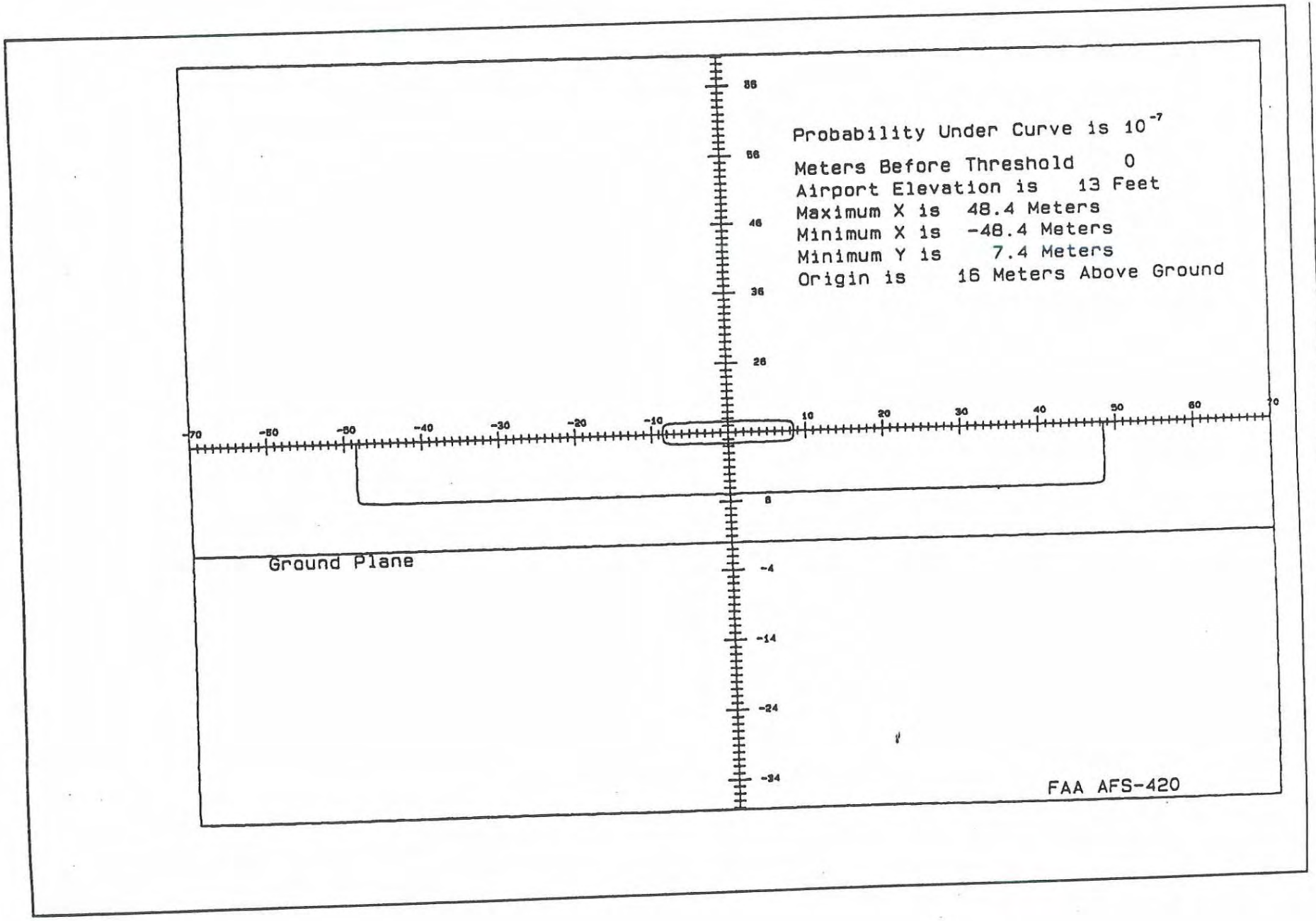
1. An analysis was made of wind data and the instrument landing systems at 40 existing airports worldwide that were considered likely to host a new larger aircraft according to marketing forecasts by manufacturers. The analysis assumed that ILS critical and sensitive areas were protected. The results of the analysis were used to define composite models of the wind and instrument landing systems representative of the conditions found at the various airport locations. The composite models served as input to the computer simulations.

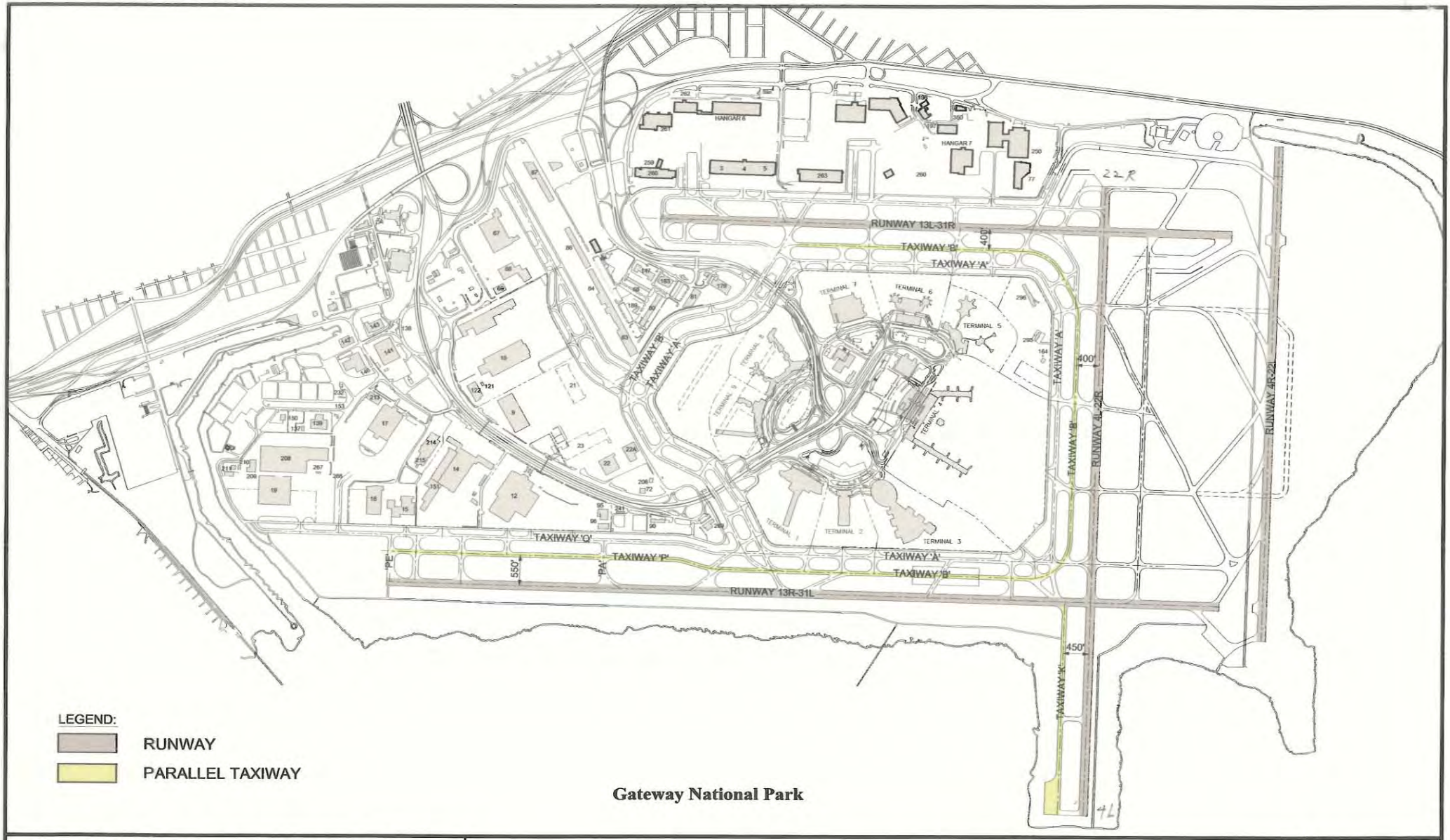
2. Examination was made of an immense amount of simulation generated flight track data at various perpendicular planes or tiles located at intervals along the flight path. Iso-probability contours were constructed at each tile location using the lateral and vertical distributions centred around the extended runway centre line. These contours were based on the location of the center-of-gravity (C.G.) of the aircraft and were, at times, oval in shape. The iso-probability contour at the threshold is shown in Figure A5-1. The lateral component of the contour does not vary significantly with airport elevation due to the tracking capabilities of the autopilot system. The vertical component of the contour is affected by the atmospheric density while executing the go-around manoeuvre (at higher altitudes the aircraft is flying faster and producing less lifting force so it travels farther down the runway before beginning to climb).

3. The lower curve in the figures is the lower half of the oval curve corrected for semispan and wheel location of the aircraft. The value of semispan used was 40 metres (i.e., a total span of 80 metres) with the flight path of the bottom of the wheel located 24 feet below the horizontal plane of the C.G. point. The lower half of the curve is that part of the curve below the median of the vertical distribution. Therefore, the probability of some part of the aircraft being below the lower curve is $1x10^{-7}$. At some tile locations past runway threshold, the ground plane crosses the lower curve. This indicates that some aircraft are expected to touch wheels on the runway. It does not indicate that they have impacted the ground or crashed. The ends of the lower curve indicate the maximum distance from runway centre line, for a probability of $1x10^{-7}$, that we would expect to find an aircraft wing tip.

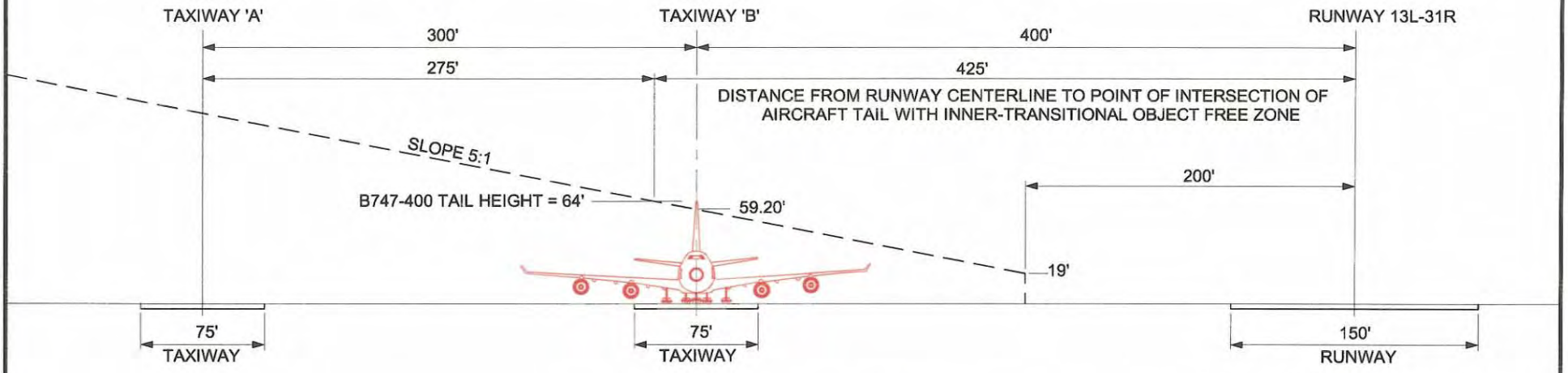
Study Finding

The simulation studies, for autoland approaches, found that the maximum distance from runway centre line that one would expect to find an aircraft wing tip is contained within $\pm$ 50 metres on either side of the centre line. This result is contained within the dimensions of the balked landing surface found in Table 4-1 of Annex 14, Volume 1, where the code number is 4 and the code letter is E. **To ensure ILS signal integrity for NLA operations using autoland see *Manual of All-Weather Operations*, section 5.2.13.** These findings are part of an aeronautical study being conducted by the United States.


Probability Under Curve is 10^{-7}
Meters Before Threshold 0
Airport Elevation is 13 Feet
Maximum X is 48.4 Meters
Minimum X is -48.4 Meters
Minimum Y is 7.4 Meters
Origin is 16 Meters Above Ground
Ground Plane
FAA AFS-420



John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical andTechnical Services Division** **Master and Site Planning Division**	**Runway to Parallel Taxiway Separation**	**1**



BOEING 747-400 TAXIING ON TAXIWAY 'B'

FOR ILS CATEGORY II RUNWAYS

H = 53-0.13 X WINGSPAN - 0.0022 X ELEVATION

WHERE:

WINGSPAN = 261.333 FEET

RUNWAY ELEVATION = 12 FEET

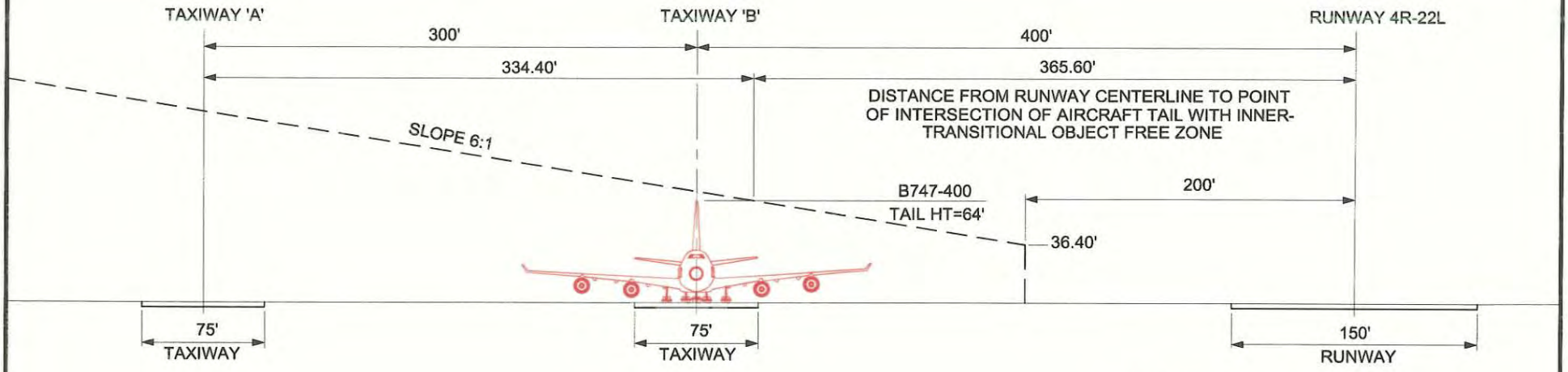
H = 53-(0.13 X 261.33) - 0.0022 (12)

H = 19'

RUNWAY OBJECT FREE ZONE

CATEGORY II / III CONDITIONS

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Runway to Parallel Taxiway Separation**	**2**



BOEING 747-400 TAXIING ON TAXIWAY 'B'

RUNWAY OBJECT FREE ZONE
CATEGORY I - TAXIWAY B

FOR ILS CATEGORY I RUNWAYS:

H = 61-0.094 X WINGSPAN - 0.003 X ELEVATION

WHERE:

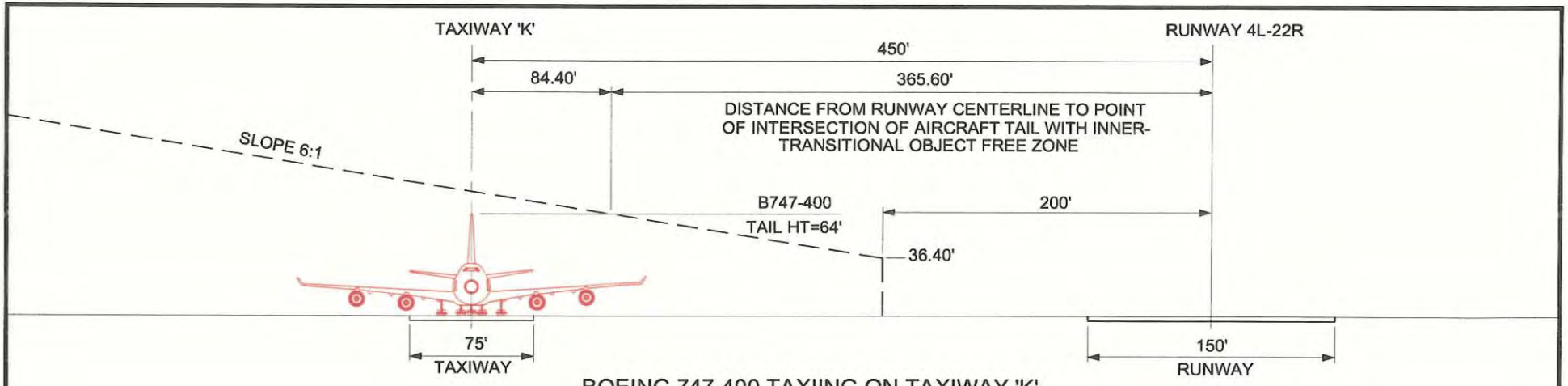
WINGSPAN = 261.333 FEET

RUNWAY ELEVATION = 12 FEET

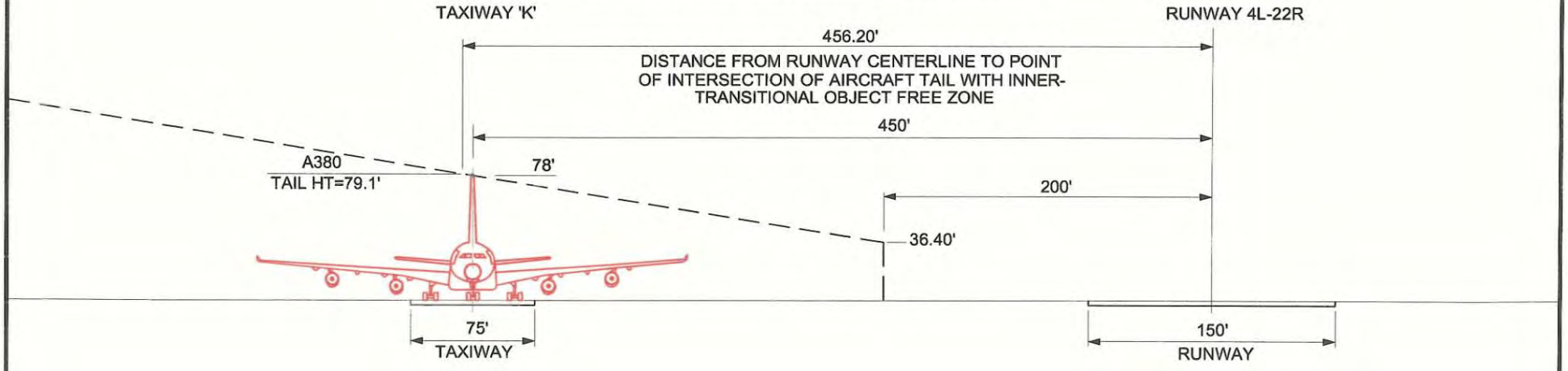
H = 61-(0.094 X 261.33) - 0.003 (12)

H = 36.40'

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Runway to Parallel Taxiway Separation**	**3**



BOEING 747-400 TAXIING ON TAXIWAY 'K'

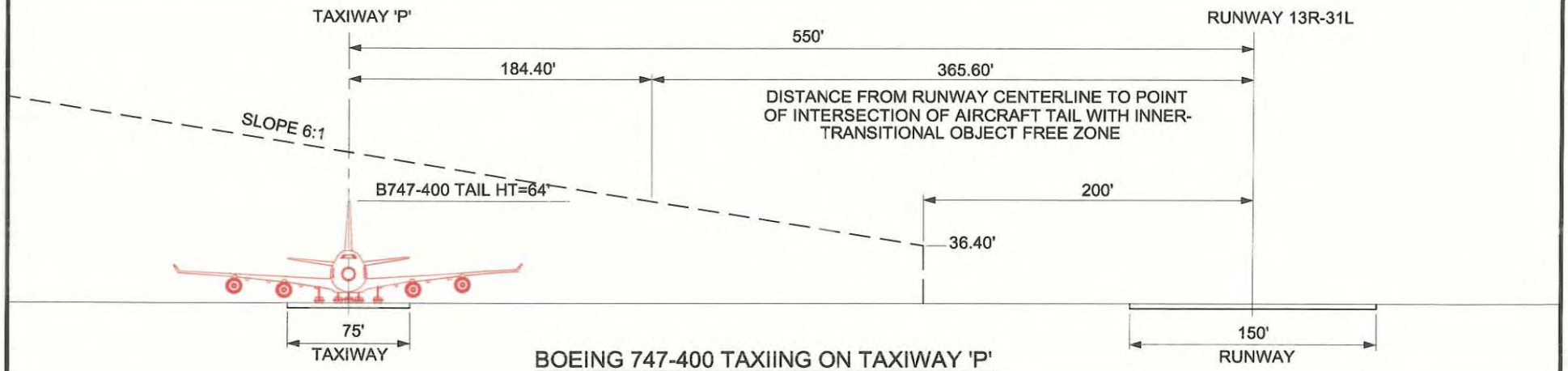


A380 TAXIING ON TAXIWAY 'K'

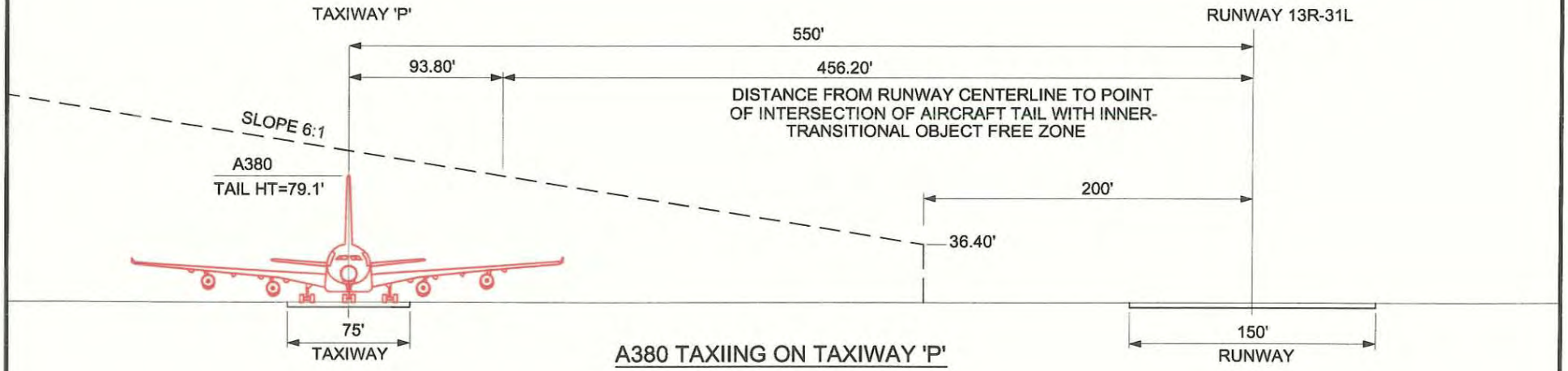
RUNWAY OBJECT FREE ZONE

CATEGORY I

John F. Kennedy International Airport New York, NY	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Runway to Parallel Taxiway Separation**	**4**



BOEING 747-400 TAXIING ON TAXIWAY 'P'

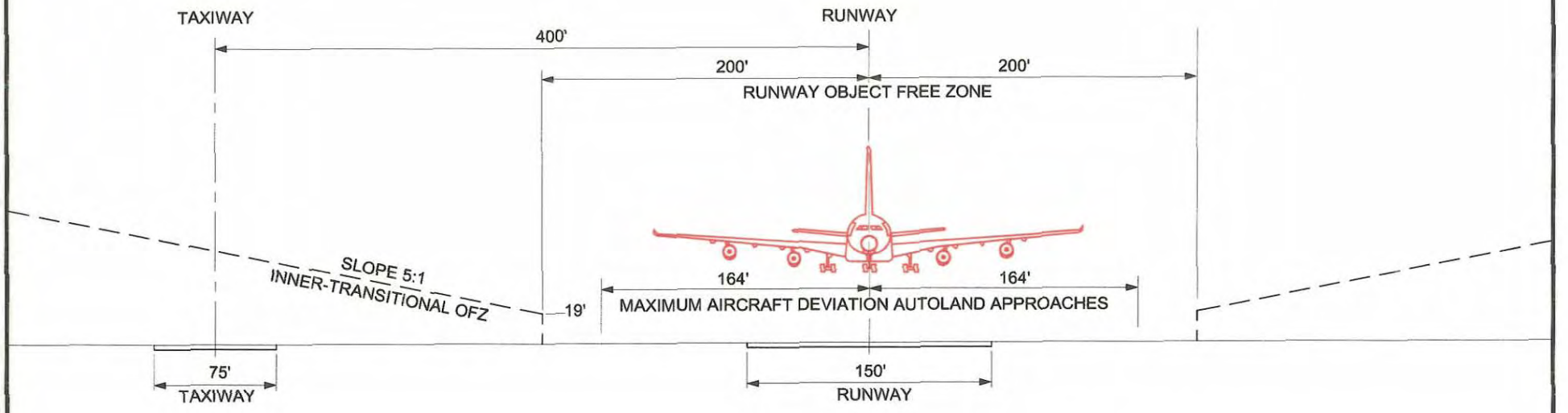


A380 TAXIING ON TAXIWAY 'P'

RUNWAY OBJECT FREE ZONE

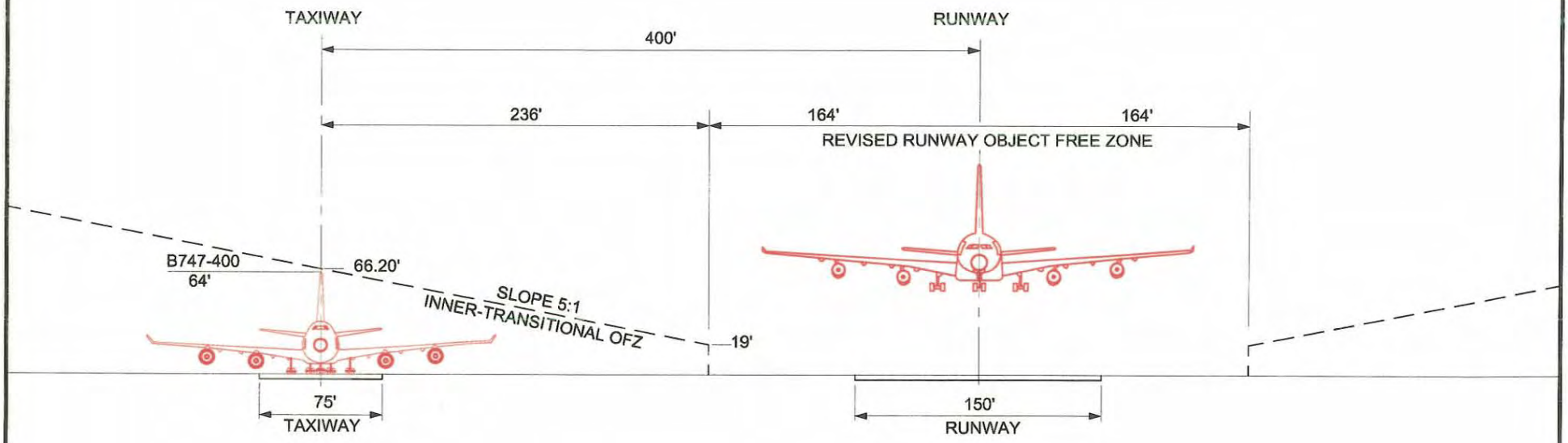
CATEGORY I

John F. Kennedy International Airport New York, NY	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Runway to Parallel Taxiway Separation**	**5**



AUTOLAND APPROACH
CATEGORY II / III CONDITIONS

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Runway to Parallel Taxiway Separation**	**6**



REVISED RUNWAY OBJECT FREE ZONE

CATEGORY II / III CONDITIONS

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Runway to Parallel Taxiway Separation**	**7**

TAXIWAY CENTERLINE TO TAXIWAY CENTERLINE

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT:	2. LOCATION(CITY,STATE):	3. LOC ID:
John F. Kennedy International Airport	New York, New York	JFK

4. EFFECTED RUNWAY/TAXIWAY:	5. APPROACH (EACH RUNWAY):	6. AIRPORT REF. CODE (ARC):
Taxiways A, B, P and Q See Figure 1	__ PIR __ NPI __ VISUAL	D-V

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY):

Airbus A380

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Group VI taxiway centerline to taxiway centerline separation, AC 150/5300-13 AIRPORT DESIGN, Table 2-3

9. STANDARD/REQUIREMENT:

324 feet, in accordance with Table 2-3

10. PROPOSED:

284 feet

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):

It is not feasible to move the existing runways and relocating the existing taxiways would reduce the existing runway to taxiway separation or reduce available ramp space, increase ramp congestion and result in a downsizing and/or elimination of existing gate positions.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):

No other viable alternatives

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY (FAA ORDER 5300.1E):

See attached.

ATTACH ADDITIONAL SHEETS AS NECESSARY – INCLUDE SKETCH/PLAN

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION:	LOCATION:	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR:	15. ORIGINATOR'S ORGANIZATION:	16. TELEPHONE:
17. DATE OF LATEST FAA SIGNED ALP:		
18. ADO RECOMMENDATION:	19. SIGNATURE:	20. DATE:
21. FAA DIVISIONAL REVIEW (AT, AF, FS):		

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR

COMMENTS:

22. AIRPORTS' DIVISION FINAL ACTION:

[ ] UNCONDITIONAL APPROVAL	[ ] CONDITIONAL APPROVAL	[ ] DISAPPROVAL

DATE:	SIGNATURE:	TITLE:

CONDITIONS OF APPROVAL:

SUPPLEMENT TO
FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

Proposed modification to taxiway to centerline to parallel taxiway centerline separation.

13. State why modification would provide an acceptable level of safety.

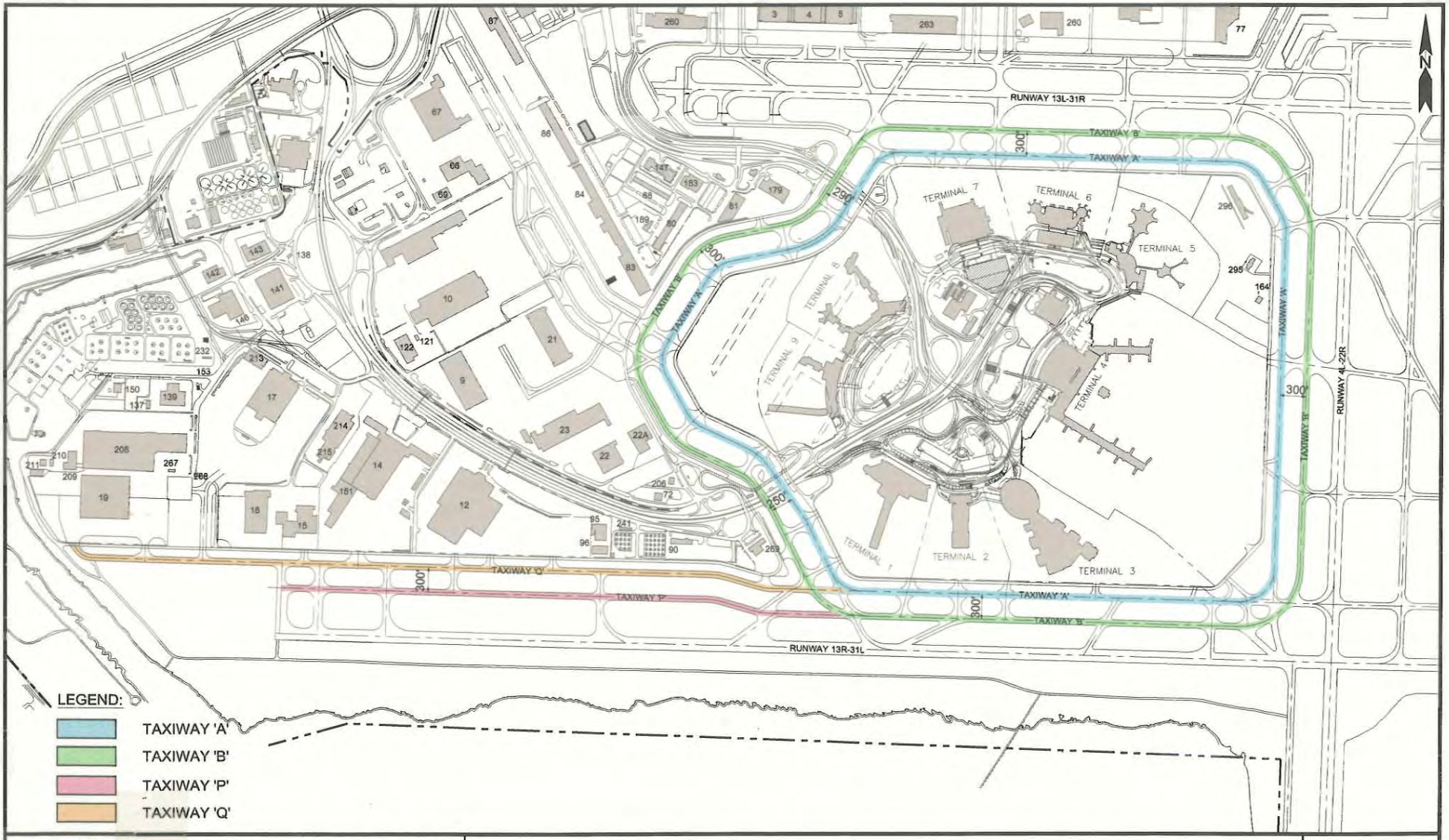
The inner and outer taxiways Alpha, Bravo, Papa and Quebec, currently have a centerline-to-centerline separation of 300 feet with the exception of the Van Wyck and 150th Street taxiway bridges. The separation is reduced to 250 and 290 feet respectively over these bridges. (See Figure 1)

It is proposed that this separation be reduced to 284 feet by moving Taxiway Alpha and Quebec 16 feet closer to the adjacent parallel taxiway (Taxiway Bravo and Papa respectively). Moving these "inner" taxiways closer to the adjacent "outer" taxiways will maintain group V taxiway-to-taxiway separation standards and increase the separation between the inner taxiway and the airport's vehicle service road (See Figure 2). An operational restriction will be established to prohibit the A380 from operating on Taxiway Bravo. An additional restriction associated with this modification to standard includes the condition that the A380 operate at taxilane speed while on the "inner" taxiway. The wingtip separation between a 747-400 and the A380 as a result of moving taxiway Alpha will be greater than 47 feet, which exceeds Group VI Taxilane wingtip clearance standards (36 feet).

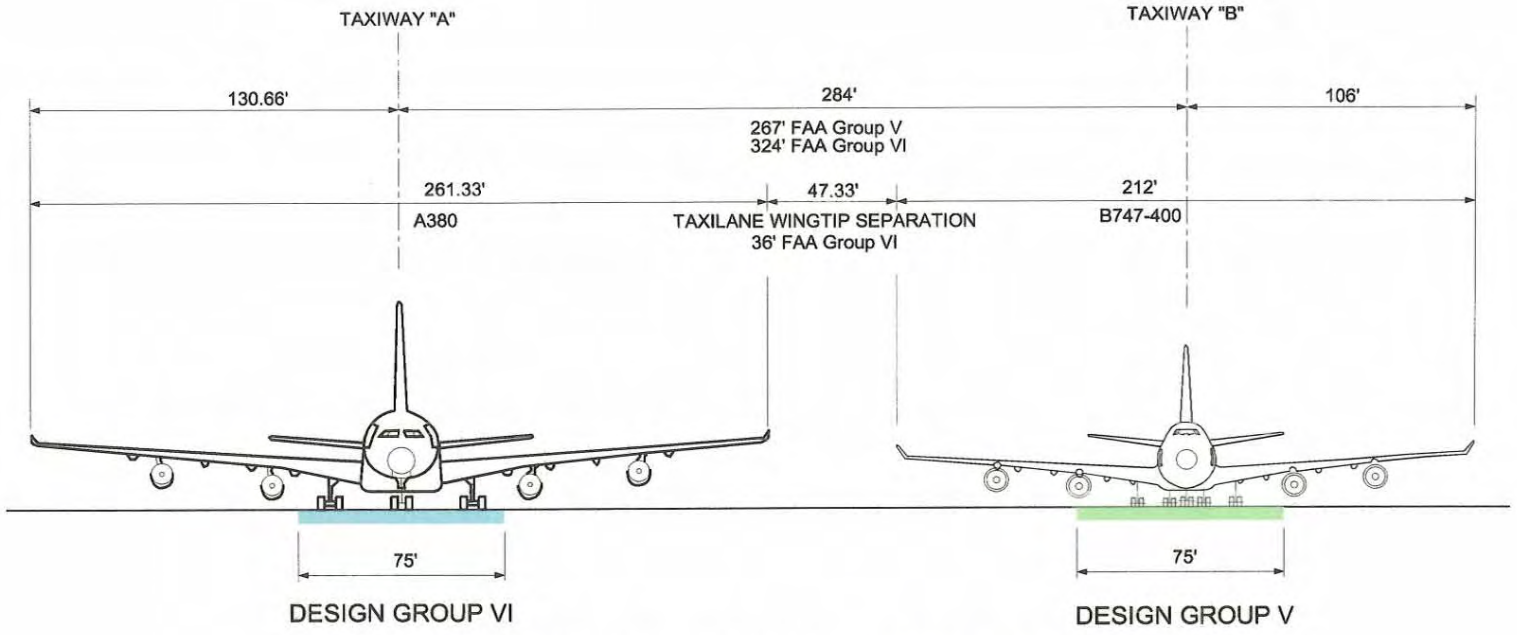
The taxiway deviation analyses conducted by FAA to date at JFK airport demonstrate the ability of large aircraft to stay consistently on taxiway centerline with little deviation (Only 27 deviations greater than 10' out of 4,737 observations of 747 aircraft). The few significant deviations that occurred appear to be related to the unusually large pavement widths that exist at JFK along with poor weather conditions (more than 50% of deviations greater than 10 feet occurred on the same bad weather day). The largest single deviation was 22 feet. The maximum deviation during simultaneous operations of 747's on Taxiway's Alpha and Bravo was 3 feet. In addition, taxiway deviation studies conducted at European Airports (Amsterdam and London Heathrow) further support the assessment that Group VI aircraft can be accommodated on taxiways spaced at less than 300 feet apart, with an adequate level of safety.

To enhance the ground navigational capability of the A380 the aircraft is being designed with a pilot eye height less than the 747-400 and will have camera displays available to pilots for improved navigation. Those taxiways, which will accommodate the A380 at JFK, will have edges that are more clearly identified by delineators. Existing delineator spacing of 100 feet will be reduced to 75 feet on A380 taxiways. In addition, taxiway centerline lighting spacing will be decreased to 50 feet from the current standard of 100 feet.

When the A380 is taxiing over the Van Wyck and 150th Street taxiway bridges all other traffic will be held. No simultaneous operations will be permitted.



John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical andTechnical Services Division** **Master and Site Planning Division**	**Taxiway to Taxiway Centerline Separations**	**1**



TAXIWAY SECTION FOR 16 FEET MODIFICATION

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Taxiway to Taxiway Centerline Separations**	**2**

TAXIWAY WIDTH

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT:	2. LOCATION(CITY,STATE):	3. LOC ID:
John F. Kennedy International Airport	New York, New York	JFK

4. EFFECTED RUNWAY/TAXIWAY:	5. APPROACH (EACH RUNWAY):	6. AIRPORT REF. CODE (ARC):
See Figure 1	___ PIR ___ NPI ___ VISUAL	D-V

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY):

Airbus A380

MODIFICATION OF STANDARDS

8. *TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):*

Group VI Taxiway width, AC 150/5300-13 AIRPORT DESIGN, Table 4-1

9. STANDARD/REQUIREMENT:

100 feet, in accordance with Table 4-1, Group VI

10. PROPOSED:

75 feet, which is the existing condition.

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):

Modifying existing taxiways to meet Design Group VI standards will require demolition of shoulder and erosion pavement sections and reconstruction of full depth pavement sections. This reconstruction would require shutdown of taxiways during construction for extended periods of time. Such closures would be operationally disruptive to airlines due to the high volume of activity at JFK and would potentially result in increased delays.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):

No other viable alternatives.

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY (FAA ORDER 5300.1E):

See attached.

ATTACH ADDITIONAL SHEETS AS NECESSARY – INCLUDE SKETCH/PLAN

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION:	LOCATION:	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR:	15. ORIGINATOR'S ORGANIZATION:	16. TELEPHONE:
17. DATE OF LATEST FAA SIGNED ALP:		
18. ADO RECOMMENDATION:	19. SIGNATURE:	20. DATE:
21. FAA DIVISIONAL REVIEW (AT, AF, FS):		

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR

COMMENTS:

22. *AIRPORTS' DIVISION FINAL ACTION:*

[ ] UNCONDITIONAL APPROVAL	[ ] CONDITIONAL APPROVAL	[ ] DISAPPROVAL

DATE:	*SIGNATURE:*	TITLE:

CONDITIONS OF APPROVAL:

SUPPLEMENT TO
FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

Proposed modification to taxiway width.

13. State why modification would provide an acceptable level of safety.

Design Group VI taxiway width standards call for 100-foot wide taxiway with 40-foot wide shoulders for a total pavement width of 180 feet. Taxiways at JFK are 75 feet wide with 25-foot wide shoulders and 25-foot wide erosion control pavement for a total width of 175 feet. The taxiways planned to accommodate the A380 at JFK are outlined within Figure 1.

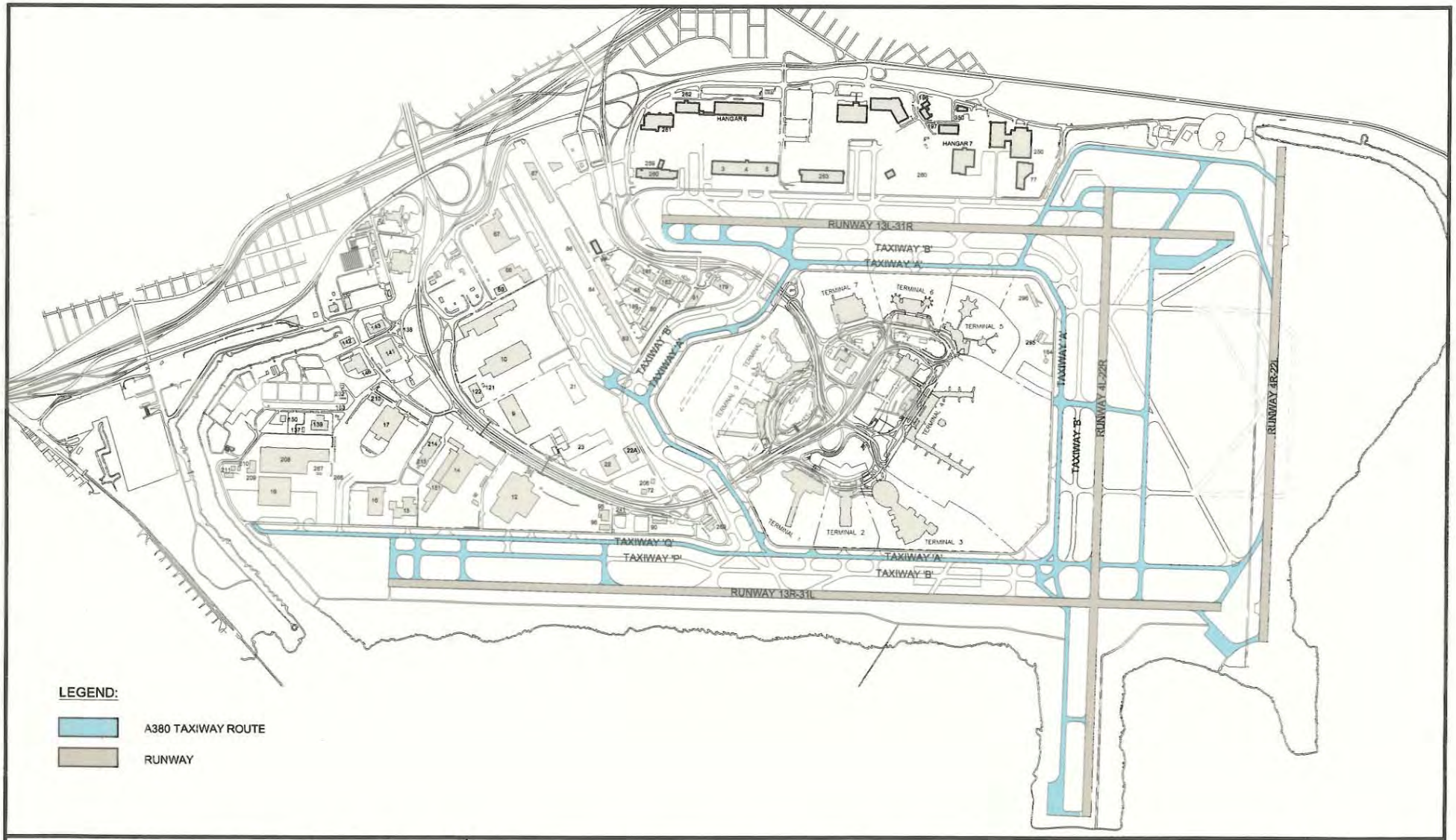
JFK will maintain the 75-foot wide taxiways while increasing the existing erosion pavement widths from 25 feet to 40 feet, for a total pavement width of 205 feet. The inclusion of the additional erosion pavement will provide a total pavement width greater than the FAA Group VI standard. The existing taxiway shoulders are structurally capable of accommodating the loading associated with intermittent travel of the A380 (see Figure 2).

The distance between the main landing gear wheel outer edge to the edge of taxiway, 14 feet, approaches the 15-foot Group V taxiway edge safety margin. The Group V standard appears to be more applicable as Group VI standards assumed a much greater landing gear width for New Large Aircraft than proposed for the A380 (Group VI standards assumed 60' wide landing track, Group V standards assumed 45', the A380 is 46.9'). The taxiway deviation analyses conducted by FAA to date at JFK airport demonstrate the ability of large aircraft to stay consistently on taxiway centerline with little deviation (Only 27 deviations greater than 10' out of 4,737 observations). The few significant deviations that occurred appear to be related to the unusually large pavement widths that exist at JFK along with poor weather conditions (more than 50% of deviations greater that 10 feet occurred on the same bad weather day).

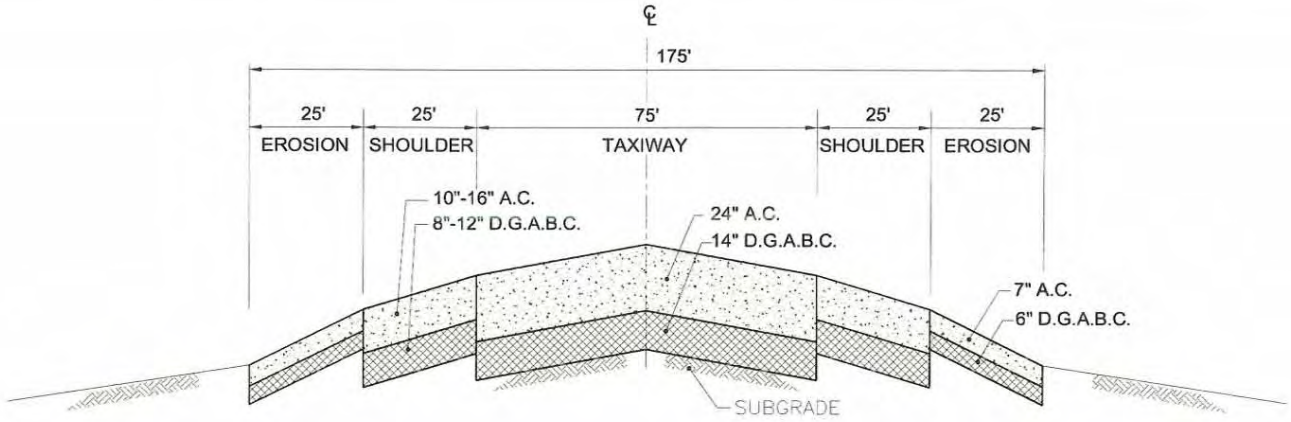
To enhance the ground navigational capability of the A380 the aircraft is being designed with a pilot eye height less than the 747-400 and will have camera displays available to pilots for improved navigation.

Those taxiways, which will accommodate the A380 at JFK, will have edges that are more clearly identified by more closely spaced delineators. Existing delineator spacing of 100 feet will be reduced to 75 feet on A380 taxiways. In addition, taxiway centerline lighting spacing will be reduced to 50 feet from the current standard of 100 feet.

Any new taxiways constructed at JFK will be designed to meet group VI standards (Please see figure 3 for plan views of existing and proposed taxiway modifications).

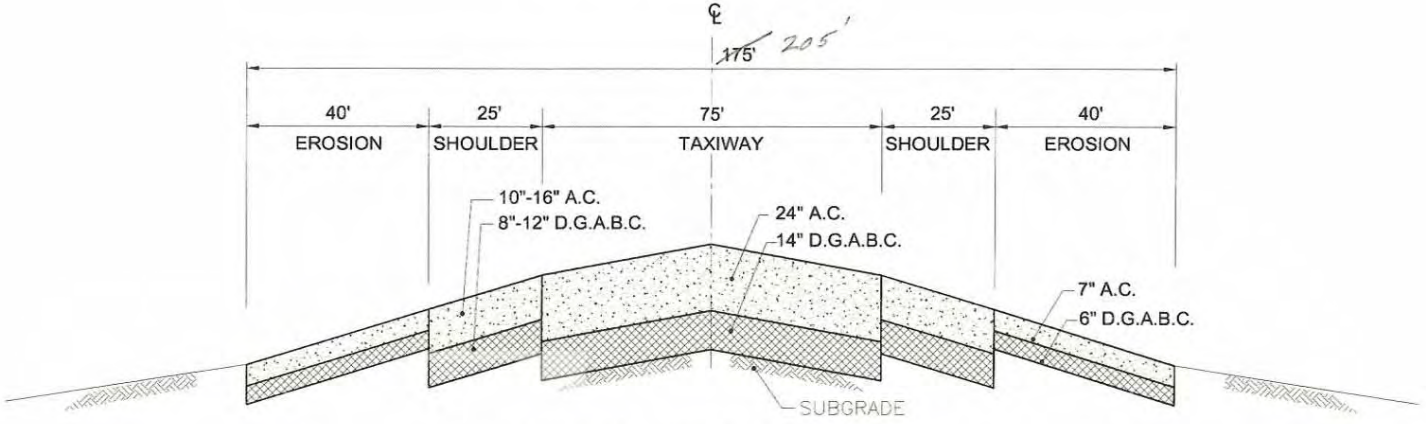


John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical andTechnical Services Division** **Master and Site Planning Division**	**A380 Taxiways**	**1**



EXISTING TAXIWAY SECTION

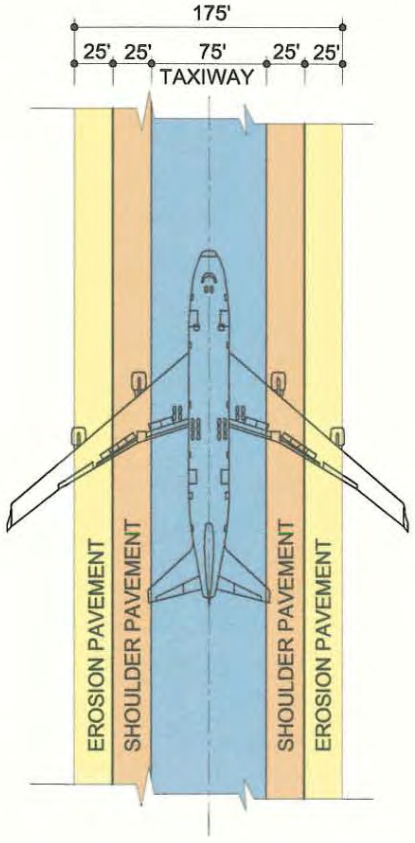
N.T.S.



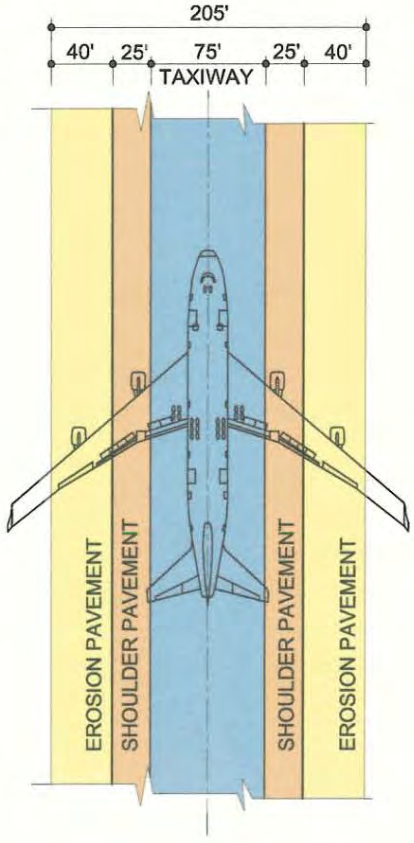
PROPOSED TAXIWAY SECTION

N.T.S.

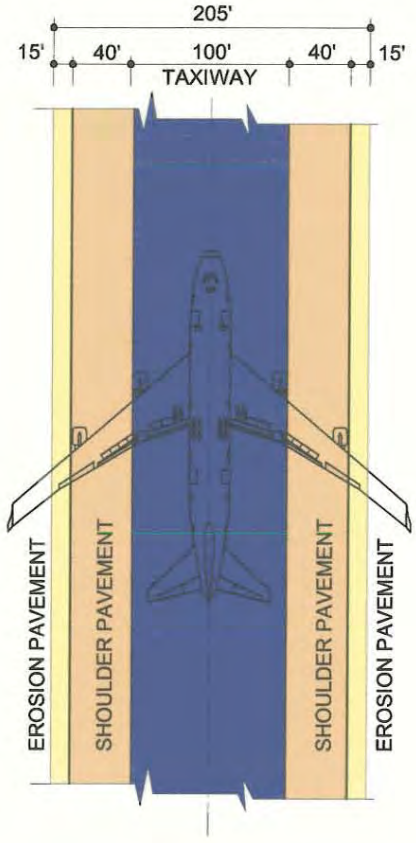
John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Taxiway Widening**	**2**



A380
EXISTING TAXIWAY



A380
MODIFIED TAXIWAY



A380
NEW TAXIWAY

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Taxiway Widening**	**3**

TAXIWAY CENTERLINE TO FIXED OR MOVEABLE OBJECT

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND

1. AIRPORT:	2. LOCATION(CITY,STATE):	3. LOC ID:
John F. Kennedy International Airport	New York, New York	JFK

4. EFFECTED RUNWAY/TAXIWAY:	5. APPROACH (EACH RUNWAY):	6. AIRPORT REF. CODE (ARC):
Taxiway A, Q See Figure 1	___ PIR ___ NPI ___ VISUAL	D-V

7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY):

Airbus A380

MODIFICATION OF STANDARDS

8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):

Group VI Taxiway centerline to fixed or moveable object, AC 150/5300-13 AIRPORT DESIGN, Table 2-3

9. STANDARD/REQUIREMENT:

193 feet, in accordance to Table 2-3

10. PROPOSED:

146 feet

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):

Relocating the existing restricted service road towards the CTA and cargo areas would reduce available ramp space, increase ramp congestion and result in a downsizing and/or elimination of existing gate positions.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):

No other viable alternatives.

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY (FAA ORDER 5300.1E):

See attached.

ATTACH ADDITIONAL SHEETS AS NECESSARY – INCLUDE SKETCH/PLAN

FAA EASTERN REGION
MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION:	LOCATION:	PAGE 2 OF 2
14. SIGNATURE OF ORIGINATOR:	15. ORIGINATOR'S ORGANIZATION:	16. TELEPHONE:
17. DATE OF LATEST FAA SIGNED ALP:		
18. ADO RECOMMENDATION:	19. SIGNATURE:	20. DATE:
21. FAA DIVISIONAL REVIEW (AT, AF, FS):		

ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR

COMMENTS:

22. AIRPORTS' DIVISION FINAL ACTION:

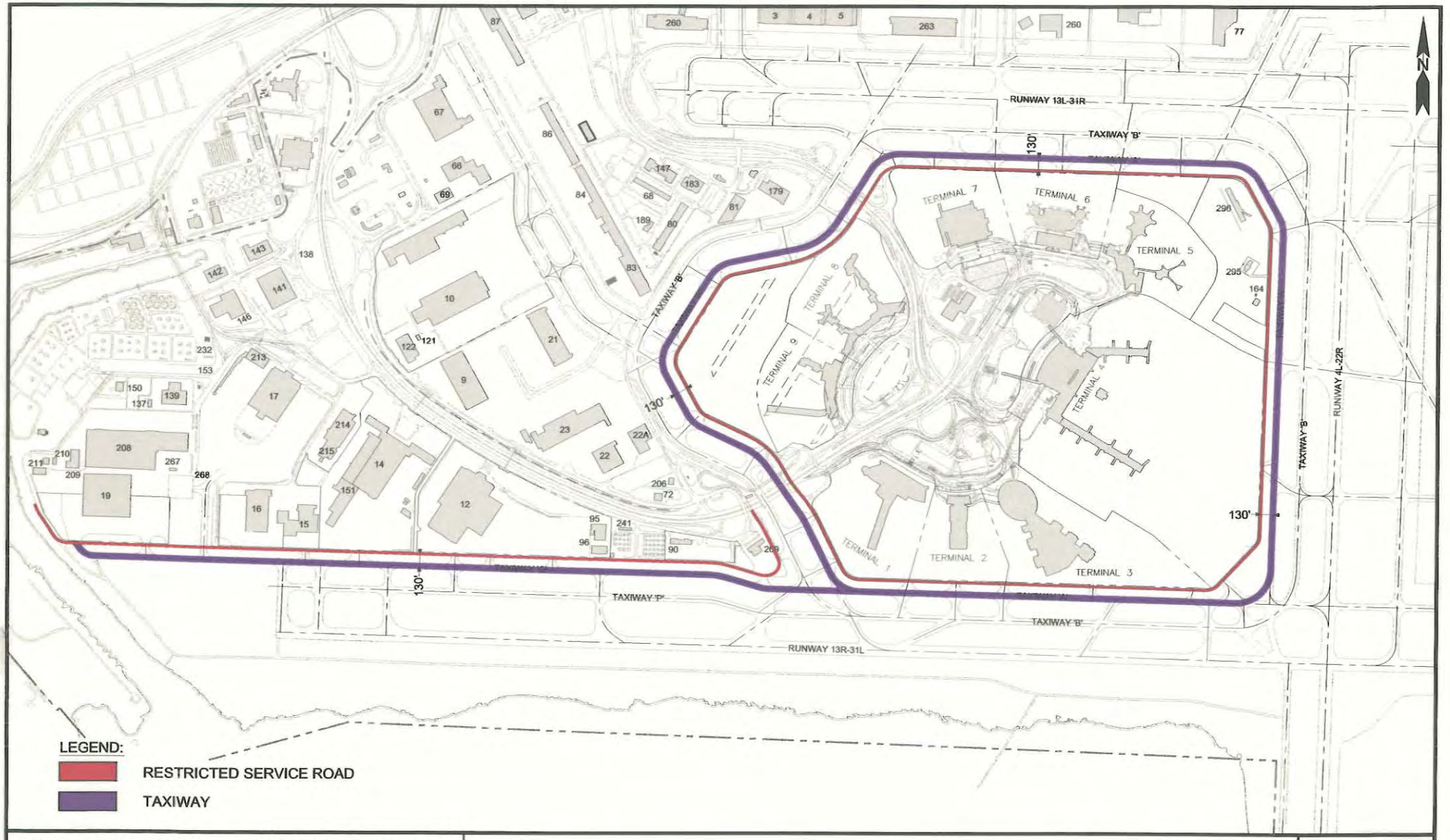
[ ] UNCONDITIONAL APPROVAL	[ ] CONDITIONAL APPROVAL	[ ] DISAPPROVAL

DATE:	SIGNATURE:	TITLE:

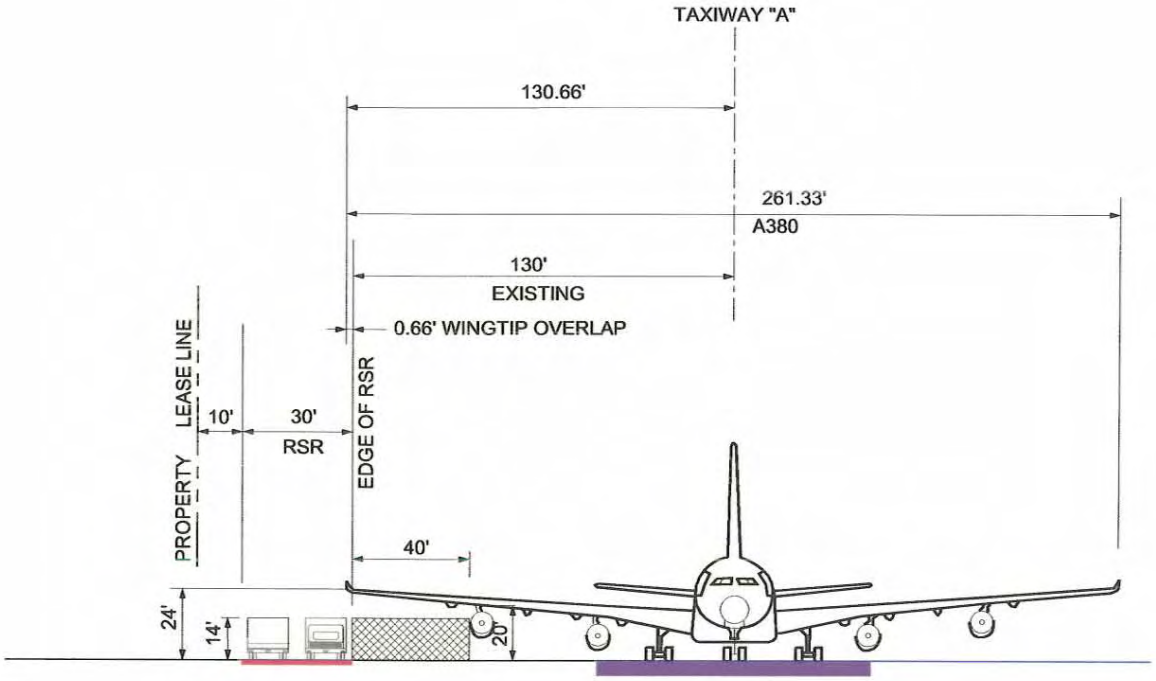
CONDITIONS OF APPROVAL:

To enhance the ground navigational capability of the A380 the aircraft is being designed with a pilot eye height less than the 747-400 and will have camera displays available to pilots for improved navigation. Those taxiways, which will accommodate the A380 at JFK, will have edges that are more clearly identified by more closely spaced delineators. Existing delineator spacing of 100 feet will be reduced to 75 feet on A380 taxiways. In addition, taxiway centerline lighting spacing will be decreased to 50 feet from the current standard of 100 feet.

An operational restriction will be established for this modification to standard that will require the A380 to operate at taxilane speed, while on Taxiway Alpha and Quebec.

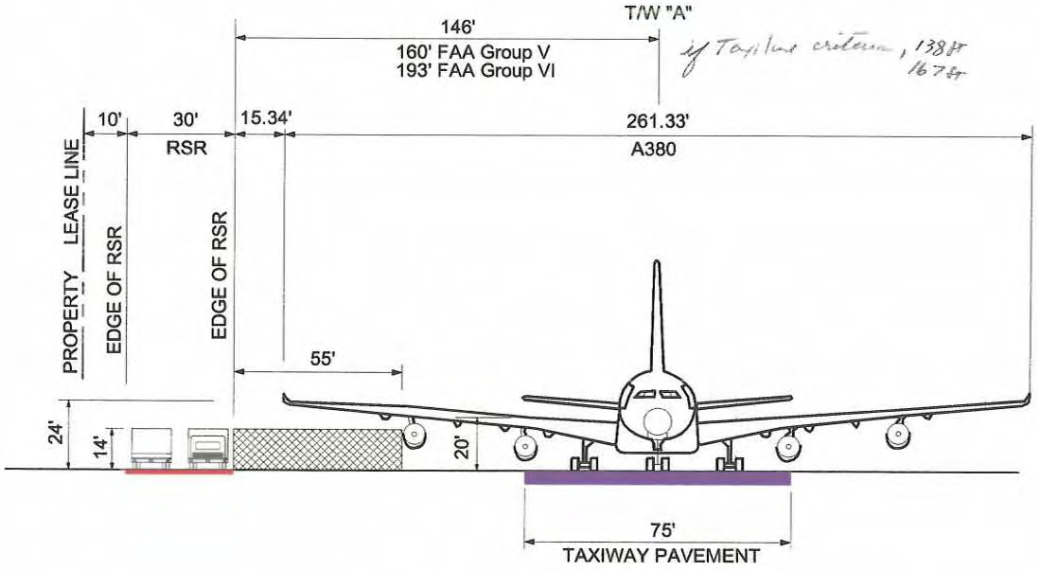


John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical andTechnical Services Division** **Master and Site Planning Division**	**Taxiway Centerline to Fixed or Movable Object**	**1**



EXISTING TAXIWAY SECTION

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Taxiway Centerline to Fixed or Movable Object**	**2**



SECTION FOR 16 FEET MODIFICATION

John F. Kennedy International Airport **New York, NY**	**Modification of Airport Design Standards**	**Figure**
Aviation Department **Aeronautical and Technical Services Division** **Master and Site Planning Division**	**Taxiway Centerline to Fixed or Movable Object**	**3**