Appendix A

- Fundamentals of Characterizing Sound, Noise Effects, and Metrics

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This appendix presents the basic tools for describing and understanding sound: how it originates, moves through a medium – most frequently the atmosphere – and how it is experienced by a receiver. Understanding these fundamentals at a basic level is critical to subsequently understanding how characteristics of sound influence human perception of *noise*, which is commonly referred to as "unwanted sound." Information presented in the NEM document relies upon a reader's understanding of the characteristics of sound, the effects noise has on persons and communities, and the metrics or descriptors most commonly used to quantify noise. This appendix presents these fundamentals to facilitate an understanding of the noise exposure setting against which land-compatibility is assessed and recommendations are made.

Contents

A.1. Fundamentals of Acoustics

Sound is a physical phenomenon consisting of minute vibrations (waveforms) that travel through a medium such as air or water. Audible sounds are those vibrations that can be sensed by the human ear. At the ear, sound waves vibrate the ear drum, which transmits the vibration via a network of bones to the cochlea. The cochlea then converts the vibration into neurological impulses that are interpreted by the brain as sound. One's experience and perception of sound depends on both the pattern of vibrations from the sound source and the way our hearing mechanism interprets these vibrations.

A sound *source* induces vibrations in the air which spread outward from the sound source as alternating bands of dense (compression) and sparse (expansion) air particles. This results in a variation of pressure above and below the baseline atmospheric pressure (as shown in Figure A-1). The distance between successive compressions or successive expansions is the wavelength of the sound, and the number of compressions or expansions passing a fixed location per unit of time is the frequency of the sound. Frequency is normally expressed in cycles per second or Hertz (Hz); a sound having a1000 Hz frequency indicates that the alternating compression and expansion occurs 1000 times per second. A high frequency sound is shorter in wavelength and lower frequency sound is correspondingly longer in wavelength. In contrast to frequency which describes the cycling of impulses, the overall magnitude of such impulses that is the average amplitude of the variations of the pressure above and below atmospheric pressure is called the sound pressure. Referring again to Figure A-1, the frequency and related wavelength are viewed from left to right whereas the pressure amplitude or overall magnitude are the distances above and below the baseline or reference atmospheric pressure.

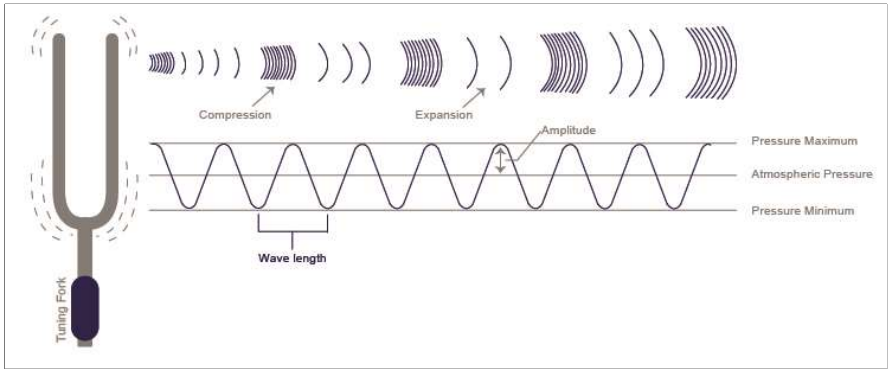

Figure A-1 - Characteristics of Sound

Sound travels through air at about 1,100 feet per second; however, its speed differs in other media (e.g., water). Therefore, to more fully characterize sound, its three defining characteristics are typically identified: (1) magnitude, (2) frequency spectrum, and (3) the variations of these two over a time interval.

A.1.1. Magnitude

Telephone engineers were among the first to extensively study the ear's response to sound pressure, finding that the ear responds to a broad range of sound pressures. A healthy human ear can detect a sound tone having a frequency a 1,000 Hz at sound pressures (amplitudes) as low as 20 micropascals. (This is expressed as 20µPa and equals to 20 x 10-6 Pascals (Pa). For reference, standard atmospheric pressure at sea level is 101,325 Pascals.). At the other end of an amplitude scale, the threshold of pain was found to occur around a sound pressure of 200 Pascals—10,000,000 times as large as the barely audible 20µPa magnitude. Whether barely audible (20 µPa) or pain-inducing (200 Pa), these pressures are comparatively small variations around atmospheric pressure (101,235 Pa).

Since a human ear is able to respond to such a large range of sound pressures, early telephone engineers had a measurement problem. At the threshold of hearing where the ear could detect a sound pressure of 20µPa, an increase of 40µPa was a noticeable change; yet at 10 Pa, that same increase of 40 µPa (or 0.00004 pascals) was undetectable. Thus, a shorthand method for expressing the magnitude of a sound was necessary. Their solution was to develop a logarithmic scale based on the ratio of the sound pressure to a reference sound pressure.

A logarithm (base 10 "common" logarithm) is simply a power of 10. For example, 100 equals 10 times 10, which equates to 10^2. The logarithm of 100 is then 2 (log 100 = 2). Similarly, 10^3 equals 10 times 10 times 10, which equates to 1,000. Consequently, the log of 1,000 is 3.

When units were standardized, the Bel, in honor of Alexander Graham Bell, was defined as the log of the square of the ratio of two sound pressures, with the decibel one tenth of that. The Bel itself proved to be too coarse of a unit, so the term decibels (dB) remained in common use. Values on the decibel scale are referred to as levels. The following equation shows the relationship of sound pressure level, L, in decibels to sound pressure where p is the

$$L = 10 \log 10 \left(\frac{p^2}{p_0^2}\right)$$

Equation A-1 - Sound Pressure Level in dB

pressure of the sound that is being compared and p0 is the reference pressure against which p is compared.

The level (in decibels) equals 10 times the log of the square of the quantity of measured sound pressure divided by 20 µPa (this squared quantity is proportional to the sound power). Recall that the sound pressure that is barely detectable by the human ear is 20µPa. By using this as a reference, the telephone engineers "zeroed" the logarithmic scale for sound at the threshold of hearing.

Sensitivity to Changes in Loudness

Under laboratory conditions, people can detect single-decibel changes in sound level. But, when comparing sounds in our everyday experience, we are less sensitive to differences in sound intensities. From a practical standpoint, a 5-dB difference is the smallest change generally noticeable to the average listener. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness. This relation holds true for loud sounds and for quieter sounds across the speech frequencies. See §2.1.2, below, for additional information on frequency and human hearing.

Adding Decibels

Because of the logarithmic nature of the decibel and the fact that sound pressure is a measure of the variation in air pressure, neither sound pressure level in decibels nor sound pressures in µPa can be added directly. However, the quantity inside the parentheses in Equation A.1, which is proportional to the sound energy, can be added. Note that if the sound pressure levels being added are quite different in magnitude, adding the lesser value to the greater value yields relatively little change to the higher value when expressed as dB and that adding sounds with equal sound pressure levels results in a three-decibel increase.

A.1.2. Frequency

As noted, frequency is the rate of vibrations for a sound and is measured in Hz where one Hz indicates one vibration (or cycle) per second. As with the ability to hear events of widely ranging pressure amplitudes described above, the human ear also hears sounds having widely ranging frequencies (e.g., from about 20 Hz to about 20,000 Hz). However, not all sounds in this wide range of frequencies are heard equally well by the human ear. The ear is most sensitive to sounds having frequencies in the range of 1,000 Hz to 4,000 Hz.

Some simple sound sources, such as a tuning fork, produce sounds with a single frequency (i.e., a pure tone). Most sounds however are more complicated and their signals consist of multiple many frequencies. A sound spectrum is a representation of a sound showing the magnitude of the various frequencies present in the sound. Knowledge of the frequency spectrum of a signal is important for the following reasons:

- People and animals have different hearing sensitivity and react differently to various frequencies. For instance, everyone is familiar with a "dog whistle" which produces a signal that dogs can hear but humans cannot. This occurs because dog whistles produce a tone having a frequency above the range at which humans can hear but within the range of the dog's hearing. At the other end of the frequency scale, elephants communicate at frequencies below the range of human hearing.
- Structures respond to much lower frequencies (e.g., 1–30 Hz) than humans. Therefore, low-frequency sounds that people cannot hear can still create problems by inducing vibration in buildings.
- Different sound sources produce signals consisting of different frequency characteristics.
- Engineering solutions for reducing or controlling sound are therefore frequency-dependent.

Figure A-2 shows an example of a frequency spectrum for jet departure noise. Unlike the vibrations of the tuning fork shown in Figure A-1, the turbulent mixing of the jet exhaust gases produces noise across a wide range of frequencies as opposed to a single frequency. The spectrum is shown divided into frequency bands, each of which spans one-third of an octave. An octave is a doubling of frequency. Spectra are often displayed in octave or one-third octave bands.

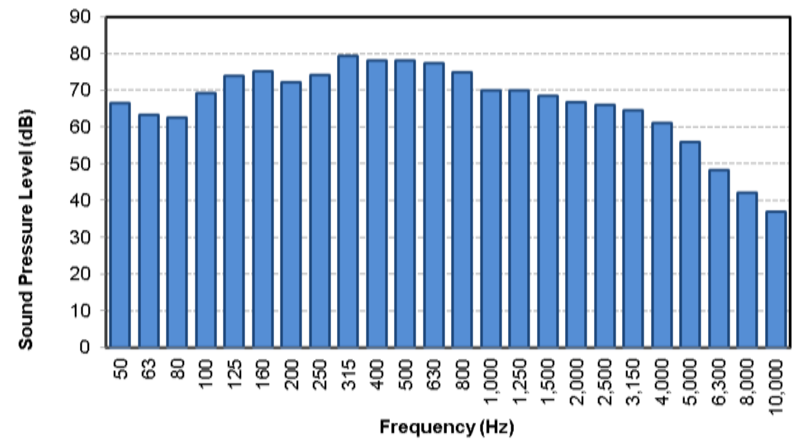

Figure A-2. Example Spectrum of Jet Departure Noise

High-quality measuring devices (e.g., sound level meters) are equally sensitive to sounds across the full range of human hearing. Therefore, to approximate the human perception of common environmental sounds, the acoustical community designed a range of frequency-based adjustments to be applied to measured sound levels. Today, two of these weighting systems remain in common usage, the A-weighting and C-weighting, illustrated in Figure A-3.

These weightings are based on the response of human ears to moderate- (A-weighting) or high-level (C-weighting) sounds. For most industrial and transportation applications, A-weighting is used. For loud sounds with significant low frequency content, C-weighting is used. A-weighting applies progressively higher reductions to lower frequencies, mimicking the reduced sensitivity of human ears to low frequency sounds. However, in order to more accurately capture the low frequency energy and higher levels present, C-weighting, with its much slower roll-off at lower frequencies, is more appropriate for noise sources such as explosions and sonic booms.

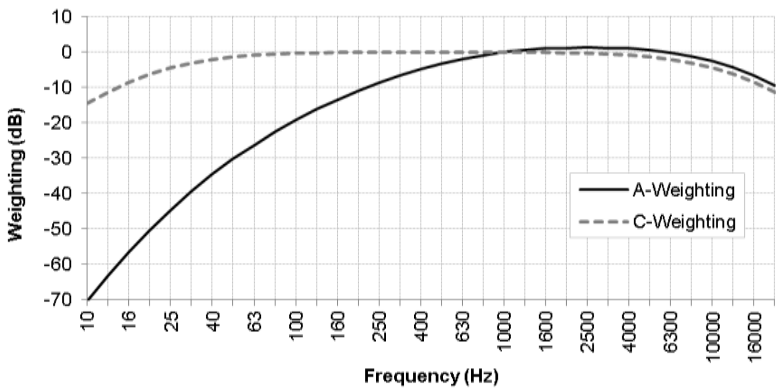

Figure A-3. A- and C-Weighting Scales

A.1.3. Variation of Sound with Time

The third characteristic used to describe sound (after magnitude and frequency) is its relative stability over time. The temporal pattern of sound is important in predicting annoyance. Sound can be classified into three categories that define its basic time pattern: steady state, intermittent, and impulsive.

Steady-State Sound

Steady-state sound is a sound of consistent level and spectral content. Typical examples of steady-state sound are the sounds produced by ventilation or mechanical systems that operate more or less continuously. Annoyance due to steady-state sound depends on the level of the sound, its frequency content, and its duration. Generally, the longer the sound goes on and the more tones are audible, the greater degree of annoyance people will experience.

Intermittent Sound

Intermittent sounds are those which are produced for short periods. The sound temporarily rises above the background and then fades back into it. Intermittent sounds are typically associated with moving sound sources such as an aircraft overflight or a single-vehicle drive-by. Intermittent sound is typically a few minutes or less in duration; the annoyance of a transient sound is dependent on both the maximum level and the duration.

Impulsive Sound

Impulsive sound is of short duration (typically less than one second), low frequency, and high intensity. It has abrupt onset, rapid decay, and often a rapidly-changing spectral composition. Impulsive sound is characteristically associated with such sources as large-caliber weapons, demolition activities, sonic booms, and many industrial processes (e.g., jackhammers, pile drivers). However, certain aspects of helicopter noise events are also impulsive.

A.2. Propagation of Sound

As sound travels from the source to the receiver, several factors influence the level and spectrum of the sound heard by a receiver. These factors generally result in a reduction, or *attenuation*, of the sound level:

- Spherical spreading
- Ground effect
- Attenuation through vegetation
- Attenuation due to barriers (including terrain)
- Atmospheric effects

Note that, for other than spherical spreading, all factors tend to have more effect on higher frequencies with low frequencies able to propagate over long distances with little attenuation. Hence, the "rumble" of jet departures or highway traffic can often be heard at large distance, while the higher frequency characteristics of the signal are lost.

A.2.1. Spherical Spreading

The sound from the point source, such as a generator, spreads in all directions like an expanding sphere. A rule of thumb in acoustics is that a spherically spreading sound decreases by 6 dB for every doubling of distance. Thus, increasing the distance from 200 feet to 300 feet does not provide as much reduction as moving from 100 to 200 feet. In practice, high-frequency sound is attenuated faster than 6 dB per doubling of the distance because some energy is lost in the medium (air) due to atmospheric effects at this frequency range. This loss, called excess attenuation, is dependent upon air temperature and humidity as well as the signal's sound frequency and is due to a process called vibrational relaxation in oxygen and nitrogen molecules.

Another exception to the "6-dB-per-doubling rule" involves a line source (such as a busy freeway) rather than a point source. When standing by a line source, the listener receives noise simultaneously from the entire breadth of the feature – in this case, it would be the line of cars traveling on the freeway. The sound from a line source can be pictured as an expanding cylinder. For a long, straight line source, the sound level drops by 3 dB for every doubling of distance from the source. In practice, due to excess attenuation and other factors, highway noise tends to drop off by about 4 dB for every doubling of distance from the highway.

A.2.2. Ground Effect

When sound propagates along the surface of the earth from a source to a receiver it follows two paths. The first is a direct path from the source to the receiver and the second is a path that starts at the source, reflects off the ground, and then travels to the receiver. If the ground is hard, such as pavement or water, the sound reflects off of the surface and adds to the sound from the direct path resulting in higher levels than the direct path alone. When sound reflects off of soft ground such freshly-plowed earth, grass, or loose snow, some frequencies of the reflected sound experience a phase reversal, where the areas of high and low pressure become reversed. Adding this phase-reversed sound with the sound from the direct pathway results in a reduction in the total sound at the receiver. Thus, sound levels are generally higher when the sound propagates over hard ground as compared to soft ground.

A.2.3. Attenuation from Vegetation

Wide areas of dense foliage provide some attenuation for higher frequency sound when they are located between a source and receiver. The vegetation must be dense enough to block the line of sight over even short distances and must extend well above the line of sight. The attenuation is negligible for low-frequency sound sources such as explosions, but increases with frequency. At 250 Hz, approximately 400 ft of dense foliage would be required to produce a noticeable 5 dB of attenuation for a sound source such as an aircraft run-up. At 1,500 Hz, approximately 250 ft of dense foliage would be required to produce 5 dB of attenuation for a sound source such as roadway traffic.

A.2.4. Attenuation Due to Barriers (Including Natural Terrain)

Barriers, berms, and natural terrain can attenuate sound when they are located in the line of sight between the source and the receiver. This attenuation, which acousticians call insertion loss, increases with height, width, and proximity to either the source or the receiver. If there are gaps in a barrier, the potential benefits of acoustical shielding will be substantially reduced.

Figure A-4 illustrates the concept. The sound from the helicopter has a direct path to the person on the right of the diagram. The direct path to the person on the left of the diagram is blocked by the hill. The sound must travel over the hill to the person. The greater the change in direction of the sound path at the top of the barrier is, the greater the reduction in sound that occurs. The change in direction can be increased by increasing the height of the barrier or moving the source or receiver closer to the barrier (if the source or receiver is below the top of the barrier). As the figure illustrates, barriers are most effective for sound sources on the ground. If the helicopter in the figure were to climb upward, there would be a direct path to both people on the ground.

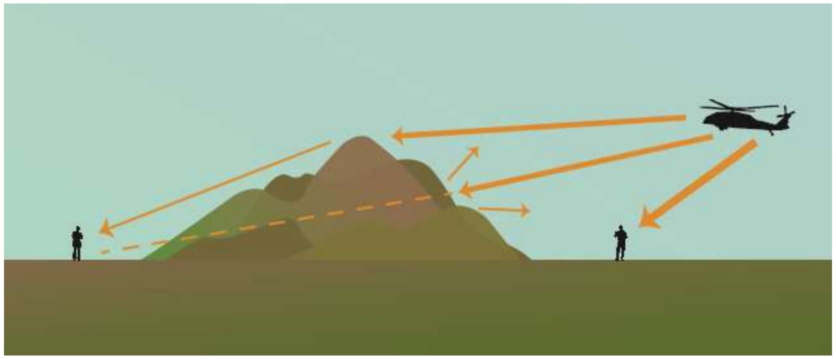

Figure A-4. Barrier Insertion Loss Example

A.2.5. Atmospheric Effects

Weather (or atmospheric) conditions that influence the propagation of sound include humidity, precipitation, temperature, wind, and turbulence (or gustiness). The effect of wind—turbulence in particular—is generally more important than the effects from other factors. Under calm wind conditions, the importance of temperature can increase, in particular, temperature changes occurring with altitude known as temperature gradients. This can sometimes influence propagation quite significantly. Humidity generally has little significance compared to the other effects.

Influence of Humidity and Precipitation

Humidity and precipitation rarely affect sound propagation in a significant manner. Humidity can reduce propagation of high-frequency noise under calm wind conditions. In very cold conditions, listeners often observe that noise sources such as aircraft sound "tinny," because the dry air increases the propagation of high-frequency sound. Rain, snow, and fog also have little, if any, noticeable effect on sound propagation. A substantial body of empirical data supports these conclusions.

Influence of Temperature

Air temperature affects the velocity of sound in the atmosphere. As a result, if the temperature varies at different heights above the ground, sound will travel in curved paths rather than straight lines. This bending of the sound path is called refraction. During the day, temperature normally decreases with increasing height. Under such "temperature lapse" conditions, when the air temperature decreases with height, the atmosphere refracts ("bends") sound waves upwards, and an acoustical shadow zone may exist at some distance from the noise source.

Under some weather conditions, an upper level of warmer air may trap a lower layer of cool air. Such an inversion of normal conditions (i.e., temperature gradients typically lapse with altitude) is most common in the evening, at night, and early in the morning when heat absorbed by the ground during the day radiates into the atmosphere. The effect of an inversion is just the opposite of lapse conditions: it causes sound propagating through the atmosphere to refract downward.

The downward refraction caused by temperature inversions often allows sound rays with originally upward-sloping paths to bypass obstructions and ground effects, increasing noise levels at greater distances. This type of effect is most noticeable at night, when temperature inversions are most common and when ambient sound levels are low enough that they do not otherwise mask distant noise sources.

Influence of Wind

Sound traveling in the direction of the wind (downwind) has a higher speed than sound traveling through calm air. Likewise sound traveling against the direction of the wind (upwind) has a lower speed than sound traveling through calm air. Wind speed typically increases with the height above the ground. This gradient in wind speeds, and sound speeds, causes the sound to refract. Sound refracts downward in the downwind direction and upward in the upwind direction. In general, receivers that are downwind of a source will experience higher sound levels, and those that are upwind will experience lower sound levels. As with a temperature inversion, the downward curving paths reduce or eliminate the insertion loss of barriers in the downwind direction. Wind perpendicular to the sound path has no significant effect.

Wind turbulence (or gustiness) can also affect sound propagation. Sound levels heard at remote receiver locations will fluctuate with gustiness. In addition, gustiness can cause considerable attenuation of sound due to the effects of eddies traveling with the wind. Attenuation due to eddies is essentially the same in all directions, with or against the flow of the wind, and can mask the refractive effects discussed above.

A.2.6. Effects on Propagation

The foregoing effects on propagation described above interact with each other and in some cases are additive. Specific combinations of conditions influence propagation and in order to predict how sound would propagate it is important to understand these varied effects. While the basics are described in this document, for complex permutations entailing interaction of several variables, consultation with an acoustical professional for modeling support and analysis may be required.

A.3. Noise Metrics

Noise metrics may be thought of as measures of noise 'dose'. There are two main types, describing (1) single noise events (Single Event Noise Metrics) and (2) total noise experienced over longer time periods (Cumulative Noise Metrics). Note that all decibel values, whether they relate to basic scales, event metrics or cumulative metrics, are generally referred to as levels - indeed in acoustic measurement, a level is always a decibel value.

Single event metrics are indicators of the intrusiveness, loudness, or noisiness of individual aircraft noises. Cumulative metrics used to measure long-term noise are indicators of community annoyance. But for aircraft noise it is logical that they represent aggregations of single events in some way. A practical noise index must be simple, practical, unambiguous, and capable of accurate measurement (using conventional, standard instrumentation). It must also be suitable for estimation by calculation from underlying source variables and robust - not over-sensitive to small changes in input variables.

Community annoyance research (much of which has been concerned with the noise of aircraft and road traffic), and the search for reliable long-term noise rating procedures, started in the mid- 1950s. As instrumentation for measuring long term noise was very limited then and for some time afterwards, early noise indices tended to incorporate measures that could be obtained manually or by simple mechanical means. Aircraft noise near airports could (and still can) be characterized by statistics describing individual noise events, such as their average levels and numbers. The noise of heavy road traffic, on the other hand, is made up of a very large number of overlapping events and it was then more appropriate to determine level distribution statistics such as L10, the level exceeded for 10% of the time. On the whole, aircraft noise affects far fewer people than road traffic noise but can reach high exposure levels close to busy airports. Here a separate identification of event levels and numbers of events focuses attention on the relative contributions of these two variables to annoyance.

Noise levels are usually presented at discrete, fixed observer locations or alternatively are presented as contours (i.e. lines/curves connecting points of equal values) depicting the area where the specified levels are exceeded. Noise levels are used - especially cumulative metrics - in assessment of effects from all domains of transportation noise: road, railway and air-traffic, as well as for the description of the noise produced from industrial sources, recreational activities etc. In practice, contours are almost always estimated via calculation (i.e., modeled) whereas values at specific locations can also be measured directly (except in the case of forecasted future activity).

Community judgments about the suitability of a sound environment are rarely based on a single sound. Rather, multiple sources of sound accumulate to produce the overall experience of a "quiet" or "noisy" neighborhood. Noise, as noted at the outset of this appendix, is defined as unwanted sound. The receiver imparts a value judgement onto an otherwise neutral physical phenomenon (i.e., sound). In 1974, the Environmental Protection Agency (EPA) established a procedure to assess the cumulative, 24-hour exposure to noise for citizens of the United States. This procedure was published in what has become known as "the Levels Document." To explain this procedure, the sections below will define noise metrics, beginning with simple metrics and progressing to the more complex. Because these metrics typically were developed to systematically characterize sound in the context of evaluating its undesirable effects, they are ordinarily labeled as noise metrics.

A.3.1. Maximum Level (L_{max})

Figure A-5 depicts the time history for an intermittent noise event, such as an aircraft flyover or car pass-by. The sound level increases as a car or aircraft approaches, then the sound level falls and blends into the background as the aircraft or car recedes into the distance. It is often convenient to describe a particular noise event by its *Maximum A-weighted Sound Pressure Level* (L_{max}). The sound level rises as the noise source nears the receiver and decreases as the noise source moves away.

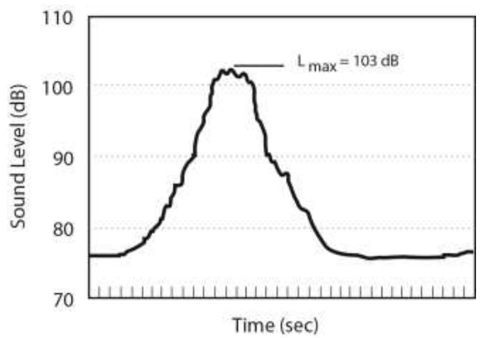

Figure A-5. Variation in Sound Level over Time and Maximum Sound Level

Subjective tests indicate that human response to sound is a function not only of its maximum level, but also of the duration of the signal and its temporal variation. Time-related changes might range from a sound level constant over time, as produced by a continuously operating machine, to the constantly varying sound levels perceived near highways and, even more so, around airports.

Over the past 30 years, a wide variety of acoustic measures or rating scales have been developed for the purpose of quantifying the sound generated by particular sources. These measures of sound have been described by the Acoustical Society of America (ASA) and are defined in the American National Standards Institute (ANSI) publication, *Acoustical Terminology* (ref ANSI S1.1, 1994).

This great number of measures results from the wide variations in the description of specific spectral and temporal characteristics among sound sources. For an engineering analysis of the noise exposure of a particular source, one measure may have many advantages over another. For management of noise at airports (or military airfields) three cumulative measures are important: *Equivalent Sound Level* (L_{eq}), *Day-Night Average Sound Level* (DNL or L_{dn}), and *Community Noise Equivalent Level* (CNEL). However, to understand a cumulative measure, it is helpful to first describe another single-event measure, *Sound Exposure Level (SEL)* in addition to the L_{max} described above because SEL is a metric accounts for duration in addition to the maximum pressure level that L_{max} quantifies.

A.3.2. Sound Exposure Level (SEL)

Research has established that annoyance of an intrusive noise event increases with both the level (magnitude) and the duration of the intrusion. Thus, a long-duration, lower-level event can be as annoying as a higher-level, shorter event. The SEL captures both variables in a single numerical quantity. The SEL (as illustrated in Figure A-6) is defined as the total acoustic energy in an event from background to background (typically computed or defined as a level that is 10 to 20 dB lower than the event peak) that is then normalized or compressed into a one-second interval. This single number, SEL, represents all the acoustic energy of an event as if that event had occurred within a one-second time period. In the example presented below, the several second duration event having a L_{max} of 103 dB would have a SEL of 108 dB. By definition, if the event duration is greater than one second, the SEL would be greater than the L_{max} of the same event.

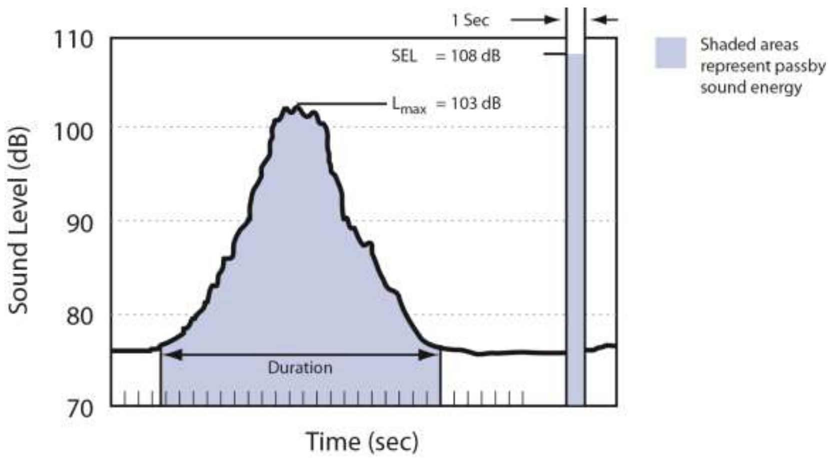

Figure A-6. Sound Exposure Level of a Noise Event

A.3.3. Equivalent Sound Level (L_{eq})

Annoyance also increases with the number of separate times an intrusive sound is experienced during a given period of time. The equivalent sound level (L_{eq}) captures the number of intrusions by measuring the average acoustic energy over a period of time in order to assess the cumulative effect of several events occurring over a period of time. The period can be of any length but it usually is a meaningful block of time such as an eight-hour L_{eq} for the office setting or a one-hour L_{eq} for a classroom environment. The L_{eq} is defined as the level of continuous sound over a given period that would deliver the same amount of energy as the actual time-varying sound exposure. Figure A-7 illustrates how the variation in sound exposure can be summarized in terms of a single, cumulative, value of a one-hour L_{eq}.

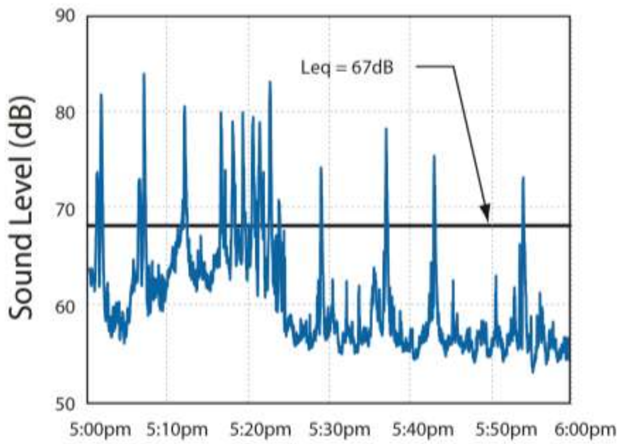

Figure A-7. Equivalent Sound Level (Leq)

A.3.4. Day Night Average Sound Level (DNL)

Annoyance is greater when an intrusive sound occurs at night. To capture the heightened annoyance of nighttime noise, when ambient or background noise tends to diminish and the atmospheric conditions noted in §A.2.5 can tend to attenuate sound to a lesser degree (e.g., wind diminishes or temperature inversions might form), the EPA recommends a special kind of 24-hour L_{eq} known as the DNL (or sometimes referred to as L_{dn}). As is implied in its name, the DNL represents the noise energy present during a daily period. However, it normally is calculated through use of operations data from a longer period, such as a year, in order to smooth out fluctuations occurring in day-to-day operations.

The DNL is calculated in two parts: a fifteen-hour daytime L_{eq} (0700 to 2359) and a nine-hour nighttime L_{eq} (2200 to 0659). When calculating the 24-hour DNL the nighttime L_{eq} is treated as if it were 10 decibels higher to account for the additional intrusiveness of noise at night (see Figure A-8). An alternative way of describing this adjustment is that each event occurring during the nighttime period calculated is as if it were equivalent to ten daytime events.

When recommending the 10 dB nighttime increase, the EPA did not intend its measure to be used to predict sleep disturbance but instead to capture the added annoyance of nighttime events. Different metrics would be used to estimate sleep disturbance are not discussed in this appendix as the Part 150 program relies on the linkage of community annoyance and land-use compatibility recommendations. In recommending the DNL for general use, the EPA also recommends that community planners use the 365-day annual average DNL.

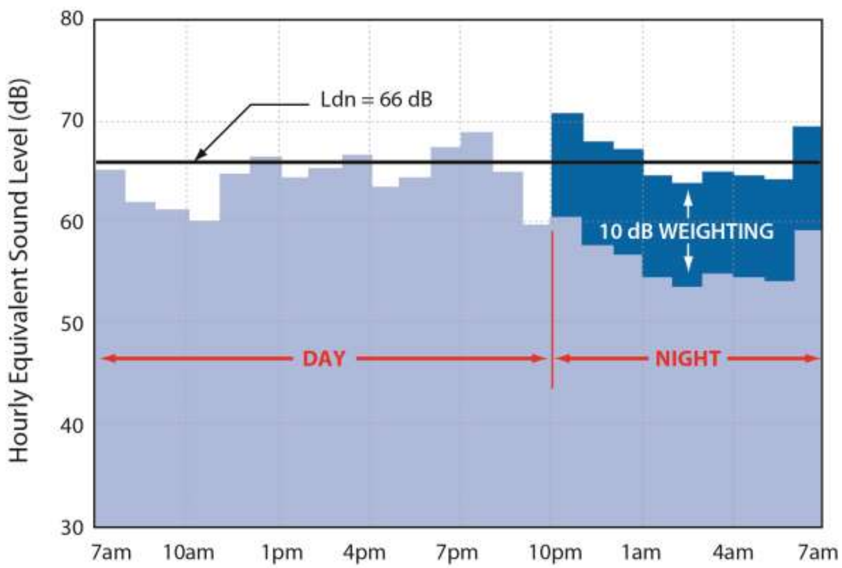

Figure A-8. Example of a Day-Night Average Sound Level Calculation

A.4. Noise Effects

As noted previously, sound refers to the physical description of an event, whereas noise reflects human reaction to it and is customarily defined as unwanted sound. Strictly speaking, this guidance deals principally with aircraft sound and sound levels. However here, as elsewhere, the word noise is generally used as a synonym for sound, especially when - as is the case for aircraft - the sound is unwanted by the receiver.

A.4.1 Noise Effects

There are many different effects of noise on people and individuals experience them to different degrees. The effects can be separated into two broad categories as illustrated in Figure A-9: (a) behavioral - the interference of noise with normal living - and (b) physiological - including potential health effects. At a first level of behavioral reaction, noise disturbs human activity by causing distraction or by physically interfering with it. Grouped together under the general heading of disturbance, these effects include detection/distraction, speech interference, disruption of work/mental activity, and sleep disturbance. A second level of behavioral reaction, sometimes viewed as an indirect response to disturbance of different kinds, is annoyance. A third level response is overt reaction including complaints.

Possible health effects that might be caused by noise over a period of time include (1) noise induced hearing loss and (2) other, indirect, risks to physiological and psychological well-being. The first, which is a consequence of very high levels of sound exposure, is well-documented and is not considered likely to be caused by the levels of aircraft noise experienced beyond airport boundaries. The nature of the second is much less certain; it is known that noise can cause a variety of biological reflexes and responses referred to as stress reactions but whether, over a period of time, these could lead to clinically recognizable illness is unclear. Research into these continues in many countries.

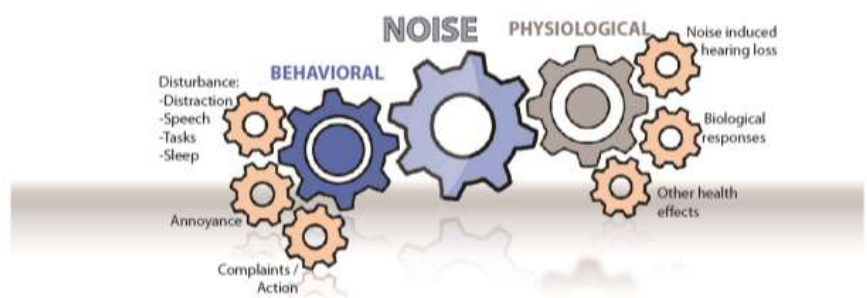

Figure A-9. General Cause and Effect Relationships between Noise and Noise Effects

The effects of noise have been extensively researched, particularly with the aim of establishing quantitative relationships between the amount of noise and the severity and extent of the effects. But behavioral reactions are essentially subjective and very sensitive to non-acoustic socio-psychological factors such as location, activity, state of well-being, familiarity with the noise, environmental expectations and attitudes to the noise makers. The effects of such modifying factors dramatically weaken correlations between noise and response by masking or confounding their dependency on noise. Such relationships are further obscured by variations in noise exposure over time and space, because individuals move around and engage in different activities.

Obvious physical factors include time and situation which govern intrusions into activities - sleep disturbance occurs primarily at night, speech interference during the day and so on. But equally important are those that control attitudes and susceptibilities; whether or not a particular noise annoys may depend very much upon the message it carries; concerns about the sources of noise can influence annoyance reactions more strongly than physical sound exposure itself.

Because of the combined influences of acoustical and non-acoustical factors, it is difficult to isolate the underlying noise-response relationships. In general, noise assessment methodology needs to be consistent with the understanding of the factors involved. Because effects on the community as a whole can only be described in broad statistical terms, noise exposures are commonly defined only as long-term averages at representative locations. This is why cumulative noise exposure metrics such as DNL are favored when assessing community annoyance.

An essential conclusion from aircraft noise effects research is that community annoyance is the most useful general criterion of overall, long-term aircraft noise impact and that it can be correlated with long-term average sound exposure. However, before considering community annoyance and noise-annoyance relationships, it is worthwhile reviewing the various effects of noise, and their interrelationships - with each other and with sound exposure.

Some noise-effect relationships – shown in **Figure A-9 above** - can be quantified; others cannot. Noise disturbance and short-term annoyance - immediate responses to individual noise events of relatively short duration - have been studied extensively in research laboratories. Laboratory experiments can be performed with great accuracy and they have provided a wealth of knowledge about the fundamental characteristics of human hearing and perception of sound.

But a detailed understanding of specific disturbance criteria is not particularly helpful when it comes to assessing the day-by-day impact of environmental noise on communities. The noise experienced by individuals obviously depends on where they live and work and upon their lifestyles; no two people experience exactly the same sound exposure patterns over a period of time or the same interference with their activities. And different people react differently to the same sound; some are a great deal more sensitive than others. When coupled with the multiple and differing potential disturbance effects, these variations make studies in the community intrinsically much more complex than laboratory work. Yet it is only in that real world that the relationships between cause and long-term annoyance - as a consequence of total long-term sound exposure from all sources - can be investigated.

This long-term aspect of cause and effect has been the primary influence on the direction that field research on noise effects on communities has taken. Community annoyance has been adopted as a general indicator for all of the possible impacts of environmental noise. In social survey studies, individuals' annoyance has been measured in a variety of ways - quantifying it on simple numerical or category scales or via elaborate multi-question procedures. These measurements have then been correlated with various measures of typical sound exposure, first to decide what the appropriate metric is, and then to 'calibrate' the metric, that is to determine the exposure-response relationship. In such correlations, the overall impact of noise is sometimes expressed as an average across individuals or, alternatively, as the incidence of high annoyance (such as the percentage of respondents 'highly annoyed').

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Appendix B

- Noise Complaints

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B.1. Noise Complaints

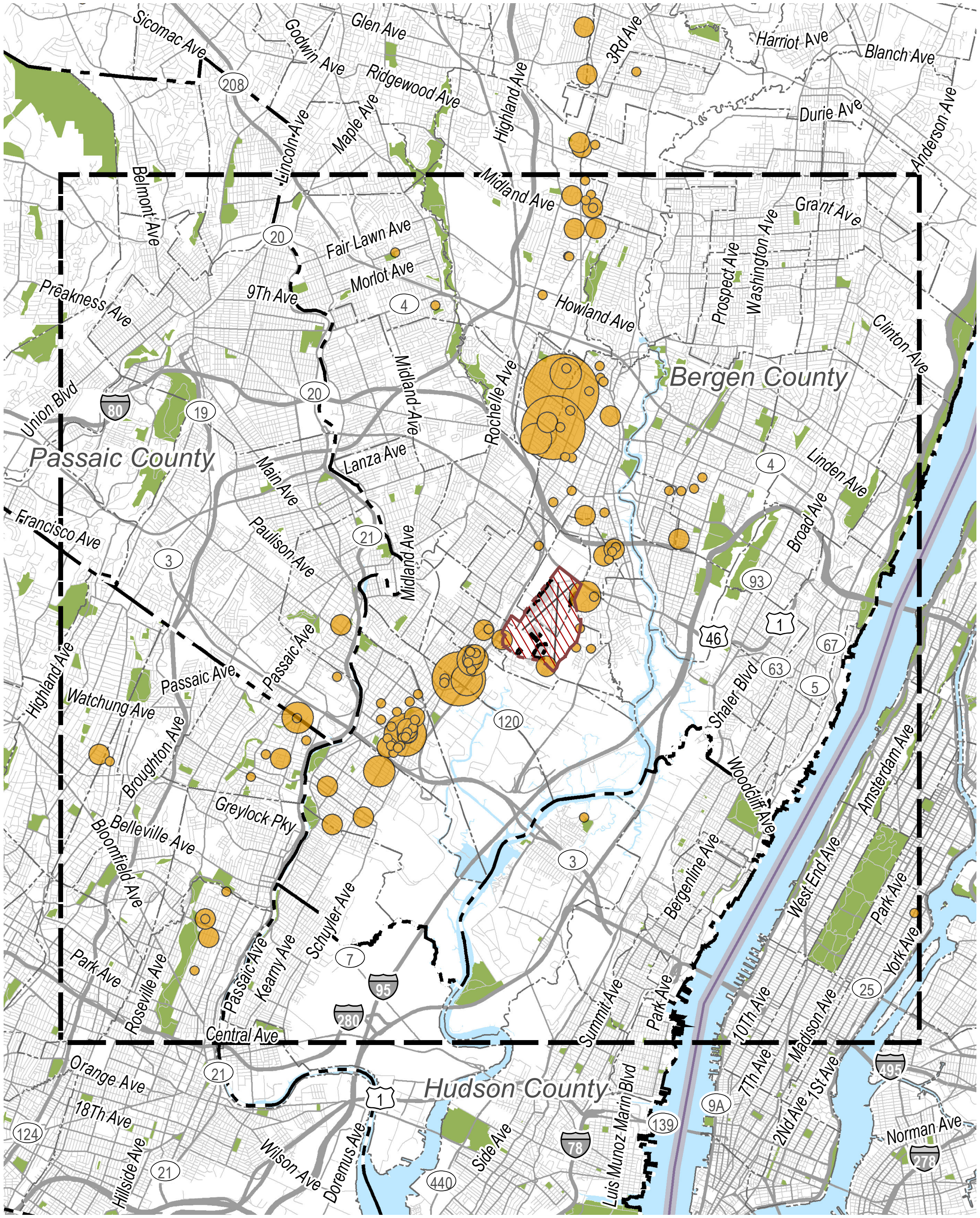
The Port Authority provides two primary means of filing an aircraft noise complaint: (1) by completing and submitting the form on the Port Authority's website or (2) by leaving a voicemail on the airport noise complaint hotline. Noise complaints are recorded and processed with the help of the Port Authority's PlaneNoise® complaint management system. Each noise complaint received is compiled in a database, verified for accuracy, analyzed, and mapped for reporting. Noise complaint reports are provided to the FAA on a monthly basis to notify them of areas of noise concerns.

Figures B-1 through B-4 depict the geographic distribution of noise complaints that the Port Authority received in 2014 and 2015 regarding aircraft operations in four categories: (1) jets, (2) propeller aircraft, (3) helicopters, and (4) unspecified aircraft types. (Note: unspecified indicates that complainant did not identify the aircraft type.) The figures use circles to graphically depict the number of complaints – in ranges – received from specific addresses at the center of the circle.

As the figures show, a majority of the complaints received in each category are from addresses within the Study Area, some are from outside the Study Area, and a very small percentage are from addresses that are outside of the figure's geographic extent

B.2. Noise Complaint Figures

Figures B-1 through B-8 below illustrate complaints for jet, propeller, helicopter and unspecified aircraft types during both daytime hours (07:00 AM – 10:00 PM) and nighttime hours (10:00 PM – 07:00 AM).



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-1

Daytime (7 am – 10 pm)
Noise Complaints: Jet Aircraft

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Runway
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow

- 501-1,000 Complaints
- 101-500 Complaints
- 51-100 Complaints
- 26-50 Complaints
- 11-25 Complaints
- 6-10 Complaints
- 2-5 Complaints
- 1 Complaint

Jet complaints received in 2014 & 2015: 593
Jet complaints on this figure: 572 (96.4%)
Jet complaints in the Study Area: 562 (94.7%)

N 0 15,000 30,000 Ft

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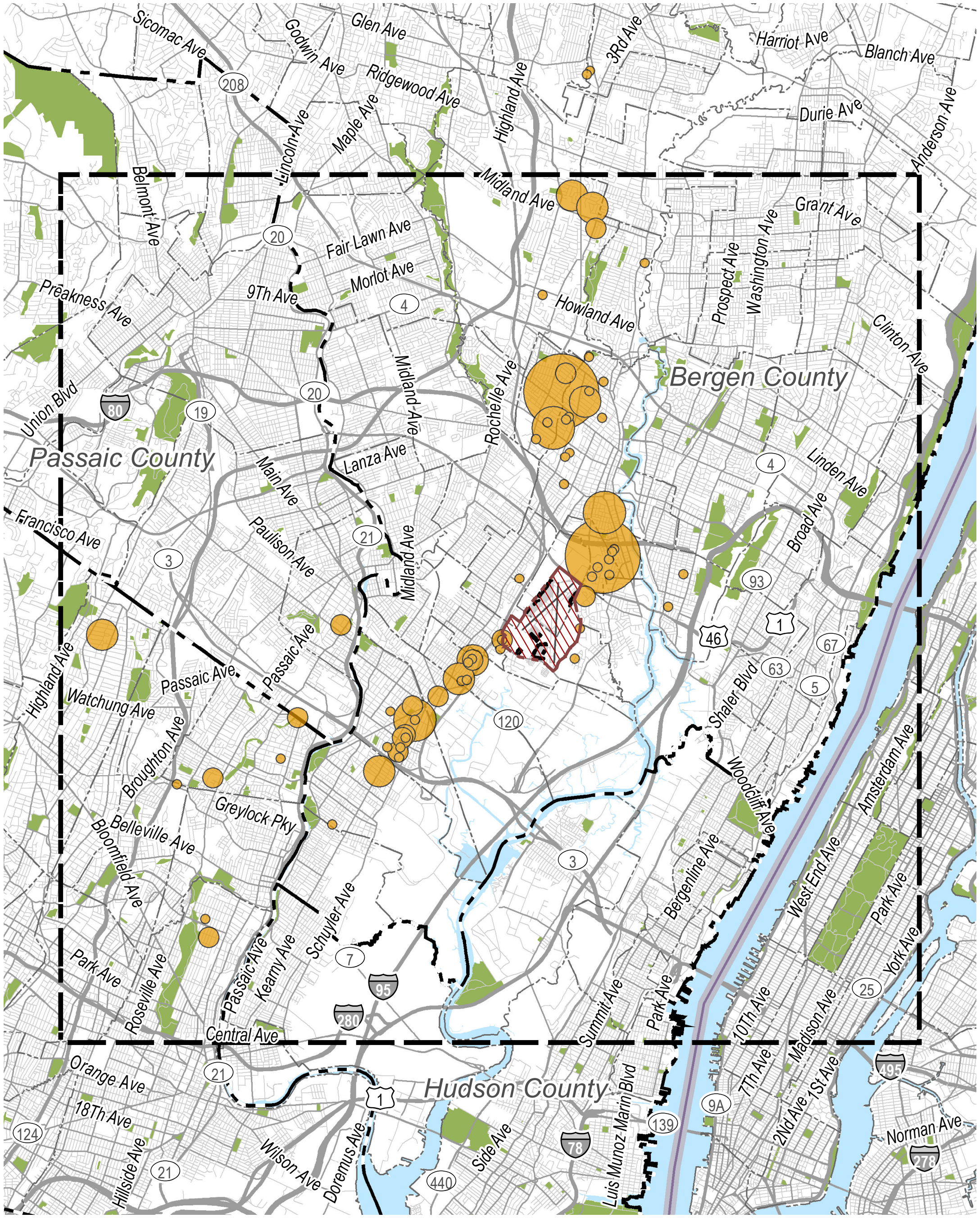
Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-2

Nighttime (10 pm – 7 am)
Noise Complaints: Jet Aircraft

TEB Airport Boundary (Approximate)
TEB Study Area
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow

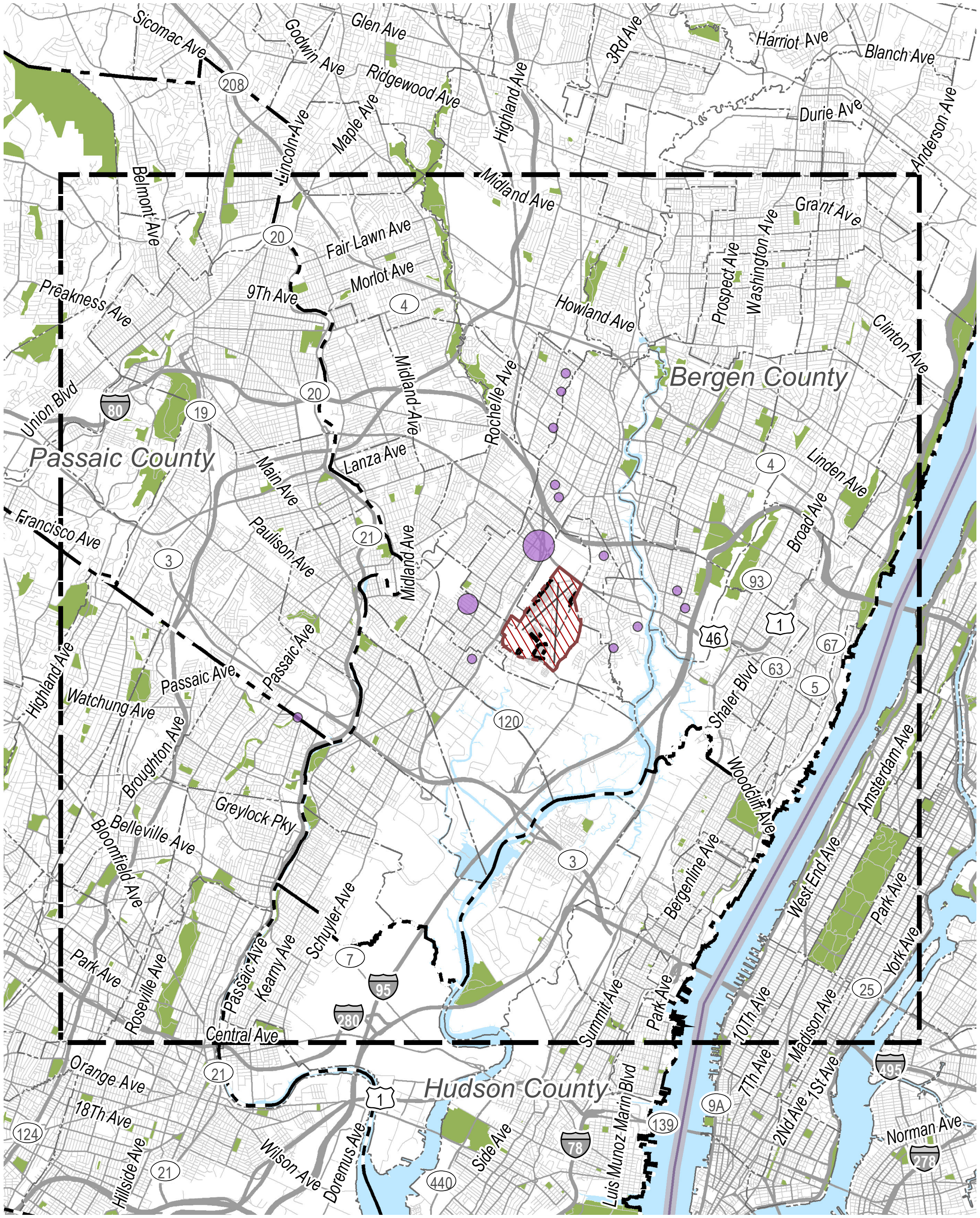
501-1,000 Complaints
101-500 Complaints
51-100 Complaints
26-50 Complaints
11-25 Complaints
6-10 Complaints
2-5 Complaints
1 Complaint

Jet complaints received in 2014 & 2015: 800
Jet complaints on this figure: 785 (98.1%)
Jet complaints in the Study Area: 783 (97.9%)

N 0 15,000 30,000 Ft

hmmh

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-3

Daytime (7 am – 10 pm)
Noise Complaints: Propeller Aircraft

TEB Airport Boundary (Approximate)
TEB Study Area
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

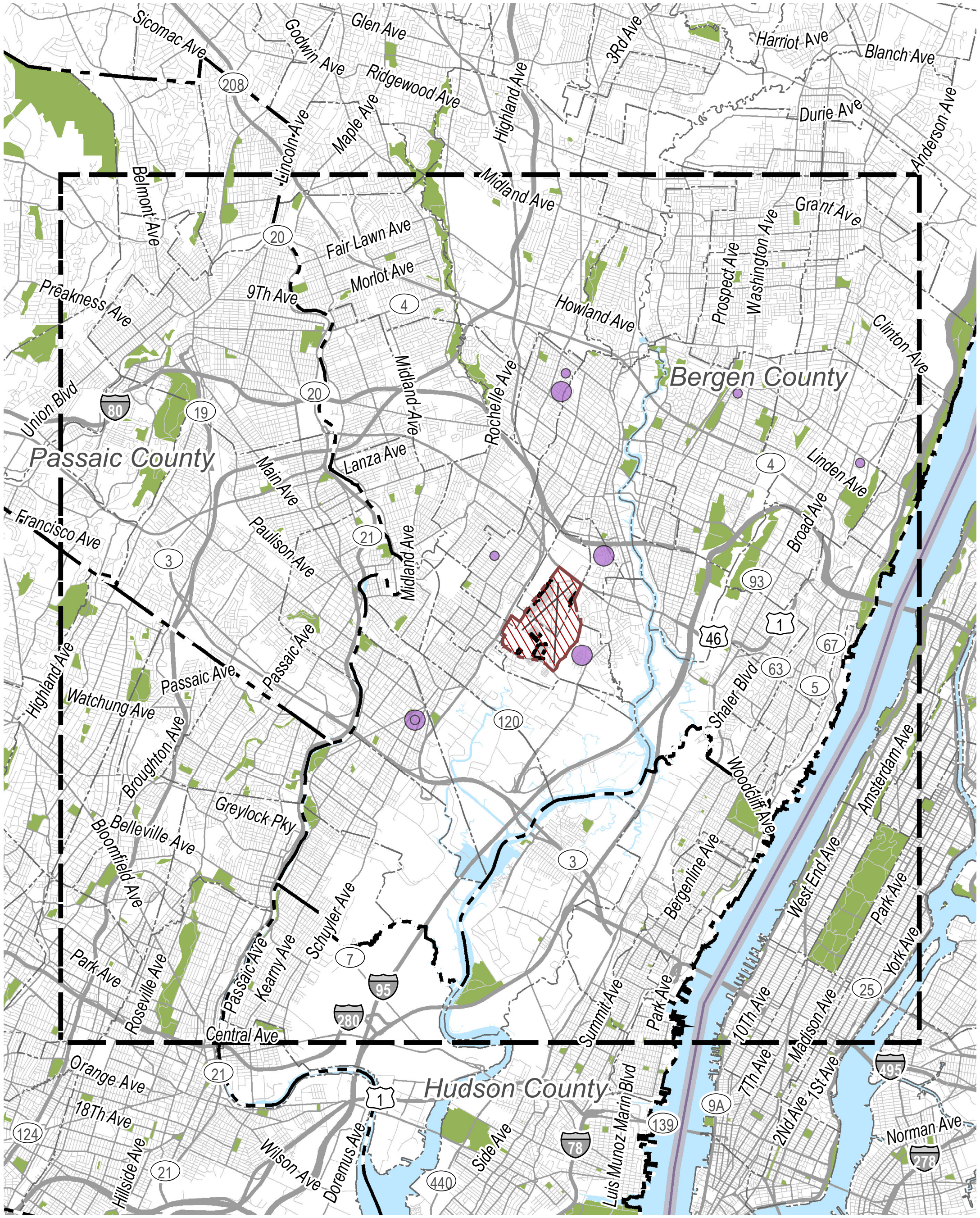
Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow

501-1,000 Complaints
101-500 Complaints
51-100 Complaints
26-50 Complaints
11-25 Complaints
6-10 Complaints
2-5 Complaints
1 Complaint

Propeller complaints received in 2014 & 2015: 23
Propeller complaints on this figure: 23 (100.0%)
Propeller complaints in the Study Area: 23 (100.0%)

N 0 15,000 30,000 Ft

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-4

Nighttime (10 pm – 7 am)
Noise Complaints: Propeller Aircraft

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Runway
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow

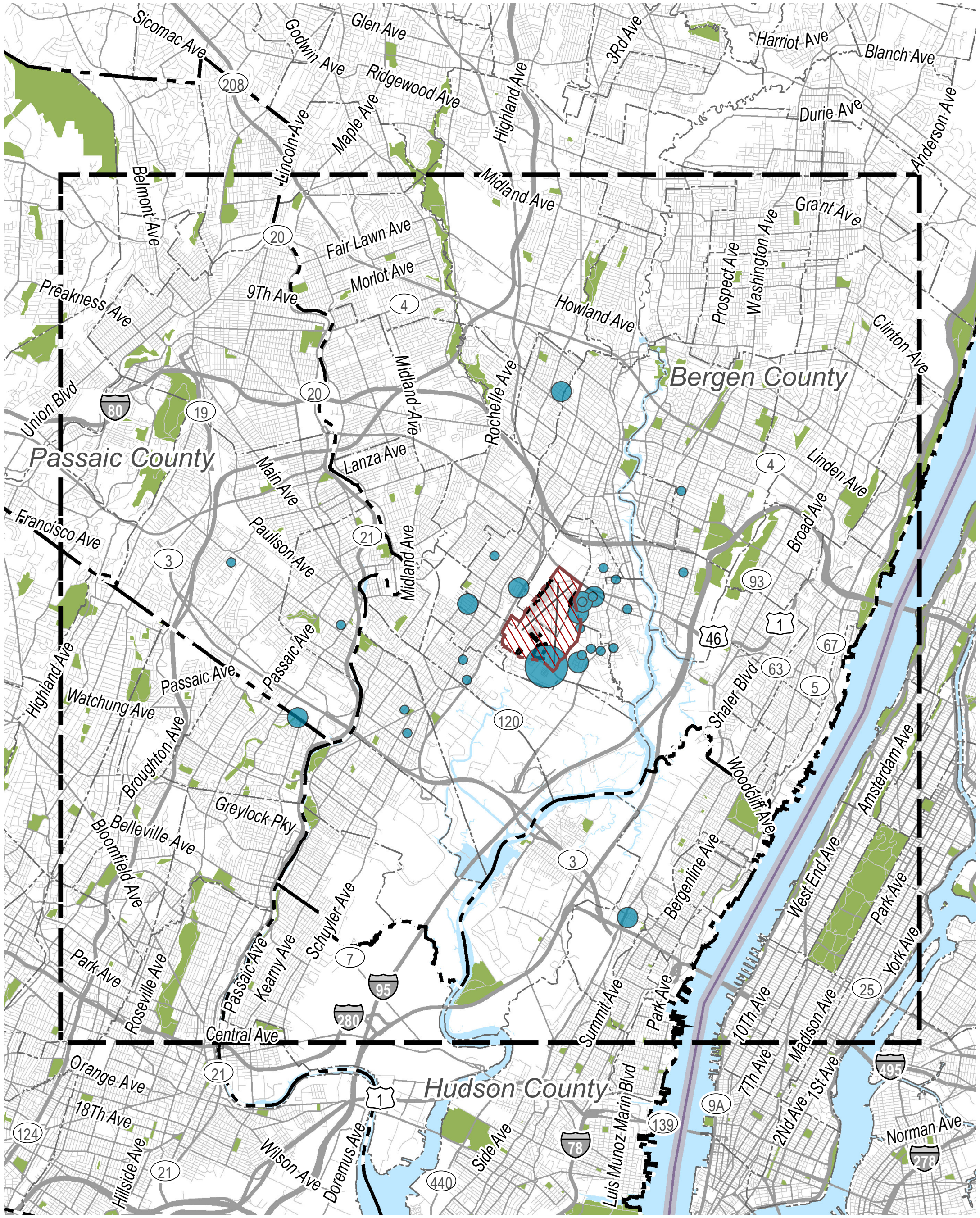
- 501-1,000 Complaints
- 101-500 Complaints
- 51-100 Complaints
- 26-50 Complaints
- 11-25 Complaints
- 6-10 Complaints
- 2-5 Complaints
- 1 Complaint

Propeller complaints received in 2014 & 2015: 14
Propeller complaints on this figure: 13 (92.9%)
Propeller complaints in the Study Area: 13 (92.9%)

N

0 15,000 30,000 Ft

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

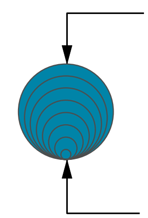
Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-5

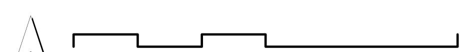
Daytime (7 am – 10 pm)
Noise Complaints: Helicopters

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Runway
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

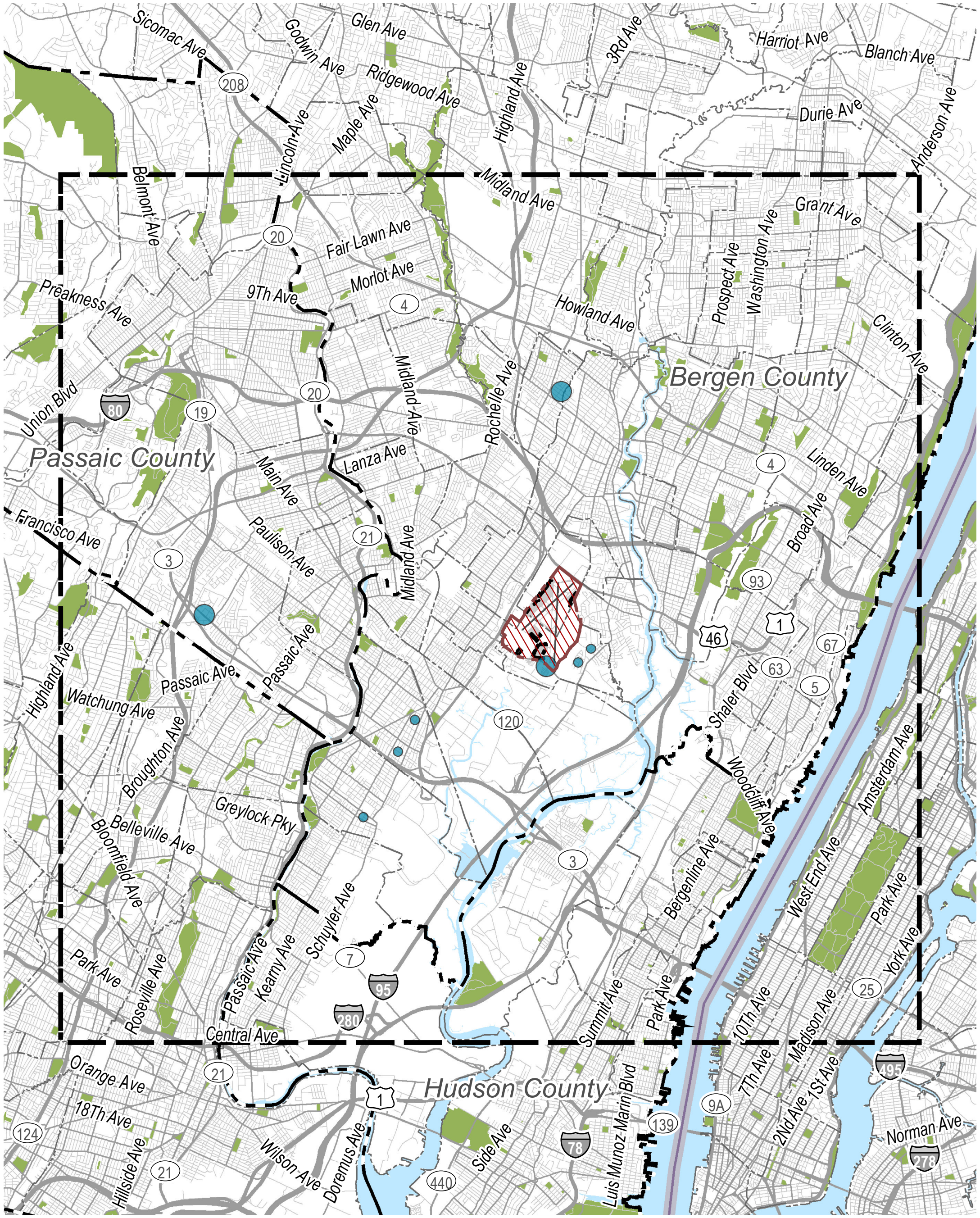
Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow



Helicopter complaints received in 2014 & 2015: 63
Helicopter complaints on this figure: 61 (96.8%)
Helicopter complaints in the Study Area: 61 (96.8%)



Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-6

Nighttime (10 pm – 7 am)
Noise Complaints: Helicopters

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Runway
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

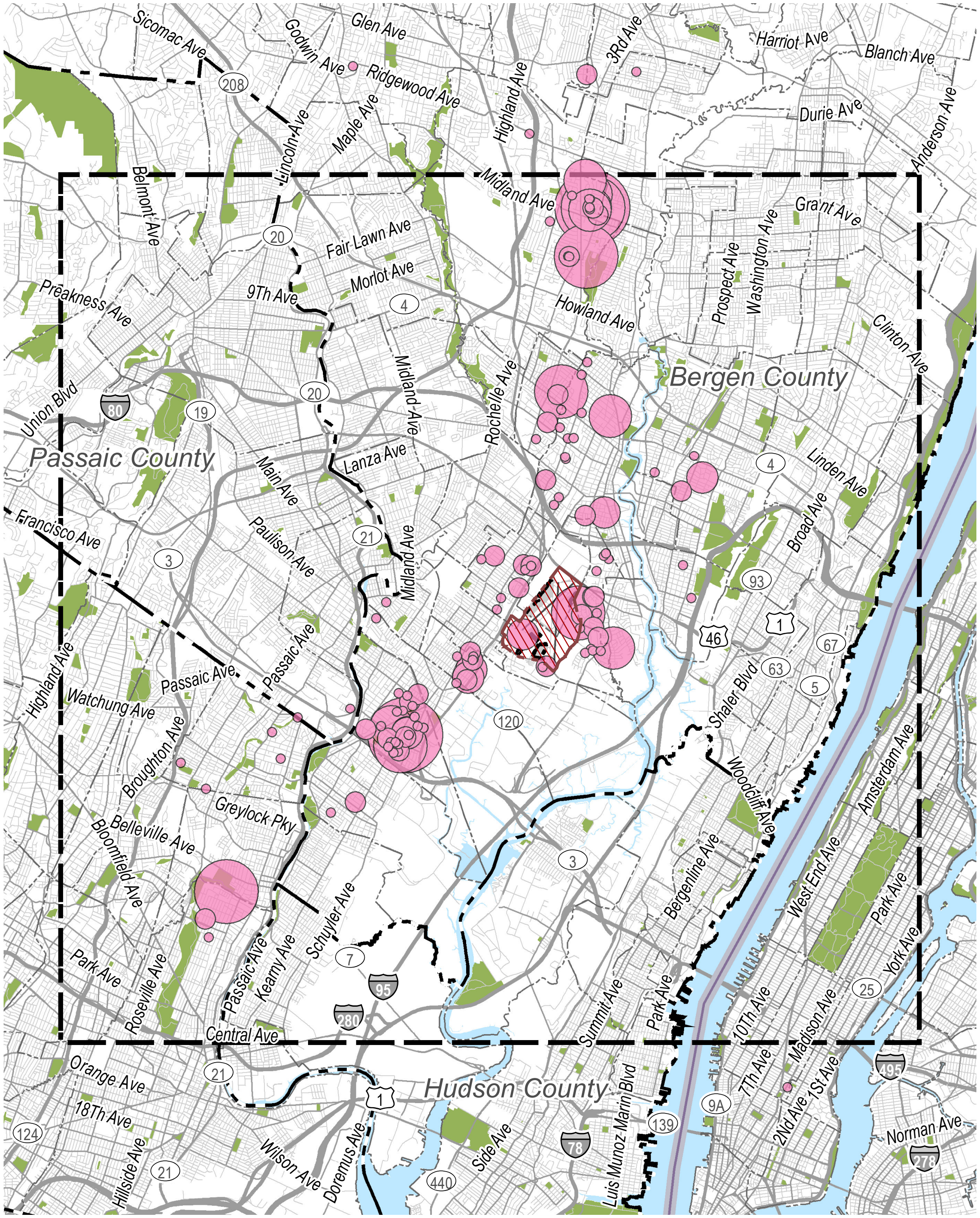
Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow

- 501-1,000 Complaints
- 101-500 Complaints
- 51-100 Complaints
- 26-50 Complaints
- 11-25 Complaints
- 6-10 Complaints
- 2-5 Complaints
- 1 Complaint

Helicopter complaints received in 2014 & 2015: 15
Helicopter complaints on this figure: 15 (100.0%)
Helicopter complaints in the Study Area: 15 (100.0%)

N 0 15,000 30,000 Ft

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-7

Daytime (7 am – 10 pm) Noise Complaints: Unspecified Aircraft Types

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Runway
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow

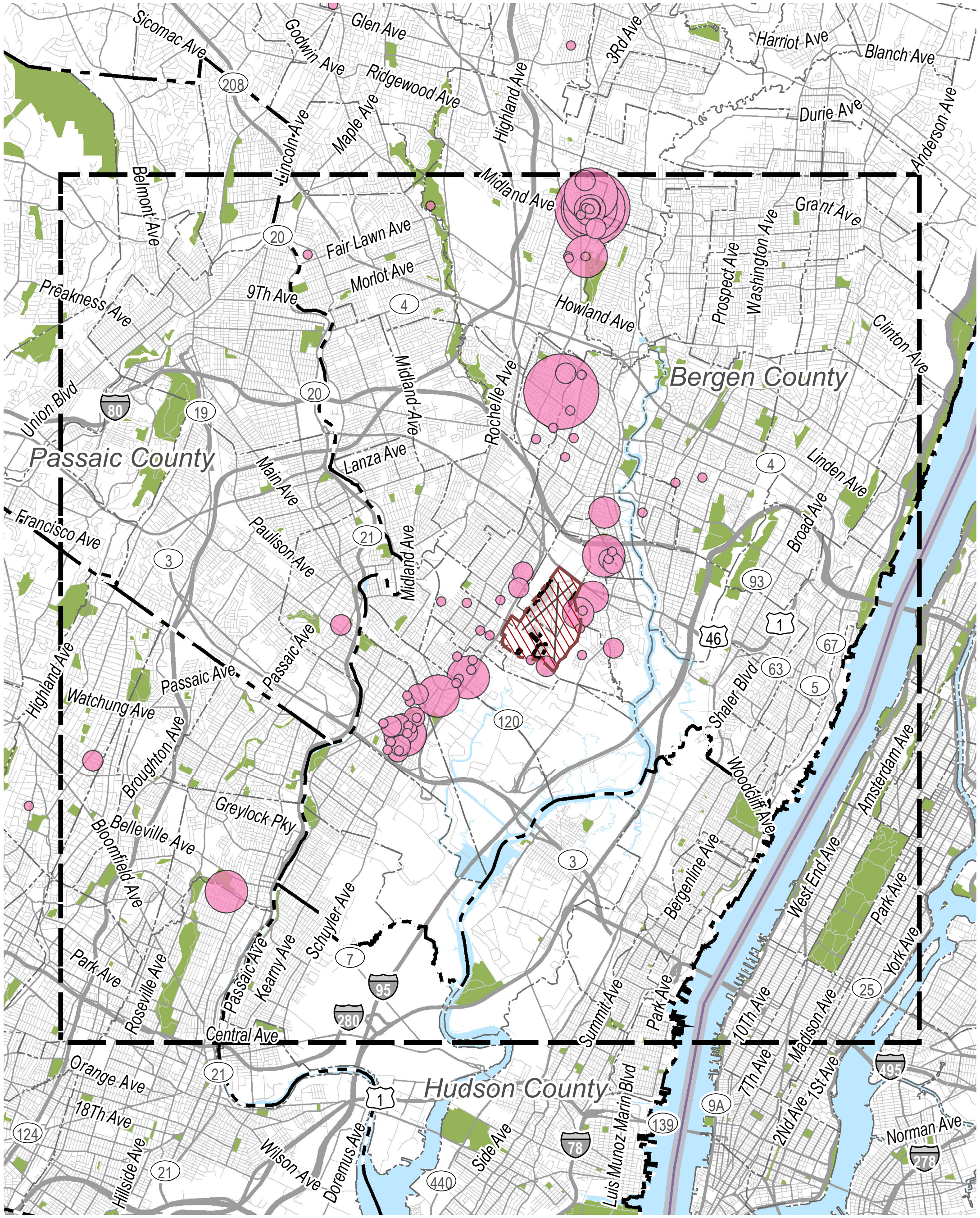
- 501-1,000 Complaints
- 101-500 Complaints
- 51-100 Complaints
- 26-50 Complaints
- 11-25 Complaints
- 6-10 Complaints
- 2-5 Complaints
- 1 Complaint

Unspecified complaints received in 2014 & 2015: 960
Unspecified complaints on this figure: 951 (99.0%)
Unspecified complaints in the Study Area: 945 (98.4%)

N 0 15,000 30,000 Ft

hmmh

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: B-8

Nighttime (10 pm – 7 am) Noise Complaints: Unspecified Aircraft Types

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Runway
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

Circles represent the number of complaints received from the address at the center of the circle, in ranges, as follow

- 501-1,000 Complaints
- 101-500 Complaints
- 51-100 Complaints
- 26-50 Complaints
- 11-25 Complaints
- 6-10 Complaints
- 2-5 Complaints
- 1 Complaint

Unspecified complaints received in 2014 & 2015: 744
Unspecified complaints on this figure: 741 (99.6%)
Unspecified complaints in the Study Area: 738 (99.2%)

N 0 15,000 30,000 Ft

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

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Appendix C

- Land Use

This appendix includes two subsections: (1) C.1, titled "Land Use, Zoning, and Noise Sensitive Sites," and (2) C.2, titled "Final Land Use Review," whereas the public review draft of this document only addressed the first of these two topics and, therefore, did not have subsections. This revision was required to address the following action: During March 2017, as part of the development of the final NEM, the HMMH Team undertook final quality assurance / quality control (QA/QC) steps, including field surveys of land uses within the NEM contours. Appendix C.2 was added to present the memorandum that summarizes the steps undertaken in that field work and the resulting refinements in land use within the contours, including updated NEM graphics and tables of noncompatible land uses. The original "Land Use, Zoning, and Noise Sensitive Sites" discussion was relabeled C.1, and revised to reflect the land use refinements resulting from the QA/QC steps, and also to incorporate revisions made in response to public comments received (as presented and addressed in Appendix H).

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Appendix C.1

- Land Use, Zoning, and Noise Sensitive Sites

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APPENDIX C.1

LAND USE, ZONING, AND NOISE SENSITIVE SITES

This appendix contains information on the collection of land use data for the 14 CFR Part 150 Study for TEB and a detailed description of land uses, zoning, and noise sensitive sites in the Land Use Data Collection Area.

SUMMARY OF LAND USE PLANS AND ZONING

1 Introduction

Teterboro Airport (TEB) is located in Teterboro, New Jersey and classified as a reliever airport for the New York-New Jersey area. TEB is owned and operated by the Port Authority of New York and New Jersey (Port Authority). In 2014, TEB served approximately 3,500 passengers and had a total of 165,670 aircraft operations.[1] TEB is located within the Borough of Teterboro, the Borough of Moonachie, and the Borough of Hasbrouck Heights in Bergen County, New Jersey; and is bordered by the boroughs of Moonachie and Little Ferry to the east, the boroughs of Carlstadt and East Rutherford to the south, the boroughs of Hasbrouck Heights and Wood-Ridge to the west, and the City of Hackensack and Township of South Hackensack to the north. TEB is also located in New Jersey Meadowlands District, maintained by the New Jersey Sports & Exposition Authority (NJSEA), which provides additional land use planning and zoning for portions of the Borough of Carlstadt, Borough of East Rutherford, Borough of Little Ferry, Borough of Moonachie, Township of South Hackensack, and Borough of Teterboro in the TEB vicinity.

2 Study Areas

Two study areas were identified during the development of the 14 CFR Part 150 Study (Part 150 Study); the Study Area and the Land Use Data Collection Area (**Figure C-1**).

2.1 Study Area

The Study Area was developed by the Port Authority in consultation with the Federal Aviation Administration (FAA) to meet Part 150 regulations, including a 30,000-foot perimeter around TEB (about 6 miles) from each runway end.[2] This Study Area represents the outermost limit of the data collection, analyses, and public outreach required for the Part 150 Study.

The Study Area encompasses parts of four counties in New Jersey; Bergen, Essex, Hudson, and Passaic, as well as part of New York County in New York. Additionally, the Study Area encompasses the fourteen municipalities that make up the Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC), which is made up of the airport, FAA, airport users, and the 14 municipalities to ensure meaningful dialogue between parties is maintained and to oversee noise abatement at TEB.

2.2 Land Use Data Collection Area

A Land Use Data Collection Area was developed to allow for a detailed review and collection of land use data. The Land Use Data Collection Area included municipalities with the potential to be located within TEB's 2016 Existing DNL 65 or higher dB noise contours and/or TEB's 2021 Future 65 DNL or higher noise contours as dictated by Part 150 regulations.

The Land Use Data Collection Area is within the TEB Study Area and is located entirely within Bergen County. There are nine municipalities located within the Land Use Data Collection Area:

- Borough of Carlstadt;
- Borough of East Rutherford;
- Borough of Hasbrouck Heights;
- Borough of Little Ferry;
- Borough of Moonachie;
- Borough of Wood-Ridge;
- Borough of Teterboro;
- City of Hackensack; and
- Township of South Hackensack.

Additionally, the Land Use Data Collection Area encompasses the NJSEA that provides land use planning and zoning for approximately 30-square-miles along the Hackensack River in both Bergen and Hudson Counties. The NJSEA serves as the planning and zoning agency for six of the listed municipalities, the exceptions being the Borough of Hasbrouck Heights, the Borough of Wood-Ridge, and the City of Hackensack.

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1 Federal Aviation Administration, APO Terminal Area Forecast Detail Report for TEB, Forecast Issued January 2016. Accessed: http://taf.faa.gov/Home/RunReport.

2 Sec. A150.103(b)(1) states:

> (b) Except as provided in paragraph (c) of this section, the following information must be obtained for input to the calculation of noise exposure contours:
>
> (1) A map of the airport and its environs at an adequately detailed scale (not less than 1 inch to 2,000 feet) indicating runway length, alignments, landing thresholds, takeoff start-of-roll points, airport boundary, and flight tracks out to at least 30,000 feet from the end of each runway.

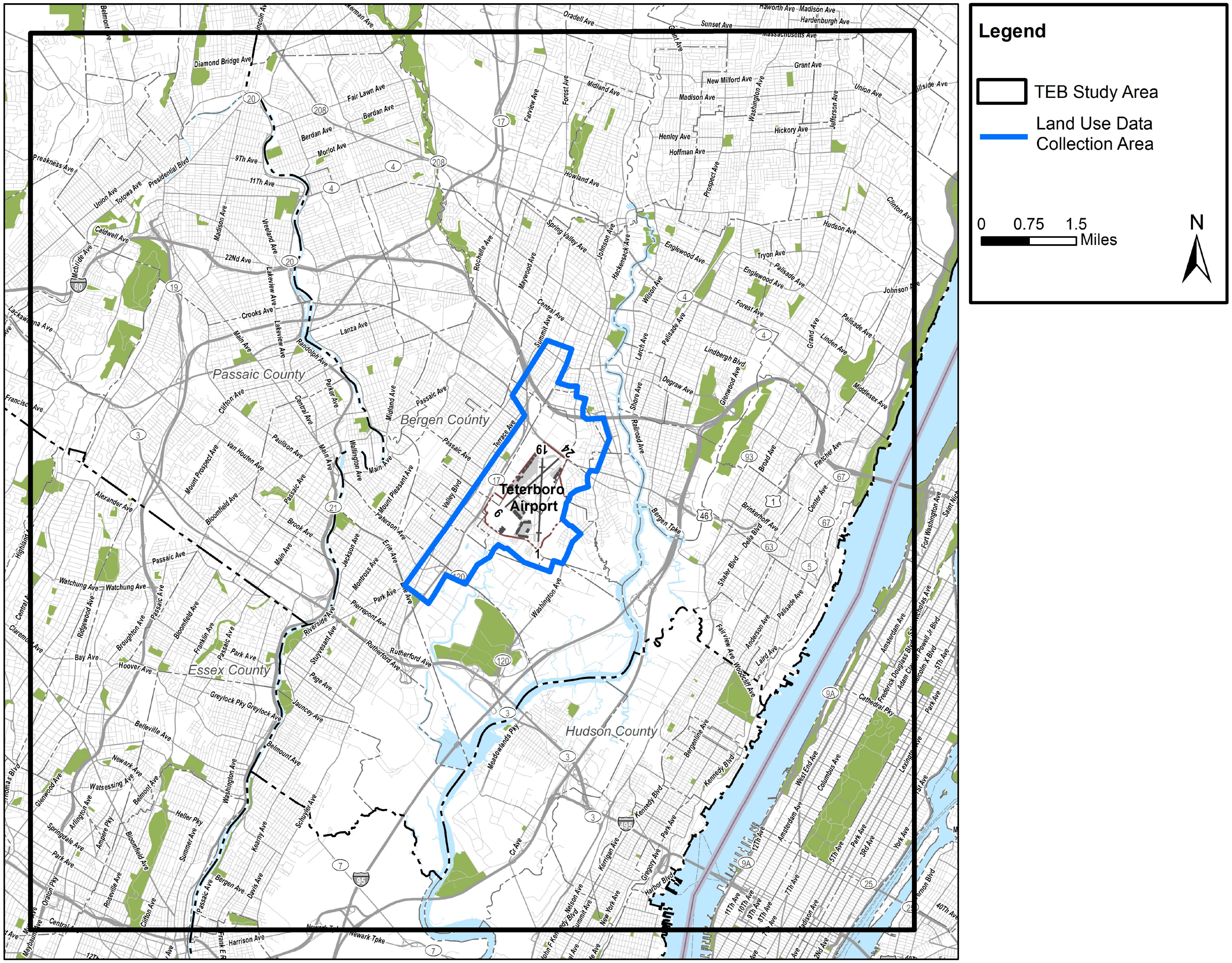

Figure C-1: Study Area

Sources: ESRI, 2016; and RS&H, 2016

3 Existing Land Uses

Land use designations within the Land Use Data Collection Area were based from Table 1 found in 14 CFR Part 150, Appendix A. Land uses for each municipality were consolidated into one of the following categories to enhance the legibility of the land use map (**Table C-1** summarizes each consolidated land use):

- Single family residential;
- Multi-family residential;
- Mobile home residential;
- Transient lodgings;
- Public use 1;
- Public use 2;
- Recreational / open space;
- Commercial use;
- Manufacturing and production; and
- Vacant / undefined.

No mixed commercial and residential uses were identified within the 65 DNL contour. For the small area of mixed commercial and residential uses depicted on the NEM graphics outside of the 65 DNL contour (primarily in Hasbrouck Heights), the more noise-sensitive land use was depicted on the graphic. [3]

Table C-1: Consolidated Part 150 Land Use Categories

Sources: Title 14 CFR Part 150; and RS&H, 2016.

Consolidated Land Use Categories	Typical Uses
Single Family Residential	Single family homes
Multi-Family Residential	Apartment buildings (private, cooperative, and public), mixed commercial and residential buildings with residence either attached or above, one-story multi-use building with multiple occupants, and condominiums
Mobile Home - Residential	Mobile homes
Transient Lodgings	Hotels and motels
Public Use 1	Schools, day cares, hospitals, nursing homes, churches, auditoriums, concert halls, and libraries
Public Use 2	Government services, transportation, and parking areas
Recreational / Open Space	Outdoor and spectator sports arenas, outdoor music shells, amphitheaters, nature exhibits and zoos, amusements, parks, resorts and camps, golf courses, riding stables, and water recreation areas
Commercial Use	Offices (business and professional), wholesale/retail, hardware and farm equipment, retail trade-general, utilities and communication
Manufacturing and Production	Manufacturing (general, photographic, and optical), agriculture (except livestock) and forestry, livestock farming and breeding, mining and fishing, and resource production and extraction
Vacant / Undefined	Undeveloped land not of recreational or open space category

[3] For example; if the building is commercial on the first floor with a single family residential unit on the second floor, the single family land use category is used since it refers to a more sensitive land use as shown in Table C-1.

3.1 New Jersey Sports and Exposition Authority

TEB is located within the New Jersey Meadowlands District, maintained by the New Jersey Sports & Exposition Authority (NJSEA), which provides additional land use planning and zoning for portions of six municipalities in the Land Use Data Collection Area (Borough of Carlstadt, Borough of East Rutherford, Borough of Little Ferry, Borough of Moonachie, Township of South Hackensack, and Borough of Teterboro). Land use development for the NJSEA is guided by the New Jersey Meadowlands Commission (NJMC) through the Meadowlands Environmental Research Institute (MERI).[4] The NJSEA was consulted as part of this study. Table C-2 summarizes the land use designations identified by the MERI.

Table C-2: Meadowlands Environmental Research Institute Land Use Classifications

Sources: MERI, 2016; and RS&H, 2016.

Land Uses	Description
Commercial Office	Central Business District, isolated commercial office buildings, educational institutions
Commercial Retail	Commercial Strip Development, Isolated commercial establishments for goods and/or services, shopping centers
Communication & Utility	Port facilities, power facilities, wetland rights-of-way, upland rights-of-way, water treatment facilities, sewage treatment facilities, stormwater basin
Hotels and Motels	Resorts, Hotels, Motels and related facilities
Industrial	Light industrial, heavy industrial, power generation
Industrial Commercial Complex	Educational institutions, health institutions, correctional institutions, government centers, military installations, other institutional
Open Lands	Cemetery, cemetery on wetland, undeveloped land within urban areas, inactive land with street patterns, open areas, phragmites dominate urban area, managed wetland in maintained lawn greenspace
Public / Quasi Public Services	Public services under private ownership
Recreational Land	Golf courses, picnic and camping parks, marina and boat launches, athletic fields, parks, swimming pools, swimming beaches, formal lawns, arboretums and landscaped areas, open areas in parks, stadium, theaters, cultural centers, zoos, and managed wetland in built-up maintained recreation area
Residential	Single-family residences, multiple-unit dwellings and mobile homes
Transportation	Major roadway, bridge over water, railroad facilities, bus and truck terminals, airport facilities
Transitional Lands	Areas for redevelopment
Water	Oceans, seas, lakes, ponds, rivers, streams
Wetlands	Tidal marshes, non-tidal marshes, wet meadows, prairie potholes, vernal pools, playa lakes

For purposes of the Part 150, classifications of hotels and motels and residential have the greatest significance because these classifications generally encompass lands considered incompatible with aircraft noise level 65 DNL and higher contours.[5]

[4] New Jersey Sports and Exposition Authority, MERI. Accessed: http://www.njsea.com/njmc/about/meri.html.

[5] There are exceptions; not all hotels, motels, and residences are considered incompatible under Part 150. For example, previously sound-attenuated residences are compatible under Part 150.

MERI land use classifications were consolidated to the Part 150 land use categories shown in Table C-1. Table C-3 shows the consolidation of land use classifications for those municipalities within the jurisdiction of NJSEA.

Table C-3: Consolidation of Land Uses for Meadowlands Environmental Research Institute
Source: RS&H, 2016.

Meadowlands Environmental Research Institute Land Use Classifications	Part 150 Study Land Use Categories
Commercial Office	Commercial Use
Commercial Retail	Commercial Use
Communication & Utility	Commercial Use
Hotels and Motels	Transient Lodgings
Industrial	Manufacturing and Production
Industrial Commercial Complex	Manufacturing and Production
Open Lands	Recreational / Open Space
Public / Quasi Public Services	Public Use 1 and Public Use 2
Recreational Land	Recreational / Open Space
Residential	Residential
Transportation	Public Use 2
Transitional Lands	Vacant / Undefined
Water	Vacant / Undefined
Wetlands	Vacant / Undefined

3.2 Borough of Carlstadt

Land use development within the Borough of Carlstadt is guided by the Borough of Carlstadt and the NJMC through the MERI.[6] **Table C-2** summarizes the land use designations identified by the MERI.

The Borough of Carlstadt land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-3** shows the consolidation of land use classifications for the Borough of Carlstadt.

3.3 Borough of East Rutherford

Land use development within the Borough of East Rutherford is guided by the Borough of East Rutherford and the NJMC through the MERI.[7] **Table C-2** summarizes the land use designations identified by the MERI.

The Borough of East Rutherford land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-3** shows the consolidation of land use classifications for the Borough of East Rutherford.

[6] New Jersey Meadowlands Commission, Meadowlands Environmental Research Institute (MERI), Borough of Carlstadt Land Use Map. Accessed: http://meri.njmeadowlands.gov/downloads/gis/maps/Carlstadt_Landuse_WebMap_District_11x17_Portrait.pdf.

[7] New Jersey Meadowlands Commission, Meadowlands Environmental Research Institute (MERI), Borough of East Rutherford Land Use Map. Accessed: http://meri.njmeadowlands.gov/downloads/gis/maps/East_Rutherford_Landuse_WebMap_District_11x17_Portrait.pdf.

3.4 Borough of Hasbrouck Heights

Land use development within the Borough of Hasbrouck Heights is guided by the Vacant Land Analysis included in the Hasbrouck Heights Borough Land Use Map.[8] **Table C-4** summarizes the land use classifications identified by Remington & Vernick Engineers and the Borough of Hasbrouck Heights.

Table C-4: Borough of Hasbrouck Heights Land Use Classifications
Sources: Remington & Vernick Engineers, 2015; the Borough of Hasbrouck Heights, 2015; and RS&H, 2016.

Land Uses	Description
Single Family	Single-family detached home or separate house is a free-standing residential building
Multi Family	Two-flat, three-flat, four-flat, duplex or semi-detached, townhouse, apartment building, mixed use building, and apartment community
Commercial	Central business district, commercial strip development, isolated commercial establishments for goods and/or services, shopping centers
Industrial	Industrial park suitable for corporate offices, office parks, light industrial, manufacturing, and heavy industrial
Parkland	Picnic and camping parks, marina and boat launches, athletic fields, swimming beaches, stadium, theaters, cultural centers, zoos
Semi Public	Golf courses, swimming pools, formal lawns, arboretums and landscaped areas
Other Public Uses	Public services under private ownership
Vacant Land	Land with no houses, offices, or other permanent structures
Water Bodies	Oceans, seas, lakes, ponds, rivers, and streams

The Borough of Hasbrouck Heights land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-5** shows the consolidation of land use classifications for the Borough of Hasbrouck Heights.

Table C-5: Consolidation of Land Uses for Borough of Hasbrouck Heights
Source: RS&H, 2016.

Borough of Hasbrouck Heights Land Use Classifications	Part 150 Study Land Use Categories
Single Family	Single Family Residential
Multi Family	Multi-Family Residential
Commercial	Commercial Use
Industrial	Manufacturing and Production
Parkland	Recreational / Open Space
Semi Public	Recreational / Open Space
Other Public Uses	Public Use 2
Vacant Land	Vacant / Undefined
Water Bodies	Recreational / Open Space

[8] Hasbrouck Heights Borough, Bergen County, New Jersey, Land Use Map – Vacant Land Analysis, MODIV property classes as of 11/2015.

3.5 Borough of Little Ferry

Land use development within the Borough of Little Ferry is guided by the Borough of Little Ferry and the NJMC through the MERI.[9] **Table C-2** summarizes the land use designations identified by MERI.

The Borough of Little Ferry land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-3** shows the consolidation of land use classifications for the Borough of Little Ferry.

3.6 Borough of Moonachie

Land use development within the Borough of Moonachie is guided by the Borough of Moonachie and the NJMC through the MERI.[10] **Table C-2** summarizes the land use designations identified by MERI.

The Borough of Moonachie land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-3** shows the consolidation of land use classifications for the Borough of Moonachie.

3.7 Borough of Wood-Ridge

Land use development within the Borough of Wood-Ridge is guided by the Borough of Wood-Ridge.[11] **Table C-6** summarizes the land use designations identified by the Borough of Wood-Ridge.

Table C-6: Borough of Wood-Ridge Land Use Classifications
Sources: Borough of Wood-Ridge, 2009; and RS&H, 2016.

Land Uses	Description
Industrial	Manufacturing, warehouse, laboratory, research
Commercial	Wholesale, retail, service establishments, commercial recreation, restaurants, office buildings, hotel, funeral home
Institutional, Public	Schools, hospitals, nursing homes, auditoriums, arenas
Single Family Residential	Single-family detached home or separate house is a free-standing residential building
Multi-Family Residential	Two-flat, three-flat, four-flat, duplex or semi-detached, townhouse, apartment building, mixed use building, and apartment community

The Borough of Wood-Ridge land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-7** shows the consolidation of land use classifications for the Borough of Wood-Ridge.

[9] New Jersey Meadowlands Commission, Meadowlands Environmental Research Institute (MERI), Borough of Little Ferry Land Use Map. Accessed: http://meri.njmeadowlands.gov/downloads/gis/maps/Little_Ferry_Landuse_WebMap_District_11x17_Portrait.pdf.

[10] New Jersey Meadowlands Commission, Meadowlands Environmental Research Institute (MERI), Borough of Moonachie Land Use Map. Accessed: http://meri.njmeadowlands.gov/downloads/gis/maps/Moonachie_Landuse_WebMap_District_11x17_Portrait.pdf.

[11] Borough of Wood-Ridge, Code of the Borough of Wood-Ridge, New Jersey, Part II General Legislation, Subdivision of Land; Site Plans, 2009. Accessed: http://www.njwoodridge.org/borough_code/Subdivision-of-Land-Site-Plans-Pg22001.pdf.

Table C-7: Consolidation of Land Uses for Borough of Wood-Ridge
Source: RS&H, 2016.

Borough of Wood-Ridge Land Use Classifications	Part 150 Study Land Use Categories
Industrial	Manufacturing and Production
Commercial	Commercial Use
Institutional, Public	Public Use 1
Single Family Residential	Single Family Residential
Multi-Family Residential	Multi-Family Residential

3.8 Borough of Teterboro

Land use development within the Borough of Teterboro is guided by the Borough of Teterboro and the NJMC through the MERI.[12] **Table C-2** summarizes the land use designations identified by MERI.

The Borough of Teterboro land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-3** shows the consolidation of land use classifications for the Borough of Teterboro.

3.9 City of Hackensack

Land use development within the City of Hackensack is guided by the Downtown Rehabilitation program through the City of Hackensack.[13] **Table C-8** summarizes the land use classifications identified in various redevelopment projects listed within the Downtown Rehabilitation program on the City of Hackensack's website.

Table C-8: City of Hackensack Land Use Classifications
Source: City of Hackensack, 2016; and RS&H, 2016.

Land Uses	Description
Residential	Multi-family, apartments, condominiums, townhomes, residence halls, lofts, and live work studios
Retail	Retail stores and shops, restaurants, eating and drinking establishments, bakeries, delicatessens, movie theaters, grocery stores, hardware, book and stationeries, florists, art galleries and studios
Commercial	General office, medical, child care, physical therapy, health and wellness, professional uses, banks, pharmacies, health and fitness clubs
Parking	Structured parking as permitted use serving other uses
Streetscape, Plazas & Open Space	Parks, plazas, open space including hardscape, softscape and streetscape
Structured Public Parking	In addition to the parking required for residential and/or commercial uses, a minimum of 150 and up to a maximum of 300 public parking spaces are permitted on the property
NJ Transit Bus Station	NJ Transit Bus Station loading is permitted. Overnight parking of NJ Transit buses is strictly prohibited in redevelopment areas
Hotel / Conference Center	Minimum 100 rooms
Public / Civic	Parks, plazas, open space, riverfront amenities, civic, museum, public facilities

[12] New Jersey Meadowlands Commission, Meadowlands Environmental Research Institute (MERI), Borough of Teterboro Land Use Map. Accessed: http://meri.njmeadowlands.gov/downloads/gis/maps/Teterboro_Landuse_WebMap_District_11x17_Portrait.pdf.

[13] City of Hackensack, Downtown Rehabilitation, Updated Winter 2016. Accessed: http://www.hackensack.org/Redevelopment.

The City of Hackensack land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-9** shows the consolidation of land use classifications for the City of Hackensack.

Table C-9: Consolidation of Land Uses for City of Hackensack
Source: RS&H, 2016.

City of Hackensack Land Use Classifications	Part 150 Study Land Use Categories
Residential	Multi-Family Residential
Retail	Commercial Use
Commercial	Commercial Use
Parking	Public Use 2
Streetscape, Plazas & Open Space	Recreational / Open Space
Structured Public Parking	Public Use 2
NJ Transit Bus Station	Public Use 2
Hotel / Conference Center	Transient Lodgings
Public / Civic	Recreational / Open Space

3.10 Township of South Hackensack

Land use development within the Township of South Hackensack is guided by the Township of South Hackensack and the NJMC through the MERI.[14] **Table C-2** summarizes the land use designations identified by MERI.

The Township of South Hackensack land use classifications were consolidated to the Part 150 land use categories shown in **Table C-1**. **Table C-3** shows the consolidation of land use classifications for the Township of South Hackensack.

3.11 Consolidation of Land Use Classifications

Consolidation of land use classifications was necessary for this Study. As shown in pervious sections, municipalities do not categorize land uses in the same manner, likely causing confusion when trying to map all land uses on one map. To create a uniformed land use map, consolidation of municipality land uses was required. **Figure C-2** shows the uniformed land use map for the Land Use Data Collection Area.

14 New Jersey Meadowlands Commission, Meadowlands Environmental Research Institute (MERI), Township of South Hackensack Land Use Map. Accessed: http://meri.njmeadowlands.gov/downloads/gis/maps/South_Hackensack_Landuse_WebMap_District_11x17_Portrait.pdf.

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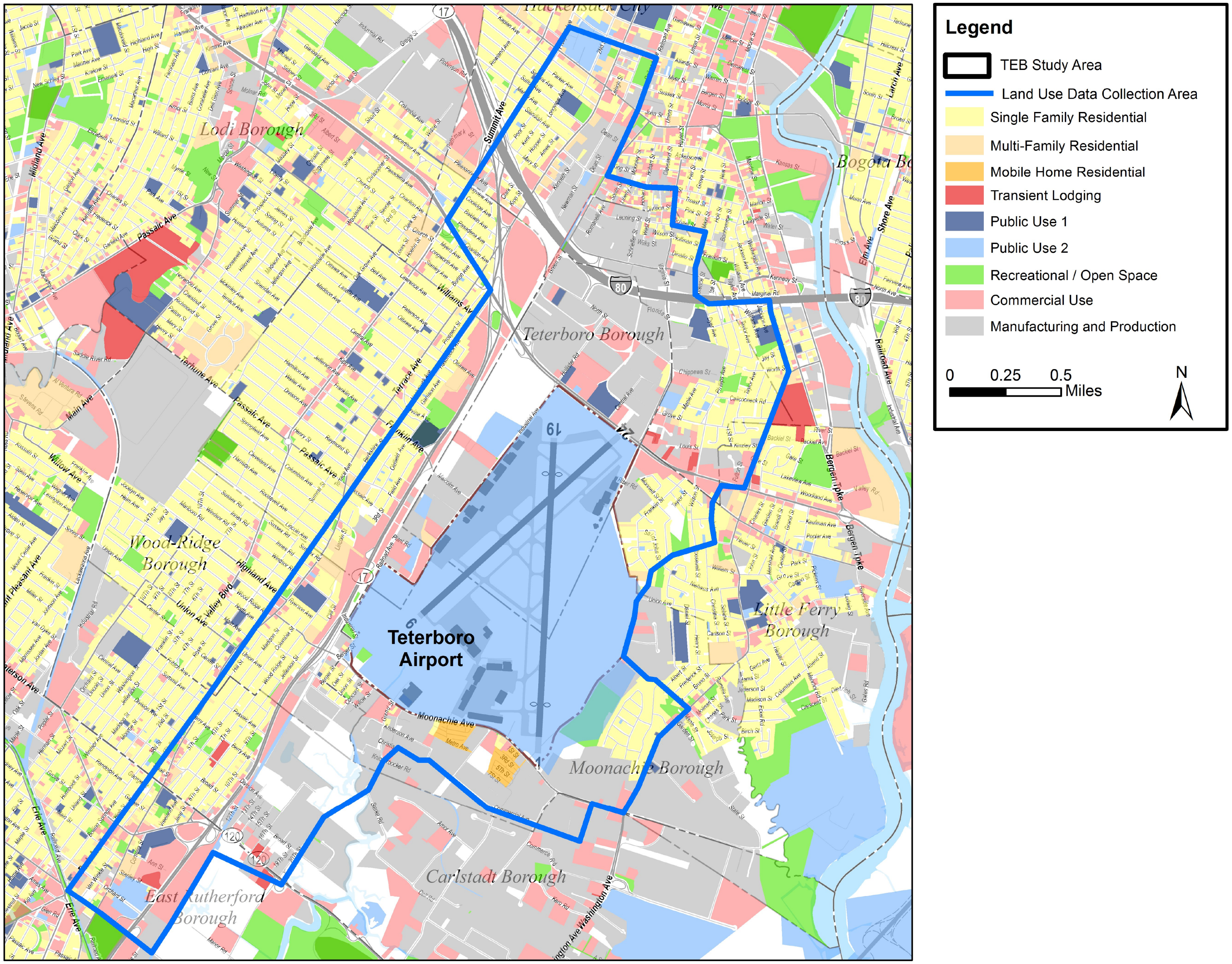

Figure C-2: Existing Land Uses

Sources: ESRI, 2016; and RS&H, 2016

4 Zoning

Zoning designations within the Land Use Data Collection Area were loosely based from Table 1 found in 14 CFR Part 150, Appendix A. Zoning designations for each municipality were consolidated into one of the following categories to enhance the legibility of the zoning map (**Table C-10** summarizes each consolidated zoning designation):

- Residential;
- Industrial;
- Commercial;
- Open Space / Recreation;
- Public Use;
- Vacant;
- Redevelopment; and
- Airport Facilities.

Table C-10: Consolidated Zoning Designations for Part 150 Study
Source: 14 CFR Part 150; and RS&H, 2016.

Consolidated Zoning Designation	Description
Residential	Single family, multi-family, mobile home, garden apartments, etc.
Industrial	Manufacturing, warehouses, recycling facilities,
Commercial	Retail, offices, restaurants, banks, pet shops, etc.
Open Space / Recreation	Parks, auditoriums, bicycle trails, outdoor arenas, etc.
Public Use	Health care facilities, transportation, utilities, etc.
Vacant	Undeveloped land not of the Open Space / Recreation designation
Redevelopment	Redevelopment areas with no specified zoning.
Airport Facilities	Teterboro Airport

4.1 New Jersey Sports and Exposition Authority

Six municipalities in the Land Use Data Collection Area are within the New Jersey Meadowlands District, maintained by the New Jersey Sports & Exposition Authority (NJSEA). Zoning for the NJSEA is guided by the New Jersey Meadowlands Commission (NJMC) through the Meadowlands Environmental Research Institute (MERI). **Table C-11** summarizes the land use designations identified in the Zoning section of the NJSEA Master Plan.

Table C-11: NJSEA Zoning Designations
Sources: NJSEA, 2015; and RS&H, 2017.

Zoning Designation	Description
Aviation Facilities (AF)	A place where aircraft, including helicopters, land and take off, usually equipped with hangars, facilities for refueling and repair, and various accommodations for passengers. Any use directly related to the support of airport operations, including aircraft storage, maintenance, and repair, flight instruction, and catering services.
Commercial Park (CP)	Designed to accommodate commercial mixed use developments in compact centers designed to be interrelated to provide a mitigating effect upon peak hour traffic that would normally be generated from single commercial uses. Development should provide for safe and unimpeded pedestrian movement.
Environmental Conservation (EC)	Designed to preserve and enhance the ecological values of wetlands, open water and adjacent uplands within the District. The zone seeks to provide public access to these areas and encourage scientific and educational study in regard to wetland ecology.
Heavy Industrial (HI)	Any manufacturing, production, processing, assembly or fabrication of goods, materials or products, including any incidental cleaning, servicing, testing, repair or storage of those same goods, materials or products, which may include the limited storage of flammable or explosive materials.
Highway Commercial (HC)	Designed to accommodate commercial uses oriented toward, and located in proximity to, highways. Permitted uses include; automobile repair facilities, minor; banks; car washes; essential public services; fuel service stations; hotels and motels; parks or recreation facilities; personal services; public utility uses, light; restaurants; and retail.
Intermodal A (IA)	Designed to accommodate transportation facilities that are located proximate to rail lines in the District and whose operations are related to port, rail, and trucking activities, and complementary light industrial uses.
Intermodal B (IB)	Designed to accommodate high-intensity transportation facilities that are located proximate to rail lines in the District and whose operations are related to port and rail activities, including rail and trucking facilities and supporting uses. Due to the intensity of the permitted uses, the zone is also designed to accommodate uses related to the construction industry.
Light Industrial A (LI-A)	Designed to accommodate on large lots a wide range of industrial, distribution, commercial and business uses that generate a minimum of detrimental environmental effects.
Light Industrial B (LI-B)	Designed to accommodate a wide range of industrial, distribution, and commercial uses that generate a minimum of detrimental environmental effects.
Low Density Residential (LDR)	Provides for the development and preservation of low-density residential uses and neighborhoods, and to provide for the development of community and institutional uses that are compatible with the character of a residential district.
Neighborhood Commercial (NC)	Provides uses compatible with the scale and character of the neighboring residential areas, serving both residents and area employees.
Planned Residential (PR)	Designed to accommodate high-density residential development that includes a mix of housing types; small-scale commercial uses that provide for the needs of and increase the convenience to residents; community and institutional uses that are compatible with the character of a residential district; and preserved open space and wetlands.
Parks and Recreation (PA)	Provides for the creation, management and appropriate use of public open space and recreation facilities within the District in a manner that allows for the public use and enjoyment of these areas.

Zoning Designation	Description
Public Utilities (PU)	Designed to accommodate heavy public utility and intermodal uses.
Regional Commercial (RC)	Large-scale commercial development proximate to major roadways and is designed to accommodate a range of commercial uses serving a regional market area. Development in the zone should incorporate regional retail facilities and large-scale commercial employment centers.
Sports and Exposition (SE)	Designed to accommodate major spectator sport and exposition uses and related uses built under the jurisdiction of the NJSEA and to provide for the designation of land not acquired for such uses.
Transportation Center (TC)	Designated to accommodate a major commuter transfer center and associated office, hotel, and other commercial uses; banks; bus garages; business support services; commercial off-street parking; commercial recreation, indoor; cultural facilities; day care facilities; essential public services; helistops; hotels; institutional uses; offices; parks or recreation facilities; passenger rail terminals; personal services; public utility uses, light; restaurants; retail; and taxi and limousine services.
Waterfront Recreation (WR)	Designated to accommodate marinas in combination with other water-oriented commercial and recreation facilities that provide and encourage public access to and visibility of the Hackensack River or its tributaries. The Waterfront Recreation zone is to be developed in such a way that views of the river are protected.
Roads, Rails, ROWs	All streets, roads, highways, public ways, and railroad ROWs, if not otherwise specifically designated, shall be deemed to be in the same zone as the property immediately abutting upon the same. Where the center line of a street, road, highway, public way, waterway or railroad ROW serves as a zone boundary, the zoning of such areas, unless otherwise specifically designated, shall be deemed to be the same as that of the abutting property up to such center line.
Redevelopment Area	Applicable use and bulk requirements for an area within the District designated as a redevelopment area in accordance with N.J.A.C. 19:3-5, shall be established on a case-by-case basis and, once adopted by the Commission, shall supersede the applicable regulations in this subchapter.
Water (WAT)	All waterways comprising the Hackensack River and its tributaries shall be deemed to be in the Environmental Conservation zone, except in cases where a grant, lease or other conveyance of riparian rights is made to an adjoining property owner by the State of New Jersey.
Light Industrial & Distribution Zone - Teterboro	Allows for production, processing, manufacture, fabrication, cleaning, servicing, testing, repair and storage of goods, materials or products, and business offices accessory thereto.
Redevelopment Area 1 Zone - Teterboro	Redevelopment area.
Redevelopment Area 2 Zone - Teterboro	Redevelopment area.
Commercial Zone - Carlstadt	Permitted uses include hotels, retail service, offices, retail service store, food supermarket, professional office, discount store, tavern, restaurant, confectionary, shop of a plumber, electrician or similar trades person, automobile sales, cleaning, and pressing and tailoring operations. Any use permitted within the residential zone shall be permitted within the commercial zone.
Light Industrial - Carlstadt	Permitted uses include any production, processing, manufacture, fabrication, cleaning, servicing, testing, repair or storage of goods, materials or products, and business offices involving the storage of flammable or explosive materials. In addition, permitted uses also include establishments for scientific research and development, business, and commercial establishments.

Zoning Designation	Description
Mixed Commercial Zone - Carlstadt	Permitted uses include commercial use and multi-family dwellings, not to exceed four living units.
Residential Zone - Carlstadt	Permitted uses include dwellings, schools, public libraries, public museums, churches and church buildings, parks and playgrounds, an office for a professional person, and garages.
Manufacturing Zone - Moonachie	Designates a subarea devoted to manufacturing, warehousing, research, and office uses.
1-Family Residential Zone - Moonachie	Permits one family dwelling, not to exceed one such dwelling on each lot.
2-Family Residential Zone - Moonachie	Permits a two family dwelling not exceeding one such dwelling on each lot. A two family dwelling shall contain no more than five bedrooms with no more than three bedrooms per unit.
General Business Zone - Moonachie	Permitted uses include retail stores and banks, personal service store, including but not limited to barber shops, beauty parlors and tailors, business, professional, or governmental offices, funeral parlors, service establishments, theatres and restaurants, outlets and pickup stations, and newspaper printing.
Limited Business Zone - Moonachie	Permitted principal use is for business and professional offices, and banks.
Low Density Residential - East Rutherford	Permitted uses include one-family dwellings, private garages, animal shelters for domestic pets, residential structures (swimming pools, fireplaces), and customary home occupations.
Medium Density Residential - East Rutherford	Permitted uses include single- and two-family residential dwellings, private garages, animal shelters for domestic pets, and residential structures (swimming pools, fireplaces).
Multi-Family Residential - East Rutherford	Permitted uses include high-rise apartments, garden apartments, townhouse development, single- and two-family dwellings, equipment storage buildings, parking garages, and playgrounds and common open spaces areas.
Neighborhood Commercial - East Rutherford	Permitted uses include retail and personal service uses, group day-care centers and nursery schools, eat-in and takeout restaurants (no drive-throughs), townhouses, multifamily residences, garden apartments, storage sheds, refuse areas, and parking lots.
Regional Commercial - East Rutherford	Permitted uses include mixed use retail/office/hotel/entertainment: movie theaters, indoor recreation, video arcades, health and fitness clubs, book and video stores, theme restaurants, professional, corporate or government offices, hotels, eat-in restaurants, public recreation facilities, new car/automobile showrooms, including outdoor display facilities, movie theater complexes, commercial educational institutions, indoor recreational facilities, financial institutions without drive-through facilities, accessory retail uses. In addition, permitted uses include mechanical equipment and accessory uses customary and incidental to the operation of business.
Planned Commercial Development - East Rutherford	Permitted uses include administrative, executive and business offices, including professional offices, hotels, restaurants, research laboratories and related facilities, health and wellness centers (diagnostic facilities, such as X-ray and MRI as well as physical therapy and rehabilitation), corporate training facilities, health and fitness centers, indoor recreation centers, financial institutions, non-automotive-related retail outlets and personal service establishments, supermarkets, multifamily residences, cafeterias, parking lots, and parking garages.
Redevelopment-1 - East Rutherford	Redevelopment area.
Light Industrial - East Rutherford	Permitted uses include manufacturing, processing, compounding, assembling and packaging of materials or product, research laboratories, wholesale establishments, professional offices, self-storage facilities, auto-maintenance

Zoning Designation	Description
	facilities, recycling facilities, freight-forwarding facilities, indoor recreation, health and fitness clubs, accessory office uses, accessory uses customary and incidental to the operation of the business, and mechanical equipment.
One & Two Family Residential - Little Ferry	Allows single-family dwellings, duplexes, and two-family dwellings at a maximum size of 7,500 square feet.
Multifamily Residential - Little Ferry	Permitted uses include multi-family dwellings consisting of garden apartments and garden apartment dwelling groups, at a maximum size of 40,000 square feet.
Highway & Regional Business - Little Ferry	Permitted uses include all uses listed in the B-N Zone, as well as bowling alleys, funeral parlors and mortuaries, newspaper printing and job printing shops, assembly halls, bus stations and waiting rooms, telephone exchange, gymnasium, automobile sales/services/stations, hotels and motels, animals hospitals, agricultural nurseries and greenhouses, manufacturing assembling, etc.; maximum size of 10,000 square feet.
Neighborhood Business - Little Ferry	Permitted uses include retail stores and shops, personal service establishments including: barber shops, beauty parlors, shoe repair stores, tailor shops, laundries, dry cleaning establishments, eating and drinking establishments (except drive-in establishments), professional, business, and governmental offices, banks, savings, and loan institutions, music and dancing schools and studios, art galleries, art studios, and museums; maximum size of 5,000 square feet.
Restricted Industrial - Little Ferry	Permitted uses include research laboratories, business offices either as principal or accessory uses, manufacture by processing, fabrication or assembly of projects, and a cafeterias as an accessory use; maximum size of 20,000 square feet.
General Industrial - Little Ferry	Permitted uses include construction company offices and yards, chemical and metal processing companies, truck terminals and warehouses, open storage, repair and machine shops, and automobile repair shops; maximum size of 20,000 square feet.
Public Facilities - Little Ferry	Permitted uses include areas for buildings and facilities that are owned and operated by Federal, State, or local governments, public utilities, special districts, or nonprofit organizations which are used to provide governmental or public services. Several examples include City Hall, fire stations, public parks, pedestrian/bicycle trails, public reservoirs, well sites, pump stations, etc.
Residential - South Hackensack	Permitted uses include single- and two-family dwelling units, public utilities within public rights-of-way, and digital data communication radio units.
Commercial - South Hackensack	Permitted uses include local business activities: antique shops, bakeries and butcher shops, cabinet and furniture stores, drug stores, florists, grocery stores, meat markets, package liquor stores, eating and drinking establishments, local fast-food or service activities: barbershops and beauty salons, tailors, dressmakers, coin-operated laundries, dry cleaners, printing establishments, television and radio repairs, theaters, music and dancing schools, art galleries, art studios, travel agencies, repairs of small appliances/household articles, office buildings, banks, savings and loan institutions, professional, business and government offices, offices for physicians, dentists, lawyers, architects, engineers, accountants, real estate and insurance brokers, post office, mortgage offices, brokerage houses or other investment-related offices, offices for commercial, financial or executive purposes, public utilities with public rights-of-way, and digital data communication radio units.
Industrial - South Hackensack	Permitted uses include manufacturing by assembly (of component parts only), machine shops, warehouses and miniwarehouses, private security vaults, car

Zoning Designation	Description
	wash establishments, open storage of goods and materials, motor vehicle body repair and paint shops, public utilities within public rights-of-way, digital data communication radio units, life sciences industry, professional, business and governmental offices, banks, saving and loans, mortgage offices, brokerage house or other investment-related offices, retail and wholesale sale of goods and services, offices for commercial, financial or executive purposes, baking and preparation of food (not to be consumed on premises), laboratories and related offices engaged in research or product testing, and printing and publishing.
Mixed - South Hackensack	Permitted uses include hotels, professional business and governmental offices, banks, savings and loans, mortgage offices, brokerage houses or other investment-related offices and post offices, eating and drinking places (including fast-food restaurants), public utilities within public rights-of-way, digital data communication radio units, retail sale of goods and services, offices for commercial, financial or executive purposes, barber shops, beauty parlors and similar service establishments, stores, shops, department stores and similar uses for retail merchandising, and printing and publishing.
Senior Citizen Multifamily Res - South Hackensack	Permitted uses include multifamily-dwelling structures designed for occupancy by low- and moderate-income senior citizens. Minimum lot size is 27,500 square feet.

The NJSEA zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-12** shows the consolidation of zoning designations for the NJSEA.

Table C-12: NJSEA Zoning Designations
Source: RS&H, 2017.

NJSEA Zoning Designation	Part 150 Zoning Designation
Aviation Facilities	Aviation Facilities
Commercial Park	Commercial
Environmental Conservation	Open Space
Heavy Industrial	Industrial
Highway Commercial	Commercial
Intermodal A	Public Use
Intermodal B	Public Use
Light Industrial A	Industrial
Light Industrial B	Industrial
Low Density Residential	Residential
Neighborhood Commercial	Commercial
Planned Residential	Residential
Parks and Recreation	Open Space
Public Utilities	Public Use
Regional Commercial	Commercial
Sports and Exposition	Open Space
Transportation Center	Public Use
Waterfront Recreation	Open Space
Roads, Rails, ROWs	Public Use

NJSEA Zoning Designation	Part 150 Zoning Designation
Redevelopment Area	Redevelopment
Water	Open Space
Light Industrial & Distribution Zone - Teterboro	Industrial
Redevelopment Area 1 Zone - Teterboro	Redevelopment
Redevelopment Area 2 Zone - Teterboro	Redevelopment
Commercial Zone – Carlstadt	Commercial
Light Industrial – Carlstadt	Industrial
Mixed Commercial Zone – Carlstadt	Commercial
Residential Zone – Carlstadt	Residential
Manufacturing Zone – Moonachie	Industrial
1-Family Residential Zone - Moonachie	Residential
2-Family Residential Zone - Moonachie	Residential
General Business Zone – Moonachie	Commercial
Limited Business Zone – Moonachie	Commercial
Low Density Residential - East Rutherford	Residential
Medium Density Residential - East Rutherford	Residential
Multi-Family Residential - East Rutherford	Residential
Neighborhood Commercial - East Rutherford	Commercial
Regional Commercial - East Rutherford	Commercial
Planned Commercial Development - East Rutherford	Commercial
Redevelopment-1 - East Rutherford	Redevelopment
Light Industrial - East Rutherford	Industrial
One & Two Family Residential - Little Ferry	Residential
Multifamily Residential - Little Ferry	Residential
Highway & Regional Business - Little Ferry	Commercial
Neighborhood Business - Little Ferry	Commercial
Restricted Industrial - Little Ferry	Industrial
General Industrial - Little Ferry	Industrial
Public Facilities - Little Ferry	Public Use
Residential - South Hackensack	Residential
Commercial - South Hackensack	Commercial
Industrial - South Hackensack	Industrial
Mixed - South Hackensack	Commercial
Senior Citizen Multifamily Res - South Hackensack	Residential

4.2 Borough of Carlstadt

Zoning within the Borough of Carlstadt is guided by the Borough of Carlstadt, 2015 Carlstadt Zoning Ordinance. **Table C-13** summarizes the land use designations identified in the Zoning section of the Carlstadt Zoning Ordinance.[15]

Table C-13: Borough of Carlstadt Zoning Designations
Sources: Borough of Carlstadt, 2015; and RS&H, 2016.

Zoning Designation	Description
Residential Zone	Permitted uses include dwellings, schools, public libraries, public museums, churches and church buildings, parks and playgrounds, an office for a professional person, and garages.
Island Residential Zone	Permitted uses include residential development, commercial development, chapels, churches, synagogues and temples, private schools, offices for professional services, charitable and social services, public cultural facilities, government uses, light public utility uses, medical facilities, and nursing homes.
Commercial Zone	Permitted uses include hotels, retail service, offices, retail service store, food supermarket, professional office, discount store, tavern, restaurant, confectionary, shop of a plumber, electrician or similar trades person, automobile sales, cleaning, and pressing and tailoring operations. Any use permitted within the residential zone shall be permitted within the commercial zone.
Mixed Commercial Zone	Permitted uses include commercial use and multi-family dwellings, not to exceed four living units.
Waterfront Recreational Zone	Permitted uses include marinas for docking, repair, sale, servicing, storage of boats and other water recreational oriented uses, small retail shops, and restaurants.
Research Distribution Park Zone	Permitted uses include establishments for scientific research and development, any production, processing, manufacture or fabrication of goods, office facilities, and warehouses.
Light Industrial Zone	Permitted uses include any production, processing, manufacture, fabrication, cleaning, servicing, testing, repair or storage of goods, materials or products, and business offices involving the storage of flammable or explosive materials. In addition, permitted uses also include establishments for scientific research and development, business, and commercial establishments.
Light Industrial I and Distribution B Zone	Permitted uses include automobile service stations, mobile home and trailer sales, rental, and repair, automobile and truck leasing and sales (exclusive of semitrailers), boat sales, rental and repair, warehouses, wholesale establishments and other storage facilities, light public utility uses, governmental uses, heavy public utility uses, helistops, hotel and motels, restaurants, retail uses, radio, television and microwave transmission towers, and hospitals and clinics.

15 Borough of Carlstadt, Zoning Ordinance of the Borough of Carlstadt: Chapter XXI – Zoning. Adopted September 17, 2015. Accessed: http://www.ecodes.generalcode.com/codes/2026_A/2026021.pdf#xml=http://www.ecodes.generalcode.com/searchresults.asp?cmd=pdfhits&index=2026_A&filename=2026021.pdf&fn=E:\siteinfo\ecodes\codebooks\2026_A\2026-021.pdf.

Zoning Designation	Description
Light Industrial II and Distribution A Zone	Permitted uses include any production, processing, manufacture, fabrication, cleaning, servicing, testing, repair or storage of goods, materials or products, and business offices accessory thereto, but not including the storage of flammable or explosive materials as a principal use; establishments for scientific research, business or commercial establishments, warehouses, wholesale establishments and other storage facilities, business offices, light public utility, automobile service stations, governmental uses, heavy public utility uses, helistops, hotels and motels, restaurants, retail uses, radio, television and microwave transmission towers, hospitals, clinics, and medical facilities.
Heavy Industrial Zone	Permitted uses include uses permitted in a light industrial zone, however, no building or premises shall be used and no building shall be erected which is arranged, intended or designed to be used for any of the following trades, industries or uses: explosives (manufacture or storage), fireworks (manufacture or storage), incineration, reduction, storage or dumping of slaughterhouse refuse, rancid fats, garbage, dead animals or offal, except by the borough or its agents, pyroxlin plastic manufacture, automobile junkyard, secondhand building material, sale of used cars, and storage of motor vehicles (except for permitted garages).
Marshland Preservation Zone	Permitted uses include scientific and educational study, experimentation in regard to marshland ecology, and walkways for nature observations.

The Borough of Carlstadt zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-14** shows the consolidation of zoning designations for the Borough of Carlstadt.

Table C-14: Consolidation of Zoning Designations for Borough of Carlstadt
Source: RS&H, 2106.

Borough of Carlstadt Zoning Designation	Part 150 Zoning Designation
Residential Zone	Residential
Island Residential Zone	Public Use
Commercial Zone	Commercial
Mixed Commercial Zone	Commercial
Waterfront Recreational Zone	Open Space / Recreation
Research Distribution Park Zone	Industrial
Light Industrial Zone	Industrial
Light Industrial Zone I and Distribution B Zone	Industrial
Light Industrial II and Distribution A Zone	Industrial
Heavy Industrial Zone	Industrial
Marshland Preservation Zone	Public Use

4.3 Borough of East Rutherford

Zoning within the Borough of East Rutherford is guided by the 2010 East Rutherford Comprehensive Zoning Ordinance. **Table C-15** summarizes the land use designations identified in the East Rutherford Use Regulations section of the Zoning Ordinance.[16]

Table C-15: Borough of East Rutherford Zoning Designations
Sources: Borough of East Rutherford, 2010; and RS&H, 2016.

Zoning Designation	Description
Low-Density Residential, One-Family Dwelling: (R-1)	Permitted uses include one-family dwellings, private garages, animal shelters for domestic pets, residential structures (swimming pools, fireplaces), and customary home occupations.
Medium-Density Residential, One- and Two-Family Dwellings: (R-2)	Permitted uses include single- and two-family residential dwellings, private garages, animal shelters for domestic pets, and residential structures (swimming pools, fireplaces).
High-Density Residential, Multifamily Dwellings: (R-3)	Permitted uses include high-rise apartments, garden apartments, townhouse development, single- and two-family dwellings, equipment storage buildings, parking garages, and playgrounds and common open spaces areas.
Neighborhood Commercial: (NC)	Permitted uses include retail and personal service uses, group day-care centers and nursery schools, eat-in and takeout restaurants (no drive-throughs), townhouses, multifamily residences, garden apartments, storage sheds, refuse areas, and parking lots.
Regional Commercial: (RC)	Permitted uses include mixed use retail/office/hotel/entertainment: movie theaters, indoor recreation, video arcades, health and fitness clubs, book and video stores, theme restaurants, professional, corporate or government offices, hotels, eat-in restaurants, public recreation facilities, new car/automobile showrooms, including outdoor display facilities, movie theater complexes, commercial educational institutions, indoor recreational facilities, financial institutions without drive-through facilities, accessory retail uses. In addition, permitted uses include mechanical equipment and accessory uses customary and incidental to the operation of business.
Planned Commercial Development: (PCD)	Permitted uses include administrative, executive and business offices, including professional offices, hotels, restaurants, research laboratories and related facilities, health and wellness centers (diagnostic facilities, such as X-ray and MRI as well as physical therapy and rehabilitation), corporate training facilities, health and fitness centers, indoor recreation centers, financial institutions, non-automotive-related retail outlets and personal service establishments, supermarkets, multifamily residences, cafeterias, parking lots, and parking garages.
Light Industrial: (I)	Permitted uses include manufacturing, processing, compounding, assembling and packaging of materials or product, research laboratories, wholesale establishments, professional offices, self-storage facilities, auto-maintenance facilities, recycling facilities, freight-forwarding facilities, indoor recreation, health and fitness clubs, accessory office uses, accessory uses customary and incidental to the operation of the business, and mechanical equipment.

The Borough of Carlstadt zoning designations were consolidated to Part 150 zoning designations shown in Table C-10. Table C-16 shows the consolidation of zoning designations for the Borough of Carlstadt.

[16] Borough of East Rutherford, Comprehensive Zoning Ordinance of the Borough of East Rutherford. Adopted September 21, 2010. Accessed: http://www.ecode360.com/9414945.

Table C-16: Consolidation of Zoning Designations for Borough of East Rutherford
Source: RS&H, 2016.

Borough of East Rutherford Zoning Designation	Part 150 Zoning Designation
Low-Density Residential, One-Family Dwelling: (R-1)	Residential
Medium-Density Residential, One- and Two-Family Dwellings: (R-2)	Residential
High-Density Residential, Multifamily Dwellings: (R-3)	Residential
Neighborhood Commercial: (NC)	Public Use
Regional Commercial: (RC)	Commercial
Planned Commercial Development: (PCD)	Commercial
Light Industrial: (I)	Industrial

4.4 Borough of Hasbrouck Heights

Zoning within the Borough of Hasbrouck Heights is guided by the 2011 Zoning Ordinance. **Table C-17** summarizes the land use designations identified in the Establishment of Zoning section of the Zoning Ordinance.[17]

Table C-17: Borough of Hasbrouck Heights Zoning Designations
Sources: Borough of Hasbrouck Heights, 2011; and RS&H, 2016.

Zoning Designation	Description
One-Family Residential: (R-1)	Allows single family dwellings with 5,000-square-foot minimum lot sizes and a maximum height of 28 feet.
One-Family Residential: (R-2)	Allows single family dwellings with 5,000-square-foot minimum lot sizes and a maximum building height of 28 feet.
One- and Two-Family Residential: (R-3)	Allows single family dwellings with 5,000-square-foot minimum lot sizes, two family dwellings with 7,500-square-foot lot sizes, and a maximum height of 28 feet.
Townhouse Residential: (R-4)	Allows single family dwellings with 5,000-square-foot minimum lot sizes and a maximum building height of 28 feet as well as townhouses with 35,000-square-foot minimum lot sizes, and a maximum building height of 25 feet.
Garden Apartment: (R-5)	Allows apartment dwellings with a minimum of lot size of 40,000 square feet and a maximum building height of 25 feet.
Senior Citizen Residential: (R-6)	Senior Citizen Residential allows dwellings with a minimum of lot size of 40,000 square feet and a maximum building height of 55 feet.
Central Business District: (B-1)	Allows businesses development with a minimum lot size of 2,500 square feet and a maximum building height of 28 feet.
Highway Commercial Business and Professional Office: (B-2)	Highway Commercial allows commercial development with a minimum lot size of 20,000 square feet and a maximum building height of 28 feet. Business and Professional Office zoning allows business and office development with a minimum lot size of 130,000 square feet and a maximum building height of 60 feet.
Industry: (I)	Industry allows for industrial land use development with a minimum lot size of 20,000 square feet and a maximum building height of 40 feet.

[17] Borough of Hasbrouck Heights, Code of the Borough of Hasbrouck Heights: Chapter 275 – Article III: Establishment of Zoning Districts and Zoning Map. Adopted August 9, 2011. Accessed: http://ecode360.com/attachment/HA1233/HA1233-275b%20Schedule%202.pdf.

The Borough of Hasbrouck Heights zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-18** shows the consolidation of zoning designations for the Borough of Hasbrouck Heights.

Table C-18: Consolidation of Zoning Designations for Borough of Hasbrouck Heights
Source: RS&H, 2016.

Borough of Hasbrouck Heights Zoning Designation	Part 150 Zoning Designation
One-Family Residential: (R-1)	Residential
One-Family Residential: (R-2)	Residential
One- and Two-Family Residential: (R-3)	Residential
Townhouse Residential: (R-4)	Residential
Garden Apartment: (R-5)	Residential
Senior Citizen Residential: (R-6)	Residential
Central Business District: (B-1)	Commercial
Highway Commercial Business and Professional Office: (B-2)	Commercial
Industry: (I)	Industrial

4.5 Borough of Little Ferry

Zoning within the Borough of Little Ferry is guided by the 2015 Little Ferry Zoning Ordinance. **Table C-19** summarizes the land use designations identified in the Zone, Bulk, and Parking Regulations section of the Little Ferry Zoning Ordinance.[18]

Table C-19: Borough of Little Ferry Zoning Designations
Sources: Borough of Little Ferry, 2015; and RS&H, 2016.

Zoning Designation	Description
One and Two-Family Residential Zones: (R)	Allows single-family dwellings, duplexes, and two-family dwellings at a maximum size of 7,500 square feet.
Multi-Family Residential Zone: (R-M)	Permitted uses include multi-family dwellings consisting of garden apartments and garden apartment dwelling groups, at a maximum size of 40,000 square feet.
Neighborhood Business Zone: (B-N)	Permitted uses include retail stores and shops, personal service establishments including: barber shops, beauty parlors, shoe repair stores, tailor shops, laundries, dry cleaning establishments, eating and drinking establishments (except drive-in establishments), professional, business, and governmental offices, banks, savings, and loan institutions, music and dancing schools and studios, art galleries, art studios, and museums; maximum size of 5,000 square feet.
Highway Business Zone: (B-H)	Permitted uses include all uses listed in the B-N Zone, as well as bowling alleys, funeral parlors and mortuaries, newspaper printing and job printing shops, assembly halls, bus stations and waiting rooms, telephone exchange, gymnasium, automobile sales/services/stations, hotels and motels, animals hospitals, agricultural nurseries and greenhouses, manufacturing assembling, etc.; maximum size of 10,000 square feet.
General Business Zone: (B-G)	Permitted uses include retail stores and shops, personal service establishments, bowling alleys, funeral parlors and mortuaries, eating and drinking establishments, professional, business, and governmental offices, banks, savings, and loan institutions, newspaper printing and job printing shops, music and dancing schools

[18] Borough of Little Ferry, Zoning Ordinance, Borough of Little Ferry, New Jersey. Adopted June 9, 2015. Accessed: http://65.244.122.199//planning/data/ordinances/Little%20Ferry/ORDINANCE-DRAFT.pdf.

Zoning Designation	Description
	and studios, assembly halls, bus stations and waiting rooms, art galleries, art studios and museums, telephone exchange, gymnasiums, repair shops, and off-street parking facilities; maximum size of 5,000 square feet.
Restricted Industrial Zone: (I-R)	Permitted uses include research laboratories, business offices either as principal or accessory uses, manufacture by processing, fabrication or assembly of projects, and a cafeterias as an accessory use; maximum size of 20,000 square feet.
General Industrial Zone: (I-G)	Permitted uses include construction company offices and yards, chemical and metal processing companies, truck terminals and warehouses, open storage, repair and machine shops, and automobile repair shops; maximum size of 20,000 square feet.
Recreation and Public Facility Zone: (P)	Permitted uses include areas for buildings and facilities that are owned and operated by Federal, State, or local governments, public utilities, special districts, or nonprofit organizations which are used to provide governmental or public services. Several examples include City Hall, fire stations, public parks, pedestrian/bicycle trails, public reservoirs, well sites, pump stations, etc.

The Borough of Little Ferry zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-20** shows the consolidation of zoning designations for the Borough of Little Ferry.

Table C-20: Consolidation of Zoning Designations for Borough of Little Ferry
Source: RS&H, 2016.

Borough of Little Ferry Zoning Designation	Part 150 Zoning Designation
One and Two-Family Residential Zones: (R)	Residential
Multi-Family Residential Zone: (R-M)	Residential
Neighborhood Business Zone: (B-N)	Commercial
Highway Business Zone: (B-H)	Commercial
General Business Zone: (B-G)	Commercial
Restricted Industrial Zone: (I-R)	Industrial
General Industrial Zone: (I-G)	Industrial
Recreation and Public Facility Zone: (P)	Public Use

4.6 Borough of Moonachie

Zoning within the Borough of Moonachie is guided by the 2011 Moonachie Land Subdivision Zoning document. **Table C-21** summarizes the land use designations identified in the General Regulations Schedule of the Borough of the Moonachie Land Use Subdivision and Zoning document.[19]

[19] Borough of Moonachie, Borough of Moonachie in the County of Bergen, State of New Jersey – Land Subdivision and Zoning. Adopted April 28, 2011. Accessed: http://65.244.122.199//planning/data/ordinances/Moonachie/ORDD197312.pdf.

Table C-21: Borough of Moonachie Zoning Designations
Sources: Borough of Moonachie, 2011; and RS&H, 2016.

Zoning Designation	Description
One-Family Residential: (R-1)	Permits one family dwelling, not to exceed one such dwelling on each lot.
Two-Family Residential: (R-2)	Permits a two family dwelling not exceeding one such dwelling on each lot. A two family dwelling shall contain no more than five bedrooms with no more than three bedrooms per unit.
Mobile Home Park: (MHP)	Mobile home park shall mean any place where a mobile home may be parked, other than an enclosed building, for more than three hours. Mobile home refers to any self-propelled, nonself-propelled vehicle, portable, or semiportable structure used or intended for use as a temporary, permanent dwelling, or sleeping place for one or more persons, including but not limited to mobile homes, dependent and independent travel trailers, piggyback campers, camp cars, mobile home buses, and tents.
Commercial Office: (C)	Permitted primary uses include office banks and restaurants.
General Business: (B-1)	Permitted uses include retail stores and banks, personal service store, including but not limited to barber shops, beauty parlors and tailors, business, professional, or governmental offices, funeral parlors, service establishments, theatres and restaurants, outlets and pickup stations, and newspaper printing.
Manufacturing: (M)	Designates a subarea devoted to manufacturing, warehousing, research, and office uses.

The Borough of Moonachie zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-22** shows the consolidation of zoning designations for the Borough of Moonachie.

Table C-22: Consolidation of Zoning Designations for Borough of Moonachie
Source: RS&H, 2016.

Borough of Moonachie Zoning Designation	Part 150 Zoning Designation
One-Family Residential: (R-1)	Residential
Two-Family Residential: (R-2)	Residential
Mobile Home Park: (MHP)	Residential
Commercial Office: (C)	Commercial
General Business: (B-1)	Commercial
Manufacturing: (M)	Industrial

4.7 Borough of Wood-Ridge

Zoning within the Borough of Wood-Ridge is guided by the 2009 Wood-Ridge Zoning Ordinance. **Table C-23** summarizes the land use designations identified in the Zoning section of the Wood-Ridge Zoning Ordinance.[20]

[20] Borough of Wood-Ridge, Zoning Ordinance of the Borough of Wood-Ridge: Chapter XVI - Zoning. Adopted June 9, 2009. http://www.co.bergen.nj.us/index.aspx?nid=728.

Table C-23: Borough of Wood-Ridge Zoning Designations
Sources: Borough of Wood-Ridge, 2009, RS&H, 2016.

Zoning Designation	Description
One-Family Residential: (R-1)	Allows single family dwellings with 5,000-square-foot minimum lot sizes and a maximum height of 28 feet.
One-Family Residential: (R-2)	Allows single family dwellings with 5,000-square-foot minimum lot sizes and a maximum building height of 28 feet.
Multifamily-Family Residential: (R-3)	Allows single family dwellings with 5,000-square-foot minimum lot sizes, two family dwellings with 7,500-square-foot lot sizes, and a maximum height of 28 feet.
Townhouse Residential: (R-4)	Allows single family dwellings with 5,000-square-foot minimum lot sizes and a maximum building height of 28 feet as well as townhouses with 35,000-square-foot minimum lot sizes, and a maximum building height of 25 feet.
Garden Apartment: (R-5)	Allows apartment dwellings with a minimum of lot size of 40,000 square feet and a maximum building height of 25 feet.
Senior Citizen Residential: (R-6)	Senior Citizen Residential allows dwellings with a minimum of lot size of 40,000 square feet and a maximum building height of 55 feet.
Central Business District: (B-1)	Allows businesses development with a minimum lot size of 2,500 square feet and a maximum building height of 28 feet.
Highway Commercial Business and Professional Office: (B-2)	Highway Commercial allows commercial development with a minimum lot size of 20,000 square feet and a maximum building height of 28 feet. Business and Professional Office zoning allows business and office development with a minimum lot size of 130,000 square feet and a maximum building height of 60 feet.
Industry: (I)	Industry allows for industrial land use development with a minimum lot size of 20,000 square feet and a maximum building height of 40 feet.

The Borough of Wood-Ridge zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-24** shows the consolidation of zoning designations for the Borough of Wood-Ridge.

Table C-24: Consolidation of Zoning Designations for Borough of Wood-Ridge
Source: RS&H, 2016.

Borough of Wood-Ridge Zoning Designation	Part 150 Zoning Designation
One-Family Residential: (R-1)	Residential
One-Family Residential: (R-2)	Residential
Multifamily-Family Residential: (R-3)	Residential
Townhouse Residential: (R-4)	Residential
Garden Apartment: (R-5)	Residential
Senior Citizen Residential: (R-6)	Residential
Central Business District: (B-1)	Commercial
Highway Commercial Business and Professional Office: (B-2)	Commercial

4.8 Borough of Teterboro

Zoning within the Borough of Teterboro is guided by the 2011 Teterboro Zoning Ordinance. **Table C-25** summarizes the land use designations identified in the Zone Regulations section of the Teterboro Zoning Ordinance.[21]

Table C-25: Borough of Teterboro Zoning Designations
Sources: Borough of Teterboro, 2011; and RS&H, 2016.

Zoning Designation	Description
Low Density Residential: (R)	Allows single-family dwellings, duplexes, and two-family dwellings at a maximum size of 7,500 square feet.
Light Industrial and Distribution Zone: (I)	Allows for production, processing, manufacture, fabrication, cleaning, servicing, testing, repair and storage of goods, materials or products, and business offices accessory thereto.
Airport Facilities Zone: (A)	Designated to accommodate airport and aviation uses and those uses which are customarily associated with such facilities, built under the jurisdiction of the Port.

The Borough of Teterboro zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-26** shows the consolidation of zoning designations for the Borough of Teterboro.

Table C-26: Consolidation of Zoning Designations for Borough of Teterboro
Source: RS&H, 2016.

Borough of Teterboro Zoning Designation	Part 150 Zoning Designation
Low Density Residential: (R)	Residential
Light Industrial and Distribution Zone: (I)	Industrial
Airport Facilities Zone: (A)	Airport Facilities Zone

4.9 City of Hackensack

Zoning within the City of Hackensack is guided by the 2015 Hackensack Zoning Ordinance. **Table C-27** summarizes the land use designations identified in the Zoning section of the Hackensack Zoning Ordinance.[22]

Table C-27: City of Hackensack Zoning Designations
Sources: City of Hackensack, 2015; and RS&H, 2016.

Zoning Designation	Description
Single-Family Residential: (R-100)	Permitted uses include all uses permitted in the R-50 district. Minimum one-family lot size is 20,000 square feet.
Single-Family Residential: (R-75)	Permitted uses include all uses permitted in the R-50 district. Minimum one-family lot size is 10,000 square feet.

21 Borough of Teterboro, Zoning Ordinance of the Borough of Teterboro: Article V – Zone Regulations. Adopted July 12, 2011. Accessed: http://www.co.bergen.nj.us/index.aspx?nid=728.

22 City of Hackensack, Zoning Ordinance and Map Chapter 175, City of Hackensack, NJ. Adopted February 24, 2015. Accessed: http://www.hackensack.org/filestorage/6876/8776/8778/ZoningCodeWeb.pdf.

Zoning Designation	Description
Single-Family Residential: (R-60)	Permitted uses include all uses permitted in the R-50 district. Minimum one-family lot size is 7,500 square feet.
Single-Family Residential: (R-50)	Permitted uses include single-family dwellings, municipal facilities and buildings, municipal parks and playgrounds, public or parochial schools (limited to prekindergarten through grade 12), residential-professional practice, community residence for developmentally disabled, fences, garages, signs, and swimming pools. Minimum one-family lot size is 5,000 square feet.
Single and Two-family Residential: (R-2)	Permitted uses include all uses permitted in the R-50 district as well as two-family dwellings. Minimum one-family lot size is 5,000 square feet.
Single, Two-Family and Townhouse: (R-2B)	Permitted uses include all uses permitted in the R-2 district as well as townhouses. Minimum lot size for one & two-family dwellings is 5,000 square feet and 15,000 square feet for townhouses.
Median Density Multi-Family Residential: (R-3A)	Permitted uses include all uses permitted in the R-2A and R-2B district as well as multi-family dwellings, professional offices in multifamily dwellings, underground parking, parking garages and decks, and off-street parking areas.
Medium Density Multi-Family Residential: (R-3B)	Permitted uses include all uses permitted in the R-3A district as well as professional and business office buildings.
High Density Multi-Family Residential: (R-3)	Permitted uses include all uses permitted in the R-50 district as well as multifamily dwellings and professional offices in multifamily dwellings. Minimum lot size for one-family dwellings is 7,500 square feet and 30,000 square feet for multifamily dwellings.
Health Care Services: (HCS)	Permitted uses include hospitals and medical centers, offices of physicians, dentists, surgeons, chiropractors, ophthalmologists, and other licensed practitioners, medical and dental laboratories, research facilities, facilities for the education and training of hospital personnel, convalescent or nursing homes and life care facilities, any principal use permitted in the R-3B medium density multifamily residential and office zone, municipal, county, state, or federal government buildings, public and private day schools, gift or flower shops, cafeterias, restaurants, pharmacies, off-street parking lots, garages, signs, and fences.
Neighborhood Business: (B-1)	Permitted uses include retail stores and shops, art galleries, bakeries, bank or trust companies, savings and loan institutions, clubs, lodges, meeting halls, day nursery, nursery school, child care center, delicatessen store, drug stores, florist shop, funeral parlors, hardware stores, mixed commercial/residential buildings, multi-family dwellings, municipal, county, state or federal government buildings, package liquor stores, personal service establishments, pet shops, professional offices, business offices, governmental offices, office buildings, townhouses, travel agencies or offices, off-street parking facilities, fences, signs, and steam or wet-wash laundries.
Central Business District: (B-2)	Permitted uses include all uses permitted in the B-1 district (except studios for instruction of self-defense, day nurseries, nursery schools, and townhouses), appliance stores, book and stationary stores, business or vocational schools, department stores, dry goods and variety stores, theaters, concert halls, auditoriums, furniture stores, hardware and for building supply stores, hobby and craft stores, hotels, movie theaters, bowling alleys, and other indoor amusement facilities, multi-family dwellings, office equipment establishments, painting, plumbing and wallpaper stores, photographic equipment and supply stores, supermarkets, telegraphic office, and telephone exchange.
Mixed Use District: (B-2A)	Permitted uses include all uses permitted in the B-2 district. Minimum lot size for hotel & multifamily buildings is 1.5 acres.
General Business: (B-3)	Permitted uses include all uses permitted in the B-2 district (except multi-family dwellings), newspaper offices, and publishing and job printing, including blueprints, photostats, offsets, and other similar reproductions.

Zoning Designation	Description
Regional Shopping: (B-4)	Permitted uses include all permitted principal uses in the B-2 district (except multifamily dwellings), shopping centers with a minimum gross floor area of 600,000 square feet, off-street parking and loading facilities, as well as outdoor lighting.
Community Shopping: (B-5)	Permitted uses include all permitted principal uses in the B-2 district (except multifamily dwellings), shopping centers with a minimum gross floor area of 100,000 square feet, all accessory uses permitted in the B-1 zone district, and outdoor lighting.
University Office: (UN)	Permitted uses include colleges or universities including auditoriums, athletic fields, gymnasiums, and dormitories, offices or office use, municipal buildings, public parks and playgrounds, public schools and vocational schools, restaurants, accessory storage, fences, off-street parking and loading facilities, outdoor lighting, and signs.
High Rise Office: (HRO)	Permitted uses include business offices, professional offices, governmental offices, bank or trust company or savings and loan institution (except drive-in facilities), restaurants, municipal, county, state, or federal building, park or recreation facilities, and any accessory use permitted in the UN district; minimum lot size is 100,000 square feet.
Office: (O)	Permitted uses include business offices, professional offices, governmental offices, bank, trust, savings, and loan institutions (except drive-in facilities), restaurants, municipal, county, state or federal building, park or recreation facilities, and any accessory use permitted in the UN district. Minimum lot size is 20,000 square feet.
Manufacturing: (M1)	Permitted uses include bank, trust, savings, and loan institutions (except drive-in facilities), business or vocational schools, club, lodge, meeting hall or social recreation buildings, contracting business, general manufacturing plant or establishment, municipal, county, state or federal building, park or recreation facilities, office building or office use, printing and publishing, engraving, public utility building or structure (other than gas manufacturing plant), repair and service of appliances, furniture and other home and offices articles (except public garages), research lab, retail sales, shop of a plumber, electrician, carpenter or similar tradesman, warehouse, wholesale business, any accessory use permitted in the B-3 district, and the parking, storing or garaging of commercial motor vehicles.
Manufacturing: (M2)	Permitted uses include all principal uses permitted in the Manufacturing (M-1) district, as well as truck and bus terminals and yards.

The City of Hackensack zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-28** shows the consolidation of zoning designations for the City of Hackensack.

Table C-28: Consolidation of Zoning Designations for City of Hackensack
Source: RS&H, 2016.

City of Hackensack Zoning Designation	Part 150 Zoning Designation
Single-Family Residential: (R-100)	Residential
Single-Family Residential: (R-75)	Residential
Single-Family Residential: (R-60)	Residential
Single-Family Residential: (R-50)	Residential
Single and Two-family Residential: (R-2)	Residential
Single, Two-Family and Garden Apartment: (R-2A)	Residential
Single, Two-Family and Townhouse: (R-2B)	Residential
Median Density Multi-Family Residential: (R-3A)	Residential
Medium Density Multi-Family Residential: (R-3B)	Residential
High Density Multi-Family Residential: (R-3)	Residential
Health Care Services: (HCS)	Public Use
Neighborhood Business: (B-1)	Commercial
Central Business District: (B-2)	Commercial

City of Hackensack Zoning Designation	Part 150 Zoning Designation
Mixed Use District: (B-2A)	Commercial
General Business: (B-3)	Commercial
Regional Shopping: (B-4)	Commercial
Community Shopping: (B-5)	Commercial
University Office: (UN)	Public Use
High Rise Office: (HRO)	Commercial
Office: (O)	Commercial
Manufacturing: (M1)	Industrial
Manufacturing: (M2)	Industrial

4.10 Township of South Hackensack

Zoning within the Township of South Hackensack is guided by the 2014 South Hackensack Zoning Ordinance. **Table C-29** summarizes the land use designations identified in the Zoning Districts section of the South Hackensack Zoning Ordinance.[23]

Table C-29: Township of South Hackensack Zoning Designations
Sources: Township of South Hackensack, 2014; and RS&H, 2016.

Zoning Designation	Description
One- and Two-Family Residential Zone: (A District)	Permitted uses include single- and two-family dwelling units, public utilities within public rights-of-way, and digital data communication radio units.
Commercial Zone: (B District)	Permitted uses include local business activities: antique shops, bakeries and butcher shops, cabinet and furniture stores, drug stores, florists, grocery stores, meat markets, package liquor stores, eating and drinking establishments, local fast-food or service activities: barbershops and beauty salons, tailors, dressmakers, coin-operated laundries, dry cleaners, printing establishments, television and radio repairs, theaters, music and dancing schools, art galleries, art studios, travel agencies, repairs of small appliances/household articles, office buildings, banks, savings and loan institutions, professional, business and government offices, offices for physicians, dentists, lawyers, architects, engineers, accountants, real estate and insurance brokers, post office, mortgage offices, brokerage houses or other investment-related offices, offices for commercial, financial or executive purposes, public utilities with public rights-of-way, and digital data communication radio units.
Industrial Zone: (C District)	Permitted uses include manufacturing by assembly (of component parts only), machine shops, warehouses and miniwarehouses, private security vaults, car wash establishments, open storage of goods and materials, motor vehicle body repair and paint shops, public utilities within public rights-of-way, digital data communication radio units, life sciences industry, professional, business and governmental offices, banks, saving and loans, mortgage offices, brokerage house or other investment-related offices, retail and wholesale sale of goods and services, offices for commercial, financial or executive purposes, baking and preparation of food (not to be consumed on premises), laboratories and related offices engaged in research or product testing, and printing and publishing.
Mixed Use Zone: (M District)	Permitted uses include hotels, professional business and governmental offices, banks, savings and loans, mortgage offices, brokerage houses or other investment-related offices and post offices, eating and drinking places (including fast-food restaurants), public utilities within public rights-of-way, digital data communication radio units, retail sale of goods and services, offices for commercial, financial or executive purposes, barber shops, beauty parlors and similar service establishments, stores, shops, department stores and similar uses for retail merchandising, and printing and publishing.
Senior Citizen Multifamily Residential Zone: (SCR District)	Permitted uses include multifamily-dwelling structures designed for occupancy by low- and moderate-income senior citizens. Minimum lot size is 27,500 square feet.
Affordable Housing Overlay District: (AHOD)	The purpose of this overlay zone is to create a realistic opportunity for the construction of low- and moderate-income housing as land becomes available for development.

[23] Township of South Hackensack, Code of the Township of South Hackensack: Chapter 147 – Zoning. Adopted December 11, 2014. Accessed: http://www.ecode360.com/6495228.

The Township of South Hackensack zoning designations were consolidated to Part 150 zoning designations shown in **Table C-10**. **Table C-30** shows the consolidation of zoning designations for the Township of South Hackensack.

Table C-30: Consolidation of Zoning Designations for Township of South Hackensack
Source: RS&H, 2016.

Township of South Hackensack Zoning Designation	Part 150 Zoning Designation
One- and Two-Family Residential Zone: (A District)	Residential
Commercial Zone: (B District)	Commercial
Industrial Zone: (C District)	Industrial
Mixed Use Zone: (M District)	Commercial
Senior Citizen Multifamily Residential Zone: (SCR District)	Residential
Affordable Housing Overlay District: (AHOD)	Residential

Consolidation of zoning designations was necessary for this Study. As shown in pervious sections, municipalities do not zone land uses in the same manner, likely causing confusion when trying to map all zoning designations on one map. To create a uniformed zoning map, consolidation of municipality zoning designations was required. **Figure C-3** shows the uniformed zoning map for the Land Use Data Collection Area.

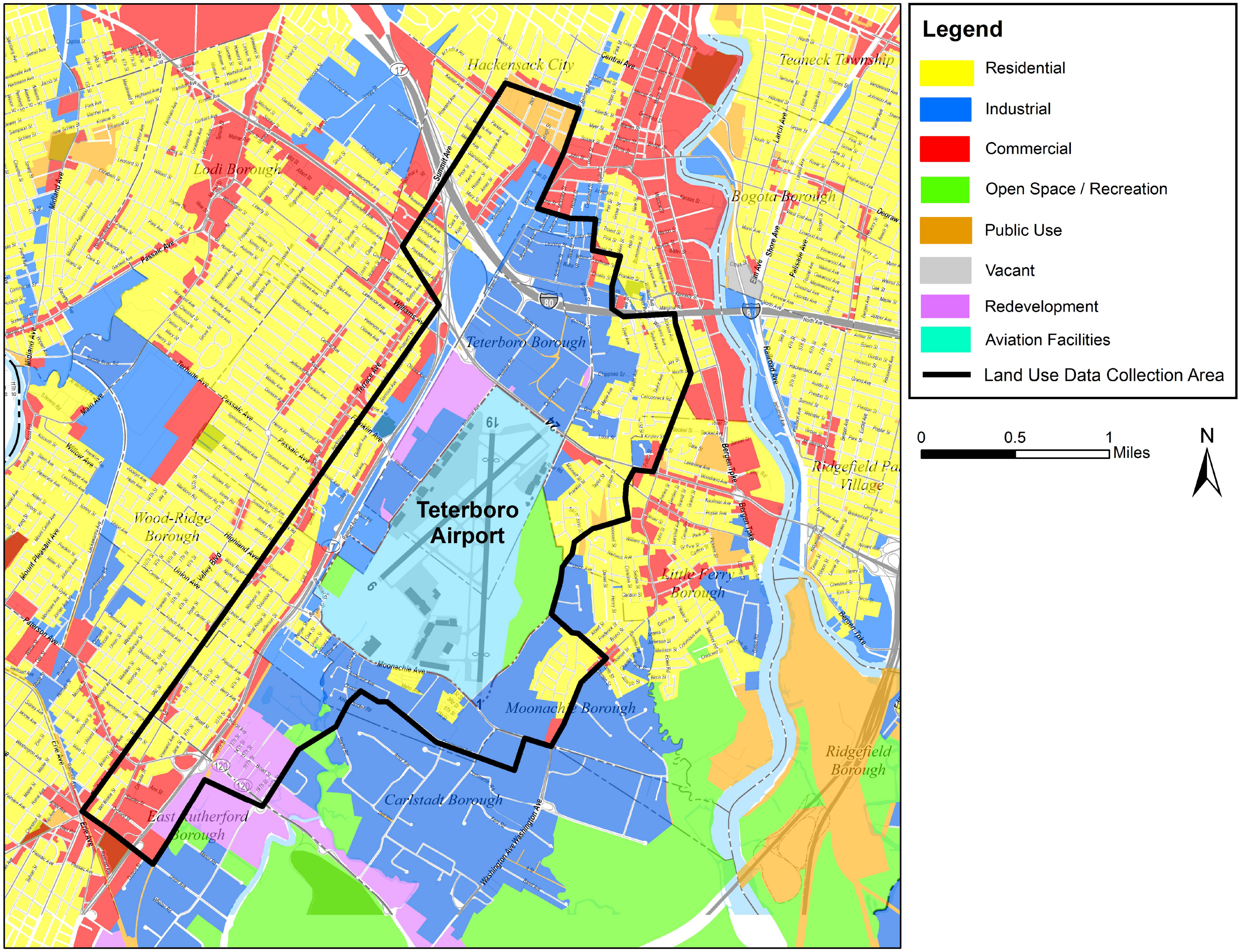

Figure C-3: Zoning Designations

Sources: ESRI, 2016; and RS&H, 2016

5 Noise Sensitive Sites

Identification of noise sensitive sites within the TEB Land Use Data Collection Area were collected from a variety of sources including Bergen County Planning and Engineering Department, municipality master plans, consultation meetings with municipalities, and available online mapping sources. Title 14 CFR Part 150 requires properties eligible for inclusion in the National Register of Historic Places (NRHP) to be identified and mapped along with land uses. Noise sensitive sites often include churches or places of worship, hospitals, schools, colleges, universities, libraries, open space / recreational areas, among others. The following noise sensitive sites have been identified for the TEB Land Use Data Collection Area:

- Churches and places of worship;
- Schools, K-12 and colleges/universities, and day cares;
- Hospitals and health clinics;
- Open space / recreational areas; and
- Historic properties.

The locations of noise sensitive sites within the Land Use Data Collection Area are shown in **Figure C-4** through **Figure C-8**. There are seven churches, 11 schools and day cares, four hospitals and health clinics, and four historic properties within the Land Use Data Collection Area.

6 Municipality Coordination

Municipalities within the Land Use Data Collection Area were consulted to obtain existing, planned, and future land use data including, but not limited to, jurisdictional boundaries, open space and environmental feature plans, historic properties, current master plan or general plan, zoning maps, redevelopment plans, and previously soundproofed facilities.

Coordination took place during in-person meetings with each municipality. **Table C-31** lists the meeting date for each municipality within the Land Use Data Collection Area.

Table C-31: Municipality Meeting Dates
Source: RS&H, 2016.

Municipality	Meeting Date
Borough of Carlstadt	January 28, 2016
Borough of East Rutherford	January 28, 2016
Borough of Hasbrouck Heights	January 28, 2016
Borough of Wood-Ridge	January 26, 2016
Borough of Teterboro	January 26, 2016
City of Hackensack	January 26, 2016
Township of South Hackensack	January 27, 2016
New Jersey Meadowlands District	March 3, 2016
Borough of Little Ferry	January 24, 2017
Borough of Moonachie	February 16, 2017

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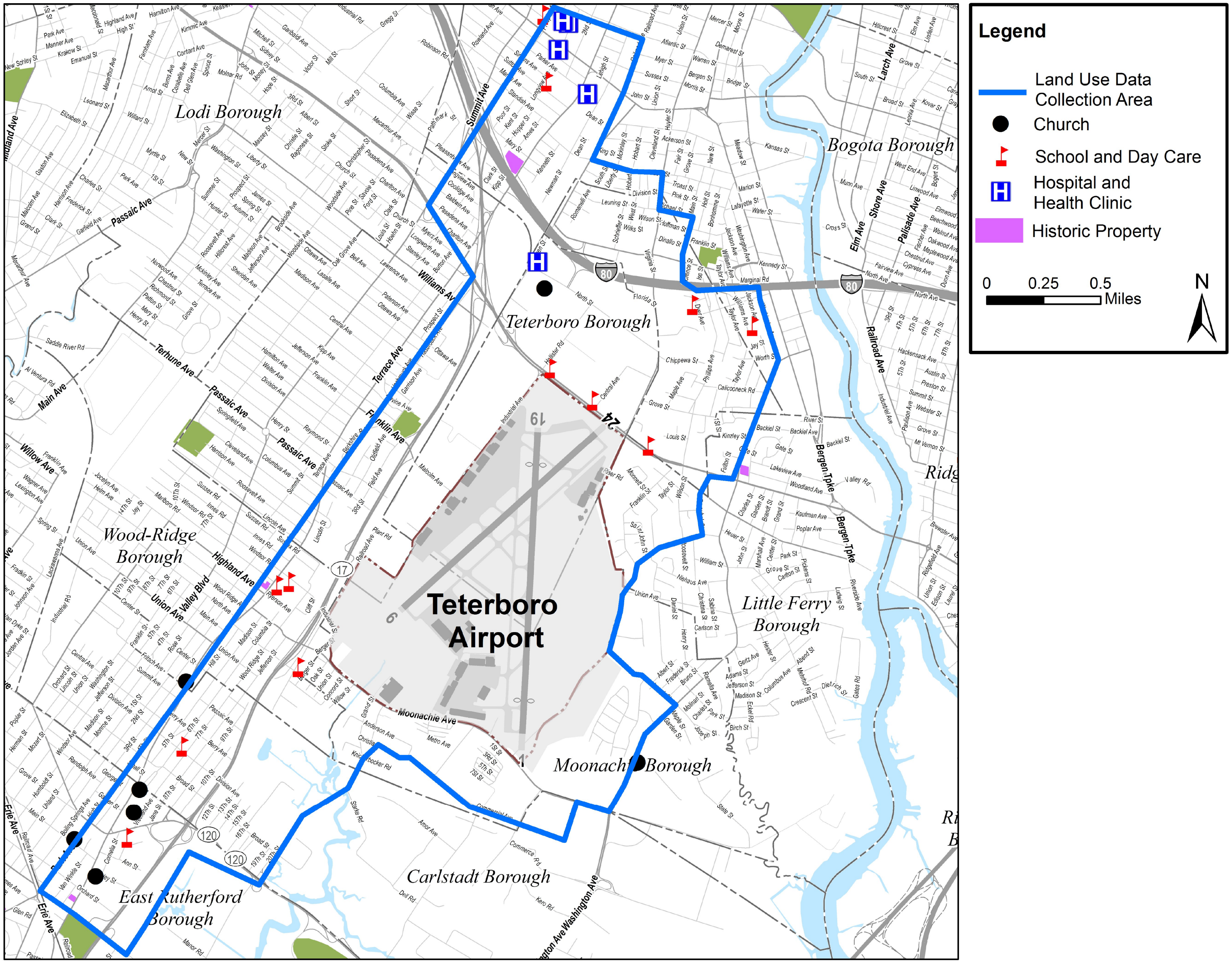

Figure C-4: Noise Sensitive Sites

Sources: ESRI, 2016; and RS&H, 2016

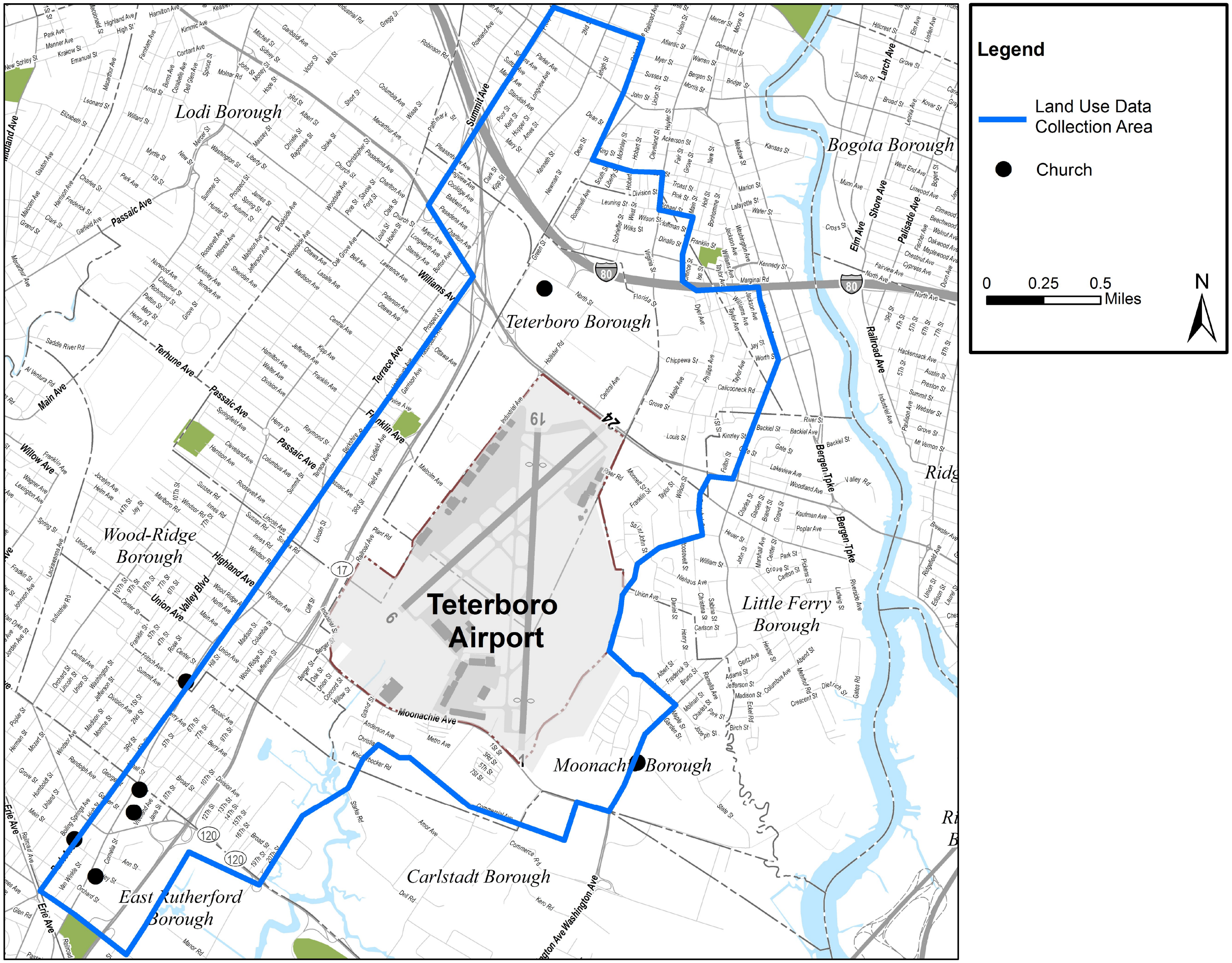

Figure C-5: Noise Sensitive Sites - Churches

Sources: ESRI, 2016; and RS&H, 2016

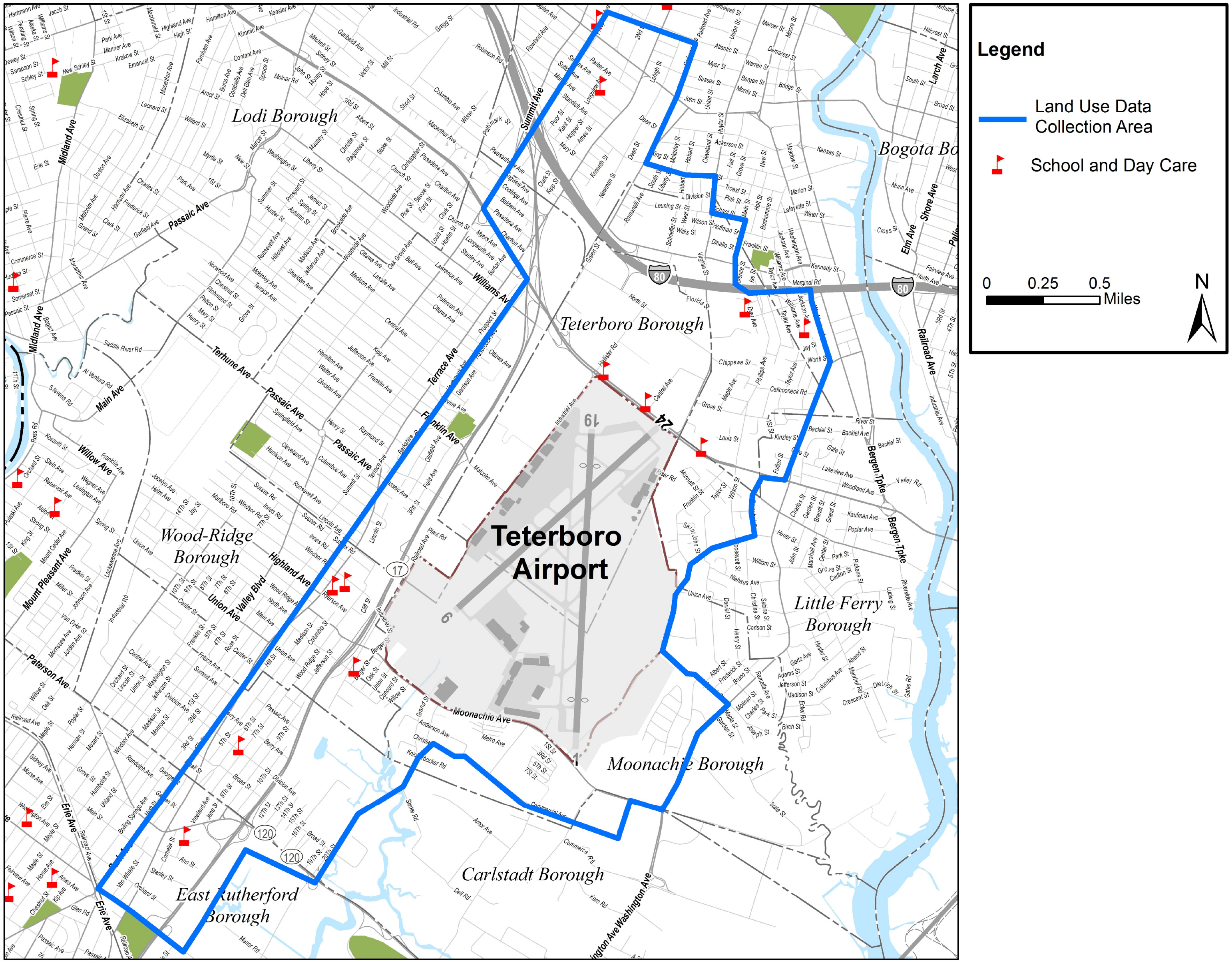

Figure C-6: Noise Sensitive Sites - Schools and Day Cares

Sources: ESRI, 2016; and RS&H, 2016

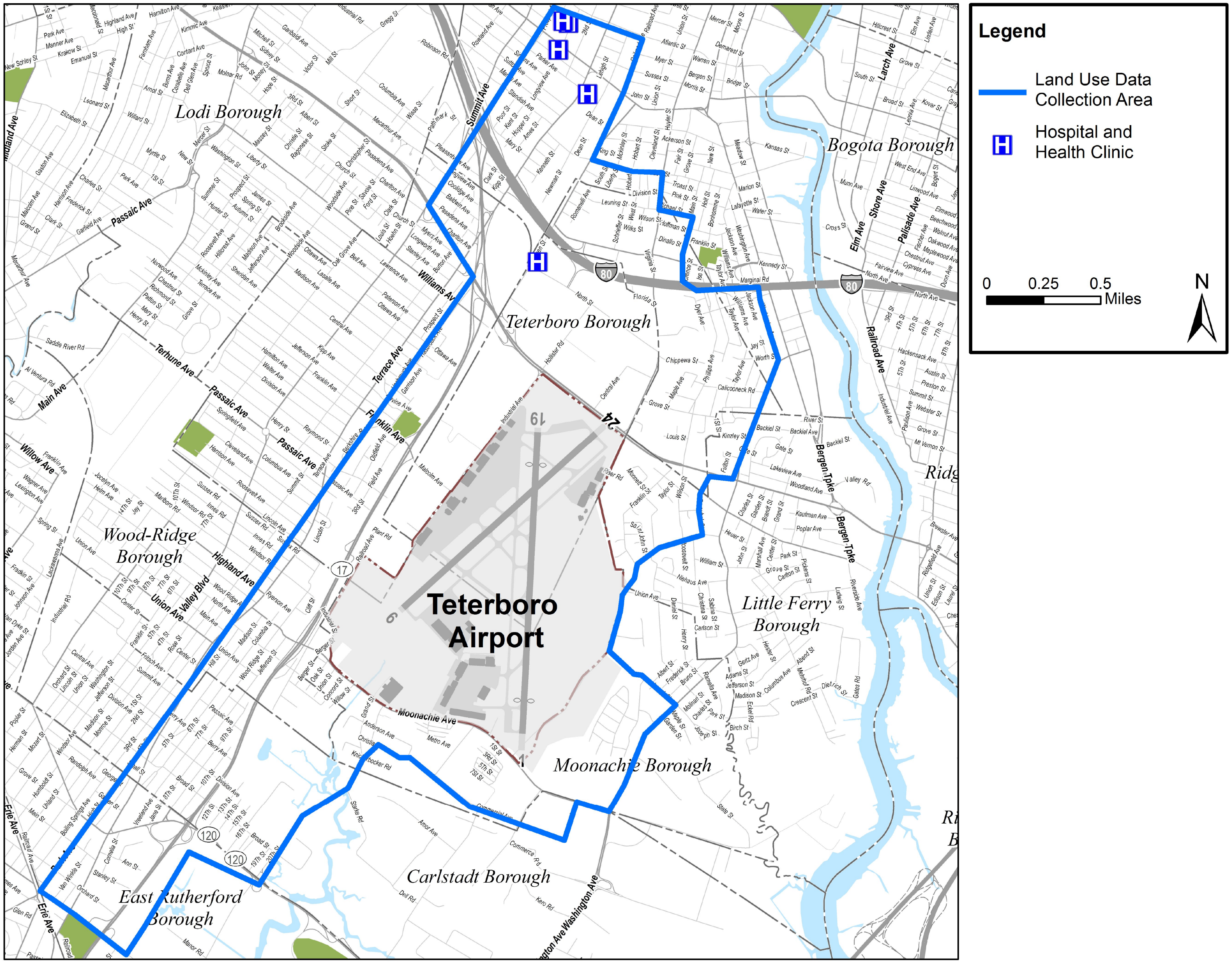

Figure C-7: Noise Sensitive Sites - Hospitals and Health Clinics
Sources: ESRI, 2016; and RS&H, 2016

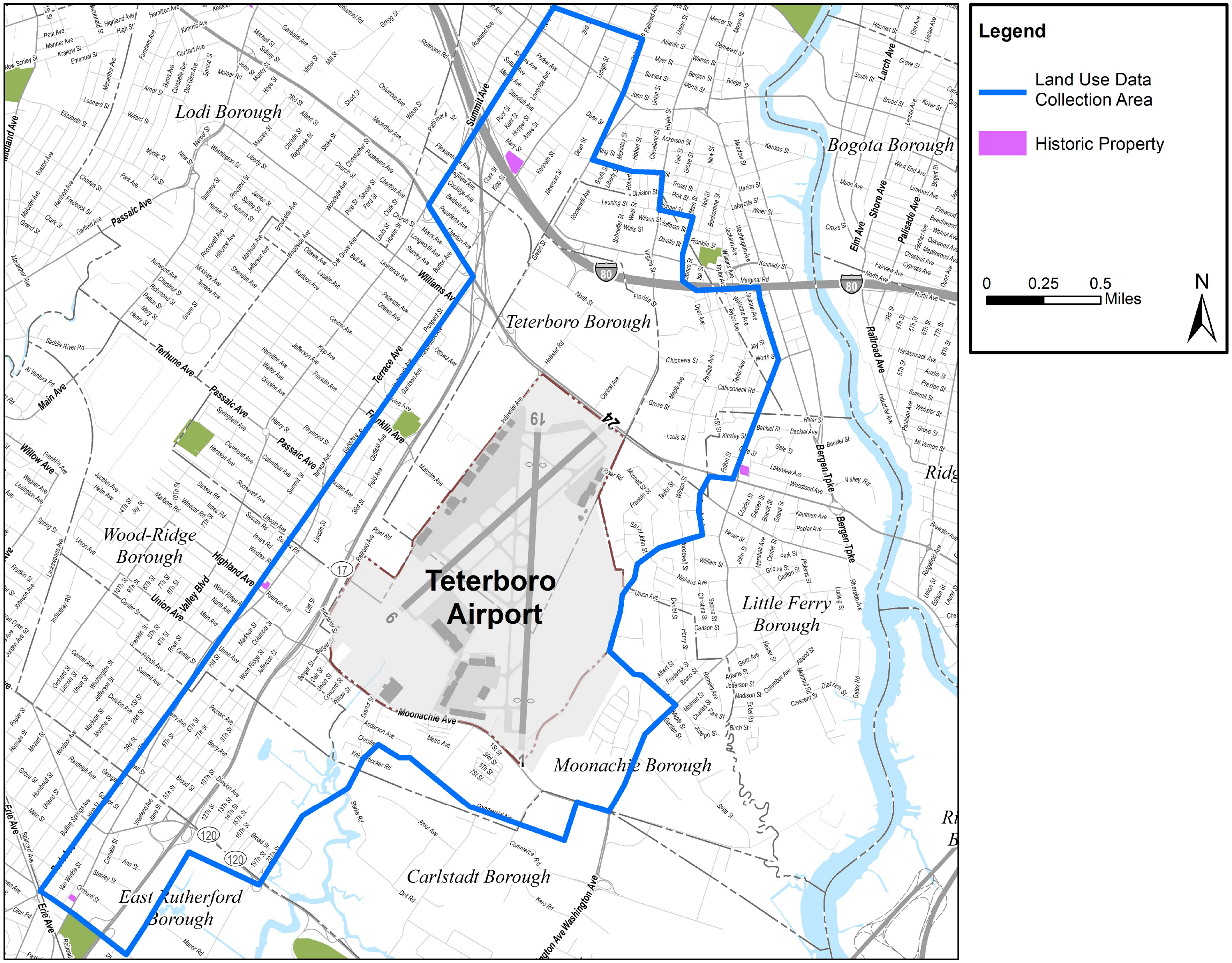

Figure C-8: Noise Sensitive Sites - Historic Properties

Sources: ESRI, 2016; and RS&H, 2016

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Appendix C.2

- Final Land Use Review

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TECHNICAL MEMORANDUM

To:	Timothy Middleton, PANYNJ
From:	Ted Baldwin and Robert C. Mentzer
Date:	April 6, 2017
Subject:	Teterboro Airport 14 CFR Part 150 Study Noise Exposure Map QA/QC
Reference:	HMMH Project Number 307260.002.004

1. Introduction

The HMMH team of consulting firms is assisting the Port Authority of New York and New Jersey (PANYNJ) to prepare a 14 CFR Part 150 Airport Noise and Land Use Compatibility Study for Teterboro Airport (TEB). The Noise Exposure Map (NEM) documentation addresses 2016 and 2021. The HMMH Team will provide the PANYNJ with final NEM documentation to submit to the FAA in April 2017. That documentation will address comments received from all stakeholders during the public review period for the December 2016 draft NEM.

During March 2017, as part of the development of the final NEM, the HMMH Team undertook final quality assurance / quality control (QA/QC) steps, including field surveys of land uses within the NEM contours.

This memorandum summarizes refinements in land use within those contours that resulted from that field work, including updated NEM graphics and tables of noncompatible land uses.

2. Revised Land Uses Depicted on the Noise Exposure Map Figures

The March 2017 QA/QC led to the revision of the land use designation of 21 parcels within the 2016 and 2021 65 DNL contours. For the 2016 contours, 20 of these parcels are within the 65-70 DNL band and one is within the 70-75 DNL band. For the 2021 contours, 19 of the parcels are within the 65-70 DNL band and two are within the 70-75 DNL band. The changes for each year are listed below:

- For 2016, within the 65-70 DNL band
  - One parcel changed from commercial to school/university use (this is the Jersey College School of Nursing that we presented at TAC 11 on March 31, 2017)
  - One parcel changed from commercial to single family use
  - One parcel changed from multifamily residential to single family residential
  - Twelve parcels changed from single family residential to multi-family residential
  - One parcel changed from single family residential to vacant/undefined
  - One parcel changed from single family residential to manufacturing and production
  - Three parcels changed from commercial to vacant/undefined use
- For 2016, within the 70-75 DNL band
  - One parcel changed from vacant/undefined to manufacturing and production

- For 2021 within the 65-70 DNL band
  - One parcel changed from commercial to school/university use (this is the Jersey College School of Nursing that we presented at TAC 11 on March 31, 2017)
  - One parcel changed from commercial to single family use
  - One parcel changed from multifamily residential to single family residential
  - Eleven parcels changed from single family residential to multi-family residential
  - One parcel changed from single family residential to vacant/undefined
  - One parcel changed from single family residential to manufacturing and production
  - Three parcels changed from commercial to vacant/undefined use
- For 2021, within the 70-75 DNL band
  - One parcel changed from single family residential to multi-family residential
  - One parcel changed from vacant/undefined to manufacturing and production

Several revised figures attached to this memorandum depict these changes graphically. The first three graphics present updated versions of NEM Figures 5-1, 5-2, and 5-3. The final NEM submittal to the FAA will include these three updated figures.

- Figure 5-1 Existing Conditions (2016) Noise Exposure Map
- Figure 5-2 Forecast Conditions (2021) Noise Exposure Map
- Figure 5-3 Comparison of Existing (2016) and Forecast (2021) Noise Exposure Maps

Since the land use changes are so subtle, the fourth and fifth figures present versions of Figure 5-3 that are for the purposes of this memorandum only and will not be included in the final NEM submittal. These figures depict only the parcels on which the land uses changed:[1]

- Figure 5-3a The *revised* land uses on parcels where land use was revised
- Figure 5-3b The *original* land uses on parcels where land use was revised

Upon PANYNJ acceptance of the updated Figures 5-1, 5-2, and 5-3, HMMH will modify all appropriate NEM figures to depict the updated land use base map.

3. Revised Dwelling Unit, Population Count, and Sensitive Receptor Tabulations

The revised land uses affect dwelling unit, population count, and sensitive receptor tabulations.

Tables 1, 2, and 3 compare the original and updated values for sensitive sites, dwelling units, and residential population within the 65 and higher DNL contours. Table 4 presents the estimated population counts within the 55 and higher DNL contours. Table 1 notes the addition of the Jersey College School of Nursing that was added to the NEM figures. That school is in a converted commercial structure. The table also notes that the church within the 2016 and 2021 contours changed in name, but not use; it is one tenant in a commercial structure.

Section 4 presents updated versions of Tables 5-1, 5-2, 5-3, and E-1 that will replace the original versions in the final NEM submittal to the FAA.

Table 1: Noise Sensitive Sites within 2016 and 2021 65 DNL Contour
Source: RS&H and HMMH, 2016 and 2017

	Year	Noise Sensitive Site	Type	Address	Town
Original Receptors	Within 2016 and 2021	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
		Bergen County Technical School (Note 1)	School	504 US-46	Teterboro
	Within 2021 Only	North Jersey Vineyard Church	Church	370 North St	Teterboro
Revised Receptors	Within 2016 and 2021	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
		Bergen County Technical School (Note 1)	School	504 US-46	Teterboro
		Jersey College School of Nursing (Added)	*School*	*546 US-46*	*Teterboro*
	Within 2021 Only	Catalyst Agape Church (Note 2)	Church	370 North St	Teterboro
Note 1: The Bergen County Technical School was soundproofed as a part of the School Soundproofing Program discussed in Section 2.5. Note 2: The North Jersey Vineyard Church changed to a different congregation – the Catalyst Agape Church – in the same location.					

[1] The fourth and fifth figures also show parcels where the March 2017 field work led to changes in land use outside the 65 DNL contours; those parcels are not relevant to the NEM, but may be in areas where the extent of the contours change as the result of noise abatement alternatives considered in the Noise Compatibility Program (NCP) phase of the study.

Table 2 Dwelling Units within 2016 and 2021 65 DNL Contours

Source: 2010 US Census Block Data, RS&H and HMMH, 2016 and 2017

Year	Metric	Dwelling Units within DNL Contour Interval							
		65-70 Original	*65-70 Revised*	70-75 Original	*70-75 Revised*	>75 Original	*>75 Revised*	Total Original	*Total Revised*
2016	Single Family	95	*88*	0	*0*	0	*0*	95	*88*
	Multi-Family	19	*51*	0	*0*	0	*0*	19	*51*
	Mobile Home	44	*44*	8	*8*	0	*0*	52	*52*
	Total	158	*183*	8	*8*	0	*0*	166	*191*
2021	Single Family	95	*83*	5	*5*	0	*0*	100	*88*
	Multi-Family	19	*49*	2	*2*	0	*0*	21	*51*
	Mobile Home[2]	48	*48*	10	*9*	0	*0*	58	*57*
	Total	162	*180*	17	*16*	0	*0*	179	*196*

Table 3: Population within 2016 and 2021 65 DNL Contours[3]

Source: 2010 US Census Block Data, RS&H and HMMH, 2016 and 2017

Year	Metric	Population within DNL Contour Interval							
		65-70 Original	*65-70 Revised*	70-75 Original	*70-75 Revised*	>75 Original	*>75 Revised*	Total Original	*Total Revised*
2016	Single Family	230	*213*	0	*0*	0	*0*	230	*213*
	Multi-Family	46	*123*	0	*0*	0	*0*	46	*123*
	Mobile Home	106	*106*	19	*19*	0	*0*	125	*125*
	Total	382	*442*	19	*19*	0	*0*	401	*461*
2021	Single Family	230	*201*	12	*12*	0	*0*	242	*213*
	Multi-Family	46	*119*	5	*5*	0	*0*	51	*124*
	Mobile Home	116	*116*	24	*22*	0	*0*	140	*138*
	Total	392	*436*	41	*39*	0	*0*	433	*475*
Note: Population = 2.42 people times number of residential units									

Table 4: Population within 2016 and 2021 55 DNL Contours

Source: 2010 US Census Block Data, RS&H and HMMH, 2016 and 2017

Noise Level, DNL	Estimated Population Counts			
	2016 Original	*2016 Revised*	2021 Original	*2021 Revised*
55-60	42,166	*42,166*	45,763	*45,763*
60-65	4,950	*4,950*	5567	*5,567*
65-70	382	*442*	392	*436*
70-75	19	*19*	41	*39*
>75	0	*0*	0	*0*

[2] The count of mobile homes within the 2021 contours listed in Table 2 changed by one unit (and the associated population listed in Table 3 accordingly) because these updated counts took advantage of more up-to-date aerial photography that has become available which depicts slight changes in park layout that were made after Hurricane Sandy.

[3] 2010 US Census Block Data. In order to estimate the number of people residing within the noise contours, existing parcel boundary land use maps were overlaid on 2010 US Census TIGER file maps that depict Census blocks – the smallest Census enumeration unit. "Populated Area" data polygons were then created by combining Census blocks with the residential land use concentrating population and housing unit values into the residential portion of the census block where people actually live. For example, in some areas the population is concentrated along the road rather than over several square miles of open or undeveloped land.

Using Geographic Information Systems (GIS) tools, the noise contours were intersected with these "Residential/Census" data for each DNL noise contour interval. The resultant wholly or partially encompassed Residential/Census areas were then identified and the proportion of total area within the contour level was calculated to determine the estimated residential population and housing unit counts.

4. Replacement Tables 5-1, 5-2, 5-3, and E-1 for the Final NEM

Table 5-1 Dwelling Units within 2016 and 2021 65 DNL Contours

Source: 2010 US Census Block Data, RS&H and HMMH, 2016 and 2017

Year	Metric	Dwelling Units within DNL Contour Interval			
		65-70	70-75	>75	Total
2016	Single Family	88	0	0	88
	Multi-Family	51	0	0	51
	Mobile Home	44	8	0	52
	Total	183	8	0	191
2021	Single Family	83	5	0	88
	Multi-Family	49	2	0	51
	Mobile Home[4]	48	9	0	57
	Total	180	16	0	196

Table 5-2: Population within 2016 and 2021 65 DNL Contours[5]

Source: 2010 US Census Block Data, RS&H and HMMH, 2016 and 2017

Year	Metric	Population within DNL Contour Interval			
		65-70	70-75	>75	Total
2016	Single Family	213	0	0	213
	Multi-Family	123	0	0	123
	Mobile Home	106	19	0	125
	Total	442	19	0	461
2021	Single Family	201	12	0	213
	Multi-Family	119	5	0	124
	Mobile Home	116	22	0	138
	Total	436	39	0	475
Note: Population = 2.42 people times number of residential units					

[4] The count of mobile homes within the 2021 contours listed in Table 2 changed by one unit (and the associated population listed in Table 3 accordingly) because these updated counts took advantage of more up-to-date aerial photography that has become available which depicts slight changes in park layout that were made after Hurricane Sandy.

[5] 2010 US Census Block Data. In order to estimate the number of people residing within the noise contours, existing parcel boundary land use maps were overlaid on 2010 US Census TIGER file maps that depict Census blocks – the smallest Census enumeration unit. "Populated Area" data polygons were then created by combining Census blocks with the residential land use concentrating population and housing unit values into the residential portion of the census block where people actually live. For example, in some areas the population is concentrated along the road rather than over several square miles of open or undeveloped land.

Using Geographic Information Systems (GIS) tools, the noise contours were intersected with these "Residential/Census" data for each DNL noise contour interval. The resultant wholly or partially encompassed Residential/Census areas were then identified and the proportion of total area within the contour level was calculated to determine the estimated residential population and housing unit counts.

Table 5-3: Noise Sensitive Sites within 2016 and 2021 65 DNL Contour
Source: RS&H and HMMH, 2016 and 2017

Year	Noise Sensitive Site	Type	Address	Town
Within 2016 and 2021	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
	Bergen County Technical School(Note 1)	School	504 US-46	Teterboro
	Jersey College School of Nursing(Note 2)	School	*546 US-46*	*Teterboro*
Within 2021 Only	Catalyst Agape Church(Note 2)	Church	370 North St	Teterboro
Note 1: The Bergen County Technical School was soundproofed as a part of the School Soundproofing Program discussed in Section 2.5. Note 2: The Jersey College School of Nursing is in a former commercial structure, and Catalyst Agape Church is occupies a portion of a commercial structure with other commercial tenants.				

Table E-1: Population within 2016 and 2021 55 DNL Contours
Source: 2010 US Census Block Data, RS&H and HMMH, 2016 and 2017

Noise Level, DNL	Estimated Population Counts	
	2016	2021
55-60	42,166	45,763
60-65	4,950	5,567
65-70	442	436
70-75	19	39
75+	0	0

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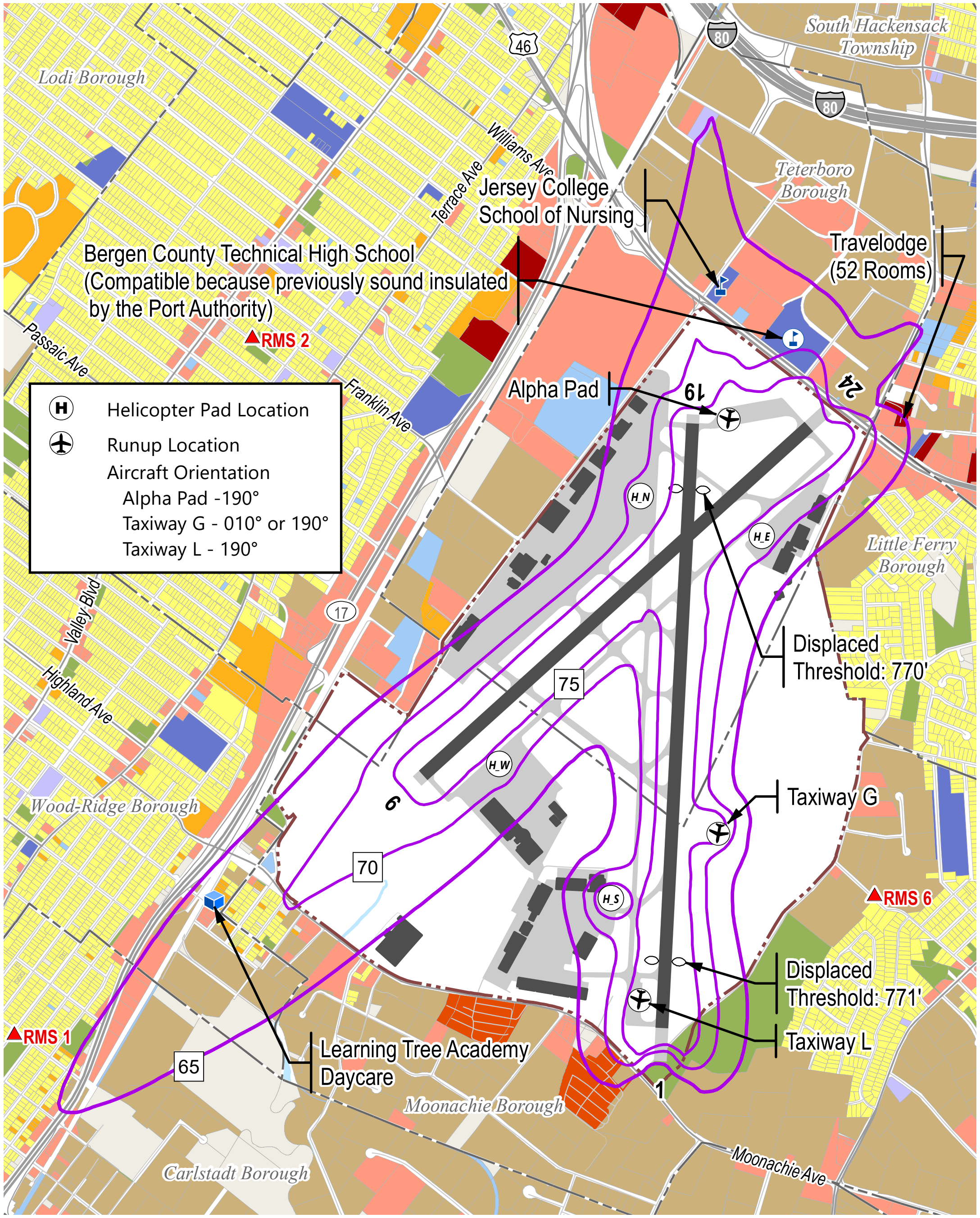

THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: 5-1

Existing Conditions (2016) Noise Exposure Map

- 2016 DNL Contours (65-75)
- TEB Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

Non-Compatible within DNL 65

- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging (Hotel, Motel, etc..)
- School / University / Daycare
- Place of Worship

Compatible within DNL 65

- Recreational / Open Space / Cemetery
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- School
- School *(Sound Insulated)*
- Daycare

Note: Entire area depicted on the figure is within Bergen County and Bergen County has jurisdictional and land use control

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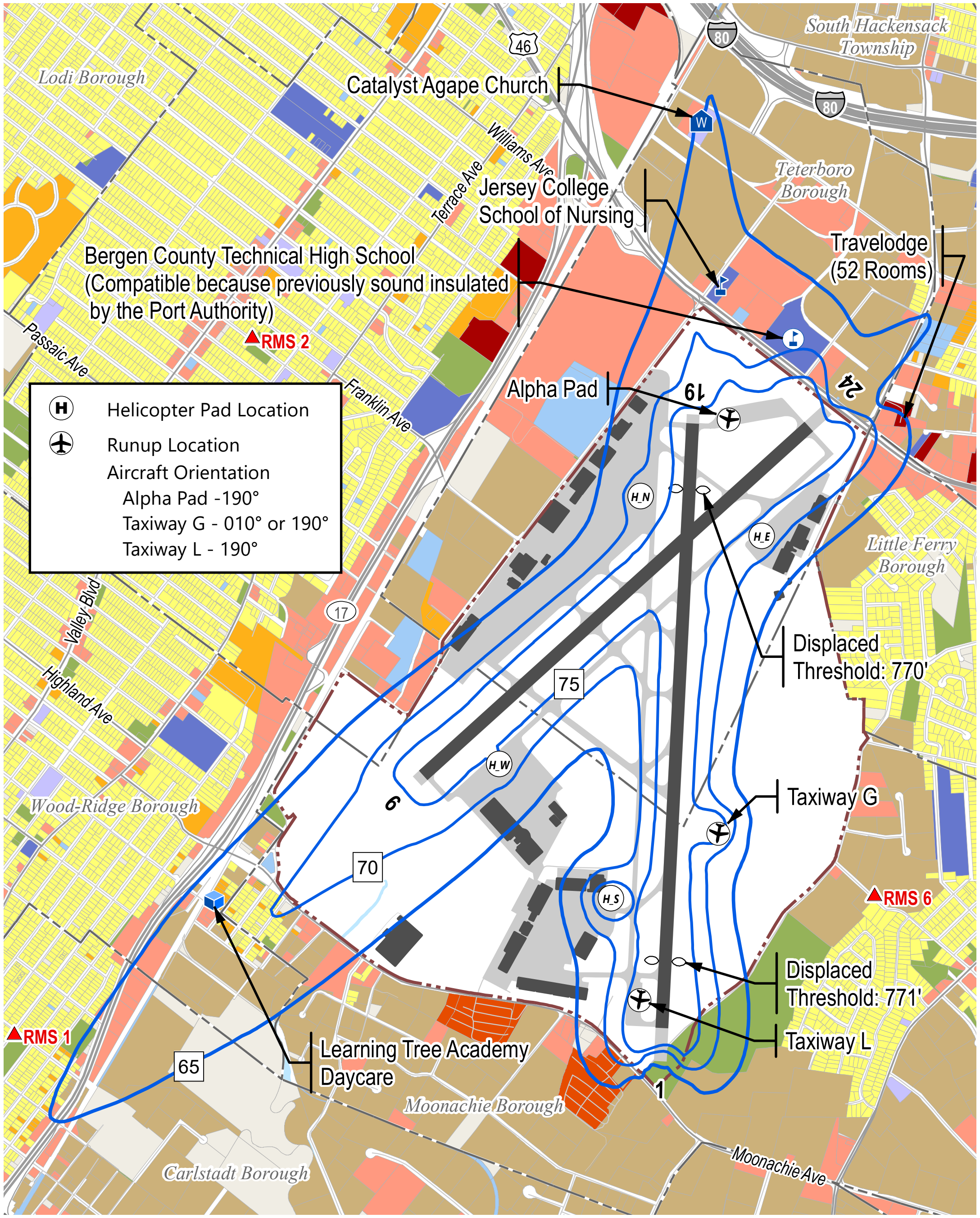
Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: 5-2

Forecast Conditions (2021) Noise Exposure Map

2021 DNL Contours (65-75)
TEB Airport Boundary (Approximate)
Runway
RMS # Noise Monitor Locations
Municipal Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

Non-Compatible within DNL 65

Single Family Residential
Multi-Family Residential
Mobile Home
Transient Lodging (Hotel, Motel, etc..)
School / University / Daycare
Place of Worship

Compatible within DNL 65

Recreational / Open Space / Cemetery
Commercial Use
Manufacturing and Production
Public Use
Vacant / Undefined

School
School *(Sound Insulated)*
Place of Worship
Daycare

Note: Entire area depicted on the figure is within Bergen County and Bergen County has jurisdictional and land use control

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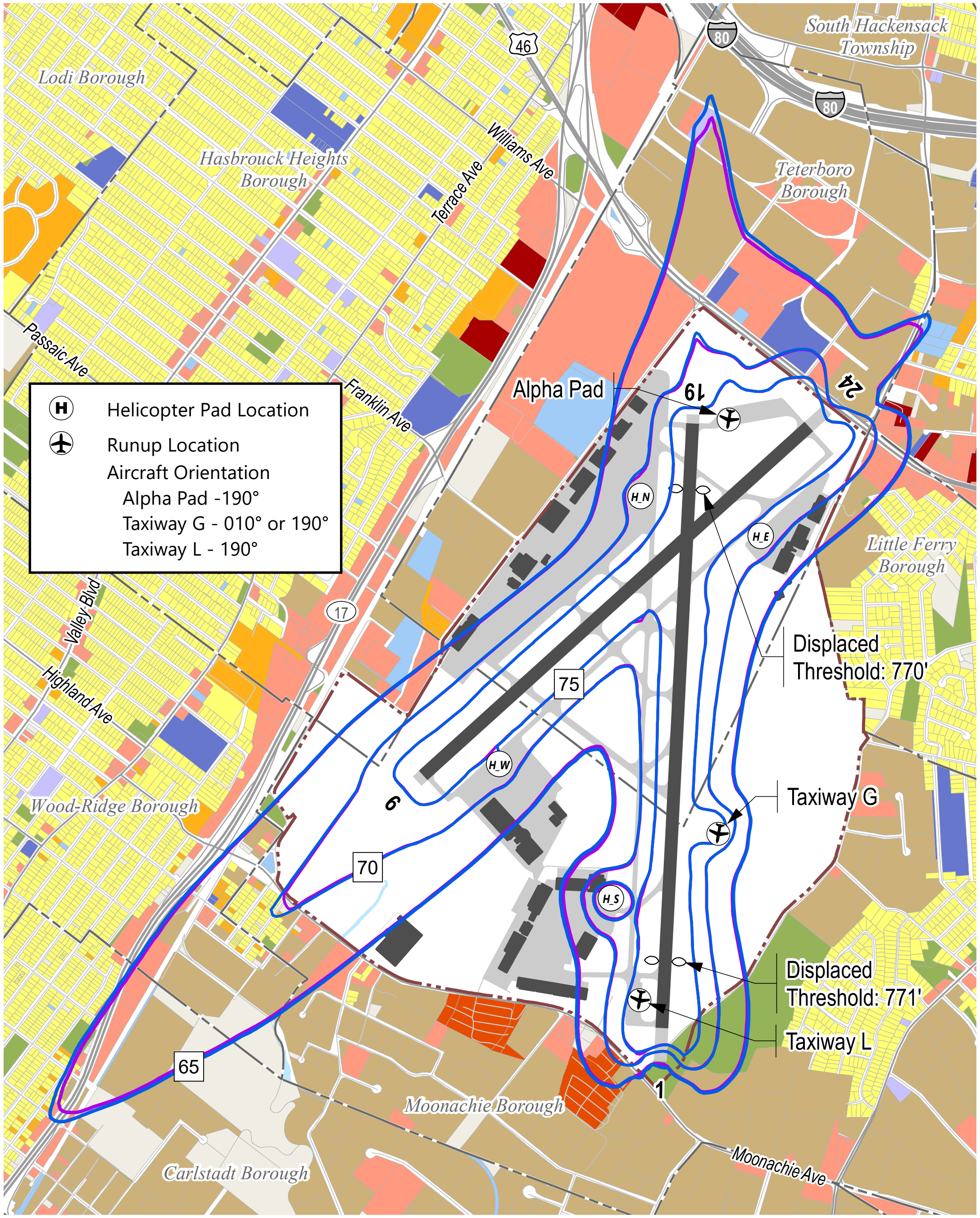
Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: 5-3

Comparison of Existing (2016) and Forecast (2021) Noise Exposure Maps

- 2016 DNL Contours (65-75)
- 2021 DNL Contours (65-75)
- TEB Airport Boundary (Approximate)
- Runway
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

Non-Compatible within DNL 65

- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging (Hotel, Motel, etc..)
- School / University / Daycare
- Place of Worship

Compatible within DNL 65

- Recreational / Open Space / Cemetery
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined

Note: Entire area depicted on the figure is within Bergen County and Bergen County has jurisdictional and land use control

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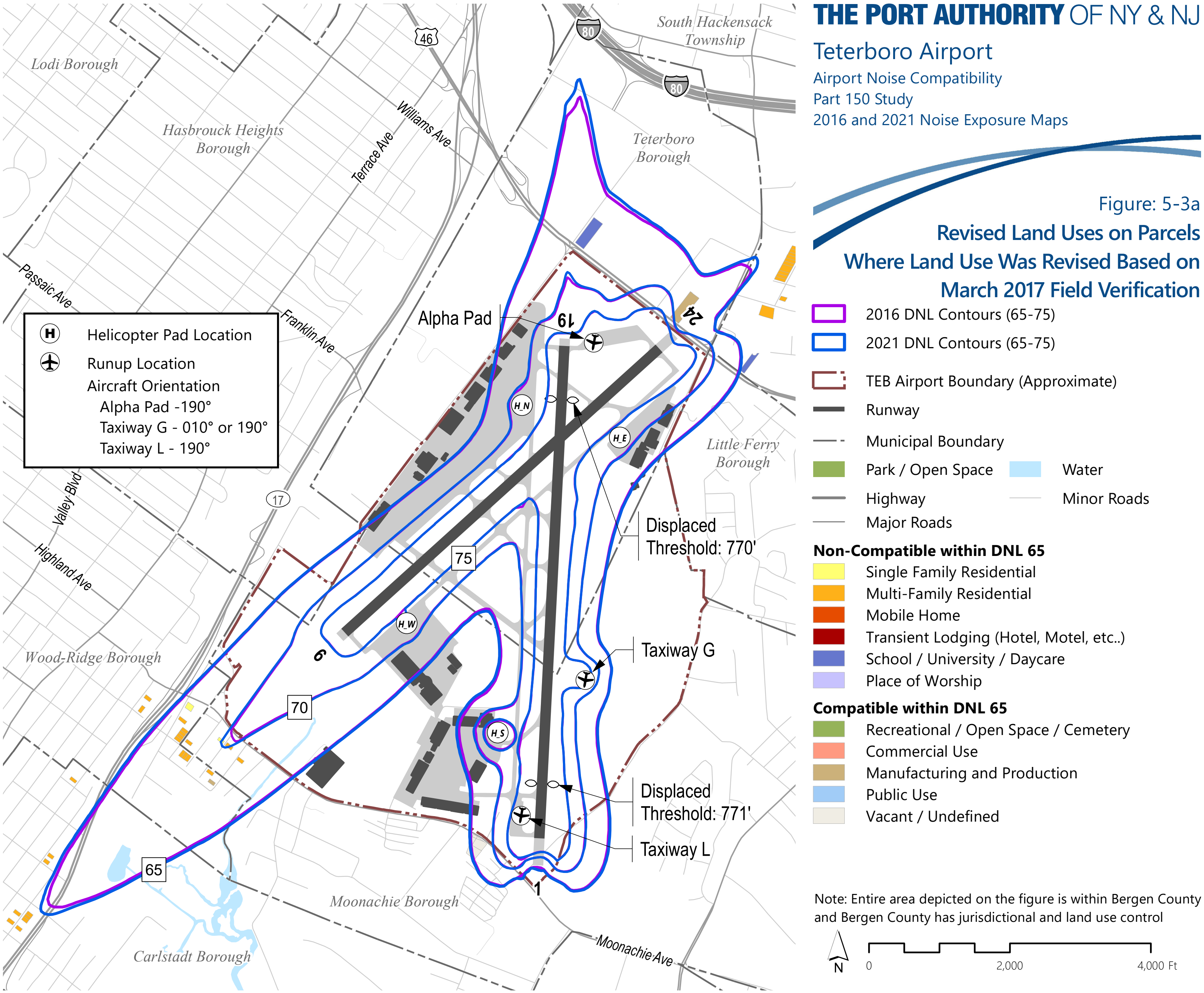
hmmh

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



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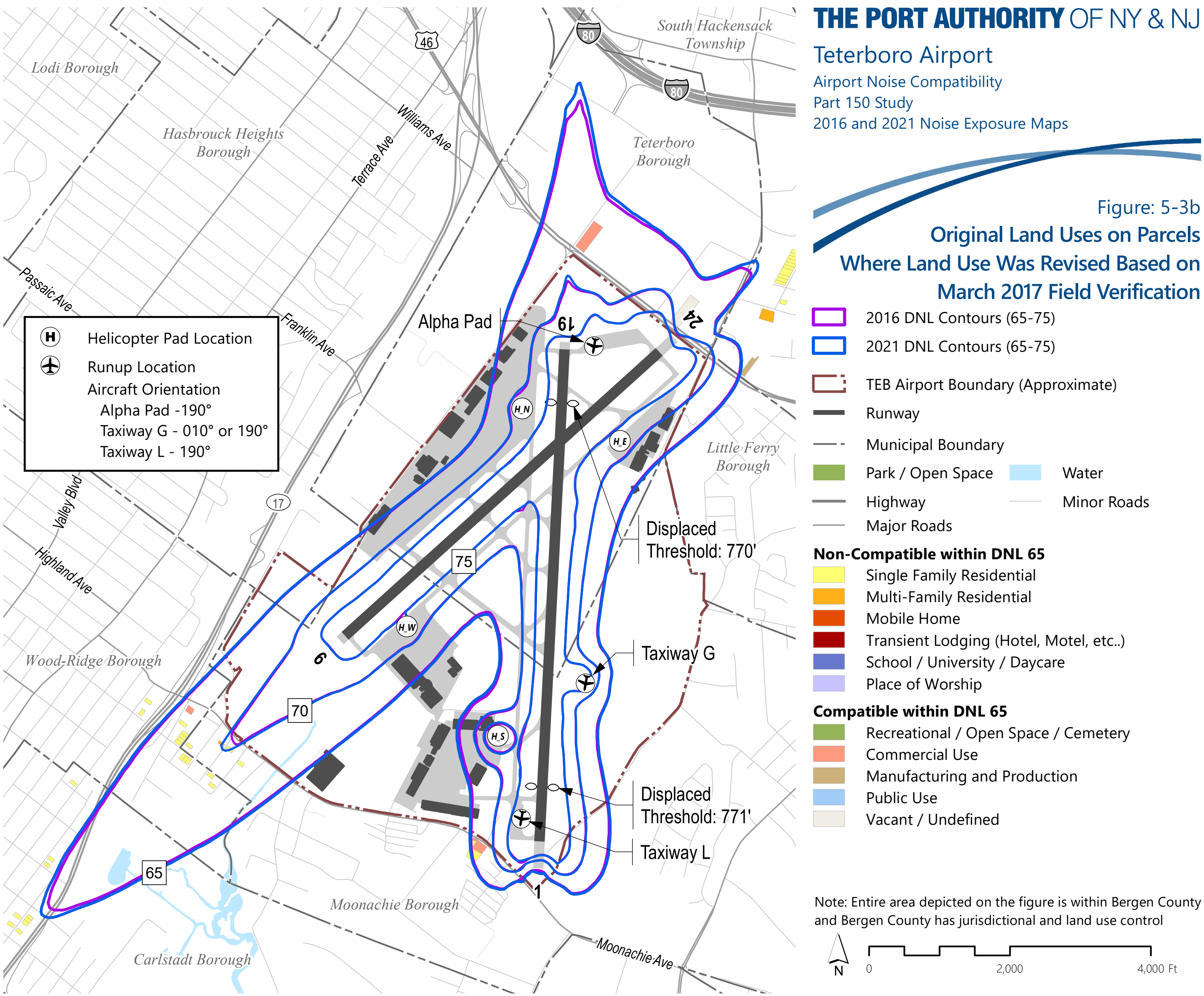

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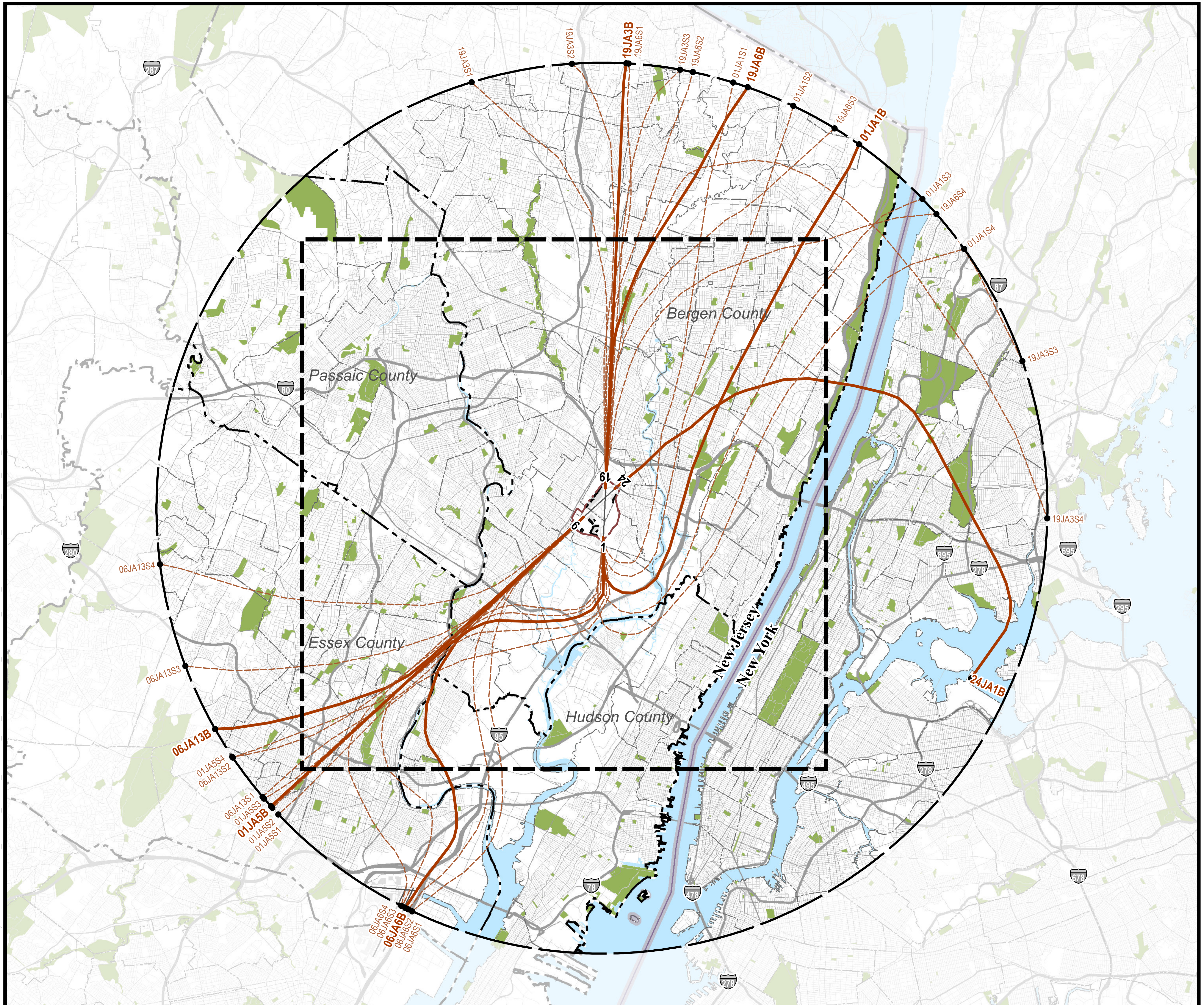


THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

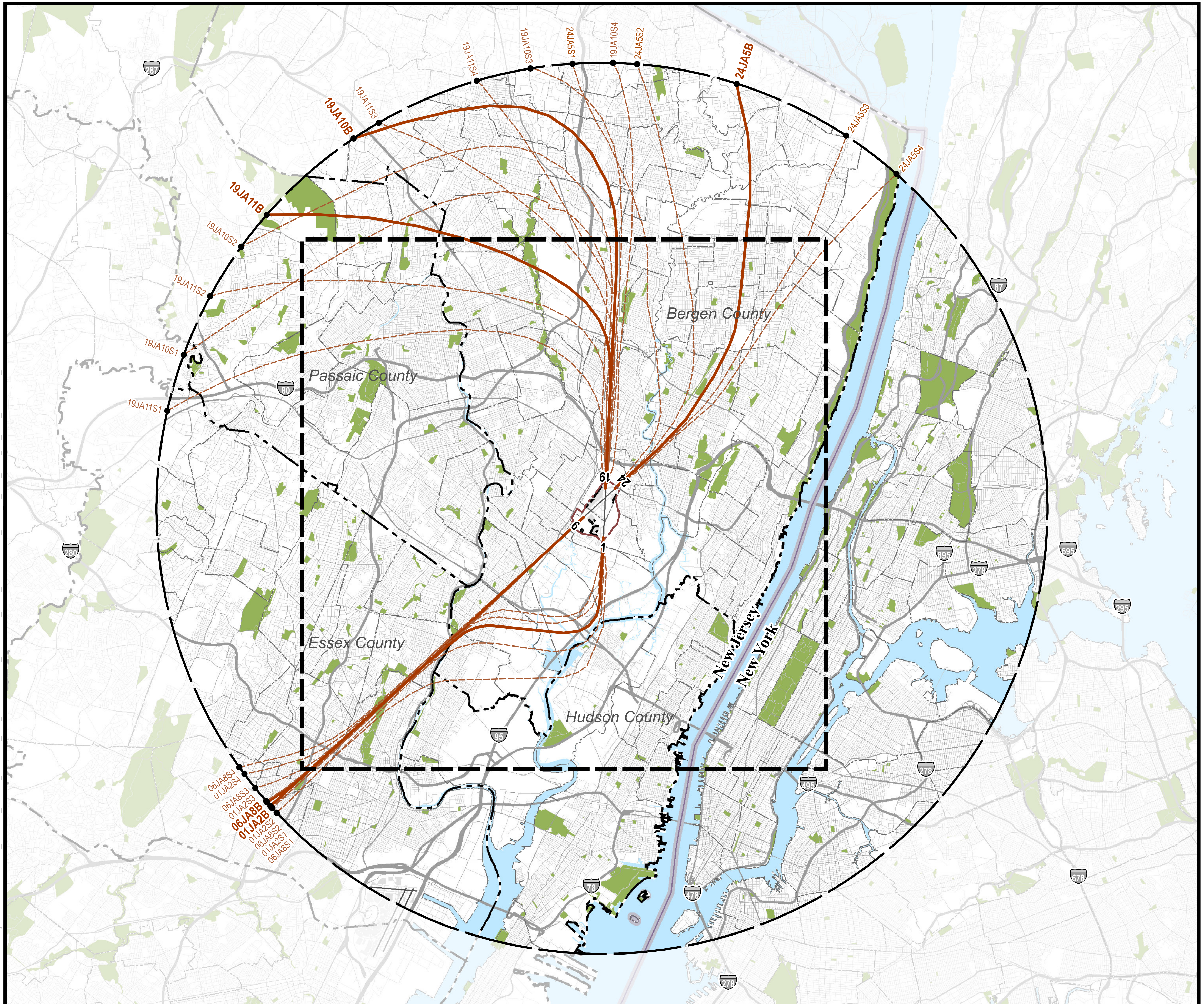
Jet Arrival Model Tracks
Sheet 1 of 10

Model Backbone Track (Arrival)
Model Track (Arrival)

19JA2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Jet Arrival Model Tracks
Sheet 2 of 10

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Minor Roads
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0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N

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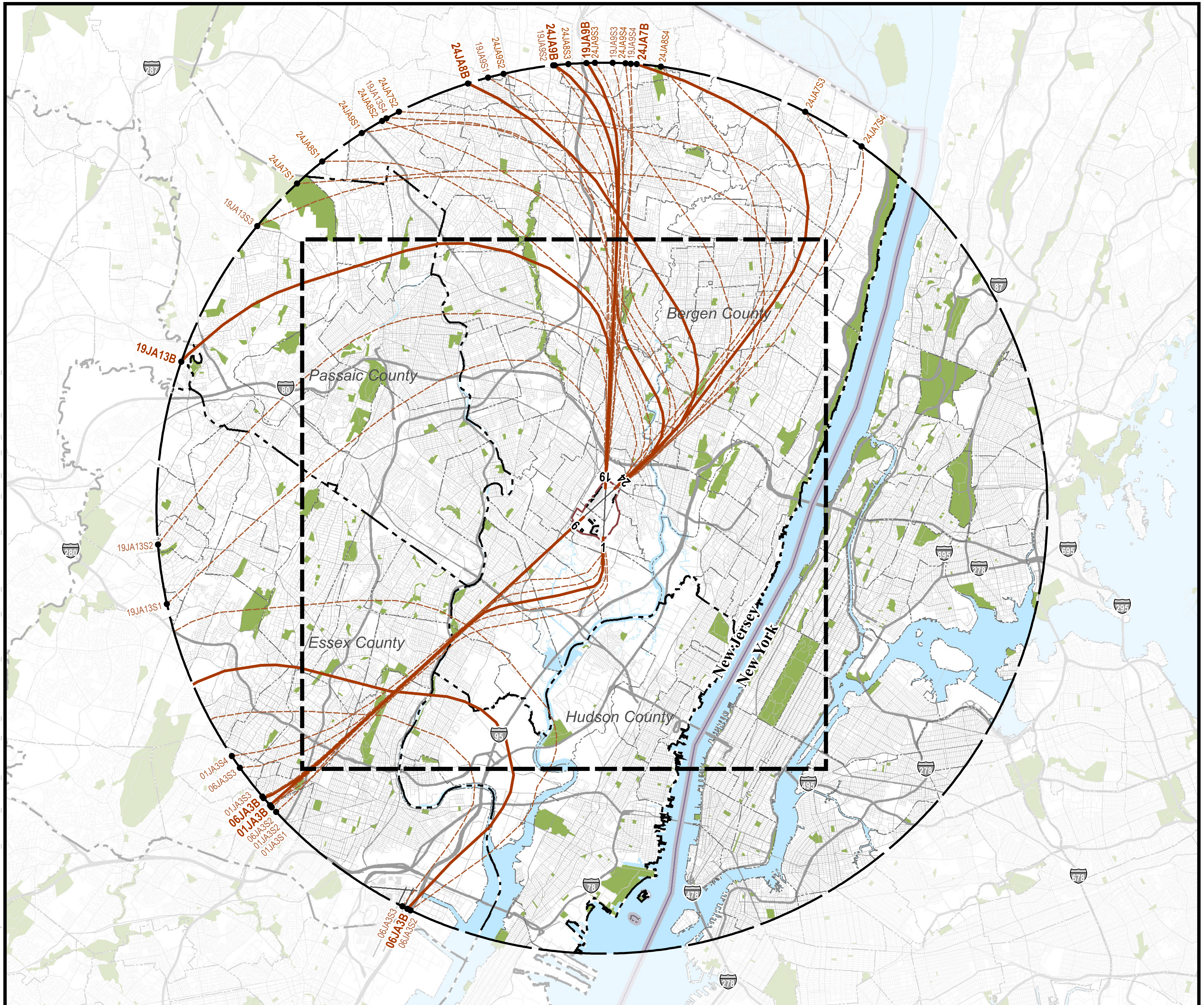

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Teterboro Airport

Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Jet Arrival Model Tracks
Sheet 3 of 10

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Highway
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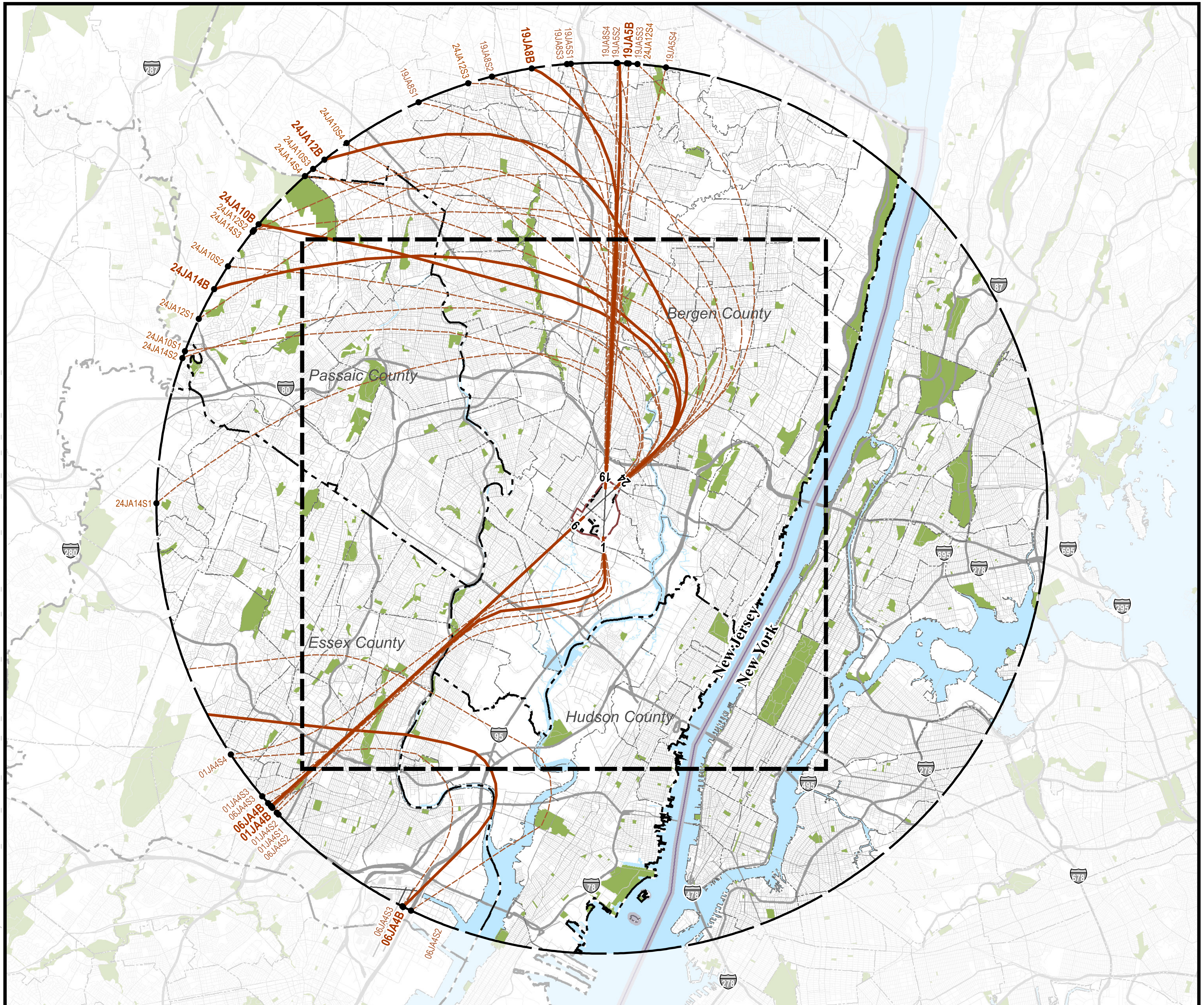
N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles



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Teterboro Airport

Airport Noise Compatibility
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Jet Arrival Model Tracks
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Minor Roads
Major Roads

N

0 — 15,000 — 30,000 Feet

0 — 2.5 — 5 Nautical Miles

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Teterboro Airport

Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Jet Arrival Model Tracks
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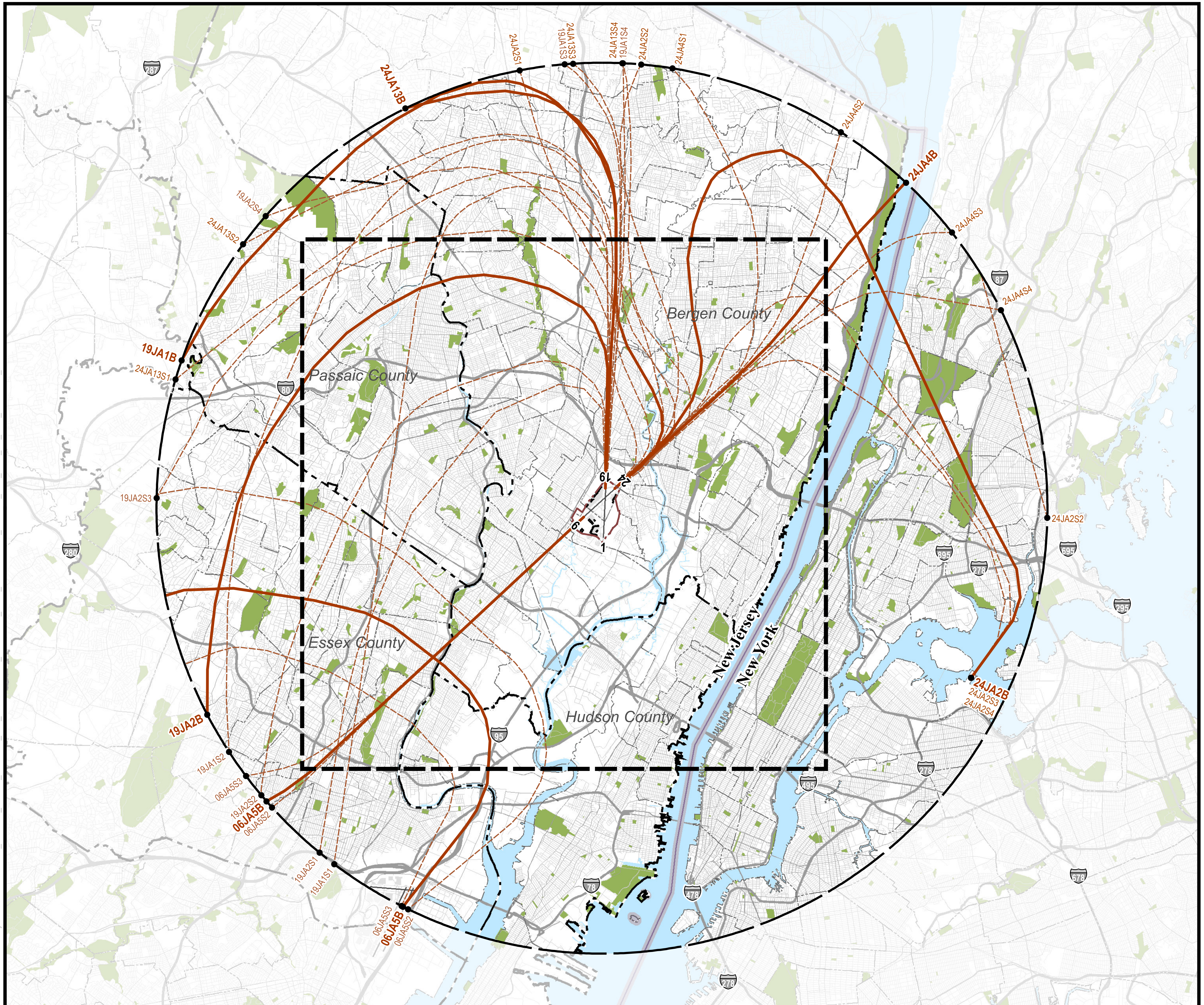

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0 15,000 30,000 Feet
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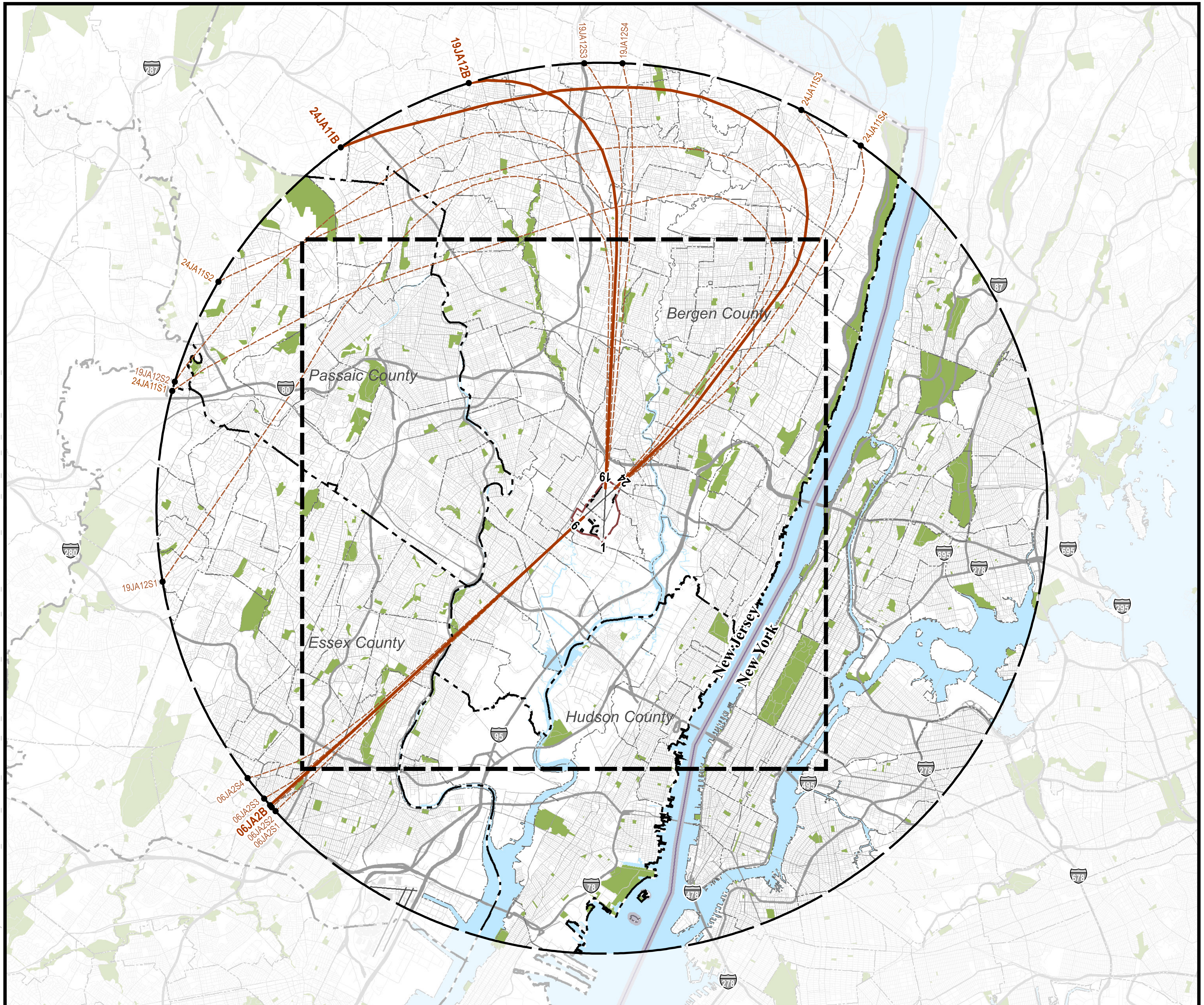

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Teterboro Airport

Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Jet Arrival Model Tracks
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N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

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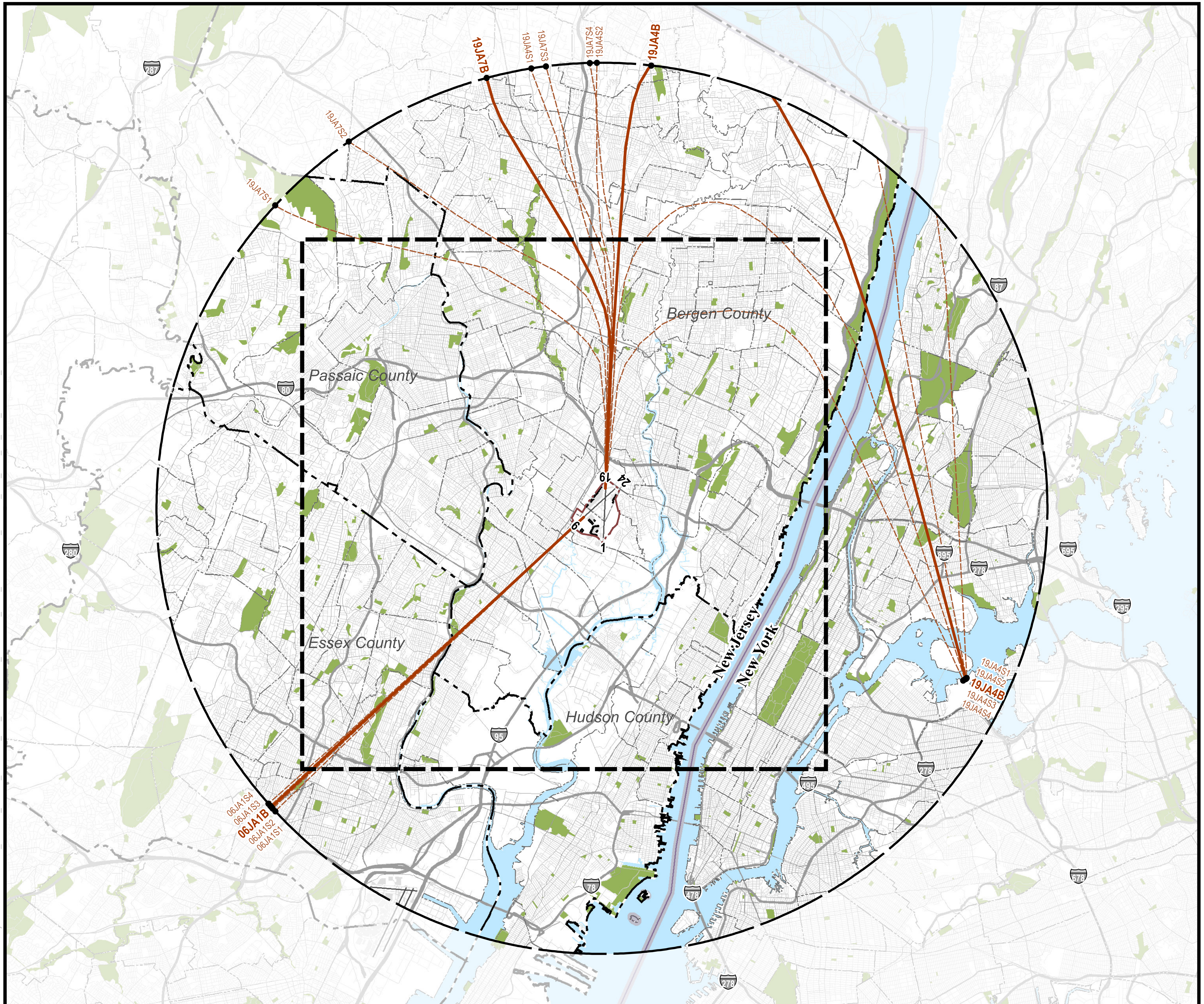

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Teterboro Airport

Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Jet Arrival Model Tracks
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Model Backbone Track (Arrival)
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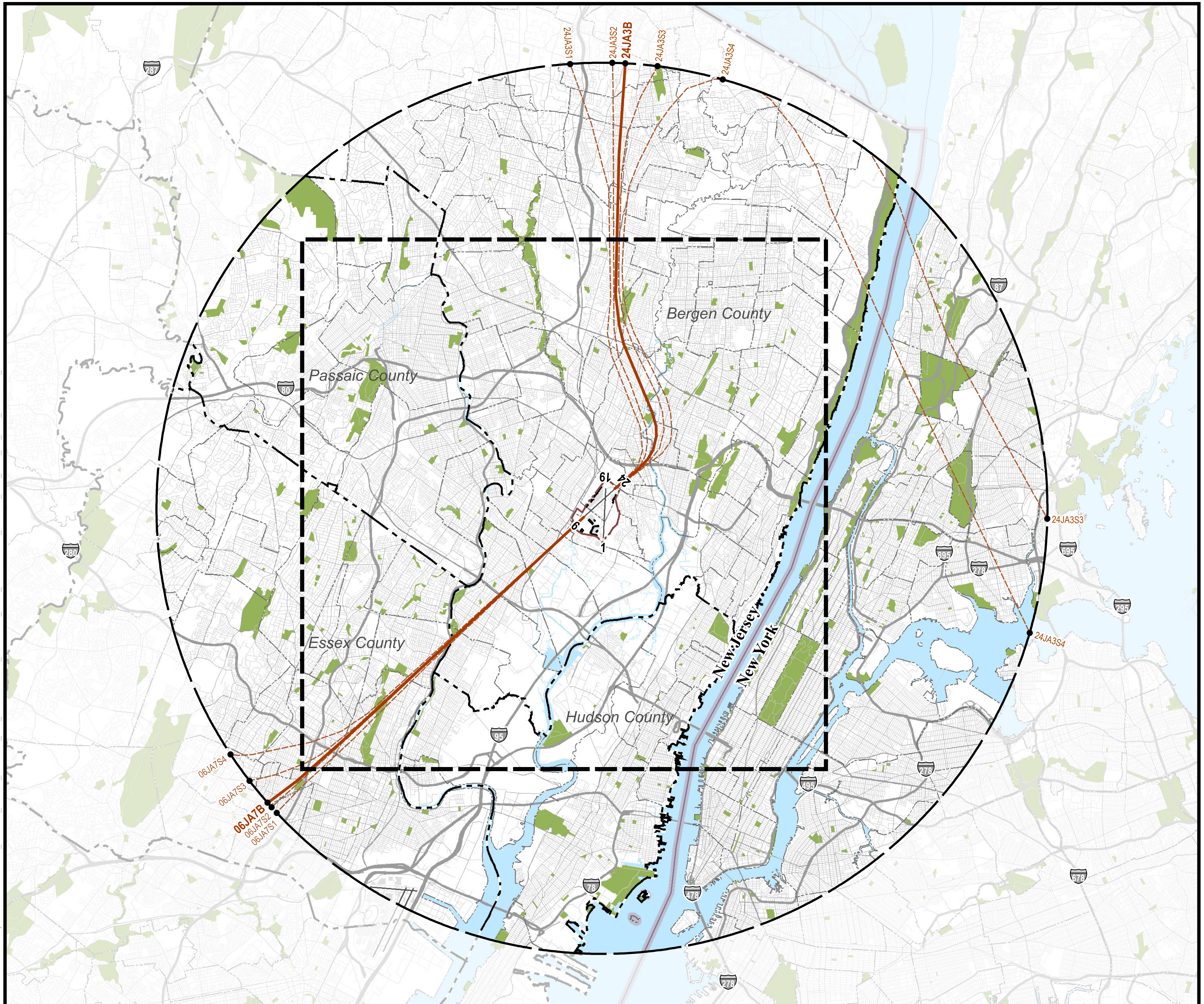

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Airport Noise Compatibility
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Jet Arrival Model Tracks
Sheet 8 of 10

Model Backbone Track (Arrival)
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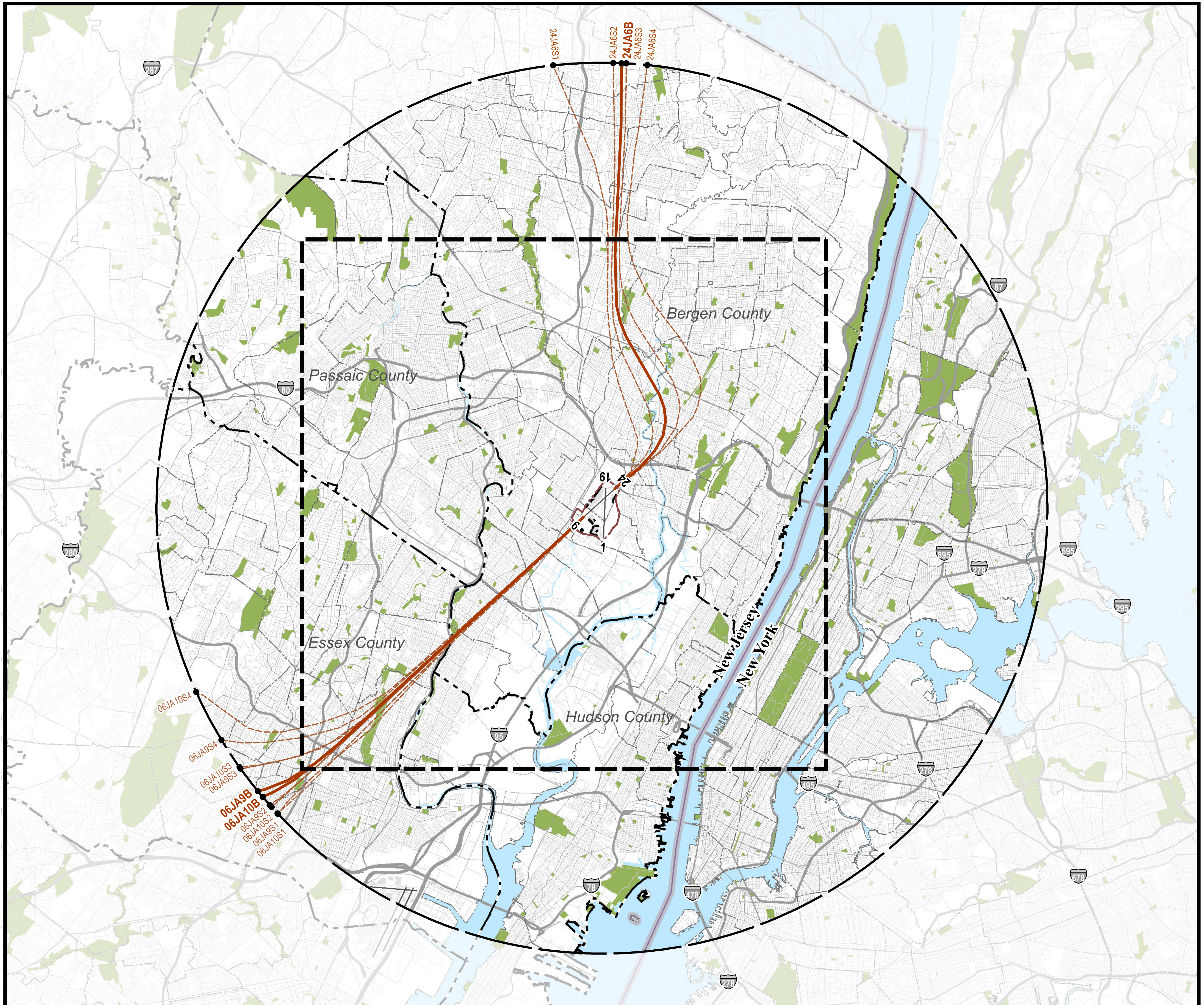
N

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles



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Jet Arrival Model Tracks
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Model Backbone Track (Arrival)
Model Track (Arrival)

19JA2B
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County Boundary
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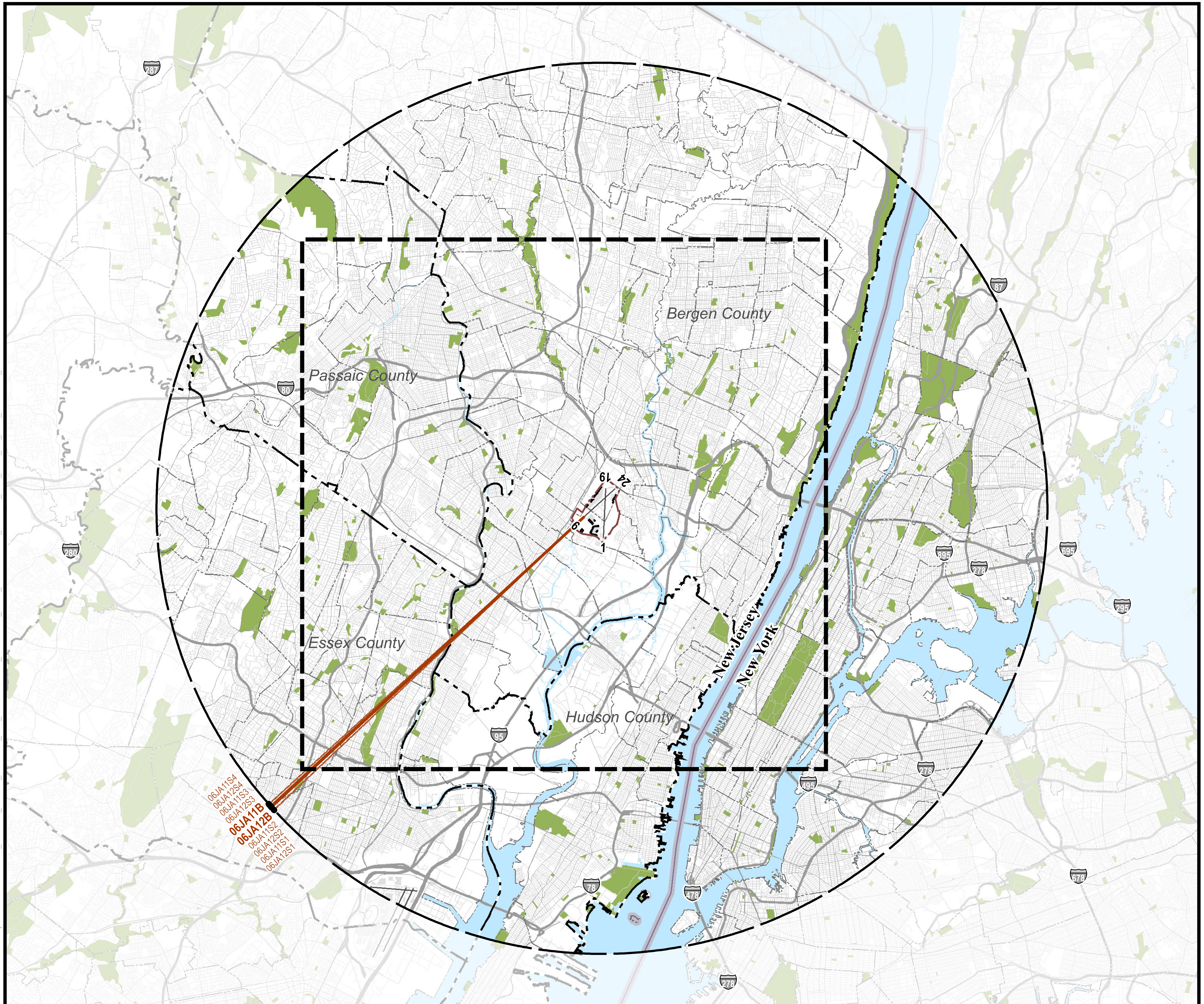
Water
Highway
Minor Roads
Major Roads

N

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles



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Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Jet Arrival Model Tracks
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Model Backbone Track (Arrival)
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Highway
Minor Roads
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0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N

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Teterboro Airport

Airport Noise Compatibility
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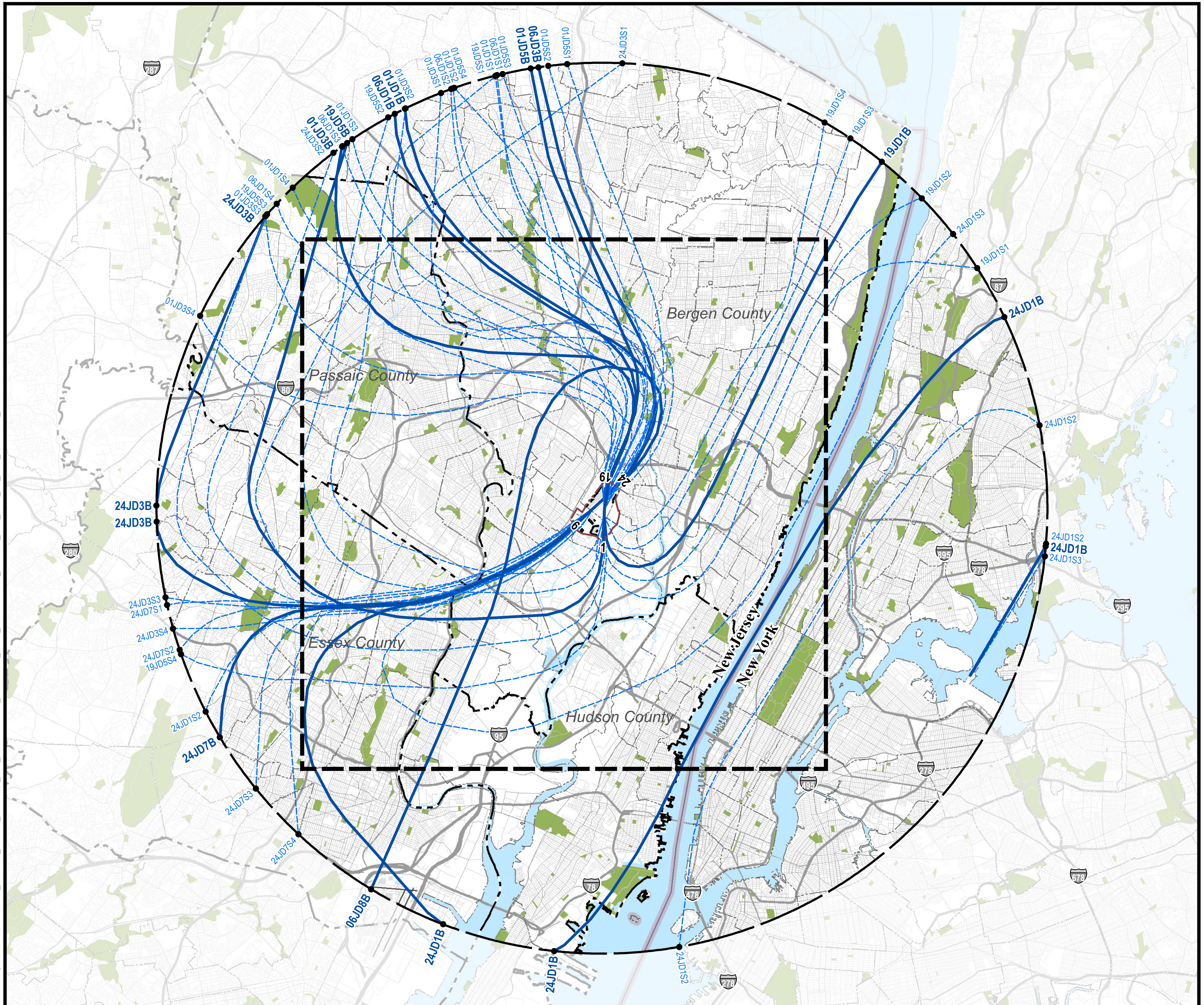
2016 and 2021 Noise Exposure Maps

Jet Departure Model Tracks
Sheet 1 of 5



- Model Backbone Track (Departure)
- Model Track (Departure)

19JD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

- TEB Airport Boundary (Approximate)
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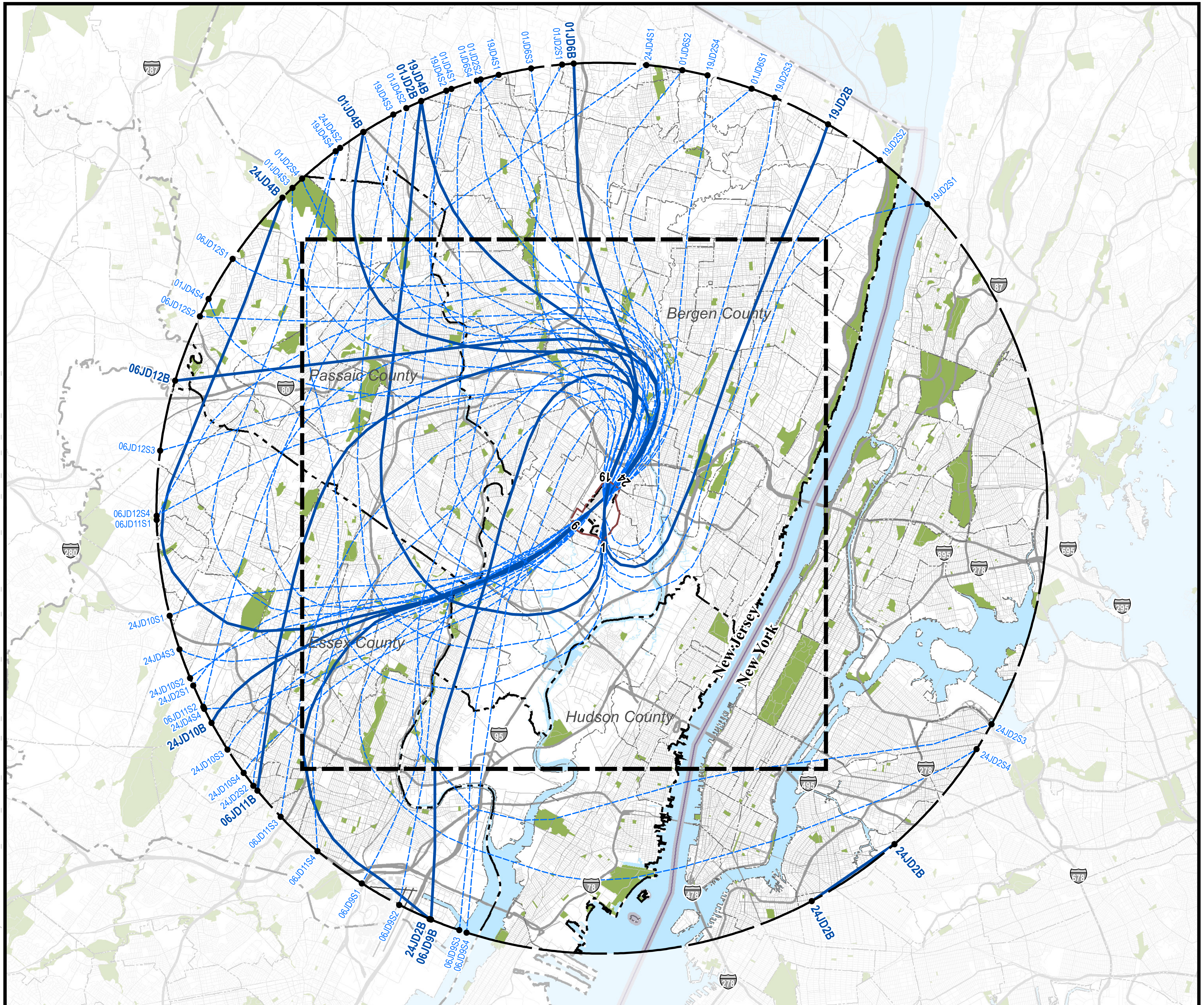
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N



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Airport Noise Compatibility
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Jet Departure Model Tracks
Sheet 2 of 5

Model Backbone Track (Departure)
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N

0 15,000 30,000 Feet

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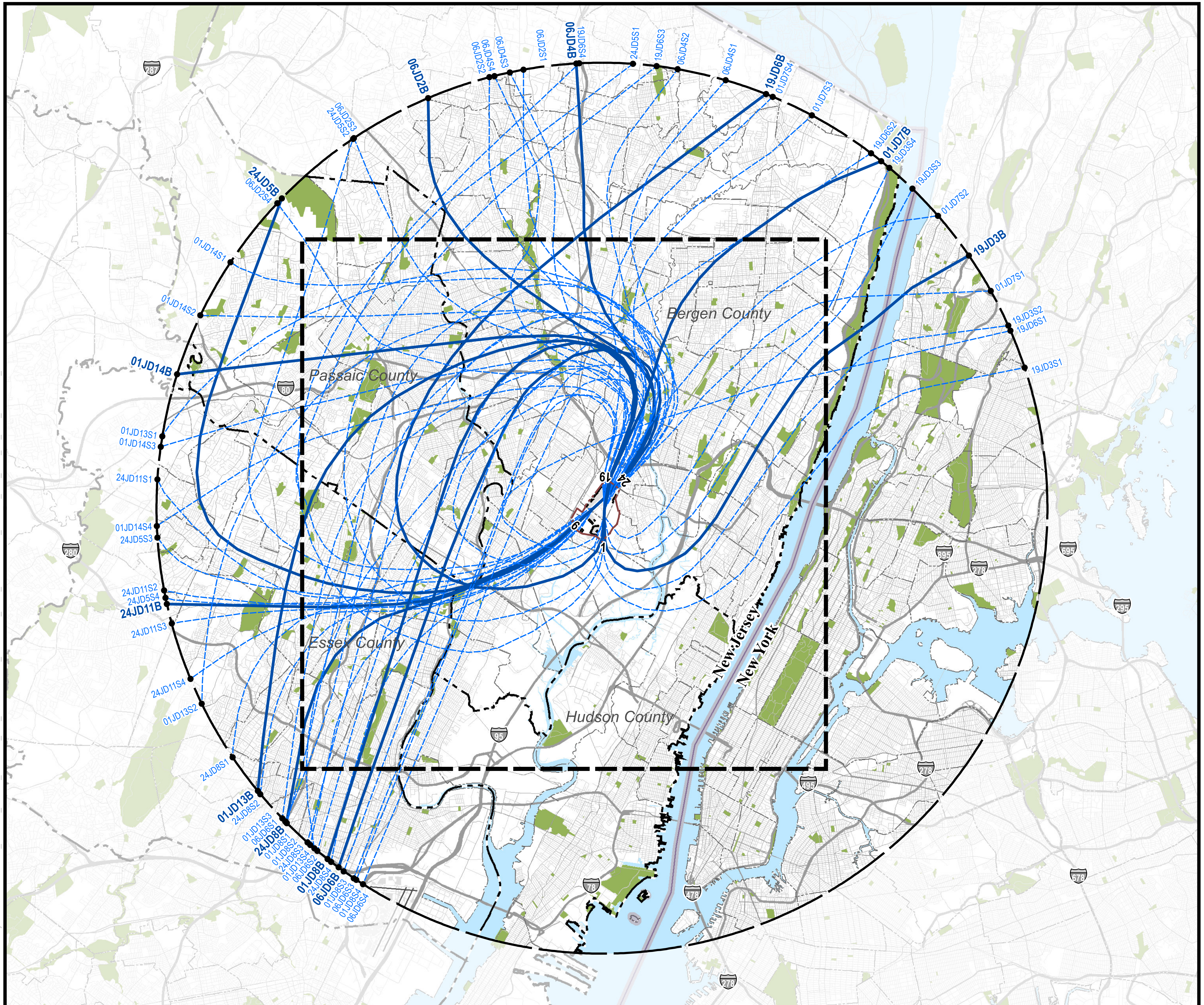

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Teterboro Airport

Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Jet Departure Model Tracks
Sheet 3 of 5

Model Backbone Track (Departure)
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State Boundary
Municipal Boundary
County Boundary
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Water
Highway
Minor Roads
Major Roads

N

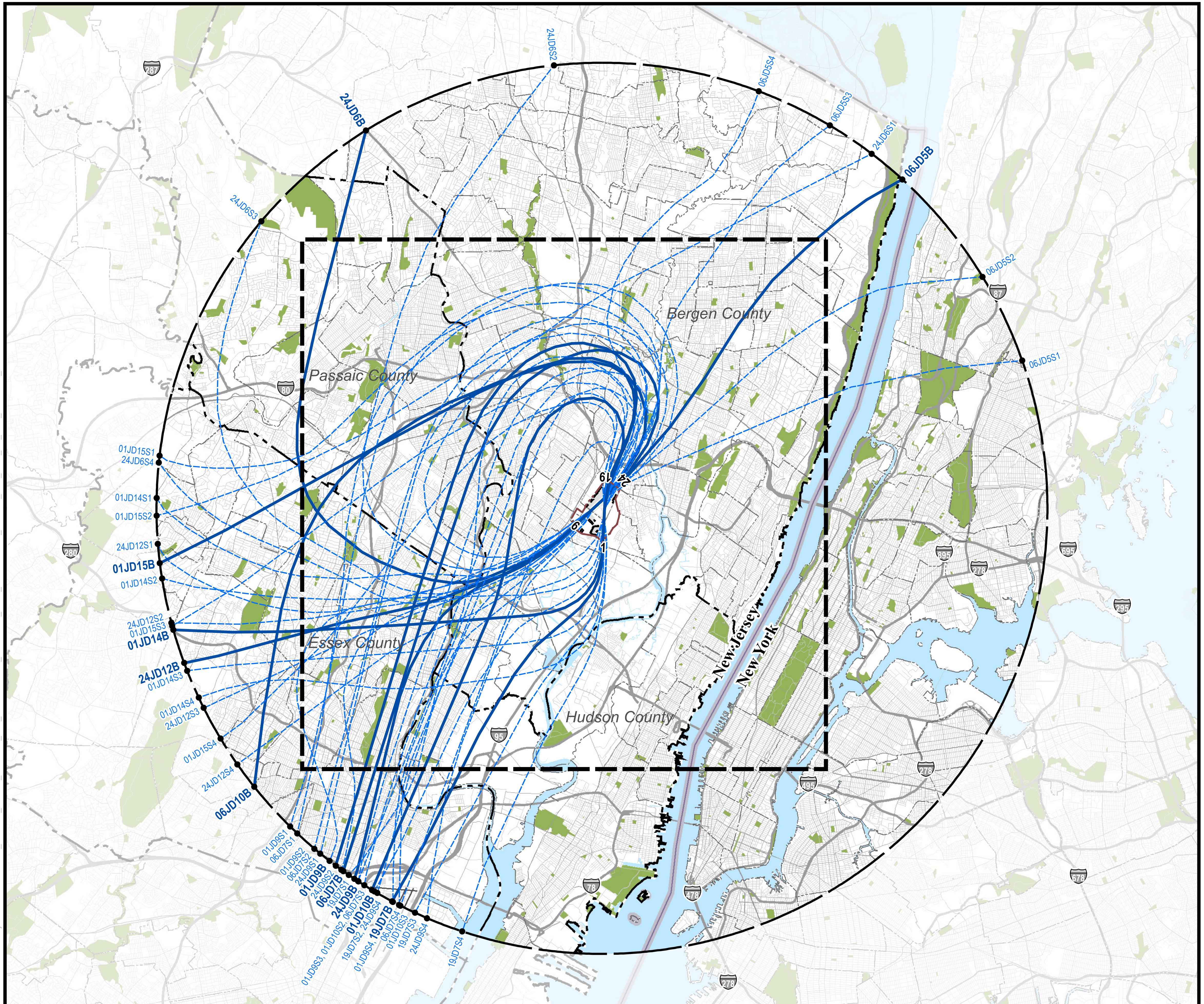
0 15,000 30,000 Feet
0 2.5 5 Nautical Miles

THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Jet Departure Model Tracks
Sheet 4 of 5



Model Backbone Track (Departure)
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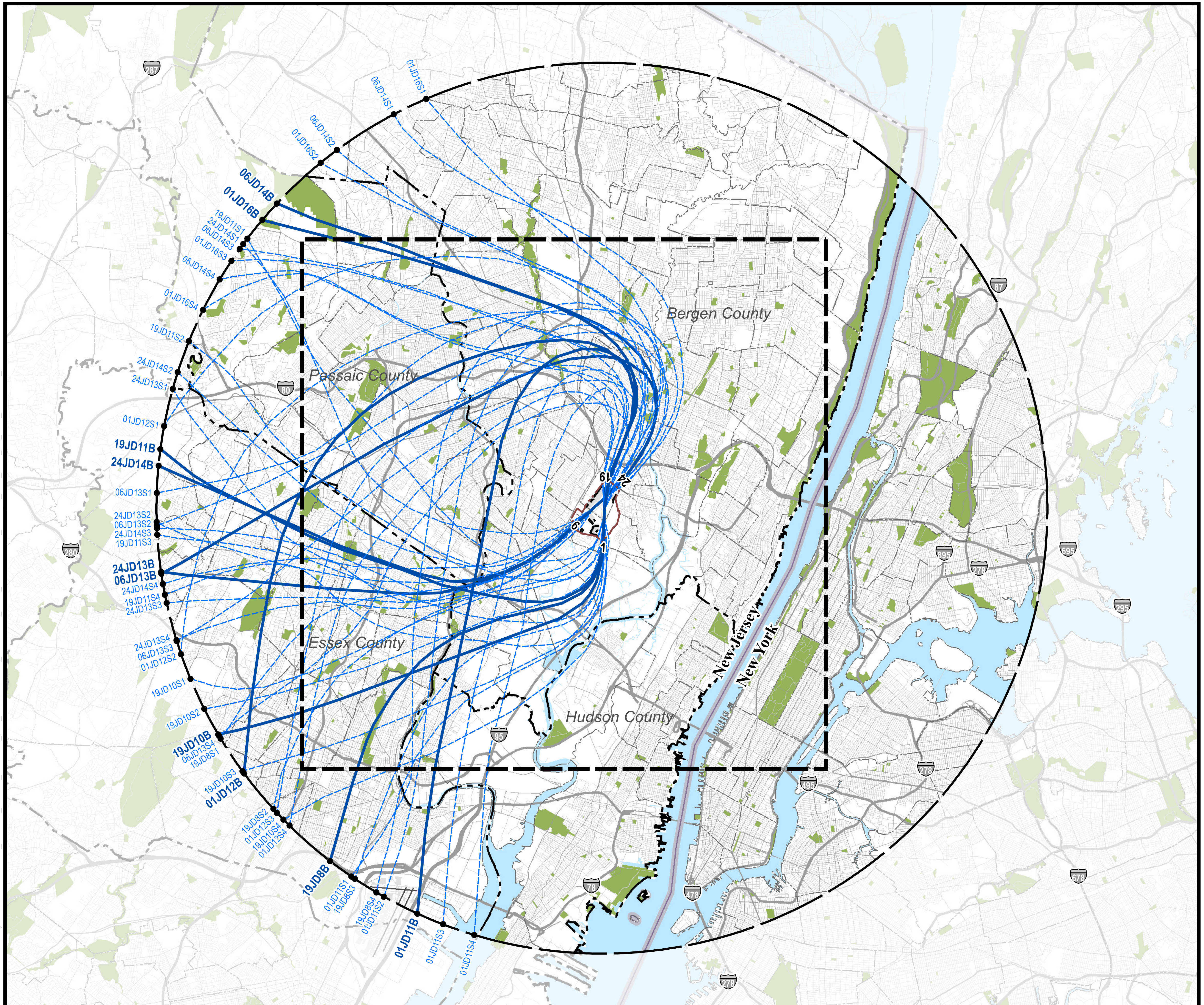
Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Jet Departure Model Tracks
Sheet 5 of 5



Model Backbone Track (Departure)
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Teterboro Airport

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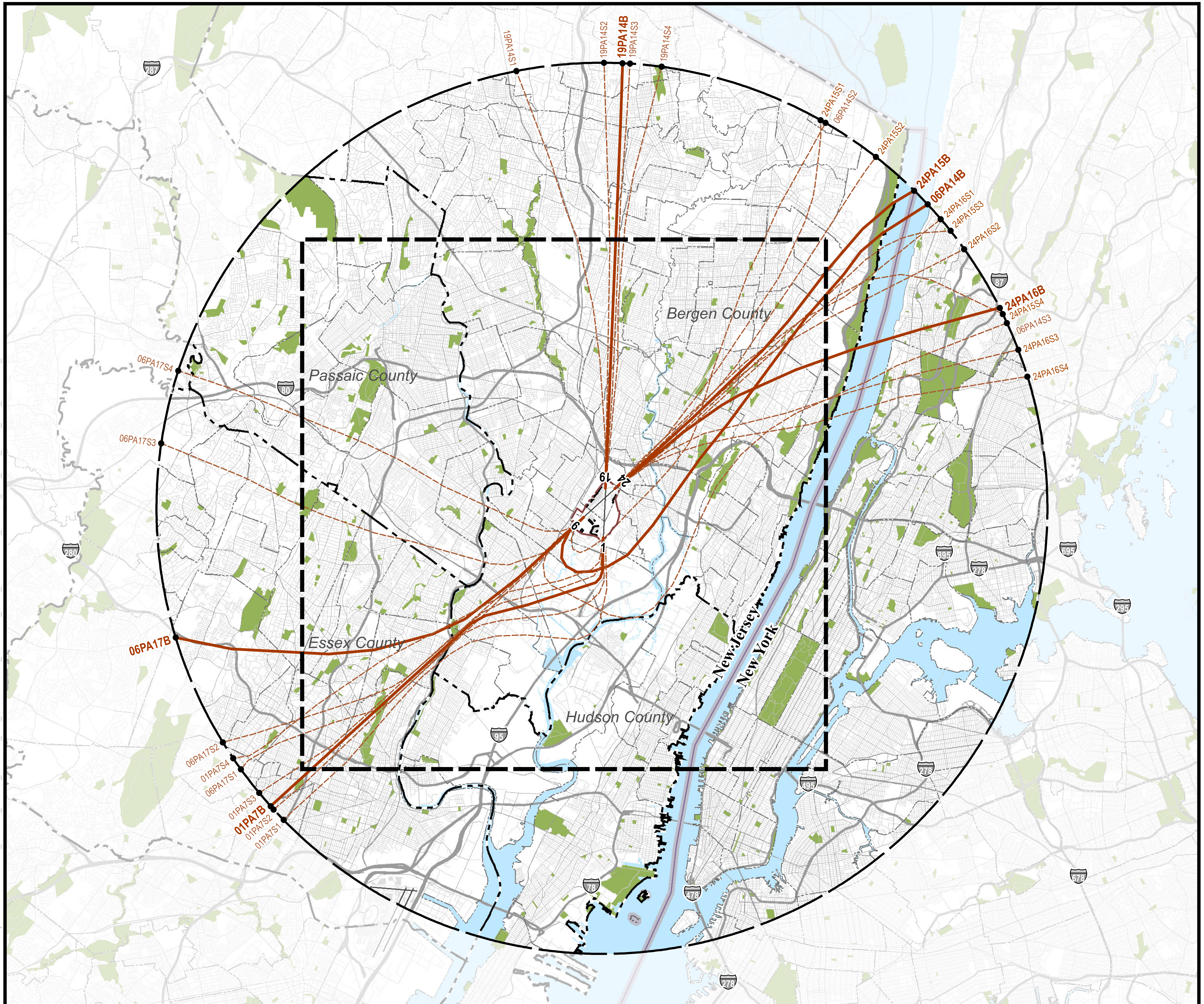
Part 150 Study
2016 and 2021 Noise Exposure Maps

Piston Arrival Model Tracks
Sheet 1 of 6



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0 15,000 30,000 Feet

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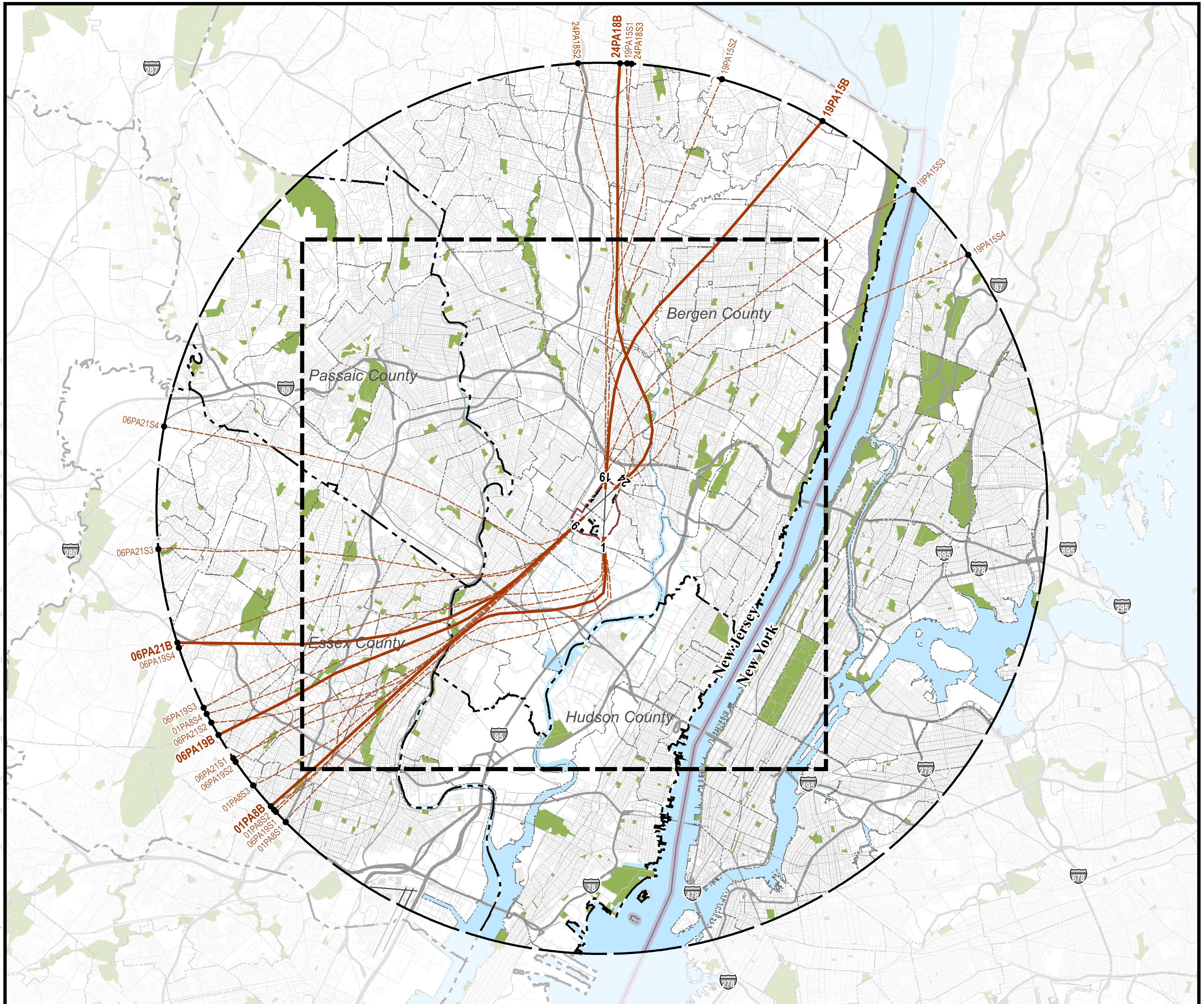

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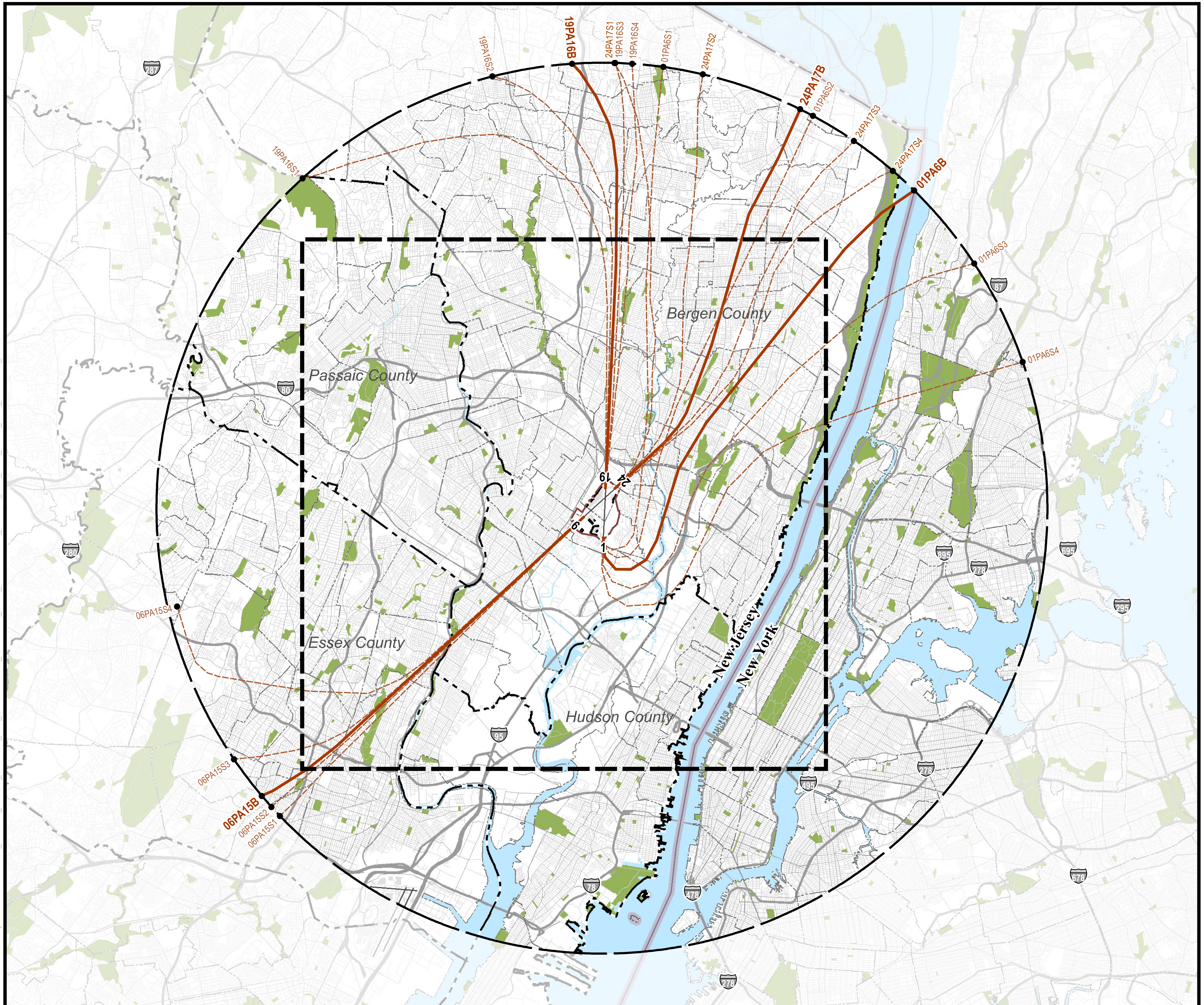

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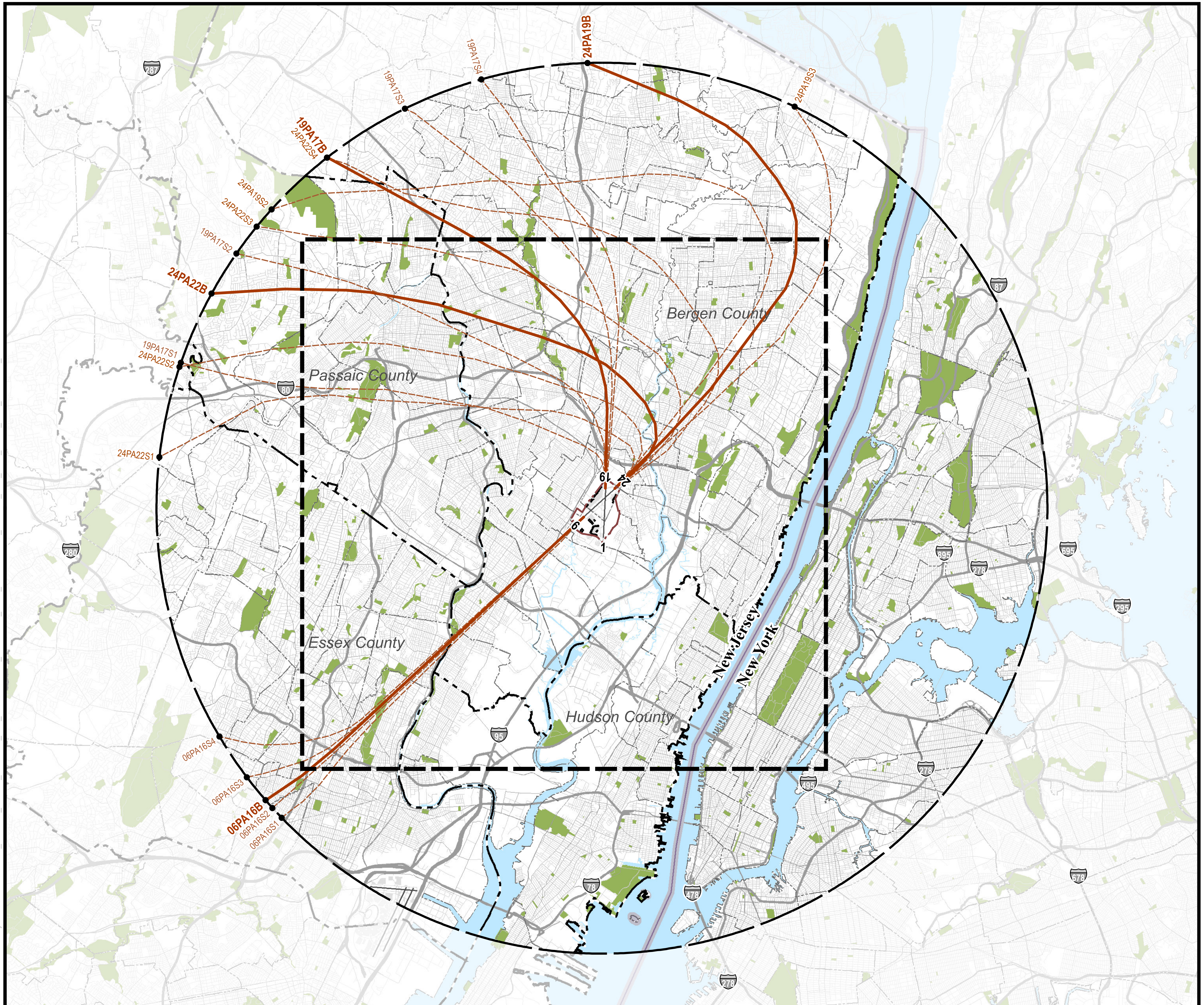

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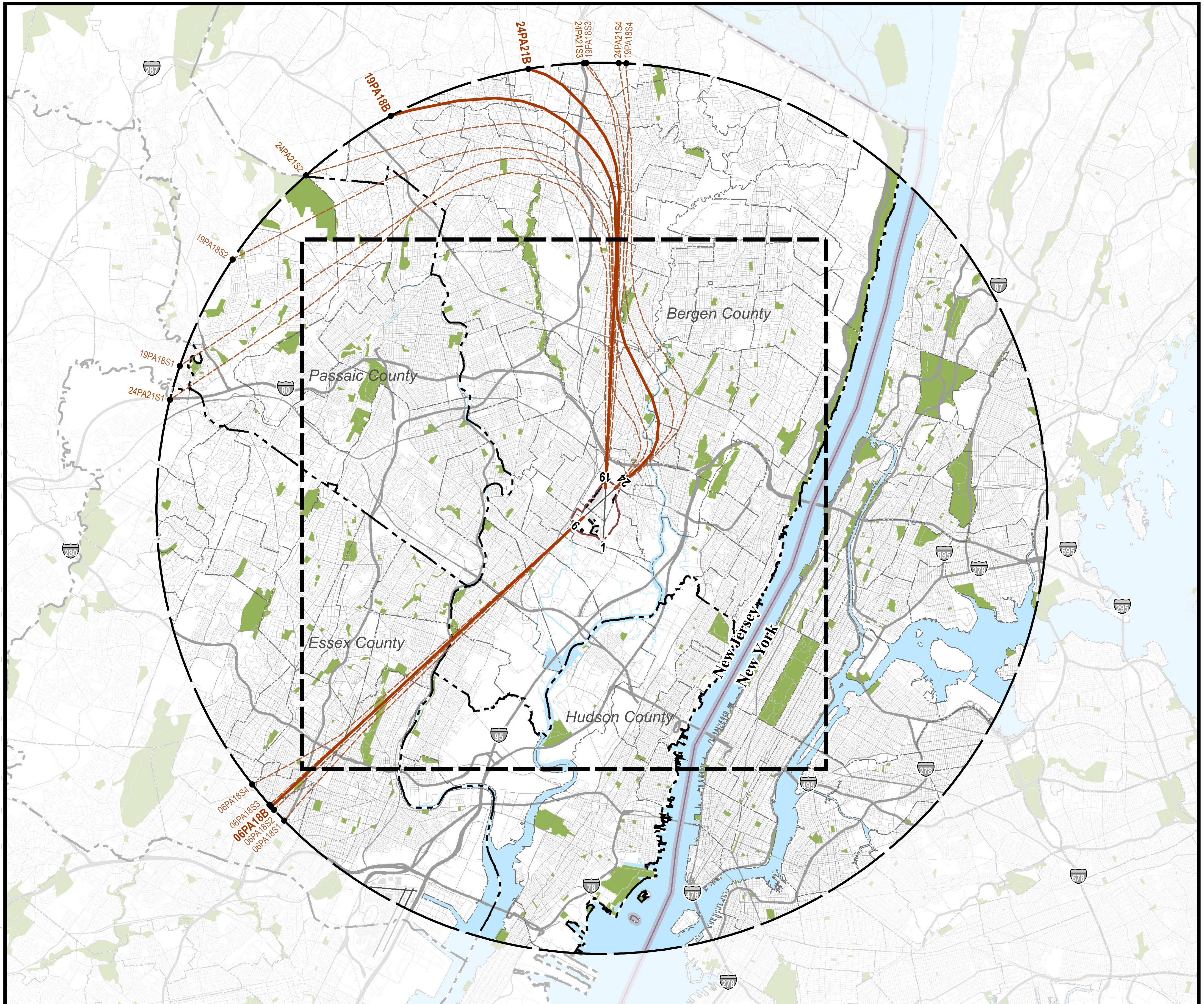

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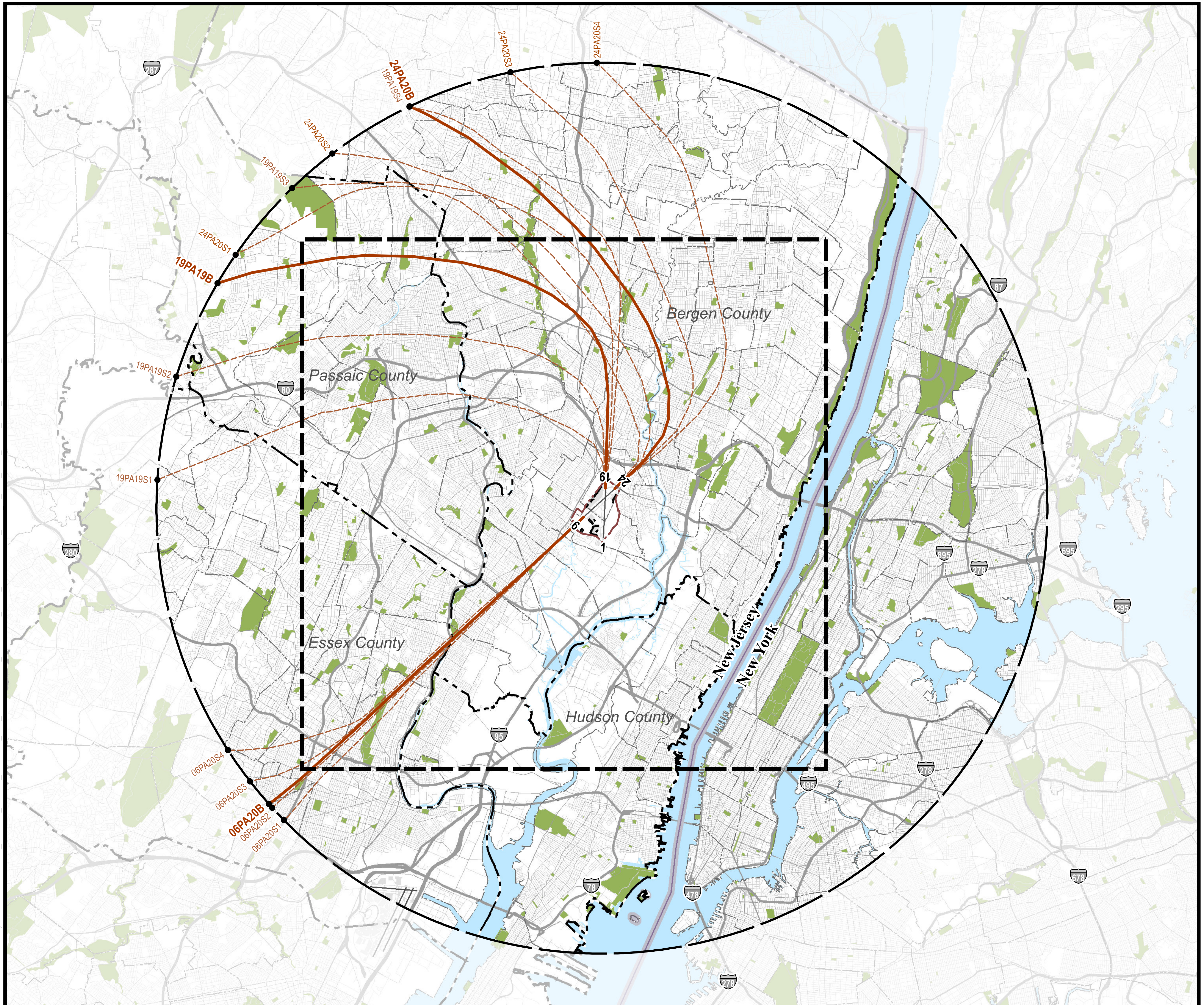

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Airport Noise Compatibility
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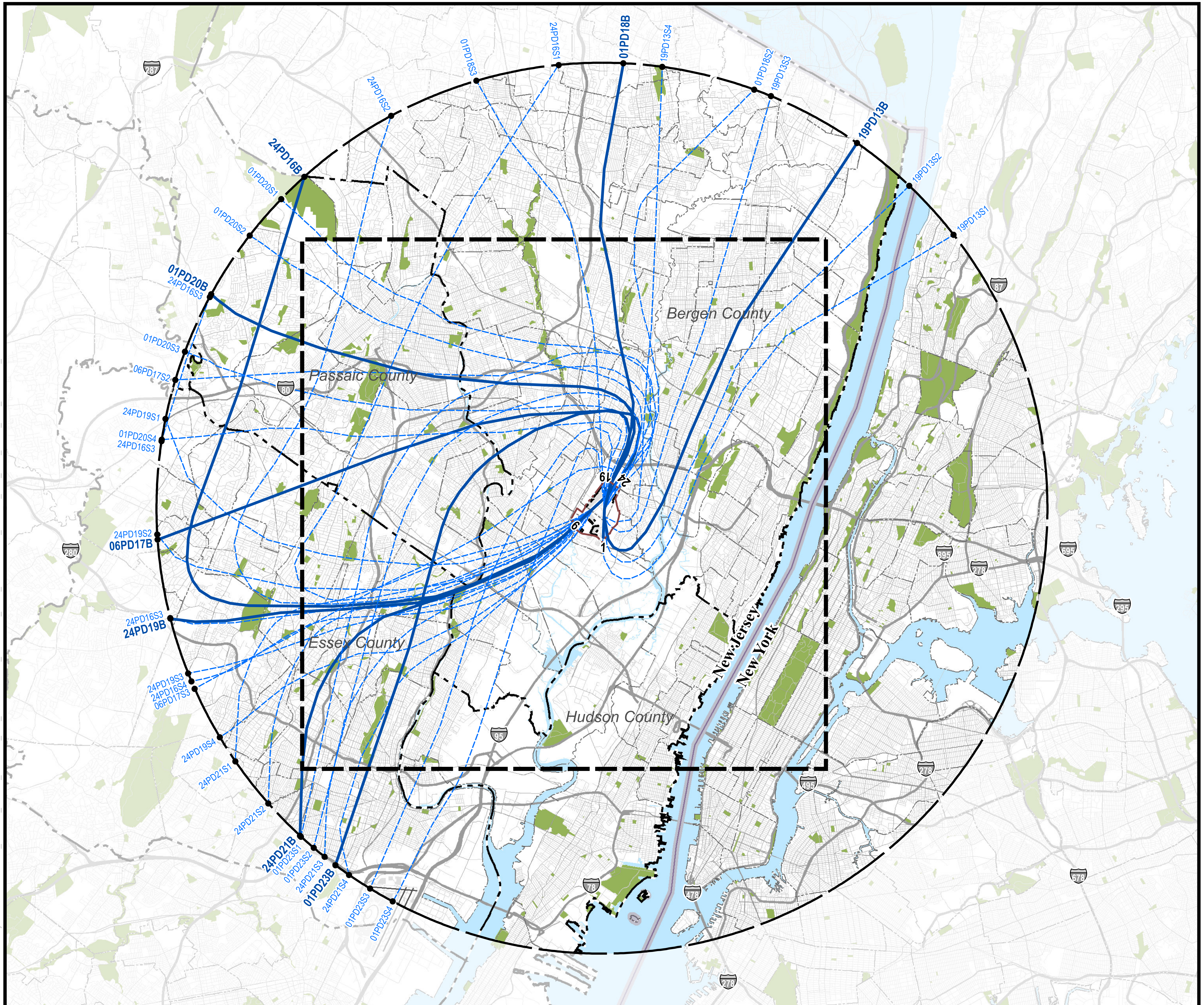
Piston Departure Model Tracks
Sheet 1 of 5



Model Backbone Track (Departure)
Model Track (Departure)

19PD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N

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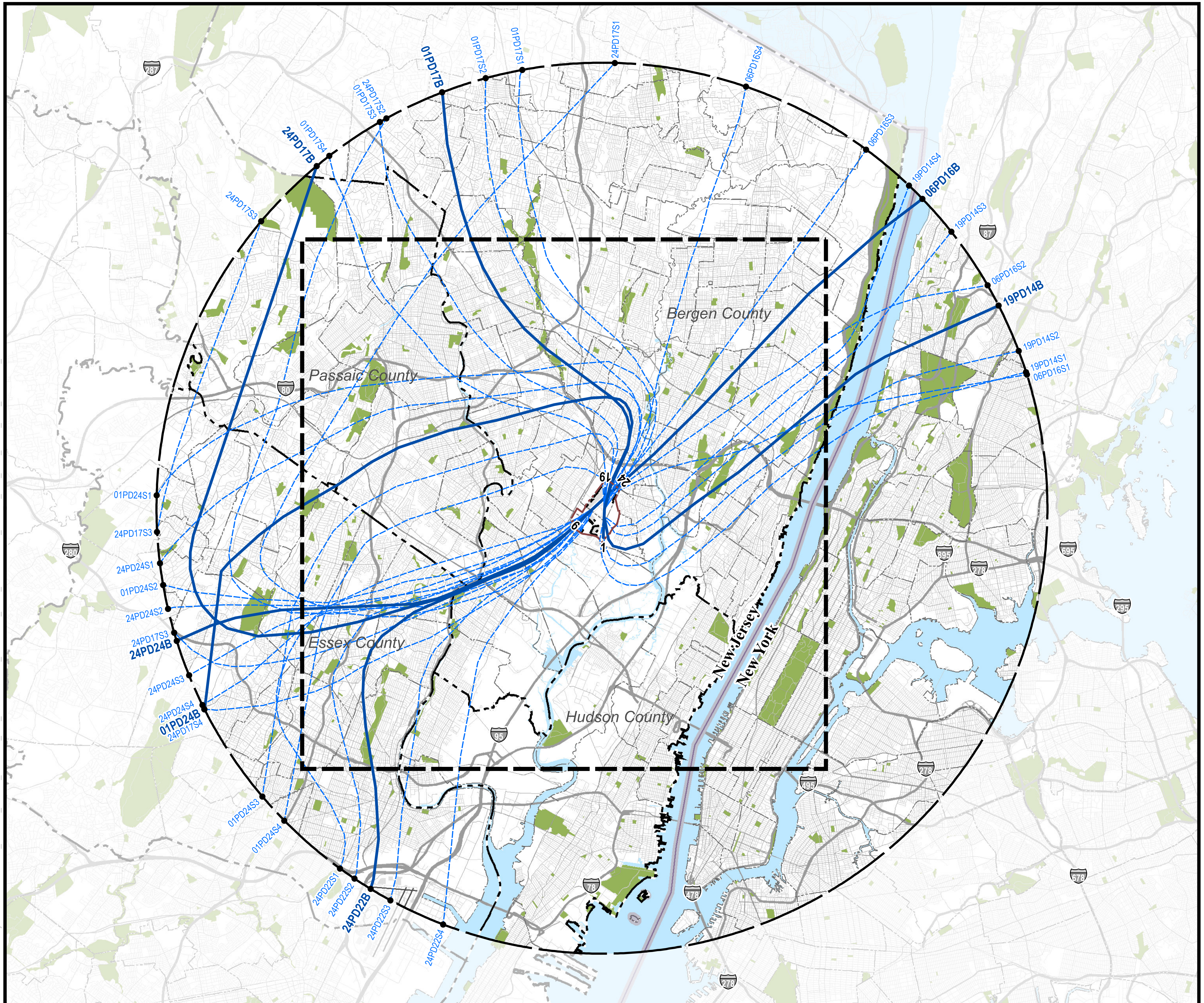
Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Piston Departure Model Tracks
Sheet 2 of 5



Model Backbone Track (Departure)
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19PD2B
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Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N

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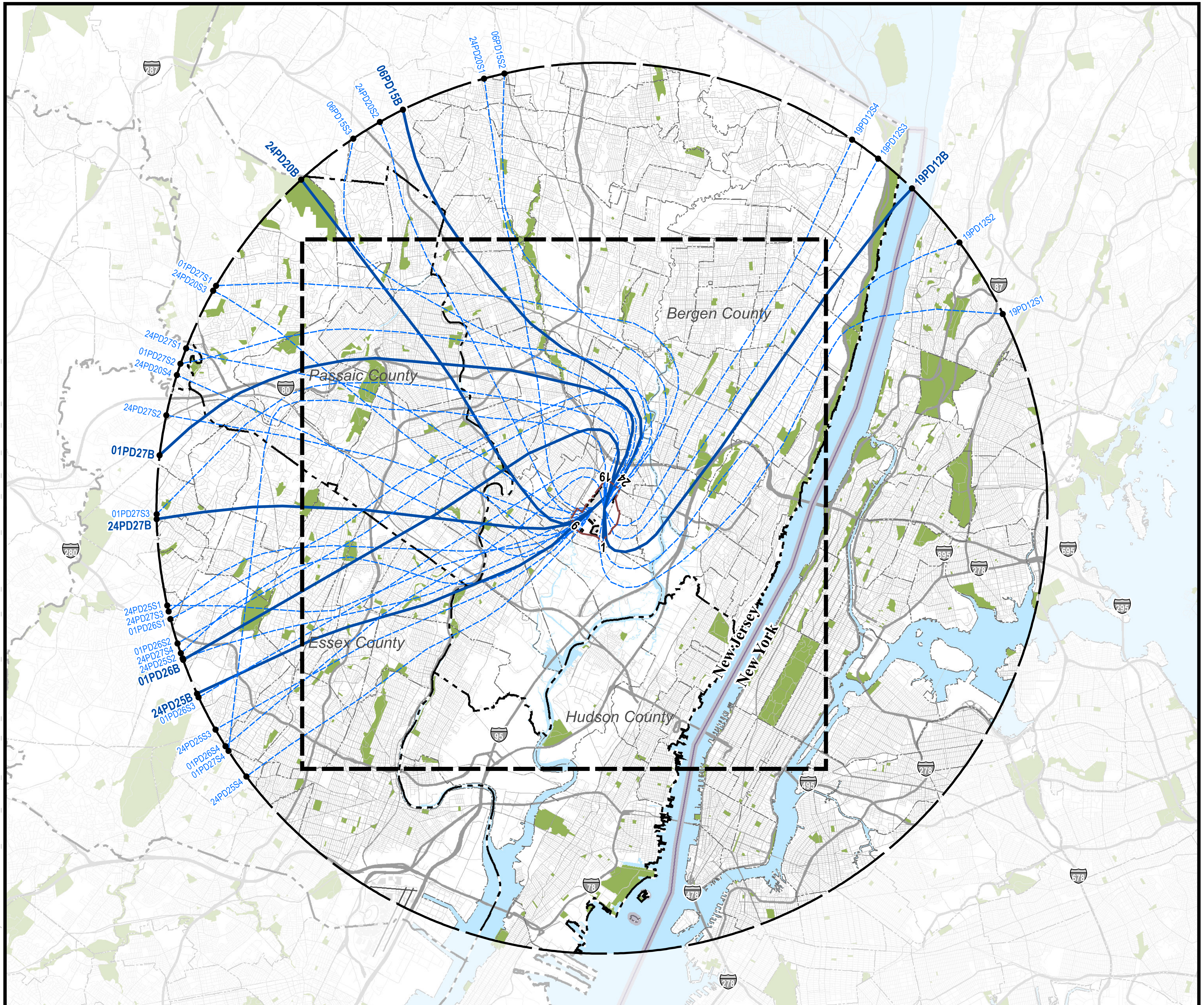
Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Piston Departure Model Tracks
Sheet 3 of 5



- Model Backbone Track (Departure)
- Model Track (Departure)

19PD2B
- Unique Model Track ID
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- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
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- TEB Study Area
- Model Track Boundary
- Runway
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

N

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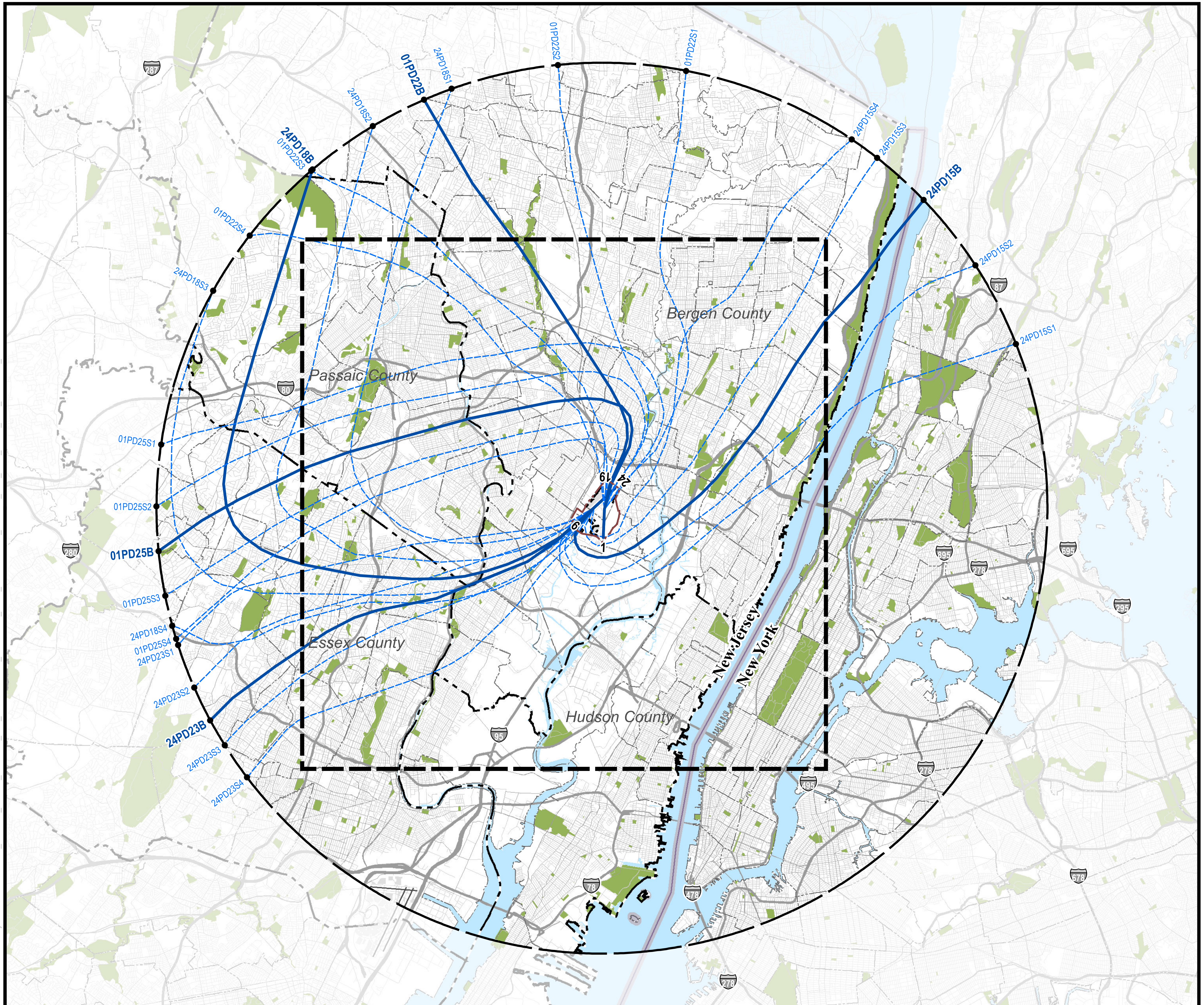
Piston Departure Model Tracks
Sheet 4 of 5



Model Backbone Track (Departure)
Model Track (Departure)

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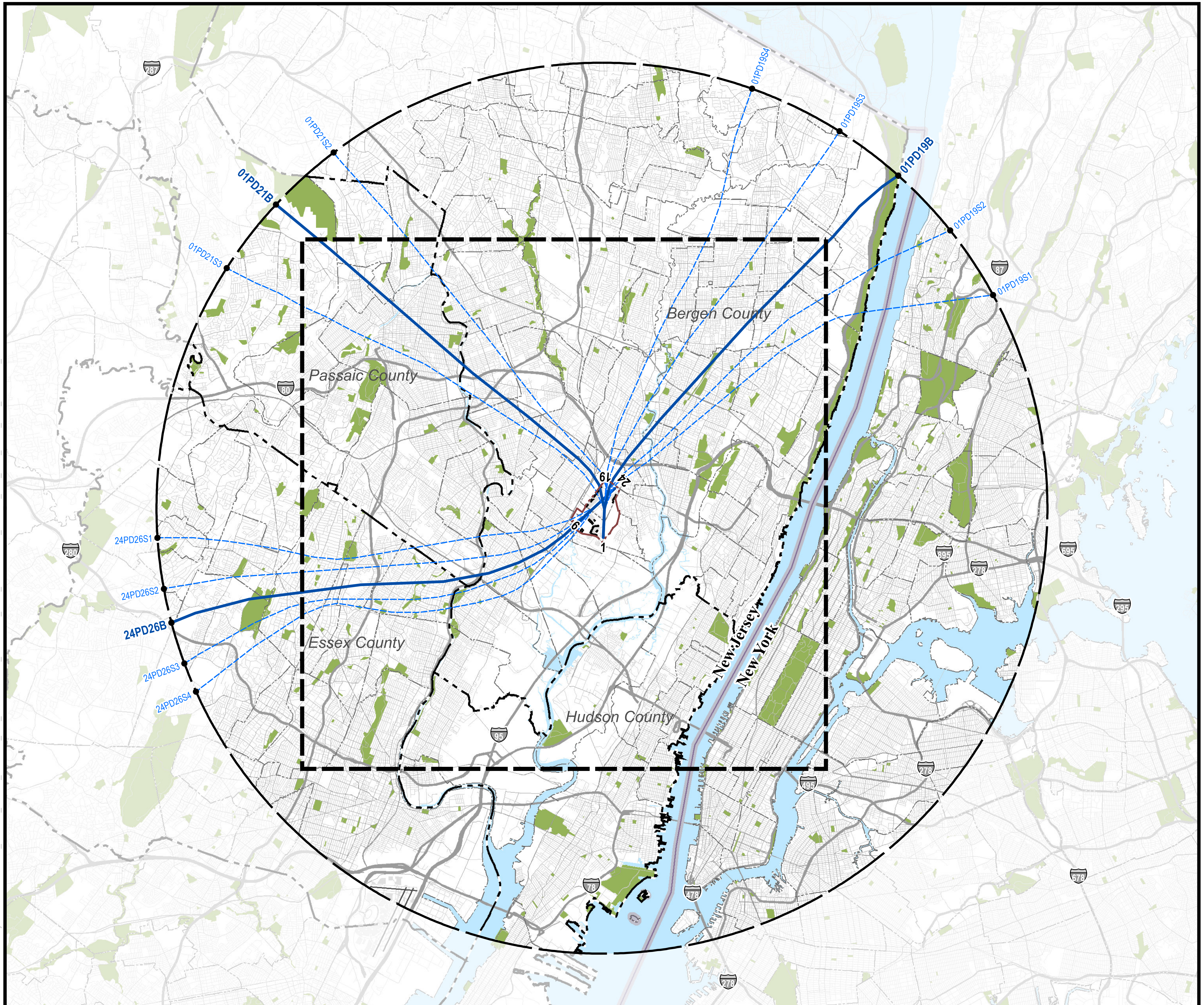
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles



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Airport Noise Compatibility
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Piston Departure Model Tracks
Sheet 5 of 5

Model Backbone Track (Departure)
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Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
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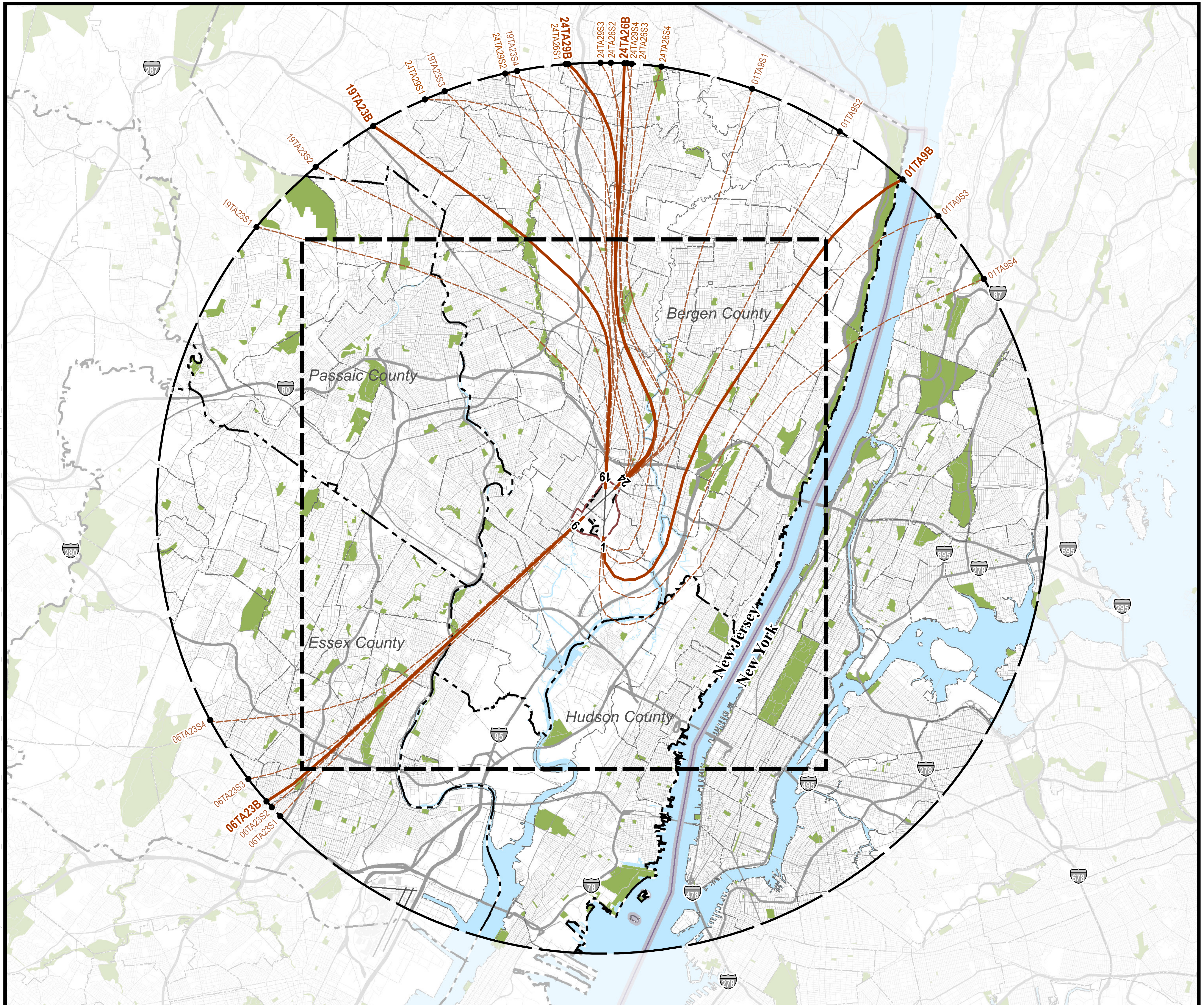

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Teterboro Airport

Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Turboprop Arrival Model Tracks
Sheet 1 of 5

Model Backbone Track (Arrival)
Model Track (Arrival)

19TA2B
- Unique Model Track ID
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- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)
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Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles

N

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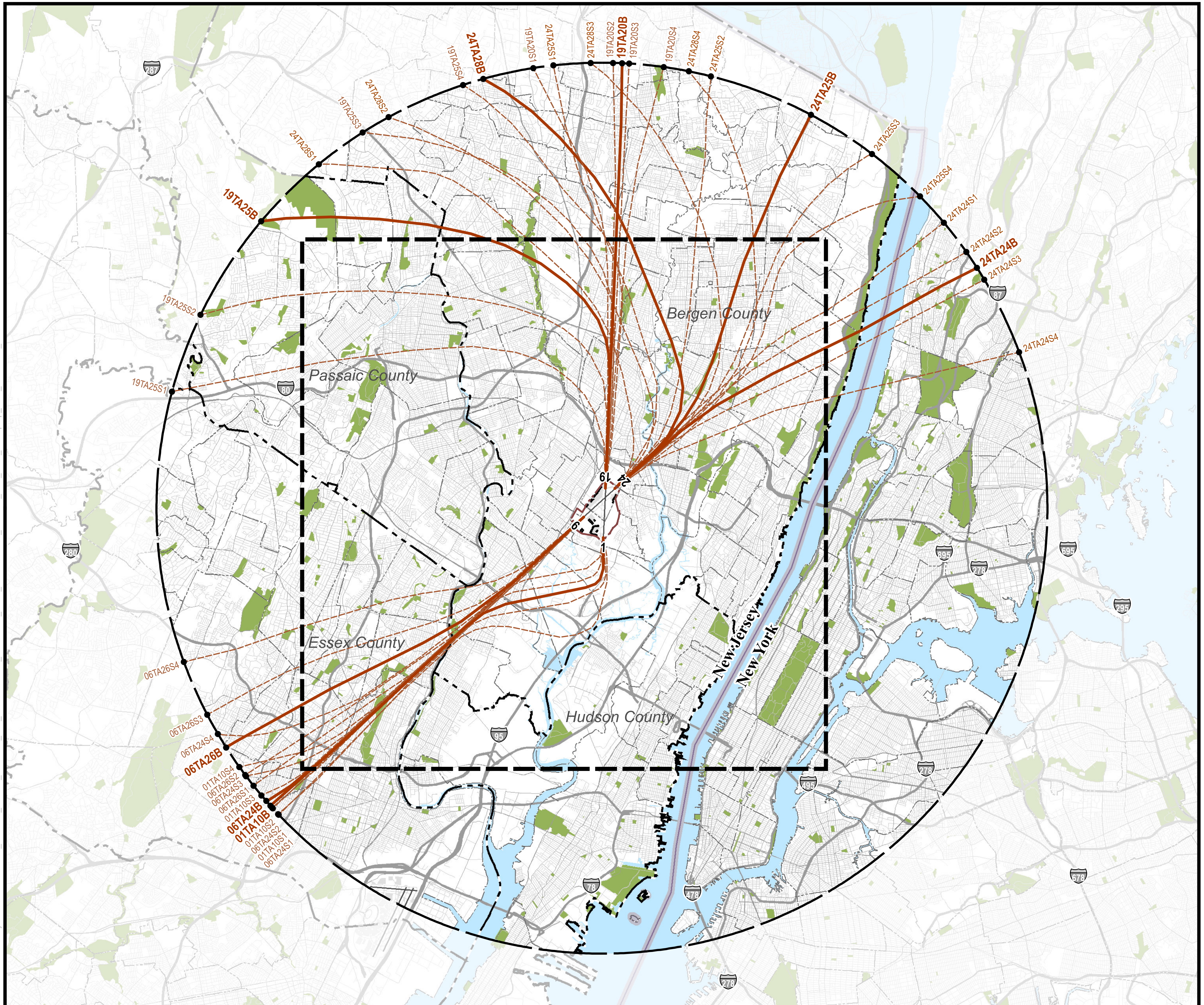
Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Turboprop Arrival Model Tracks
Sheet 2 of 5



Model Backbone Track (Arrival)
Model Track (Arrival)

19TA2B
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- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
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Municipal Boundary
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Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

N

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Teterboro Airport

Airport Noise Compatibility
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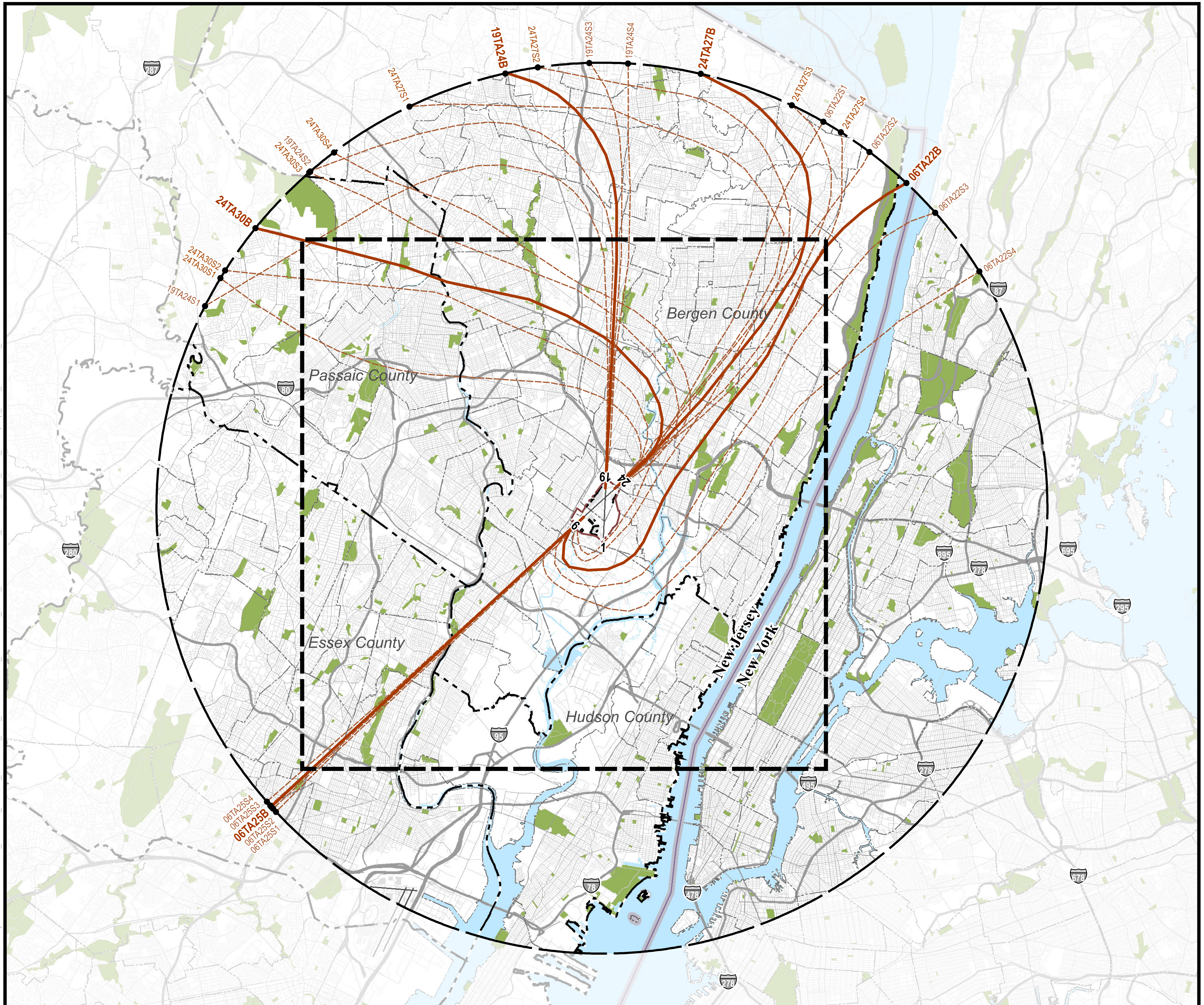
2016 and 2021 Noise Exposure Maps

Turboprop Arrival Model Tracks
Sheet 3 of 5



Model Backbone Track (Arrival)
Model Track (Arrival)

19TA2B
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State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

N

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles

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Airport Noise Compatibility
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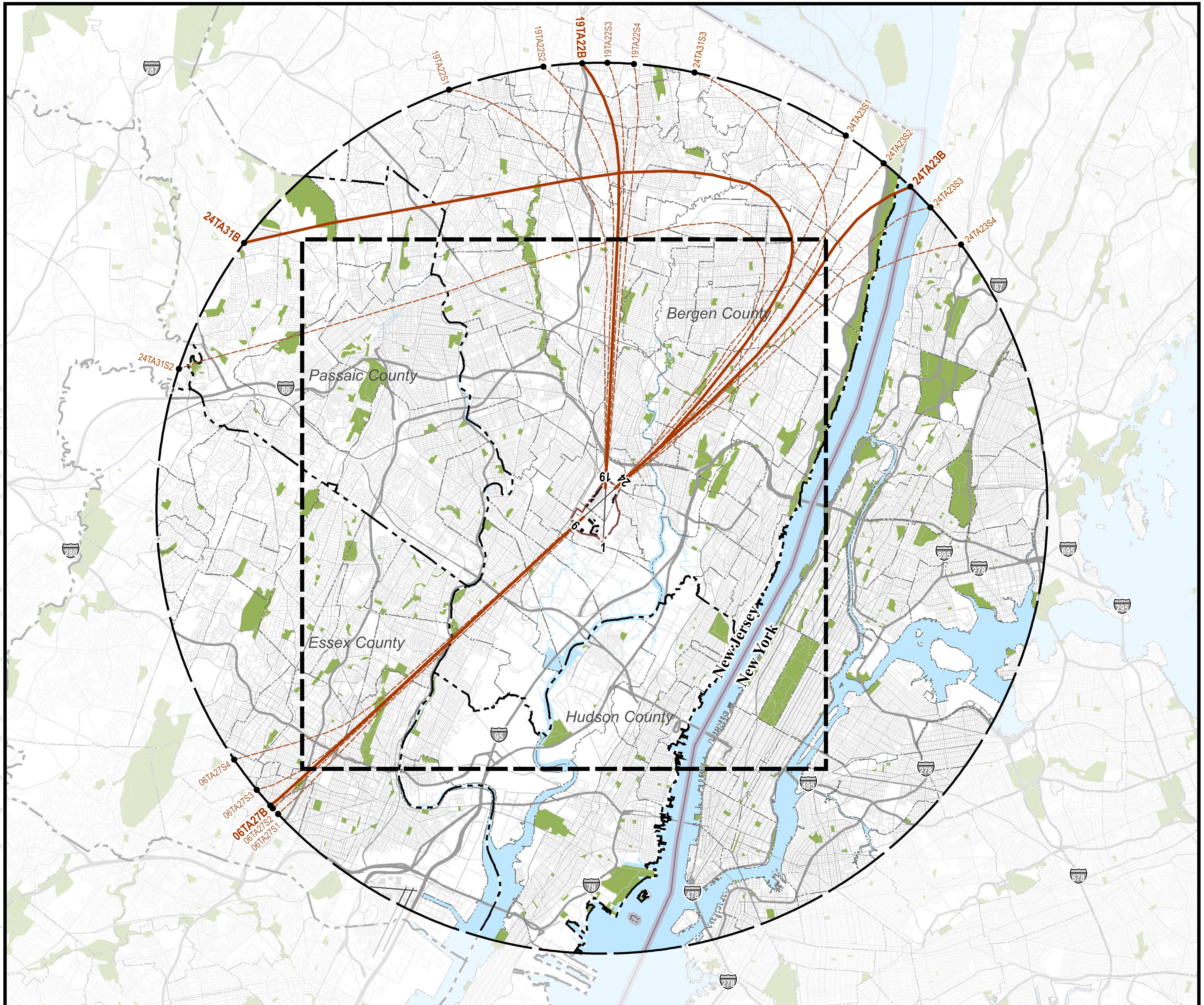
Turboprop Arrival Model Tracks
Sheet 4 of 5



Model Backbone Track (Arrival)
Model Track (Arrival)

19TA2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N

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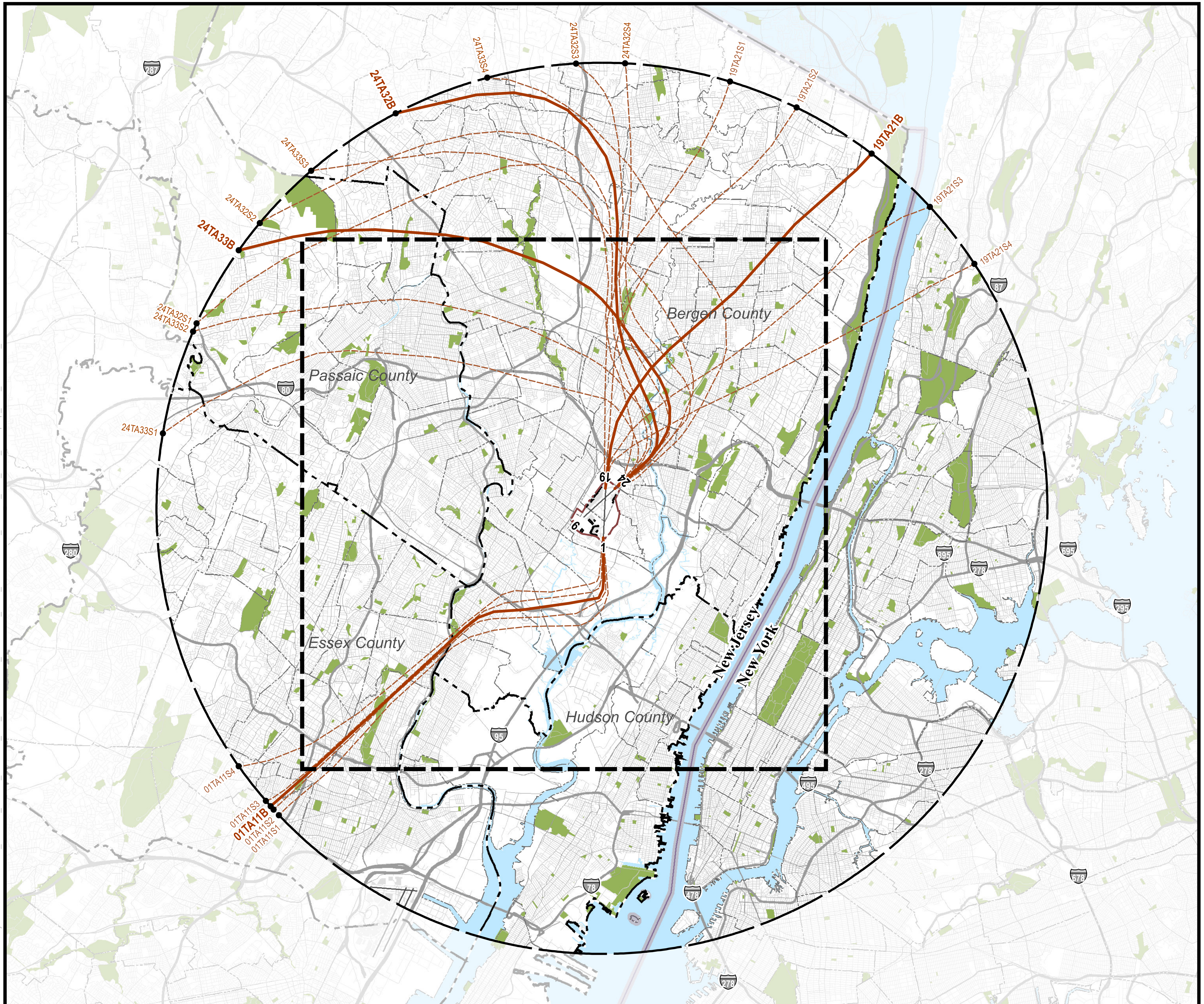

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Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Turboprop Arrival Model Tracks
Sheet 5 of 5

Model Backbone Track (Arrival)

Model Track (Arrival)

19TA2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)

TEB Study Area

Model Track Boundary

Runway

State Boundary

Municipal Boundary

County Boundary

Park / Open Space

Water

Highway

Minor Roads

Major Roads

N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

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Teterboro Airport

Airport Noise Compatibility
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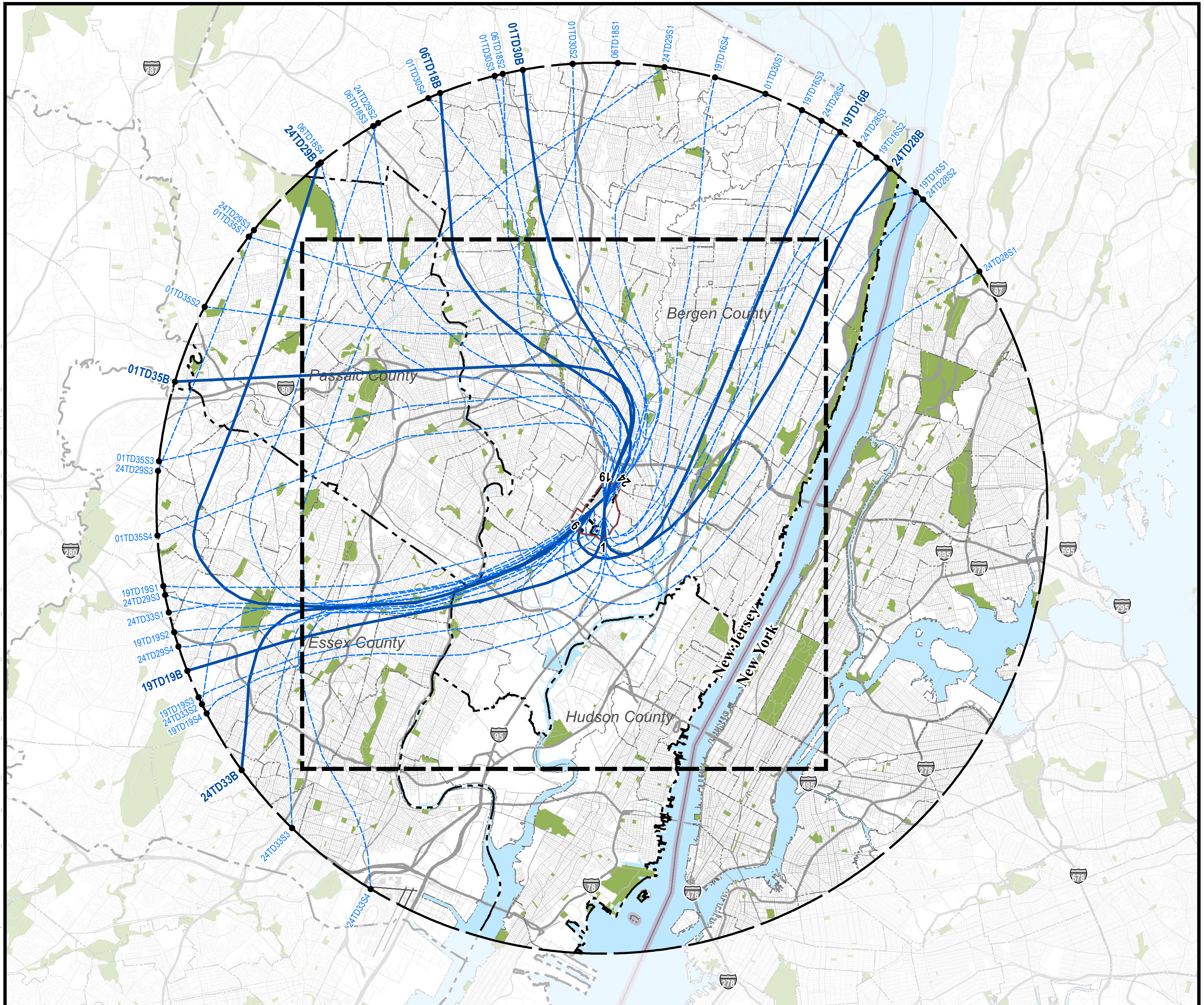
Turboprop Departure Model Tracks
Sheet 1 of 5



Model Backbone Track (Departure)
Model Track (Departure)

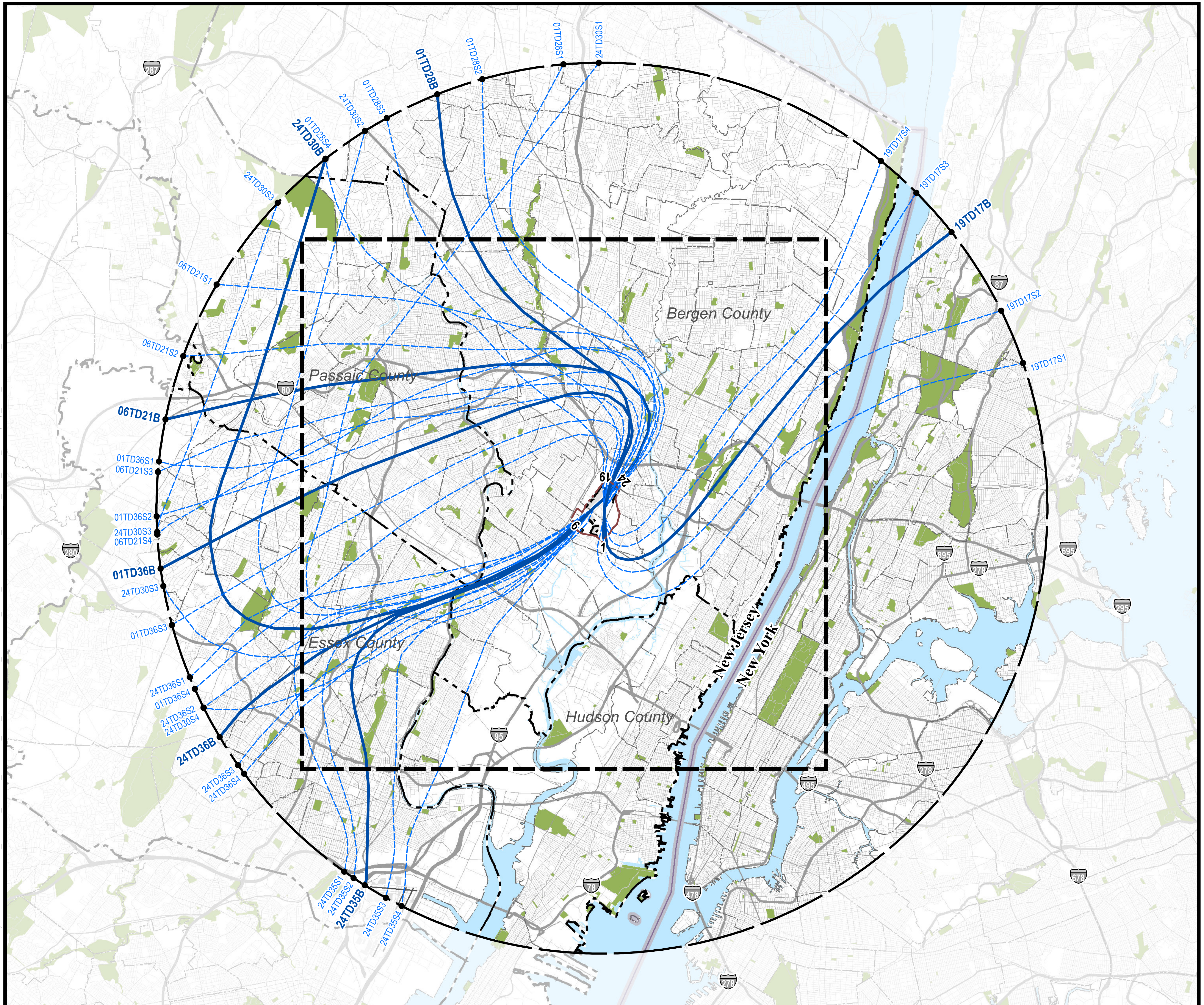
19TD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles



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Airport Noise Compatibility
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2016 and 2021 Noise Exposure Maps

Turboprop Departure Model Tracks
Sheet 2 of 5

Model Backbone Track (Departure)

Model Track (Departure)

19TD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)

TEB Study Area

Model Track Boundary

Runway

State Boundary | Municipal Boundary

County Boundary

Park / Open Space | Water

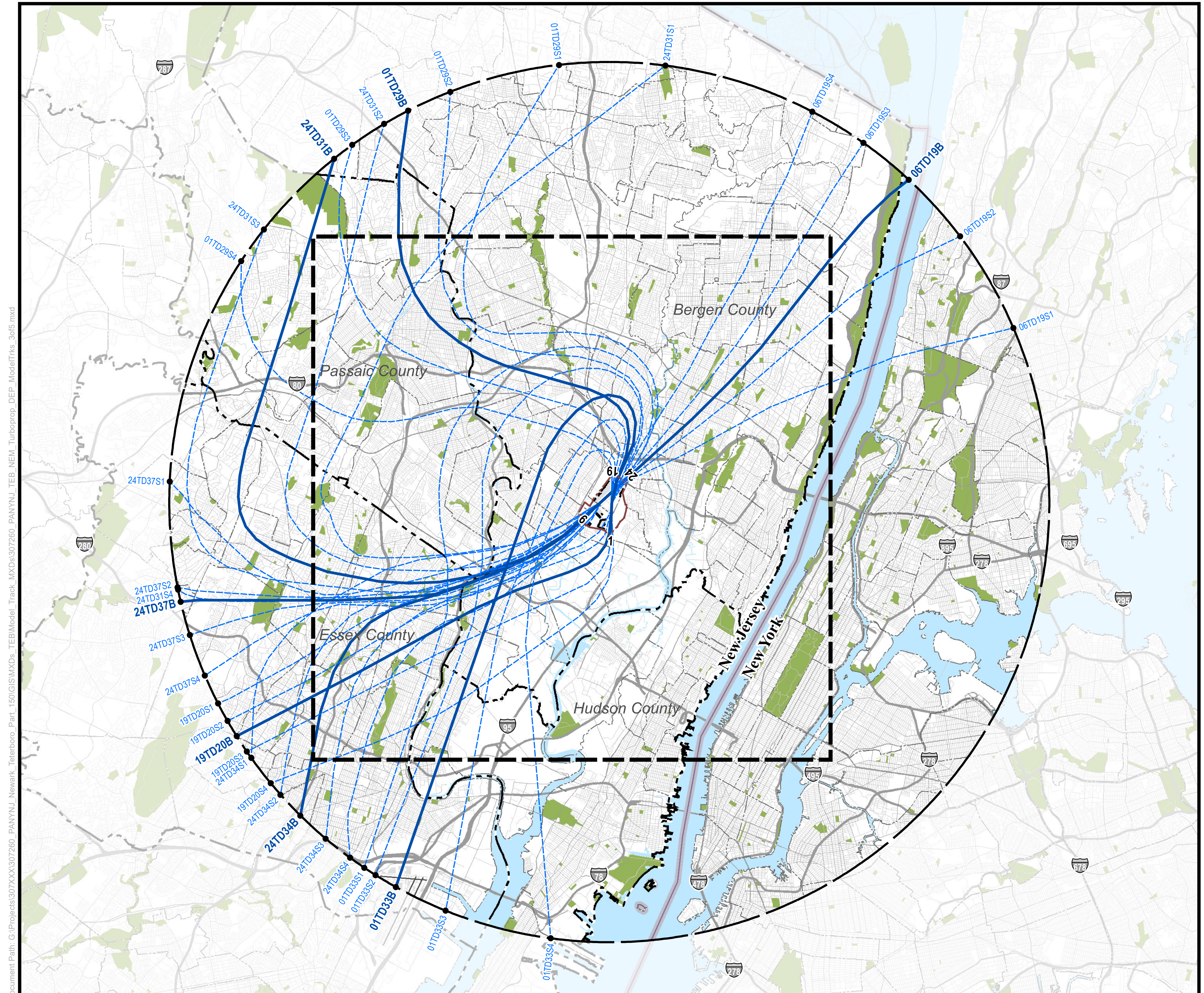
Highway | Minor Roads

Major Roads

N

0 | 15,000 | 30,000 Feet

0 | 2.5 | 5 Nautical Miles



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2016 and 2021 Noise Exposure Maps

Turboprop Departure Model Tracks
Sheet 3 of 5

Model Backbone Track (Departure)
Model Track (Departure)

19TD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
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TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

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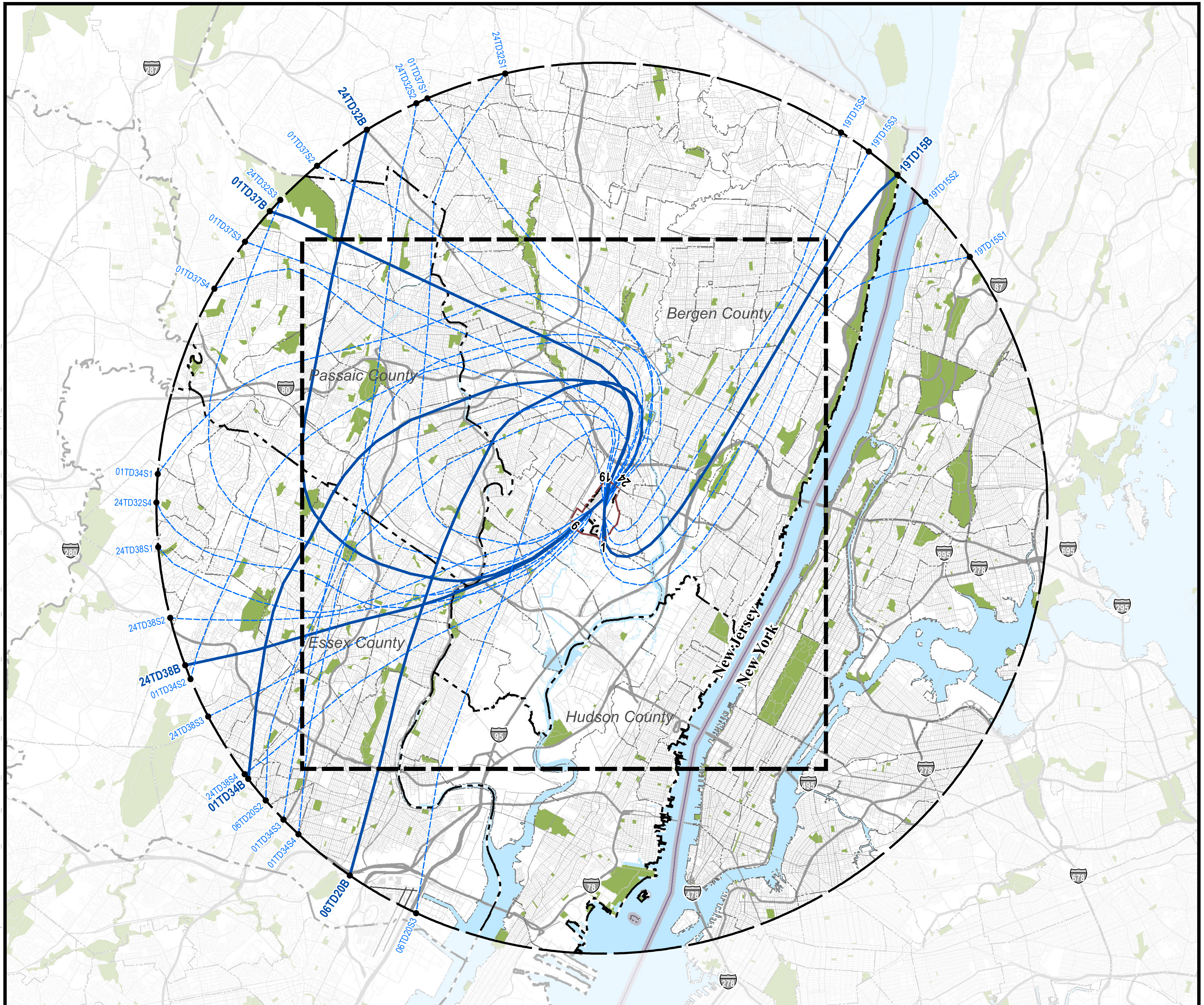
Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Turboprop Departure Model Tracks
Sheet 4 of 5



Model Backbone Track (Departure)
Model Track (Departure)

19TD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Runway ID

TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles
N

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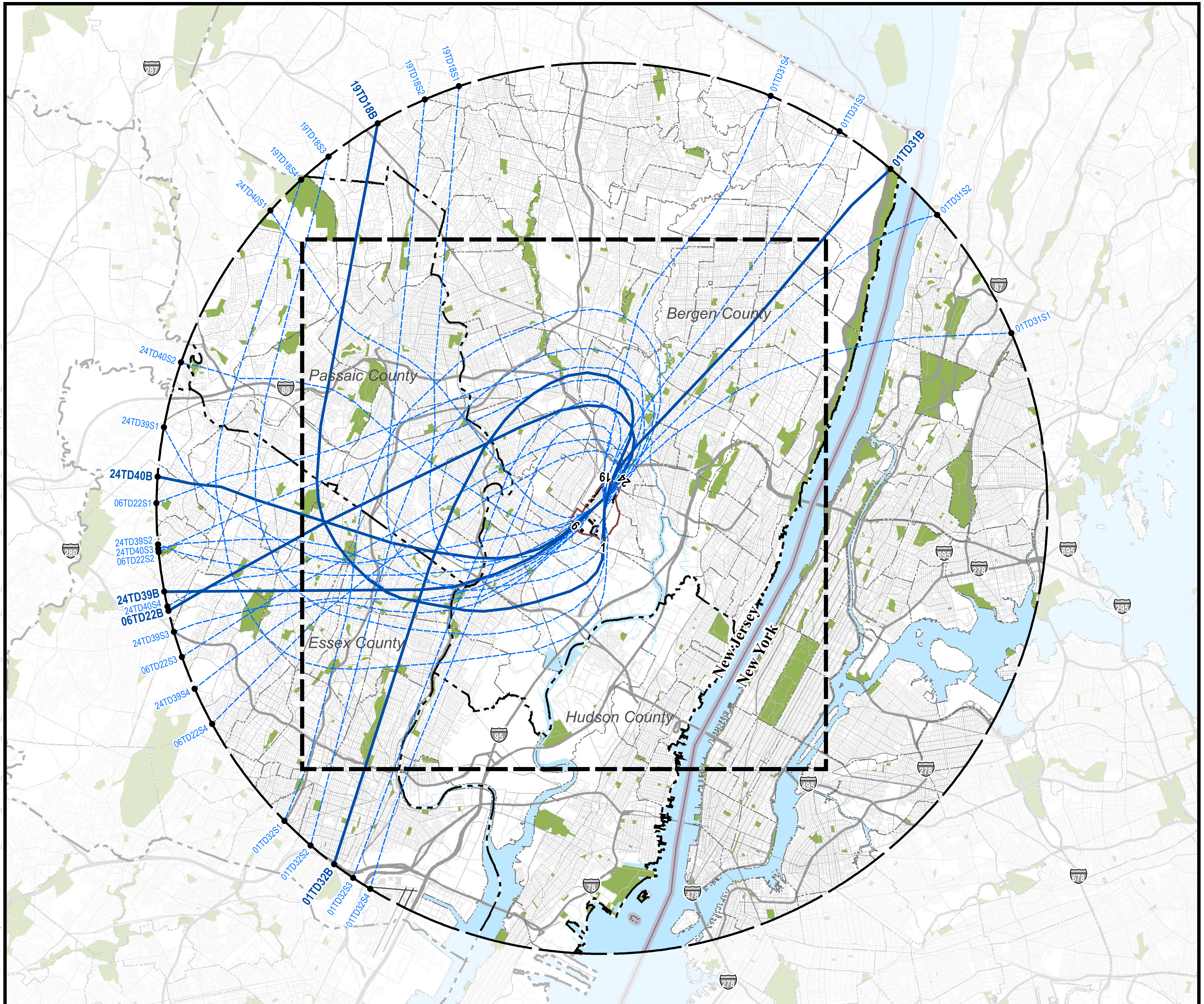
Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Turboprop Departure Model Tracks
Sheet 5 of 5



Model Backbone Track (Departure)
Model Track (Departure)

19TD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
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TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

N
0 15,000 30,000 Feet
0 2.5 5 Nautical Miles

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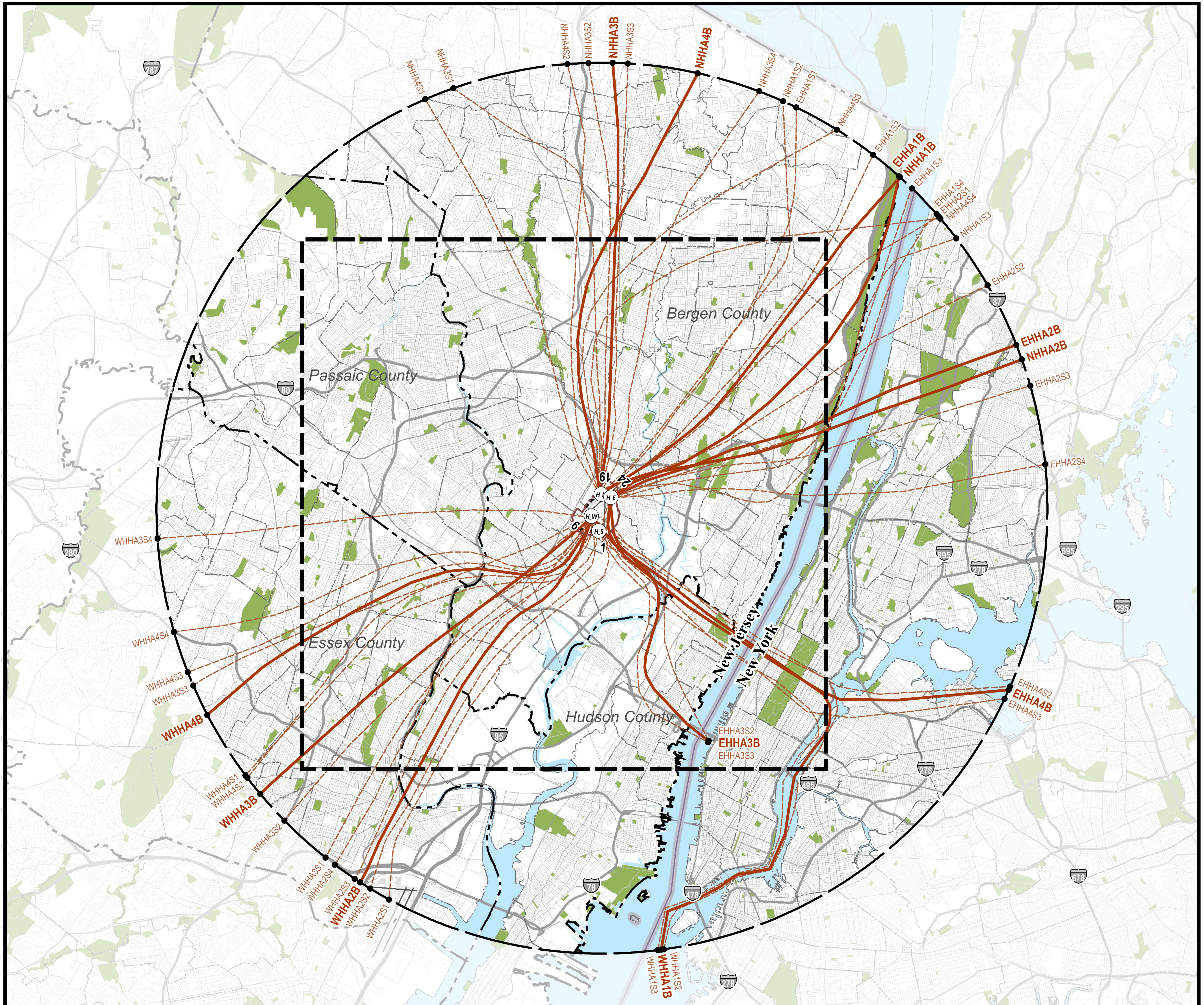
Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Helicopter Arrival Model Tracks
Sheet 1 of 3



- Model Backbone Track (Arrival)
- Model Track (Arrival)

NHHA2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Helicopter Pad ID

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Model Track Boundary
- Runway
- Helicopter Pad Location
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

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Teterboro Airport

Airport Noise Compatibility
Part 150 Study
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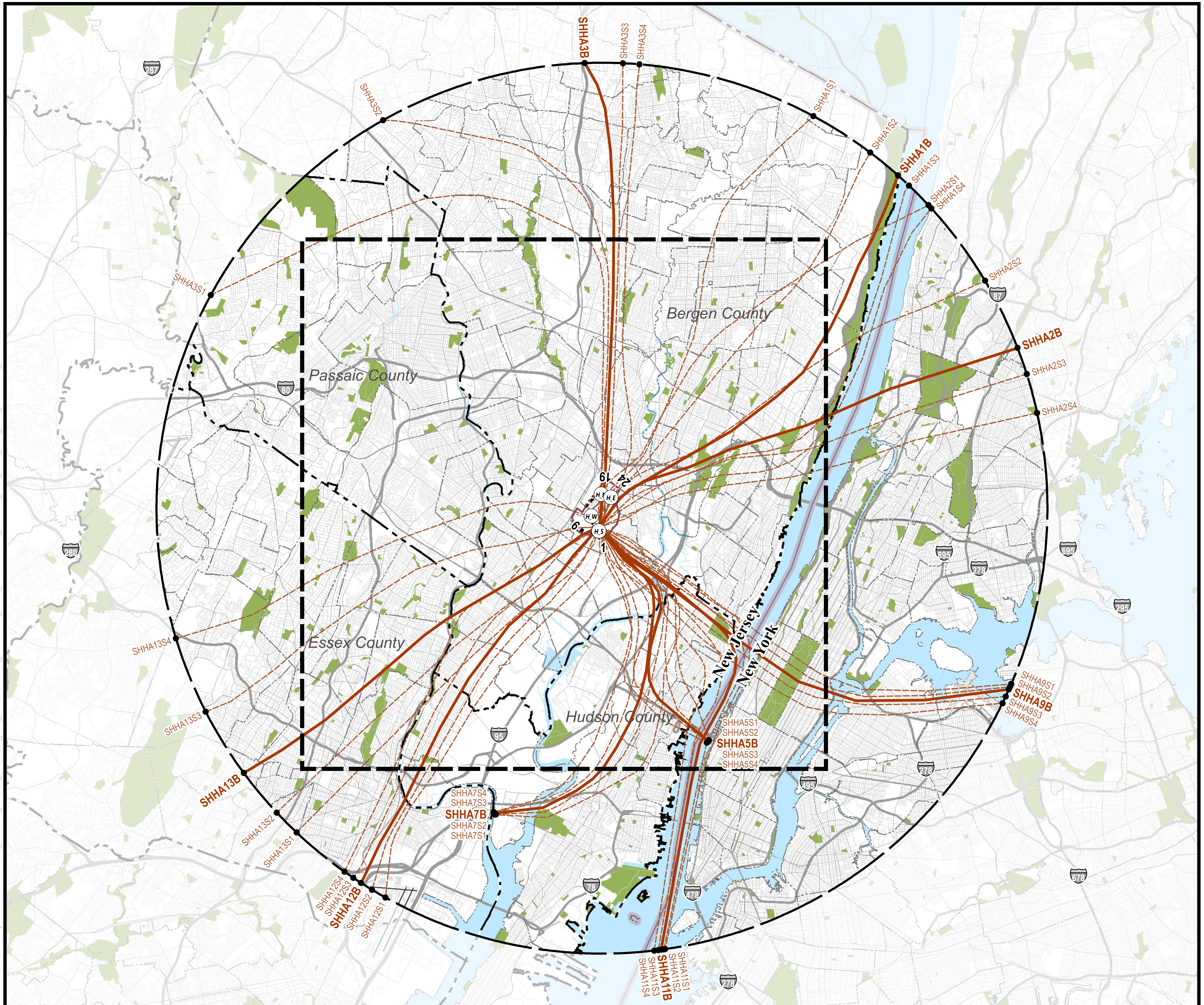
Helicopter Arrival Model Tracks
Sheet 2 of 3



- Model Backbone Track (Arrival)
- Model Track (Arrival)

NHHA2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Helicopter Pad ID

- TEB Airport Boundary (Approximate)
- TEB Study Area
- Model Track Boundary
- Runway
- Helicopter Pad Location
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

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Airport Noise Compatibility
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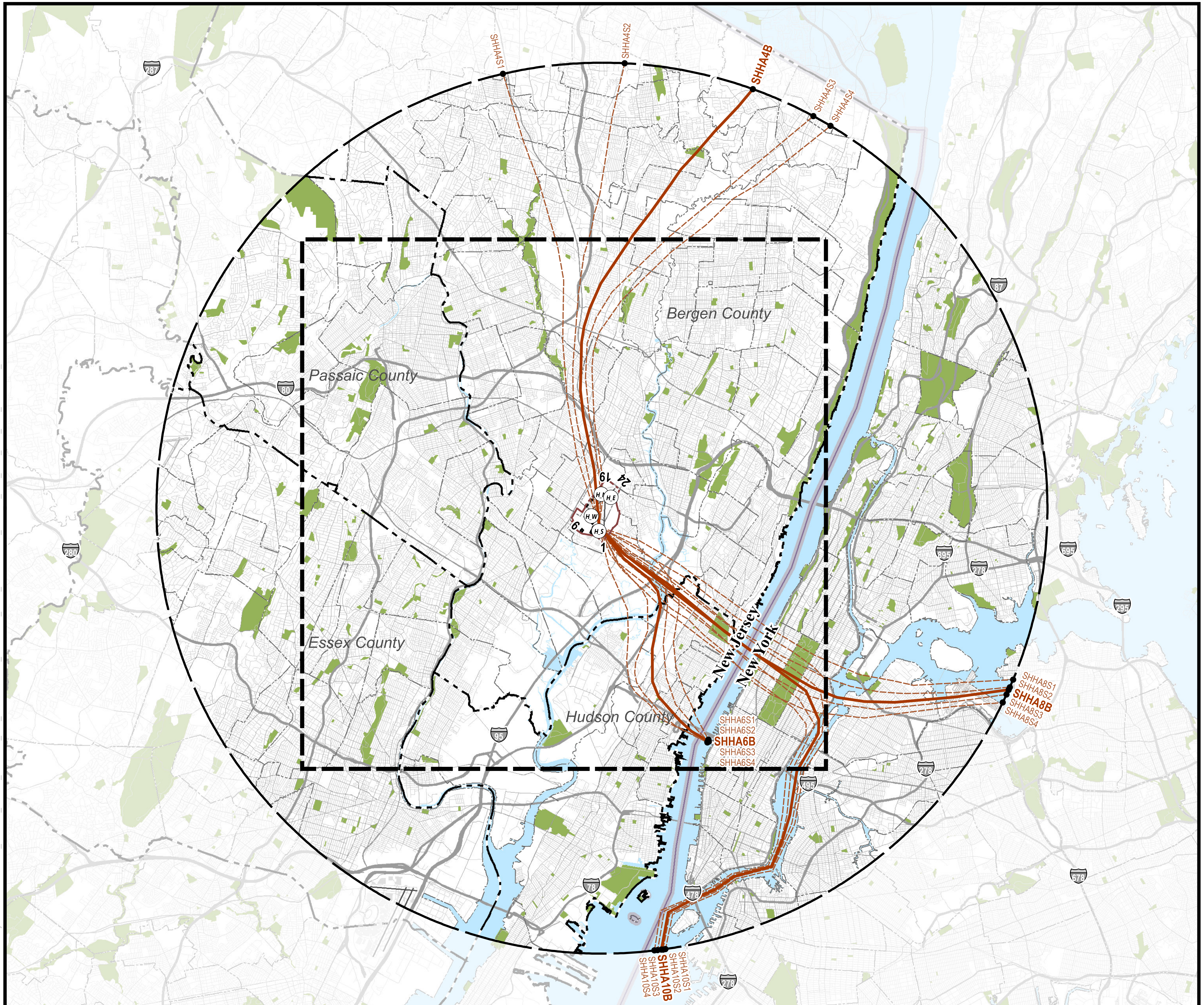
Helicopter Arrival Model Tracks
Sheet 3 of 3



Model Backbone Track (Arrival)
Model Track (Arrival)

NHHA2B
- Unique Model Track ID
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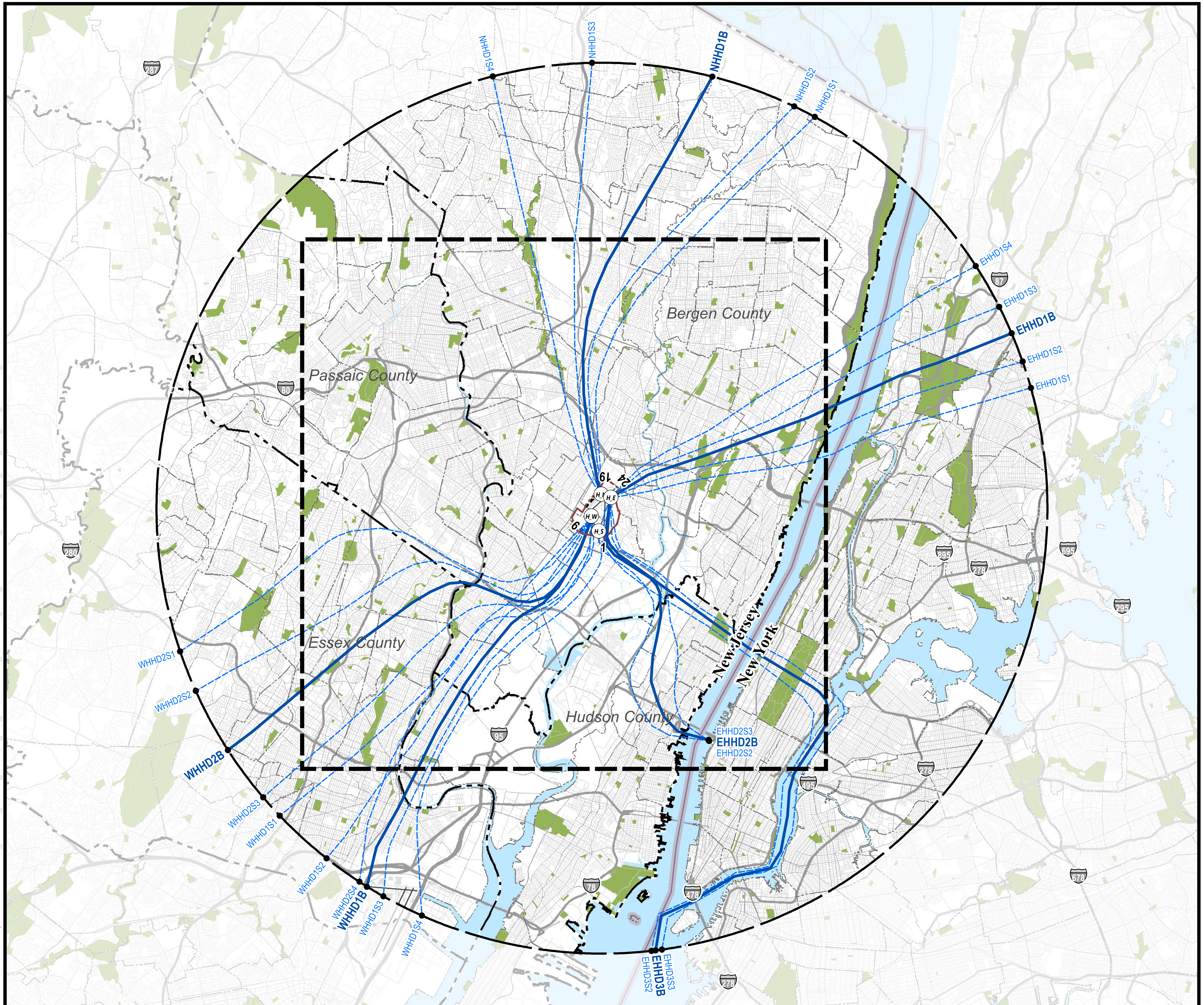
- Helicopter Pad ID

TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary

Runway | Helicopter Pad Location
State Boundary | Municipal Boundary
County Boundary
Park / Open Space | Water
Highway | Minor Roads
Major Roads

N

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles



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Airport Noise Compatibility
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Helicopter Departure Model Tracks
Sheet 1 of 3

Model Backbone Track (Departure)
Model Track (Departure)

NHHD2B
- Unique Model Track ID
- Operation Type (A: Arrival, D:Departure)
- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Helicopter Pad ID

TEB Airport Boundary (Approximate)
TEB Study Area
Model Track Boundary
Runway
Helicopter Pad Location
State Boundary
Municipal Boundary
County Boundary
Park / Open Space
Water
Highway
Minor Roads
Major Roads

N

0 15,000 30,000 Feet
0 2.5 5 Nautical Miles

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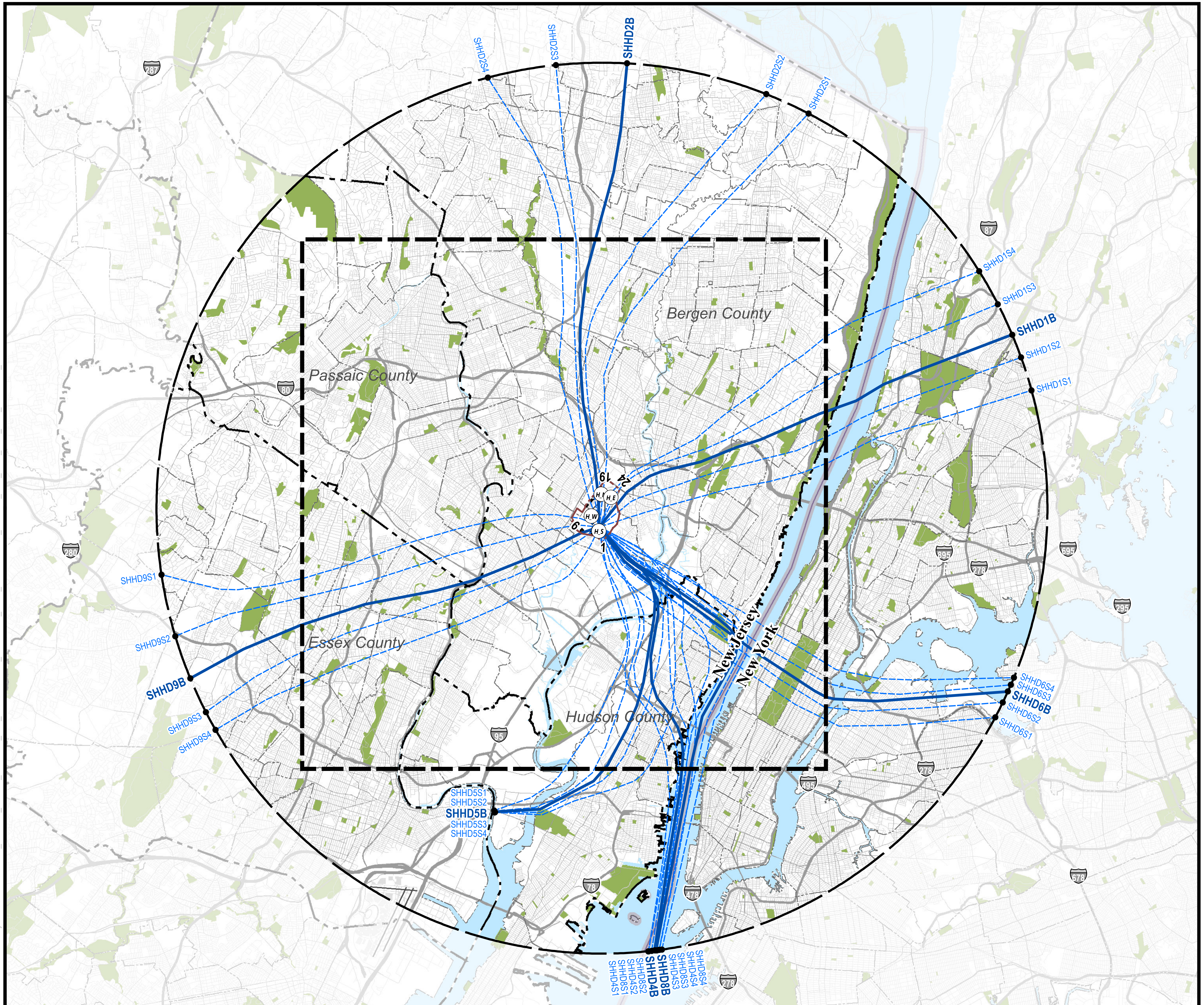

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Airport Noise Compatibility
Part 150 Study
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Helicopter Departure Model Tracks
Sheet 2 of 3

Model Backbone Track (Departure)
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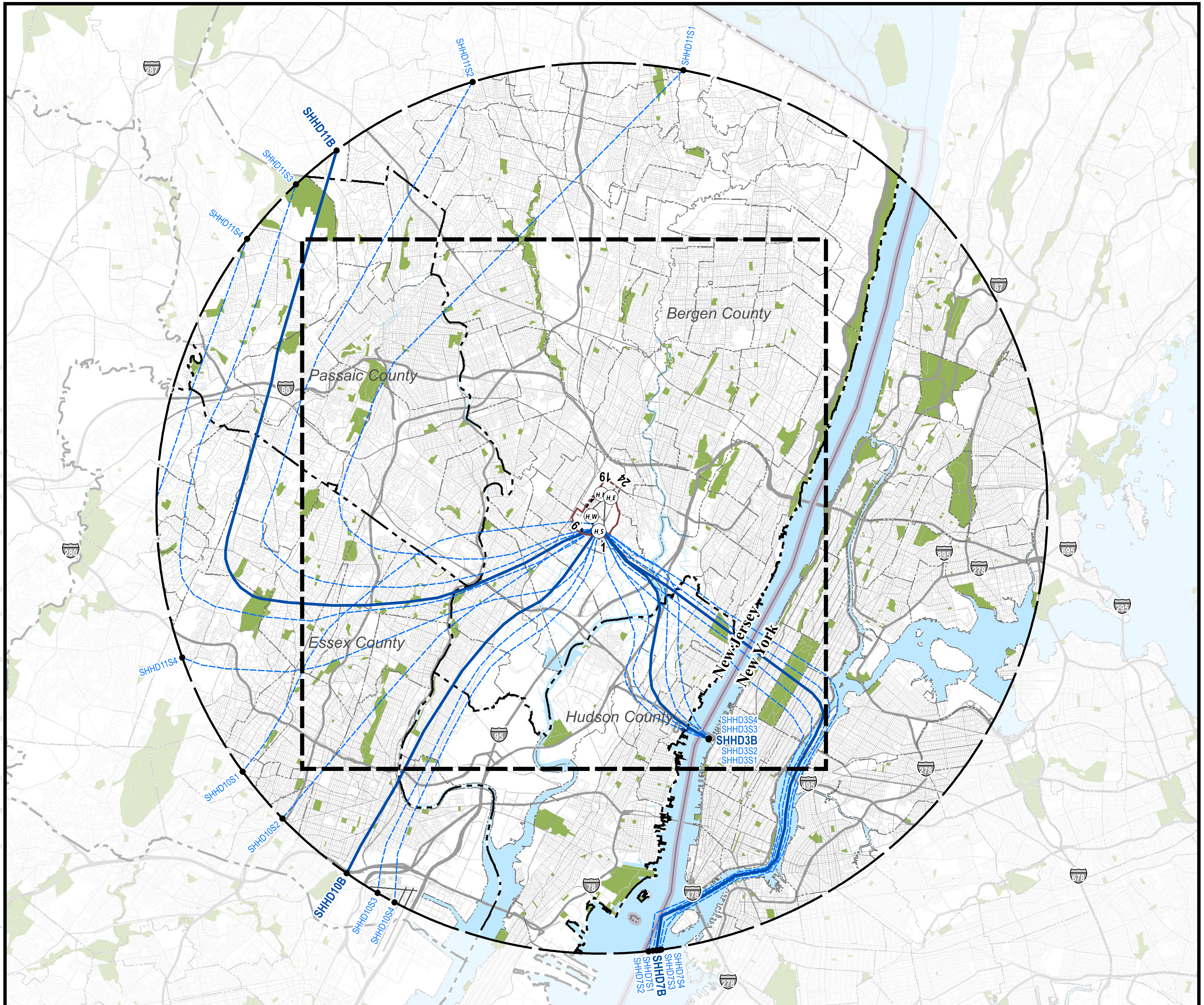
Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Helicopter Departure Model Tracks
Sheet 3 of 3



Model Backbone Track (Departure)
Model Track (Departure)

NHHD2B
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- Engine Type (J:Jet, P:Piston, T:Turboprop, H: Helicopter)
- Helicopter Pad ID

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Minor Roads
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N

0 15,000 30,000 Feet

0 2.5 5 Nautical Miles

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Appendix D

- Documentation of the Noise Modeling Process

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Appendix D.1

- Memorandum for Continued Use of INM

- Noise Modeling Inputs

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U.S. Department of Transportation
Federal Aviation Administration

Eastern Region, Airports Division

1 Aviation Plaza, Room 516
Jamaica, NY 11434-4809

T: (718) 553-3330
F: (718) 995-5615

July 21, 2015

Ms. Kelly Mitchell
Aviation Noise Office
The Port Authority of New York and New Jersey
4 World Trade Center
150 Greenwich Street, 18th Floor
New York, NY 10006

Re: Memorandum on Continued Use of INM from ESA Airports

Dear Ms. Mitchell,

Thank you for your e-mail of April 14, 2015 transmitting a memorandum from your consultant, ESA Airports, to the Port Authority of New York and New Jersey regarding the use of the Integrated Noise Model (INM) Version 7.0d for the Part 150 Noise Studies at LaGuardia and John F. Kennedy International Airports. Additionally, we have been provided a memorandum from your other consultant, HMMH, via e-mail from Timothy Middleton, documenting work done with INM 7.0d to date for the Part 150 Noise Studies for Newark Liberty International and Teterboro Airports. The Federal Aviation Administration (FAA) concurs with the overarching recommendations of both memos and agrees that sufficient work using INM 7.0d has been completed to date to warrant the continued use of the INM for the Part 150 Studies at all four airports. The FAA will not seek to require any conversion to the use of the newly released Airport Environmental Design Tool (AEDT) Model Version 2b, released on May 29, 2015 for the remainder of these studies. Please be aware that any future updates to Noise Exposure Maps or Noise Compatibility Plans resulting from the current Part 150 Studies will require the use of the FAA-approved model that is current at the time those updates begin.

We would like to raise a concern with the language used in the third paragraph of the memorandum from ESA Airports. The memorandum cites the project kickoff meeting notes by quoting that "The FAA stated further that they are aware of potential issues of INM vs. AEDT and have started internal discussions regarding how to address this topic." We would like to clarify that the FAA at no time raised any issues regarding the performance, capabilities, or accuracy of the new AEDT Model and that we fully support its use for all studies initiated following its release. The kickoff meeting cited occurred in October 2014, approximately seven months prior to the release of AEDT, and the "issues" cited in the meeting notes were actually discussions between FAA staff present at the meeting regarding uncertainty at the time of the meeting as to when AEDT would be released for use. Additionally, FAA staff discussed areas of policy development regarding the release of AEDT that had not yet been finalized as of the date of the kickoff meeting for the Part 150 Studies.

1

Thank you for taking our clarification of the language provided in the memo into consideration. If you would like to discuss this further, please call me at 718-553-2511.

Sincerely,

Andrew Brooks
Environmental Program Manager
Airports Division, AEA-610

cc: T. Middleton, PANYNJ
A. Yousuf, PANYNJ
E. Knoesel, PANYNJ

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TECHNICAL MEMORANDUM

To:	Timothy Middleton, PANYNJ
From:	Ted Baldwin and Robert C. Mentzer
Date:	March 24, 2016
Subject:	Teterboro Airport 14 CFR Part 150 Study Noise Modeling Inputs
Reference:	HMMH Project Number 307260.002.004

1. INTRODUCTION

HMMH, in association with several other consulting firms (the "HMMH Team") is assisting the Port Authority of New York and New Jersey (PANYNJ) to prepare a 14 CFR Part 150 Airport Noise and Land Use Compatibility Study for Teterboro Airport (TEB). The study will include Noise Exposure Map (NEM) documentation for 2016 and 2021, the anticipated year of submission to the FAA and the fifth year from the anticipated year of submission, respectively.[1] The NEM documentation will include Day-Night Average Sound Level (DNL) contours, prepared using the FAA's Integrated Noise Model (INM) Version 7.0d, which was the most current FAA noise model available at the time the TEB Part 150 study commenced.

This memorandum presents proposed noise modeling inputs for forecast 2016 and 2021 operations in the following areas, which are required for application of the INM:

- Physical description of the airport layout (Section 2)
- Aircraft noise and performance characteristics (Section 3)
- Aircraft flight and runup operations (Section 4)
- Runway utilization rates (Section 5)
- Flight track geometry and utilization rates (Section 6)
- Meteorological conditions (Section 7)
- Terrain data (Section 7)

The purpose of this memorandum is to obtain PANYNJ staff approval of the noise modeling inputs prior to commencing the modeling tasks. It should be noted that formal FAA approval is required for forecasts of aircraft operations (as discussed in Section 4), and three categories of non-standard noise modeling inputs (as discussed in Section 3):

- INM aircraft types to use for modeling types that are not available in the INM as standard aircraft types or as types for which the FAA has identified pre-approved substitutes.
- User-defined aircraft for which no standard INM aircraft is appropriate to serve as a substitute.
- Approval of user-defined flight profiles, to address non-standard air traffic control procedures affecting departure or approach profiles, and non-standard aircraft departure weights.

The PANYNJ will distribute this memorandum to the TEB Part 150 Technical Advisory Committee (TAC), discuss it with the group at the March 30, 2016 TAC meeting, and provide the committee with time to submit comments on its content prior to authorizing HMMH to initiate the modeling. The final version of this memorandum that is incorporated into the Part 150 documentation for submission to the FAA will be revised to summarize and address input received from the PANYNJ, FAA, TAC, or other parties.

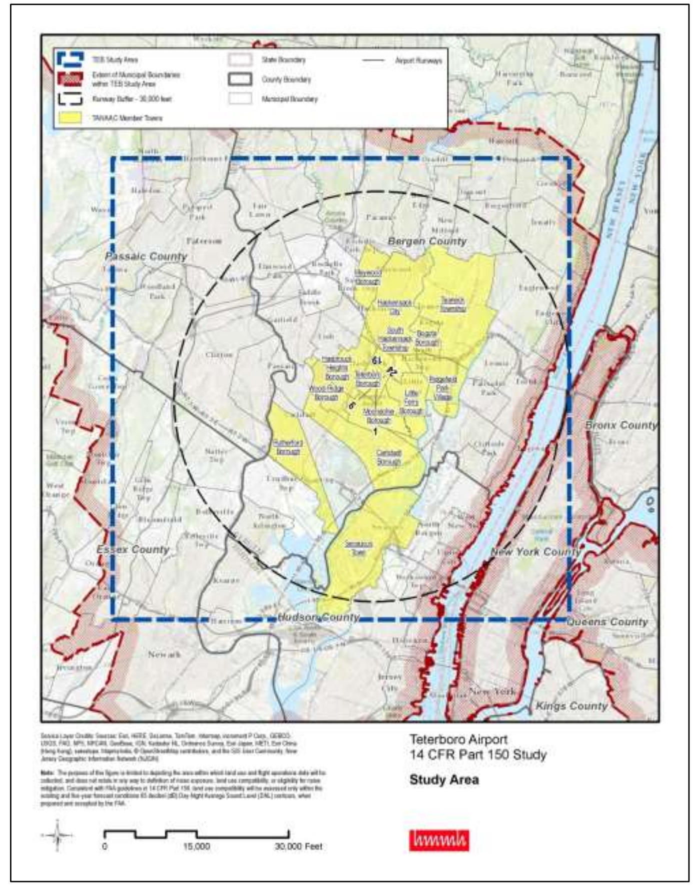
[1] For consistency with §150.21(a) and §150.21(a)(1).

2. PHYSICAL DESCRIPTION OF THE AIRPORT LAYOUT

Figure 1 presents the TEB Part 150 Study Area and depicts the location of the airport in a regional context.[2]

Figure 1. TEB Part 150 Study Area

Source: HMMH, 2015



[2] The Study Area identifies the absolute outer limit of the overall scope of any data collection, analyses, outreach, or other investigations. Factors that were used in defining the Study Area were reviewed with the TEB TAC and are described in the "Study Protocol for EWR and TEB 14 CFR Part 150 Studies - November 2015," available at: http://panynjpart150.com/TEB_SP.asp.

Table 1 presents runway layout information that the INM requires as inputs.

Table 1. TEB Runway Data

Sources: (1) Runway lengths from TEB Airport Diagram (See Figure 2), other data from (2) PANYNJ airport layout plan and (3) FAA 5010 "Airport Master Records and Reports" accessed June 9, 2015 at: https://www.faa.gov/airports/airport_safety/airportdata_5010/

Runway End	End Latitude and Longitude (Decimal Degrees)	Elevation, feet above mean sea level (MSL)	Length, feet	Threshold Crossing Height, feet	Displaced Landing Threshold, feet
1	40.838681 74.060367	8.4	7,000	58	771
19	40.857864 74.058958	6.4		57	770
6	40.846725 74.070297	4.9	6,013	50	None
24	40.857733 74.054106	6.8		46	None

Figure 2 presents an annotated copy of the FAA's "Airport Diagram" for TEB, with annotations added to show:

- The approximate airport property line
- Displaced landing threshold distances
- Locations of designated runup locations on Taxiways "A," "G," and "L"
- Informal helipad locations at four locations

Section 4.4 presents the forecast 2016 and 2021 runup activity at the three runup locations.

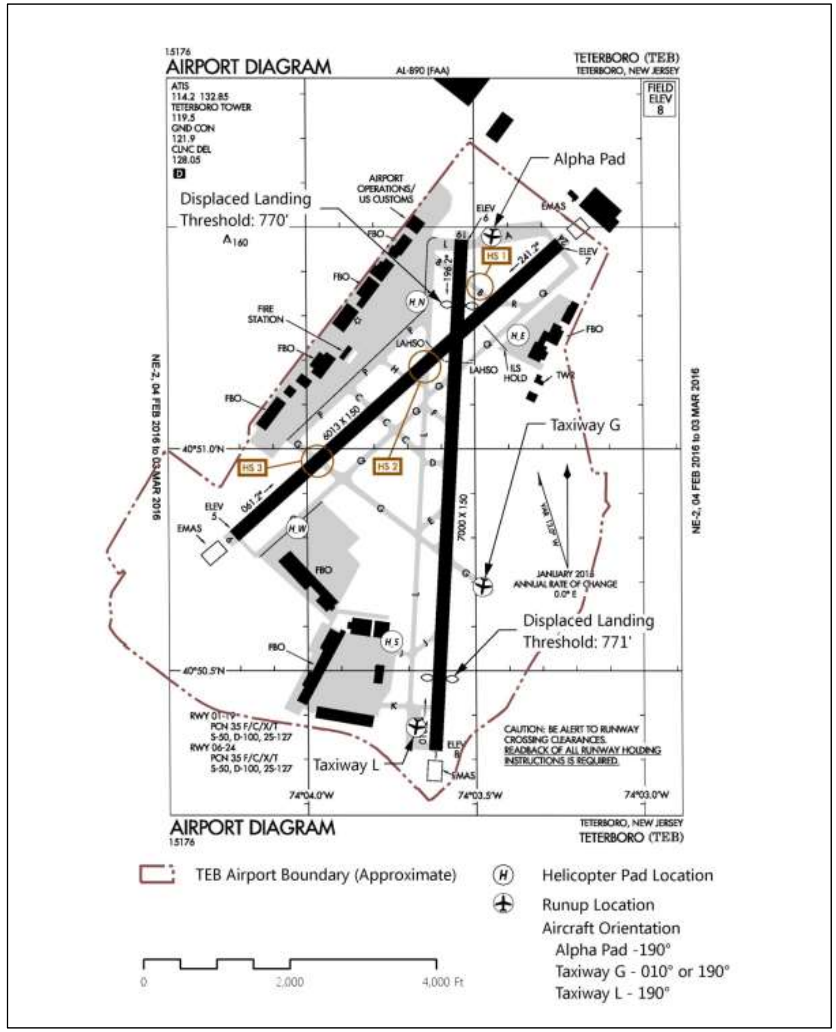
Section 5.1 presents the forecast 2016 and 2021 fixed-wing utilization of each of the four runways.

Section 5.2 presents the forecast 2016 and 2021 utilization of the four helipads. The informal helipad locations do not have any official designation. For the purposes of this study, they will be referred to as follow:

- North helipad – on the ramp on the west side of the airport, northwest of the runway intersection (labelled "H_N" on Figure 2)
- East helipad – on the ramp on the east side of the airport, east of the runway intersection (labelled "H_E" on Figure 2)
- South helipad – on the ramp on the south side of the airport, in the vicinity of Taxiway "J", west of the southerly end of Runway 1/19 (labelled "H_S" on Figure 2)
- West helipad – on the ramp on the southwest side of the airport, along Taxiway "Q", south of the westerly end of Runway 6/24 (labelled "H_W" on Figure 2)

Figure 2 Annotated TEB Airport Diagram

Sources: (1) FAA Airport Diagrams (http://aeronav.faa.gov/d-tpp/1602/00890ad.pdf) effective February 4, 2016 to March 3, 2016, (2) PANYNJ helipad and runup location information, and (3) HMMH annotations, 2016.



3. AIRCRAFT NOISE AND PERFORMANCE CHARACTERISTICS

The INM database contains noise and performance data for over one hundred different aircraft types. The program automatically accesses the applicable noise and performance data for operations by those aircraft. Noise data are provided for distances from 200 feet to 25,000 feet, for a particular aircraft with engines at a specific thrust level. Performance data include thrust, speed, and altitude profiles for takeoffs and landings.

The PANYNJ has made submissions to the FAA related to requesting guidance and approval related to the use of use non-standard aircraft noise and performance standards in four areas:

- INM aircraft types to use for modeling types that are not available in the INM as standard aircraft types and for which the FAA has not identified pre-approved substitutes (see Section 3.1).
- User-defined aircraft for which no standard INM aircraft would be an appropriate substitute (Section 3.2).
- Approval of user-defined flight profiles, to address non-standard air traffic control procedures affecting departure or approach profiles (see Section 3.3).
- Approval of a user-defined flight profile to address a non-standard aircraft departure weight for the Gulfstream V (GV) INM aircraft type (see Section 3.4).

HMMH will not commence noise modeling until the PANYNJ has received FAA approval of these requests, which may require providing the FAA with additional information or analysis.

3.1 Non-Standard Aircraft Type Substitutes

The aircraft models listed in the tables in Section 4 identify operations according to INM aircraft types. Many of these INM types represent multiple aircraft models with comparable noise and performance characteristics. For some aircraft models for which the database does not include type-specific data, the FAA has identified "standard" substitutes; i.e., pre-approved surrogates to use from among the types in the database. For any model not included in the database and for which there is no standard substitute, the FAA works with the INM user to identify an appropriate "non-standard substitute." On February 10, 2016, the PANYNJ submitted a request to the FAA for review and approval of the 12 recommended non-standard substitutes listed in Table 2. On March 10, 2016, the FAA approved the use of these substitutions for the TEB Part 150 study only.

Table 2. Aircraft Types Requiring FAA-Approved Substitutions

Source: HMMH

#	Aircraft Category	Aircraft Code	Represented Aircraft Models	FAA-Approved INM Substitution
1	Jet	E50P	Embraer EMB-500 Phenom 100	CNA510
2	Jet	E55P	Embraer EMB-505 Phenom 300	CNA560E
3	Jet	GLF6	Gulfstream 650/Gulfstream 6	GV
4	Jet	G280	Gulfstream 280	CL601
5	Jet	H25B	Raytheon Hawker 700/800, 800XP	LEAR35
6	Jet	H25C	Raytheon Hawker 1000	LEAR35
7	Jet	GL5T	Bombardier Global 5000	GV
8	Jet	F20Q	Falcon 20 (Re-engined)	LEAR35
9	Jet	FA7X	Falcon 7X	F10062
10	Jet	LJ40	Learjet 40	LEAR35
11	Jet	CL64	Canadair Challenger 604	CL601
12	Jet	CL65	Canadair Challenger 605	CL601

3.2 User-Defined Gulfstream III/IIB with Stage 3 "Hushkit"

HMMH and the PANYNJ believe a "user-defined aircraft" represents the most appropriate approach to model Gulfstream III/IIB (GIII/IIB) aircraft that have been modified (with a "hushkit") to meet 14 CFR Part 36 Stage 3

noise standards.[3] On February 10, 2016, the PANYNJ submitted a request to the FAA for use of a user-defined aircraft for this purpose. The request included detailed technical documentation that the FAA requires in such submissions. The FAA approved this user-defined aircraft on March 10, 2016.

3.3 User-Defined Flight Profiles

Based on a review of flight track data from the PANYNJ's Airport Noise and Operations Monitoring System (ANOMS), HMMH determined that some aircraft arriving to and departing from TEB commonly fly procedures that are not represented by the standard profiles provided in the INM, and that "user-defined profiles" would be the most appropriate means of modeling actual flight operations.

A February 24, 2016 PANYNJ submission to the FAA requested that the FAA review and approve user-defined profiles that were developed for this purpose. The request is a format that the FAA and the PANYNJ agreed would be most appropriate and efficient for the TEB Part 150 study.

Section 4 of this memorandum presents forecast activity at TEB for calendar years 2016 and 2021 in 63 aircraft types. Those aircraft types will be modeled using 32 unique INM aircraft types (consistent with the use of modeling substitutes, as discussed in Section 3.1. Due to the diverse nature of operations at TEB, user-defined profiles were created for the 17 INM aircraft types representing the top 90% of operations in 2014 (which include at least one representative type from each modeling group), as shown in Table 3.

[3] The FAA has established limits on allowable levels of aircraft noise emissions, under 14 CFR Part 36, " Noise Standards: Aircraft Type and Airworthiness Certification," that vary according to aircraft "design" criteria. In general, permissible noise levels increase with maximum gross takeoff weight. Jet aircraft are assigned to one of three "stage" categories:

- "Stage 1" aircraft have never been shown to meet any noise standards.
- "Stage 2" aircraft meet original noise limits, set in 1969.
- "Stage 3" aircraft meet more stringent limits, established in 1977.
- "Stage 4" aircraft meet the most recent Part 36 standards, established in 2005.

At the direction of the U.S. Congress, the FAA adopted regulations that ban U.S. operations of all Stage 1 and 2 civil jet operations as of January 1, 2016, with limited exemptions for emergency operations, departures of aircraft permanently leaving the U.S., flights within or into the U.S. for the purpose of receiving modifications to meet Stage 3 standards, etc. One response to this restriction was development of aircraft modifications that reduce the noise of a given airframe/powerplant combination sufficiently to meet Stage 3. These types of modifications are commonly termed "hushkits."

Table 3. Aircraft Considered for User-Defined Profiles

Source: HMMH

Aircraft Modeling Group	INM Aircraft Type	2014 Annual Operations	Percentage of Operations
Medium/Small Jets	LEAR35	21,536	13.0%
Large/Medium Jets	CL601	16,172	9.8%
Large/Medium Jets	CL600	14,543	8.8%
Large Jets	GV	13,818	8.3%
Large Jets	GIV	12,296	7.4%
Large Jets	F10062	9,110	5.5%
Medium Jets	CNA560XL	9,024	5.4%
Medium Jets	CNA750	8,740	5.3%
Medium Jets	MU3001	6,250	3.8%
Helicopters	S76	5,786	3.5%
Turboprops	CNA208	5,402	3.3%
Piston Propellers	GASEPV	5,018	3.0%
Medium Jets	CNA680	4,834	2.9%
Turboprops	DO228	4,680	2.8%
Medium/Small Jets	CNA525C	4,574	2.8%
Medium Jets	CNA560U	4,100	2.5%
Medium/Small Jets	CNA55B	3,858	2.3%
		TOTAL	**90.4%**
Note: Total 2014 operations equal 165,666			

3.4 User-Defined Gulfstream V (GV) Departure Flight Profiles

The INM identifies the Gulfstream V ("GV") database type as a pre-approved "standard" substitute (as discussed in Section 3.1) for several larger corporate jets; i.e., the Gulfstream 6, Gulfstream G650, Bombardier Global Express, and Bombardier Global 5000. The INM database includes a single departure weight of 76,000 pounds for the GV. Many TEB departures conducted in the GV itself and the other large jets for which it is a standard substitute fly longer distances, with larger fuel loads and – thus – heavier takeoff weights. To reflect the longer takeoff roll and other departure profile differences associated with such higher-weight departures, PANYNJ submitted a request to the FAA on March 2, 2016 to approve a user-defined variant of this aircraft with a departure weight of 90,000 pounds, the approximate maximum gross takeoff weight for the GV.

4. AIRCRAFT OPERATIONS

Consistent with FAA guidance,[4] the PANYNJ submitted a memorandum to the FAA on February 18, 2016 requesting approval of forecasts of TEB operations for 2016 and 2012.

4.1 Forecast Process

The PANYNJ, HMMH Team, and FAA collaborated in the development of a "Study Protocol for Newark/Liberty International (EWR) and Teterboro (TEB) Airports 14 CFR Part 150 Studies" (November 2015). Section 5 of that document sets forth the "Aviation Activity Forecast Protocol." The PANYNJ and the HMMH Team followed that protocol in preparing the TEB Part 150 forecasts.

[4] FAA "Guidance on Review and Approval of Aviation Forecasts," June 2008, accessed on February 2, 2016 at https://www.faa.gov/airports/planning_capacity/media/approval_local_forecasts_2008.pdf.

The PANYNJ prepared the primary forecasts, including detail on annual arrival and departure operations by aircraft type for day (7 am - 10 pm) and night (10 pm - 7 am) time periods used in calculating DNL. The consulting firm of RS&H took the lead for the HMMH Team in performing "derivative" forecasts addressing supplemental detail required for the noise model input, including identifying stage lengths for departure operations,[5] and distributing the small number of "unallocated" operations[6] in the PANYNJ forecast.

4.2 Consistency with FAA's Terminal Area Forecast (TAF)

FAA requires that airport sponsors' locally generated forecasts be consistent with the FAA's Terminal Area Forecast (TAF) for the airport. Specific FAA guidance for approval of forecasts states: "For all classes of airports, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if they meet the following criterion: Forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period."[7]

Section 5.1 of the "Study Protocol for Newark/Liberty International (EWR) and Teterboro (TEB) Airports 14 CFR Part 150 Studies" [HMMH, November 2015] states that "the FAA's 2014 TAF (issued January 2015) will be used as the baseline operational forecast."[8]

For consistency with the Study Protocol, Table 4 compares the forecasts of total operations for 2016 and 2021 to the forecasts for those years as presented in the 2014 TAF.[9] Table 4 shows that the Part 150 forecast for 2016 differs from the 2014 TAF forecast for 2016 by less than two percent and the Part 150 forecast for 2021 differs from the 2014 TAF forecast for 2021 by less than 10 percent.

Table 4. Comparison of 2016 and 2021 PANYNJ Forecasts to 2014 FAA Terminal Area Forecasts

Source: HMMH

Year	FAA TAF Forecast (January 2015)	PANYNJ Part 150 Forecast	Difference (PANYNJ-TAF)	PANYNJ Percentage Difference from TAF
2016	167,952	171,112	3,160	1.88%
2021	171,016	187,036	16,020	9.37%

Table 5 compares the forecasts of total operations for 2016 and 2021 to the forecasts for those years as presented in the *2015* TAF, which the FAA published in January 2016. While not required by the Study Protocol, this comparison is provided for informational purposes to take advantage of the most recent TAF. The PANYNJ forecasts are even more closely aligned with this more up-to-date FAA forecast; the Part 150 forecast for 2016 differs from the 2015 TAF forecast for 2016 by less than one percent and the Part 150 forecast for 2021 differs from the 2015 TAF forecast for 2021 by less than six percent.

[5] It should be noted that the INM database does not include standard modeling inputs for varied departure stage lengths for most general aviation aircraft models.

[6] The numbers of unallocated operations were very small. In 2016: 41 jet, 10 turboprop, 17 piston, and 20 helicopter operations per day. In 2021: 43 jet, 10 turboprop, 16 piston, and 23 helicopter operations per day,

[7] FAA, *op. cit.*

[8] This requirement in the Study Protocol follows guidance provided in the September 2, 2015 letter from Mr. Andrew Brooks, FAA Environmental Program Manager, Airports Division, AEA-610, to Mr. Edward C. Knoesel, Manager Aviation Environmental Programs, The Port Authority of New York and New Jersey, "Re: Request to Utilize FAA Terminal Area Forecasts as Basis for Activity Levels for 14 CFR Part 150 Noise Studies at John F. Kennedy International, LaGuardia, Newark Liberty International, and Teterboro Airports."

[9] The comparison only addresses operations, because the Part 150 regulation only requires forecasts of aircraft operations; there is no requirement for consideration of either enplanements or based aircraft.

Table 5. Comparison of 2016 and 2021 PANYNJ Forecasts to 2014 FAA Terminal Area Forecasts

Source: HMMH

Year	FAA TAF Forecast (January 2016)	PANYNJ Part 150 Forecast	Difference (PANYNJ-TAF)	PANYNJ Percentage Difference from TAF
2016	172,537	171,112	-1,425	-0.83%
2021	177,646	187,036	9,390	5.29%

In all cases, the Part 150 forecasts differ from the TAF by less than the 10% tolerance for a five-year or less forecast period. The closer agreement of the Part 150 forecasts with the most current (2015) TAF is significant, in that it shows improved agreement with the most recent FAA projections.

4.3 Flight Operations

Table 7 and Table 8 on the following pages present the forecasts of annual operations for 2016 and 2021, respectively. The tables present forecast detail in categories that the INM requires for calculation of DNL:

- Actual aircraft type and associated INM types (first and second columns, respectively)
- Type of operation – arrival and departure
- DNL "day" and "night" time periods

The INM uses departure "stage length" (the distance between the departure and arrival airport) as a surrogate for aircraft departure weight, since fuel load is the largest factor affecting variation in aircraft weight. Most air carrier aircraft types in the INM include a range of stage lengths. However, with only a few exceptions, general aviation aircraft types in the INM include only a single departure stage length; there is only one aircraft type in the forecast 2016 and 2021 fleet mixes for which the INM provides multiple stage lengths – the Embraer EMB-135 / ECJ-135. For that aircraft, the forecast distribution of departure stage lengths in both 2016 and 2021 are as follow:

Table 6. Embraer EMB-135 / ECJ-135 Departure Stage Length Distribution

Source: RS&H Derivative Forecast

Percentage of Departures Assigned to Differing Stage Lengths, in Nautical Miles					
0-500	501-1,000	1,001-1,500	1,501-2,500	2,501-3,500	3,501-4,500,
13%	64%	12%	5%	5%	1%

As discussed in Section 3.4, the PANYNJ has submitted a request to the FAA for review and approval of user-defined inputs for modeling the GV INM aircraft type with a 90,000 pound takeoff weight. The purpose of this request is to reflect the fact that many TEB departures in the six aircraft types modeled using the GV INM type[10] depart at or near the GV's 90,500 pound maximum gross takeoff weight, rather than at the 76,000 weight assumed for the standard GV in the INM database. Based on the RS&H derivative forecast, 11% of the six aircraft types modeled using the GV INM type will be assigned to this departure profile; the remaining 89% will be assigned to the standard 76,000 pound departure profile. These percentages apply to both 2016 and 2021 operations.

[10] The GV itself, and four types for which the INM identifies the GV as a pre-approved "standard" substitute (as discussed in Section 3.1); i.e., the Gulfstream 6, Gulfstream G650, Bombardier Global Express, and Bombardier Global 5000.

Table 7. 2016 Aircraft Activity Forecast

Source: PANYNJ and RS&H, 2016

	Forecast 2016 TEB Operations								
		Arrivals		Departures		Total Operations			% Total
Aircraft Type	INM Type	Day	Night	Day	Night	Day	Night	Total	Oper'ns
Large Jets (> 41,000 lbs.)									
Gulfstream 4	GIV	5,628	1,021	5,955	695	11,583	1,716	13,299	7.8%
Gulfstream 5	GV	3,688	558	3,759	488	7,447	1,046	8,493	5.0%
Falcon 2000	CL600	3,317	351	3,417	251	6,734	602	7,336	4.3%
Canadair Challenger 604	CL601	2,646	329	2,728	246	5,374	575	5,949	3.5%
Falcon 900	F10062	2,319	274	2,416	176	4,735	450	5,185	3.0%
Bombardier Global Express	GV	1,967	265	1,924	307	3,891	572	4,463	2.6%
Bombardier Global 5000	GV	863	106	868	101	1,731	207	1,938	1.1%
Embraer EMB135 ECJ135	EMB135	649	146	728	68	1,377	214	1,591	0.9%
Falcon 7X	F10062	673	82	675	80	1,348	162	1,510	0.9%
Canadair CRJ100/200	CL601	529	57	533	53	1,062	110	1,172	0.7%
Canadair Regional Jet 1/2	CL601	498	11	504	5	1,002	16	1,018	0.6%
Canadair Challenger 600	CL600	281	28	289	21	570	49	619	0.4%
Canadair Challenger 601	CL601	200	26	220	6	420	32	452	0.3%
Gulfstream 6	GV	188	36	208	18	396	54	450	0.3%
Gulfstream G650	GV	181	34	196	20	377	54	431	0.3%
Gulfstream 3	GIIB-HKD	164	28	184	8	348	36	384	0.2%
Total Large Jets		**23,791**	**3,352**	**24,604**	**2,543**	**48,395**	**5,895**	**54,290**	**31.7%**
Medium Jets (12,500 - 41,000 lbs.)									
Hawker HS-125-700/800	Lear35	5,104	508	5,161	451	10,265	959	11,224	6.6%
Cessna 560XL Citation Excel	CNA560XL	4,565	316	4,542	339	9,107	655	9,762	5.7%
Cessna 750 Citation 10	CNA750	4,011	536	4,264	283	8,275	819	9,094	5.3%
Canadair Challenger 300	CL601	3,937	447	4,145	238	8,082	685	8,767	5.1%
Beech Beechjet 400	MU3001	2,759	273	2,839	193	5,598	466	6,064	3.5%
Cessna 680 Citation Sovereign	CNA680	2,382	233	2,467	147	4,849	380	5,229	3.1%
Cessna 560 Citation 5	MU3001	1,871	118	1,872	117	3,743	235	3,978	2.3%
Learjet 40	Lear35	1,819	98	1,799	117	3,618	215	3,833	2.2%
Learjet 60	CNA55B	1,840	166	1,848	159	3,688	325	4,013	2.3%
Gulfstream Galaxy	CL600	1,594	227	1,674	147	3,268	374	3,642	2.1%
Embraer Phenom 300	CNA560E	1,079	80	1,091	69	2,170	149	2,319	1.4%
Learjet 35	Lear35	786	281	781	286	1,567	567	2,134	1.2%
Falcon 50	F10062	909	76	918	68	1,827	144	1,971	1.2%
Cessna 550 Citation 2	CNA500	719	70	725	65	1,444	135	1,579	0.9%
Generic Jet - Gulfstream 280	CL601	932	160	933	177	1,865	337	2,202	1.3%
Cessna 650 Citation 3	CIT3	440	40	449	33	889	73	962	0.6%
Learjet 55	Lear35	370	74	375	69	745	143	888	0.5%
Hawker 4000	CL600	337	46	348	33	685	79	764	0.4%
Hawker 1000	Lear35	283	44	289	38	572	82	654	0.4%
Learjet 31	Lear35	297	26	297	26	594	52	646	0.4%
Gulfstream 150 Galaxy	IA1125	286	29	292	23	578	52	630	0.4%
IAI ASTRA 1125	IA1125	278	32	281	29	559	61	620	0.4%
Falcon 20 (Hushkit)	Lear35	197	36	190	43	387	79	466	0.3%
Gulfstream G280	CL601	184	5	184	5	368	10	378	0.2%
Total Medium Jets		**36,979**	**3,921**	**37,764**	**3,155**	**74,743**	**7,076**	**81,819**	**47.8%**
Small Jets (< 12,500 lbs.)									
Cessna 525 Citation	CNA525C	2,077	142	2,102	116	4,179	258	4,437	2.6%
Embraer Phenom 100	CNA510	346	8	337	17	683	25	708	0.4%
Raytheon Premier 1	Lear35	291	12	286	17	577	29	606	0.4%
Falcon 10	Lear35	213	26	209	30	422	56	478	0.3%
Cessna Citation Mustang	CNA510	231	21	246	8	477	29	506	0.3%
Total Small Jets		**3,158**	**209**	**3,180**	**188**	**6,338**	**397**	**6,735**	**3.9%**
Total Jets		**63,928**	**7,482**	**65,548**	**5,886**	**129,476**	**13,368**	**142,844**	**83.5%**

		Forecast 2016 TEB Operations							
		Arrivals		Departures		Total Operations			% Total
Aircraft Type	INM Type	Day	Night	Day	Night	Day	Night	Total	Oper'ns
Turbopropeller									
Pilatus PC12	CNA208	2,295	418	2,333	380	4,628	798	5,426	3.2%
Beech Super King Air 300	DO228	1,238	74	1,271	41	2,509	115	2,624	1.5%
Generic Turboprop - King Air 300	DO228	907	161	907	161	1,814	322	2,136	1.2%
Beech King Air 200	CNA441	700	27	687	40	1,387	67	1,454	0.8%
Beech F90 King Air	CNA441	480	19	470	29	950	48	998	0.6%
Piaggio P180 Avanti	SD330	200	17	201	16	401	33	434	0.3%
Total Turboprops		**5,820**	**716**	**5,869**	**667**	**11,689**	**1,383**	**13,072**	**7.6%**
Twin Engine Piston Propeller									
Piper PA31 Navajo	PA31	290	36	294	32	584	68	652	0.4%
Beech 58 Baron	BEC58P	273	28	278	23	551	51	602	0.4%
Total Twin Engine Piston		**563**	**64**	**572**	**55**	**1,135**	**119**	**1,254**	**0.7%**
Single Engine Piston Propeller									
Cirrus SR22	GASEPV	469	25	465	29	934	54	988	0.6%
Generic Piston - Cirrus SR22	GASEPV	1,687	299	1,687	299	3,374	598	3,972	2.3%
Total Single Engine Piston		**2,156**	**324**	**2,152**	**328**	**4,308**	**652**	**4,960**	**2.9%**
Total Piston Propeller		**2,719**	**388**	**2,724**	**383**	**5,443**	**771**	**6,214**	**3.7%**
Helicopters									
Sikorsky S-76	S76	829	60	820	68	1,649	128	1,777	1.0%
Sikorsky S-76B	S76	598	36	594	39	1,192	75	1,267	0.7%
Augusta A109	A109	415	23	428	9	843	32	875	0.5%
Augusta Westland AW139	SA330J	374	21	362	32	736	53	789	0.5%
Sikorsky S-76C	S76	347	31	343	35	690	66	756	0.4%
Bell 430	B430	290	20	281	28	571	48	619	0.4%
Eurocopter AS550/555 Ecureuil 2	SA355F	263	11	260	14	523	25	548	0.3%
Generic Helo - Sikorsky S-76	S76	998	177	999	177	1,997	354	2,351	1.4%
Total Helicopters		**4,114**	**379**	**4,087**	**402**	**8,201**	**781**	**8,982**	**5.2%**
Grand Totals		**76,581**	**8,965**	**78,228**	**7,338**	**154,809**	**16,303**	**171,112**	**100.0%**

Table 8. 2021 Aircraft Activity Forecast

Source: PANYNJ and RS&H, 2016

		Forecast 2021 TEB Operations							
		Arrivals		Departures		Total Operations			% Total
Aircraft Type	INM Type	Day	Night	Day	Night	Day	Night	Total	Oper'ns
Large Jets (> 41,000 lbs.)									
Gulfstream 4	GIV	6,847	1,242	7,245	846	14,092	2,088	16,180	8.7%
Gulfstream 5	GV	4,488	679	4,573	594	9,061	1,273	10,334	5.5%
Falcon 2000	CL600	3,662	388	3,772	277	7,434	665	8,099	4.3%
Canadair Challenger 604	CL601	3,219	400	3,319	299	6,538	699	7,237	3.9%
Falcon 900	F10062	2,560	302	2,667	195	5,227	497	5,724	3.1%
Bombardier Global Express	GV	2,394	323	2,341	373	4,735	696	5,431	2.9%
Bombardier Global 5000	GV	1,051	129	1,056	123	2,107	252	2,359	1.3%
Embraer EMB135 ECJ135	EMB135	699	157	784	73	1,483	230	1,713	0.9%
Falcon 7X	F10062	819	99	821	97	1,640	196	1,836	1.0%
Canadair CRJ100/200	CL601	570	62	574	57	1,144	119	1,263	0.7%
Canadair Regional Jet 1/2	CL601	536	12	543	5	1,079	17	1,096	0.6%
Canadair Challenger 600	CL600	342	34	352	26	694	60	754	0.4%
Canadair Challenger 601	CL601	215	28	237	6	452	34	486	0.3%
Gulfstream 6	GV	229	43	253	22	482	65	547	0.3%
Gulfstream G650	GV	220	41	239	25	459	66	525	0.3%
Gulfstream 3	GIIB-HKD	152	26	170	8	322	34	356	0.2%
Total Large Jets		**28,003**	**3,965**	**28,946**	**3,026**	**56,949**	**6,991**	**63,940**	**34.2%**
Medium Jets (12,500 - 41,000 lbs.)									
Hawker HS-125-700/800	Lear35	4,732	471	4,786	418	9,518	889	10,407	5.6%
Cessna 560XL Citation Excel	CNA560XL	5,554	385	5,526	413	11,080	798	11,878	6.4%
Cessna 750 Citation 10	CNA750	4,428	592	4,707	313	9,135	905	10,040	5.4%
Canadair Challenger 300	CL601	4,789	544	5,043	290	9,832	834	10,666	5.7%
Beech Beechjet 400	MU3001	2,559	253	2,632	179	5,191	432	5,623	3.0%
Cessna 680 Citation Sovereign	CNA680	2,898	283	3,002	179	5,900	462	6,362	3.4%
Cessna 560 Citation 5	MU3001	1,735	109	1,736	108	3,471	217	3,688	2.0%
Learjet 40	Lear35	1,687	91	1,668	108	3,355	199	3,554	1.9%
Learjet 60	CNA55B	2,032	183	2,040	175	4,072	358	4,430	2.4%
Gulfstream Galaxy	CL600	1,478	211	1,552	136	3,030	347	3,377	1.8%
Embraer Phenom 300	CNA560E	1,221	91	1,234	78	2,455	169	2,624	1.4%
Learjet 35	Lear35	729	261	724	265	1,453	526	1,979	1.1%
Falcon 50	F10062	980	82	989	73	1,969	155	2,124	1.1%
Cessna 550 Citation 2	CNA500	775	75	781	70	1,556	145	1,701	0.9%
Generic Jet - Gulfstream 280	CL601	1,012	174	1,011	174	2,023	348	2,371	1.3%
Cessna 650 Citation 3	CIT3	408	37	416	31	824	68	892	0.5%
Learjet 55	Lear35	343	69	347	64	690	133	823	0.4%
Hawker 4000	CL600	363	50	375	35	738	85	823	0.4%
Hawker 1000	Lear35	263	40	268	35	531	75	606	0.3%
Learjet 31	Lear35	276	24	276	24	552	48	600	0.3%
Gulfstream 150 Galaxy	IA1125	265	27	271	22	536	49	585	0.3%
IAI ASTRA 1125	IA1125	258	30	261	27	519	57	576	0.3%
Falcon 20 (Hushkit)	Lear35	183	33	176	40	359	73	432	0.2%
Gulfstream G280	CL601	170	5	170	5	340	10	350	0.2%
Total Medium Jets		**39,138**	**4,120**	**39,991**	**3,262**	**79,129**	**7,382**	**86,511**	**46.3%**
Small Jets (< 12,500 lbs.)									
Cessna 525 Citation	CNA525C	1,926	132	1,949	107	3,875	239	4,114	2.2%
Embraer Phenom 100	CNA510	392	9	381	19	773	28	801	0.4%
Raytheon Premier 1	Lear35	313	13	308	18	621	31	652	0.3%
Falcon 10	Lear35	198	24	194	28	392	52	444	0.2%
Cessna Citation Mustang	CNA510	248	22	265	8	513	30	543	0.3%
Total Small Jets		**3,077**	**200**	**3,097**	**180**	**6,174**	**380**	**6,554**	**3.5%**
Total Jets		**70,218**	**8,285**	**72,034**	**6,468**	**142,252**	**14,753**	**157,005**	**83.9%**

		Forecast 2021 TEB Operations							
		Arrivals		Departures		Total Operations			% Total
Aircraft Type	INM Type	Day	Night	Day	Night	Day	Night	Total	Oper'ns
Turbopropeller									
Pilatus PC12	CNA208	2,318	422	2,357	384	4,675	806	5,481	2.9%
Beech Super King Air 300	DO228	1,401	84	1,438	46	2,839	130	2,969	1.6%
Generic Turboprop - King Air 300	DO228	917	162	916	162	1,833	324	2,157	1.2%
Beech King Air 200	CNA441	707	27	694	40	1,401	67	1,468	0.8%
Beech F90 King Air	CNA441	485	19	475	29	960	48	1,008	0.5%
Piaggio P180 Avanti	SD330	202	17	203	16	405	33	438	0.2%
Total Turbopropeller		**6,030**	**731**	**6,083**	**677**	**12,113**	**1,408**	**13,521**	**7.2%**
Twin Engine Piston Propeller									
Piper PA31 Navajo	PA31	280	35	284	31	564	66	630	0.3%
Beech 58 Baron	BEC58P	263	27	268	22	531	49	580	0.3%
Total Twin Engine Piston		**543**	**62**	**552**	**53**	**1,095**	**115**	**1,210**	**0.6%**
Single Engine Piston Propeller									
Cirrus SR22	GASEPV	453	24	449	28	902	52	954	0.5%
Generic Piston - Cirrus SR22	GASEPV	1,625	287	1,625	287	3,250	574	3,824	2.0%
Total Single Engine Piston		**2,078**	**311**	**2,074**	**315**	**4,152**	**626**	**4,778**	**2.6%**
Total Piston Propeller		**2,621**	**373**	**2,626**	**368**	**5,247**	**741**	**5,988**	**3.2%**
Helicopters									
Sikorsky S-76	S76	971	70	960	79	1,931	149	2,080	1.1%
Sikorsky S-76B	S76	700	42	695	45	1,395	87	1,482	0.8%
Augusta A109	A109	485	27	501	10	986	37	1,023	0.5%
Augusta Westland AW139	SA330J	438	25	424	37	862	62	924	0.5%
Sikorsky S-76C	S76	406	36	402	41	808	77	885	0.5%
Bell 430	B430	339	24	329	33	668	57	725	0.4%
Eurocopter AS550/555 Ecureuil 2	SA355F	307	12	304	16	611	28	639	0.3%
Generic Helo - Sikorsky S-76	S76	1,175	207	1,175	207	2,350	414	2,764	1.1%
Total Helicopters		**4,821**	**443**	**4,790**	**468**	**9,611**	**911**	**10,522**	**5.6%**
Grand Totals		**83,690**	**9,832**	**85,533**	**7,981**	**169,223**	**17,813**	**187,036**	**100.0%**

4.4 Runup Operations

The TEB staff maintains logs of runup activity. The data for all of calendar year 2014 were used to develop runup modeling assumptions.

High-power (93%) maintenance runups will be modeled at the three designated runup locations marked on Figure 2; i.e., on Taxiways A, G, and L. Based on the runup logs, the percentage use of these locations will be as follow:

- Taxiway A – 85%
- Taxiway G – 13%
- Taxiway L – 2%

Based on established runup procedures, the runups will be modeled at the following headings:

- All runups on Taxiways A and L will be modeled at a heading of 190° magnetic.
- Runups on Taxiway G will be modeled at two headings: 38% at a 010° magnetic heading and 62% at a 190° magnetic heading. These heading percentages are based on the overall north-south split of jet runway use (approximately 38% on Runways 1 and 6 combined, and 62% on Runways 19 and 24 combined), under the assumption that runup orientation – like runway use – is selected to be the one that is most closely aligned with the wind.

Table 9 summarizes the proposed runup activity to be included in the modeling for 2016 and 2021. Given the relatively limited amount of runup activity and modest growth in aircraft activity forecast through 2021, there was no basis for projecting any significant increase in runups over the five-year forecast period. Table 9 summarizes the annual runup activity by aircraft type and duration, during the day (7 am – 10 pm) and night (10 pm – 7 am) time periods considered in calculating DNL. The runup duration was not logged for approximately 10% of all operations; those operations were assigned to the most common duration (five minutes). Runups by unknown aircraft types will be modelled as the MU3001, the most common aircraft type conducting runups, where the type was known.

Table 9. Proposed 2016 and 2021 Runup Activity to Be Modeled

Source: TEB Runup Logs

INM Type	Common Name	Number of Runup Operations per Year			Distribution of Durations										
		Day	Night	Total	<1min	1 min	2 min	3 min	4 min	5 min	5-10 min	10-15 min	15-20 min	20-30 min	>30 min
CL600	CL600	12	14	26	6	0	2	0	0	9	4	3	2	0	0
CL601	CL601	25	17	42	10	3	4	1	0	10	3	4	1	6	0
CIT3	Citation 3	0	2	2	0	0	0	1	0	1	0	0	0	0	0
CNA500	Citation 2	1	1	2	2	0	0	0	0	0	0	0	0	0	0
CNA510	Citation 510	2	0	2	0	0	0	0	0	2	0	0	0	0	0
CNA525C	Citation 525C	4	7	11	1	0	0	0	0	2	7	1	0	0	0
CNA55B	Cessna 550 B	2	2	4	1	2	0	0	0	1	0	0	0	0	0
CNA560E	Citation 560 Encore	4	8	12	2	0	0	0	0	3	7	0	0	0	0
CNA560XL	Citation 560 Excel	12	13	25	8	1	0	1	0	5	2	2	2	4	0
CNA680	Citation 680 Sovereign	4	2	6	1	0	0	0	1	0	1	2	1	0	0
CNA750	Citation X	5	10	15	3	0	0	1	0	10	0	1	0	0	0
DO228	Dornier 228	7	3	10	1	0	0	0	0	5	3	1	0	0	0
EMB145	Embraer 145 ER	7	8	15	4	1	0	0	0	3	0	2	2	3	0
F10062	Fokker 100-62	10	13	23	8	1	0	1	0	6	6	1	0	0	0
GIV	Gulfstream GIV	3	8	11	2	0	1	1	1	4	1	0	0	1	0
GV	Gulfstream GV	17	14	31	8	5	2	1	0	5	5	2	0	3	0
IA1125	ASTRA 1125	0	2	2	0	1	0	0	0	0	0	1	0	0	0
LEAR35	LEAR 36	51	28	79	20	0	6	1	0	14	12	6	4	14	2
MU3001	MU300-10	114	73	187	54	1	0	0	0	32	21	29	12	35	3
SD330	SD330	0	1	1	1	0	0	0	0	0	0	0	0	0	0
SA330J	August Westland 139	1	1	2	0	0	0	0	0	1	0	0	1	0	0
S76	Sikorsky S-76	0	1	1	1	0	0	0	0	0	0	0	0	0	0
GASEPV	Single variable prop	0	6	6	3	0	0	0	0	0	1	1	1	0	0
NA	Unknown aircraft	5	22	27	1	0	0	1	0	23	1	0	1	0	0
Total		**286**	**256**	**542**	**137**	**15**	**15**	**9**	**2**	**136**	**74**	**56**	**27**	**66**	**5**

5. RUNWAY AND HELIPAD UTILIZATION RATES

5.1 Fixed-Wing Runway Utilization Rates

Table 10 summarizes fixed-wing runway utilization rates that were developed from the TEB Compuland database, which is very comprehensive and accurate, because it is based on human observations. The rates are presented for the same six classes of aircraft types as the activity forecasts (Table 7 and Table 8); i.e., three jet weight categories and three classes of propeller-driven aircraft. The generally similar performance characteristics of aircraft within each of these categories result in comparable runway utilization rates.

Table 10. 2016 and 2021 Fixed-Wing Runway Utilization Percentages

Source: HMMH (based on TEB Compuland Database), 2015

Aircraft Group	Runway End	2016 and 2021 Fixed-Wing Runway Utilization Percentages						
		Arrival			Departure			Grand
		Day	Night	Total	Day	Night	Total	Total
Large Jets (> 41,000 lbs.)	01	7%	7%	7%	35%	32%	34%	21%
	06	28%	35%	29%	3%	10%	3%	16%
	19	52%	39%	50%	2%	9%	2%	27%
	24	13%	18%	14%	61%	49%	60%	36%
	Total	100%	100%	100%	100%	100%	100%	100%
Medium Jets (12,500 to 41,000 lbs.)	01	8%	6%	8%	35%	31%	35%	21%
	06	29%	36%	30%	3%	13%	3%	17%
	19	50%	38%	49%	1%	6%	2%	26%
	24	13%	19%	14%	61%	50%	60%	36%
	Total	100%	100%	100%	100%	100%	100%	100%
Small Jets (< 12,500 lbs.)	01	8%	2%	8%	36%	29%	35%	21%
	06	29%	36%	29%	3%	17%	4%	17%
	19	47%	36%	47%	3%	3%	3%	25%
	24	16%	26%	16%	58%	51%	58%	37%
	Total	100%	100%	100%	100%	100%	100%	100%
Turbopropeller	01	10%	7%	10%	32%	19%	31%	20%
	06	27%	24%	26%	8%	21%	9%	18%
	19	41%	27%	40%	11%	18%	11%	26%
	24	22%	42%	24%	49%	42%	49%	36%
	Total	100%	100%	100%	100%	100%	100%	100%
Multi-Engine Piston Propeller	01	12%	4%	11%	28%	24%	28%	20%
	06	22%	32%	22%	10%	20%	10%	16%
	19	40%	45%	41%	17%	11%	16%	28%
	24	26%	19%	26%	45%	45%	45%	36%
	Total	100%	100%	100%	100%	100%	100%	100%
Single Engine Piston Propeller	01	12%	5%	12%	26%	25%	26%	19%
	06	23%	34%	24%	8%	27%	10%	17%
	19	37%	36%	37%	15%	11%	15%	26%
	24	27%	25%	27%	50%	36%	50%	38%
	Total	100%	100%	100%	100%	100%	100%	100%
Overall Fixed-Wing	01	8%	6%	8%	34%	30%	34%	21%
	06	28%	35%	29%	3%	13%	4%	17%
	19	49%	38%	48%	3%	8%	3%	26%
	24	14%	21%	15%	59%	49%	58%	36%
	Total	100%	100%	100%	100%	100%	100%	100%

5.2 Helipad Utilization Rates

Table 11 summarizes proposed helipad utilization rates to be modeled. Like the runway utilization rates, these rates were developed from the highly accurate TEB Compuland database.

Table 11. 2016 and 2021 Helipad Utilization Percentages

Source: HMMH (based on TEB Compuland Database), 2015

	2016 and 2021 Helipad Utilization Percentages						
	Arrivals			Departures			Grand
Helipad	Day	Night	Total	Day	Night	Total	Total
East	7%	10%	7%	6%	6%	6%	7%
North	8%	12%	8%	9%	8%	9%	8%
South	80%	69%	79%	79%	75%	79%	79%
West	5%	9%	5%	6%	10%	6%	6%
Total	100%	100%	100%	100%	100%	100%	100%

6. FLIGHT TRACK GEOMETRY AND UTILIZATION RATES

Flight track geometry and utilization rates were developed using flight track data for 2014 obtained from the TEB ANOMS installation. The complex fleet mix and track geometry led to the development of a large number of modeling tracks (1,225 overall), as summarized by aircraft type and arrival/departure groups in Table 12.

Table 12. Numbers of Flight Tracks by Category

Source: HMMH, 2016

Aircraft Category	Arrival Tracks	Departure Tracks	Total Tracks
Jet	215	259	474
Turbopropeller	128	168	296
Piston Propeller	119	142	261
Helicopter	113	81	194
Total	575	650	1,225

The large numbers of tracks required use of multiple sheets (42 in total) to depict them clearly. Table 13 identifies the numbers of flight track sheets in each aircraft type and arrival/departure group. The figures will be available on the TEB Part 150 website.

Table 13. Numbers of Flight Track Sheets by Category

Source: HMMH, 2016

Aircraft Category	Arrival Track Sheets	Departure Track Sheets	Total Track Sheets
Jet	10	5	15
Turbopropeller	5	5	10
Piston Propeller	6	5	11
Helicopter	3	3	6
Total	24	18	42

The following tables summarize the flight track utilization rates and identify the sheets on which each track is presented on the TEB Part 150 website. The flight track sheets are presented in the order listed in the preceding table; i.e.:

1. Jet arrivals
2. Jet departures
3. Turbopropeller arrivals
4. Turbopropeller departures
5. Piston propeller arrivals
6. Piston propeller departures
7. Helicopter arrivals
8. Helicopter departures

Table 14. Runway 01 Jet Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Arrival Track Sheet
01JA1B	0.5%	1 of 10
01JA1S1	0.1%	1 of 10
01JA1S2	0.3%	1 of 10
01JA1S3	0.1%	1 of 10
01JA1S4	0.3%	1 of 10
01JA2B	1.2%	2 of 10
01JA2S1	0.2%	2 of 10
01JA2S2	0.8%	2 of 10
01JA2S3	0.2%	2 of 10
01JA2S4	0.8%	2 of 10
01JA3B	7.5%	3 of 10
01JA3S1	1.2%	3 of 10
01JA3S2	4.7%	3 of 10
01JA3S3	1.2%	3 of 10
01JA3S4	4.7%	3 of 10
01JA4B	23.5%	4 of 10
01JA4S1	3.8%	4 of 10
01JA4S2	14.8%	4 of 10
01JA4S3	3.8%	4 of 10
01JA4S4	14.8%	4 of 10
01JA5B	5.9%	1 of 10
01JA5S1	1.0%	1 of 10
01JA5S2	3.7%	1 of 10
01JA5S3	1.0%	1 of 10
01JA5S4	3.7%	1 of 10
Total	100.0%	

Table 15. Runway 06 Jet Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Arrival Track Sheet	Track Name	Percent Use	Track Sheet
06JA1B	8.7%	7 of 10	06JA8S1	1.1%	2 of 10
06JA1S1	1.4%	7 of 10	06JA8S2	4.3%	2 of 10
06JA1S2	5.5%	7 of 10	06JA8S3	4.3%	2 of 10
06JA1S3	5.5%	7 of 10	06JA8S4	1.1%	2 of 10
06JA1S4	1.4%	7 of 10	06JA9B	5.0%	9 of 10
06JA2B	7.0%	6 of 10	06JA9S1	0.8%	9 of 10
06JA2S1	1.1%	6 of 10	06JA9S2	3.1%	9 of 10
06JA2S2	4.4%	6 of 10	06JA9S3	3.1%	9 of 10
06JA2S3	4.4%	6 of 10	06JA9S4	0.8%	9 of 10
06JA2S4	1.1%	6 of 10	06JA10B	0.4%	9 of 10
06JA3B	0.0%	3 of 10	06JA10S1	0.1%	9 of 10
06JA3S2	0.0%	3 of 10	06JA10S2	0.3%	9 of 10
06JA3S3	0.0%	3 of 10	06JA10S3	0.3%	9 of 10
06JA4B	0.0%	4 of 10	06JA10S4	0.1%	9 of 10
06JA4S2	0.0%	4 of 10	06JA11B	6.8%	10 of 10
06JA4S3	0.0%	4 of 10	06JA11S1	1.1%	10 of 10
06JA5B	0.0%	5 of 10	06JA11S2	4.3%	10 of 10
06JA5S2	0.0%	5 of 10	06JA11S3	4.3%	10 of 10
06JA5S3	0.0%	5 of 10	06JA11S4	1.1%	10 of 10
06JA6B	0.0%	1 of 10	06JA12B	2.3%	10 of 10
06JA6S1	0.0%	1 of 10	06JA12S1	0.4%	10 of 10
06JA6S2	0.0%	1 of 10	06JA12S2	1.4%	10 of 10
06JA6S3	0.0%	1 of 10	06JA12S3	1.4%	10 of 10
06JA6S4	0.0%	1 of 10	06JA12S4	0.4%	10 of 10
06JA7B	0.9%	8 of 10	06JA13B	0.6%	1 of 10
06JA7S1	0.2%	8 of 10	06JA13S1	0.1%	1 of 10
06JA7S2	0.6%	8 of 10	06JA13S2	0.4%	1 of 10
06JA7S3	0.6%	8 of 10	06JA13S3	0.4%	1 of 10
06JA7S4	0.2%	8 of 10	06JA13S4	0.1%	1 of 10
06JA8B	6.8%	2 of 10	Total	100.0%	

Table 16. Runway 19 Jet Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Arrival Track Sheet	Track Name	Percent Use	Jet Arrival Track Sheet
19JA1B	0.1%	5 of 10	19JA7S3	0.0%	7 of 10
19JA1S1	0.0%	5 of 10	19JA7S4	0.0%	7 of 10
19JA1S2	0.1%	5 of 10	19JA8B	8.8%	4 of 10
19JA1S3	0.1%	5 of 10	19JA8S1	1.4%	4 of 10
19JA1S4	0.0%	5 of 10	19JA8S2	5.6%	4 of 10
19JA2B	0.0%	5 of 10	19JA8S3	5.6%	4 of 10
19JA2S1	0.0%	5 of 10	19JA8S4	1.4%	4 of 10
19JA2S2	0.0%	5 of 10	19JA9B	11.0%	3 of 10
19JA2S3	0.0%	5 of 10	19JA9S1	1.8%	3 of 10
19JA2S4	0.0%	5 of 10	19JA9S2	7.0%	3 of 10
19JA3B	0.1%	1 of 10	19JA9S3	7.0%	3 of 10
19JA3S1	0.0%	1 of 10	19JA9S4	1.8%	3 of 10
19JA3S2	0.0%	1 of 10	19JA10B	11.8%	2 of 10
19JA3S3	0.0%	1 of 10	19JA10S1	1.9%	2 of 10
19JA3S4	0.0%	1 of 10	19JA10S2	7.4%	2 of 10
19JA4B	0.0%	7 of 10	19JA10S3	7.4%	2 of 10
19JA4S1	0.0%	7 of 10	19JA10S4	1.9%	2 of 10
19JA4S2	0.0%	7 of 10	19JA11B	4.1%	2 of 10
19JA4S3	0.0%	7 of 10	19JA11S1	0.7%	2 of 10
19JA4S4	0.0%	7 of 10	19JA11S2	2.6%	2 of 10
19JA5B	2.1%	4 of 10	19JA11S3	2.6%	2 of 10
19JA5S1	0.3%	4 of 10	19JA11S4	0.7%	2 of 10
19JA5S2	1.3%	4 of 10	19JA12B	0.3%	6 of 10
19JA5S3	1.3%	4 of 10	19JA12S1	0.0%	6 of 10
19JA5S4	0.3%	4 of 10	19JA12S2	0.2%	6 of 10
19JA6B	0.1%	1 of 10	19JA12S3	0.2%	6 of 10
19JA6S1	0.0%	1 of 10	19JA12S4	0.0%	6 of 10
19JA6S2	0.1%	1 of 10	19JA13B	0.1%	3 of 10
19JA6S3	0.1%	1 of 10	19JA13S1	0.0%	3 of 10
19JA6S4	0.0%	1 of 10	19JA13S2	0.1%	3 of 10
19JA7B	0.1%	7 of 10	19JA13S3	0.1%	3 of 10
19JA7S1	0.0%	7 of 10	19JA13S4	0.0%	3 of 10
19JA7S2	0.0%	7 of 10	Total	100.0%	

Table 17. Runway 24 Jet Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Arrival Track Sheet	Track Name	Percent Use	Jet Arrival Track Sheet
24JA1B	0.1%	1 of 10	24JA8S2	2.7%	3 of 10
24JA2B	0.1%	5 of 10	24JA8S3	2.7%	3 of 10
24JA2S1	0.0%	5 of 10	24JA8S4	0.7%	3 of 10
24JA2S2	0.1%	5 of 10	24JA9B	11.7%	3 of 10
24JA2S3	0.1%	5 of 10	24JA9S1	1.9%	3 of 10
24JA2S4	0.0%	5 of 10	24JA9S2	7.4%	3 of 10
24JA3B	0.1%	8 of 10	24JA9S3	7.4%	3 of 10
24JA3S1	0.0%	8 of 10	24JA9S4	1.9%	3 of 10
24JA3S2	0.0%	8 of 10	24JA10B	1.8%	4 of 10
24JA3S3	0.0%	8 of 10	24JA10S1	0.3%	4 of 10
24JA3S4	0.0%	8 of 10	24JA10S2	1.1%	4 of 10
24JA4B	0.4%	5 of 10	24JA10S3	1.1%	4 of 10
24JA4S1	0.1%	5 of 10	24JA10S4	0.3%	4 of 10
24JA4S2	0.3%	5 of 10	24JA11B	1.4%	6 of 10
24JA4S3	0.3%	5 of 10	24JA11S1	0.2%	6 of 10
24JA4S4	0.1%	5 of 10	24JA11S2	0.9%	6 of 10
24JA5B	0.8%	2 of 10	24JA11S3	0.9%	6 of 10
24JA5S1	0.1%	2 of 10	24JA11S4	0.2%	6 of 10
24JA5S2	0.5%	2 of 10	24JA12B	2.8%	4 of 10
24JA5S3	0.5%	2 of 10	24JA12S1	0.5%	4 of 10
24JA5S4	0.1%	2 of 10	24JA12S2	1.8%	4 of 10
24JA6B	1.4%	9 of 10	24JA12S3	1.8%	4 of 10
24JA6S1	0.2%	9 of 10	24JA12S4	0.5%	4 of 10
24JA6S2	0.9%	9 of 10	24JA13B	7.3%	5 of 10
24JA6S3	0.9%	9 of 10	24JA13S1	1.2%	5 of 10
24JA6S4	0.2%	9 of 10	24JA13S2	4.6%	5 of 10
24JA7B	2.0%	3 of 10	24JA13S3	4.6%	5 of 10
24JA7S1	0.3%	3 of 10	24JA13S4	1.2%	5 of 10
24JA7S2	1.2%	3 of 10	24JA14B	4.4%	4 of 10
24JA7S3	1.2%	3 of 10	24JA14S1	0.7%	4 of 10
24JA7S4	0.3%	3 of 10	24JA14S2	2.8%	4 of 10
24JA8B	4.3%	3 of 10	24JA14S3	2.8%	4 of 10
24JA8S1	0.7%	3 of 10	24JA14S4	0.7%	4 of 10
			Total	100.0%	

Table 18. Runway 01 Jet Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Departure Track Sheet	Track Name	Percent Use	Jet Departure Track Sheet
01JD1B	1.4%	1 of 5	01JD8S1	0.3%	3 of 5
01JD1S3	1.4%	1 of 5	01JD9B	2.1%	4 of 5
01JD1S2	0.4%	1 of 5	01JD9S3	2.1%	4 of 5
01JD1S4	2.2%	1 of 5	01JD9S2	0.5%	4 of 5
01JD1S1	0.4%	1 of 5	01JD9S4	3.3%	4 of 5
01JD2B	2.6%	2 of 5	01JD9S1	0.5%	4 of 5
01JD2S3	2.6%	2 of 5	01JD10B	0.0%	4 of 5
01JD2S2	0.7%	2 of 5	01JD10S3	0.0%	4 of 5
01JD2S4	4.1%	2 of 5	01JD10S2	0.0%	4 of 5
01JD2S1	0.7%	2 of 5	01JD11B	0.3%	5 of 5
01JD3B	0.1%	1 of 5	01JD11S3	0.1%	5 of 5
01JD3S3	0.1%	1 of 5	01JD11S2	0.2%	5 of 5
01JD3S2	0.0%	1 of 5	01JD11S4	0.2%	5 of 5
01JD3S4	0.2%	1 of 5	01JD11S1	0.1%	5 of 5
01JD3S1	0.0%	1 of 5	01JD12B	0.7%	5 of 5
01JD4B	0.2%	2 of 5	01JD12S3	0.1%	5 of 5
01JD4S3	0.2%	2 of 5	01JD12S2	0.5%	5 of 5
01JD4S2	0.1%	2 of 5	01JD12S4	0.5%	5 of 5
01JD4S4	0.4%	2 of 5	01JD12S1	0.1%	5 of 5
01JD4S1	0.1%	2 of 5	01JD13B	0.8%	3 of 5
01JD5B	0.0%	1 of 5	01JD13S3	0.1%	3 of 5
01JD5S3	0.0%	1 of 5	01JD13S2	0.5%	3 of 5
01JD5S2	0.0%	1 of 5	01JD13S4	0.5%	3 of 5
01JD5S4	0.1%	1 of 5	01JD13S1	0.1%	3 of 5
01JD5S1	0.0%	1 of 5	01JD14B	19.4%	3 of 5
01JD6B	0.5%	2 of 5	01JD14S3	3.2%	3 of 5
01JD6S3	0.5%	2 of 5	01JD14S2	12.3%	3 of 5
01JD6S2	0.1%	2 of 5	01JD14S4	12.3%	3 of 5
01JD6S4	0.8%	2 of 5	01JD14S1	3.2%	3 of 5
01JD6S1	0.1%	2 of 5	01JD15B	2.0%	4 of 5
01JD7B	0.2%	3 of 5	01JD15S3	0.3%	4 of 5
01JD7S3	0.2%	3 of 5	01JD15S2	1.3%	4 of 5
01JD7S2	0.0%	3 of 5	01JD15S4	1.3%	4 of 5
01JD7S4	0.3%	3 of 5	01JD15S1	0.3%	4 of 5
01JD7S1	0.0%	3 of 5	01JD16B	2.4%	5 of 5
01JD8B	1.0%	3 of 5	01JD16S3	0.4%	5 of 5
01JD8S3	1.0%	3 of 5	01JD16S2	1.5%	5 of 5
01JD8S2	0.3%	3 of 5	01JD16S4	1.5%	5 of 5
01JD8S4	1.7%	3 of 5	01JD16S1	0.4%	5 of 5
			Total	100.0%	

Table 19. Runway 06 Jet Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Departure Track Sheet	Track Name	Percent Use	Jet Departure Track Sheet
06JD1B	1.5%	1 of 5	06JD7S4	0.6%	4 of 5
06JD1S3	0.9%	1 of 5	06JD7S1	0.6%	4 of 5
06JD1S2	0.9%	1 of 5	06JD8B	0.3%	1 of 5
06JD1S4	0.2%	1 of 5	06JD9B	0.4%	2 of 5
06JD1S1	0.2%	1 of 5	06JD9S3	0.3%	2 of 5
06JD2B	2.3%	3 of 5	06JD9S2	0.3%	2 of 5
06JD2S3	1.5%	3 of 5	06JD9S4	0.1%	2 of 5
06JD2S2	1.5%	3 of 5	06JD9S1	0.1%	2 of 5
06JD2S4	0.4%	3 of 5	06JD10B	0.3%	4 of 5
06JD2S1	0.4%	3 of 5	06JD11B	1.3%	2 of 5
06JD3B	0.2%	1 of 5	06JD11S3	0.8%	2 of 5
06JD4B	0.4%	3 of 5	06JD11S2	0.8%	2 of 5
06JD4S3	0.3%	3 of 5	06JD11S4	0.2%	2 of 5
06JD4S2	0.3%	3 of 5	06JD11S1	0.2%	2 of 5
06JD4S4	0.1%	3 of 5	06JD12B	21.9%	2 of 5
06JD4S1	0.1%	3 of 5	06JD12S3	13.8%	2 of 5
06JD5B	0.9%	4 of 5	06JD12S2	13.8%	2 of 5
06JD5S3	0.6%	4 of 5	06JD12S4	3.6%	2 of 5
06JD5S2	0.6%	4 of 5	06JD12S1	3.6%	2 of 5
06JD5S4	0.1%	4 of 5	06JD13B	2.5%	5 of 5
06JD5S1	0.1%	4 of 5	06JD13S3	1.6%	5 of 5
06JD6B	0.6%	3 of 5	06JD13S2	1.6%	5 of 5
06JD6S3	0.4%	3 of 5	06JD13S4	0.4%	5 of 5
06JD6S2	0.4%	3 of 5	06JD13S1	0.4%	5 of 5
06JD6S4	0.1%	3 of 5	06JD14B	2.6%	5 of 5
06JD6S1	0.1%	3 of 5	06JD14S3	1.6%	5 of 5
06JD7B	3.9%	4 of 5	06JD14S2	1.6%	5 of 5
06JD7S3	2.5%	4 of 5	06JD14S4	0.4%	5 of 5
06JD7S2	2.5%	4 of 5	06JD14S1	0.4%	5 of 5
			Total	100.0%	

Table 20. Runway 19 Jet Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Departure Track Sheet	Track Name	Percent Use	Jet Departure Track Sheet
19JD1B	2.3%	1 of 5	19JD6S4	0.4%	3 of 5
19JD1S3	1.4%	1 of 5	19JD6S1	0.4%	3 of 5
19JD1S2	1.4%	1 of 5	19JD7B	3.5%	4 of 5
19JD1S4	0.4%	1 of 5	19JD7S3	2.2%	4 of 5
19JD1S1	0.4%	1 of 5	19JD7S2	2.2%	4 of 5
19JD2B	1.2%	2 of 5	19JD7S4	0.6%	4 of 5
19JD2S3	0.8%	2 of 5	19JD7S1	0.6%	4 of 5
19JD2S2	0.8%	2 of 5	19JD8B	3.0%	5 of 5
19JD2S4	0.2%	2 of 5	19JD8S3	1.9%	5 of 5
19JD2S1	0.2%	2 of 5	19JD8S2	1.9%	5 of 5
19JD3B	1.4%	3 of 5	19JD8S4	0.5%	5 of 5
19JD3S3	0.9%	3 of 5	19JD8S1	0.5%	5 of 5
19JD3S2	0.9%	3 of 5	19JD9B	12.1%	4 of 5
19JD3S4	0.2%	3 of 5	19JD9S3	7.6%	4 of 5
19JD3S1	0.2%	3 of 5	19JD9S2	7.6%	4 of 5
19JD4B	1.6%	2 of 5	19JD9S4	2.0%	4 of 5
19JD4S3	1.0%	2 of 5	19JD9S1	2.0%	4 of 5
19JD4S2	1.0%	2 of 5	19JD10B	4.0%	5 of 5
19JD4S4	0.3%	2 of 5	19JD10S3	2.5%	5 of 5
19JD4S1	0.3%	2 of 5	19JD10S2	2.5%	5 of 5
19JD5B	4.6%	1 of 5	19JD10S4	0.6%	5 of 5
19JD5S3	2.9%	1 of 5	19JD10S1	0.6%	5 of 5
19JD5S2	2.9%	1 of 5	19JD11B	2.3%	5 of 5
19JD5S4	0.8%	1 of 5	19JD11S3	1.4%	5 of 5
19JD5S1	0.8%	1 of 5	19JD11S2	1.4%	5 of 5
19JD6B	2.7%	3 of 5	19JD11S4	0.4%	5 of 5
19JD6S3	1.7%	3 of 5	19JD11S1	0.4%	5 of 5
19JD6S2	1.7%	3 of 5	Total	100.0%	

Table 21. Runway 24 Jet Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Jet Departure Track Sheet	Track Name	Percent Use	Jet Departure Track Sheet
24JD1B	0.1%	1 of 5	24JD8S3	2.6%	3 of 5
24JD1S3	0.0%	1 of 5	24JD8S2	2.6%	3 of 5
24JD1S2	0.0%	1 of 5	24JD8S4	0.7%	3 of 5
24JD2B	0.1%	2 of 5	24JD8S1	0.7%	3 of 5
24JD2S3	0.0%	2 of 5	24JD9B	0.5%	4 of 5
24JD2S2	0.0%	2 of 5	24JD9S3	0.3%	4 of 5
24JD2S4	0.0%	2 of 5	24JD9S2	0.3%	4 of 5
24JD2S1	0.0%	2 of 5	24JD9S4	0.1%	4 of 5
24JD3B	3.2%	1 of 5	24JD9S1	0.1%	4 of 5
24JD3S3	2.0%	1 of 5	24JD10B	0.9%	2 of 5
24JD3S2	2.0%	1 of 5	24JD10S3	0.5%	2 of 5
24JD3S4	0.5%	1 of 5	24JD10S2	0.5%	2 of 5
24JD3S1	0.5%	1 of 5	24JD10S4	0.1%	2 of 5
24JD4B	1.6%	2 of 5	24JD10S1	0.1%	2 of 5
24JD4S3	1.0%	2 of 5	24JD11B	10.5%	3 of 5
24JD4S2	1.0%	2 of 5	24JD11S3	6.7%	3 of 5
24JD4S4	0.3%	2 of 5	24JD11S2	6.7%	3 of 5
24JD4S1	0.3%	2 of 5	24JD11S4	1.7%	3 of 5
24JD5B	2.5%	3 of 5	24JD11S1	1.7%	3 of 5
24JD5S3	1.6%	3 of 5	24JD12B	7.0%	4 of 5
24JD5S2	1.6%	3 of 5	24JD12S3	4.4%	4 of 5
24JD5S4	0.4%	3 of 5	24JD12S2	4.4%	4 of 5
24JD5S1	0.4%	3 of 5	24JD12S4	1.1%	4 of 5
24JD6B	0.8%	4 of 5	24JD12S1	1.1%	4 of 5
24JD6S3	0.5%	4 of 5	24JD13B	5.6%	5 of 5
24JD6S2	0.5%	4 of 5	24JD13S3	3.6%	5 of 5
24JD6S4	0.1%	4 of 5	24JD13S2	3.6%	5 of 5
24JD6S1	0.1%	4 of 5	24JD13S4	0.9%	5 of 5
24JD7B	1.1%	1 of 5	24JD13S1	0.9%	5 of 5
24JD7S3	0.7%	1 of 5	24JD14B	0.7%	5 of 5
24JD7S2	0.7%	1 of 5	24JD14S3	0.4%	5 of 5
24JD7S4	0.2%	1 of 5	24JD14S2	0.4%	5 of 5
24JD7S1	0.2%	1 of 5	24JD14S4	0.1%	5 of 5
24JD8B	4.1%	3 of 5	24JD14S1	0.1%	5 of 5
			Total	100.0%	

Table 22. Runway 01 Turbopropeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Arrival Track Sheet
01TA9B	13.4%	1 of 5
01TA9S3	13.4%	1 of 5
01TA9S2	3.5%	1 of 5
01TA9S4	21.2%	1 of 5
01TA9S1	3.5%	1 of 5
01TA10B	4.0%	2 of 5
01TA10S3	4.0%	2 of 5
01TA10S2	1.0%	2 of 5
01TA10S4	6.3%	2 of 5
01TA10S1	1.0%	2 of 5
01TA11B	7.0%	5 of 5
01TA11S3	7.0%	5 of 5
01TA11S2	1.8%	5 of 5
01TA11S4	11.0%	5 of 5
01TA11S1	1.8%	5 of 5
Total	100.0%	

Table 23. Runway 06 Turbopropeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Arrival Track Sheet
06TA22B	0.8%	3 of 5
06TA22S3	0.5%	3 of 5
06TA22S2	0.5%	3 of 5
06TA22S4	0.1%	3 of 5
06TA22S1	0.1%	3 of 5
06TA23B	9.6%	1 of 5
06TA23S3	6.1%	1 of 5
06TA23S2	6.1%	1 of 5
06TA23S4	1.6%	1 of 5
06TA23S1	1.6%	1 of 5
06TA24B	7.6%	2 of 5
06TA24S3	4.8%	2 of 5
06TA24S2	4.8%	2 of 5
06TA24S4	1.2%	2 of 5
06TA24S1	1.2%	2 of 5
06TA25B	11.5%	3 of 5
06TA25S3	7.3%	3 of 5
06TA25S2	7.3%	3 of 5
06TA25S4	1.9%	3 of 5
06TA25S1	1.9%	3 of 5
06TA26B	0.5%	2 of 5
06TA26S3	0.3%	2 of 5
06TA26S2	0.3%	2 of 5
06TA26S4	0.1%	2 of 5
06TA26S1	0.1%	2 of 5
06TA27B	8.6%	4 of 5
06TA27S3	5.4%	4 of 5
06TA27S2	5.4%	4 of 5
06TA27S4	1.4%	4 of 5
06TA27S1	1.4%	4 of 5
Total	100.0%	

Table 24. Runway 19 Turbopropeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Arrival Track Sheet
19TA20B	9.7%	2 of 5
19TA20S3	6.2%	2 of 5
19TA20S2	6.2%	2 of 5
19TA20S4	1.6%	2 of 5
19TA20S1	1.6%	2 of 5
19TA21B	1.2%	5 of 5
19TA21S3	0.8%	5 of 5
19TA21S2	0.8%	5 of 5
19TA21S4	0.2%	5 of 5
19TA21S1	0.2%	5 of 5
19TA22B	9.0%	4 of 5
19TA22S3	5.7%	4 of 5
19TA22S2	5.7%	4 of 5
19TA22S4	1.5%	4 of 5
19TA22S1	1.5%	4 of 5
19TA23B	0.8%	1 of 5
19TA23S3	0.5%	1 of 5
19TA23S2	0.5%	1 of 5
19TA23S4	0.1%	1 of 5
19TA23S1	0.1%	1 of 5
19TA24B	13.8%	3 of 5
19TA24S3	8.8%	3 of 5
19TA24S2	8.8%	3 of 5
19TA24S4	2.3%	3 of 5
19TA24S1	2.3%	3 of 5
19TA25B	3.9%	2 of 5
19TA25S3	2.5%	2 of 5
19TA25S2	2.5%	2 of 5
19TA25S4	0.6%	2 of 5
19TA25S1	0.6%	2 of 5
Total	100.0%	

Table 25. Runway 24 Turbopropeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Arrival Track Sheet	Track Name	Percent Use	Turbopropeller Arrival Track Sheet
24TA23B	16.9%	4 of 5	24TA28S2	1.1%	2 of 5
24TA23S3	10.7%	4 of 5	24TA28S4	0.3%	2 of 5
24TA23S2	10.7%	4 of 5	24TA28S1	0.3%	2 of 5
24TA23S4	2.8%	4 of 5	24TA29B	3.6%	1 of 5
24TA23S1	2.8%	4 of 5	24TA29S3	2.3%	1 of 5
24TA24B	4.2%	2 of 5	24TA29S2	2.3%	1 of 5
24TA24S3	2.7%	2 of 5	24TA29S4	0.6%	1 of 5
24TA24S2	2.7%	2 of 5	24TA29S1	0.6%	1 of 5
24TA24S4	0.7%	2 of 5	24TA30B	0.5%	3 of 5
24TA24S1	0.7%	2 of 5	24TA30S3	0.3%	3 of 5
24TA25B	4.9%	2 of 5	24TA30S2	0.3%	3 of 5
24TA25S3	3.1%	2 of 5	24TA30S4	0.1%	3 of 5
24TA25S2	3.1%	2 of 5	24TA30S1	0.1%	3 of 5
24TA25S4	0.8%	2 of 5	24TA31B	0.7%	4 of 5
24TA25S1	0.8%	2 of 5	24TA31S3	0.2%	4 of 5
24TA26B	1.8%	1 of 5	24TA31S2	0.2%	4 of 5
24TA26S3	1.1%	1 of 5	24TA32B	1.9%	5 of 5
24TA26S2	1.1%	1 of 5	24TA32S3	1.2%	5 of 5
24TA26S4	0.3%	1 of 5	24TA32S2	1.2%	5 of 5
24TA26S1	0.3%	1 of 5	24TA32S4	0.3%	5 of 5
24TA27B	0.7%	3 of 5	24TA32S1	0.3%	5 of 5
24TA27S3	0.4%	3 of 5	24TA33B	2.0%	5 of 5
24TA27S2	0.4%	3 of 5	24TA33S3	1.3%	5 of 5
24TA27S4	0.1%	3 of 5	24TA33S2	1.3%	5 of 5
24TA27S1	0.1%	3 of 5	24TA33S4	0.3%	5 of 5
24TA28B	1.8%	2 of 5	24TA33S1	0.3%	5 of 5
24TA28S3	1.1%	2 of 5	Total	100.0%	

Table 26. Runway 01 Turbopropeller Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Departure Track Sheet	Track Name	Percent Use	Turbopropeller Departure Track Sheet
01TD28B	9.7%	2 of 5	01TD33B	0.4%	3 of 5
01TD28S1	1.6%	2 of 5	01TD33S1	0.1%	3 of 5
01TD28S2	6.2%	2 of 5	01TD33S2	0.3%	3 of 5
01TD28S3	1.6%	2 of 5	01TD33S3	0.1%	3 of 5
01TD28S4	6.2%	2 of 5	01TD33S4	0.3%	3 of 5
01TD29B	1.6%	3 of 5	01TD34B	0.8%	4 of 5
01TD29S1	0.3%	3 of 5	01TD34S1	0.1%	4 of 5
01TD29S2	1.0%	3 of 5	01TD34S2	0.5%	4 of 5
01TD29S3	0.3%	3 of 5	01TD34S3	0.1%	4 of 5
01TD29S4	1.0%	3 of 5	01TD34S4	0.5%	4 of 5
01TD30B	2.3%	1 of 5	01TD35B	13.7%	1 of 5
01TD30S1	0.4%	1 of 5	01TD35S1	2.2%	1 of 5
01TD30S2	1.4%	1 of 5	01TD35S2	8.6%	1 of 5
01TD30S3	0.4%	1 of 5	01TD35S3	2.2%	1 of 5
01TD30S4	1.4%	1 of 5	01TD35S4	8.6%	1 of 5
01TD31B	2.5%	5 of 5	01TD36B	3.5%	2 of 5
01TD31S1	0.4%	5 of 5	01TD36S1	0.6%	2 of 5
01TD31S2	1.6%	5 of 5	01TD36S2	2.2%	2 of 5
01TD31S3	0.4%	5 of 5	01TD36S3	0.6%	2 of 5
01TD31S4	1.6%	5 of 5	01TD36S4	2.2%	2 of 5
01TD32B	2.5%	5 of 5	01TD37B	1.5%	4 of 5
01TD32S1	0.4%	5 of 5	01TD37S1	0.3%	4 of 5
01TD32S2	1.6%	5 of 5	01TD37S2	1.0%	4 of 5
01TD32S3	0.4%	5 of 5	01TD37S3	0.3%	4 of 5
01TD32S4	1.6%	5 of 5	01TD37S4	1.0%	4 of 5
			Total	100.0%	

Table 27. Runway 06 Turbopropeller Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Departure Track Sheet
06TD18B	3.3%	1 of 5
06TD18S1	0.5%	1 of 5
06TD18S2	2.1%	1 of 5
06TD18S3	2.1%	1 of 5
06TD18S4	0.5%	1 of 5
06TD19B	19.2%	3 of 5
06TD19S1	3.1%	3 of 5
06TD19S2	12.1%	3 of 5
06TD19S3	12.1%	3 of 5
06TD19S4	3.1%	3 of 5
06TD20B	3.3%	4 of 5
06TD20S2	0.8%	4 of 5
06TD20S3	0.8%	4 of 5
06TD21B	6.2%	2 of 5
06TD21S1	1.0%	2 of 5
06TD21S2	3.9%	2 of 5
06TD21S3	3.9%	2 of 5
06TD21S4	1.0%	2 of 5
06TD22B	8.1%	5 of 5
06TD22S1	1.3%	5 of 5
06TD22S2	5.1%	5 of 5
06TD22S3	5.1%	5 of 5
06TD22S4	1.3%	5 of 5
Total	100.0%	

Table 28. Runway 19 Turbopropeller Departures Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Departures Track Sheet
19TD15B	20.0%	4 of 5
19TD15S1	3.3%	4 of 5
19TD15S2	12.6%	4 of 5
19TD15S3	12.6%	4 of 5
19TD15S4	3.3%	4 of 5
19TD16B	5.3%	1 of 5
19TD16S1	0.9%	1 of 5
19TD16S2	3.4%	1 of 5
19TD16S3	3.4%	1 of 5
19TD16S4	0.9%	1 of 5
19TD17B	6.3%	2 of 5
19TD17S1	1.0%	2 of 5
19TD17S2	4.0%	2 of 5
19TD17S3	4.0%	2 of 5
19TD17S4	1.0%	2 of 5
19TD18B	1.1%	5 of 5
19TD18S1	0.2%	5 of 5
19TD18S2	0.7%	5 of 5
19TD18S3	0.7%	5 of 5
19TD18S4	0.2%	5 of 5
19TD19B	1.7%	1 of 5
19TD19S1	0.3%	1 of 5
19TD19S2	1.1%	1 of 5
19TD19S3	1.1%	1 of 5
19TD19S4	0.3%	1 of 5
19TD20B	4.3%	3 of 5
19TD20S1	0.7%	3 of 5
19TD20S2	2.7%	3 of 5
19TD20S3	2.7%	3 of 5
19TD20S4	0.7%	3 of 5
Total	100.0%	

Table 29. Runway 24 Turbopropeller Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Turbopropeller Departure Track Sheet	Track Name	Percent Use	Turbopropeller Departure Track Sheet
24TD28B	1.0%	1 of 5	24TD34S3	1.4%	3 of 5
24TD28S1	0.2%	1 of 5	24TD34S4	0.4%	3 of 5
24TD28S2	0.6%	1 of 5	24TD35B	0.3%	2 of 5
24TD28S3	0.6%	1 of 5	24TD35S1	0.0%	2 of 5
24TD28S4	0.2%	1 of 5	24TD35S2	0.2%	2 of 5
24TD29B	4.7%	1 of 5	24TD35S3	0.2%	2 of 5
24TD29S1	0.8%	1 of 5	24TD35S4	0.0%	2 of 5
24TD29S2	3.0%	1 of 5	24TD36B	0.5%	2 of 5
24TD29S3	3.0%	1 of 5	24TD36S1	0.1%	2 of 5
24TD29S4	0.8%	1 of 5	24TD36S2	0.3%	2 of 5
24TD30B	3.7%	2 of 5	24TD36S3	0.3%	2 of 5
24TD30S1	0.6%	2 of 5	24TD36S4	0.1%	2 of 5
24TD30S2	2.3%	2 of 5	24TD37B	7.4%	3 of 5
24TD30S3	2.3%	2 of 5	24TD37S1	1.2%	3 of 5
24TD30S4	0.6%	2 of 5	24TD37S2	4.7%	3 of 5
24TD31B	4.1%	3 of 5	24TD37S3	4.7%	3 of 5
24TD31S1	0.7%	3 of 5	24TD37S4	1.2%	3 of 5
24TD31S2	2.6%	3 of 5	24TD38B	7.6%	4 of 5
24TD31S3	2.6%	3 of 5	24TD38S1	1.2%	4 of 5
24TD31S4	0.7%	3 of 5	24TD38S2	4.8%	4 of 5
24TD32B	1.4%	4 of 5	24TD38S3	4.8%	4 of 5
24TD32S1	0.2%	4 of 5	24TD38S4	1.2%	4 of 5
24TD32S2	0.9%	4 of 5	24TD39B	4.4%	5 of 5
24TD32S3	0.9%	4 of 5	24TD39S1	0.7%	5 of 5
24TD32S4	0.2%	4 of 5	24TD39S2	2.8%	5 of 5
24TD33B	0.4%	1 of 5	24TD39S3	2.8%	5 of 5
24TD33S1	0.1%	1 of 5	24TD39S4	0.7%	5 of 5
24TD33S2	0.2%	1 of 5	24TD40B	1.0%	5 of 5
24TD33S3	0.2%	1 of 5	24TD40S1	0.2%	5 of 5
24TD33S4	0.1%	1 of 5	24TD40S2	0.6%	5 of 5
24TD34B	2.2%	3 of 5	24TD40S3	0.6%	5 of 5
24TD34S1	0.4%	3 of 5	24TD40S4	0.2%	5 of 5
24TD34S2	1.4%	3 of 5	Total	100.0%	

Table 30. Runway 01 Propeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Arrival Track Sheet
01PA6B	30.1%	3 of 6
01PA6S1	2.8%	3 of 6
01PA6S2	7.0%	3 of 6
01PA6S3	7.0%	3 of 6
01PA6S4	17.0%	3 of 6
01PA7B	4.9%	1 of 6
01PA7S1	1.3%	1 of 6
01PA7S2	1.3%	1 of 6
01PA7S3	4.9%	1 of 6
01PA7S4	7.8%	1 of 6
01PA8B	3.9%	2 of 6
01PA8S1	1.0%	2 of 6
01PA8S2	1.0%	2 of 6
01PA8S3	3.9%	2 of 6
01PA8S4	6.1%	2 of 6
Total	100.0%	

Table 31. Runway 06 Propeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Arrival Track Sheet
06PA14B	1.8%	1 of 6
06PA14S2	0.4%	1 of 6
06PA14S3	0.4%	1 of 6
06PA15B	4.1%	3 of 6
06PA15S1	0.7%	3 of 6
06PA15S2	2.6%	3 of 6
06PA15S3	2.6%	3 of 6
06PA15S4	0.7%	3 of 6
06PA16B	7.1%	4 of 6
06PA16S1	1.2%	4 of 6
06PA16S2	4.5%	4 of 6
06PA16S3	4.5%	4 of 6
06PA16S4	1.2%	4 of 6
06PA17B	1.7%	1 of 6
06PA17S1	0.3%	1 of 6
06PA17S2	1.1%	1 of 6
06PA17S3	1.1%	1 of 6
06PA17S4	0.3%	1 of 6
06PA18B	13.3%	5 of 6
06PA18S1	2.2%	5 of 6
06PA18S2	8.4%	5 of 6
06PA18S3	8.4%	5 of 6
06PA18S4	2.2%	5 of 6
06PA19B	1.9%	2 of 6
06PA19S1	0.3%	2 of 6
06PA19S2	1.2%	2 of 6
06PA19S3	1.2%	2 of 6
06PA19S4	0.3%	2 of 6
06PA20B	7.7%	6 of 6
06PA20S1	1.3%	6 of 6
06PA20S2	4.9%	6 of 6
06PA20S3	4.9%	6 of 6
06PA20S4	1.3%	6 of 6
06PA21B	1.7%	2 of 6
06PA21S1	0.3%	2 of 6
06PA21S2	1.1%	2 of 6
06PA21S3	1.1%	2 of 6
06PA21S4	0.3%	2 of 6
Total	100.0%	

Table 32. Runway 19 Propeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Arrival Track Sheet
19PA14B	7.1%	1 of 6
19PA14S1	1.2%	1 of 6
19PA14S2	4.5%	1 of 6
19PA14S3	4.5%	1 of 6
19PA14S4	1.2%	1 of 6
19PA15B	2.1%	2 of 6
19PA15S1	0.3%	2 of 6
19PA15S2	1.3%	2 of 6
19PA15S3	1.3%	2 of 6
19PA15S4	0.3%	2 of 6
19PA16B	13.0%	3 of 6
19PA16S1	2.1%	3 of 6
19PA16S2	8.2%	3 of 6
19PA16S3	8.2%	3 of 6
19PA16S4	2.1%	3 of 6
19PA17B	4.4%	4 of 6
19PA17S1	0.7%	4 of 6
19PA17S2	2.8%	4 of 6
19PA17S3	2.8%	4 of 6
19PA17S4	0.7%	4 of 6
19PA18B	6.8%	5 of 6
19PA18S1	1.1%	5 of 6
19PA18S2	4.3%	5 of 6
19PA18S3	4.3%	5 of 6
19PA18S4	1.1%	5 of 6
19PA19B	5.2%	6 of 6
19PA19S1	0.8%	6 of 6
19PA19S2	3.3%	6 of 6
19PA19S3	3.3%	6 of 6
19PA19S4	0.8%	6 of 6
Total	100.0%	

Table 33. Runway 24 Propeller Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Arrival Track Sheet
24PA15B	13.9%	1 of 6
24PA15S1	2.3%	1 of 6
24PA15S2	8.8%	1 of 6
24PA15S3	8.8%	1 of 6
24PA15S4	2.3%	1 of 6
24PA16B	6.6%	1 of 6
24PA16S1	1.1%	1 of 6
24PA16S2	4.2%	1 of 6
24PA16S3	4.2%	1 of 6
24PA16S4	1.1%	1 of 6
24PA17B	5.0%	3 of 6
24PA17S1	0.8%	3 of 6
24PA17S2	3.1%	3 of 6
24PA17S3	3.1%	3 of 6
24PA17S4	0.8%	3 of 6
24PA18B	1.7%	2 of 6
24PA18S2	0.4%	2 of 6
24PA18S3	0.4%	2 of 6
24PA19B	1.7%	4 of 6
24PA19S2	0.4%	4 of 6
24PA19S3	0.4%	4 of 6
24PA20B	2.5%	6 of 6
24PA20S1	0.4%	6 of 6
24PA20S2	1.6%	6 of 6
24PA20S3	1.6%	6 of 6
24PA20S4	0.4%	6 of 6
24PA21B	3.9%	5 of 6
24PA21S1	0.6%	5 of 6
24PA21S2	2.5%	5 of 6
24PA21S3	2.5%	5 of 6
24PA21S4	0.6%	5 of 6
24PA22B	4.7%	4 of 6
24PA22S1	0.8%	4 of 6
24PA22S2	3.0%	4 of 6
24PA22S3	3.0%	4 of 6
24PA22S4	0.8%	4 of 6
Total	100.0%	

Table 34. Runway 01 Propeller Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Departure Track Sheet	Track Name	Percent Use	Propeller Departure Track Sheet
01PD17B	10.1%	2 of 5	01PD23B	2.0%	1 of 5
01PD17S1	0.9%	2 of 5	01PD23S1	0.3%	1 of 5
01PD17S2	2.4%	2 of 5	01PD23S2	1.2%	1 of 5
01PD17S3	2.4%	2 of 5	01PD23S3	0.3%	1 of 5
01PD17S4	5.7%	2 of 5	01PD23S4	1.2%	1 of 5
01PD18B	0.5%	1 of 5	01PD24B	2.1%	2 of 5
01PD18S2	0.1%	1 of 5	01PD24S1	0.3%	2 of 5
01PD18S3	0.5%	1 of 5	01PD24S2	1.3%	2 of 5
01PD19B	3.6%	5 of 5	01PD24S3	0.3%	2 of 5
01PD19S1	0.6%	5 of 5	01PD24S4	1.3%	2 of 5
01PD19S2	2.3%	5 of 5	01PD25B	9.8%	4 of 5
01PD19S3	0.6%	5 of 5	01PD25S1	1.6%	4 of 5
01PD19S4	2.3%	5 of 5	01PD25S2	6.2%	4 of 5
01PD20B	5.6%	1 of 5	01PD25S3	1.6%	4 of 5
01PD20S1	0.5%	1 of 5	01PD25S4	6.2%	4 of 5
01PD20S2	1.3%	1 of 5	01PD26B	2.1%	3 of 5
01PD20S3	1.3%	1 of 5	01PD26S1	0.3%	3 of 5
01PD20S4	3.2%	1 of 5	01PD26S2	1.3%	3 of 5
01PD21B	0.6%	5 of 5	01PD26S3	0.3%	3 of 5
01PD21S2	0.1%	5 of 5	01PD26S4	1.3%	3 of 5
01PD21S3	0.6%	5 of 5	01PD27B	2.9%	3 of 5
01PD22B	2.4%	4 of 5	01PD27S1	0.5%	3 of 5
01PD22S1	0.4%	4 of 5	01PD27S2	1.8%	3 of 5
01PD22S2	1.5%	4 of 5	01PD27S3	0.5%	3 of 5
01PD22S3	0.4%	4 of 5	01PD27S4	1.8%	3 of 5
01PD22S4	1.5%	4 of 5	Total	100.0%	

Table 35. Runway 06 Propeller Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Departure Track Sheet
06PD15B	4.1%	3 of 5
06PD15S2	1.0%	3 of 5
06PD15S3	1.0%	3 of 5
06PD16B	32.8%	2 of 5
06PD16S1	5.4%	2 of 5
06PD16S2	20.7%	2 of 5
06PD16S3	20.7%	2 of 5
06PD16S4	5.4%	2 of 5
06PD17B	6.1%	1 of 5
06PD17S2	1.4%	1 of 5
06PD17S3	1.4%	1 of 5
Total	100.0%	

Table 36. Runway 19 Propeller Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Departure Track Sheet
19PD12B	23.9%	3 of 5
19PD12S1	3.9%	3 of 5
19PD12S2	15.1%	3 of 5
19PD12S3	15.1%	3 of 5
19PD12S4	3.9%	3 of 5
19PD13B	5.5%	1 of 5
19PD13S1	0.9%	1 of 5
19PD13S2	3.5%	1 of 5
19PD13S3	3.5%	1 of 5
19PD13S4	0.9%	1 of 5
19PD14B	9.2%	2 of 5
19PD14S1	1.5%	2 of 5
19PD14S2	5.8%	2 of 5
19PD14S3	5.8%	2 of 5
19PD14S4	1.5%	2 of 5
Total	100.0%	

Table 37. Runway 24 Propeller Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Propeller Departure Track Sheet	Track Name	Percent Use	Propeller Departure Track Sheet
24PD15B	1.2%	4 of 5	24PD21S3	1.7%	1 of 5
24PD15S1	0.2%	4 of 5	24PD21S4	0.4%	1 of 5
24PD15S2	0.7%	4 of 5	24PD22B	1.1%	2 of 5
24PD15S3	0.7%	4 of 5	24PD22S1	0.2%	2 of 5
24PD15S4	0.2%	4 of 5	24PD22S2	0.7%	2 of 5
24PD16B	1.7%	1 of 5	24PD22S3	0.7%	2 of 5
24PD16S1	0.3%	1 of 5	24PD22S4	0.2%	2 of 5
24PD16S2	1.1%	1 of 5	24PD23B	1.6%	4 of 5
24PD16S3	1.1%	1 of 5	24PD23S1	0.3%	4 of 5
24PD16S4	0.3%	1 of 5	24PD23S2	1.0%	4 of 5
24PD17B	2.4%	2 of 5	24PD23S3	1.0%	4 of 5
24PD17S1	0.4%	2 of 5	24PD23S4	0.3%	4 of 5
24PD17S2	1.5%	2 of 5	24PD24B	5.1%	2 of 5
24PD17S3	1.5%	2 of 5	24PD24S1	0.8%	2 of 5
24PD17S4	0.4%	2 of 5	24PD24S2	3.3%	2 of 5
24PD18B	2.2%	4 of 5	24PD24S3	3.3%	2 of 5
24PD18S1	0.4%	4 of 5	24PD24S4	0.8%	2 of 5
24PD18S2	1.4%	4 of 5	24PD25B	9.7%	3 of 5
24PD18S3	1.4%	4 of 5	24PD25S1	1.6%	3 of 5
24PD18S4	0.4%	4 of 5	24PD25S2	6.1%	3 of 5
24PD19B	3.3%	1 of 5	24PD25S3	6.1%	3 of 5
24PD19S1	0.5%	1 of 5	24PD25S4	1.6%	3 of 5
24PD19S2	2.1%	1 of 5	24PD26B	3.4%	5 of 5
24PD19S3	2.1%	1 of 5	24PD26S1	0.6%	5 of 5
24PD19S4	0.5%	1 of 5	24PD26S2	2.1%	5 of 5
24PD20B	2.4%	3 of 5	24PD26S3	2.1%	5 of 5
24PD20S1	0.4%	3 of 5	24PD26S4	0.6%	5 of 5
24PD20S2	1.5%	3 of 5	24PD27B	2.0%	3 of 5
24PD20S3	1.5%	3 of 5	24PD27S1	0.3%	3 of 5
24PD20S4	0.4%	3 of 5	24PD27S2	1.2%	3 of 5
24PD21B	2.7%	1 of 5	24PD27S3	1.2%	3 of 5
24PD21S1	0.4%	1 of 5	24PD27S4	0.3%	3 of 5
24PD21S2	1.7%	1 of 5	Total	100.0%	

Table 38. Helicopter Arrival Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Helicopter Arrival Track Sheet	Track Name	Percent Use	Helicopter Arrival Track Sheet
West Helipad			East Helipad		
WHHA1B	5.6%	1 of 3	EHHA1B	7.1%	1 of 3
WHHA1S2	1.3%	1 of 3	EHHA1S1	1.2%	1 of 3
WHHA1S3	1.3%	1 of 3	EHHA1S2	4.5%	1 of 3
WHHA2B	24.1%	1 of 3	EHHA1S3	4.5%	1 of 3
WHHA2S1	3.9%	1 of 3	EHHA1S4	1.2%	1 of 3
WHHA2S2	15.2%	1 of 3	EHHA2B	26.6%	1 of 3
WHHA2S3	15.2%	1 of 3	EHHA2S1	4.3%	1 of 3
WHHA2S4	3.9%	1 of 3	EHHA2S2	16.8%	1 of 3
WHHA3B	6.6%	1 of 3	EHHA2S3	16.8%	1 of 3
WHHA3S1	1.1%	1 of 3	EHHA2S4	4.3%	1 of 3
WHHA3S2	4.2%	1 of 3	EHHA3B	4.8%	1 of 3
WHHA3S3	4.2%	1 of 3	EHHA3S2	1.1%	1 of 3
WHHA3S4	1.1%	1 of 3	EHHA3S3	1.1%	1 of 3
WHHA4B	4.8%	1 of 3	EHHA4B	3.9%	1 of 3
WHHA4S1	0.8%	1 of 3	EHHA4S2	0.9%	1 of 3
WHHA4S2	3.0%	1 of 3	EHHA4S3	0.9%	1 of 3
WHHA4S3	3.0%	1 of 3	Total	100.0%	
WHHA4S4	0.8%	1 of 3			
Total	100.0%				
North Helipad					
NHHA1B	3.3%	1 of 3	NHHA3S3	3.7%	1 of 3
NHHA1S2	0.8%	1 of 3	NHHA3S4	1.0%	1 of 3
NHHA1S3	0.8%	1 of 3	NHHA4B	29.6%	1 of 3
NHHA2B	3.3%	1 of 3	NHHA4S1	4.8%	1 of 3
NHHA3B	5.9%	1 of 3	NHHA4S2	18.7%	1 of 3
NHA3S1	1.0%	1 of 3	NHHA4S3	18.7%	1 of 3
NHA3S2	3.7%	1 of 3	NHHA4S4	4.8%	1 of 3
			Total	100.0%	

Table 39. Helicopter Arrival Flight Track Utilization Rates (continued)

Source: HMMH, 2016

Track Name	Percent Use	Helicopter Arrival Track Sheet	Track Name	Percent Use	Helicopter Arrival Track Sheet
South Helipad					
SHHA1B	0.4%	2 of 3	SHHA7S3	0.8%	2 of 3
SHHA1S1	0.1%	2 of 3	SHHA7S4	0.2%	2 of 3
SHHA1S2	0.2%	2 of 3	SHHA8B	2.1%	3 of 3
SHHA1S3	0.2%	2 of 3	SHHA8S1	0.3%	3 of 3
SHHA1S4	0.1%	2 of 3	SHHA8S2	1.3%	3 of 3
SHHA2B	0.9%	2 of 3	SHHA8S3	1.3%	3 of 3
SHHA2S1	0.1%	2 of 3	SHHA8S4	0.3%	3 of 3
SHHA2S2	0.6%	2 of 3	SHHA9B	3.0%	2 of 3
SHHA2S3	0.6%	2 of 3	SHHA9S1	0.5%	2 of 3
SHHA2S4	0.1%	2 of 3	SHHA9S2	1.9%	2 of 3
SHHA3B	0.5%	2 of 3	SHHA9S3	1.9%	2 of 3
SHHA3S1	0.1%	2 of 3	SHHA9S4	0.5%	2 of 3
SHHA3S2	0.3%	2 of 3	SHHA10B	7.9%	3 of 3
SHHA3S3	0.3%	2 of 3	SHHA10S1	1.3%	3 of 3
SHHA3S4	0.1%	2 of 3	SHHA10S2	5.0%	3 of 3
SHHA4B	0.9%	3 of 3	SHHA10S3	5.0%	3 of 3
SHHA4S1	0.1%	3 of 3	SHHA10S4	1.3%	3 of 3
SHHA4S2	0.6%	3 of 3	SHHA11B	1.0%	2 of 3
SHHA4S3	0.6%	3 of 3	SHHA11S1	0.2%	2 of 3
SHHA4S4	0.1%	3 of 3	SHHA11S2	0.6%	2 of 3
SHHA5B	14.5%	2 of 3	SHHA11S3	0.6%	2 of 3
SHHA5S1	2.4%	2 of 3	SHHA11S4	0.2%	2 of 3
SHHA5S2	9.2%	2 of 3	SHHA12B	2.0%	2 of 3
SHHA5S3	9.2%	2 of 3	SHHA12S1	0.3%	2 of 3
SHHA5S4	2.4%	2 of 3	SHHA12S2	1.3%	2 of 3
SHHA6B	3.3%	3 of 3	SHHA12S3	1.3%	2 of 3
SHHA6S1	0.5%	3 of 3	SHHA12S4	0.3%	2 of 3
SHHA6S2	2.1%	3 of 3	SHHA13B	1.0%	2 of 3
SHHA6S3	2.1%	3 of 3	SHHA13S1	0.2%	2 of 3
SHHA6S4	0.5%	3 of 3	SHHA13S2	0.6%	2 of 3
SHHA7B	1.2%	2 of 3	SHHA13S3	0.6%	2 of 3
SHHA7S1	0.2%	2 of 3	SHHA13S4	0.2%	2 of 3
SHHA7S2	0.8%	2 of 3	Total	100.0%	

Table 40. Helicopter Departure Flight Track Utilization Rates

Source: HMMH, 2016

Track Name	Percent Use	Helicopter Departure Track Sheet	Track Name	Percent Use	Helicopter Departure Track Sheet
North Helipad			East Helipad		
NHHD1B	38.6%	1 of 3	EHHD1B	31.2%	1 of 3
NHHD1S1	6.3%	1 of 3	EHHD1S1	5.1%	1 of 3
NHHD1S2	24.4%	1 of 3	EHHD1S2	19.8%	1 of 3
NHHD1S3	24.4%	1 of 3	EHHD1S3	19.8%	1 of 3
NHHD1S4	6.3%	1 of 3	EHHD1S4	5.1%	1 of 3
Total	100.0%		EHHD2B	6.5%	1 of 3
West Helipad			EHHD2S32	1.5%	1 of 3
WHHD1B	30.1%	1 of 3	EHHD2S3	1.5%	1 of 3
WHHD1S1	4.9%	1 of 3	EHHD3B	6.5%	1 of 3
WHHD1S2	19.0%	1 of 3	EHHD3S2	1.5%	1 of 3
WHHD1S3	19.0%	1 of 3	EHHD3S3	1.5%	1 of 3
WHHD1S4	4.9%	1 of 3	Total	100.0%	
WHHD2B	8.5%	1 of 3			
WHHD2S1	1.4%	1 of 3			
WHHD2S2	5.4%	1 of 3			
WHHD2S3	5.4%	1 of 3			
WHHD2S4	1.4%	1 of 3			
Total	100.0%				
South Helipad					
SHHD1B	1.0%	2 of 3	SHHD6S3	3.6%	2 of 3
SHHD1S1	0.2%	2 of 3	SHHD6S4	0.9%	2 of 3
SHHD1S2	0.6%	2 of 3	SHHD7B	9.3%	3 of 3
SHHD1S3	0.6%	2 of 3	SHHD7S1	1.5%	3 of 3
SHHD1S4	0.2%	2 of 3	SHHD7S2	5.9%	3 of 3
SHHD2B	1.1%	2 of 3	SHHD7S3	5.9%	3 of 3
SHHD2S1	0.2%	2 of 3	SHHD7S4	1.5%	3 of 3
SHHD2S2	0.7%	2 of 3	SHHD8B	2.6%	2 of 3
SHHD2S3	0.7%	2 of 3	SHHD8S1	0.4%	2 of 3
SHHD2S4	0.2%	2 of 3	SHHD8S2	1.7%	2 of 3
SHHD3B	11.0%	3 of 3	SHHD8S3	1.7%	2 of 3
SHHD3S1	1.8%	3 of 3	SHHD8S4	0.4%	2 of 3
SHHD3S2	6.9%	3 of 3	SHHD9B	0.7%	2 of 3
SHHD3S3	6.9%	3 of 3	SHHD9S1	0.1%	2 of 3
SHHD3S4	1.8%	3 of 3	SHHD9S2	0.4%	2 of 3
SHHD4B	3.8%	2 of 3	SHHD9S3	0.4%	2 of 3
SHHD4S1	0.6%	2 of 3	SHHD9S4	0.1%	2 of 3
SHHD4S2	2.4%	2 of 3	SHHD10B	1.3%	3 of 3
SHHD4S3	2.4%	2 of 3	SHHD10S1	0.2%	3 of 3
SHHD4S4	0.6%	2 of 3	SHHD10S2	0.8%	3 of 3
SHHD5B	1.6%	2 of 3	SHHD10S3	0.8%	3 of 3
SHHD5S1	0.3%	2 of 3	SHHD10S4	0.2%	3 of 3
SHHD5S2	1.0%	2 of 3	SHHD11B	0.6%	3 of 3
SHHD5S3	1.0%	2 of 3	SHHD11S1	0.1%	3 of 3
SHHD5S4	0.3%	2 of 3	SHHD11S2	0.4%	3 of 3
SHHD6B	5.6%	2 of 3	SHHD11S3	0.4%	3 of 3
SHHD6S1	0.9%	2 of 3	SHHD11S4	0.1%	3 of 3
SHHD6S2	3.6%	2 of 3	Total	100.0%	

7. METEOROLOGICAL AND TERRAIN DATA

The INM also requires data on two sets of local conditions affecting aircraft operations and sound propagation; i.e., annual average day meteorological conditions and terrain.

7.1 Meteorological Data

The INM uses annual-average-day meteorological data to adjust aircraft performance and sound propagation. Data in the following three required categories were obtained from the National Climatic Data Center for calendar year 2014:

- Temperature: 54.6°F
- Pressure: 30.02 inches mercury (Hg)
- Relative humidity: 59.4%

7.2 Terrain Data

The INM uses terrain data to adjust the aircraft-to-ground path length, to take into account locations where terrain variation relative to the airfield makes the ground closer to or farther from the aircraft relative to flat-earth conditions.

Terrain data were obtained from the United States Geological Survey National Elevation Dataset for a 33-foot grid spacing covering the Study Area.

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Appendix D.2

- Part 150 Activity Forecast
- FAA Approval

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TECHNICAL MEMORANDUM

To:	Timothy Middleton, PANYNJ
From:	Ted Baldwin
Date:	February 17, 2016
Subject:	Teterboro Airport 14 CFR Part 150 Study Forecasts
Reference:	HMMH Project Number 307260.002.004

1. BACKGROUND

HMMH, in association with several other consulting firms (the "HMMH Team") is assisting the Port Authority of New York and New Jersey (PANYNJ) to prepare a 14 CFR Part 150 Airport Noise and Land Use Compatibility Study for Teterboro Airport (TEB). The study will include Noise Exposure Map (NEM) documentation for 2016 and 2021, the anticipated year of submission to the FAA and the fifth year from the anticipated year of submission, respectively.[1]

This memorandum and its attachments present proposed forecasts for those two years for the PANYNJ to submit to the Federal Aviation Administration (FAA) for review and approval, consistent with FAA guidance.[2]

2. FORECAST PROCESS

The PANYNJ, HMMH Team, and FAA collaborated in the development of a "Study Protocol for Newark/Liberty International (EWR) and Teterboro (TEB) Airports 14 CFR Part 150 Studies" (November 2015). Section 5 of that document sets forth the "Aviation Activity Forecast Protocol." The PANYNJ and the HMMH Team followed that protocol in preparing the TEB Part 150 forecasts.

The PANYNJ prepared the primary forecasts, including detail on average annual day arrival and departure operations by aircraft types available in the FAA's Integrated Noise Model (INM) for day (7 am - 10 pm) and night (10 pm - 7 am) time periods. The consulting firm of RS&H took the lead for the HMMH Team in performing "derivative" forecast analyses to prepare supplemental detail required for the noise model input; i.e., identifying stage lengths for departure operations,[3] and distributing the small number of "unallocated" operations[4] in the PANYNJ forecast.

These two forecasts are presented in the two attachments to this memorandum:

1. "Teterboro Airport Aircraft Fleet Mix and Annual Aircraft Operations Forecast, 2014-2033," Port Authority of New York and New Jersey, January 20, 2016.
2. Teterboro Airport NEM Forecast: Supplemental Detail Fleet Mix Methodology," RS&H, February 2016.

The first of these two attachments includes tables presenting the average annual day arrival and departure operations by INM aircraft types for day and night time periods.

[1] For consistency with §150.21(a) and §150.21(a)(1).

[2] FAA "Guidance on Review and Approval of Aviation Forecasts," June 2008, accessed on February 2, 2016 at https://www.faa.gov/airports/planning_capacity/media/approval_local_forecasts_2008.pdf.

[3] It should be noted that the INM database does not include standard modeling inputs for varied departure stage lengths for most general aviation aircraft models.

[4] In 2016: 23 jet, 10 turboprop, 18 piston, and 20 helicopter operations per day. In 2021: 43 jet, 10 turboprop, 18 piston, and 24 helicopter operations per day,

3. CONSISTENCY WITH FAA TERMINAL AREA FORECAST

FAA requires that airport sponsors' locally generated forecasts be consistent with the FAA's Terminal Area Forecast (TAF) for the airport. Specific FAA guidance for approval of forecasts states: "For all classes of airports, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if they meet the following criterion: Forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period."[5]

Section 5.1 of the "Study Protocol for Newark/Liberty International (EWR) and Teterboro (TEB) Airports 14 CFR Part 150 Studies" [HMMH, November 2015] states that "the FAA's 2014 TAF (issued January 2015) will be used as the baseline operational forecast."[6] Since the TEB Part 150 Study commenced, the FAA has prepared an updated 2015 TAF (issued January 2016), this data will be shown for compartive information purposes only because of its availability.

For consistency with the Study Protocol, Table 1 compares the forecasts of total operations for 2016 and 2021 to the forecasts for those years as presented in the 2014 TAF. Table 2 compares the forecasts of total operations for 2016 and 2021 to the forecasts for those years as presented in the the 2015 TAF.[7]

Table 1. Comparison of 2016 and 2021 PANYNJ Forecasts to 2014 FAA Terminal Area Forecasts

Year	FAA TAF Forecast (January 2015)	PANYNJ Part 150 Forecast	Difference (PANYNJ-TAF)	PANYNJ Percentage Difference from TAF
2016	167,952	171,112	3,160	1.88%
2021	171,016	187,036	16,020	9.37%

Table 2. Comparison of 2016 and 2021 PANYNJ Forecasts to 2015 FAA Terminal Area Forecasts

Year	FAA TAF Forecast (January 2016)	PANYNJ Part 150 Forecast	Difference (PANYNJ-TAF)	PANYNJ Percentage Difference from TAF
2016	172,537	171,112	-1,425	-0.83%
2021	177,646	187,036	9,390	5.29%

Table 1 shows that the Part 150 forecast for 2016 differs from the 2014 TAF forecast for 2016 by less than two percent and the Part 150 forecast for 2021 differs from the 2014 TAF forecast for 2021 by less than 10 percent.

Table 2 shows that the Part 150 forecast for 2016 differs from the 2015 TAF forecast for 2016 by less than one percent and the Part 150 forecast for 2021 differs from the 2015 TAF forecast for 2021 by less than six percent.

In all cases, the Part 150 forecasts differ from the TAF by less than the 10% tolerance for a five-year or less forecast period. The closer agreement of the Part 150 forecasts with the most current (2015) TAF is significant, in that it shows improved agreement with the most recent FAA projections.

Table 3 reproduces the report from which the 2014 TAF data presented in Table 1 were drawn. Table 4 reproduces the report from which the 2015 TAF data presented in Table 2 were drawn.[8]

[5] FAA, *op. cit.*

[6] This requirement in the Study Protocol follows guidance provided in the September 2, 2015 letter from Mr. Andrew Brooks, FAA Environmental Program Manager, Airports Division, AEA-610, to Mr. Edward C. Knoesel, Manager Aviation Environmental Programs, The Port Authority of New York and New Jersey, "Re: Request to Utilize FAA Terminal Area Forecasts as Basis for Activity Levels for 14 CFR Part 150 Noise Studies at John F. Kennedy International, LaGuardia, Newark Liberty International, and Teterboro Airports."

[7] The comparison only addresses operations, because the Part 150 regulation only requires forecasts of aircraft operations; there is no requirement for consideration of either enplanements or based aircraft.

Table 3. 2014 FAA Terminal Area Forecast for Teterboro Airport

APO TERMINAL AREA FORECAST DETAIL REPORT
Forecast Issued January 2015

TEB

	Enplanements			AIRCRAFT OPERATIONS: Itinerant Operations					AIRCRAFT OPERATIONS: Local Operations					
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Ops	Total Tracon Ops	Based Aircraft
REGION:AEA **STATE:**NJ **LOCID:**TEB														
CITY:TETERBORO **AIRPORT:**TETERBORO														
2014*	27	3,351	3,378	55	66,624	98,473	503	165,655	15	0	15	165,670	0	120
2015*	27	3,351	3,378	55	66,624	100,153	503	167,335	15	0	15	167,350	0	120
2016*	27	3,351	3,378	55	66,624	100,755	503	167,937	15	0	15	167,952	0	120
2017*	27	3,351	3,378	55	66,624	101,360	503	168,542	15	0	15	168,557	0	120
2018*	27	3,351	3,378	55	66,624	101,969	503	169,151	15	0	15	169,166	0	120
2019*	27	3,351	3,378	55	66,624	102,582	503	169,764	15	0	15	169,779	0	120
2020*	27	3,351	3,378	55	66,624	103,199	503	170,381	15	0	15	170,396	0	120
2021*	27	3,351	3,378	55	66,624	103,819	503	171,001	15	0	15	171,016	0	120

* Denotes forecast values (2014 and later years were forecasts in the 20145 TAF issued in January 2015).

Table 4. 2015 FAA Terminal Area Forecast for Teterboro Airport

APO TERMINAL AREA FORECAST DETAIL REPORT
Forecast Issued January 2016

TEB

	Enplanements			AIRCRAFT OPERATIONS: Itinerant Operations					AIRCRAFT OPERATIONS: Local Operations					
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Ops	Total Tracon Ops	Based Aircraft
REGION:AEA **STATE:**NJ **LOCID:**TEB														
CITY:TETERBORO **AIRPORT:**TETERBORO														
2014	46	3,454	3,500	55	66,624	98,473	503	165,655	15	0	15	165,670	0	112
2015*	50	2,339	2,389	71	69,387	100,478	638	170,574	0	0	0	170,574	0	112
2016*	50	2,339	2,389	71	70,081	101,747	638	172,537	0	0	0	172,537	0	112
2017*	50	2,339	2,389	71	70,782	102,052	638	173,543	0	0	0	173,543	0	112
2018*	50	2,339	2,389	71	71,489	102,358	638	174,556	0	0	0	174,556	0	112
2019*	50	2,339	2,389	71	72,204	102,665	638	175,578	0	0	0	175,578	0	112
2020*	50	2,339	2,389	71	72,926	102,973	638	176,608	0	0	0	176,608	0	112
2021*	50	2,339	2,389	71	73,655	103,282	638	177,646	0	0	0	177,646	0	112

* Denotes forecast values (2015 and later years were forecasts in the 2015 TAF issued in January 2016).

[8] Note: The tables are in different formats due to the need to draw the 2014 TAF report from historic sources and the 2015 TAF from current on-line sources.

Attachment 1:

"Teterboro Airport Aircraft Fleet Mix and Annual Aircraft Operations Forecast, 2014-2033"

Port Authority of New York and New Jersey, January 20, 2016

Teterboro Airport

Aircraft Fleet Mix and Annual Aircraft Operations Forecast 2014-2033

The Port Authority of New York and New Jersey

January 20, 2016

CONTENTS

1.1: FORECAST OVERVIEW

In order to evaluate existing and future noise exposure resulting from aircraft operations at Teterboro Airport (TEB), it is necessary to quantify the anticipated level of airport activity (operations), as well as the types of aircraft expected to be operating at the Airport. The 14 CFR Part 150 Airport Noise Compatibility Planning process requires consideration of existing noise levels, and the prediction of noise levels five years into the future based on the forecasted level of operations and anticipated fleet mix. Therefore, this Part 150 forecast provides average annual day (AAD) aircraft operations by aircraft type at Teterboro Airport (TEB) for the years 2016 and 2021. In addition to the years required for the Part 150 study, a detailed fleet mix forecast for the years 2023, 2028, and 2033 are also provided.

The assumptions inherent in the Part 150 forecast are based on numerous sources of data and input from the Federal Aviation Administration (FAA), the Port Authority of New York and New Jersey (PANYNJ), and third party data sources. These sources include the following:

- FAA 2014 Terminal Area Forecast for TEB (TAF)
- The Port Authority of New York and New Jersey
- PANYNJ Airport Noise and Operations Monitoring System Data (ANOMS)
- FAA Aerospace Forecast FY2015-2035
- General Aviation Manufacturers Association (GAMA)
- Woods & Poole Economics, Inc.

Per FAA requirements, the TEB Part 150 forecast is presented in terms of AAD operations (arrivals and departures) by aircraft type and time of day. AAD operations depict a representative day of all aircraft operations that occur over the course of a year. As such, the total forecast of existing and future annual operations are divided by annual days to determine the ADD operations. For the purposes of the Day-Night Average Sound Level (DNL) metric used in Part 150 studies, daytime is defined as 7:00am to 9:59pm while nighttime is defined as 10:00pm to 6:59am.

The 2014 FAA TEB TAF, presented in **Table 1.1** is used as the baseline for the aircraft operations forecast. The 2014 TEB TAF predicts no growth in air taxi and military operations and a 0.7 percent average annual growth rate (AAGR) for GA operations from 2014 through 2033. Total operations at TEB are forecast to grow at 0.4 percent AAGR through the forecast period. **Exhibit 1.1** illustrates historical and TAF projected TEB operations from 1990 through 2040.

The analysis presented in this report supports the Port Authority's position that growth rates shown in the FAA 2014 TAF are too low and the Port Authority chooses to use higher growth rates for the TEB FAR Part 150 Study. This position was reached after assessment of the unique characteristics of TEB aircraft

TETERBORO AIRPORT
FLEET Mix and NEM Forecast

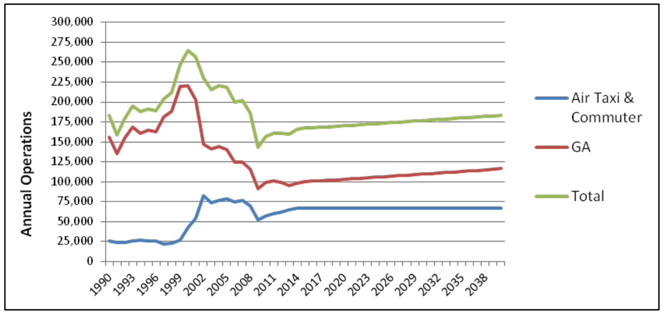
activity, socio-economic conditions of the region and tenant Fixed Base Operator (FBO) plans for facility expansions.

Table 1.1: 2014 TEB TAF – Operations

Fiscal Year	Itinerant Operations				Local Operations			Total Operations
	Air Taxi & Commuter	GA	Military	Total Itinerant	Civil	Military	Total Local	
2010	56,878	99,591	521	157,076	-	-	-	157,076
2011	59,859	100,886	473	161,310	-	-	-	161,310
2012	61,616	98,839	358	161,005	-	-	-	161,005
2013	64,461	94,988	435	159,938	-	-	-	159,938
2014	66,624	98,473	503	165,655	15	-	15	165,670
2015	66,624	100,153	503	167,335	15	-	15	167,350
2016	66,624	100,755	503	167,937	15	-	15	167,952
2017	66,624	101,360	503	168,542	15	-	15	168,557
2018	66,624	101,969	503	169,151	15	-	15	169,166
2019	66,624	102,582	503	169,764	15	-	15	169,779
2020	66,624	103,199	503	170,381	15	-	15	170,396
2021	66,624	103,819	503	171,001	15	-	15	171,016
2022	66,624	104,443	503	171,625	15	-	15	171,640
2023	66,624	105,071	503	172,253	15	-	15	172,268
2024	66,624	105,702	503	172,884	15	-	15	172,899
2025	66,624	106,337	503	173,519	15	-	15	173,534
2026	66,624	106,976	503	174,158	15	-	15	174,173
2027	66,624	107,618	503	174,800	15	-	15	174,815
2028	66,624	108,264	503	175,446	15	-	15	175,461
2029	66,624	108,915	503	176,097	15	-	15	176,112
2030	66,624	109,570	503	176,752	15	-	15	176,767
2031	66,624	110,228	503	177,410	15	-	15	177,425
2032	66,624	110,890	503	178,072	15	-	15	178,087
2033	66,624	111,556	503	178,738	15	-	15	178,753
2014-2033 AAGR	0.0%	0.7%	0.0%	0.4%	0.0%		0.0%	0.4%

Source: 2014 TEB TAF

Exhibit 1.1: 2014 TEB TAF – Operations



Source: 2014 TEB TAF

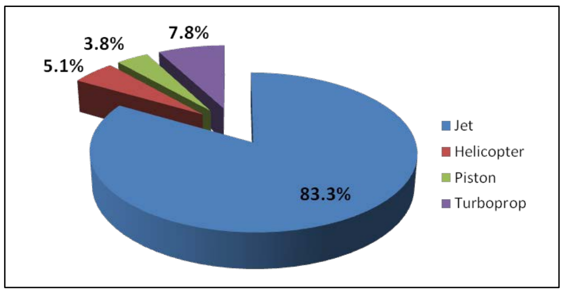
1.2: TAF FORECAST REVIEW AND DEVELOPMENT OF PORT AUTHORITY FORECASTS

The FAA Aerospace Forecast FY2015-2035 predicts the following average annual growth rates for the national GA fleet by aircraft type:

- Jet: 2.2 percent AAGR
- Helicopter: 3.2 percent AAGR
- Turboprop: 0.2 percent AAGR
- Piston: -0.7 percent AAGR

Assuming that new aircraft entering the fleet will be utilized at a rate consistent with the existing fleet, the FAA fleet growth rates can be used as a proxy for the operations growth rates. In the case of business jet operations, a 2.2 percent AAGR may be on the conservative side. In addition to fleet growth rates, the FAA Aerospace Forecast provides forecasts for hours flown by aircraft type. In the case of business jet aircraft, the FAA predicts an AAGR for hours flown of 3.6 percent indicating an anticipated increase in business jet utilization rates (i.e., more operations per aircraft and/or increased stage length). As illustrated in **Exhibit 1.2**, business jets accounted for 83.3 percent of 2014 operations at TEB, and this number is expected to increase through the forecast period. Simply put, jet aircraft traffic drives TEB operations and the FAA Aerospace Forecasts predicts strong growth in this type.

Exhibit 1.2: 2014 TEB Fleet Mix by Aircraft Type



Sources: 2014 TEB ANOMS

Comments and feedback from TEB FBO managers reinforce the likelihood of strong growth in operations. These insights include:

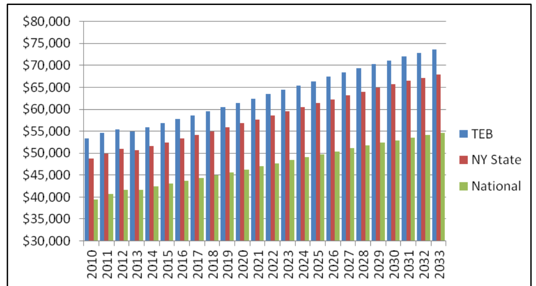
- All hangars are at maximum capacity; there are currently waitlists to base aircraft at TEB.
- The Port Authority Board has approved hangar and ramp expansion projects to increase TEB airside capacity.
- Expansion of airside facilities by TEB's FBOs indicate that demand will not remain static as the TAF suggests, but that the FBOs anticipate robust growth driven by strong business jet activity.

TETERBORO AIRPORT
FLEET Mix and NEM Forecast

1.2.1: Socio-economic Factors Affecting TEB Demand

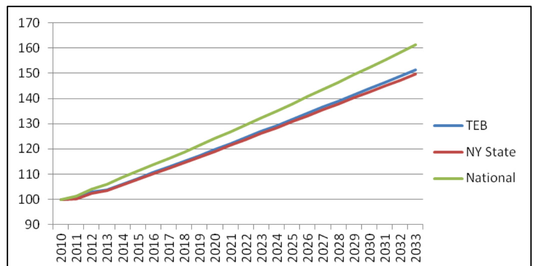
There are no current or projected underlying socio-economic factors in the TEB catchment area that would justify below national-average growth. Per capita personal income (PCPI) in the TEB catchment area is strong and projected to remain so, as illustrated in **Exhibit 1.3.** Additionally, gross national product (GNP) is forecast to grow at a robust 2.1 percent annually through the forecast period, as illustrated in **Exhibit 1.4**. A correlation analysis pairing GNP and TEB operations for 2010 through 2014 returned a correlation coefficient of 0.82, indicating a strong correlation between the two variables. GNP is expected to be a better predictor of TEB operations than PCPI or TEB catchment area gross regional product (GRP).

Exhibit 1.3: TEB Catchment Area Annual per Capita Income



Source: Woods & Poole

Exhibit 1.4: GNP-GRP Growth, Indexed



Source: Woods & Poole

1.2.2: Recommended TEB Forecast Factors

It is recommended that the TEB forecast use the FAA GA aircraft growth rates presented in the FAA Aerospace Forecast FY2015-2035. These growth rates provide an independent growth rate for each aircraft type in the TEB fleet, which is particularly important due to TEB's unique fleet of 83.3 percent jet aircraft. The projected growth of aircraft in the GA fleet will act as a proxy for operations growth since it is assumed that at a minimum, new aircraft entering the fleet will average the same number of annual operations as existing aircraft in the fleet. However, as previously mentioned, this may be a conservative estimate when applied to business jets operations. The FAA expects business jet aircraft hours flown to increase 3.6 percent annually, a rate greater than additions to the fleet (2.2 percent) indicating a higher anticipated utilization of aircraft. The FAA GA forecast factors to be used for TEB operations, by aircraft type are the following:

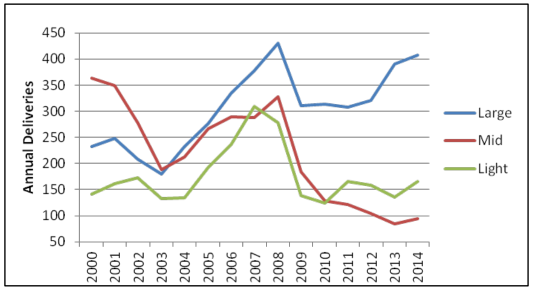
- Jet: 2.2 percent AAGR
- Helicopter: 3.2 percent AAGR
- Turboprop: 0.2 percent AAGR
- Piston: -0.7 percent AAGR

These growth rates are national and are considered conservative for the robust TEB market. However, they are more aggressive than those presented in the TAF. Overall, these factors yield a 2.0 percent AAGR versus the 0.4 percent AAGR found in the TAF.

1.3: TEB OPERATIONS AND FLEET MIX FORECAST

National trends in the business jet fleet, similar to the trends observed at TEB, indicate increasing size and range of new aircraft entering the fleet. The Honeywell 2015 Global Business Aviation Outlook states, "Operators continue to focus on larger-cabin aircraft classes, ranging from super mid-size through ultra-long-range and business liner, which are expected to account for more than 80 percent of all expenditures on new business jets in the near term." As illustrated in **Exhibit 1.5**, new business jet aircraft entering the fleet have become progressively larger and by 2010 large business jet deliveries had outpaced deliveries of mid-size and light jets combined.

Exhibit 1.5: 2010-2014 Business Jet Deliveries by Size



Source: GAMA 2014 General Aviation Statistical Databook

In order to account for the fleet shift toward larger business jet operations, the TEB jet fleet is broken out into the following categories:

- Large & Super Mid – In Production
- Large & Super Mid – Out of Production
- Midsize – In Production
- Midsize – Out of Production
- Light – In Production
- Light – Out of production

Independent growth rates are applied based on anticipated new deliveries, and retirements of aging aircraft. **Table 1.2** presents the TEB fleet mix forecast through 2033. Note that all Stage 2 aircraft are out of the TEB fleet by the end of 2015.

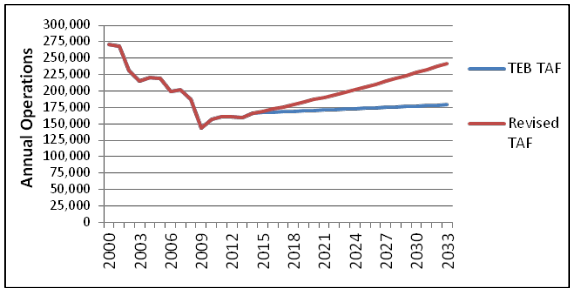
Table 1.2: TEB Fleet Mix Forecast 2014-2033

Aircraft Type			2014		2015		2016		2021		2023		2028		2033	
			Total	% of Ops	Total	% of Ops	Total	% of Ops	Total	% of Ops	Total	% of Ops	Total	% of Ops	Total	% of Ops
GLF4	Gulfstream 4	J	12,296	7.4%	12,788	7.6%	13,299	7.8%	16,180	8.7%	17,501	9.0%	21,293	9.9%	25,906	10.7%
H25B	Hawker HS-125-700/800	J	11,570	7.0%	11,396	6.8%	11,224	6.6%	10,407	5.6%	10,097	5.2%	9,362	4.3%	8,681	3.6%
C56X	Cessna 560XL Citation Excel	J	9,024	5.4%	9,386	5.6%	9,762	5.7%	11,878	6.4%	12,847	6.6%	15,630	7.2%	19,016	7.9%
C750	Cessna 750 Citation 10	J	8,740	5.3%	8,914	5.3%	9,094	5.3%	10,040	5.4%	10,445	5.4%	11,533	5.3%	12,733	5.3%
CL30	Canadair Challenger 300	J	8,106	4.9%	8,431	5.0%	8,767	5.1%	10,666	5.7%	11,538	5.9%	14,038	6.5%	17,079	7.1%
GLF5	Gulfstream 5	J	7,852	4.7%	8,166	4.9%	8,493	5.0%	10,334	5.5%	11,178	5.7%	13,600	6.3%	16,546	6.8%
F2TH	Falcon 2000	J	7,050	4.3%	7,192	4.3%	7,336	4.3%	8,099	4.3%	8,427	4.3%	9,304	4.3%	10,272	4.2%
BE40	Beech Beechjet 400	J	6,250	3.8%	6,156	3.7%	6,064	3.5%	5,623	3.0%	5,455	2.8%	5,057	2.3%	4,688	1.9%
CL64	Canadair Challenger 604	J	5,500	3.3%	5,720	3.4%	5,949	3.5%	7,237	3.9%	7,828	4.0%	9,524	4.4%	11,587	4.8%
PC12	Pilatus PC-12	T	5,402	3.3%	5,414	3.2%	5,426	3.2%	5,481	2.9%	5,505	2.8%	5,560	2.6%	5,616	2.3%
F900	Falcon 900	J	4,986	3.0%	5,085	3.0%	5,185	3.0%	5,724	3.1%	5,954	3.1%	6,574	3.0%	7,258	3.0%
C680	Cessna 680 Citation Sorereign	J	4,834	2.9%	5,027	3.0%	5,229	3.1%	6,362	3.4%	6,881	3.5%	8,371	3.9%	10,185	4.2%
C525	Cessna 525 Citation	J	4,574	2.8%	4,505	2.7%	4,437	2.6%	4,114	2.2%	3,991	2.1%	3,701	1.7%	3,431	1.4%
C560	Cessna 560 Citation 5	J	4,100	2.5%	4,038	2.4%	3,978	2.3%	3,688	2.0%	3,576	1.8%	3,315	1.5%	3,073	1.3%
GLEX	Bombardier Global Express	J	4,126	2.5%	4,291	2.5%	4,463	2.6%	5,431	2.9%	5,875	3.0%	7,149	3.3%	8,699	3.6%
LJ40	Learjet 40	J	3,950	2.4%	3,891	2.3%	3,833	2.2%	3,554	1.9%	3,448	1.8%	3,197	1.5%	2,965	1.2%
LJ60	Learjet 60	J	3,858	2.3%	3,935	2.3%	4,013	2.3%	4,430	2.4%	4,611	2.4%	5,091	2.4%	5,621	2.3%
GALX	Gulfstream Galaxy	J	3,752	2.3%	3,696	2.2%	3,642	2.1%	3,377	1.8%	3,277	1.7%	3,038	1.4%	2,816	1.2%
BE30	Beech Super King Air 300	T	2,498	1.5%	2,560	1.5%	2,624	1.5%	2,969	1.6%	3,119	1.6%	3,529	1.6%	3,993	1.6%
E55P	Embraer Phenom 300	J	2,206	1.3%	2,262	1.3%	2,319	1.4%	2,624	1.4%	2,757	1.4%	3,119	1.4%	3,529	1.5%
LJ35	Learjet 35	J	2,198	1.3%	2,166	1.3%	2,134	1.2%	1,979	1.1%	1,919	1.0%	1,780	0.8%	1,651	0.7%
FA50	Falcon 50	J	1,914	1.2%	1,942	1.2%	1,971	1.2%	2,124	1.1%	2,188	1.1%	2,357	1.1%	2,539	1.0%
GL5T	Bombardier Global 5000	J	1,792	1.1%	1,864	1.1%	1,938	1.1%	2,359	1.3%	2,551	1.3%	3,103	1.4%	3,776	1.6%
S76	Sikorsky S-76	H	1,668	1.0%	1,722	1.0%	1,777	1.0%	2,080	1.1%	2,216	1.1%	2,593	1.2%	3,035	1.3%
E135	Embraer EMB-135 ECJ-135	J	1,544	0.9%	1,567	0.9%	1,591	0.9%	1,713	0.9%	1,764	0.9%	1,900	0.9%	2,046	0.8%
C550	Cessna 550 Citation 2	J	1,532	0.9%	1,555	0.9%	1,579	0.9%	1,701	0.9%	1,753	0.9%	1,889	0.9%	2,035	0.8%
BE20	Beech King Air 200	T	1,450	0.9%	1,452	0.9%	1,454	0.8%	1,468	0.8%	1,472	0.8%	1,486	0.7%	1,500	0.6%
FA7X	Falcon 7X	J	1,396	0.8%	1,452	0.9%	1,510	0.9%	1,836	1.0%	1,986	1.0%	2,416	1.1%	2,940	1.2%
	Other Jet		14,878	9.0%	14,955	8.9%	15,034	8.8%	15,525	8.3%	15,770	8.1%	16,482	7.6%	17,374	7.2%
	Other TurboProp		3,556	2.1%	3,562	2.1%	3,568	2.1%	3,603	1.9%	3,615	1.9%	3,650	1.7%	3,686	1.5%
	Other Helicopter		6,776	4.1%	6,991	4.2%	7,215	4.2%	8,442	4.5%	8,991	4.6%	10,524	4.9%	12,319	5.1%
	Other Piston		6,288	3.8%	6,246	3.7%	6,204	3.6%	5,988	3.2%	5,906	3.0%	5,701	2.6%	5,505	2.3%
	Total		**165,666**	**100%**	**168,327**	**100%**	**171,112**	**100%**	**187,036**	**100%**	**194,441**	**100%**	**215,866**	**100%**	**242,100**	**100%**

Sources: 2014 TEB ANOMS Data, Landrum & Brown

As expected, business jet operations drive the vast majority of TEB growth through the forecast period. Total jet operations grow at 2.2 percent annually, which is in line with the FAA Aerospace Forecast FY2015-2035 growth rates for business jet aircraft. In total, business jets are projected to add over 68,000 annual operations between 2014 and 2033, accounting for 89.5 percent of TEB operations growth. Helicopter operations will also experience strong growth, growing from 5.1 percent of TEB operations in 2014 to 6.3 percent by 2033. Turboprop operations will remain relatively static while piston operations will experience a gradual decline through the forecast period. **Exhibit 1.6** illustrates the Port Authority forecast growth in operations versus the 2014 FAA TEB TAF.

Exhibit 1.6: TEB TAF versus Revised Forecast



Source: 2014 TEB TAF, Landrum & Brown

1.4: TEB NEM FORECAST

Table 1.3 and **Table 1.4** present the TEB NEM forecast for 2021 and 2022 respectively. The TEB fleet mix forecast is used as the basis for operations and aircraft type. ADD operations (total annual operations divided by 365) are shown by arrivals and departures and time of day. Time of day indicates a day operation or a night operation and is defined as follows:

- Day Operations: 7:00am to 9:59pm
- Night Operations: 10:00pm to 6:59am

PANYNJ 2014 Airport Noise and Operations Monitoring System (ANOMS) data for 2014 is used to determine the average annual day-night split by aircraft type.

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TETERBORO AIRPORT
FLEET Mix and NEM Forecast

Table 1.3: 2021 TEB NEM Forecast

Aircraft Type			2015							2021						
			Arrivals		Departures		Total			Arrivals		Departures		Total		
			Day	Night	Day	Night	Day	Night	Total	Day	Night	Day	Night	Day	Night	Total
GLF4	Gulfstream 4	J	15	3	16	2	31	5	36	19	3	20	2	39	5	44
H25B	Hawker HS-125-700/800	J	14	1	14	1	28	2	30	13	1	13	1	26	2	28
C56X	Cessna 560XL Citation Excel	J	12	1	12	1	24	2	26	15	1	15	1	30	2	32
C750	Cessna 750 Citation 10	J	11	1	11	1	22	2	24	12	2	13	1	25	3	28
CL30	Canadair Challenger 300	J	10	1	11	1	21	2	23	13	1	14	1	27	2	29
GLF5	Gulfstream 5	J	10	2	11	1	21	3	24	12	2	13	2	25	4	29
F2TH	Falcon 2000	J	9	1	9	1	18	2	20	10	1	10	1	20	2	22
BE40	Beech Beechjet 400	J	8	1	8	1	16	2	18	7	1	7	1	14	2	16
CL64	Canadair Challenger 604	J	7	1	7	1	14	2	16	9	1	9	1	18	2	20
PC12	Pilatus PC-12	T	6	1	6	1	12	2	14	6	1	6	1	12	2	14
F900	Falcon 900	J	6	1	7	-	13	1	14	7	1	7	1	14	2	16
C680	Cessna 680 Citation Sovereign	J	6	1	6	1	12	2	14	8	1	8	1	16	2	18
C525	Cessna 525 Citation	J	6	-	6	-	12	-	12	5	-	5	-	10	-	10
C560	Cessna 560 Citation 5	J	5	-	5	-	10	-	10	5	-	5	-	10	-	10
GLEX	Bombardier Global Express	J	5	1	5	1	10	2	12	7	1	6	1	13	2	15
LJ40	Learjet 40	J	5	-	5	-	10	-	10	5	-	5	-	10	-	10
LJ60	Learjet 60	J	5	-	5	-	10	-	10	6	1	6	-	12	1	13
GALX	Gulfstream Galaxy	J	4	1	5	-	9	1	10	4	1	4	-	8	1	9
BE30	Beech Super King Air 300	T	3	-	3	-	6	-	6	4	-	4	-	8	-	8
E55P	Embraer Phenom 300	J	3	-	3	-	6	-	6	3	-	3	-	6	-	6
LJ35	Learjet 35	J	2	1	2	1	4	2	6	2	1	2	1	4	2	6
FA50	Falcon 50	J	2	-	2	-	4	-	4	3	-	3	-	6	-	6
GL5T	Bombardier Global 5000	J	2	-	2	-	4	-	4	3	-	3	-	6	-	6
S76	Sikorsky S-76	H	2	-	2	-	4	-	4	3	-	3	-	6	-	6
E135	Embraer EMB-135 ECJ-135	J	2	-	2	-	4	-	4	2	-	2	-	4	-	4
C550	Cessna 550 Citation 2	J	2	-	2	-	4	-	4	2	-	2	-	4	-	4
BE20	Beech King Air 200	T	2	-	2	-	4	-	4	2	-	2	-	4	-	4
FA7X	Falcon 7X	J	2	-	2	-	4	-	4	2	-	2	-	4	-	4
	Other Jet		19	2	19	2	38	4	42	19	2	20	2	39	4	43
	Other TurboProp		5	-	5	-	10	-	10	5	-	5	-	10	-	10
	Other Helicopter		9	1	9	1	18	2	20	11	1	11	1	22	2	24
	Other Piston		8	1	8	1	16	2	18	8	1	8	1	16	2	18
			207	**22**	**212**	**18**	**419**	**40**	**459**	**232**	**24**	**236**	**20**	**468**	**44**	**512**

Aircraft Type		2015				2021			
		Arrivals		Departures		Arrivals		Departures	
		Day	Night	Day	Night	Day	Night	Day	Night
GLF4	Gulfstream 4	84.6%	15.4%	89.6%	10.4%	84.6%	15.4%	89.5%	10.5%
H25B	Hawker HS-125-700/800	90.9%	9.1%	92.0%	8.0%	90.9%	9.1%	92.0%	8.0%
C56X	Cessna 560XL Citation Excel	93.5%	6.5%	93.1%	6.9%	93.5%	6.5%	93.0%	7.0%
C750	Cessna 750 Citation 10	88.2%	11.8%	93.8%	6.2%	88.2%	11.8%	93.8%	6.2%
CL30	Canadair Challenger 300	89.8%	10.2%	94.6%	5.4%	89.8%	10.2%	94.6%	5.4%
GLF5	Gulfstream 5	86.8%	13.2%	88.5%	11.5%	86.9%	13.1%	88.5%	11.5%
F2TH	Falcon 2000	90.4%	9.6%	93.2%	6.8%	90.4%	9.6%	93.2%	6.8%
BE40	Beech Beechjet 400	91.0%	9.0%	93.6%	6.4%	91.0%	9.0%	93.6%	6.4%
CL64	Canadair Challenger 604	89.0%	11.0%	91.7%	8.3%	88.9%	11.1%	91.7%	8.3%
PC12	Pilatus PC-12	84.6%	15.4%	86.0%	14.0%	84.6%	15.4%	86.0%	14.0%
F900	Falcon 900	89.4%	10.6%	93.2%	6.8%	89.4%	10.6%	93.2%	6.8%
C680	Cessna 680 Citation Sovereign	91.1%	8.9%	94.4%	5.6%	91.1%	8.9%	94.4%	5.6%
C525	Cessna 525 Citation	93.6%	6.4%	94.8%	5.2%	93.6%	6.4%	94.8%	5.2%
C560	Cessna 560 Citation 5	94.1%	5.9%	94.1%	5.9%	94.1%	5.9%	94.1%	5.9%
GLEX	Bombardier Global Express	88.1%	11.9%	86.2%	13.8%	88.1%	11.9%	86.3%	13.7%
LJ40	Learjet 40	94.9%	5.1%	93.9%	6.1%	94.9%	5.1%	93.9%	6.1%
LJ60	Learjet 60	91.7%	8.3%	92.1%	7.9%	91.7%	8.3%	92.1%	7.9%
GALX	Gulfstream Galaxy	87.6%	12.4%	91.9%	8.1%	87.5%	12.5%	91.9%	8.1%
BE30	Beech Super King Air 300	94.4%	5.6%	96.9%	3.1%	94.3%	5.7%	96.9%	3.1%
E55P	Embraer Phenom 300	93.1%	6.9%	94.1%	5.9%	93.1%	6.9%	94.1%	5.9%
LJ35	Learjet 35	73.7%	26.3%	73.2%	26.8%	73.6%	26.4%	73.2%	26.8%
FA50	Falcon 50	92.3%	7.7%	93.1%	6.9%	92.3%	7.7%	93.1%	6.9%
GL5T	Bombardier Global 5000	89.1%	10.9%	89.6%	10.4%	89.1%	10.9%	89.6%	10.4%
S76	Sikorsky S-76	93.3%	6.7%	92.3%	7.7%	93.3%	6.7%	92.4%	7.6%
E135	Embraer EMB-135 ECJ-135	81.6%	18.4%	91.5%	8.5%	81.7%	18.3%	91.5%	8.5%
C550	Cessna 550 Citation 2	91.1%	8.9%	91.8%	8.2%	91.2%	8.8%	91.8%	8.2%
BE20	Beech King Air 200	96.3%	3.7%	94.5%	5.5%	96.3%	3.7%	94.6%	5.4%
FA7X	Falcon 7X	89.1%	10.9%	89.4%	10.6%	89.2%	10.8%	89.4%	10.6%
	Other Jet	90.6%	9.4%	92.3%	7.7%	90.7%	9.3%	92.5%	7.5%
	Other TurboProp	95.7%	4.3%	93.4%	6.6%	95.8%	4.2%	93.5%	6.5%
	Other Helicopter	94.2%	5.8%	92.8%	7.2%	94.2%	5.8%	92.9%	7.1%
	Other Piston	93.7%	6.3%	92.8%	7.2%	93.7%	6.3%	92.8%	7.2%
		90.1%	**9.9%**	**91.9%**	**8.1%**	**90.0%**	**10.0%**	**91.9%**	**8.1%**

Sources: 2014 TEB TAF, 2014 TEB ANOMS Data, Landrum & Brown

TETERBORO AIRPORT

FLEET Mix and NEM Forecast

Table 1.4: 2022 TEB NEM Forecast

Aircraft Type			2016 Arrivals		2016 Departures		2016 Total			2022 Arrivals		2022 Departures		2022 Total			2016 Arrivals		2016 Departures		2022 Arrivals		2022 Departures	
			Day	Night	Day	Night	Day	Night	Total	Day	Night	Day	Night	Day	Night	Total	Day	Night	Day	Night	Day	Night	Day	Night
GLF4	Gulfstream 4	J	15	3	16	2	31	5	36	20	4	21	2	41	6	47	84.6%	15.4%	89.5%	10.5%	84.6%	15.4%	89.5%	10.5%
H25B	Hawker HS-125-700/800	J	14	1	14	1	28	2	30	13	1	13	1	26	2	28	90.9%	9.1%	92.0%	8.0%	90.9%	9.1%	92.0%	8.0%
C56X	Cessna 560XL Citation Excel	J	13	1	13	1	26	2	28	16	1	16	1	32	2	34	93.5%	6.5%	93.1%	6.9%	93.5%	6.5%	93.0%	7.0%
C750	Cessna 750 Citation 10	J	11	1	12	1	23	2	25	12	2	13	1	25	3	28	88.2%	11.8%	93.8%	6.2%	88.2%	11.8%	93.8%	6.2%
CL30	Canadair Challenger 300	J	11	1	11	1	22	2	24	14	2	15	1	29	3	32	89.8%	10.2%	94.6%	5.4%	89.8%	10.2%	94.6%	5.4%
GLF5	Gulfstream 5	J	10	2	11	1	21	3	24	13	2	13	2	26	4	30	86.9%	13.1%	88.5%	11.5%	86.9%	13.1%	88.5%	11.5%
F2TH	Falcon 2000	J	9	1	9	1	18	2	20	10	1	11	1	21	2	23	90.4%	9.6%	93.2%	6.8%	90.4%	9.6%	93.1%	6.9%
BE40	Beech Beechjet 400	J	8	1	8	1	16	2	18	7	1	7	-	14	1	15	91.0%	9.0%	93.6%	6.4%	91.0%	9.0%	93.6%	6.4%
CL64	Canadair Challenger 604	J	7	1	7	1	14	2	16	9	1	9	1	18	2	20	88.9%	11.1%	91.7%	8.3%	88.9%	11.1%	91.7%	8.3%
PC12	Pilatus PC-12	T	6	1	6	1	12	2	14	6	1	6	1	12	2	14	84.6%	15.4%	86.0%	14.0%	84.6%	15.4%	86.0%	14.0%
F900	Falcon 900	J	6	1	7	-	13	1	14	7	1	7	1	14	2	16	89.4%	10.6%	93.2%	6.8%	89.4%	10.6%	93.2%	6.8%
C680	Cessna 680 Citation Sovereign	J	7	1	7	1	14	2	16	8	1	9	1	17	2	19	91.1%	8.9%	94.4%	5.6%	91.1%	8.9%	94.4%	5.6%
C525	Cessna 525 Citation	J	6	-	6	-	12	-	12	5	-	5	-	10	-	10	93.6%	6.4%	94.8%	5.2%	93.6%	6.4%	94.8%	5.2%
C560	Cessna 560 Citation 5	J	5	-	5	-	10	-	10	5	-	5	-	10	-	10	94.1%	5.9%	94.1%	5.9%	94.1%	5.9%	94.2%	5.8%
GLEX	Bombardier Global Express	J	5	1	5	1	10	2	12	7	1	7	1	14	2	16	88.1%	11.9%	86.2%	13.8%	88.1%	11.9%	86.3%	13.7%
LJ40	Learjet 40	J	5	-	5	-	10	-	10	5	-	5	-	10	-	10	94.9%	5.1%	93.9%	6.1%	94.9%	5.1%	93.9%	6.1%
LJ60	Learjet 60	J	5	-	5	-	10	-	10	6	1	6	-	12	1	13	91.7%	8.3%	92.1%	7.9%	91.7%	8.3%	92.1%	7.9%
GALX	Gulfstream Galaxy	J	4	1	5	-	9	1	10	4	1	4	-	8	1	9	87.5%	12.5%	91.9%	8.1%	87.5%	12.5%	91.9%	8.1%
BE30	Beech Super King Air 300	T	3	-	3	-	6	-	6	4	-	4	-	8	-	8	94.4%	5.6%	96.9%	3.1%	94.3%	5.7%	96.9%	3.1%
E55P	Embraer Phenom 300	J	3	-	3	-	6	-	6	3	-	3	-	6	-	6	93.1%	6.9%	94.1%	5.9%	93.1%	6.9%	94.1%	5.9%
LJ35	Learjet 35	J	2	1	2	1	4	2	6	2	1	2	1	4	2	6	73.7%	26.3%	73.2%	26.8%	73.6%	26.4%	73.2%	26.8%
FA50	Falcon 50	J	3	-	3	-	6	-	6	3	-	3	-	6	-	6	92.3%	7.7%	93.1%	6.9%	92.3%	7.7%	93.1%	6.9%
GL5T	Bombardier Global 5000	J	2	-	2	-	4	-	4	3	-	3	-	6	-	6	89.1%	10.9%	89.6%	10.4%	89.1%	10.9%	89.6%	10.4%
S76	Sikorsky S-76	H	2	-	2	-	4	-	4	3	-	3	-	6	-	6	93.3%	6.7%	92.3%	7.7%	93.3%	6.7%	92.4%	7.6%
E135	Embraer EMB-135 ECJ-135	J	2	-	2	-	4	-	4	2	-	2	-	4	-	4	81.6%	18.4%	91.5%	8.5%	81.7%	18.3%	91.5%	8.5%
C550	Cessna 550 Citation 2	J	2	-	2	-	4	-	4	2	-	2	-	4	-	4	91.1%	8.9%	91.8%	8.2%	91.2%	8.8%	91.8%	8.2%
BE20	Beech King Air 200	T	2	-	2	-	4	-	4	2	-	2	-	4	-	4	96.3%	3.7%	94.5%	5.5%	96.3%	3.7%	94.6%	5.4%
FA7X	Falcon 7X	J	2	-	2	-	4	-	4	2	-	2	-	4	-	4	89.1%	10.9%	89.4%	10.6%	89.2%	10.8%	89.4%	10.6%
	Other Jet		19	2	19	2	38	4	42	19	2	20	2	39	4	43	90.6%	9.4%	92.3%	7.7%	90.7%	9.3%	92.5%	7.5%
	Other TurboProp		5	-	5	-	10	-	10	5	-	5	-	10	-	10	95.7%	4.3%	93.4%	6.6%	95.8%	4.2%	93.5%	6.5%
	Other Helicopter		9	1	9	1	18	2	20	11	1	11	1	22	2	24	94.2%	5.8%	92.9%	7.1%	94.2%	5.8%	92.9%	7.1%
	Other Piston		8	1	8	1	16	2	18	8	1	8	1	16	2	18	93.7%	6.3%	92.8%	7.2%	93.7%	6.3%	92.8%	7.2%
			211	**22**	**216**	**18**	**427**	**40**	**467**	**236**	**26**	**242**	**19**	**478**	**45**	**523**	**90.1%**	**9.9%**	**91.9%**	**8.1%**	**90.0%**	**10.0%**	**91.9%**	**8.1%**

Sources: 2014 TEB TAF, 2014 TEB ANOMS Data, Landrum & Brown

hmmh

Attachment 2:

Teterboro Airport NEM Forecast: Supplemental Detail Fleet Mix Methodology"

RS&H, February 2016

Teterboro Airport NEM Forecast:

Supplemental Detail Fleet Mix Methodology

February 2016

Prepared for:

Port Authority of New York and New Jersey

Teterboro Airport NEM Forecast: Supplemental Detail Fleet Mix

1.0 Introduction

The Port Authority of New York and New Jersey has prepared detailed forecasts for use in generating Noise Exposure Map (NEM) contours for the TEB Part 150 Study, using the Federal Aviation Administration (FAA) Integrated Noise Model (INM). The Port Authority forecasts are presented as Attachment 1, a separate document titled "Teterboro Airport Aircraft Fleet Mix and Annual Aircraft Operations Forecast, 2014-2033" [Port Authority of New York and New Jersey, January 20, 2016] – (Port Authority Forecast).

The Port Authority forecast provided a majority of the information required for preparation or noise contours using the INM, including, for a detailed list of aircraft models:

- Average annual daily aircraft departures in the daytime (7 a.m. – 10 p.m.)[1] for 2016 and 2021
- Average annual daily aircraft departures in the nighttime (10 p.m. – 7 a.m.) for 2016 and 2021
- Average annual daily aircraft arrivals in the daytime (7 a.m. – 10 p.m.) for 2016 and 2021
- Average annual daily aircraft arrivals in the nighttime (10 p.m. – 7 a.m.) for 2016 and 2021

The NEM contours will reflect forecast activity and noise exposure in calendar years 2016 and 2021. The detailed Port Authority forecasts for 2016 and 2021 that include these breakdowns are presented in Tables 1.7 and 1.6, respectively, of the Port Authority Forecast document.

The Port Authority forecasts did not include information required for complete inputs to the INM in two areas: (1) departure stage lengths and (2) 100% assignment of forecast operations to specific aircraft types. RS&H prepared this Supplemental Detail Fleet Mix document to address these requirements. Sections 2 and 3 of this document address those requirements.

[1] The day and night breakdown is essential, because the Day-Night Average Sound Level (DNL) metric that Part 150 requires airport proprietors to use in preparing NEM contours applies a 10 decibel upward adjustment to all nighttime operations, which is mathematically equivalent to increasing nighttime operations by a factor of 10; i.e., considering the noise contribution of each night operation to be the same as 10 identical daytime operations.

Section 4 discusses the organization of an electronic spreadsheet that presents the full 2016 and 2021 forecasts, with the derivative forecast detail presented in this document integrated into the overall Port Authority Forecasts.

2.0 Methodology for Determination of Stage Lengths

For some aircraft types, the INM uses departure stage length; i.e., the distance flown by aircraft departures; as a surrogate for aircraft weight, because fuel load, which varies most directly with departure stage length, is the most significant determinant of variation in aircraft weight.

For purposes of developing INM inputs, aircraft departure stage lengths are subdivided into nine general lengths of flight segments. These are provided in the Table 1.

Table 1
INM Stage Length Categories

Stage Length	Distance (Nautical Miles)
1	0-500
2	501-1,000
3	1,001-1,500
4	1,501-2,500
5	2,501-3,500
6	3,501-4,500
7	4,501-5,500
8	5,500-6,500
9	> 6,500

Source: INM User's Guide, April 2007, page 153.

Two detailed databases are available for use in preparation of the 2016 existing conditions and 2021 five-year forecast conditions fleet mix: (1) the Port Authority's Airport Noise and Operations Management System (ANOMS), and (2) the Compuland database of aircraft operations maintained by AvPORTS, the firm with which the Port Authority has contracted to manage TEB. The Compuland database is used for assessing landing fees. It is based on manual logging of airport operations through actual observations, so is considered the most reliable record of TEB operations. Therefore, it was used as the primary basis for the forecast.

However, Compuland data does not include stage lengths. The process used to develop stage length inputs involved matching ANOMS and Compuland data to compare fleet mixes and identify detailed stage lengths for the aircraft types included in the forecast. This was accomplished by matching up aircraft types from the ANOMS data source with similar aircraft in the Compuland data source by stage length. The stage length data percentages were then applied to the aircraft operations by stage length to the ANOMS data source.

There were too few operations in Stage Length Categories 8 or 9 (5,500-6,500 nautical miles and >6,500 nautical miles, respectively) to justify modeling, since they would result in average daily operations that rounded to 0. Therefore, any operations in stage lengths greater than 4,500 nautical miles (Stage Length Category 6) were summed and assigned to Stage Length Category 7 (4,501-5,500 nautical miles), to ensure they were included in the modeled fleet mixes.

Table 1 presents a summary of operations by percent of Stage Length:

Table 1

Percent of Operations by Stage Length Category

Year	Stage Length 1	Stage Length 2	Stage Length 3	Stage Length 4	Stage Length 5	Stage Length 6	Stage Length 7+	Stage Length Totals
2014	38,011	107,191	12,136	3,158	3,829	1,118	264	165,666
	22.94%	64.70%	7.32%	1.90%	2.31%	0.67%	0.16%	100.00%
2016	39,197	110,625	12,480	3,280	4,040	1,201	287	171,112
	22.91%	64.65%	7.29%	1.92%	2.36%	0.70%	0.17%	100.00%
2021	42,364	121,088	13,610	3,637	4,552	1,443	342	187,036
	22.65%	64.74%	7.28%	1.94%	2.43%	0.77%	0.18%	100.00%

3.0 Allocating Unspecified Operations

The Port Authority Forecast provided a detailed fleet mix forecast that identified specific aircraft types for all aircraft models that – according to the Compuland data – conducted at least 196 operations in 2014. The Port Authority Forecast aggregated operations by aircraft models for which the 2014 Compuland data included less than 196 operations into an overall category titled "unallocated", with subtotals in four generic aircraft types – jets, turboprops, helicopters, and pistons. For the purposes of developing the INM inputs, it was necessary to assign these operations to specific aircraft models in the 2016 and 2021 forecasts.

The methodology used to identify a single representative aircraft model for each of the four aircraft categories; i.e., jet, turboprop, helicopter, and piston; included the following steps:

- Identify the average weight of the aircraft models in each of the four categories in 2014. The calculation of the average weight took into account the relative portion of overall operations by each model in each category.[2] For example, the average weight of the 44 jet models operating at TEB, adjusted to take into account each model's portion of overall operations, is 37,600 pounds.

- Select an aircraft type in each category from among the aircraft models identified as operating at TEB in 2014 that is closest in weight to the average weight.

- For example, the Gulfstream 280 general aviation jet, with a weight of 39,600 pounds, was determined to be the closest to the average weight of 37,600 pounds. This type was selected to represent all unallocated jet operations.

- Perform similar evaluations for the other aircraft categories. The representative aircraft in 2014 for the other categories was determined to be:

    - Turboprops - Beech King Air 300;
    - General Aviation Pistons - Cirrus SR-22; and,
    - Helicopters - Sikorsky 76-B.

Appendix A provides brief descriptions of these four representative aircraft.

[2] Specifically, the average aircraft weight was determined by multiplying the weight of an aircraft type by its number of operations, summed across all aircraft models, and divided by the total number of operations.

4.0 NEM TEB Forecasts Combining Port Authority and RS&H Inputs

The full detail of the TEB forecasts are presented on an electronic copy of a spreadsheet titled "20160217_RS&H_and_PANYNJ_Final_TEB_ Forecast.xlsx", which will accompany this document and the submission of the proposed forecast to the FAA for review and approval.

The spreadsheet includes two tabs:

- The "Stage Length Forecast" tab presents the 2016 and 2021 stage length forecasts prepared following the approach discussed in Section 2 of this document.

- The "Departure Arrival Forecast" tab presents the 2016 and 2021 forecasts of annual average daily departures and arrivals in the day and night time periods. These forecasts are identical to the forecasts in the Port Authority Forecast document, with the exception that unallocated operations that were included in the Port Authority forecasts have been allocated following the approach discussed in Section 3 of this document.

Appendix A: Representative Aircraft Models

The information in this section is an example of the aircraft types that were researched to identify which models of aircraft would best represent unallocated aircraft in the forecast.

Corporate Jets – Gulfstream and the Israeli Aircraft Industry (IAI) began working on a next generation Gulfstream 200 in 2005. The new aircraft was designed by IAI to meet Gulfstream requirements, but is a Gulfstream certificated aircraft. Aircraft models in the same category as the G280 include the Hawker 4000, Bombardier Challenger 300, and the Embraer Legacy 500. The first aircraft took flight in December 2009. The aircraft has a range of 3,600 nautical miles.

Turboprops – The King Air Model 300 series is the representative turboprop aircraft for unallocated turboprop operations. The Beech King Air family is the longest continuous production turboprop (1974) and has four production models – B200GT, B200CGT, B300, and B330C. These models will be part of the fleet for many years to come. The King Air Model 300 is the lower aircraft depicted in the following figure.

General Aviation Pistons – Cirrus aircraft are considered to be innovative aircraft manufacturer of general aviation aircraft. The Cirrus model SR22 is the most popular new generation piston aircraft. This model of piston aircraft is the one that operates most frequently at TEB and is selected as the model to represent the unallocated operations in the forecast.

Helicopters - The Sikorsky 76 series, which was originally built for rigorous demands of the offshore oil market, continues to improve in response to today's most critical market requirements with increased performance. Its capabilities fit naturally into other market segments, such as executive transport and other various uses in the medical field as well. A common model of this aircraft is the S-76B with newer generation models S-76C and S-76C+. A next generation 76-D is being developed. For TEB, the S-76B is the aircraft identified to represent unallocated helicopter operations as well as the additional unallocated helicopter operations in 2016 and 2021.

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U.S. Department of Transportation
Federal Aviation Administration

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March 28, 2016

Mr. Edward C. Knoesel
Manager, Aviation Environmental Programs
The Port Authority of New York and New Jersey
4 World Trade Center
150 Greenwich Street, 18th Floor
New York, NY 10006

Re: Teterboro Airport 14 CFR Part 150 Study Forecasts Memorandum

Dear Mr. Knoesel,

We received the Teterboro Airport 14 CFR Part 150 Study Forecasts Memorandum electronically for review and approval on February 18, 2016. We have no comments on the Forecast Memorandum. We also note that our previous comments on the Aircraft Fleet Mix and Operations Forecast 2014-2033 for Teterboro Airport, contained as Attachment 1 to the Memorandum, have all been addressed.

Therefore, the use of the Aircraft Fleet Mix and Operations Forecast 2014-2033 for Teterboro Airport and the derivation of the forecast as shown in the Teterboro Airport 14 CFR Part 150 Study Forecasts Memorandum are approved. This approval is specific to the use of this forecast in the Teterboro Airport CFR Part 150 Study. Additionally, the approval is limited to the data through the year 2021, as that is the year of development for the future Noise Exposure Map associated with the 14 CFR Part 150 Study.

If you have any questions, please call me at 718-553-2511.

Sincerely,

Andrew Brooks
Environmental Program Manager
Airports Division, AEA-610

cc: K. Mitchell, PANYNJ
A. Yousuf, PANYNJ
T. Middleton, PANYNJ

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Appendix D.3

- INM Aircraft Substitution Authorization
- FAA Approval

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HMMH
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February 9, 2016

Mr. Timothy Middleton
Program Manager – Part 150 Noise Studies
Aviation Department
The Port Authority of New York and New Jersey
4 World Trade Center
150 Greenwich St., 18th Floor
New York, NY 10007

Subject: Teterboro Airport (TEB)
TEB Part 150 Noise Exposure Map – INM Substitution and User Defined Aircraft Request

Reference: HMMH Project No. 307260.002

Dear Mr. Middleton:

The Port Authority of New York and New Jersey has provided HMMH with forecasts of operations for our use in preparing 2016 and 2021 Day-Night Average Sound level (DNL) contours for the Teterboro Airport (TEB) 14 CFR Part 150 study. As you are aware, we are developing the contours using the most current release of the Federal Aviation Administration (FAA) Integrated Noise Model (INM); i.e., Version 7.0d.

Several aircraft types in the Port Authority forecast for TEB are not available in the INM as standard aircraft types or as types for which the FAA has identified pre-approved substitutes. Therefore, consistent with established FAA policies and procedures, we submit this request for approval of the identified aircraft types of interest, included in Attachment A.

We also have identified one aircraft type – the Gulfstream III/IIB with QS3 Hushkit – for which we believe a "user-defined aircraft", represents the most appropriate modeling approach. Attachment B presents a request, justification, and data in the format that FAA expects to receive to consider and approve such a request.

If you concur, HMMH requests that the Port Authority submit this request to FAA. We expect that – consistent with prior practice – FAA will review and INM 7.0d substitutes that we have proposed, or provide alternative guidance. In accordance with FAA policy, we expect that this request will be reviewed by the agency's Airport Planning and Environmental Division (APP-400) and Office of Environment and Energy Noise Division (AEE-100).

We will be happy to respond to questions regarding this request from either the Port Authority or FAA.

Thank you for your assistance in this matter.

Sincerely yours,
Harris Miller Miller & Hanson Inc. d/b/a/ HMMH

Robert C. Mentzer Jr.
Principal Consultant

Attachment A: INM Aircraft Substitution Requests and Suggestions
Attachment B: User Defined Aircraft Request
File: GIIB_INM_Study_and_Excel_Calc_Worksheet.zip

ATTACHMENT A
INM AIRCRAFT SUBSTITUTION REQUESTS AND SUGGESTIONS

The aircraft types listed in Table 1 are included in the Noise Exposure Map (NEM) Update and require a FAA approved substitution. In each case, we have identified a substitute for each aircraft using the INM 7.0d database. The basis for our recommendations is discussed following Table 1.

Table 1. Aircraft Types and Recommended INM Substitutions

#	Group	Aircraft Code	Represented Aircraft Models	Recommended INM Substitution
1.1	Jet	E50P	Embraer EMB-500 Phenom 100	CNA510
1.2	Jet	E55P	Embraer EMB-505 Phenom 300	CNA560E
1.3	Jet	GLF6	Gulfstream 650/Gulfstream 6	GV
1.4	Jet	G280	Gulfstream 280	CL601
1.5	Jet	H25B	Raytheon Hawker 700/800, 800XP	LEAR35
1.6	Jet	H25C	Raytheon Hawker 1000	LEAR35
1.7	Jet	GL5T	Bombardier Global 5000	GV
1.8	Jet	F20Q	Falcon 20 (Re-engined)	LEAR35
1.9	Jet	FA7X	Falcon 7X	F10062
1.10	Jet	LJ40	Learjet 40	LEAR35
1.11	Jet	CL64	Canadair Challenger 604	CL601
1.12	Jet	CL65	Canadair Challenger 605	CL601

HMMH
Noise Exposure Map for Teterboro Airport
Request for INM 7.0d Aircraft Type Substitutions
February 9, 2016

1.1 Embraer EMB-500 Phenom 100 – E50P

We propose to model Embraer Phenom 100 operations with INM type CNA510.

Table 2 presents certification data for the Embraer Phenom 100 (EMB-500) and the Cessna Mustang. The Cessna Mustang, identified in INM as the CNA510, has the same series of engines as the EMB-500 and provides the closest match in certification levels.

Table 2. Noise Certification Data for Embraer EMB 500 Phenom 100 and Cessna Citation Mustang

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Fly Over	Approach
Embraer	EMB 500	10,472	9,766	Pratt & Whitney Canada / PW617F-E	81.4	70.4	86.1
Cessna Aircraft Company	Cessna 510 / Citation Mustang	8,644	8,001	Pratt & Whitney Canada / PW615F-A	85.0	73.9	86.0

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

1.2 Embraer EMB-505 Phenom 300 – E55P

We propose to model Embraer Phenom 300 operations with INM type CNA560E.

Both the Phenom 300 (EMB-505) and the Cessna 560 Encore are light jets which are similar in weight with two Pratt & Whitney fuselage mounted engines. The two aircraft are similar in certified noise levels, with the CNA560E being slightly higher on lateral and approach, as shown in Table 3.

Table 3. Noise Certification Data for Embraer EMB 505 Phenom 300 and Cessna 560 Eclipse

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Fly Over	Approach
Embraer	EMB 505	17,968	16,865	Pratt & Whitney Canada / PW535E	88.8	69.9	88.5
Cessna Aircraft Company	Cessna 560 Encore	16,630	15,200	Pratt & Whitney Canada / PW535A	89.8	70.0	90.5

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

HMMH
Noise Exposure Map for Teterboro Airport
Request for INM 7.0d Aircraft Type Substitutions
February 9, 2016

1.3 Gulfstream 650 – G650, Gulfstream 6 – GLF6

We propose to model the Gulfstream 650 with the INM type GV aircraft.
We propose to model the Gulfstream 6 with the INM type GV aircraft.

The Gulfstream 650 (G-VI) jet is the latest version of Gulfstream Aircraft's G-III, IV, and V aircraft. All of these aircraft have similar design, but the G-VI has greater range, payload, and overall performance capabilities than earlier variants. This aircraft most closely matches the G-V aircraft. Certification data for the G-V and the G-VI are shown in Table 4 below.

Table 4. Noise Certification Data for Gulfstream V and Gulfstream VI

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Gulfstream	V	90,500	75,299	BR700-710A1	89.1	80.3	90.8
Gulfstream	VI	99,598	83,498	BR700-725A1	89.8	77.5	88.3

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

1.4 Gulfstream 280 – G280

We propose to model the Gulfstream 280 with the INM type CL601 aircraft.

The Gulfstream 280 (G280) is the newest aircraft produced by Gulfstream. This aircraft most closely matches the CL601 aircraft in terms of size and performance. Certification data for the G280 and CL601 are shown in Table 5 below.

Table 5. Noise Certification Data for Gulfstream 280 and Bombardier CL601

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Gulfstream	280	45,100	35,999	HTF7250G	84.3	80.2	91.2
Bombardier	CL601	39,599	32,699	CF34-1A	89.5	75.2	90.5

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

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1.5 Raytheon Hawker 700/800, 800XP – H25B

We propose to model the Hawker 700/ 800, 800XP with the INM type LEAR35 aircraft.

The Raytheon Hawker 700/800 and 800XP (H25B) are mid-size business jets. The 800XP variant is developed from the British Aerospace (BAe) 125-800 aircraft. The 800XP feature a MTOW of 28,000 lbs and a MLW of 23,350 lbs, and are equipped with two Honeywell TFE731-5BR engines rated at 4,660 lbs of thrust each.[1] Since the INM 7.0d Aircraft Substitutions list includes the LEAR35 as the substitute aircraft for the Raytheon Hawker 800, we determined that the 700 and 800XP can be substituted by the INM type LEAR35 aircraft due to the similar aircraft characteristics shown in Table 6 below.

Table 6. Noise Certification Data for Raytheon Hawker 125 and Learjet 35

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Raytheon	Hawker 125-700A	25,500	22,000	TFE731-3-1H	89.2	88.0	96.3
Raytheon	Hawker 125-800	27,400	23,350	TFE731-5R-1H	87.2	80.9	96.5
Raytheon	Hawker 125-800XP	28,000	23,350	TFE731-5BR	87.1	79.3	93.3
Learjet	35	18,000	14,300	TFE731-2-2B	87.9	84.5	92.2

Sources:
FAA AC 36-1H Appendix 1, from
https://www.faa.gov/about/office_org/headquarters_offices/apl/noise_emissions/aircraft_noise_levels/
Hawker Beechcraft Corporation, FAA Approved Airplane Flight Manual – Hawker 800XP and 900XP.
Note:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight

[1] *www.legacyaviationgroup.com/PDF/hawker_800xp_specs.pdf*

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1.6 Raytheon Hawker 1000 – H25C

We propose to model Raytheon Hawker 1000 operations with INM type LEAR35.

Similar to the Hawker 800 and 800XP above, the Hawker 1000 has fuselage mounted engines and is slightly larger at 31,000 lbs MTOW. Instead of the TFE 731 engines the Hawker 1000 has the PW300 series engines. Certification data for the Hawker 1000 and Lear35 are shown in Table 7 below.

Table 7. Noise Certification Data for Raytheon Hawker 125-1000 and Learjet 35A

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Raytheon	Hawker 125-1000	31,000	25,000	PW305	85.9	81.8	91.6
Learjet	LEAR 35 A	18,000	14,300	TFE731-2-2B	87.4	83.6	91.3

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

1.7 Bombardier Global 5000 – GL5T

We propose to model GL5T operations with INM type GV.

The GL5T, Bombardier BD-700 Global 5000, is similar to the Bombardier BD-700 Global Express which has the INM type GV listed in the model as the approved substitution. Both aircraft use variants of the Rolls-Royce BR710 engine and both have similar maximum take-off weights, landing weights and noise levels. Table 8 provides a comparison of the noise certification data for these aircraft.

Table 8. Noise Certification Data for Bombardier Global Express, Global 5000 and Gulfstream V

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Bombardier	BD-700-1A11 (Global 5000)	92,500	78,600	BR700-710-A2-20	88.9	81.3	89.7
Bombardier	BD-700-1A10 (Global Express)	93,500	78,500	BR700-710-A2-20	88.9	81.6	89.7
Gulfstream	G-V	90,500	75,300	BR700-710-A1-10	89.1	80.3	90.8

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

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1.8 Falcon 20 (Hushkit) – F20Q

We propose to model Falcon 20 (Hushkit) operations with INM type LEAR35.

The F20Q (Falcon 20 Quiet), is similar to the Lear35. The Falcon 20 Quiet has been re-engined to comply with Stage 3 noise limits. Both aircraft use variants of the TFE731 engine and both have similar maximum take-off weights, landing weights and noise levels.

Table 9 provides a comparison of the noise certification data for these aircraft.

Table 9. Noise Certification Data for Falcon 20 (Re-engined) and Lear 35

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Falcon	20	29,100	27,800	TFE731-5BR-2C	88.6	81.8	90.0
Learjet	LEAR 35 A	18,000	14,300	TFE731-2-2B	87.4	83.6	91.3

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

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1.9 Falcon 7X – FA7X

We propose to model FA7X operations with INM type F10062.

The Dassault Falcon 7X is a relatively new three-engine (two are fuselage mounted and one tail mounted) corporate jet and does not have an FAA-approved INM substitution. The FA7X is powered by three Pratt & Whitney Canada PW 307A engines and is heavier than previous three-engine Dassault corporate aircraft that are powered by Allied Signal/Garrett TFE731 series engines (i.e. Falcon 50 and Falcon 900). Certification from EASA indicates that the INM F10062 would be an appropriate substitution. The Dassault Falcon 7X has a certified MTOW of 31,298 kg (69,000 lb.) and a certified MLW of 28,304 kg (62,400 lb.). For comparison, the Fokker 100 has a MTOW of 43,090 kg and a MLW of 38,780 kg. Since the FA7X has three-engines and the Fokker 100 has two engines (along with most other candidate INM 7.0d types), thrust to weight comparisons would not be effective because three-engine and two-engine aircraft have different certification requirements regarding available thrust for engine-out conditions. Table 10 presents a comparison of the Dassault Falcon 7X and Fokker 100 certification data.

Table 10. Noise Certification Data for Dassault Falcon 7X and Fokker F28 mk 100

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Dassault Aviation	Falcon 7X	31,298	28,304	Pratt & Whitney Canada PW 307 A	90.4	83.7	92.6
Fokker Services	F28 Mark 1000	43,090	38,780	Rolls-Royce Tay 620-15	89.3	83.4	93.1

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

1.10 Learjet 40 – LJ40

We propose to model LJ40 operations with INM type LEAR35.

The LJ40 is a derivative of the Learjet 45 (LJ45) with a shorter fuselage. The LJ40 and LJ45 engines are both versions of the Honeywell TFE731-20AR. In INM 7.0d, the LJ45 is mapped to the substitution aircraft, LEAR35. Table 11 presents a comparison of the Learjet 40 and Learjet 35 certification data.

Table 11. Noise Certification Data for Learjet 40 and Learjet 35

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Learjet	Learjet 40	21,500	19,200	Allied Signal TFE731-20AR(-1B)	85.1	75.5	93.4
Learjet	Learjet 35	18,000	14,300	Garrett AiResearch TFE731-2-2B	86.7	84.0	92.2

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

1.11 Canadair Challenger 604 – CL64

We propose to model CL64 operations with INM type CL601.

The Challenger 604 is an upgrade of the Challenger 601 design, incorporating more advanced GE CF34-3B engines, increased fuel capacity (including saddle tanks in the rear of the aircraft), new undercarriage for a higher takeoff and landing weight, structural improvements to wings and tail, and a new Rockwell Collins ProLine 4 avionics system. Table 12 presents a comparison of the Canadair Challenger 604 and Challenger 601 certification data.

Table 12. Noise Certification Data for Canadair Challenger 604 and Challenger 601

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Bombardier Inc.	Challenger 604, 604DX, 605	47,600	37,999	GE CF34-3B	84.6	80.9	91.3
Bombardier Inc.	Challenger 601	42,099	35,999	GE CF34-1A	83.9	79.8	91.2

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

1.12 Canadair Challenger 605 – CL65

We propose to model CL65 operations with INM type CL601.

The Challenger 605 is an avionics and structural upgrade of the Challenger 604 design. Structural improvements include larger cabin windows. Cockpit instrumentation updated with the Collins Proline 21 avionics and "electronic flight bag" capability. Table 13 presents a comparison of the Canadair Challenger 605 and Challenger 601 certification data.

Table 13. Noise Certification Data for Canadair Challenger 605 and Challenger 601

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Bombardier Inc.	Challenger 604, 604DX, 605	47,600	37,999	GE CF34-3B	84.6	80.9	91.3
Bombardier Inc.	Challenger 601	42,099	35,999	GE CF34-1A	83.9	79.8	91.2

Source:
"MAdB JETS(151210).xlsx" from http://easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight
All weights from EASA certification data converted from kilograms to pounds.

ATTACHMENT B
INM USER-DEFINED AIRCRAFT REQUEST

The aircraft type listed in Table 14 is included in the Teterboro Airport (TEB) 14 CFR Part 150 Study forecast and would best be modeled with an INM aircraft type with user-defined modifications. We have identified a user-defined type developed from the INM 7.0d database. The basis for our recommendations is discussed following Table 14.

Table 14. Aircraft Types and Recommended INM Substitutions

#	Group	Aircraft Code	Represented Aircraft Models	Recommended INM Substitution
1.1	Jet	GIII/GIIB	Gulfstream III/IIB with QS3 Hushkit	GIIB-HKD

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1.1 Gulfstream GIII/GIIB with Hushkits

Background
This memorandum requests FAA approval of a user-defined aircraft for the Gulfstream III (GIII) recertified to 14 CFR Part 36 Stage 3 via hushkit installations for use in the Teterboro Airport (TEB) Part 150 Study (HMMH Project 307260.002). The Port Authority of New York New Jersey (PANYNJ) is the sponsoring agency.

The Gulfstream G1159A refers to the GIII model and the Gulfstream G1159B refers to the GIIB model. The GIIB is the version of the aircraft in the INM and will be used as the baseline for the user defined aircraft. They have the same engines and weights. The GIIB in the INM is a Stage 2 Business Jet and Stage 2 jets as of December 31, 2015 are no longer allowed to operate in the contiguous United States unless they meet Stage 3 standards (typically through the use of hushkits). The GIV is the most representative Stage 3 version of the aircraft in the INM; however, the GIIB with the hushkit noise certificate values are significantly higher than the GIV. Table 2 presents a comparison of the Gulfstream IIB and Gulfstream IV certification data.

Table 2. Noise Certification Data for Gulfstream III and Gulfstream IV

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Lateral	Flyover	Approach
Gulfstream	Gulfstream IIB	69,700	58,500	Rolls-Royce Spey 511-8, Chapter 3 QTA Hushkit	95.9	87.0	97.7
Gulfstream	Gulfstream IV	73,200	58,500	Rolls-Royce Tay 611-8	87.3	76.8	91.0

Source:
"uscert_appendix_01_20120424.xlsx" from
https://www.faa.gov/about/office_org/headquarters_offices/apl/noise_emissions/aircraft_noise_levels/
Notes:
MTOW = Maximum Takeoff Weight; MLW = Maximum Landing Weight

Therefore we recommend making modifications to the GIIB to reflect the hushkit as opposed to using the GIV as a substitute.

Statement of Benefit
With the modification of existing GIIB aircraft with the hushkits that qualify the aircraft as Stage 3, it becomes necessary to provide this aircraft in the modeling process to accurately reflect the aircraft noise exposure around TEB.

Analysis
The process for modifying the GIIB Noise-Power-Distance (NPD) curves to account for the addition of hushkits is summarized below with all calculations presented in the step-by-step Excel spreadsheet (attached). The resulting data will be included in the INM 7.0d study for the user-defined aircraft, GIIB_HKD.

The following table shows the AC36-1H, Appendix 1, data listed for the GIIB with and without hushkits. These data show that the sound level for takeoff is approximately 7-dB less for the GIIB with hushkits aircraft while the non-hushkit GIIB aircraft is slightly quieter on approach. Using these data and the existing INM 7.0d NPD data for the SPEYHK[2] noise identifier, the revised NPD curves were developed.

[2] SPEYHK is the INM name for the Noise-Power-Distance curves for the GII and the GIIB. It is based on the engine name the SPEY 511-8.

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In INM 7.0d, the GIIB uses the SPEYHK noise curves. The arrival and departure noise curves for SPEYHK have identical values for thrust settings from 1,000 to 10,000 lbs. For this process the following assumptions were made:

- On arrival, the aircraft was approximately 394 feet above the certification measurement position based on the aircraft certification procedures in 14 CFR Part 36 B36.3c.
- There were no changes to aircraft performance
- Arrival thrust and speed for both the GIIB and GIIB with hushkit certification measurements are the same
- As with the SPEYHK NPD curves, the departure and arrival NPD curves are identical
- The dB offset for certification EPNL for unit of thrust also applies to NPD curves for other metrics (SEL, Lmax)

Table 3 Aircraft Noise Data for Certificated Turbojet Powered Airplanes
Source: AC36-1H Appendix 1

		MTOW	MLW			(EPNdB)				
MANUFACTURER	MODEL	1000#	1000#	ENGINE MODEL	No.	TO	SL	AP	STAGE	NOTES
GULFSTREAM	GIIB-GIII	69.70	58.50	SPEY 511-8	2	91.1	103.4	97.3	2	12
GULFSTREAM	G-IIB/G-III (Quiet Tech Aero;STC ST02618AT)	69.70	58.50	SPEY 511-8 (RB 163-25)	2	87.0	95.9	97.7	2	12

The next step was to find the arrival thrust in the INM EPNdB NPD curves associated with 394 feet and 97.3 dBA (97.3 dBA is arrival EPNdB reported in AC36-1H for the unhushkitted GIIB). Table 4 shows the interpolated EPNdB values for a distance of 394 feet. The interpolation indicates that the thrust level should be 3,373 lbs.

Table 4 INM Thrust Estimate for 394 feet
Source: HMMH

SPEYHK INM 7.0d npd_curve.pdf			Interpolated
Thrust	EPNdB in dBA		
	200 ft	400 ft	394 ft
1,000	89.0	85.1	85.2
2,000	94.1	90.2	90.3
4,000	104.3	100.4	100.5
6,000	110.3	106.4	106.5
8,000	117.3	113.1	113.5
10,000	123.9	120.0	120.1

The following step was to determine the dB benefit or difference between the hushkit and non-hushkit GIIB aircraft noise levels as a function of thrust. Both a linear interpolation and a second order equation (quadratic equation) were developed using the two known points and assuming that at zero thrust there is no differential in thrust for the two aircraft. In the final analysis the developed quadratic equation was used to provide a continuous function and to provide the A-weighted dB adjustments at the listed NPD curve thrust levels (Table 5).

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Table 5 Calculated dB Adjustments to SPEYHK INM NPD Curves
Source: HMMH

Thrust (lbs)	Interpolated A-weighted dB Adjustment	
	Linear	Quadratic
1,000	0.4	0.3
2,000	0.4	0.5
4,000	-0.2	0.2
6,000	-2.2	-0.8
8,000	-4.2	-2.6
10,000	-6.1	-5.2

The quadratic adjustments were then added to the SPEYHK NPD curves to derive the SPEYHK_HKD[3] NPD curves for the different metric NPD curves. Table 6 is an example of the INM provided SPEYHK values and Table 7 provides the adjusted SPEYHK_HKD adjusted EPNdB NPD curves (E). The NPD curves for the other NPD metrics (Max, Perceived, SEL) are adjusted in the same manner.

Table 6 INM NPD Curve without Hushkit (EPNdB used as an Example)
Source: FAA INM

NOISE_ID	NOISE TYPE	OP MODE	THRUST SET	L_200	L_400	L_630	L_1000	L_2000	L_4000	L_6300	L_10000	L_16000	L_25000
SPEYHK	E	A	1000	89.0	85.1	82.1	78.7	72.9	66.4	61.7	56.5	50.9	45.2
SPEYHK	E	A	2000	94.1	90.2	87.2	83.8	78.0	71.5	66.8	61.6	56.0	50.3
SPEYHK	E	A	4000	104.3	100.4	97.4	94.0	88.2	81.7	77.0	71.8	66.2	60.5
SPEYHK	E	A	6000	110.3	106.4	103.4	100.0	94.2	87.7	83.0	77.8	72.2	66.5
SPEYHK	E	A	8000	117.3	113.4	110.4	107.2	101.2	94.7	90.0	84.8	79.2	73.5
SPEYHK	E	A	10000	123.9	120	117	113.6	107.8	101.3	96.6	91.4	85.8	80.1
SPEYHK	E	D	1000	89.0	85.1	82.1	78.7	72.9	66.4	61.7	56.5	50.9	45.2
SPEYHK	E	D	2000	94.1	90.2	87.2	83.8	78.0	71.5	66.8	61.6	56.0	50.3
SPEYHK	E	D	4000	104.3	100.4	97.4	94.0	88.2	81.7	77.0	71.8	66.2	60.5
SPEYHK	E	D	6000	110.3	106.4	103.4	100	94.2	87.7	83.0	77.8	72.2	66.5
SPEYHK	E	D	8000	117.3	113.4	110.4	107.2	101.2	94.7	90.0	84.8	79.2	73.5
SPEYHK	E	D	10000	123.9	120.0	117.0	113.6	107.8	101.3	96.6	91.4	85.8	80.1

[3] SPEYHK_HKD is the name we have assigned to the modified NPD curves for the GIIB with the Hushkit.

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Table 7 INM NPD Curve Adjustments with Hushkit (EPNdB used as an Example)

NOISE_ID	NOISE TYPE	OP MODE	THRUST SET	L_200	L_400	L_630	L_1000	L_2000	L_4000	L_6300	L_10000	L_16000	L_25000
SPEYHK_HKD	E	A	1000	89.3	85.4	82.4	79	73.2	66.7	62	56.8	51.2	45.5
SPEYHK_HKD	E	A	2000	94.6	90.7	87.7	84.3	78.5	72	67.3	62.1	56.5	50.8
SPEYHK_HKD	E	A	4000	104.5	100.6	97.6	94.2	88.4	81.9	77.2	72	66.4	60.7
SPEYHK_HKD	E	A	6000	109.5	105.6	102.6	99.2	93.4	86.9	82.2	77	71.4	65.7
SPEYHK_HKD	E	A	8000	114.7	110.8	107.8	104.6	98.6	92.1	87.4	82.2	76.6	70.9
SPEYHK_HKD	E	A	10000	118.7	114.8	111.8	108.4	102.6	96.1	91.4	86.2	80.6	74.9
SPEYHK_HKD	E	D	1000	89.3	85.4	82.4	79	73.2	66.7	62	56.8	51.2	45.5
SPEYHK_HKD	E	D	2000	94.6	90.7	87.7	84.3	78.5	72	67.3	62.1	56.5	50.8
SPEYHK_HKD	E	D	4000	104.5	100.6	97.6	94.2	88.4	81.9	77.2	72	66.4	60.7
SPEYHK_HKD	E	D	6000	109.5	105.6	102.6	99.2	93.4	86.9	82.2	77	71.4	65.7
SPEYHK_HKD	E	D	8000	114.7	110.8	107.8	104.6	98.6	92.1	87.4	82.2	76.6	70.9
SPEYHK_HKD	E	D	10000	118.7	114.8	111.8	108.4	102.6	96.1	91.4	86.2	80.6	74.9

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Table 8 presents a grid analysis of the resulting SEL values for both the GIIB and proposed GIIB_HKD aircraft on straight out departures. The GIIB_HKD STD profile is the same as that for the GIIB STANDARD; the only changes are to the NPD curves. The INM output SEL contours for 85 dB, 90 dB, and 95 dB are shown in Figure 1 (GIIB_HKD in colors) for a standard day. The changes result in an approximate 3dB reduction at takeoff and 3 to 4 dB after 5 nmi from brake release due to the performance of the aircraft. The SEL differences reflect the reduction in noise attributed to the hushkit modification of the modeled aircraft and more accurately represent that aircraft for the NEM. All GIIB aircraft flown at TEB as of 2016 will be hushkitted since as of Dec 31, 2015, Stage 2 aircraft are no longer allowed to operate in the fleet.

Table 8. Departure SEL Values for Proposed GIIB_HKD versus GIIB
Calculated with INM 7.0d using standard atmospheric conditions

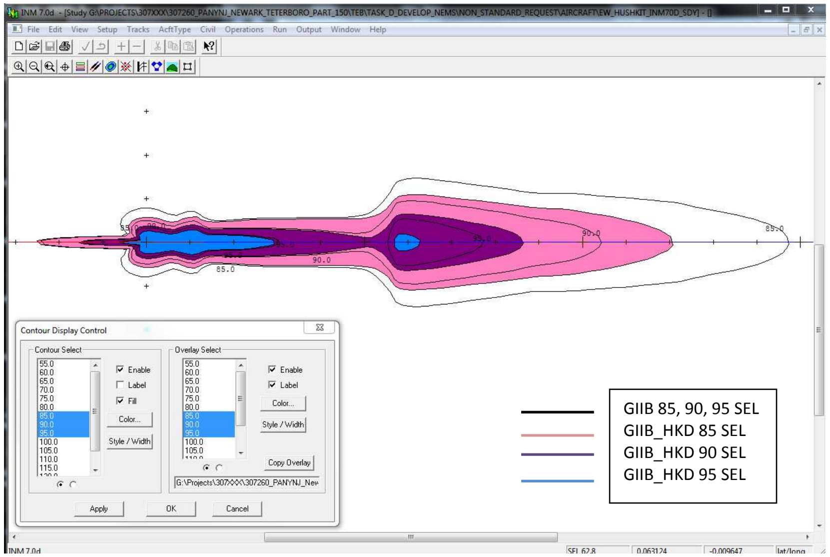
Grid Points (nmi) Distance from start-of-take-off-roll	GIIB (SEL, dB)	GIIB_HKD (SEL, dB)	Difference (dB)
0.5	138.9	136.2	-2.7
1.0	116.0	113.4	-2.6
1.5	102.4	101.9	-0.5
2.0	99.5	99.0	-0.5
2.5	97.2	96.7	-0.5
3.0	95.3	94.9	-0.4
3.5	93.9	93.5	-0.4
4.0	92.7	92.2	-0.5
4.5	91.7	91.1	-0.6
5.0	91.1	90.3	-0.8
5.5	94.5	92.0	-2.5
6.0	99.2	95.6	-3.6
6.5	98.0	94.5	-3.5
7.0	96.7	93.4	-3.3
7.5	95.5	92.3	-3.2
8.0	94.4	91.3	-3.1
8.5	93.3	90.3	-3.0
9.0	92.2	89.3	-2.9
9.5	91.5	88.6	-2.9
10.0	90.7	87.8	-2.9

The EXCEL spreadsheet with the step-by-step calculations is included in a ZIP file, attached to the overall submittal.

HMMH
Noise Exposure Map for Teterboro Airport
Request for INM 7.0d Aircraft Type Substitutions
February 9, 2016

We request FAA's approval to use these modified NPD curves to represent a GIIB recertified to 14 CFR Part 36 Stage 3 via a hushkit in the INM 7.0d analysis for the Teterboro Airport Noise Exposure Map.

Figure 1 INM 7.0d Screen Shot Comparing SEL of GIIB and GIIB_HKD
Source: HMMH, INM7.0d



U.S. Department of Transportation
Federal Aviation Administration

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

March 9, 2016

Andrew Brooks
Environmental Program Manager
Federal Aviation Administration
Eastern Regional Office
1 Aviation Plaza
Jamaica, NY 11434

Dear Andrew,

The Office of Environment and Energy (AEE) has reviewed the proposed non-standard Integrated Noise Model (INM) aircraft substitutions for the Teterboro Airport (TEB) 14 CFR Part 150 study.

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Port Authority of New York and New Jersey in preparing the 2016 and 2021 Day-Night Average Sound level (DNL) contours for the TEB Part 150 study. The contours will be developed using the most current release of the INM; i.e., Version 7.0d. HMMH has proposed substitutions for 12 aircraft types that currently do not have standard substitutions in the INM aircraft database. The proposed substitutions and the corresponding AEE recommendations are summarized in the table below.

Aircraft	**HMMH Proposed Substitution**	**AEE Recommendation**
Embraer EMB-500 Phenom 100	CNA510	Concur
Embraer EMB-505 Phenom 300	CNA560E	Concur
Gulfstream 650/Gulfstream 6	GV	Concur
Gulfstream 280	CL601	Concur
Raytheon Hawker 700/800, 800XP	LEAR35	Concur
Raytheon Hawker 1000	LEAR35	Concur
Bombardier Global 5000	GV	Concur
Falcon 20 (Re-engined)	LEAR35	Concur
Falcon 7X	F10062	Concur
Learjet 40	LEAR35	Concur
Canadair Challenger 604	CL601	Concur
Canadair Challenger 605	CL601	Concur

2

In addition to the aircraft listed above HMMH also identified one aircraft type – the Gulfstream III/IIB with hushkit – for which they believe a user-defined aircraft represents the most appropriate modeling approach. HMMH provided the justification, data and method for creating the user defined aircraft. AEE has reviewed the submission and concurs that the use of a user defined aircraft is justified for modeling the Gulfstream III/IIB with hushkit and that the method used to modify the NPD curves for the user defined aircraft is reasonable.

AEE concurs with the aircraft substitutions proposed by HMMH including the user defined aircraft for the GIII/IIB with hushkit. Please understand that this approval is limited to this particular Part 150 for TEB. Any additional projects or non-standard INM input at TEB or any other site will require separate approval.

Sincerely,

Rebecca Cointin

Rebecca Cointin, Manager
AEE/Noise Division

cc: Jim Byers, APP-400

Appendix D.4

- INM Non-Standard Profile Authorization

- FAA Approval

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TECHNICAL MEMORANDUM

To:	Timothy Middleton Port Authority of New York and New Jersey 4 World Trade Center, 150 Greenwich Street, 18th Floor New York, NY 10007
From:	Robert Mentzer Jr., Justin Divens, and Ted Baldwin, HMMH
Date:	May 6, 2016
Subject:	Teterboro Airport Noise Exposure Map - Requested Review and Approval of Integrated Noise Model Non-Standard Flight Profiles - *Revised*
Reference:	HMMH Project Number 307260.002

1. INTRODUCTION

Harris Miller Miller & Hanson Inc. d/b/a HMMH is assisting the Port Authority of New York and New Jersey (PANYNJ) prepare a 14 CFR Part 150 Noise Exposure Map for the Teterboro Airport (TEB). We are using the Integrated Noise Model (INM) Version 7.0d for all aircraft noise modeling. Consistent with Federal Aviation Administration (FAA) policies and procedures, any changes to the standard INM arrival and departure profiles require prior written approval from the Office of Environment and Energy Noise Division (AEE-100). This requirement applies to the use of user-defined profiles for the 14 CFR Part 150 Noise Exposure Map being prepared for TEB.[1]

Based on a review of flight track data from the Port Authority's Airport Noise and Operations Monitoring System (ANOMS), HMMH has determined some user-defined profiles will be required for the Teterboro Part 150 study. Certain aircraft arriving to and departing from TEB commonly fly procedures that are not represented by the standard profiles provided in the INM. These aircraft would be better represented by user-defined profiles which can emulate actual flight operations.

For the Teterboro Part 150 Study, we are requesting FAA approval for the use of user-defined arrival and departure profiles for the arrival and departure operations outlined above where the standard INM profile differs from procedures typically flown by aircraft at TEB. The remainder of this memorandum presents the streamlined methodology used to develop user-defined arrival and departure profiles for inclusion in the 2016 and 2021 INM inputs being developed for the Teterboro Part 150 study. Attachments A through J of this memorandum present graphs and tables comparing a representative sample of user-defined arrival and departure profiles to the respective INM standard profiles.

The user-defined profiles presented in this memorandum, and associated attachments, are preliminary and subject to change following consultation with airlines/aircraft operators at TEB.

1.1 Streamlined Approval Process

Due to the large volume of user-defined profiles required for the TEB noise modeling effort, the HMMH study team is requesting a streamlined approach to approval of the user-defined profiles by the FAA's Office of Environment and Energy. For the purpose of this analysis, a single representative INM aircraft type was selected within each aircraft modeling group. Each of these representative INM aircraft type are present in the top 90% of operations in the TEB forecast. Each sample aircraft is presented to demonstrate the implementation of user-defined profiles across all aircraft within the modeling group.

Table 1 shows the sample INM aircraft for each aircraft modeling group.

1 This memorandum has been prepared to FAA guidance, including 14, CFR Part 150, Integrated Noise Model 7.0 User's Guide, and FAA's July 28, 2009 memorandum "AEE and Airports Coordination Policy for Non-Standard Modeling Procedures and Methodology"

Table 1 - Sample INM Aircraft

Aircraft Modeling Group	Sample INM Aircraft Type	Attachment for Arrivals	Attachment for Departures
Large Jets	GV	A	B
Medium Jets	LEAR35	C	D
Turboprops	CNA208	E	F
Piston Propellers	GASEPV	G	H
Helicopters	S76	I	J
Note: The Small Jet category profiles are identical to the medium jet category and therefore are not presented.			

An initial draft of this request and a separate request for a heavier-weight GV profile was provided to AEE-100 for their review. The project team received comments from AEE-100 on March 24, 2016 for this request and on March 25, 2016 for the GV request. This final submission combines the two requests into one document submittal. Section 1.2 presents AEE's comments and our responses related to the user-defined profiles. Section 1.3 does the same for the GV request.

Since submitting the initial draft, we received operator concurrence from the National Business Aviation Association (NBAA), NetJets, and the Eastern Region Helicopter Council (ERHC). Attachment L provides copies of their concurrence responses.

1.2 March 24, 2016 AEE-100 Comments on User-Defined Profiles

AEE-100 comments on the draft User Defined Profile request fell into four primary topic areas, as identified below.

Topic 1: *AEE requested clarification on Step 5 of the analysis methodology presented in Section 2.3, including two related comments:*

Comment: *Define the use of the "average altitude profile.*

Response: The average altitude profile is used to identify dominant hold-down behaviors and used as a visual check. The average profile was not used to change glide slope or any other part of the standard profile only the average altitude and average distance of the hold-down was used. The average hold-down distance is evaluated for each combination of altitude, aircraft modeling group and runway. The average hold-down distance is applied to each user-defined profile accordingly. It is also worth noting that user-defined profiles were not created for any hold-downs occurring beyond or near the study area boundary.

Comment: *On approach there is a third hold-down shown in the radar data that is not included in the modeling.*

Response: While the radar data provided shows a hold down at 3,000 ft., the majority of this hold down (at approximately 17nmi) is beyond the study area and is not included in the profile adjustments. This text is added to each section.

Topic 2: *AEE observed that the user-defined departure profiles include a deep thrust cutback to maintain level flight.*

Comment: *Confirm that the operators agree with the speed, flap and thrust data.*

Response: The flight data comparisons including INM/Radar comparison graphics, procedure step data used in the INM (including the speed, flaps and thrust) and comparisons between the standard and user-defined profiles were provided to each operator for their review, suggestions for changes or concurrence.

Topic 3: *AEE observed that it is not clear what benefit is derived from employing the user-defined profiles for helicopter operations because the radar data shows flights dropping in altitude along the flight path.*

Comment: *Confirm that the operators agree with the speed, flap and thrust data.*

Response: The radar data sample that was used in the draft submittal included data that flew between TEB and heliports within the study area resulting in the radar profile descending to those locations. The revised radar sample only shows tracks that exit the study area. For tracks that go to or from heliports within the study area the standard or user-defined profile will terminate or start at that location (it will not climb or descend).

Topic 4: *AEE questioned the helicopter SEL results.*

Comment: *The SEL data results for the Helicopter profiles look incorrect.*

Response: Correct, the incorrect track was used for the modeling. The correct track was used for this submittal and the SEL data has been revised. This change addressed AEE's comments a), b) and c).

1.3 March 25, 2016 AEE-100 Comments on Heavier-Weight GV

AEE-100 provided two recommendations for the heavier-weight GV profile:

Recommendation 1: *AEE-100 recommends changing the two "Accelerate" steps in the profile to "Accel-Percent" steps and setting the value to 55%, which is the value for the standard GV in the INM.*

Response: This change was made and the data in the request has been updated to reflect this.

Recommendation 2: *AEE-100 also recommended using the Final Speed parameter in the INM unless the operator or manufacturer provides a different value.*

Response: The operator concurred with the adjustments made to the profile and the final speed in the INM was used.

2. USER-DEFINED PROFILES DEFINITION METHODOLOGY

2.1 Profile Analysis Study Area

Appendix B, Section 3 of the INM User's guide establishes that for the purpose of developing user-defined profiles, Sound Exposure Levels (SELs) must be calculated underneath flight tracks containing the user-defined profiles at 0.5 nautical mile intervals. For arrival operations, the calculation of SEL's must begin at the point from which the profile starts or a point 10 nautical miles from the runway threshold (whatever is shorter) and end at the last point of the landing roll-out on the arrival runway. For departure operations, the calculation of SEL's must begin at the start of takeoff roll on the departure runway and end at the point in which the profile ends or a point at 10 nautical miles from the runway threshold (whatever is shorter).

The flight tracks for this project are being developed out to 10.5 nautical miles from TEB. However, since aircraft turn/maneuver/fly through the project study area and to ensure potential noise impacts were adequately considered in close proximity to TEB, user-defined profiles for arrivals and departures were evaluated to at least a distance of 20 nautical miles from the runway threshold. This extended comparison will allow for full coverage of profiles on tracks which may exit and then re-enter the study area. Also, in order to allow for full comparison to the standard profile, SEL's were computed at 0.5 nautical mile increments out to 20 nautical miles.

2.2 Considered Aircraft

The user-defined profile analysis focused on the aircraft types in the FAA approved forecast[2] for the TEB NEM prepared by the Port Authority. The 63 aircraft types presented in the forecast will be represented in INM by 32 unique INM aircraft types. Due to the diverse nature of general aviation operations, user-defined profiles were created for the 17 INM aircraft types representing the top 90% of operations at TEB, as shown in Table 2. This selection of INM types also allow for at least one INM type per modeling group selected for this project.

[2] The Teterboro Airport 14 CFR Part 150 Study forecast was approved by FAA on 3/28/2016.

Table 2 – Aircraft considered for user-defined profiles

Aircraft Modeling Group	INM Aircraft Type	2014 Annual Operations	Percentage of Operations
Medium/Small Jets	LEAR35	21,536	13.0%
Large/Medium Jets	CL601	16,172	9.8%
Large/Medium Jets	CL600	14,543	8.8%
Large Jets	GV	13,818	8.3%
Large Jets	GIV	12,296	7.4%
Large Jets	F10062	9,110	5.5%
Medium Jets	CNA560XL	9,024	5.4%
Medium Jets	CNA750	8,740	5.3%
Medium Jets	MU3001	6,250	3.8%
Helicopters	S76	5,786	3.5%
Turboprops	CNA208	5,402	3.3%
Piston Propellers	GASEPV	5,018	3.0%
Medium Jets	CNA680	4,834	2.9%
Turboprops	DO228	4,680	2.8%
Medium/Small Jets	CNA525C	4,574	2.8%
Medium Jets	CNA560U	4,100	2.5%
Medium/Small Jets	CNA55B	3,858	2.3%
		TOTAL	**90.4%**

2.3 Inventories of User-Defined Arrival and Departure Profiles

Table 3 and Table 4 present inventories of the user-defined arrival and departure profiles created, respectively. For each combination of aircraft modeling group and runway end, radar data was evaluated to determine the most commonly used level segment altitudes. The proportions of flights flying level at each altitude and the proximity of the level segment to the airport were determining factors in deciding if a user-defined profile was necessary.

Table 3 – User-Defined Arrival Profile Inventory

Aircraft Modeling Group	Runway / Helipad	Arrival Level Segments (feet AFE)				
		1,500	2,000	3,000	1,500 & 2,000	2,000 & 3,000
Large / Medium / Small Jets	1	X	X	--	X	--
	6	X	X	--	X	--
	19	--	X	X	--	X
	24	--	X	X	--	X
Turboprops	1	X	X	--	X	--
	6	X	X	--	X	--
	19	--	X	X	--	X
	24	X	X	--	--	--
Piston Propellers	1	X	X	--	X	--
	6	X	X	--	X	--
	19	--	X	X	--	X
	24	X	X	--	X	
Helicopters	E_H	X	--	--	--	--
	N_H	X	--	--	--	--
	S_H	X	--	--	--	--
	W_H	X	--	--	--	--
Note: An "X" indicates that a user-defined profile was created for all INM aircraft in that modeling group.						

Table 4 – User-Defined Departure Profile Inventory

Aircraft Modeling Group	Runway / Helipad	Departure Level Segments (feet AFE)						
		1,500	2,000	4,000	6,000	1,500 & 4,000	1,500 & 6,000	2,000 & 6,000
Large / Medium / Small Jets	1	--	X	--	X	--	--	X
	6	--	X	--	X	--	--	X
	19	X	--	--	X	--	--	X
	24	X	--	--	X	--	--	X
Turboprops	1	--	X	--	X	--	--	X
	6	X	--	--	--	--	--	--
	19	X	--	--	--	--	--	--
	24	X	--	--	X	--	X	--
Piston Propellers	1	--	X	--	X	--	--	X
	6	X	--	--	--	--	--	--
	19	X	--	--	--	--	--	--
	24	X	--	X	--	X	--	--
Helicopters	E_H	X	--	--	--	--	--	--
	N_H	X	--	--	--	--	--	--
	S_H	X	--	--	--	--	--	--
	W_H	X	--	--	--	--	--	--
Note: An "X" indicates that a user-defined profile was created for all INM aircraft in that modeling group.								

2.4 Analysis Methodology

For each aircraft identified in the TEB forecast as outlined in Section 2.2, profiles were developed using the following methodology.

1. ***Download calendar year 2014 ANOMS radar data***

   Flight tracks were evaluated and grouped to the appropriate runway based on the track lateral geometry in relation to each runway end. Tracks were then sub-grouped based on compass direction (e.g., North, South, East, and West) and INM aircraft type as detailed in Table 2.

2. ***Review profiles in study area***

   Flight tracks were reviewed out to approximately twenty nautical miles based on the analysis described in Section 2.1 of this memorandum.

3. ***Create distance vs. altitude graph for each aircraft flight track group***

   A plot depicting distance and altitude are developed for each arrival track group and sub-group based on INM aircraft type to serve as a basis for comparison for radar track data against the INM standard profiles.

4. ***Compare radar data to INM standard profiles***

   The altitude and distance plots derived from the radar track data is compared to the INM standard profile. If the INM standard profile is similar to the profile generated from the radar track data, the INM standard profile is used. If the radar track data exhibits large differences from the INM standard profile, a user-defined profile is created as described below.

5. ***Calculate average profile based on radar data***

   Each radar track group is evaluated to develop an average altitude profile, an inventory of any hold-downs, and the average distance for each hold-down. The average altitude profile is used to identify dominant hold-down behaviors and used as a visual check. The average profile was not used to change glide slope or any other part of the standard profile only the average altitude and average distance of the hold-down was used. The average hold-down distance is evaluated for each combination of altitude, aircraft modeling group and runway. The average hold-down distance is applied to each user-defined profile accordingly. It is also worth noting that user-defined profiles were not created for any hold-downs occurring beyond or near the study area boundary.

6. ***Develop user defined profile in INM***

   User-defined profiles are developed for each combination of aircraft and track group, using the INM standard profile as a starting point. Level segments were added at the altitudes seen in the radar flight track data.[3] All level flight segments are set to the same speed seen in that altitude profile for that particular altitude. Flap settings are based on the speed/flap schedule seen in the standard profile. The remainder of the user-defined profiles preserved the parameters of the respective standard profile. Each profile is run through INM for validation.

7. ***Develop user-defined profile graphs***

   Three graphs are created for each user-defined profile: Altitude vs. Distance, Speed vs. Distance, and Thrust vs. Distance. The graphs are used to compare the user-defined profiles to the corresponding INM standard profiles.

   The published airfield elevation of TEB is approximately 8 feet relative to Mean Sea Level (MSL). Therefore terms of altitude MSL and altitude Above Field Elevation (AFE) are effectively interchangeable.

8. ***Calculate SEL values for user defined profile***

   SEL values are calculated for a series of grid points spaced 0.5 nm apart underneath a straight-in or straight-out INM flight track in order to directly compare the INM standard and user-defined profiles. This comparison highlights the locations where aircraft noise levels would change if the user-defined profile is assigned instead of the INM standard profile. In some situations, the SEL values calculated for the proposed user-defined profile indicate that use of the user-defined profile would provide no benefit to the analysis and that the standard INM profile should be utilized.

9. ***Revise user-defined profiles***

   The user-defined profiles will be revised and finalized as necessary following consultation with aircraft operators at TEB.

The analysis completed by the HMMH study team indicates that several user-defined profiles are required to accurately model noise for aircraft arriving and departing at TEB on all runways and helipads.

[3] In the case of arrivals, level flight segments were divided into three segments. The initial and final segments are 1,000 ft. long transition segment used to allow INM develop the proper thrust profile. The middle segment length was developed for the remaining level flight distance.

ATTACHMENT A

Sample User-Defined Arrival Profiles – Large Jets – GV

The sample arrival profile included in this attachment was developed for the GV INM aircraft type. The sample GV profile represents a consistent user-defined profile methodology for all large jets in the TEB forecast. The GV INM aircraft type will be used to represent the GLF5 and GLEX aircraft and is proposed to be used for the following aircraft types: GLF6, G650, and GL5T[4].

This same process for developing arrival profiles for large jets will be applied to the following INM aircraft types: CL600, CL601, F10062, and GIV.

Statement of Benefit

Based on the radar flight tracks presented in Figure 1, it is clear that the GV aircraft approaching Runway 6 are not following the INM standard profile. In general, the radar data suggest that large jet aircraft profiles include one or more level flight segments while arriving to Runway 6. The INM standard GV arrival profile does not include level segments, as shown in Figure 1.

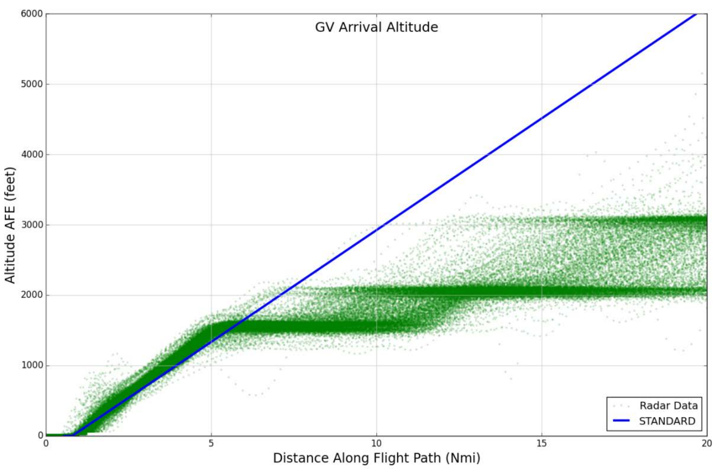

Figure 1 – GV Arrival to Runway 6 Radar Example (811 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 5 presents a comparison of SEL values for the INM standard arrival profile to SEL values for the sample user-defined arrival profile. The sample user-defined profile is named "06HD1520"[5].

4 The INM type GV is proposed to represent the GLF6, G650 and GL5T in the INM 7.0d model for TEB. FAA approval of these substitutions is pending and was submitted on 2/10/2016

5 INM only allows eight characters for the profile name. The profile naming convention used is as follows: Runway (06) + "HD" (hold down) + first hold down altitude (1,500 ft.) + second hold down altitude (2,000 ft.)

Table 5 – GV Arrival SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	06HD1520	DIFFERENCE	
1.0	57.2	57.2	0.0	
0.5	77.8	77.8	0.0	
0.0	98.5	98.5	0.0	Runway Threshold
-0.5	91.8	91.8	0.0	
-1.0	88.3	88.3	0.0	
-1.5	86.0	86.0	0.0	
-2.0	84.2	84.2	0.0	
-2.5	82.8	82.8	0.0	
-3.0	81.4	81.4	0.0	
-3.5	79.8	79.8	0.0	
-4.0	78.3	78.3	0.0	
-4.5	77.2	77.4	0.2	
-5.0	76.3	78.2	1.9	
-5.5	75.6	78.3	2.7	
-6.0	75.0	78.3	3.3	
-6.5	74.3	78.3	4.0	
-7.0	73.7	78.3	4.6	
-7.5	73.1	78.3	5.2	
-8.0	72.5	78.3	5.8	
-8.5	71.9	78.2	6.3	
-9.0	71.4	77.5	6.1	
-9.5	70.7	76.5	5.8	
-10.0	70.1	75.6	5.5	
-10.5	69.5	76.0	6.5	
-11.0	69.1	76.2	7.1	
-11.5	68.6	76.3	7.7	
-12.0	68.0	76.3	8.3	
-12.5	67.6	76.3	8.7	
-13.0	67.1	76.2	9.1	
-13.5	66.5	76.2	9.7	
-14.0	66.1	75.6	9.5	
-14.5	65.7	74.7	9.0	
-15.0	65.3	73.9	8.6	
-15.5	64.8	73.1	8.3	
-16.0	64.4	72.4	8.0	
-16.5	64.1	71.6	7.5	
-17.0	63.6	70.9	7.3	
-17.5	63.1	70.2	7.1	
-18.0	62.4	69.8	7.4	
-18.5	60.9	69.1	8.2	
-19.0	57.9	68.6	10.7	Profile STANDARD ends at ~19.1 Nmi
-19.5		68.2		
-20.0		67.6		Profile 06HD1520 ends at ~26.7 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NetJets operates the GV at TEB and reviewed and concurs that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the GV. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The arrival example represents GV arrivals to Runway 6 with a hold-down at 1,500 ft. and 2,000 ft. While, the radar data provided shows a hold down at 3,000 ft., the majority of this hold down (at approximately 17nmi) is beyond the study area and is not included in the profile adjustments. Figure 2 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 3 presents a speed versus distance graph, and Figure 4 presents a thrust versus distance graph.

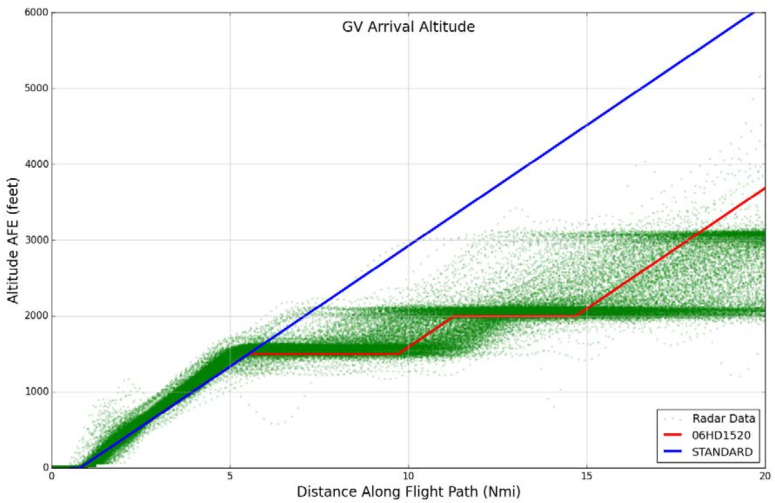

Figure 2 – GV Arrival Altitude

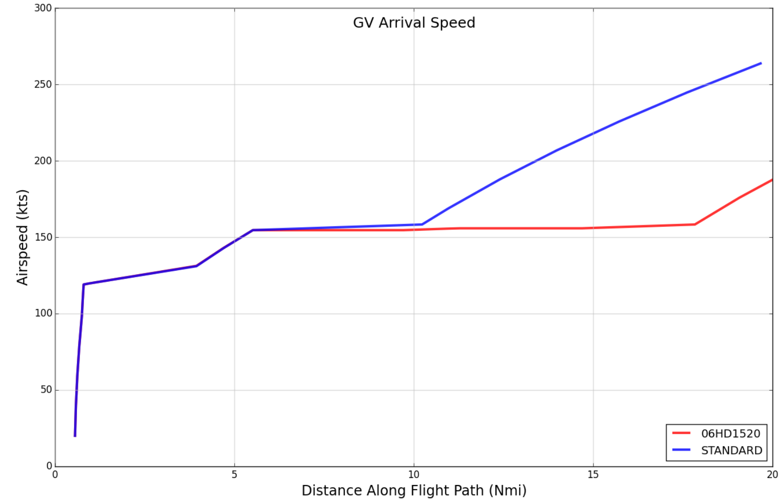

Figure 3 – GV Arrival Speed

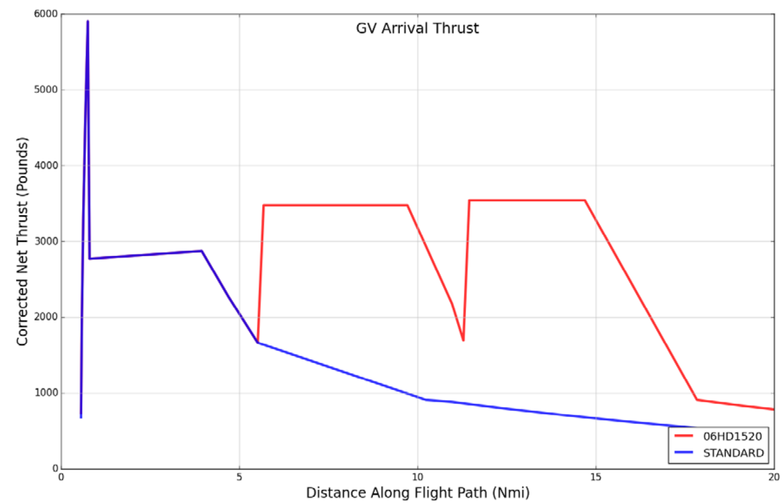

Figure 4 – GV Arrival Thrust

Table 6 and Table 7 present the data used to produce the altitude, speed, and thrust figures. The data in Table 4 and Table 5 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 6 and Table 7.

Table 6 - INM Standard GV Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GV	A	STANDARD	116102.1	5996.7	263.8	458.9
1	GV	A	STANDARD	103679.0	5346.5	244.8	543.4
2	GV	A	STANDARD	92183.1	4744.9	225.8	627.8
3	GV	A	STANDARD	81614.3	4191.7	206.9	712.2
4	GV	A	STANDARD	71972.6	3687.1	187.9	796.7
5	GV	A	STANDARD	63258.0	3231.1	168.9	881.1
6	GV	A	STANDARD	58780.1	2996.7	158.3	907.9
7	GV	A	STANDARD	30119.1	1496.7	154.6	1661.9
8	GV	A	STANDARD	25145.0	1236.4	142.8	2266.9
9	GV	A	STANDARD	20565.4	996.7	131.0	2871.9
10	GV	A	STANDARD	2413.4	46.7	119.7	2774.9
11	GV	A	STANDARD	1458.0	-3.3	119.0	2769.7
12	GV	A	STANDARD	1300.9	-3.3	108.7	4334.9
13	GV	A	STANDARD	1158.0	-3.3	98.4	5900.0
14	GV	A	STANDARD	724.8	-3.3	78.8	4594.6
15	GV	A	STANDARD	387.6	-3.3	59.1	3289.3
16	GV	A	STANDARD	146.3	-3.3	39.5	1983.9
17	GV	A	STANDARD	1.0	-3.3	19.9	678.5

Table 7 - User-Defined GV Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GV	A	06HD1520	162301.9	5996.7	263.8	458.9
1	GV	A	06HD1520	150757.7	5392.5	246.2	533.8
2	GV	A	06HD1520	140009.7	4830.0	228.6	608.6
3	GV	A	06HD1520	130057.9	4309.2	211.0	683.4
4	GV	A	06HD1520	120902.4	3830.0	193.4	758.2
5	GV	A	06HD1520	112543.1	3392.5	175.9	833.1
6	GV	A	06HD1520	104980	2996.7	158.3	907.9
7	GV	A	06HD1520	85872.7	1996.7	155.8	3538.6
8	GV	A	06HD1520	84872.7	1996.7	155.8	3538.6
9	GV	A	06HD1520	66172.7	1996.7	155.8	3538.6
10	GV	A	06HD1520	65172.7	1996.7	155.8	1692.6
11	GV	A	06HD1520	63223	1894.7	155.6	2178.0
12	GV	A	06HD1520	55619.1	1496.7	154.6	3474.5
13	GV	A	06HD1520	54619.1	1496.7	154.6	3474.5
14	GV	A	06HD1520	31119.1	1496.7	154.6	3474.5
15	GV	A	06HD1520	30119.1	1496.7	154.6	1661.9
16	GV	A	06HD1520	25146.8	1236.5	142.9	2266.9
17	GV	A	06HD1520	20565.4	996.7	131.2	2871.9
18	GV	A	06HD1520	2413.4	46.7	119.7	2774.9
19	GV	A	06HD1520	1458.0	-3.3	119.0	2769.7
20	GV	A	06HD1520	1300.9	-3.3	108.7	4334.9
21	GV	A	06HD1520	1158.0	-3.3	98.4	5900.0
22	GV	A	06HD1520	724.8	-3.3	78.8	4609.4
23	GV	A	06HD1520	387.6	-3.3	59.1	3318.8
24	GV	A	06HD1520	146.3	-3.3	39.5	2028.1
25	GV	A	06HD1520	1.0	-3.3	19.9	737.5

Table 8 and Table 9 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 8 - INM Standard GV Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GV	A	STANDARD	1	1	D	L-0-U		6000.0	250.0	3.0
GV	A	STANDARD	1	2	D	L-20-U		3000.0	160.0	3.0
GV	A	STANDARD	1	3	D	L-20-D		1500.0	160.0	3.0
GV	A	STANDARD	1	4	D	L-39-D		1000.0	137.8	3.0
GV	A	STANDARD	1	5	L	L-39-D		300.0	0.0	0.0
GV	A	STANDARD	1	6	B	L-39-D	V	1157.0	107.0	40.0
GV	A	STANDARD	1	7	B	-NONE-	L	0.0	20.0	4.6

Table 9 - User-Defined GV Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GV	A	06HD1520	1	1	D	L-0-U		6000.0	250.0	3.0
GV	A	06HD1520	1	2	D	L-20-U		3000.0	160.0	3.0
GV	A	06HD1520	1	3	V	L-20-D		2000.0	160.0	1000.0
GV	A	06HD1520	1	4	V	L-20-D		2000.0	160.0	18700.0
GV	A	06HD1520	1	5	V	L-20-D		2000.0	160.0	1000.0
GV	A	06HD1520	1	6	D	L-20-D		2000.0	160.0	3.0
GV	A	06HD1520	1	7	V	L-20-D		1500.0	160.0	1000.0
GV	A	06HD1520	1	8	V	L-20-D		1500.0	160.0	23500.0
GV	A	06HD1520	1	9	V	L-20-D		1500.0	160.0	1000.0
GV	A	06HD1520	1	10	D	L-20-D		1500.0	160.0	3.0
GV	A	06HD1520	1	11	D	L-39-D		1000.0	138.0	3.0
GV	A	06HD1520	1	12	L	L-39-D		300.0	0.0	0.0
GV	A	06HD1520	1	13	B	L-39-D	V	1157.0	107.0	40.0
GV	A	06HD1520	1	14	B	-NONE-	L	0.0	20.0	5.0

ATTACHMENT B

Sample User-Defined Departure Profiles – Large Jets – GV

The sample departure profile included in this attachment was developed for the GV INM aircraft type. The sample GV profile represents a consistent user-defined profile methodology for all large jets in the TEB forecast. The GV INM aircraft type will be used to represent the GLF5 and GLEX aircraft and is proposed to be used for the following aircraft types: GLF6, G650, and GL5T.

This same process for developing departure profiles for large jets will be applied to the following INM aircraft types: CL600, CL601, F10062, and GIV.

Statement of Benefit

Based on the radar flight tracks presented in Figure 5, it is clear that the GV aircraft departing Runway 24 are not following the INM standard profile. In general, the radar data suggest that large jet aircraft profiles include one or more level flight segments while departing from Runway 24. The INM standard GV departure profile does not include level segments, as shown in Figure 5.

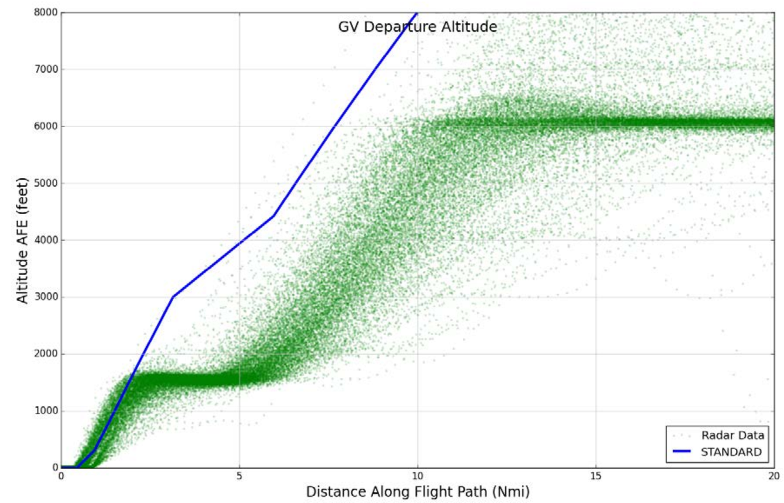

Figure 5 – GV Departure from Runway 24 Radar Example (833 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 10 presents a comparison of SEL values for the INM standard departure profile to SEL values for the sample user-defined departure profile. The sample user-defined profile is named "24HD1560."

Table 10 – GV Departure SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	06HD1520	DIFFERENCE	
0.0	100.3	100.3	0.0	
0.5	113.8	113.8	0.0	
1.0	99.1	99.1	0.0	
1.5	92.0	93.1	1.1	
2.0	88.6	84.8	-3.8	
2.5	86.1	78.0	-8.1	
3.0	84.4	77.8	-6.6	
3.5	82.8	77.7	-5.1	
4.0	81.5	77.7	-3.8	
4.5	80.3	77.7	-2.6	
5.0	79.2	77.7	-1.5	
5.5	78.2	82.2	4.0	
6.0	77.1	86.3	9.2	
6.5	76.3	84.6	8.3	
7.0	75.5	83.0	7.5	
7.5	74.9	81.6	6.7	
8.0	74.2	80.4	6.2	
8.5	73.6	79.4	5.8	
9.0	73.0	78.3	5.3	
9.5	72.4	77.3	4.9	
10.0	71.9	76.4	4.5	
10.5	71.3	75.5	4.2	
11.0	70.8	74.4	3.6	
11.5	70.1	70.5	0.4	
12.0	68.9	66.8	-2.1	
12.5	67.1	65.0	-2.1	Profile STANDARD ends at ~12.5 Nmi
13.0		64.4		
13.5		64.2		
14.0		64.1		
14.5		64.1		
15.0		64.1		
15.5		64.1		
16.0		64.1		
16.5		64.1		
17.0		64.1		
17.5		64.1		
18.0		64.1		
18.5		64.1		
19.0		64.1		
19.5		64.1		
20.0		64.1		Profile 24HD1560 ends at ~28.7 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NetJets

operates the GV at TEB and reviewed and concurs that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the GV. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The departure example represents GV departures from Runway with a hold-down at 1,500 ft. and 6,000 ft. Figure 6 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 7 presents a speed versus distance graph, and Figure 8 presents a thrust versus distance graph. Table 11 and Table 12 present the data used to produce the altitude, speed, and thrust figures. The data in Table 9 and Table 10 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 11 and Table 12.

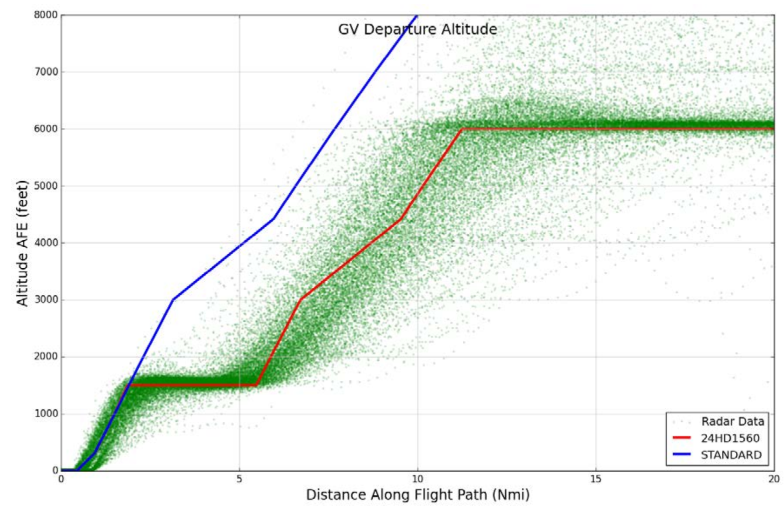

Figure 6 – GV Departure Altitude

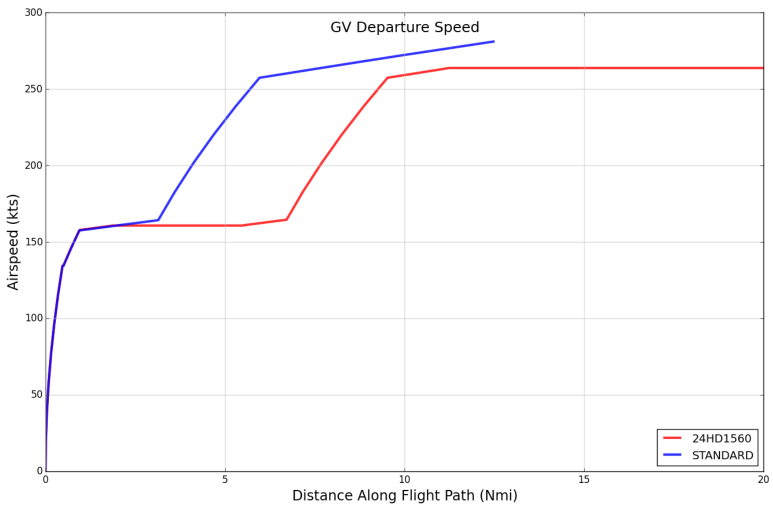

Figure 7 – GV Departure Speed

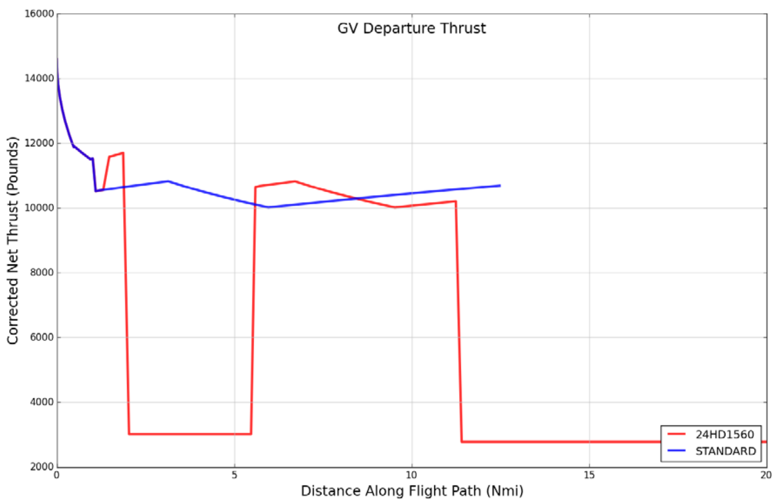

Figure 8 – GV Departure Thrust

Table 11 - INM Standard GV Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GV	D	STANDARD	0.0	-1.1	0.0	14586.1
1	GV	D	STANDARD	58.8	-1.1	19.2	14200.5
2	GV	D	STANDARD	235.1	-1.1	38.4	13814.9
3	GV	D	STANDARD	529.0	-1.1	57.6	13429.3
4	GV	D	STANDARD	940.4	-1.1	76.7	13043.7
5	GV	D	STANDARD	1469.4	-1.1	95.9	12658.1
6	GV	D	STANDARD	2115.9	-1.1	115.1	12272.5
7	GV	D	STANDARD	2879.9	-1.1	134.3	11886.9
8	GV	D	STANDARD	3041.4	33.9	134.4	11892.7
9	GV	D	STANDARD	4334.2	164.2	145.9	11702.1
10	GV	D	STANDARD	5733.7	305.2	157.5	11511.5
11	GV	D	STANDARD	6151.0	398.9	157.7	11526.9
12	GV	D	STANDARD	6657.9	498.9	158.0	10515.7
13	GV	D	STANDARD	7164.8	598.9	158.2	10539.7
14	GV	D	STANDARD	7929.7	748.9	158.6	10557.7
15	GV	D	STANDARD	13029.4	1798.9	161.2	10683.7
16	GV	D	STANDARD	19078.2	2998.9	164.2	10827.7
17	GV	D	STANDARD	21901.6	3232.8	182.8	10666.3
18	GV	D	STANDARD	25028.3	3491.9	201.5	10504.8
19	GV	D	STANDARD	28458.3	3776.0	220.1	10343.3
20	GV	D	STANDARD	32191.6	4085.3	238.7	10181.8
21	GV	D	STANDARD	36228.1	4419.8	257.4	10020.4
22	GV	D	STANDARD	39977.6	4998.9	259.7	10089.9
23	GV	D	STANDARD	46632.4	5998.9	263.8	10209.9
24	GV	D	STANDARD	53528.3	6998.9	268.0	10329.9
25	GV	D	STANDARD	60680.6	7998.9	272.3	10449.9
26	GV	D	STANDARD	61382.8	8093.5	272.7	10461.3
27	GV	D	STANDARD	68105.9	8998.9	276.6	10569.9
28	GV	D	STANDARD	75822.4	9998.9	281.1	10689.9

Table 12 - User-Defined GV Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GV	D	24HD1560	0.0	-1.1	0.0	14586.1
1	GV	D	24HD1560	58.8	-1.1	19.2	14200.5
2	GV	D	24HD1560	235.1	-1.1	38.4	13814.9
3	GV	D	24HD1560	529.0	-1.1	57.6	13429.3
4	GV	D	24HD1560	940.4	-1.1	76.7	13043.7
5	GV	D	24HD1560	1469.4	-1.1	95.9	12658.1
6	GV	D	24HD1560	2115.9	-1.1	115.1	12272.5
7	GV	D	24HD1560	2879.9	-1.1	134.3	11886.9
8	GV	D	24HD1560	3041.4	33.9	134.4	11892.7
9	GV	D	24HD1560	4352	165.8	146.1	11699.6
10	GV	D	24HD1560	5772.1	308.8	157.8	11506.4
11	GV	D	24HD1560	6173.7	398.9	158.0	11521.3
12	GV	D	24HD1560	6680.8	498.9	158.3	10512.3
13	GV	D	24HD1560	7187.9	598.9	158.5	10536.3
14	GV	D	24HD1560	7953.2	748.9	158.9	10554.3
15	GV	D	24HD1560	8978.2	973.7	159.4	11579.0
16	GV	D	24HD1560	11373.0	1498.9	160.7	11702.7
17	GV	D	24HD1560	12373.0	1498.9	160.7	3008.5
18	GV	D	24HD1560	33273.0	1498.9	160.7	3008.5
19	GV	D	24HD1560	34010.8	1648.9	161.1	10644.3
20	GV	D	24HD1560	34748.6	1798.9	161.5	10680.3
21	GV	D	24HD1560	40800.0	2998.9	164.5	10824.3
22	GV	D	24HD1560	43616.9	3232.1	183.1	10663.4
23	GV	D	24HD1560	46734.8	3490.3	201.6	10502.4
24	GV	D	24HD1560	50153.7	3773.4	220.2	10341.5
25	GV	D	24HD1560	53873.7	4081.4	238.8	10180.6
26	GV	D	24HD1560	57894.7	4414.3	257.4	10019.7
27	GV	D	24HD1560	61156.1	4918	259.4	10080.2
28	GV	D	24HD1560	61679.5	4998.9	259.7	10089.9
29	GV	D	24HD1560	68334.3	5998.9	263.8	10209.9
30	GV	D	24HD1560	69334.3	5998.9	263.8	2774.9
31	GV	D	24HD1560	144934.3	5998.9	263.8	2774.9
32	GV	D	24HD1560	145945.0	6145.5	264.4	10209.9
33	GV	D	24HD1560	151830.2	6998.9	268.0	10329.9
34	GV	D	24HD1560	158982.5	7998.9	272.3	10449.9
35	GV	D	24HD1560	166407.9	8998.9	276.6	10569.9
36	GV	D	24HD1560	174124.4	9998.9	281.1	10689.9

Table 13 and Table 14 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 13 - INM Standard GV Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GV	D	STANDARD	1	1	T	T-20-D	T	0.0	0.0	0.0
GV	D	STANDARD	1	2	C	T-20-D	T	35.0	0.0	0.0
GV	D	STANDARD	1	3	A	T-20-D	T	1500.0	165.7	0.0
GV	D	STANDARD	1	4	C	T-20-U	T	400.0	0.0	0.0
GV	D	STANDARD	1	5	C	T-20-U	C	600.0	0.0	0.0
GV	D	STANDARD	1	6	C	T-20-U	C	750.0	0.0	0.0
GV	D	STANDARD	1	7	C	T-10-U	C	1800.0	0.0	0.0
GV	D	STANDARD	1	8	C	T-10-U	C	3000.0	0.0	0.0
GV	D	STANDARD	1	9	A	T-0-U	C	1750.0	250.0	0.0
GV	D	STANDARD	1	10	C	T-0-U	C	5000.0	0.0	0.0
GV	D	STANDARD	1	11	C	T-0-U	C	6000.0	0.0	0.0
GV	D	STANDARD	1	12	C	T-0-U	C	7000.0	0.0	0.0
GV	D	STANDARD	1	13	C	T-0-U	C	8000.0	0.0	0.0
GV	D	STANDARD	1	14	C	T-0-U	C	9000.0	0.0	0.0
GV	D	STANDARD	1	15	C	T-0-U	C	10000.0	0.0	0.0

Table 14 - User-Defined GV Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GV	D	24HD1560	1	1	T	T-20-D	T	0.0	0.0	0.0
GV	D	24HD1560	1	2	C	T-20-D	T	35.0	0.0	0.0
GV	D	24HD1560	1	3	A	T-20-D	T	1500.0	166.0	0.0
GV	D	24HD1560	1	4	C	T-20-U	T	400.0	0.0	0.0
GV	D	24HD1560	1	5	C	T-20-U	C	600.0	0.0	0.0
GV	D	24HD1560	1	6	C	T-20-U	C	750.0	0.0	0.0
GV	D	24HD1560	1	7	C	T-20-U	T	1500.0	0.0	0.0
GV	D	24HD1560	1	8	V	T-20-U		1500.0	166.0	21900.0
GV	D	24HD1560	1	9	C	T-10-U	C	1800.0	0.0	0.0
GV	D	24HD1560	1	10	C	T-10-U	C	3000.0	0.0	0.0
GV	D	24HD1560	1	11	A	T-0-U	C	1750.0	250.0	0.0
GV	D	24HD1560	1	12	C	T-0-U	C	5000.0	0.0	0.0
GV	D	24HD1560	1	13	C	T-0-U	C	6000.0	0.0	0.0
GV	D	24HD1560	1	14	V	T-0-U		6000.0	250.0	76600.0
GV	D	24HD1560	1	15	C	T-0-U	C	7000.0	0.0	0.0
GV	D	24HD1560	1	16	C	T-0-U	C	8000.0	0.0	0.0
GV	D	24HD1560	1	17	C	T-0-U	C	9000.0	0.0	0.0
GV	D	24HD1560	1	18	C	T-0-U	C	10000.0	0.0	0.0

ATTACHMENT C

Sample User-Defined Arrival Profiles – Medium Jets – LEAR35

The sample arrival profile included in this attachment was developed for the LEAR35 INM aircraft type. The sample LEAR35 profile represents a consistent user-defined profile methodology for all medium and small jets in the TEB forecast. The LEAR35 INM aircraft type will represent the following aircraft from the TEB forecast: LJ31, LJ35, LJ55, PRM1, and FA10. The LEAR35 is also proposed to represent the following types: LJ40, H25B, H25C, and F20Q[6].

This same process for developing arrival profiles for medium and small jets will be applied to the following INM aircraft types: CL600, CL601, CNA525C, CNA55B, CNA560U, CNA560XL, CNA680, CNA750, and MU3001.

Statement of Benefit

Based on the radar flight tracks presented in Figure 9, it is clear that the LEAR35 aircraft approaching Runway 6 are not following the INM standard profile. In general, the radar data suggest that medium jet aircraft profiles include one or more level flight segments while arriving to Runway 6. The INM standard LEAR35 arrival profile does not include level segments, as shown in Figure 9.

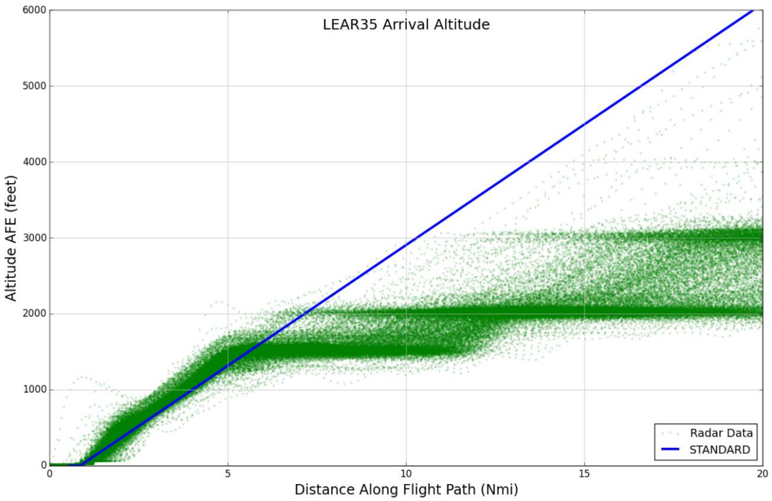

Figure 9 – LEAR35 Arrival to Runway 6 Radar Example (1,233 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 15 presents a comparison of SEL values for the

[6] The INM type LEAR35 is proposed to represent the LJ40, H25B, H25C, and F20Q in the INM 7.0d model for TEB. FAA approval of these substitutions is pending and was submitted on 2/10/2016

INM standard arrival profile to SEL values for the sample user-defined arrival profile. The sample user-defined profile is named "06HD1520."

Table 15 – LEAR35 Arrival SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	06HD1520	DIFFERENCE	
1.0	59.6	59.6	0.0	
0.5	85.5	85.5	0.0	
0.0	98.0	98.0	0.0	Runway Threshold
-0.5	91.5	91.4	-0.1	
-1.0	87.6	87.6	0.0	
-1.5	85.0	85.0	0.0	
-2.0	83.0	83.0	0.0	
-2.5	81.3	81.3	0.0	
-3.0	79.9	79.9	0.0	
-3.5	78.0	78.0	0.0	
-4.0	76.3	76.3	0.0	
-4.5	74.8	75.5	0.7	
-5.0	73.7	78.8	5.1	
-5.5	72.9	78.9	6.0	
-6.0	72.2	79.0	6.8	
-6.5	71.5	79.0	7.5	
-7.0	70.8	79.0	8.2	
-7.5	70.2	79.0	8.8	
-8.0	69.6	78.9	9.3	
-8.5	69.1	78.8	9.7	
-9.0	68.5	77.8	9.3	
-9.5	67.7	75.6	7.9	
-10.0	67.0	73.6	6.6	
-10.5	66.3	76.0	9.7	
-11.0	65.8	76.5	10.7	
-11.5	65.1	76.6	11.5	
-12.0	64.6	76.6	12.0	
-12.5	64.1	76.6	12.5	
-13.0	63.5	76.5	13.0	
-13.5	63.1	76.4	13.3	
-14.0	62.5	75.3	12.8	
-14.5	62.0	73.4	11.4	
-15.0	61.7	71.5	9.8	
-15.5	61.2	69.7	8.5	
-16.0	60.7	69.1	8.4	
-16.5	60.4	68.5	8.1	
-17.0	60.0	67.8	7.8	
-17.5	59.5	67.1	7.6	
-18.0	59.0	66.5	7.5	
-18.5	57.6	65.8	8.2	
-19.0	53.0	65.3	12.3	Profile STANDARD ends at ~19.2 Nmi
-19.5		64.6		
-20.0		64.2		Profile 06HD1520 ends at ~26.8 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA and NetJets who operate the Lear35 at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the LEAR35. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The arrival example represents LEAR35 arrivals to Runway 6 with a hold-down at 1,500 ft. and 2,000 ft. While, the radar data provided shows a hold down at 3,000 ft., the majority of this hold down (at approximately 17nmi) is beyond the study area and is not included in the profile adjustments. Figure 10 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 11 presents a speed versus distance graph, and Figure 12 presents a thrust versus distance graph. Table 16 and Table 17 present the data used to produce the altitude, speed, and thrust figures. The data in Table 14 and Table 15 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 16 and Table 17.

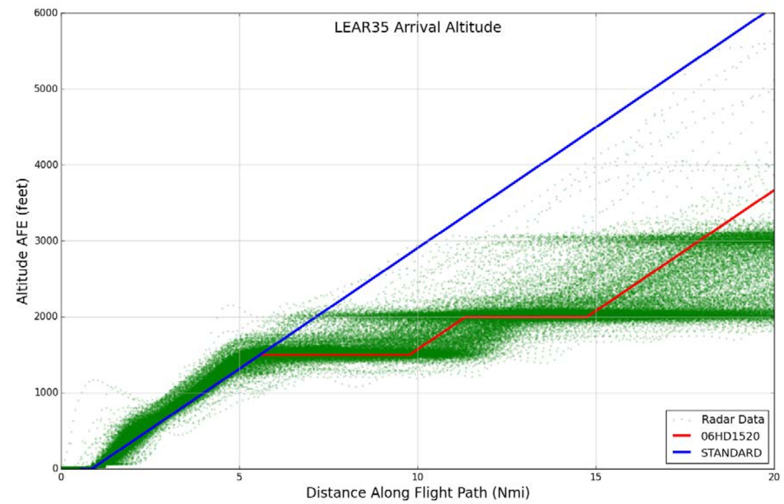

Figure 10 – LEAR35 Arrival Altitude

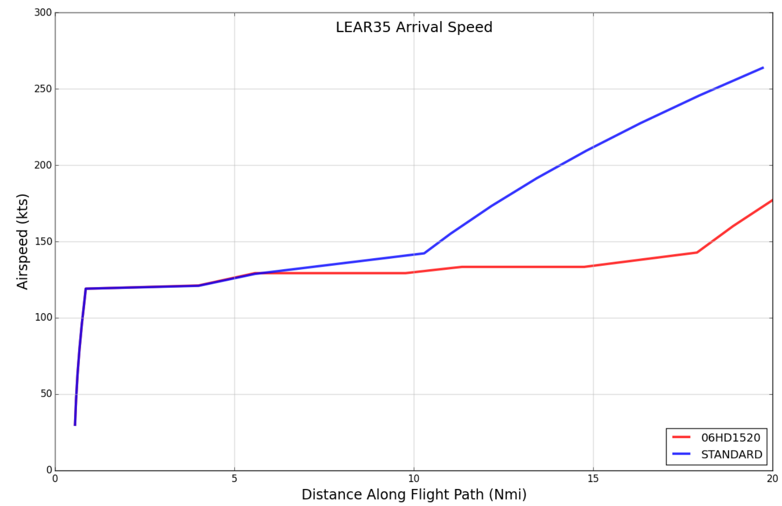

Figure 11 – LEAR35 Arrival Speed

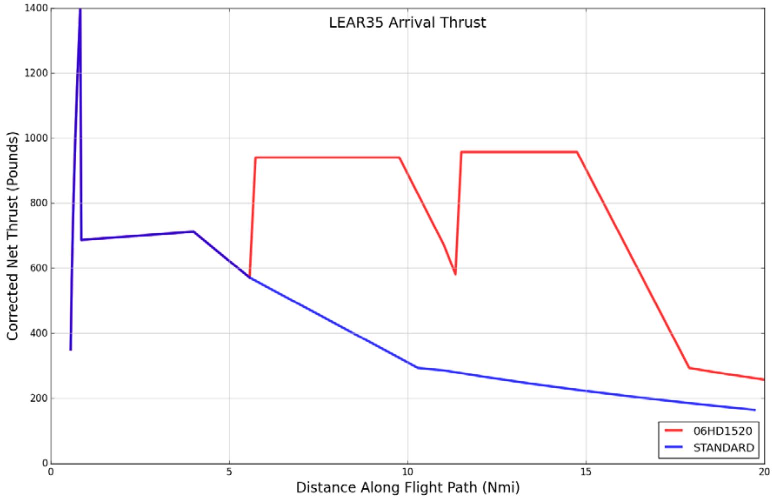

Figure 12 – LEAR35 Arrival Thrust

Table 16 - INM Standard LEAR35 Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	LEAR35	A	STANDARD	116459.1	5996.7	263.8	164.7
1	LEAR35	A	STANDARD	105748.1	5436.1	245.7	184.9
2	LEAR35	A	STANDARD	95798.6	4915.4	227.6	205.1
3	LEAR35	A	STANDARD	86610.5	4434.5	209.5	225.3
4	LEAR35	A	STANDARD	78183.9	3993.5	191.4	245.5
5	LEAR35	A	STANDARD	70518.8	3592.4	173.2	265.8
6	LEAR35	A	STANDARD	63615.1	3231.1	155.1	286.0
7	LEAR35	A	STANDARD	59137.2	2996.7	142.2	293.9
8	LEAR35	A	STANDARD	30476.2	1496.7	128.7	571.3
9	LEAR35	A	STANDARD	20922.5	996.7	120.9	712.4
10	LEAR35	A	STANDARD	2770.5	46.7	119.1	688.3
11	LEAR35	A	STANDARD	1815.1	-3.3	119.0	687.0
12	LEAR35	A	STANDARD	1633.7	-3.3	112.5	1400.0
13	LEAR35	A	STANDARD	1155.4	-3.3	96.0	1190.0
14	LEAR35	A	STANDARD	753.0	-3.3	79.4	980.0
15	LEAR35	A	STANDARD	426.5	-3.3	62.9	770.0
16	LEAR35	A	STANDARD	175.8	-3.3	46.4	560.0
17	LEAR35	A	STANDARD	1.0	-3.3	29.8	350.0

Table 17 - User-Defined LEAR35 Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	LEAR35	A	06HD1520	162659.0	5996.7	263.8	164.7
1	LEAR35	A	06HD1520	152378.7	5458.7	246.5	183.2
2	LEAR35	A	06HD1520	142795.6	4957.1	229.2	201.6
3	LEAR35	A	06HD1520	133909.6	4492.1	211.9	220.1
4	LEAR35	A	06HD1520	125720.7	4063.5	194.6	238.6
5	LEAR35	A	06HD1520	118229.0	3671.4	177.3	257.0
6	LEAR35	A	06HD1520	111434.4	3315.8	160.0	275.5
7	LEAR35	A	06HD1520	105337.0	2996.7	142.7	293.9
8	LEAR35	A	06HD1520	86229.7	1996.7	133.3	957.7
9	LEAR35	A	06HD1520	85229.7	1996.7	133.3	957.7
10	LEAR35	A	06HD1520	66529.7	1996.7	133.3	957.7
11	LEAR35	A	06HD1520	65529.7	1996.7	133.3	581.8
12	LEAR35	A	06HD1520	63580.0	1894.7	132.5	670.7
13	LEAR35	A	06HD1520	55976.1	1496.7	129.2	940.4
14	LEAR35	A	06HD1520	54976.1	1496.7	129.2	940.4
15	LEAR35	A	06HD1520	31476.1	1496.7	129.2	940.4
16	LEAR35	A	06HD1520	30476.1	1496.7	129.2	571.3
17	LEAR35	A	06HD1520	20922.4	996.7	121.1	712.4
18	LEAR35	A	06HD1520	2770.4	46.7	119.1	688.3
19	LEAR35	A	06HD1520	1815.0	-3.3	119.0	687.0
20	LEAR35	A	06HD1520	1634.0	-3.3	112.3	1400.0
21	LEAR35	A	06HD1520	1155.8	-3.3	95.8	1190.0
22	LEAR35	A	06HD1520	753.4	-3.3	79.3	980.0
23	LEAR35	A	06HD1520	426.8	-3.3	62.8	770.0
24	LEAR35	A	06HD1520	176.0	-3.3	46.3	560.0
25	LEAR35	A	06HD1520	1.0	-3.3	29.8	350.0

Table 18 and Table 19 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 18 - INM Standard LEAR35 Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
LEAR35	A	STANDARD	1	1	D	ZERO		6000.0	250.0	3.0
LEAR35	A	STANDARD	1	2	D	10		3000.0	144.5	3.0
LEAR35	A	STANDARD	1	3	D	D-INTR		1500.0	134.5	3.0
LEAR35	A	STANDARD	1	4	D	D-40		1000.0	127.8	3.0
LEAR35	A	STANDARD	1	5	L	D-40		181.4	127.8	0.0
LEAR35	A	STANDARD	1	6	B		V	1632.6	121.2	40.0
LEAR35	A	STANDARD	1	7	B		L	0.0	30.0	10.0

Table 19 - User-Defined LEAR35 Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
LEAR35	A	06HD1520	1	1	D	ZERO		6000.0	250.0	3.0
LEAR35	A	06HD1520	1	2	D	10		3000.0	145.0	3.0
LEAR35	A	06HD1520	1	3	V	D-INTR		2000.0	138.0	1000.0
LEAR35	A	06HD1520	1	4	V	D-INTR		2000.0	138.0	18700.0
LEAR35	A	06HD1520	1	5	V	D-INTR		2000.0	138.0	1000.0
LEAR35	A	06HD1520	1	6	D	D-INTR		2000.0	138.0	3.0
LEAR35	A	06HD1520	1	7	V	D-INTR		1500.0	135.0	1000.0
LEAR35	A	06HD1520	1	8	V	D-INTR		1500.0	135.0	23500.0
LEAR35	A	06HD1520	1	9	V	D-INTR		1500.0	135.0	1000.0
LEAR35	A	06HD1520	1	10	D	D-INTR		1500.0	135.0	3.0
LEAR35	A	06HD1520	1	11	D	D-40		1000.0	128.0	3.0
LEAR35	A	06HD1520	1	12	L	D-40		181.0	128.0	0.0
LEAR35	A	06HD1520	1	13	B		V	1633.0	121.0	40.0
LEAR35	A	06HD1520	1	14	B		L	0.0	30.0	10.0

ATTACHMENT D

Sample User-Defined Departure Profiles – Medium Jets – LEAR35

The sample departure profile included in this attachment was developed for the LEAR35 INM aircraft type. The sample LEAR35 profile represents a consistent user-defined profile methodology for all medium and small jets in the TEB forecast. The LEAR35 INM aircraft type will represent the following aircraft from the TEB forecast: LJ31, LJ35, LJ55, PRM1, and FA10. The LEAR35 is also proposed to represent the following types: LJ40, H25B, H25C, and F20Q.

This same process for developing departure profiles for medium and small jets will be applied to the following INM aircraft types: CL600, CL601, CNA525C, CNA55B, CNA560U, CNA560XL, CNA680, CNA750, and MU3001.

Statement of Benefit

Based on the radar flight tracks presented in Figure 13, it is clear that the LEAR35 aircraft departing Runway 24 are not following the INM standard profile. In general, the radar data suggest that medium jet aircraft profiles include one or more level flight segments while departing from Runway 24. The INM standard LEAR35 departure profile does not include level segments, as shown in Figure 13.

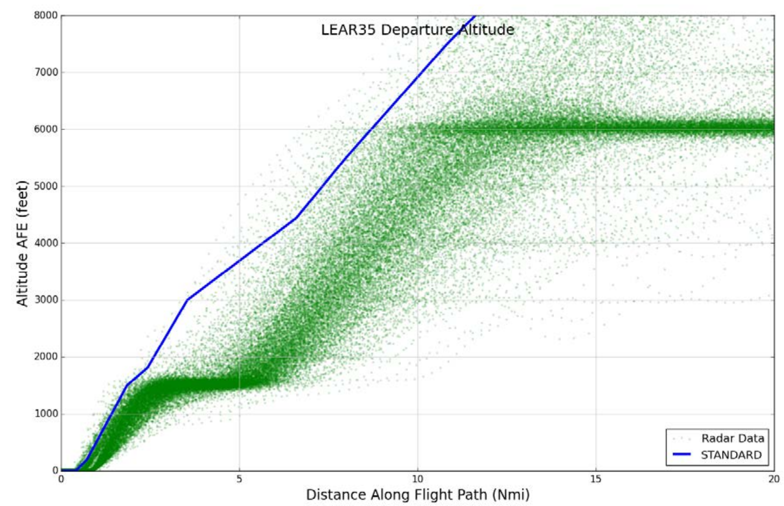

Figure 13 – LEAR35 Departure from 24 Radar Example (1,101 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 20 presents a comparison of SEL values for the INM standard departure profile to SEL values for the sample user-defined departure profile. The sample user-defined profile is named "24HD1560."

Table 20 – LEAR35 Departure SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	24HD1560	DIFFERENCE	
0.0	112.0	112.0	0.0	
0.5	119.5	119.5	0.0	
1.0	104.8	104.8	0.0	
1.5	98.1	98.1	0.0	
2.0	94.2	88.6	-5.6	
2.5	90.8	80.2	-10.6	
3.0	87.0	79.6	-7.4	
3.5	85.1	79.5	-5.6	
4.0	83.5	79.5	-4.0	
4.5	82.1	79.5	-2.6	
5.0	81.0	80.1	-0.9	
5.5	79.9	88.5	8.6	
6.0	78.8	91.7	12.9	
6.5	77.7	87.4	9.7	
7.0	76.7	85.4	8.7	
7.5	75.9	83.8	7.9	
8.0	75.1	82.4	7.3	
8.5	74.3	81.2	6.9	
9.0	73.6	80.1	6.5	
9.5	73.0	79.0	6.0	
10.0	72.4	77.9	5.5	
10.5	71.7	76.9	5.2	
11.0	71.1	76.0	4.9	
11.5	70.5	75.1	4.6	
12.0	70.1	73.8	3.7	
12.5	69.6	69.8	0.2	
13.0	69.1	65.4	-3.7	
13.5	68.6	62.9	-5.7	
14.0	67.9	62.0	-5.9	
14.5	66.5	61.7	-4.8	Profile STANDARD ends at ~14.8 Nmi
15.0		61.6		
15.5		61.6		
16.0		61.5		
16.5		61.5		
17.0		61.5		
17.5		61.5		
18.0		61.5		
18.5		61.5		
19.0		61.5		
19.5		61.5		
20.0		61.5		Profile 24HD1560 ends at ~31.0 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA and NetJets who operate the Lear35 at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the LEAR35. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The departure example represents LEAR35 departures from Runway with a hold-down at 1,500 ft. and 6,000 ft. Figure 14 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 15 presents a speed versus distance graph, and Figure 16 presents a thrust versus distance graph. Table 21 and Table 22 present the data used to produce the altitude, speed, and thrust figures. The data in Table 19 and Table 20 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 21 and Table 22.

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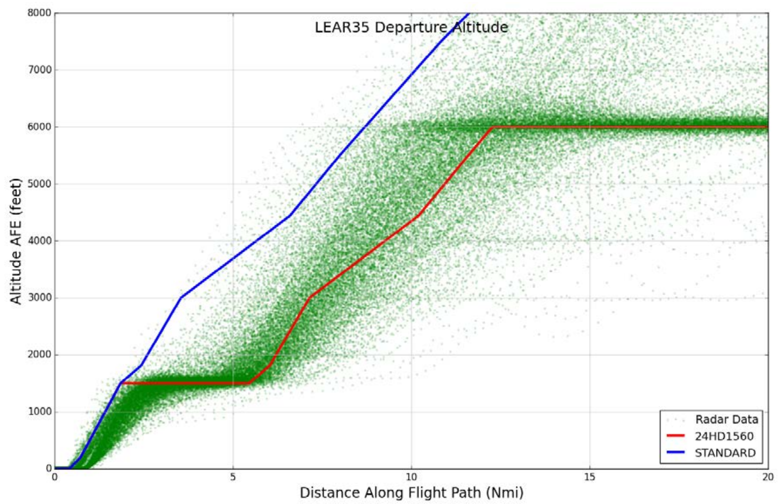

Figure 14 – LEAR35 Departure Altitude

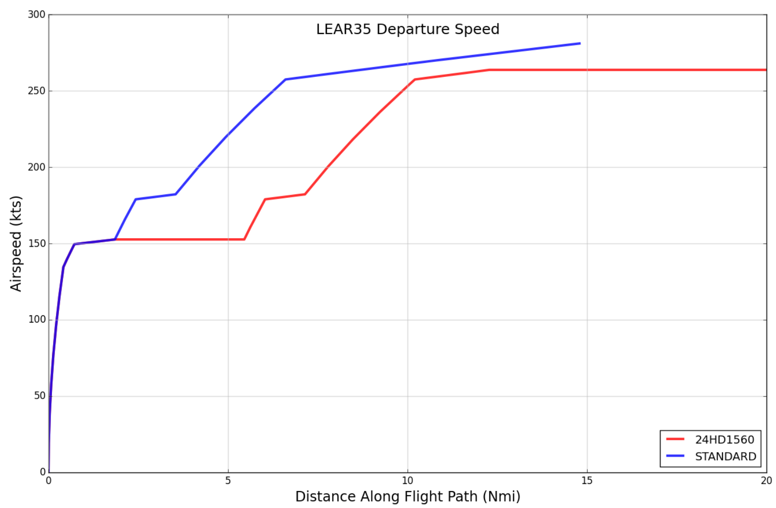

Figure 15 – LEAR35 Departure Speed

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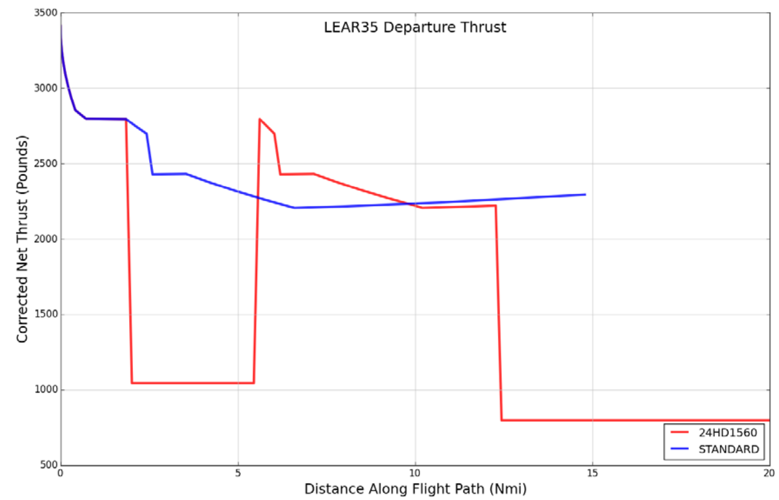

Figure 16 – LEAR35 Departure Thrust

Table 21 - INM Standard LEAR35 Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	LEAR35	D	STANDARD	0.0	-1.1	0.0	3412.6
1	LEAR35	D	STANDARD	51.5	-1.1	19.2	3332.9
2	LEAR35	D	STANDARD	206.0	-1.1	38.4	3253.3
3	LEAR35	D	STANDARD	463.6	-1.1	57.7	3173.7
4	LEAR35	D	STANDARD	824.2	-1.1	76.9	3094.0
5	LEAR35	D	STANDARD	1287.8	-1.1	96.1	3014.4
6	LEAR35	D	STANDARD	1854.5	-1.1	115.3	2934.8
7	LEAR35	D	STANDARD	2524.2	-1.1	134.5	2855.1
8	LEAR35	D	STANDARD	3038.7	51.9	138.9	2838.6
9	LEAR35	D	STANDARD	3652.7	115.1	143.8	2819.4
10	LEAR35	D	STANDARD	4382.9	190.2	149.5	2797.4
11	LEAR35	D	STANDARD	11239.4	1498.9	152.6	2794.7
12	LEAR35	D	STANDARD	12929.8	1649.3	165.7	2746.2
13	LEAR35	D	STANDARD	14759.7	1812.1	178.9	2697.7
14	LEAR35	D	STANDARD	15775.5	1990.6	179.4	2427.9
15	LEAR35	D	STANDARD	21515.6	2998.9	182.2	2430.9
16	LEAR35	D	STANDARD	25568.3	3313.4	201.0	2374.5
17	LEAR35	D	STANDARD	30019.2	3658.8	219.8	2318.1
18	LEAR35	D	STANDARD	34868.4	4035.1	238.6	2261.7
19	LEAR35	D	STANDARD	40115.8	4442.3	257.5	2205.3
20	LEAR35	D	STANDARD	48553.8	5498.9	261.7	2215.4
21	LEAR35	D	STANDARD	61223.9	6968.4	267.9	2235.8
22	LEAR35	D	STANDARD	65797.4	7498.9	270.1	2243.1
23	LEAR35	D	STANDARD	89868.2	9998.9	281.1	2293.4

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Table 22 - User-Defined LEAR35 Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	LEAR35	D	24HD1560	0.0	-1.1	0.0	3412.6
1	LEAR35	D	24HD1560	51.5	-1.1	19.2	3332.9
2	LEAR35	D	24HD1560	206.0	-1.1	38.4	3253.3
3	LEAR35	D	24HD1560	463.6	-1.1	57.7	3173.7
4	LEAR35	D	24HD1560	824.2	-1.1	76.9	3094.0
5	LEAR35	D	24HD1560	1287.8	-1.1	96.1	3014.4
6	LEAR35	D	24HD1560	1854.5	-1.1	115.3	2934.8
7	LEAR35	D	24HD1560	2524.2	-1.1	134.5	2855.1
8	LEAR35	D	24HD1560	3038.7	51.9	138.9	2838.6
9	LEAR35	D	24HD1560	3652.7	115.1	143.8	2819.4
10	LEAR35	D	24HD1560	4382.9	190.2	149.5	2797.4
11	LEAR35	D	24HD1560	11239.4	1498.9	152.6	2794.7
12	LEAR35	D	24HD1560	12239.4	1498.9	152.6	1042.5
13	LEAR35	D	24HD1560	33139.4	1498.9	152.6	1042.5
14	LEAR35	D	24HD1560	34143.4	1588.2	160.5	2794.7
15	LEAR35	D	24HD1560	36659.7	1812.1	178.9	2697.7
16	LEAR35	D	24HD1560	37675.5	1990.6	179.4	2427.9
17	LEAR35	D	24HD1560	43415.6	2998.9	182.2	2430.9
18	LEAR35	D	24HD1560	47282.8	3299.0	200.2	2377.5
19	LEAR35	D	24HD1560	51514.1	3627.3	218.2	2324.1
20	LEAR35	D	24HD1560	56109.6	3983.9	236.2	2270.7
21	LEAR35	D	24HD1560	61069.2	4368.8	254.2	2217.3
22	LEAR35	D	24HD1560	62015.8	4442.3	257.5	2205.3
23	LEAR35	D	24HD1560	70453.8	5498.9	261.7	2215.4
24	LEAR35	D	24HD1560	74606.3	5998.9	263.8	2221.3
25	LEAR35	D	24HD1560	75606.3	5998.9	263.8	796.7
26	LEAR35	D	24HD1560	151206.3	5998.9	263.8	796.7
27	LEAR35	D	24HD1560	152212.9	6114.2	264.3	2221.3
28	LEAR35	D	24HD1560	164300.4	7498.9	270.1	2243.1
29	LEAR35	D	24HD1560	188371.2	9998.9	281.1	2293.4

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Table 23 and Table 24 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 23 - INM Standard LEAR35 Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
LEAR35	D	STANDARD	1	1	T	20	T	0	143.4	0.0
LEAR35	D	STANDARD	1	2	A	20	T	1493	158.0	0.0
LEAR35	D	STANDARD	1	3	C	20	T	1500	0.0	0.0
LEAR35	D	STANDARD	1	4	A	10	T	1493	183.0	0.0
LEAR35	D	STANDARD	1	5	C	ZERO	C	3000	0.0	0.0
LEAR35	D	STANDARD	1	6	A	ZERO	C	1706	250.0	0.0
LEAR35	D	STANDARD	1	7	C	ZERO	C	5500	0.0	0.0
LEAR35	D	STANDARD	1	8	C	ZERO	C	7500	0.0	0.0
LEAR35	D	STANDARD	1	9	C	ZERO	C	10000	0.0	0.0

Table 24 - User-Defined LEAR35 Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
LEAR35	D	24HD1560	1	1	T	20	T	0.0	143.0	0.0
LEAR35	D	24HD1560	1	2	A	20	T	1493.0	158.0	0.0
LEAR35	D	24HD1560	1	3	C	20	T	1500.0	0.0	0.0
LEAR35	D	24HD1560	1	4	V	20		1500.0	158.0	21900.0
LEAR35	D	24HD1560	1	5	A	10	T	1493.0	183.0	0.0
LEAR35	D	24HD1560	1	6	C	ZERO	C	3000.0	0.0	0.0
LEAR35	D	24HD1560	1	7	A	ZERO	C	1706.0	250.0	0.0
LEAR35	D	24HD1560	1	8	C	ZERO	C	5500.0	0.0	0.0
LEAR35	D	24HD1560	1	9	C	ZERO	C	6000.0	0.0	0.0
LEAR35	D	24HD1560	1	10	V	ZERO		6000.0	250.0	76600.0
LEAR35	D	24HD1560	1	11	C	ZERO	C	7500.0	0.0	0.0
LEAR35	D	24HD1560	1	12	C	ZERO	C	10000.0	0.0	0.0

ATTACHMENT E

Sample User-Defined Arrival Profiles – Turboprops – CNA208

The sample arrival profile included in this attachment was developed for the CNA208 INM aircraft type. The sample CNA208 profile represents a consistent user-defined profile methodology for all turboprops in the TEB forecast. The CNA208 INM aircraft type will be used to represent the following aircraft from the TEB forecast: PC12.

This same process for developing arrival profiles for turboprops will be applied to the following INM aircraft type: DO228.

Statement of Benefit

Based on the radar flight tracks presented in Figure 17, it is clear that the CNA208 aircraft approaching Runway 6 are not following the INM standard profile. In general, the radar data suggest that turboprop aircraft profiles include one or more level flight segments while arriving to Runway 6. The INM standard CNA208 arrival profile does not include level segments, as shown in Figure 17.

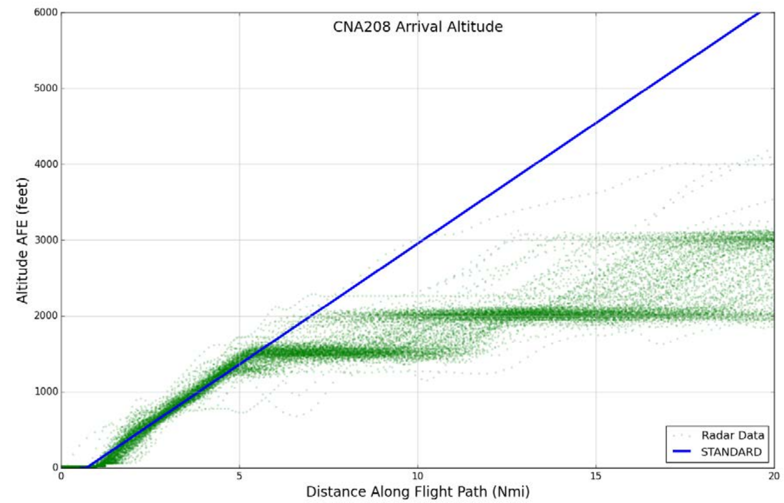

Figure 17 – CNA208 Arrival to Runway 6 Radar Example (228 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 25Table 15 presents a comparison of SEL values for the INM standard arrival profile to SEL values for the sample user-defined arrival profile. The sample user-defined profile is named "06HD1520."

Table 25 – CNA208 Arrival SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	06HD1520	DIFFERENCE	
1.0	59.3	59.3	0.0	
0.5	74.2	74.2	0.0	
0.0	99.9	99.9	0.0	Runway Threshold
-0.5	93.4	93.4	0.0	
-1.0	90.0	90.0	0.0	
-1.5	87.5	87.5	0.0	
-2.0	85.9	85.9	0.0	
-2.5	84.1	84.1	0.0	
-3.0	82.7	82.8	0.1	
-3.5	81.6	81.6	0.0	
-4.0	80.7	80.7	0.0	
-4.5	80.0	80.0	0.0	
-5.0	79.3	74.9	-4.4	
-5.5	78.7	74.9	-3.8	
-6.0	78.1	74.9	-3.2	
-6.5	77.1	74.9	-2.2	
-7.0	76.6	74.9	-1.7	
-7.5	76.1	74.9	-1.2	
-8.0	75.7	74.9	-0.8	
-8.5	75.2	74.6	-0.6	
-9.0	74.8	74.1	-0.7	
-9.5	74.4	76.9	2.5	
-10.0	73.9	76.2	2.3	
-10.5	73.3	72.9	-0.4	
-11.0	73.0	72.8	-0.2	
-11.5	72.7	72.8	0.1	
-12.0	72.4	72.8	0.4	
-12.5	71.9	72.8	0.9	
-13.0	71.4	72.8	1.4	
-13.5	71.1	72.8	1.7	
-14.0	70.8	72.4	1.6	
-14.5	70.5	71.9	1.4	
-15.0	70.2	71.4	1.2	
-15.5	69.7	70.9	1.2	
-16.0	69.3	70.7	1.4	
-16.5	69.0	70.9	1.9	
-17.0	68.8	70.8	2.0	
-17.5	68.5	71.1	2.6	
-18.0	68.2	71.4	3.2	
-18.5	67.3	71.8	4.5	
-19.0	59.5	72.2	12.7	Profile STANDARD ends at ~19.0 Nmi
-19.5		72.5		
-20.0		72.2		Profile 06HD1520 ends at ~26.7 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA members who operate the CNA208 at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the CNA208. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The arrival example represents CNA208 arrivals to Runway 6 with a hold-down at 1,500 ft. and 2,000 ft. While, the radar data provided shows a hold down at 3,000 ft., the majority of this hold down (at approximately 17nmi) is beyond the study area and is not included in the profile adjustments. Figure 18 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 19 presents a speed versus distance graph, and Figure 20 presents a thrust versus distance graph. Table 26 and Table 27 present the data used to produce the altitude, speed, and thrust figures. The data in Table 24 and Table 25 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 26 and Table 27.

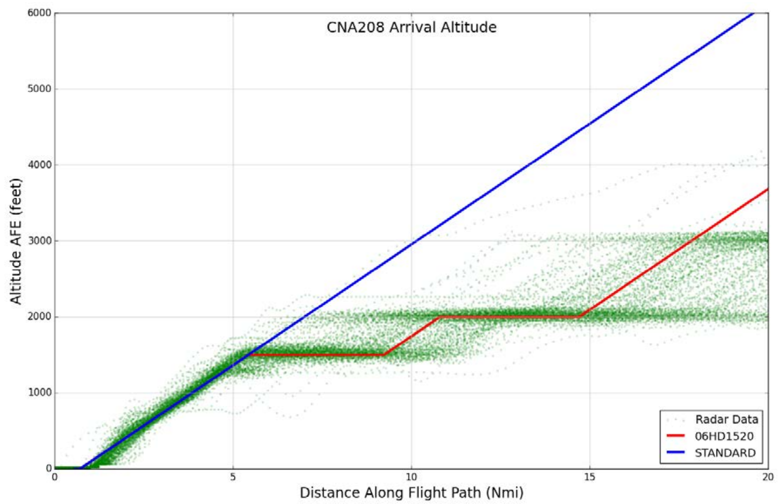

Figure 18 – CNA208 Arrival Altitude

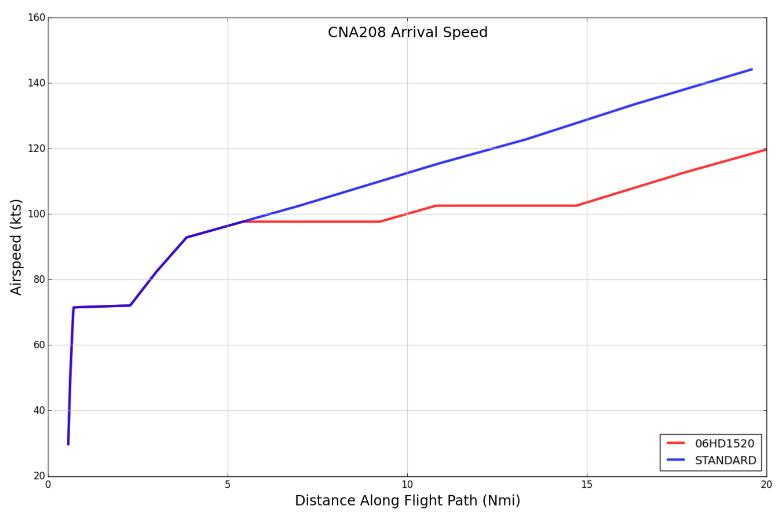

Figure 19 – CNA208 Arrival Speed

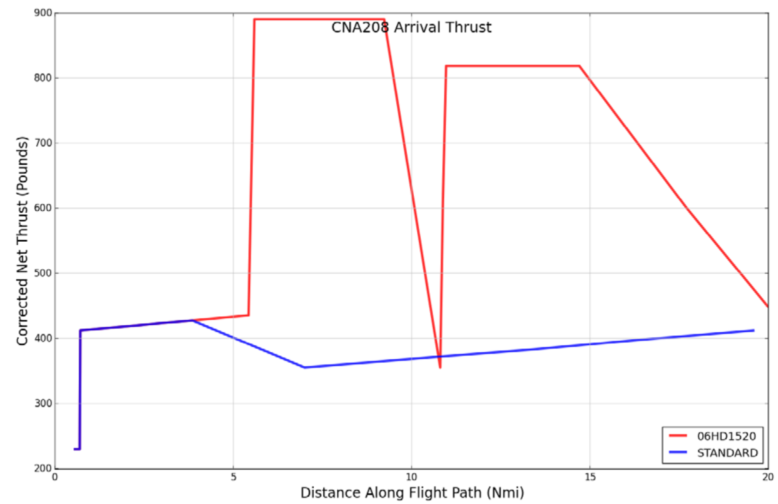

Figure 20 – CNA208 Arrival Thrust

Table 26 - INM Standard CNA208 Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	CNA208	A	STANDARD	115559.9	5996.7	144.2	412.2
1	CNA208	A	STANDARD	95686.6	4956.6	133.5	397.4
2	CNA208	A	STANDARD	77345.3	3996.7	122.8	382.5
3	CNA208	A	STANDARD	62715.9	3231.1	115.5	372.4
4	CNA208	A	STANDARD	39130.6	1996.7	102.6	355.3
5	CNA208	A	STANDARD	20023.3	996.7	92.9	427.5
6	CNA208	A	STANDARD	14945.9	731.0	82.5	423.7
7	CNA208	A	STANDARD	10469.7	496.7	72.1	419.8
8	CNA208	A	STANDARD	1871.4	46.7	71.6	413.1
9	CNA208	A	STANDARD	916.0	-3.3	71.5	412.3
10	CNA208	A	STANDARD	816.0	-3.3	69.6	230.0
11	CNA208	A	STANDARD	327.1	-3.3	49.7	230.0
12	CNA208	A	STANDARD	1.0	-3.3	29.8	230.0

Table 27 - User-Defined CNA208 Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	CNA208	A	06HD1520	162359.9	5996.7	144.2	412.2
1	CNA208	A	06HD1520	142486.6	4956.6	133.5	397.4
2	CNA208	A	06HD1520	124145.3	3996.7	122.8	382.5
3	CNA208	A	06HD1520	104180.8	2951.8	112.7	600.5
4	CNA208	A	06HD1520	85930.7	1996.7	102.6	818.4
5	CNA208	A	06HD1520	84930.7	1996.7	102.6	818.4
6	CNA208	A	06HD1520	63230.7	1996.7	102.6	818.4
7	CNA208	A	06HD1520	62683.6	1996.7	102.6	610.3
8	CNA208	A	06HD1520	62230.7	1996.7	102.6	355.3
9	CNA208	A	06HD1520	52677.0	1496.7	97.7	890.1
10	CNA208	A	06HD1520	51677.0	1496.7	97.7	890.1
11	CNA208	A	06HD1520	30577.0	1496.7	97.7	890.1
12	CNA208	A	06HD1520	29577.0	1496.7	97.7	435.4
13	CNA208	A	06HD1520	20023.3	996.7	92.9	427.5
14	CNA208	A	06HD1520	14945.9	731.0	82.5	423.7
15	CNA208	A	06HD1520	10469.7	496.7	72.1	419.8
16	CNA208	A	06HD1520	1871.4	46.7	71.6	413.1
17	CNA208	A	06HD1520	916.0	-3.3	71.5	412.3
18	CNA208	A	06HD1520	816.0	-3.3	69.6	230.0
19	CNA208	A	06HD1520	327.1	-3.3	49.7	230.0
20	CNA208	A	06HD1520	1.0	-3.3	29.8	230.0

Table 28 and Table 29 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 28 - INM Standard CNA208 Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
CNA208	A	STANDARD	1	1	D	ZERO-A		6000.0	140.0	3.0
CNA208	A	STANDARD	1	2	D	ZERO-A		4000.0	124.0	3.0
CNA208	A	STANDARD	1	3	D	ZERO-A		2000.0	108.0	3.0
CNA208	A	STANDARD	1	4	D	F30APP		1000.0	100.0	3.0
CNA208	A	STANDARD	1	5	D	F30APP		500.0	80.0	3.0
CNA208	A	STANDARD	1	6	L	F30APP		100.0	0.0	0.0
CNA208	A	STANDARD	1	7	B	F30APP	L	815.0	78.0	10.0
CNA208	A	STANDARD	1	8	B		L	0.0	30.0	10.0

Table 29 - User-Defined CNA208 Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
CNA208	A	06HD1520	1	1	D	ZERO-A		6000.0	140.0	3.0
CNA208	A	06HD1520	1	2	D	ZERO-A		4000.0	124.0	3.0
CNA208	A	06HD1520	1	3	V	ZERO-A		2000.0	108.0	1000.0
CNA208	A	06HD1520	1	4	V	ZERO-A		2000.0	108.0	21700.0
CNA208	A	06HD1520	1	5	V	ZERO-A		2000.0	108.0	1000.0
CNA208	A	06HD1520	1	6	D	ZERO-A		2000.0	108.0	3.0
CNA208	A	06HD1520	1	7	V	F30APP		1500.0	104.0	1000.0
CNA208	A	06HD1520	1	8	V	F30APP		1500.0	104.0	21100.0
CNA208	A	06HD1520	1	9	V	F30APP		1500.0	104.0	1000.0
CNA208	A	06HD1520	1	10	D	F30APP		1500.0	104.0	3.0
CNA208	A	06HD1520	1	11	D	F30APP		1000.0	100.0	3.0
CNA208	A	06HD1520	1	12	D	F30APP		500.0	80.0	3.0
CNA208	A	06HD1520	1	13	L	F30APP		100.0	0.0	0.0
CNA208	A	06HD1520	1	14	B	F30APP	L	815.0	78.0	10.0
CNA208	A	06HD1520	1	15	B		L	0.0	30.0	10.0

ATTACHMENT F

Sample User-Defined Departure Profiles – Turboprops – CNA208

The sample departure profile included in this attachment was developed for the CNA208 INM aircraft type. The sample CNA208 profile represents a consistent user-defined profile methodology for all turboprops in the TEB forecast. The CNA208 INM aircraft type will be used to represent the following aircraft from the TEB forecast: PC12.

This same process for developing departure profiles for turboprops will be applied to the following INM aircraft type: DO228.

Statement of Benefit

Based on the radar flight tracks presented in Figure 21, it is clear that the CNA208 aircraft departing Runway 24 are not following the INM standard profile. In general, the radar data suggest that turboprop aircraft profiles include one or more level flight segments while departing from Runway 24. The INM standard CNA208 departure profile does not include level segments, as shown in Figure 21.

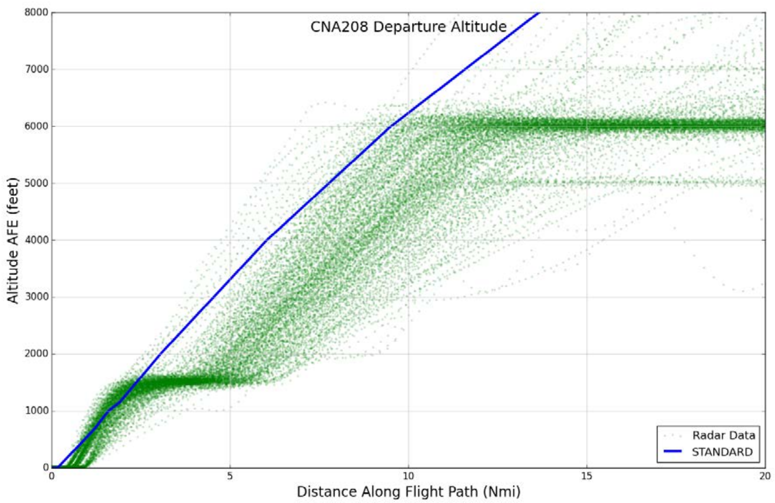

Figure 21 – CNA208 Departure from 24 Radar Example (406 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 30 presents a comparison of SEL values for the INM standard departure profile to SEL values for the sample user-defined departure profile. The sample user-defined profile is named "24HD1560."

Table 30 – CNA208 Departure SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	24HD1560	DIFFERENCE	
0.0	92.5	92.5	0.0	
0.5	93.8	93.8	0.0	
1.0	87.1	87.1	0.0	
1.5	83.7	83.7	0.0	
2.0	81.2	81.4	0.2	
2.5	79.6	75.7	-3.9	
3.0	78.3	74.9	-3.4	
3.5	77.1	74.9	-2.2	
4.0	76.2	74.9	-1.3	
4.5	75.4	76.6	1.2	
5.0	74.7	78.9	4.2	
5.5	74.0	77.7	3.7	
6.0	73.4	76.7	3.3	
6.5	72.7	75.8	3.1	
7.0	72.2	75.1	2.9	
7.5	71.7	74.4	2.7	
8.0	71.3	73.7	2.4	
8.5	70.9	73.1	2.2	
9.0	70.5	72.5	2.0	
9.5	70.1	72.0	1.9	
10.0	69.7	71.5	1.8	
10.5	69.3	71.0	1.7	
11.0	68.9	70.6	1.7	
11.5	68.6	70.2	1.6	
12.0	68.3	67.6	-0.7	
12.5	68.0	64.2	-3.8	
13.0	67.7	63.8	-3.9	
13.5	67.5	63.7	-3.8	
14.0	67.1	63.7	-3.4	
14.5	66.8	63.7	-3.1	
15.0	66.6	63.7	-2.9	
15.5	66.4	63.7	-2.7	
16.0	66.2	63.7	-2.5	
16.5	66.0	63.7	-2.3	
17.0	65.8	63.7	-2.1	
17.5	65.6	63.7	-1.9	
18.0	65.3	63.7	-1.6	
18.5	64.3	63.8	-0.5	Profile STANDARD ends at ~18.7 Nmi
19.0		63.9		
19.5		65.5		
20.0		69.1		Profile 24HD1560 ends at ~28.9 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA members who operate the CNA208 at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data and INM's performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the CNA208. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The departure example represents CNA208 departures from Runway with a hold-down at 1,500 ft. and 6,000 ft. Figure 22 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 23 presents a speed versus distance graph, and Figure 24 presents a thrust versus distance graph. Table 31 and Table 32 present the data used to produce the altitude, speed, and thrust figures. The data in Table 29 and Table 30 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 31 and Table 32.

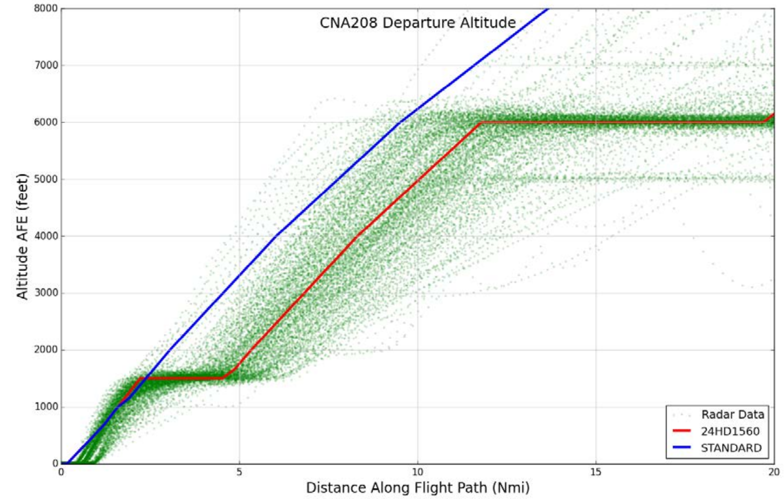

Figure 22 – CNA208 Departure Altitude

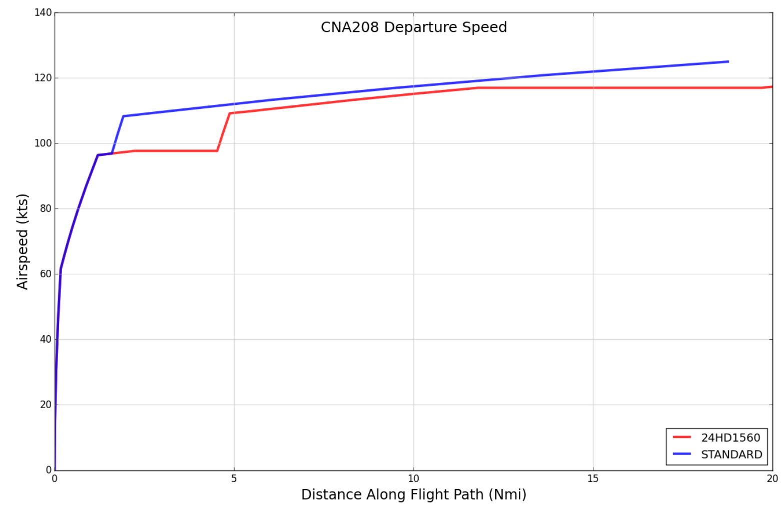

Figure 23 – CNA208 Departure Speed

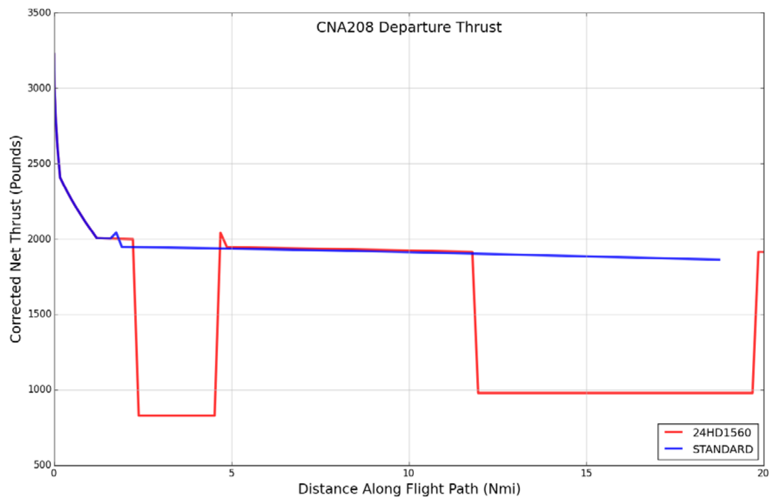

Figure 24 – CNA208 Departure Thrust

Table 31 - INM Standard CNA208 Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	CNA208	D	STANDARD	0.0	-1.1	0.0	3225.7
1	CNA208	D	STANDARD	64.7	-1.1	15.4	3021.2
2	CNA208	D	STANDARD	258.8	-1.1	30.8	2816.6
3	CNA208	D	STANDARD	582.3	-1.1	46.2	2612.0
4	CNA208	D	STANDARD	1035.3	-1.1	61.6	2407.4
5	CNA208	D	STANDARD	1587.3	58.9	65.4	2363.4
6	CNA208	D	STANDARD	2246.1	130.5	69.7	2313.9
7	CNA208	D	STANDARD	3029.6	215.6	74.5	2258.8
8	CNA208	D	STANDARD	4017.8	322.9	80.1	2194.0
9	CNA208	D	STANDARD	5344.3	467.1	87.0	2113.5
10	CNA208	D	STANDARD	7311.9	680.8	96.4	2004.8
11	CNA208	D	STANDARD	9680.1	998.9	96.9	2002.1
12	CNA208	D	STANDARD	10652.9	1076.0	102.8	2041.5
13	CNA208	D	STANDARD	11625.7	1153.1	108.3	1946.6
14	CNA208	D	STANDARD	18559.8	1998.9	109.7	1943.4
15	CNA208	D	STANDARD	36669.0	3998.9	113.3	1931.7
16	CNA208	D	STANDARD	57803.1	5998.9	117.0	1914.1
17	CNA208	D	STANDARD	61093.5	6260.0	117.5	1911.1
18	CNA208	D	STANDARD	83004.1	7998.9	120.9	1890.9
19	CNA208	D	STANDARD	113924.3	9998.9	125.0	1861.8

Table 32 - User-Defined CNA208 Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	CNA208	D	24HD1560	0.0	-1.1	0.0	3225.7
1	CNA208	D	24HD1560	64.7	-1.1	15.4	3021.2
2	CNA208	D	24HD1560	258.8	-1.1	30.8	2816.6
3	CNA208	D	24HD1560	582.3	-1.1	46.2	2612.0
4	CNA208	D	24HD1560	1035.3	-1.1	61.6	2407.4
5	CNA208	D	24HD1560	1587.3	58.9	65.4	2363.4
6	CNA208	D	24HD1560	2246.1	130.5	69.7	2313.9
7	CNA208	D	24HD1560	3029.6	215.6	74.5	2258.8
8	CNA208	D	24HD1560	4017.8	322.9	80.1	2194.0
9	CNA208	D	24HD1560	5344.3	467.1	87.0	2113.5
10	CNA208	D	24HD1560	7311.9	680.8	96.4	2004.8
11	CNA208	D	24HD1560	9680.1	998.9	96.9	2002.1
12	CNA208	D	24HD1560	13508.9	1498.9	97.7	1997.7
13	CNA208	D	24HD1560	14508.9	1498.9	97.7	827.2
14	CNA208	D	24HD1560	27508.9	1498.9	97.7	827.2
15	CNA208	D	24HD1560	28512.0	1577.8	103.3	2039.8
16	CNA208	D	24HD1560	29629.3	1665.7	109.2	1944.8
17	CNA208	D	24HD1560	32408.6	1998.9	109.7	1943.4
18	CNA208	D	24HD1560	50517.8	3998.9	113.3	1931.7
19	CNA208	D	24HD1560	61037.1	4994.4	115.2	1923.0
20	CNA208	D	24HD1560	71651.9	5998.9	117.0	1914.1
21	CNA208	D	24HD1560	72651.9	5998.9	117.0	977.4
22	CNA208	D	24HD1560	119651.9	5998.9	117.0	977.4
23	CNA208	D	24HD1560	120655.1	6078.5	117.2	1914.1
24	CNA208	D	24HD1560	144853.0	7998.9	120.9	1890.9
25	CNA208	D	24HD1560	175773.2	9998.9	125.0	1861.8

Table 33 and Table 34 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 33 - INM Standard CNA208 Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
CNA208	D	STANDARD	1	1	T	F-20D	T	0.0	0.0	0.0
CNA208	D	STANDARD	1	2	A	F-20D	T	915.0	104.0	0.0
CNA208	D	STANDARD	1	3	C	ZERO	T	1000.0	0.0	0.0
CNA208	D	STANDARD	1	4	A	ZERO	C	846.0	115.0	0.0
CNA208	D	STANDARD	1	5	C	ZERO	C	2000.0	0.0	0.0
CNA208	D	STANDARD	1	6	C	ZERO	C	4000.0	0.0	0.0
CNA208	D	STANDARD	1	7	C	ZERO	C	6000.0	0.0	0.0
CNA208	D	STANDARD	1	8	C	ZERO	C	8000.0	0.0	0.0
CNA208	D	STANDARD	1	9	C	ZERO	C	10000.0	0.0	0.0

Table 34 - User-Defined CNA208 Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
CNA208	D	24HD1560	1	1	T	F-20D	T	0.0	0.0	0.0
CNA208	D	24HD1560	1	2	A	F-20D	T	915.0	104.0	0.0
CNA208	D	24HD1560	1	3	C	ZERO	T	1000.0	0.0	0.0
CNA208	D	24HD1560	1	4	C	ZERO	T	1500.0	0.0	0.0
CNA208	D	24HD1560	1	5	V	ZERO		1500.0	104.0	14000.0
CNA208	D	24HD1560	1	6	A	ZERO	C	846.0	115.0	0.0
CNA208	D	24HD1560	1	7	C	ZERO	C	2000.0	0.0	0.0
CNA208	D	24HD1560	1	8	C	ZERO	C	4000.0	0.0	0.0
CNA208	D	24HD1560	1	9	C	ZERO	C	6000.0	0.0	0.0
CNA208	D	24HD1560	1	10	V	ZERO		6000.0	115.0	48000.0
CNA208	D	24HD1560	1	11	C	ZERO	C	8000.0	0.0	0.0
CNA208	D	24HD1560	1	12	C	ZERO	C	10000.0	0.0	0.0

ATTACHMENT G

Sample User-Defined Arrival Profiles – Piston Propellers – GASEPV

The sample arrival profile included in this attachment was developed for the GASEPV INM aircraft type. The sample GASEPV profile represents a consistent user-defined profile methodology for all piston propellers in the TEB forecast. The GASEPV INM aircraft type will be used to represent the following aircraft from the TEB forecast: SR22 and GEN PIST (Generic Piston Aircraft).

Statement of Benefit

Based on the radar flight tracks presented in Figure 25, it is clear that the GASEPV aircraft approaching Runway 6 are not following the INM standard profile. In general, the radar data suggest that piston propeller aircraft profiles include one or more level flight segments while arriving to Runway 6. The INM standard GASEPV arrival profile does not include level segments, as shown in Figure 25.

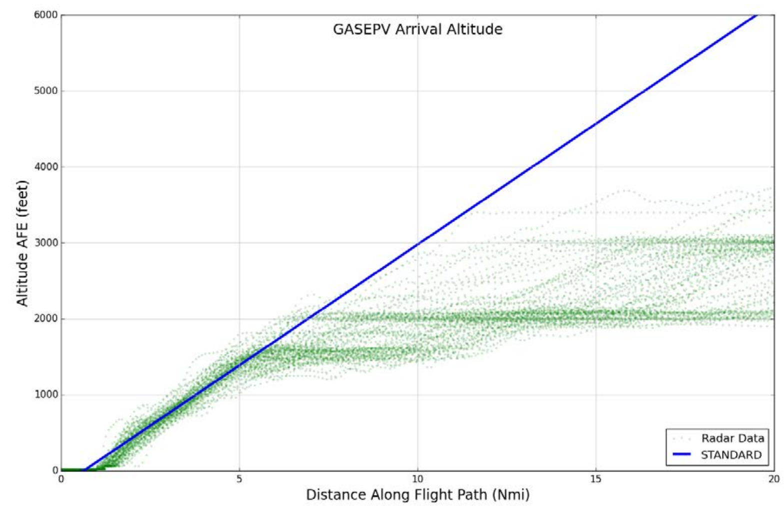

Figure 25 – GASEPV Arrival to Runway 6 Radar Example (98 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 35 presents a comparison of SEL values for the INM standard arrival profile to SEL values for the sample user-defined arrival profile. The sample user-defined profile is named "06HD1520."

Table 35 – GASEPV Arrival SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	06HD1520	DIFFERENCE	
1.0	45.5	45.5	0.0	
0.5	56.9	56.9	0.0	
0.0	95.3	95.3	0.0	Runway Threshold
-0.5	88.9	88.9	0.0	
-1.0	85.6	85.6	0.0	
-1.5	83.5	83.5	0.0	
-2.0	81.9	81.9	0.0	
-2.5	80.7	80.7	0.0	
-3.0	79.6	79.6	0.0	
-3.5	78.7	78.7	0.0	
-4.0	77.9	77.9	0.0	
-4.5	77.1	77.7	0.6	
-5.0	75.8	80.5	4.7	
-5.5	74.8	80.5	5.7	
-6.0	73.9	80.6	6.7	
-6.5	73.0	80.6	7.6	
-7.0	72.1	80.6	8.5	
-7.5	71.3	80.5	9.2	
-8.0	70.5	80.2	9.7	
-8.5	69.7	78.6	8.9	
-9.0	68.9	77.0	8.1	
-9.5	67.9	76.1	8.2	
-10.0	67.3	78.6	11.3	
-10.5	66.7	78.7	12.0	
-11.0	66.3	78.7	12.4	
-11.5	66.0	78.7	12.7	
-12.0	65.7	78.7	13.0	
-12.5	65.4	78.6	13.2	
-13.0	65.0	78.5	13.5	
-13.5	64.7	77.2	12.5	
-14.0	64.2	75.6	11.4	
-14.5	63.5	73.9	10.4	
-15.0	63.2	72.4	9.2	
-15.5	62.9	70.8	7.9	
-16.0	62.7	69.2	6.5	
-16.5	62.4	67.7	5.3	
-17.0	62.2	67.2	5.0	
-17.5	61.9	66.8	4.9	
-18.0	61.5	66.4	4.9	
-18.5	60.3	66.1	5.8	Profile STANDARD ends at ~18.9 Nmi
-19.0		65.8		
-19.5		65.5		
-20.0		65.1		Profile 06HD1520 ends at ~25.9 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA members who operate the GASEPV at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data and INM's performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the GASEPV. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The arrival example represents GASEPV arrivals to Runway 6 with a hold-down at 1,500 ft. and 2,000 ft. While, the radar data provided shows a hold down at 3,000 ft., the majority of this hold down (at approximately 17nmi) is beyond the study area and is not included in the profile adjustments. Figure 26 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 27 presents a speed versus distance graph, and Figure 28 presents a thrust versus distance graph.

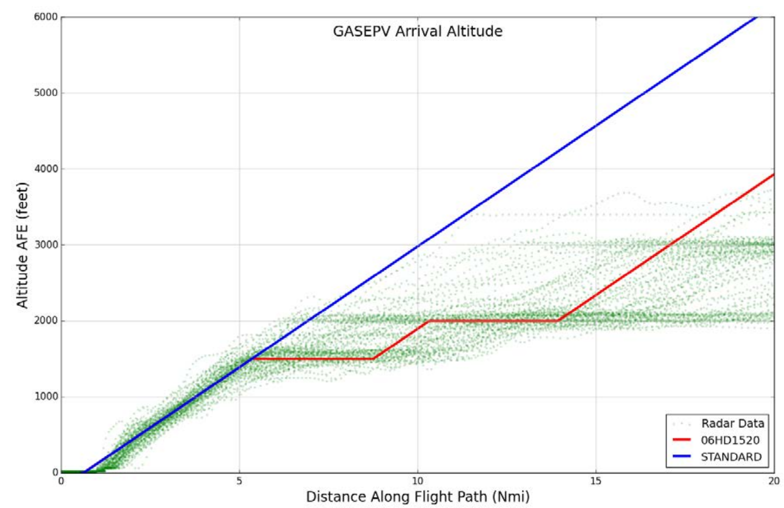

Figure 26 – GASEPV Arrival Altitude

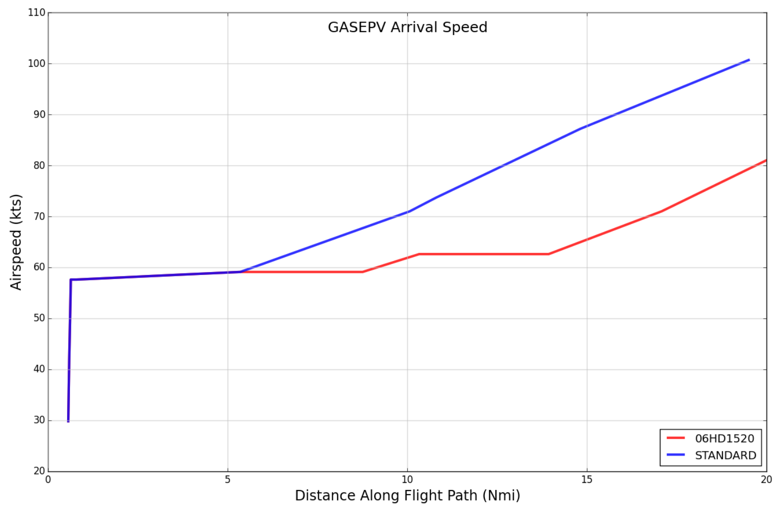

Figure 27 – GASEPV Arrival Speed

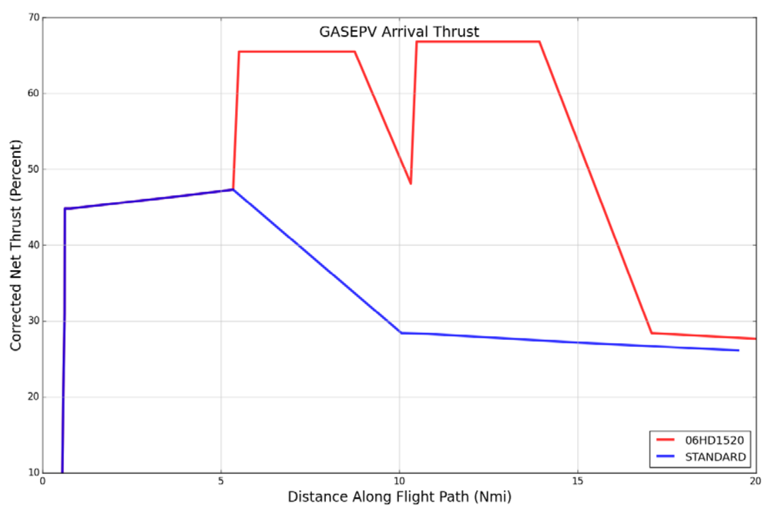

Figure 28 – GASEPV Arrival Thrust

Table 36 and Table 37 present the data used to produce the altitude, speed, and thrust figures. The data in Table 34 and Table 35 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 36 and Table 37.

Table 36 - INM Standard GASEPV Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GASEPV	A	STANDARD	115073	5996.7	100.7	26.1
1	GASEPV	A	STANDARD	86607.5	4506.9	87.2	27.2
2	GASEPV	A	STANDARD	62229.0	3231.1	73.7	28.3
3	GASEPV	A	STANDARD	57751.1	2996.7	71.0	28.4
4	GASEPV	A	STANDARD	29090.1	1496.7	59.1	47.3
5	GASEPV	A	STANDARD	19536.4	996.7	58.6	46.4
6	GASEPV	A	STANDARD	1384.4	46.7	57.6	44.8
7	GASEPV	A	STANDARD	429.0	-3.3	57.6	44.8
8	GASEPV	A	STANDARD	386.2	-3.3	54.2	31.0
9	GASEPV	A	STANDARD	165.6	-3.3	42.0	20.5
10	GASEPV	A	STANDARD	1.0	-3.3	29.8	10.0

Table 37 - User-Defined GASEPV Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GASEPV	A	06HD1520	157673.0	5996.7	100.7	26.1
1	GASEPV	A	06HD1520	126529.7	4366.8	85.8	27.3
2	GASEPV	A	06HD1520	100351.1	2996.7	71.0	28.4
3	GASEPV	A	06HD1520	81243.8	1996.7	62.6	66.8
4	GASEPV	A	06HD1520	80243.8	1996.7	62.6	66.8
5	GASEPV	A	06HD1520	62196.7	1996.7	62.6	66.8
6	GASEPV	A	06HD1520	60343.8	1996.7	62.6	66.8
7	GASEPV	A	06HD1520	59343.8	1996.7	62.6	48.1
8	GASEPV	A	06HD1520	49790.1	1496.7	59.1	65.5
9	GASEPV	A	06HD1520	48790.1	1496.7	59.1	65.5
10	GASEPV	A	06HD1520	30090.1	1496.7	59.1	65.5
11	GASEPV	A	06HD1520	29090.1	1496.7	59.1	47.3
12	GASEPV	A	06HD1520	19536.4	996.7	58.6	46.4
13	GASEPV	A	06HD1520	1384.4	46.7	57.6	44.8
14	GASEPV	A	06HD1520	429.0	-3.3	57.6	44.8
15	GASEPV	A	06HD1520	386.0	-3.3	54.6	31.0
16	GASEPV	A	06HD1520	165.2	-3.3	42.2	20.5
17	GASEPV	A	06HD1520	1.0	-3.3	29.8	10.0

Table 38 and Table 39 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 38 - INM Standard GASEPV Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GASEPV	A	STANDARD	1	1	D	ZERO		6000.0	100.0	3.0
GASEPV	A	STANDARD	1	2	D	INTR		3000.0	76.0	3.0
GASEPV	A	STANDARD	1	3	D	D-40		1500.0	66.0	3.0
GASEPV	A	STANDARD	1	4	D	D-40		1000.0	66.0	3.0
GASEPV	A	STANDARD	1	5	L	D-40		42.8	66.0	0.0
GASEPV	A	STANDARD	1	6	B		V	385.2	62.6	31.0
GASEPV	A	STANDARD	1	7	B		L	0.0	30.0	10.0

Table 39 - User-Defined GASEPV Arrival Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GASEPV	A	06HD1520	1	1	D	ZERO		6000.0	100.0	3.0
GASEPV	A	06HD1520	1	2	D	INTR		3000.0	76.0	3.0
GASEPV	A	06HD1520	1	3	V	D-40		2000.0	69.0	1000.0
GASEPV	A	06HD1520	1	4	V	D-40		2000.0	69.0	19900.0
GASEPV	A	06HD1520	1	5	V	D-40		2000.0	69.0	1000.0
GASEPV	A	06HD1520	1	6	D	D-40		2000.0	69.0	3.0
GASEPV	A	06HD1520	1	7	V	D-40		1500.0	66.0	1000.0
GASEPV	A	06HD1520	1	8	V	D-40		1500.0	66.0	18700.0
GASEPV	A	06HD1520	1	9	V	D-40		1500.0	66.0	1000.0
GASEPV	A	06HD1520	1	10	D	D-40		1500.0	66.0	3.0
GASEPV	A	06HD1520	1	11	D	D-40		1000.0	66.0	3.0
GASEPV	A	06HD1520	1	12	L	D-40		43.0	66.0	0.0
GASEPV	A	06HD1520	1	13	B		V	385.0	63.0	31.0
GASEPV	A	06HD1520	1	14	B		L	0.0	30.0	10.0

ATTACHMENT H

Sample User-Defined Departure Profiles – Piston Propellers– GASEPV

The sample departure profile included in this attachment was developed for the GASEPV INM aircraft type. The sample GASEPV profile represents a consistent user-defined profile methodology for all piston propellers in the TEB forecast. The GASEPV INM aircraft type will be used to represent the following aircraft from the TEB forecast: SR22 and GEN PIST (Generic Piston Aircraft).

Statement of Benefit

Based on the radar flight tracks presented in Figure 29, it is clear that the GASEPV aircraft departing Runway 24 are not following the INM standard profile. In general, the radar data suggest that piston propeller aircraft profiles include one or more level flight segments while departing from Runway 24. The INM standard GASEPV departure profile does not include level segments, as shown in Figure 29.

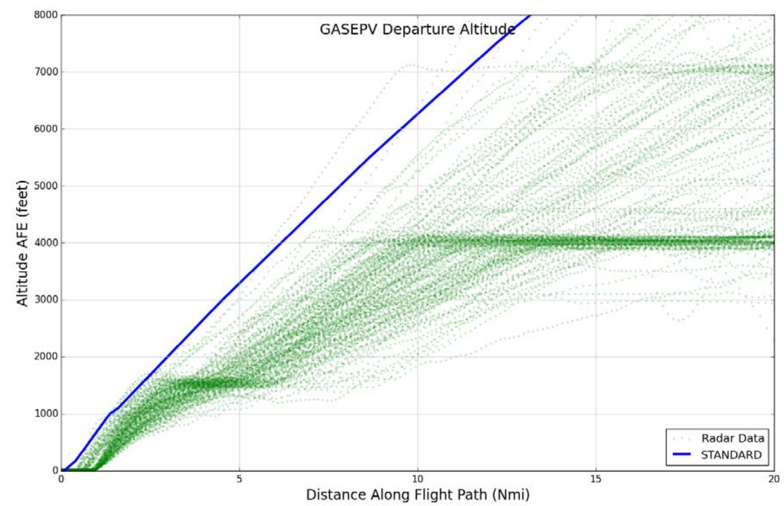

Figure 29 – GASEPV Departure from Runway 24 Radar Example (185 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 40 presents a comparison of SEL values for the INM standard departure profile to SEL values for the sample user-defined departure profile. The sample user-defined profile is named "24HD1540."

Table 40 – GASEPV Departure SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	24HD1540	DIFFERENCE	
0.0	103.6	103.6	0.0	
0.5	96.9	96.9	0.0	
1.0	91.2	91.2	0.0	
1.5	87.4	88.3	0.9	
2.0	83.3	84.9	1.6	
2.5	82.0	76.6	-5.4	
3.0	81.0	76.2	-4.8	
3.5	80.1	76.2	-3.9	
4.0	79.4	76.3	-3.1	
4.5	78.7	77.6	-1.1	
5.0	78.0	83.7	5.7	
5.5	77.5	82.6	5.1	
6.0	77.0	81.7	4.7	
6.5	76.6	80.9	4.3	
7.0	76.2	80.2	4.0	
7.5	75.8	79.5	3.7	
8.0	75.4	74.5	-0.9	
8.5	75.1	70.4	-4.7	
9.0	74.7	69.5	-5.2	
9.5	74.4	69.3	-5.1	
10.0	74.1	69.4	-4.7	
10.5	73.8	71.1	-2.7	
11.0	73.6	75.8	2.2	
11.5	73.3	75.9	2.6	
12.0	73.1	75.7	2.6	
12.5	72.8	75.3	2.5	
13.0	72.6	75.0	2.4	
13.5	72.4	74.6	2.2	
14.0	72.3	74.3	2.0	
14.5	72.1	74.1	2.0	
15.0	72.0	73.8	1.8	
15.5	71.8	73.6	1.8	
16.0	71.5	73.4	1.9	
16.5	70.8	73.1	2.3	
17.0	68.9	72.9	4.0	Profile STANDARD ends at ~17.0 Nmi
17.5		72.6		
18.0		72.4		
18.5		72.3		
19.0		72.1		
19.5		72.0		
20.0		71.8		Profile 24HD1540 ends at ~21.5 Nmi

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA members who operate the GASEPV at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data and INM's performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the GASEPV. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The departure example represents GASEPV departures from Runway with a hold-down at 1,500 ft. and 4,000 ft. Figure 30 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 31 presents a speed versus distance graph, and Figure 32 presents a thrust versus distance graph. Table 41 and Table 42 present the data used to produce the altitude, speed, and thrust figures. The data in Table 39 and Table 40 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 41 and Table 42.

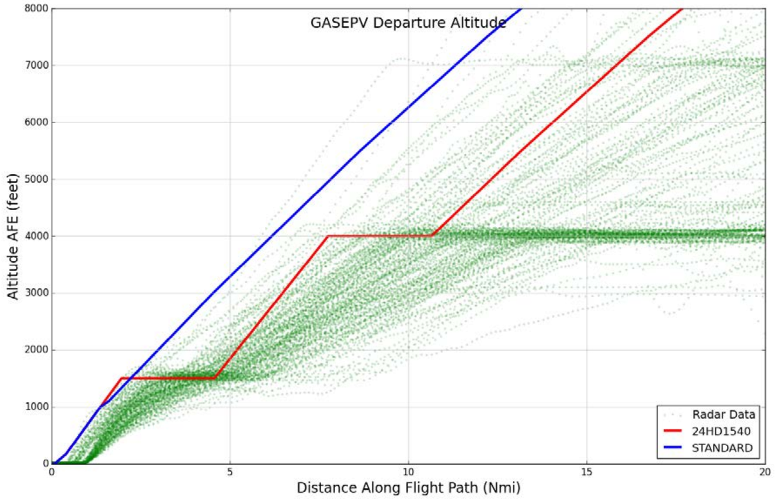

Figure 30 – GASEPV Departure Altitude

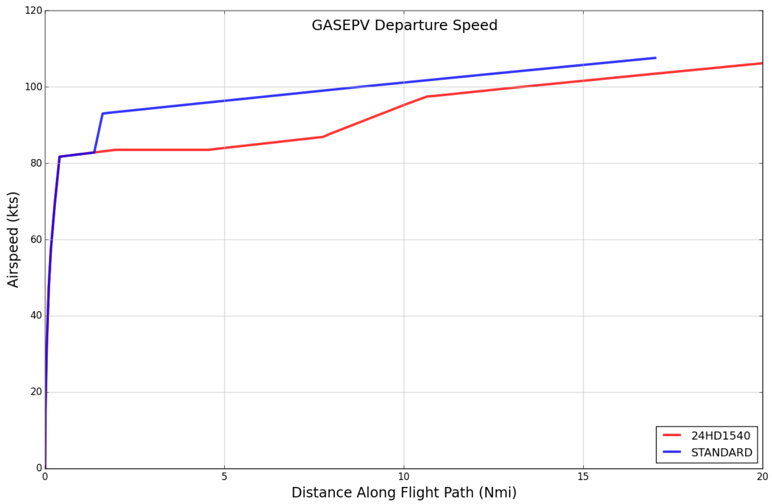

Figure 31 – GASEPV Departure Speed

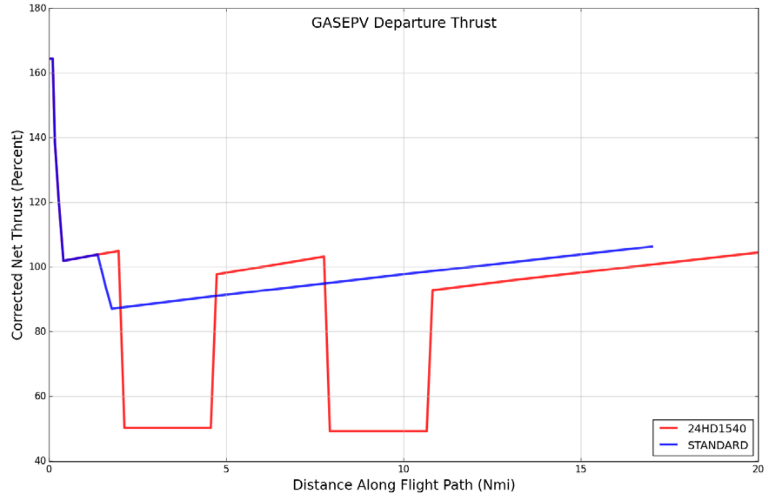

Figure 32 – GASEPV Departure Thrust

Table 41 - INM Standard GASEPV Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GASEPV	D	STANDARD	0.0	-1.1	0.0	164.4
1	GASEPV	D	STANDARD	68.7	-1.1	15.8	164.4
2	GASEPV	D	STANDARD	274.7	-1.1	31.5	164.4
3	GASEPV	D	STANDARD	618.0	-1.1	47.3	164.4
4	GASEPV	D	STANDARD	994.2	40.8	57.7	138.6
5	GASEPV	D	STANDARD	1661.5	98.8	69.7	120.3
6	GASEPV	D	STANDARD	2454.8	167.8	81.7	101.9
7	GASEPV	D	STANDARD	8318.2	998.9	82.8	103.8
8	GASEPV	D	STANDARD	9741.4	1099.3	93.0	93.6
9	GASEPV	D	STANDARD	10747.2	1206.8	93.2	87.1
10	GASEPV	D	STANDARD	27506.1	2998.9	95.9	90.8
11	GASEPV	D	STANDARD	52549.7	5498.9	99.9	96.0
12	GASEPV	D	STANDARD	61095.5	6291.0	101.2	97.8
13	GASEPV	D	STANDARD	74128.5	7498.9	103.2	100.4
14	GASEPV	D	STANDARD	103310.4	9998.9	107.6	106.3

Table 42 - User-Defined GASEPV Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GASEPV	D	24HD1540	0.0	-1.1	0.0	164.4
1	GASEPV	D	24HD1540	68.7	-1.1	15.8	164.4
2	GASEPV	D	24HD1540	274.7	-1.1	31.5	164.4
3	GASEPV	D	24HD1540	618.0	-1.1	47.3	164.4
4	GASEPV	D	24HD1540	994.2	40.8	57.7	138.6
5	GASEPV	D	24HD1540	1661.5	98.8	69.7	120.3
6	GASEPV	D	24HD1540	2454.8	167.8	81.7	101.9
7	GASEPV	D	24HD1540	8318.2	998.9	82.8	103.8
8	GASEPV	D	24HD1540	11911.8	1498.9	83.5	104.9
9	GASEPV	D	24HD1540	12911.8	1498.9	83.5	50.2
10	GASEPV	D	24HD1540	27711.8	1498.9	83.5	50.2
11	GASEPV	D	24HD1540	28720.2	1628.9	83.7	97.7
12	GASEPV	D	24HD1540	47109.9	3998.9	86.9	103.2
13	GASEPV	D	24HD1540	48109.9	3998.9	87.6	49.2
14	GASEPV	D	24HD1540	61025.0	3998.9	95.4	49.2
15	GASEPV	D	24HD1540	64709.9	3998.9	97.5	49.2
16	GASEPV	D	24HD1540	65714.8	4097.6	97.6	92.8
17	GASEPV	D	24HD1540	79980.6	5498.9	99.9	96.0
18	GASEPV	D	24HD1540	101559.5	7498.9	103.2	100.4
19	GASEPV	D	24HD1540	130741.4	9998.9	107.6	106.3

Table 43 and Table 44 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 43 - INM Standard GASEPV Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GASEPV	D	STANDARD	1	1	T	20	T	0.0	55.6	0.0
GASEPV	D	STANDARD	1	2	A	20	T	652.0	66.0	0.0
GASEPV	D	STANDARD	1	3	A	INTR	T	652.0	90.0	0.0
GASEPV	D	STANDARD	1	4	C	INTR	T	1000.0	0.0	0.0
GASEPV	D	STANDARD	1	5	A	INTR	T	652.0	100.0	0.0
GASEPV	D	STANDARD	1	6	C	ZERO	C	3000.0	0.0	0.0
GASEPV	D	STANDARD	1	7	C	ZERO	C	5500.0	0.0	0.0
GASEPV	D	STANDARD	1	8	C	ZERO	C	7500.0	0.0	0.0
GASEPV	D	STANDARD	1	9	C	ZERO	C	10000.0	0.0	0.0

Table 44 - User-Defined GASEPV Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GASEPV	D	24HD1540	1	1	T	20	T	0.0	56.0	0.0
GASEPV	D	24HD1540	1	2	A	20	T	652.0	66.0	0.0
GASEPV	D	24HD1540	1	3	A	INTR	T	652.0	90.0	0.0
GASEPV	D	24HD1540	1	4	C	INTR	T	1000.0	0.0	0.0
GASEPV	D	24HD1540	1	5	C	INTR	T	1500.0	0.0	0.0
GASEPV	D	24HD1540	1	6	V	INTR		1500.0	90.0	15800.0
GASEPV	D	24HD1540	1	5	A	INTR	T	652.0	100.0	0.0
GASEPV	D	24HD1540	1	6	C	ZERO	C	3000.0	0.0	0.0
GASEPV	D	24HD1540	1	7	C	ZERO	C	4000.0	0.0	0.0
GASEPV	D	24HD1540	1	8	V	ZERO		4000.0	100.0	17600.0
GASEPV	D	24HD1540	1	9	C	ZERO	C	5500.0	0.0	0.0
GASEPV	D	24HD1540	1	10	C	ZERO	C	7500.0	0.0	0.0
GASEPV	D	24HD1540	1	11	C	ZERO	C	10000.0	0.0	0.0

ATTACHMENT I

Sample User-Defined Arrival Profiles – Helicopters – S76

The sample arrival profile included in this attachment was developed for the S76 INM helicopter type. The sample S76 profile represents a consistent user-defined profile methodology for all helicopters in the TEB forecast. The S76 INM helicopter type will be used to represent the following helicopters from the TEB forecast: S76, S76B, S76C, GEN HEL (General Helicopter).

Statement of Benefit

Based on the radar flight tracks presented in Figure 33, it is clear that the S76 helicopters approaching the southern helipad are not following the INM standard profile. In general, the radar data suggest that helicopter profiles include one or more level flight segments while arriving to the southern helipad. The INM standard S76 arrival profile does not include a level segment at 1,500 ft., as shown in Figure 33.

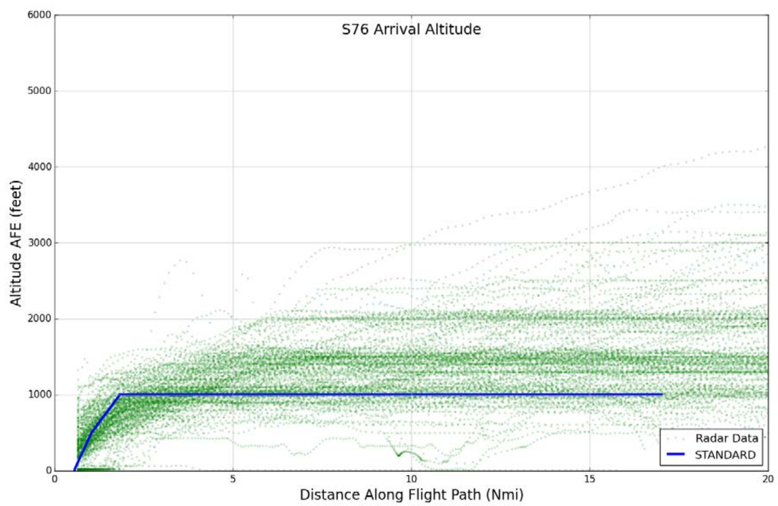

Figure 33 – S76 Arrival to Southern Helipad Example (379 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 45 presents a comparison of SEL values for the INM standard arrival profile to SEL values for the sample user-defined arrival profile. The sample user-defined profile is named "SHHD15."

Table 45 – S76 Arrival SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	SHHD15	DIFFERENCE	
0.0	128.1	128.1	0.0	Helipad
-0.5	90.5	90.5	0.0	
-1.0	88.2	88.5	0.3	
-1.5	86.2	86.8	0.6	
-2.0	84.7	84.9	0.2	
-2.5	82.2	83.0	0.8	
-3.0	82.1	80.1	-2.0	
-3.5	82.1	79.1	-3.0	
-4.0	82.1	79.0	-3.1	
-4.5	82.1	79.0	-3.1	
-5.0	82.1	79.0	-3.1	
-5.5	82.1	79.0	-3.1	
-6.0	82.1	79.0	-3.1	
-6.5	82.1	79.0	-3.1	
-7.0	82.1	79.0	-3.1	
-7.5	82.1	79.0	-3.1	
-8.0	82.1	79.0	-3.1	
-8.5	82.1	79.0	-3.1	
-9.0	82.1	79.0	-3.1	
-9.5	82.1	79.0	-3.1	
-10.0	82.1	79.0	-3.1	
-10.5	82.1	79.0	-3.1	
-11.0	82.1	79.0	-3.1	
-11.5	82.1	79.0	-3.1	
-12.0	82.1	79.0	-3.1	
-12.5	82.1	79.0	-3.1	
-13.0	82.1	79.0	-3.1	
-13.5	82.1	79.0	-3.1	
-14.0	82.1	79.0	-3.1	
-14.5	82.1	79.0	-3.1	
-15.0	82.1	79.0	-3.1	
-15.5	82.1	79.0	-3.1	
-16.0	82.0	79.0	-3.0	
-16.5	78.5	79.0	0.5	
-17.0	62.1	78.5	16.4	Profile STANDARD ends at ~17.0 Nmi
-17.5		71.8		Profile SHHD15 ends at ~17.8 Nmi
-18.0				
-18.5				
-19.0				
-19.5				
-20.0				

Concurrence of Aircraft Performance

In addition to operator concurrence on Helicopter Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA in coordination with the ERHC who operate the S76 at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the helicopter performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data and INM's performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed two graphs comparing the user-defined profiles to the INM standard profiles for the S76. Note that helicopter operations in INM do not report a thrust value like fixed-wing operations do, so two graphs are presented instead of three. The graphs include: 1) Altitude vs. Distance, and 2) Speed vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs. The arrival example represents S76 arrivals to the southern helipad with a hold-down at 1,500 ft. Figure 34 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 35 presents a speed versus distance graph.

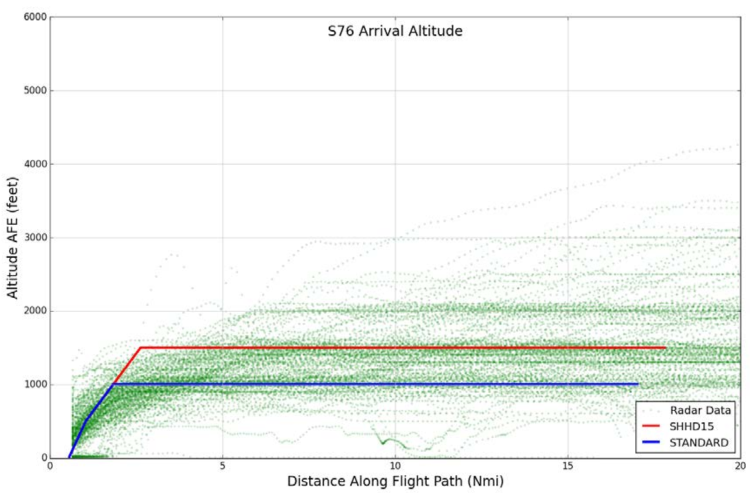

Figure 34 – S76 Arrival Altitude

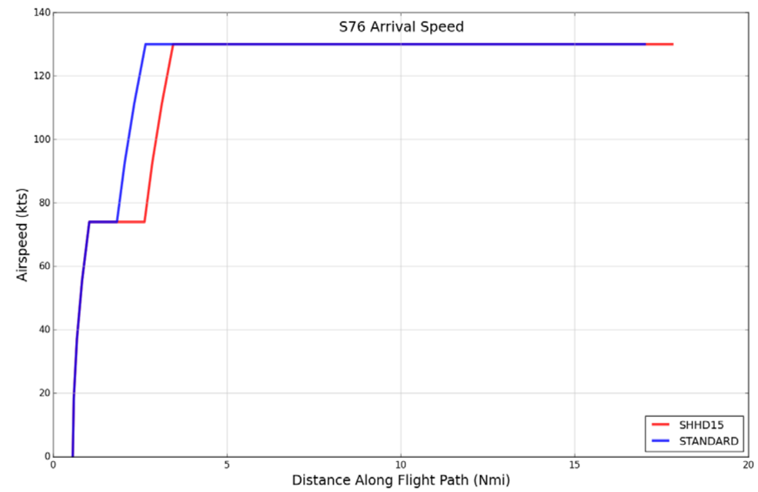

Figure 35 – S76 Arrival Speed

Table 46 and Table 47 present the data used to produce the altitude, speed, and thrust figures. The data in Table 44 and Table 45 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 46 and Table 47.

Table 46 - INM Standard S76 Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)
0	S76	A	STANDARD	103382.1	1001.1	130.0
1	S76	A	STANDARD	16132.1	1001.1	130.0
2	S76	A	STANDARD	14160.4	1001.1	111.3
3	S76	A	STANDARD	12493.7	1001.1	92.7
4	S76	A	STANDARD	11132.0	1001.1	74.0
5	S76	A	STANDARD	6306.0	501.1	74.0
6	S76	A	STANDARD	5041.2	288.9	55.5
7	S76	A	STANDARD	4137.8	137.4	37.0
8	S76	A	STANDARD	3595.7	46.4	18.5
9	S76	A	STANDARD	3415.0	16.1	0.0
10	S76	A	STANDARD	3400.0	1.1	0.0
11	S76	A	STANDARD	3400.0	1.1	0.0
12	S76	A	STANDARD	3400.0	1.1	0.0

Table 47 - User-Defined S76 Arrival

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)
0	S76	A	SHHD15	108208.0	1501.1	130.0
1	S76	A	SHHD15	20958.0	1501.1	130.0
2	S76	A	SHHD15	18986.3	1501.1	111.3
3	S76	A	SHHD15	17319.6	1501.1	92.7
4	S76	A	SHHD15	15957.9	1501.1	74.0
5	S76	A	SHHD15	6306.0	501.1	74.0
6	S76	A	SHHD15	5041.2	288.9	55.5
7	S76	A	SHHD15	4137.8	137.4	37.0
8	S76	A	SHHD15	3595.7	46.4	18.5
9	S76	A	SHHD15	3415.0	16.1	0.0
10	S76	A	SHHD15	3400.0	1.1	0.0
11	S76	A	SHHD15	3400.0	1.1	0.0
12	S76	A	SHHD15	3400.0	1.1	0.0

Table 48 and Table 49 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 48 - INM Standard S76 Arrival Procedure

HELO_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	DURATION	DISTANCE	ALTITUDE	SPEED
S76	A	STANDARD	1	1	S	0.0	0.0	1000.0	130.0
S76	A	STANDARD	1	2	L	0.0	87250.0	0.0	0.0
S76	A	STANDARD	1	3	B	0.0	5000.0	0.0	74.0
S76	A	STANDARD	1	4	A	0.0	4800.0	500.0	0.0
S76	A	STANDARD	1	5	C	0.0	2850.0	15.0	0.0
S76	A	STANDARD	1	6	Y	3.0	0.0	0.0	0.0
S76	A	STANDARD	1	7	H	30.0	0.0	0.0	0.0
S76	A	STANDARD	1	8	G	30.0	0.0	0.0	0.0

Table 49 - User-Defined S76 Arrival Procedure

HELO_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	DURATION	DISTANCE	ALTITUDE	SPEED
S76	A	SHHD15	1	1	S	0.0	0.0	1500.0	130.0
S76	A	SHHD15	1	2	L	0.0	87250.0	0.0	0.0
S76	A	SHHD15	1	3	B	0.0	5000.0	0.0	74.0
S76	A	SHHD15	1	4	A	0.0	9600.0	500.0	0.0
S76	A	SHHD15	1	5	C	0.0	2850.0	15.0	0.0
S76	A	SHHD15	1	6	Y	3.0	0.0	0.0	0.0
S76	A	SHHD15	1	7	H	30.0	0.0	0.0	0.0
S76	A	SHHD15	1	8	G	30.0	0.0	0.0	0.0

ATTACHMENT J

Sample User-Defined Departure Profiles – Helicopters– S76

The sample departure profile included in this attachment was developed for the S76 INM helicopter type. The sample S76 profile represents a consistent user-defined profile methodology for all helicopters in the TEB forecast. The S76 INM helicopter type will be used to represent the following helicopters from the TEB forecast: S76, S76B, S76C, GEN HEL (General Helicopter).

Statement of Benefit

Based on the radar flight tracks presented in Figure 36, it is clear that the S76 aircraft departing from the southern helipad are not following the INM standard profile. In general, the radar data suggest that helicopter profiles include one or more level flight segments while departing from the southern helipad. The INM standard S76 departure profile does not include a level segment at 1,500 ft., as shown in Figure 36.

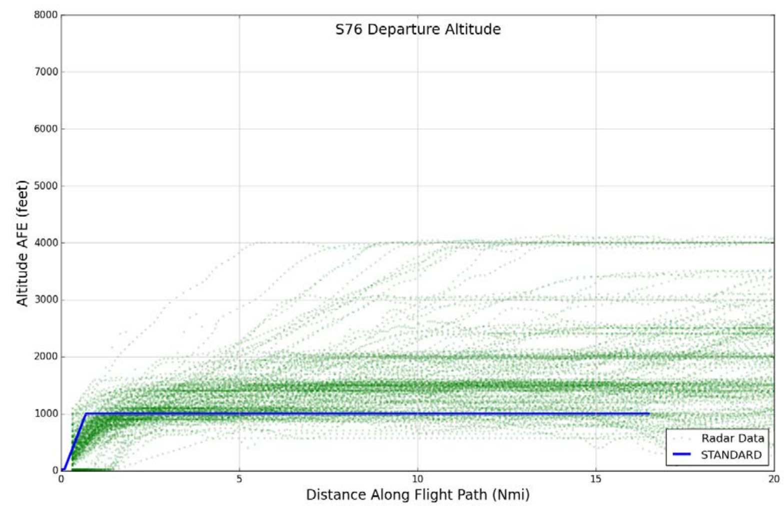

Figure 36 – S76 Departure from Southern Helipad Example (464 tracks)

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 50 presents a comparison of SEL values for the INM standard departure profile to SEL values for the sample user-defined departure profile. The sample user-defined profile is named "SHHD15."

Table 50 – S76 Departure SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	SHHD15	DIFFERENCE	
0.0	125.6	125.6	0.0	Helipad
0.5	85.1	84.9	-0.2	
1.0	82.2	79.7	-2.5	
1.5	82.5	80.1	-2.4	
2.0	82.2	79.5	-2.7	
2.5	82.2	79.3	-2.9	
3.0	82.2	79.2	-3.0	
3.5	82.2	79.2	-3.0	
4.0	82.2	79.2	-3.0	
4.5	82.2	79.2	-3.0	
5.0	82.2	79.2	-3.0	
5.5	82.2	79.2	-3.0	
6.0	82.2	79.2	-3.0	
6.5	82.2	79.2	-3.0	
7.0	82.2	79.2	-3.0	
7.5	82.2	79.2	-3.0	
8.0	82.2	79.2	-3.0	
8.5	82.2	79.2	-3.0	
9.0	82.2	79.2	-3.0	
9.5	82.2	79.2	-3.0	
10.0	82.2	79.2	-3.0	
10.5	82.2	79.2	-3.0	
11.0	82.2	79.2	-3.0	
11.5	82.2	79.2	-3.0	
12.0	82.2	79.2	-3.0	
12.5	82.2	79.2	-3.0	
13.0	82.2	79.2	-3.0	
13.5	82.2	79.2	-3.0	
14.0	82.2	79.2	-3.0	
14.5	82.2	79.2	-3.0	
15.0	82.2	79.2	-3.0	
15.5	82.2	79.2	-3.0	
16.0	82.1	79.2	-2.9	
16.5	78.9	78.8	-0.1	Profile STANDARD ends at ~16.5 Nmi
17.0		72.5		Profile SHHD15 ends at ~16.8 Nmi
17.5				
18.0				
18.5				
19.0				
19.5				
20.0				

Concurrence of Aircraft Performance

In addition to operator concurrence on Helicopter Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NBAA in coordination with the ERHC who operate the S76 at TEB reviewed and concurred that the adjusted profiles are reasonable and fall within the helicopter performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data and INM's performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed two graphs comparing the user-defined profiles to the INM standard profiles for the S76. Note that helicopter operations in INM do not report a thrust value like fixed-wing operations do, so two graphs are presented instead of three. The graphs include: 1) Altitude vs. Distance, and 2) Speed vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. The radar data were used to create an alternate version of the INM standard profile that included level segments. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs. The departure example represents S76 departures from the southern helipad with a hold-down at 1,500 ft. Figure 37 presents an altitude versus distance graph for the sample user-defined profile, the corresponding INM standard profile, and the corresponding radar data. Figure 38 presents a speed versus distance graph.

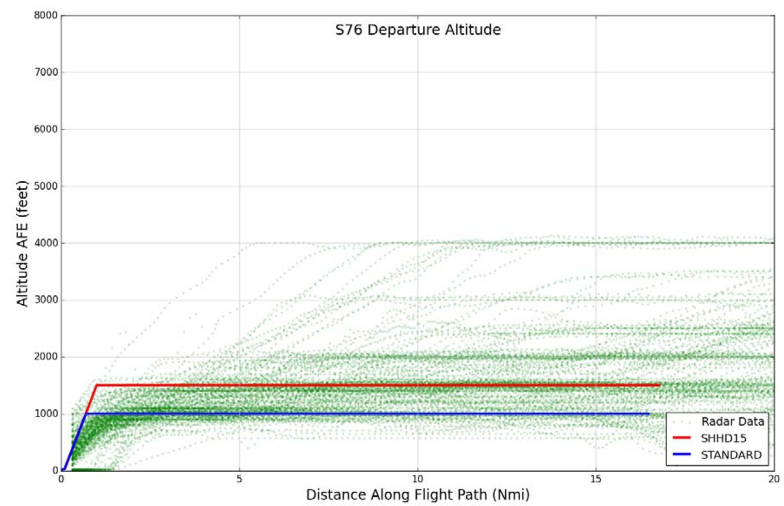

Figure 37 – S76 Departure Altitude

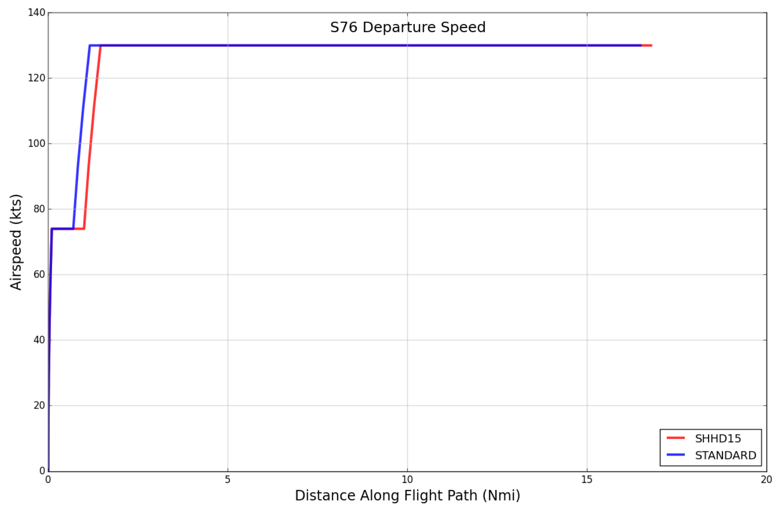

Figure 38 – S76 Departure Speed

Table 51 and Table 52 present the data used to produce the altitude, speed, and thrust figures. The data in Table 49 and Table 50 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 51 and Table 52.

Table 51 - INM Standard S76 Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)
0	S76	D	STANDARD	0.0	1.1	0.0
1	S76	D	STANDARD	0.0	1.1	0.0
2	S76	D	STANDARD	0.0	1.1	0.0
3	S76	D	STANDARD	15.0	16.1	0.0
4	S76	D	STANDARD	15.0	16.1	0.0
5	S76	D	STANDARD	40.0	16.1	15.0
6	S76	D	STANDARD	115.0	16.1	30.0
7	S76	D	STANDARD	234.7	19.7	44.7
8	S76	D	STANDARD	401.4	24.7	59.3
9	S76	D	STANDARD	615.2	31.1	74.0
10	S76	D	STANDARD	4247.1	1001.1	74.0
11	S76	D	STANDARD	5009.6	1001.1	92.7
12	S76	D	STANDARD	5942.9	1001.1	111.3
13	S76	D	STANDARD	7047.0	1001.1	130.0
14	S76	D	STANDARD	100147.0	1001.1	130.0

Table 52 - User-Defined S76 Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)
0	S76	D	SHHD15	0.0	1.1	0.0
1	S76	D	SHHD15	0.0	1.1	0.0
2	S76	D	SHHD15	0.0	1.1	0.0
3	S76	D	SHHD15	15.0	16.1	0.0
4	S76	D	SHHD15	15.0	16.1	0.0
5	S76	D	SHHD15	40.0	16.1	15.0
6	S76	D	SHHD15	115.0	16.1	30.0
7	S76	D	SHHD15	234.7	19.7	44.7
8	S76	D	SHHD15	401.4	24.7	59.3
9	S76	D	SHHD15	615.2	31.1	74.0
10	S76	D	SHHD15	6067.1	1501.1	74.0
11	S76	D	SHHD15	6829.6	1501.1	92.7
12	S76	D	SHHD15	7762.9	1501.1	111.3
13	S76	D	SHHD15	8867.0	1501.1	130.0
14	S76	D	SHHD15	101967.0	1501.1	130.0

Table 53 and Table 54 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 53 - INM Standard S76 Departure Procedure

HELO_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	DURATION	DISTANCE	ALTITUDE	SPEED
S76	D	STANDARD	1	1	G	30.0	0.0	0.0	0.0
S76	D	STANDARD	1	2	H	30.0	0.0	0.0	0.0
S76	D	STANDARD	1	3	V	3.0	0.0	15.0	0.0
S76	D	STANDARD	1	4	E	0.0	100.0	0.0	30.0
S76	D	STANDARD	1	5	F	0.0	500.0	30.0	74.0
S76	D	STANDARD	1	6	D	0.0	3500.0	1000.0	0.0
S76	D	STANDARD	1	7	E	0.0	2800.0	0.0	130.0
S76	D	STANDARD	1	8	L	0.0	93100.0	0.0	0.0

Table 54 - User-Defined S76 Departure Procedure

HELO_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	DURATION	DISTANCE	ALTITUDE	SPEED
S76	D	SHHD15	1	1	G	30.0	0.0	0.0	0.0
S76	D	SHHD15	1	2	H	30.0	0.0	0.0	0.0
S76	D	SHHD15	1	3	V	3.0	0.0	15.0	0.0
S76	D	SHHD15	1	4	E	0.0	100.0	0.0	30.0
S76	D	SHHD15	1	5	F	0.0	500.0	30.0	74.0
S76	D	SHHD15	1	6	D	0.0	5250.0	1500.0	0.0
S76	D	SHHD15	1	7	E	0.0	2800.0	0.0	130.0
S76	D	SHHD15	1	8	L	0.0	93100.0	0.0	0.0

ATTACHMENT K

Sample User-Defined Departure Profiles – GV 90,000 lbs.

The sample departure profile included in this attachment was developed for the GV INM aircraft type. The GV INM aircraft type will be used to represent the GLF5 and GLEX aircraft and is proposed to be used for the following aircraft types: GLF6, G650, and GL5T.

Statement of Benefit

Many of the in production business jets that the GV represents or is proposed to represent in the TEB forecast have higher max gross takeoff weights than the GV. Also, the HMMH team evaluated flight distances for GV aircraft and approximately 11% of the forecasted operations will be Stage length 5 or higher (greater than 2,500 nautical miles). The INM standard GV aircraft only has one departure profile with a takeoff weight of 76,925 pounds which represents an average takeoff for the GV aircraft. In order to represent the higher stage length departures we propose to model the higher stage lengths with a 90,000 pound GV aircraft.

Analysis Demonstrating Benefit

As required by Appendix B of INM User's Manual, SEL values are presented for a series of grid points spaced 0.5 nautical miles apart underneath an INM flight track. Table 55 presents a comparison of SEL values for the INM standard departure profile to SEL values for the sample user-defined departure profile. The sample user-defined profile is named "24STND90." The modified profile ends at approximately 15.5 nautical miles because HMMH is not extending the profile beyond 10,000 feet in altitude.

Table 55 – GV 90,000 lbs. Departure SEL Comparison

Grid Spacing (Nmi)	Modeled SEL Values			NOTES
	STANDARD	24STND90	DIFFERENCE	
0.0	59.9	59.9	0.0	
0.5	62.8	62.8	0.0	
1.0	100.3	100.6	0.3	
1.5	113.8	124.1	10.3	
2.0	99.1	102.7	3.6	
2.5	92.0	94.3	2.3	
3.0	88.6	90.7	2.1	
3.5	86.1	88.2	2.1	
4.0	84.4	86.2	1.8	
4.5	82.8	84.7	1.9	
5.0	81.5	83.5	2.0	
5.5	80.3	82.4	2.1	
6.0	79.2	81.3	2.1	
6.5	78.2	80.4	2.2	
7.0	77.1	79.5	2.4	
7.5	76.3	78.7	2.4	
8.0	75.5	77.9	2.4	
8.5	74.9	77.1	2.2	
9.0	74.2	76.3	2.1	
9.5	73.6	75.7	2.1	
10.0	73.0	75.1	2.1	
10.5	72.4	74.6	2.2	
11.0	71.9	74.0	2.1	
11.5	71.3	73.5	2.2	
12.0	70.8	73.0	2.2	
12.5	70.1	72.6	2.5	Profile STANDARD ends at ~12.5 Nmi
13.0		72.2		
13.5		71.8		
14.0		71.4		
14.5		71.0		
15.0		70.5		
15.5		69.8		Profile 24STND90 ends at ~15.5 Nmi
16.0				

Concurrence of Aircraft Performance

In addition to operator concurrence on Aircraft Performance, we present plots of the flight track data and developed procedure profiles, with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. The Part 150 modeling team provided the user-defined profiles to aircraft operators to obtain concurrence of the profiles. No new aircraft performance coefficient data were developed. NetJets operates the GV at TEB and reviewed and concurs that the adjusted profiles are reasonable and fall within the aircraft performance. A copy of the concurrence is provided in Attachment L.

Certification of New Parameters

User-defined profiles were developed with the INM 7.0d standard aircraft performance coefficient data included INM performance equations. No new aircraft performance coefficient data were developed, and no new user-specified thrust values were developed for the user-defined profiles.

Graphical and Tabular Comparison

In accordance with Appendix B of the INM User's Guide, the HMMH team developed three graphs comparing the user-defined profiles to the INM standard profiles for the GV. The three graphs include: 1) Altitude vs. Distance, 2) Speed vs. Distance, and 3) Thrust vs. Distance. The data presented in these graphs for the INM standard profile were derived from the INM profile database. An alternative version of the INM standard profile was created by changing the departure weight from 76,925 pounds to 90,000 pounds. The user-defined profiles were then run in INM for validation, and the output data were used to develop the user-created profile graphs.

The departure example represents GV departures from Runway 24 with a weight of 90,000 pounds. Figure 39 presents an altitude versus distance graph for the sample user-defined profile and the corresponding INM standard profile. Figure 40 presents a speed versus distance graph, and Figure 41 presents a thrust versus distance graph. Table 56 and Table 57 present the data used to produce the altitude, speed, and thrust figures. The data in Table 56 and Table 57 are produced by the flight module in the INM model from the aircraft flight procedure steps provided in Table 58 and Table 59.

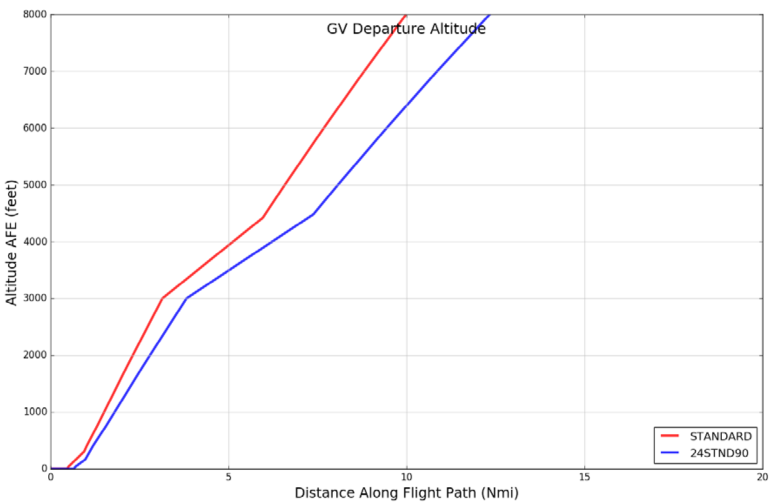

Figure 39 – GV 90,000 lbs. Departure Altitude

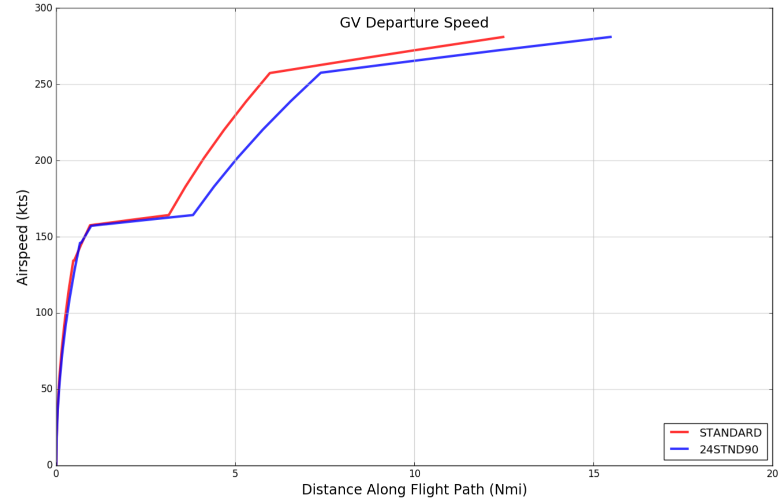

Figure 40 – GV 90,000 lbs. Departure Speed

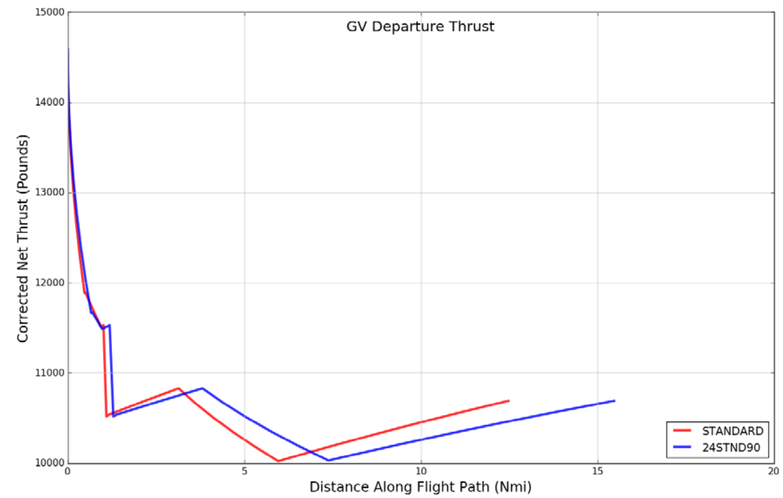

Figure 41 – GV 90,000 lbs. Departure Thrust

Table 56 - INM Standard GV Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GV	D	STANDARD	0.0	-1.1	0.0	14586.1
1	GV	D	STANDARD	58.8	-1.1	19.2	14200.5
2	GV	D	STANDARD	235.1	-1.1	38.4	13814.9
3	GV	D	STANDARD	529.0	-1.1	57.6	13429.3
4	GV	D	STANDARD	940.4	-1.1	76.7	13043.7
5	GV	D	STANDARD	1469.4	-1.1	95.9	12658.1
6	GV	D	STANDARD	2115.9	-1.1	115.1	12272.5
7	GV	D	STANDARD	2879.9	-1.1	134.3	11886.9
8	GV	D	STANDARD	3041.4	33.9	134.4	11892.7
9	GV	D	STANDARD	4334.2	164.2	145.9	11702.1
10	GV	D	STANDARD	5733.7	305.2	157.5	11511.5
11	GV	D	STANDARD	6151.0	398.9	157.7	11526.9
12	GV	D	STANDARD	6657.9	498.9	158.0	10515.7
13	GV	D	STANDARD	7164.8	598.9	158.2	10539.7
14	GV	D	STANDARD	7929.7	748.9	158.6	10557.7
15	GV	D	STANDARD	13029.4	1798.9	161.2	10683.7
16	GV	D	STANDARD	19078.2	2998.9	164.2	10827.7
17	GV	D	STANDARD	21901.6	3232.8	182.8	10666.3
18	GV	D	STANDARD	25028.3	3491.9	201.5	10504.8
19	GV	D	STANDARD	28458.3	3776.0	220.1	10343.3
20	GV	D	STANDARD	32191.6	4085.3	238.7	10181.8
21	GV	D	STANDARD	36228.1	4419.8	257.4	10020.4
22	GV	D	STANDARD	39977.6	4998.9	259.7	10089.9
23	GV	D	STANDARD	46632.4	5998.9	263.8	10209.9
24	GV	D	STANDARD	53528.3	6998.9	268.0	10329.9
25	GV	D	STANDARD	60680.6	7998.9	272.3	10449.9
26	GV	D	STANDARD	61382.8	8093.5	272.7	10461.3
27	GV	D	STANDARD	68105.9	8998.9	276.6	10569.9
28	GV	D	STANDARD	75822.4	9998.9	281.1	10689.9

Table 57 - User-Defined GV 90,000 lbs. Departure

Point #	Aircraft	Operation	Profile	Distance along Flight Path (ft)	Altitude (ft AFE)	Airspeed (knots)	Corrected Net Thrust (lbs)
0	GV	D	24STND90	0	-1.6	0	14586.2
1	GV	D	24STND90	62.8	-1.6	18.2	14221.2
2	GV	D	24STND90	251.1	-1.6	36.5	13856.3
3	GV	D	24STND90	564.9	-1.6	54.7	13491.3
4	GV	D	24STND90	1004.2	-1.6	73	13126.4
5	GV	D	24STND90	1569	-1.6	91.2	12761.4
6	GV	D	24STND90	2259.3	-1.6	109.4	12396.5
7	GV	D	24STND90	3075.1	-1.6	127.7	12031.6
8	GV	D	24STND90	4016.4	-1.6	145.9	11666.6
9	GV	D	24STND90	4226.9	33.4	146	11672.4
10	GV	D	24STND90	5913.3	162.4	157.1	11488.1
11	GV	D	24STND90	7214.1	398.4	157.7	11527
12	GV	D	24STND90	7848.1	498.4	158	10515.8
13	GV	D	24STND90	8482.1	598.4	158.2	10539.8
14	GV	D	24STND90	9439.3	748.4	158.6	10557.8
15	GV	D	24STND90	15723.4	1798.4	161.2	10683.8
16	GV	D	24STND90	23192.1	2998.4	164.2	10827.8
17	GV	D	24STND90	26758.3	3242.3	182.9	10667.8
18	GV	D	24STND90	30708.5	3512.4	201.6	10507.8
19	GV	D	24STND90	35042.8	3808.7	220.3	10347.8
20	GV	D	24STND90	39761.1	4131.4	238.9	10187.8
21	GV	D	24STND90	44863.4	4480.3	257.6	10027.7
22	GV	D	24STND90	49046.2	4998.4	259.7	10089.9
23	GV	D	24STND90	57349.7	5998.4	263.8	10209.9
24	GV	D	24STND90	65974.9	6998.4	268	10329.9
25	GV	D	24STND90	74943.8	7998.4	272.3	10449.9
26	GV	D	24STND90	84280.7	8998.4	276.6	10569.9
27	GV	D	24STND90	94012.3	9998.4	281.1	10689.9

Table 58 and Table 59 present the INM standard procedure steps, and the user-defined procedure steps, respectively.

Procedure Step Comparison

Table 58 - INM Standard GV Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GV	D	STANDARD	1	1	T	T-20-D	T	0.0	0.0	0.0
GV	D	STANDARD	1	2	C	T-20-D	T	35.0	0.0	0.0
GV	D	STANDARD	1	3	A	T-20-D	T	1500.0	165.7	0.0
GV	D	STANDARD	1	4	C	T-20-U	T	400.0	0.0	0.0
GV	D	STANDARD	1	5	C	T-20-U	C	600.0	0.0	0.0
GV	D	STANDARD	1	6	C	T-20-U	C	750.0	0.0	0.0
GV	D	STANDARD	1	7	C	T-10-U	C	1800.0	0.0	0.0
GV	D	STANDARD	1	8	C	T-10-U	C	3000.0	0.0	0.0
GV	D	STANDARD	1	9	A	T-0-U	C	1750.0	250.0	0.0
GV	D	STANDARD	1	10	C	T-0-U	C	5000.0	0.0	0.0
GV	D	STANDARD	1	11	C	T-0-U	C	6000.0	0.0	0.0
GV	D	STANDARD	1	12	C	T-0-U	C	7000.0	0.0	0.0
GV	D	STANDARD	1	13	C	T-0-U	C	8000.0	0.0	0.0
GV	D	STANDARD	1	14	C	T-0-U	C	9000.0	0.0	0.0
GV	D	STANDARD	1	15	C	T-0-U	C	10000.0	0.0	0.0

Table 59 - User-Defined GV 90,000 lbs. Departure Procedure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	STEP_NUM	STEP_TYPE	FLAP_ID	THR_TYPE	PARAM1	PARAM2	PARAM3
GV	D	24STND90	1	1	T	T-20-D	T	0	0	0
GV	D	24STND90	1	2	C	T-20-D	T	35	0	0
GV	D	24STND90	1	3	P	T-20-D	T	55	165.7	0
GV	D	24STND90	1	4	C	T-20-U	T	400	0	0
GV	D	24STND90	1	5	C	T-20-U	C	600	0	0
GV	D	24STND90	1	6	C	T-20-U	C	750	0	0
GV	D	24STND90	1	7	C	T-10-U	C	1800	0	0
GV	D	24STND90	1	8	C	T-10-U	C	3000	0	0
GV	D	24STND90	1	9	P	T-0-U	C	55	250	0
GV	D	24STND90	1	10	C	T-0-U	C	5000	0	0
GV	D	24STND90	1	11	C	T-0-U	C	6000	0	0
GV	D	24STND90	1	12	C	T-0-U	C	7000	0	0
GV	D	24STND90	1	13	C	T-0-U	C	8000	0	0
GV	D	24STND90	1	14	C	T-0-U	C	9000	0	0
GV	D	24STND90	1	15	C	T-0-U	C	10000	0	0

ATTACHMENT L

Operator Concurrence

HMMH sent packages of information regarding the user-defined profiles to NBAA, NetJets, ERHC, and the Teterboro Users Group (TUG). TUG deferred their response to NBAA. ERHC reviewed the S76 procedures and provided their response to NBAA who provided one response back for all types except for the GV. The GV and Lear35 procedures were reviewed by NetJets. The concurrence letters received are provided below:

NBAA Concurrence

The National Business Aviation Association (NBAA) concurs with the example modeled procedures

(Please check each one below):

Modified profiles to include hold downs:

Gulfstream G5	INM type: GV	Arrival ____	Departure ____
Lear 35	INM type: LEAR35	Arrival ✓	Departure ✓
Cessna 208	INM type: CNA208	Arrival ✓	Departure ✓
Single Engine Piston	INM type: GASEPV	Arrival ✓	Departure ✓
Sikorsky S-76	INM type: S76	Arrival ✓	Departure ✓

Higher Weight Departure Profile:

Gulfstream G5 INM Type: GV Heavy Weight departure profile ____________

The National Business Aviation Association (NBAA) certifies that the proposed profiles listed above departing from and arriving to Teterboro Airport fall within reasonable bounds of the aircraft's performance.

ALEX GERTSEN
Name

DIRECTOR Airports & Ground Infrastructure
Position/ Title

NetJets Concurrence

NetJets concurs with the example modeled procedures

(Please check each one below):

Modified profiles to include hold downs:

Gulfstream G5	INM type: GV	Arrival ✓	Departure ✓
Lear 35	INM type: LEAR35	Arrival ✓	Departure ✓

Higher Weight Departure Profile:

Gulfstream G5 INM Type: GV Heavy Weight departure profile ✓

NetJets certifies that the proposed profiles listed above departing from and arriving to Teterboro Airport fall within reasonable bounds of the aircraft's performance.

Artie Clark
Name

Operations & Compliance Manager
Position/ Title

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U.S. Department of Transportation
Federal Aviation Administration

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

May 23, 2016

Andrew Brooks
Environmental Program Manager
Federal Aviation Administration
Eastern Regional Office
1 Aviation Plaza
Jamaica, NY 11434

Dear Andrew,

The Office of Environment and Energy (AEE) has reviewed the proposed non-standard Integrated Noise Model (INM) user-defined departure and arrival profiles for the Part 150 studies being prepared for Teterboro Airport (TEB).

HMMH is assisting the Port Authority of New York and New Jersey in preparing the TEB Part 150 study using the most current release of the INM; i.e., Version 7.0d. HMMH has determined that some level of customization of arrival and departure profiles will be required based on a review of arrival and departure flight track data contained in the Port Authority's Airport Noise and Operations Management System (ANOMS). HMMH provided a draft memorandum dated February 22, 2016 for review by AEE describing the approach used to develop the user-defined arrival and departure profiles. HMMH submitted a supplement to the TEB user-defined profile request on March 2, 2016 to include user-defined higher weight profiles for the GV aircraft.

AEE reviewed the memoranda and had comments and questions regarding the method for developing the user-defined profiles that needed to be addressed before AEE could approve the user-defined profiles. AEE also required that HMMH provide concurrence from the aircraft operators that the user-defined profiles were within reasonable bounds of the aircraft's performance at TEB.

HMMH provided a revised memorandum dated May 16, 2016 (combining the original profile request and the higher weight GV profile request) addressing the concerns raised by AEE and providing the additional information requested by AEE including concurrence from aircraft operators on the reasonableness of the user-defined profiles. AEE has reviewed the revised memorandum and concurs that the issues raised by AEE have been addressed and all additional required documentation has been submitted.

AEE approves the use of the user-defined profiles described in the May 16 profile request memorandum from HMMH for TEB. Please understand that this approval is limited to this particular Part 150 for TEB. Any additional projects or non-standard INM input at TEB or any other site will require separate approval.

Sincerely,

Rebecca Cointin, Manager
AEE/Noise Division

cc: Jim Byers, APP-400
Timothy Middleton, Port Authority of New York and New Jersey
Ed Knoesel, Port Authority of New York and New Jersey
Adeel Yousuf, Port Authority of New York and New Jersey

Appendix D: Attachment A

- Flight Track Figures

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Appendix E

- DNL 55 and 60 Contours

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Appendix E.1

▪ Supplemental Contours

Figures E-1 and E-2 provide supplemental 55 and 60 DNL contours requested as part of this project. The 55 dB DNL contour in 2016 and 2021 extends north into Maywood and to the southwest into Essex County. Table E-1 provides the estimated population counts within each DNL contour interval computed from the 2010 US Census Block level data.

Table E-1. Estimated Population Counts by DNL Contour Interval
Source: 2010 US Census Block Level Data (HMMH 2016), and Land Use Field Surveys (HMMH, 2017)

Noise Contour interval, DNL		55-60	60-65	65-70	70-75	>75
Estimated Population Counts	2016	42,166	4,950	442	19	0
	2021	45,763	5,567	436	39	0

The population counts presented in Table E.1 differ slightly from those presented in the public review draft of this document, due to the minor revisions in land use made to reflect the March 2017 field surveys of land uses within the NEM contours that the HMMH Team completed as part of the final quality assurance / quality control (QA/QC) steps performed in development of the final NEM. Appendix C.2 was added to this document to present the memorandum that summarizes the steps undertaken in that field work and the resulting refinements in land use within the contours, including updated NEM graphics and tables of noncompatible land uses.

For comparative purposes, Table E.2 presents the estimates of population within each DNL contour interval that were provided in the December 2016 public review draft of the Noise Exposure Map. The March 2017 field work resulted in revisions to counts presented in only the three cells denoted with ***bold italic*** entries; e.g., the 2016 and 2021 65-70 DNL contour intervals, and the 2021 70-75 DNL interval.

Table E-2. Estimated Population Counts by DNL Contour Interval Presented in December 2016 Public Review Draft of the Noise Exposure Map
Source: 2010 US Census Block Level Data, HMMH 2016

Noise Contour Interval, DNL		55-60	60-65	65-70	70-75	>75
Estimated Population Counts	2016	42,166	4,950	***382***	19	0
	2021	45,763	5,567	***392***	***41***	0

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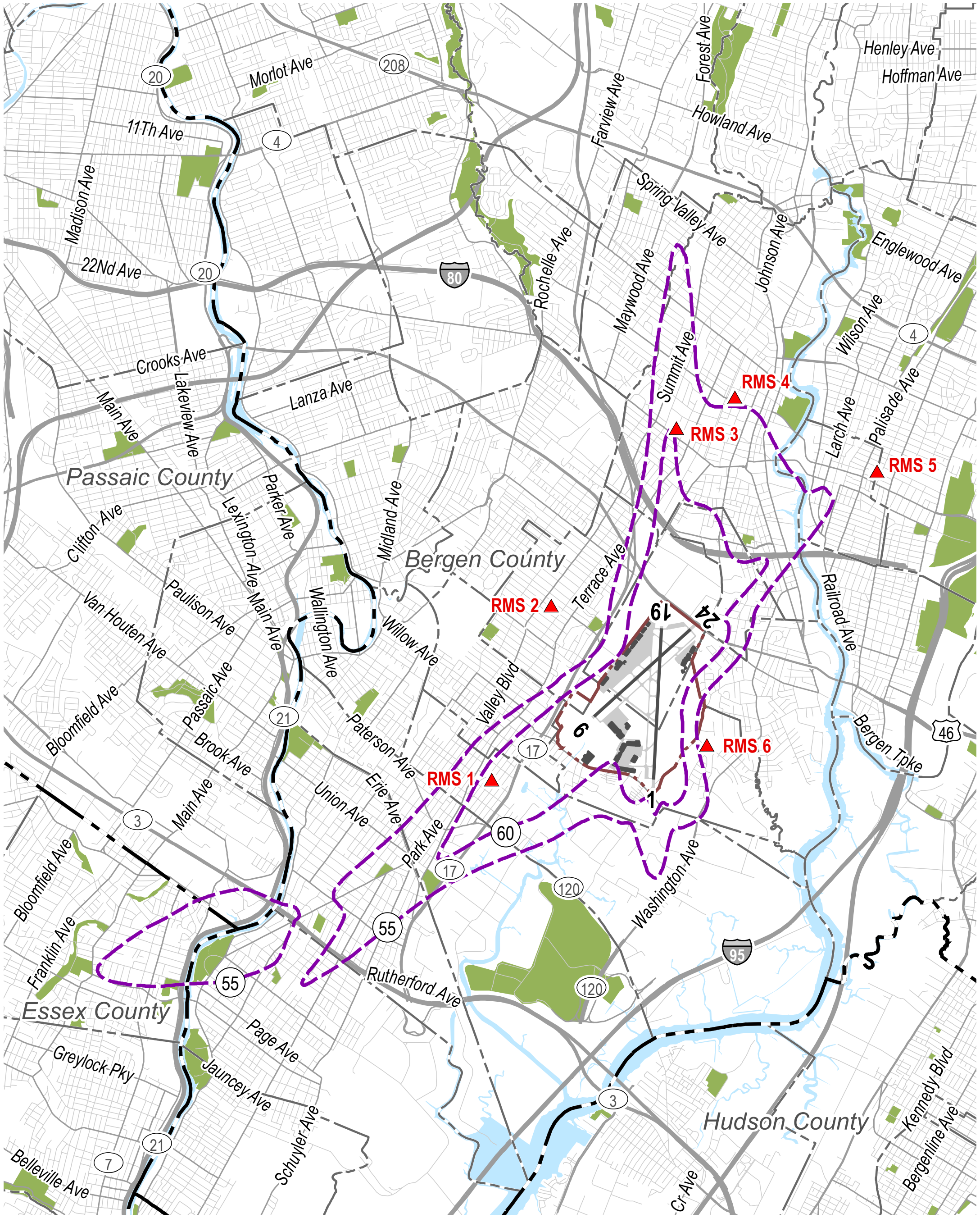


THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: E-1

2016 DNL 55 and 60 Contours

- 2016 DNL Contours (55-60)
- TEB Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

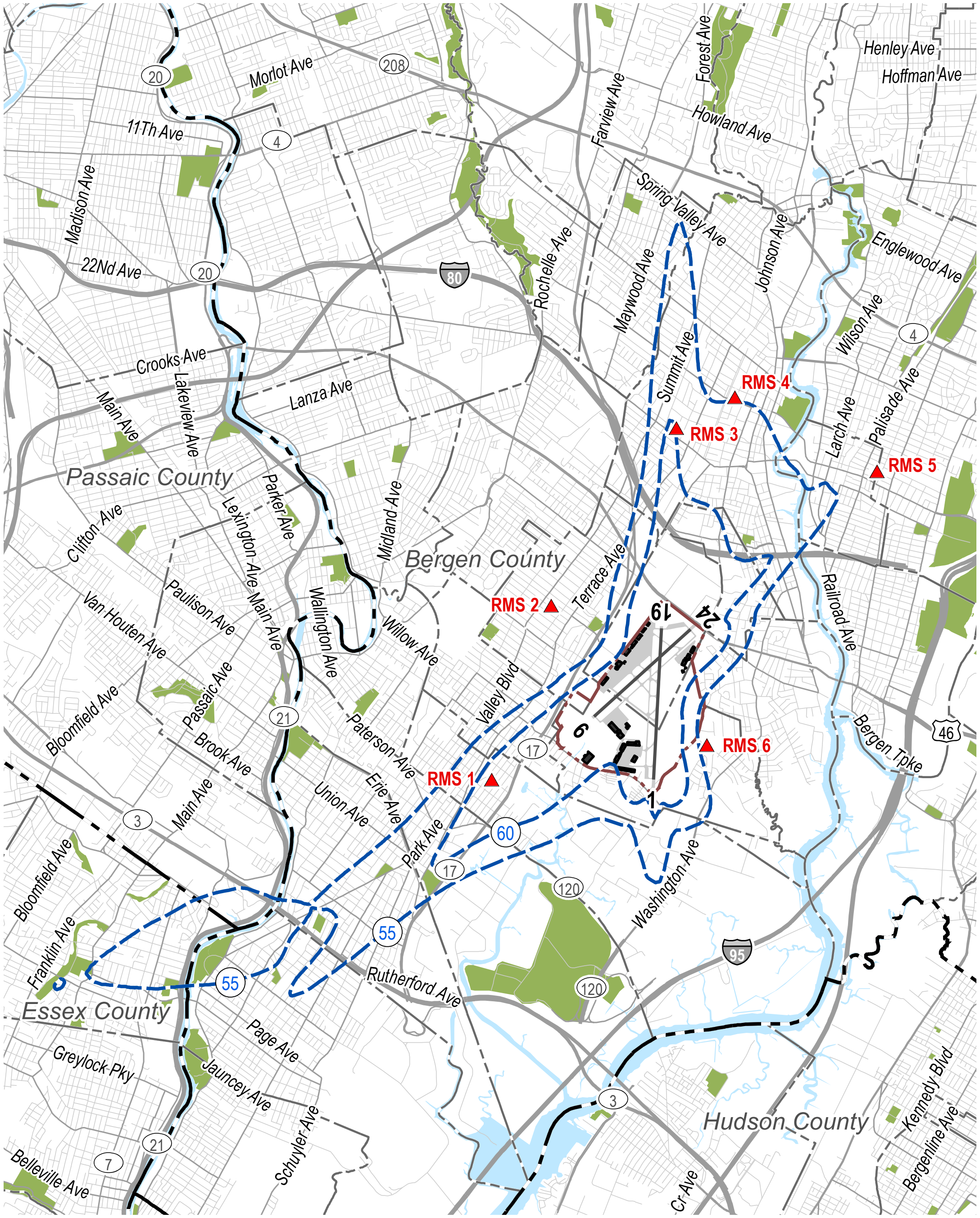
The 55 DNL noise contour "island" is due to departures from Runway 24 that climb to 1,500 feet and then level off to maintain separation with Newark Arrivals. Once they pass this area they are cleared by the TRACON (New York Terminal Radar Approach Control) to resume their climb; the reapplication of power at this point causes an increase in noise levels in the area under the climb.

N

0 8,000 16,000 Ft

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

hmmh



THE PORT AUTHORITY OF NY & NJ

Teterboro Airport

Airport Noise Compatibility
Part 150 Study
2016 and 2021 Noise Exposure Maps

Figure: E-2

2021 DNL 55 and 60 Contours

- 2021 DNL Contours (55-60)
- TEB Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

The 55 DNL noise contour "island" is due to departures from Runway 24 that climb to 1,500 feet and then level off to maintain separation with Newark Arrivals. Once they pass this area they are cleared by the TRACON (New York Terminal Radar Approach Control) to resume their climb; the reapplication of power at this point causes an increase in noise levels in the area under the climb.

N 0 8,000 16,000 Ft

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)

Appendix F

- Technical Advisory Committee

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Appendix F.1

- Technical Advisory Committee Members

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Technical Advisory Committee – Teterboro Airport (TEB) Part 150 Study

First Name	Last Name	Organization	E-Mail
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Kevin	Pattermann	FBO, Jet Aviation	kevinpattermann@jetaviation.com
Mike	Porcello	FAA NY TRACON	michael.porcello@faa.gov
Pasquale	Raquseo	FBO, Signature Flight Support (Morristown)	pasquale.raguseo@signatureflight.com
Cheryl	Rezendes	NJ Meadowlands Commission	Cheryl.Rezendes@njmeadowlands.gov
Stephen	Riethof	Aircraft Owners and Pilots Association (AOPA)	steve@riethof.net
Peter	Rothwell	Dassault Falcon Jet	peter.rothwell@falconjet.com
David	Sanchez	FAA Airports District Office (ADO)	david.sanchez@faa.gov
Ronald	Seelogy	NJ Sports Authority	Ronald.Seelogy@njmeadowlands.gov
Dave	Swanson	FAA Flight Standards District Office (FSDO)	david.a.swanson@faa.gov
Ralph	Tragale	PANYNJ Noise Office	rtragale@panynj.gov
Joe	Vukovich	Net Jets	jvukovich@netjets.com

Appendix F.2

- Technical Advisory Committee Presentations

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Welcome!

Teterboro Airport
14 CFR Part 150 Noise Compatibility Study
Technical Advisory Committee Meeting #1
July 30, 2015

Welcome and Introductions

- PANYNJ - Teterboro owner
  - AvPORTS - Teterboro Airport operations and management service providers
- HMMH Project Team - Consulting firms conducting the study
- TAC members – Diverse stakeholders
- Observers – Public and Interested parties

Meeting Agenda

- Introduction to HMMH Team
- Teterboro Airport Overview
- Part 150 Overview
- Technical Advisory Committee (TAC)
  - Makeup, Roles, and Responsibilities
  - Role of the TAC Meeting Facilitator
  - TAC Charter and Participation Agreement
- Anticipated Schedule and Topics of Meetings
- Port Authority Contacts and Websites
- TAC Discussion, Public Comment Opportunity, and Wrap up

HMMH Consulting Team Composition

- **HMMH** - Prime contractor for TEB and EWR Part 150 Studies
  - Overall project management, documentation, and outreach
  - Aircraft noise analysis and abatement planning
  - Noise compatibility analysis and planning
- **Fitzgerald & Halliday, Inc. (FHI)**
  - Public outreach and land use planning support
- **Planning Technology, Inc. (PTI)**
  - Geographic information system (GIS) data collection and database integration
- **RS&H**
  - Aviation activity forecasting
  - Identification and analysis of compatible land use strategies

HMMH TEB Part 150 Team Leadership

- **HMMH**
  - Mary Ellen Eagan - TEB and EWR Part 150 Program Manager
  - Ted Baldwin - TEB Part 150 Project Manager
  - Robert Mentzer - TEB Part 150 Assistant Project Manager
- **FHI**
  - Kisten Ahfled and Melissa Pineda - Public Outreach and TAC Facilitators
- **PTI**
  - Robert Ori - GIS data collection and database integration lead (not attending today)
- **RS&H**
  - David Full - Aviation activity forecasting and land use analysis lead (not attending today)

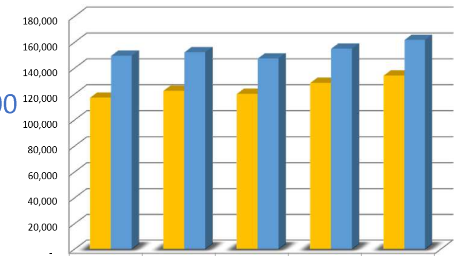
HMMH Team Experience

- **HMMH**
  - Noise, airspace, and airport planning consulting at over 200 airports worldwide
  - Part 150 studies and implementation at 80 airports
  - Noise effects research and consulting
- **FHI**
  - Multidisciplinary transportation, environmental, and community planning firm
  - Extensive experience at Port Authority airports and other facilities
- **PTI**
  - 20+ years of experience supporting The Port Authority with project assistance and implementation of technology tools
- **RS&H**
  - Worldwide aviation planning and environmental consulting experience

Teterboro Airport Overview

- A Brief History
  - PA purchased in 1949 and operated for 20 years; then a 30 year lease with Pan Am in 1969
- PANYNJ resumed airport operation in 2000
  - Operations and Maintenance contract with AFCO AvPORTS, LLC
- Since 2000, $155M spent on Major projects

Teterboro Aircraft Movements



	2010	2011	2012	2013	2014
Jets	117,193	122,514	120,140	128,608	134,267
Total	149,530	152,247	147,476	155,032	161,842

Teterboro Airport Overview

- Existing Airport Facilities:
  - 826 Acres
  - 5 FBOs
  - 6 Terminals
  - 27 Hangars
  - 3 Fuel Farms
  - 2 Customs Facilities
  - EMAS on Runways
    - 19, 6, and 24

14 CFR Part 150

- FAA created in response to federal Aviation Safety and Noise Abatement Act of 1979 (“ASNA”)
- Codified under Title 14 of the Code of Federal Regulations (CFR) Part 150
  - Formal *citation* is “14 CFR Part 150,” informal is “Part 150”
  - Formal *title* is “Airport Noise Compatibility Planning”
- *Voluntary* FAA-defined process for airport noise studies
  - 250+ airports have participated
- *Why do airports participate*? Primary reasons include:
  - Provides access to FAA funding of some approved measures
  - Well-established, understood, accepted, and comprehensive process

14 CFR Part 150

- In response to ASNA, Part 150 prescribes standards and systems for:
  - measuring noise
  - estimating cumulative noise exposure using computer modeling
  - describing noise exposure
  - coordinating with local land use agencies
  - documenting the analytical process
  - submitting the documentation to FAA
  - FAA and public review processes
  - FAA approval or disapproval process

Major Part 150 Components

- Two primary elements
  - Noise Exposure Map (NEM)
  - Noise Compatibility Program (NCP)

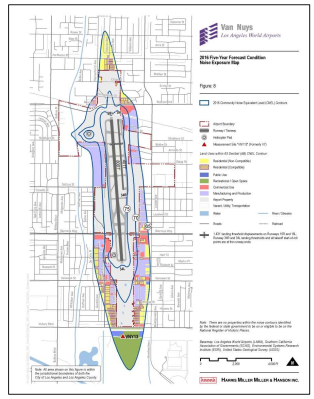
  Detailed FAA guidance at www.faa.gov/airports/environmental/airport_noise/
- Consultation required with
  - All local, state, and federal; with control over land use within DNL 65+ dB
  - FAA regional officials, regular aeronautical users of the airport
  - All parties interested in review of and comment on the draft
- Opportunity must be offered for a final public hearing on the NCP
- PANYNJ will significantly exceed all "consultation" requirements
  - Improved stakeholder relations is typically one of the most valuable study results

Part 150 Noise Exposure Map Overview

- FAA "accepts" NEM as compliant with Part 150 standards
- NEM must include detailed description of
  - Airport layout, aircraft operations, and other inputs to noise model
  - Aircraft noise exposure in terms of Day-Night Average Sound Level (DNL)
  - Land uses within DNL 65+ decibel (dB) contours
  - Noise / land use compatibility statistics within DNL 65+ dB contours
- NEM must address two calendar years
  - Year of submission
  - Forecast (at least five years from year of submission)
  - FAA reviews forecasts for consistency with Terminal Area Forecast, TAF

Recent General Aviation Airport NEM Example

- Van Nuys (California) Airport
  - Similar to TEB, one of several (three) airports operated by Los Angeles World Airports (LAWA)
- Major graphical components include:
  - DNL 65, 70 and 75 dB contours
  - Within 65 dB DNL contour
    - Generalized land use categories
    - Historic properties, schools, places of worship, health care facilities, other “discrete” sensitive uses
    - Clear identification of all *noncompatible* land uses
    - Jurisdiction(s) responsible for land use controls
  - Flight tracks (typically on supplemental figures)



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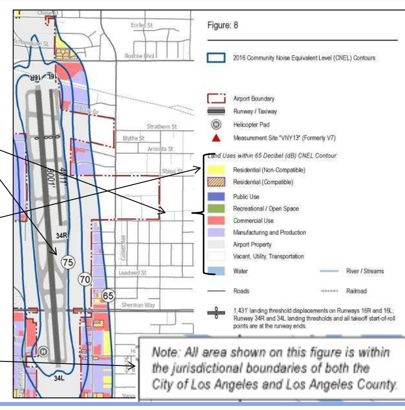
Recent General Aviation Airport NEM Example

- DNL 65, 70 and 75 dB contours
- Within 65 dB DNL contour
  - Generalized land use categories
  - Historic properties, schools, places of worship, health care facilities, other “discrete” sensitive uses (none in this case)
  - Clear identification of all *noncompatible* land uses
- Jurisdiction(s) responsible for land use controls



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Part 150 Noise Compatibility Program Overview

- NCP must address three major categories of proposed actions
  1. Noise abatement measures
  2. Compatible land use measures
  3. Program implementation
- FAA *accepts* NCP as compliant with Part 150 standards
- FAA reviews and *approves* or *disapproves* proposals on an element-by-element basis

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Part 150 Noise Compatibility Program Overview

- Noise abatement measures
  - Shrink noise contours or move them away from noncompatible uses
  - Aircraft operational, airport layout, flight track and runway use, etc.
  - *Note: Study will build on TEB's well-established abatement program*
- Compatible land use measures
  - To address existing noncompatible uses
  - To prevent introduction of new noncompatible uses
- Program implementation
  - Required actions, responsible parties, costs
  - NEM and NCP review and update processes

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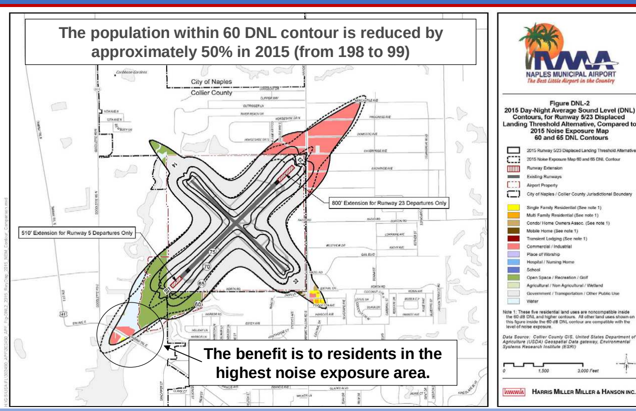
Recent Noise Abatement Alternative

- Naples (Florida) Municipal Airport
- Example is from an assessment of the benefit of additional takeoff length with displaced runway thresholds
- Limited benefit within 65 dB DNL is typical at G.A. airports today



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Generalized Part 150 Study Process

Develop Study Protocol
- Finalize methodology
- Establish TAC
- Develop project schedule and milestones

Verification
- Existing Noise Exposure Maps & EA's
- Noise complaint data
- GIS and land use data
- Flight track and noise data from ANOMS
- FAA activity forecasts

Develop NEMs
- Develop noise contours for existing and 5-year forecast conditions
- Collect land use data and policies
- Noise impact evaluation for DNL 65-75 dB
- Prepare maps in accordance with 14 CFR Part 150

Develop NCPs
- Identify land use strategies
- Evaluate noise abatement measures
- Develop Noise Compatibility Plan
- Prepare documentation

Meetings
- Technical Advisory Committee
- Part 150 Information Sessions
- Public Meetings/Hearings
- Special Presentations

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Noise Compatibility Roles and Responsibilities

Defined by "FAA Noise Abatement Policy Statement" (November 1976)

- Federal government - source emissions, air traffic control, funding, and safety oversight
- State and local government - compatible land use planning and control
- Aircraft operators - noise-sensitive schedules, cockpit procedures, and fleet improvements
- Air travelers and shippers - bear the costs
- Current and potential residents – seek to act in an informed manner
- Airport operators - plan and implement noise compatibility measures

Application of FAA Policy to Part 150 Process

- **The Port Authority**
  - Directs study - it is the Port Authority's project
  - Submits NEM and NCP documentation to FAA
- **FAA**
  - Provides input to, reviews and assists with analysis of noise abatement flight procedures
  - "Accepts" documentation and "approves" NCP measures
  - Responsible for implementation of noise abatement flight procedures
  - Assists in funding eligible measures in all three categories
- **Local governments**
  - Provide input to recommended land use measures
  - Implement and enforce land use measures to maintain and improve noise compatibility
- **All stakeholders, including aviation interests, residents, and other interested parties**
  - Monitor study process, provide input, assist with implementation

TAC Makeup

- TAC composed of stakeholders representing all significant interests
  - Key agencies; e.g., Port Authority, FAA, AvPORTS
  - Local land use jurisdictions; e.g., Bergen County
  - Airport tenants and users; e.g., fixed base operators (FBOs), NetJets, etc.
  - Aviation trade associations; e.g., National Business Aviation Association (NBAA), Aircraft Owners and Pilots Association (AOPA),
  - Established advisory bodies; e.g., Teterboro Airport Noise Abatement Advisory Committee (TANAAC), Teterboro Users Group (TUG)
  - Newark/Liberty International (EWR) Noise/Community Roundtable
- Members serve on a voluntary basis without compensation

TAC Roles and Responsibilities

- The TAC is advisory to the Port Authority solely for purposes of the TEB Part 150 Study, including
  - Review of study inputs, assumptions, analyses, documentation, etc.
  - Input, advice, and guidance related to NEM and NCP development
- TAC members are expected to provide two-way communication between the TAC and their organizations / constituents
- The Port Authority shall respect and consider TAC input, but must retain overall responsibility for the Part 150 Study and NCP recommendations
- The TAC and Port Authority recognize FAA is responsible for accepting NEM and NCP submissions and for approving NCP proposals

TAC Meeting Facilitator

- TAC meetings will be moderated by a professional facilitator
- The facilitator is responsible for ensuring TAC meetings
  - Run efficiently, respectfully, and effectively
  - Focus on the published agenda
  - Provide appropriate opportunities for all members to participate
  - Result in consensus conclusions to the maximum extent feasible
  - Are documented through preparation of accurate meeting notes
- The facilitator may extend or cut off discussion to meet these objectives
- TAC members are expected to respect the facilitator's role and authority

TAC Charter and Participation Agreement

- Charter and Participation Agreement were mailed with TAC invitations
- Charter describes TAC's role, primary and alternate member responsibilities, meeting conduct and logistics, etc.
- Up to 18 meetings anticipated - approximately once every two months
  - Agendas, and background material will be provided in advance of each meeting
  - Dates and times will be sought that are convenient to a majority of members; e.g., weekdays during normal business hours (9 am to 5 pm)
  - Meetings are expected to be two to three hours in length
- TAC meetings will be open to public observers
  - Opportunity will be provided for brief comment at the end of each meeting

Projected TAC & Public Meeting Topics, 2015-6

Anticipated Date	Meeting	Anticipated Topics
July 30, 2015	TAC 1 - ***Today***	Introduction to Part 150, TAC process, etc.
September 25, 2015	TAC 2 - ***Next TAC***	Overview of noise modeling process and inputs
October 2015	Public Information Meeting 1	Introduction to Part 150 and TEB study process
November 2015	TAC 3	Presentation and discussion of forecasts
January 2016	TAC 4	Present noise contours / discuss noise issues
March 2016	TAC 5	Present land use analyses / discuss compatibility
May 2016	TAC 6	Discuss abatement and mitigation options for analysis
July 2016	Public Information Meeting 2	Present draft NEM
July 2016	TAC 7	Present first-round abatement alt. analysis
September 2016	TAC 8	Present second-round abatement alt. analysis
November 2016	TAC 9	Present third-round abatement alt. analysis

Projected TAC & Public Meeting Topics, 2017

Anticipated Date	Meeting	Anticipated Topics
January 2017	TAC 10	Present first-round compatible land use alternatives
March 2017	TAC 11	Present second-round compatible land use alternatives
May 2017	TAC 12	Recommend abatement and compatibility measures
June 2017	Public Information Meeting 3	Present draft NCP recommendations
June 2017	TAC 13	Discuss NCP monitoring and implementation
July 2017	TAC 14	Review NCP recommendations
September 2017	TAC 15	Discuss Draft NCP and public input
September 2017	Final Public Hearing on NCP	Present proposed NCP and revised NEMs

Three TAC meetings are held in reserve for unanticipated needs

Port Authority Project Contacts and Websites

- Timothy Middleton, Program Manager - EWR and TEB Part 150 Studies
- Adeel Yousuf, Manager – Manager, Noise Office
- Address emails to NJPart150@panynj.gov
- TEB Part 150 Website provides most relevant information
  - Will be updated regularly for public outreach purposes
  - TAC will receive direct notices
  - http://panynjpart150.com/TEB_homepage
- Port Authority noise information website provides broader information
  - www.panynj.gov/airports/aircraft-noise-information

Wrap Up

- Next TAC meeting:
  - **Friday, September 25, 9 a.m. - noon**
  - Same location
  - Primary topic - Overview of Part 150 noise modeling process and inputs
- TAC member questions, comments, and discussion?
- Public Comments?
- Adjournment

Thanks for attending!

Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Study

Technical Advisory Committee Meeting #2

September 25, 2015

Meeting Agenda

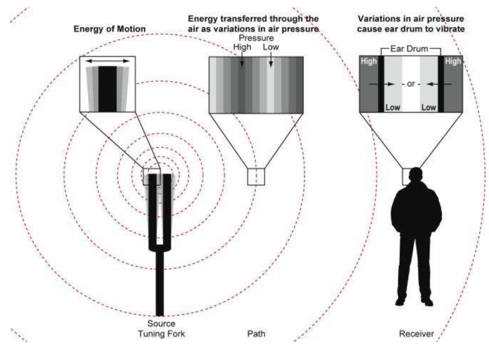
- Welcome and introductions
- “Noise 101” – Basic aircraft noise terminology
- Introduction to the FAA’s noise model, inputs, and data sources
- Overview of TEB’s existing noise abatement rules and regulations
- Upcoming meetings
- TAC Discussion
- Public Comment Opportunity
- Adjournment

Basic Noise Terminology

- Sound vs. noise
- The decibel scale (dB)
- The A-weighted decibel (dBA)
- Single event noise metrics - Lmax and SEL
- Cumulative exposure metric - DNL
- Refresher on Part 150 requirements

What is “Noise”?

- Sound is pressure variation our ears can detect
  - An objective quantity
- Noise is “unwanted sound”
  - A subjective quantity
- We relate sound and noise by considering effects
  - Annoyance
  - Speech interference
  - Sleep disruption



The Decibel Scale

- We use a *logarithmic* scale – *decibels, or dB* – to express sound levels and noise levels – *Why?*
- We can hear sound pressures over a HUGE range
  - 0.000000003 to 0.003 pounds per square inch (psi) – the threshold of hearing to the threshold of pain
- Decibels compress this range to match the way we interpret sound pressures
  - 0 to 140 dB
- *We “hear” in decibels*.

Real-Time Decibel Change “Rules of Thumb”

- In a laboratory test, a 1 dB change is generally detectible
- In a normal environment, a 3 dB change is generally the threshold of detectability for a careful listener
  - Why? Distinct A:B comparisons are rare
- A 6 dB change is clear in most day-to-day situations
- In general, a 10 dB change seems twice as loud
- Different rules of thumb apply to cumulative exposure
  - More on that in a few slides

Caution: Decibel Addition Isn't ordinary math!

- Decibels are a logarithmic quantity, so…
- Two equal sources:
  - 60 + 60 dB = ~~120 dB~~ **63 dB**
- Four equal sources:
  - 60 + 60 + 60 + 60 dB = **66 dB**
- Ten equal sources:
  - 60 + 60 + 60 + 60 + 60 + 60 + 60 + 60 + 60 + 60 dB = **70 dB**
- We are *more* sensitive to small changes and *less* sensitive to large changes

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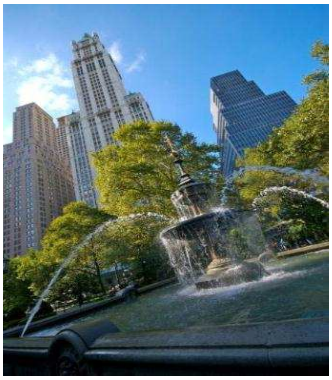
Other factors to consider...

- Sound *quality* matters
  - Sources with the same overall dB level may "sound" different



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Other factors to consider...

- Duration matters
  - Longer durations increase exposure, even for sources with the same dB level

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Other factors to consider...

- *Time of day* matters

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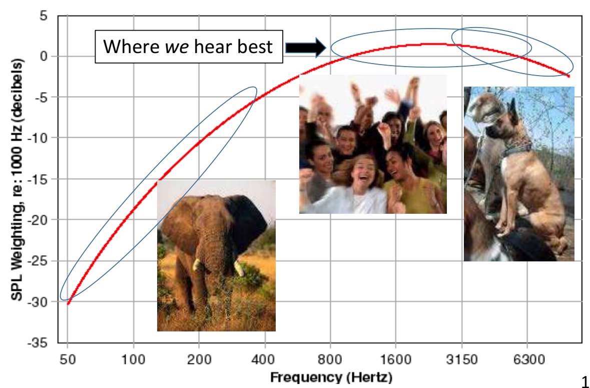
FAA requires use of the A-Weighted Sound Level

- Our ear is not equally sensitive to all frequencies
- A-weighted decibels (dBA) measure sound the way we “hear” it
- Part 150 specifies dBA metrics to describe
  - Single events
  - Cumulative exposure
- Consistent with worldwide practice



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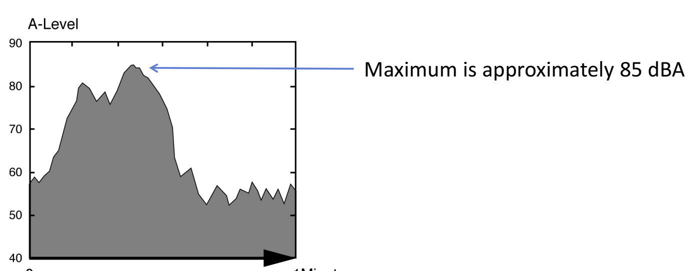
Single Event Noise Metrics: Maximum Sound Level (Lmax)

- The simplest way to describe a discrete noise “event” is its maximum sound level, Lmax



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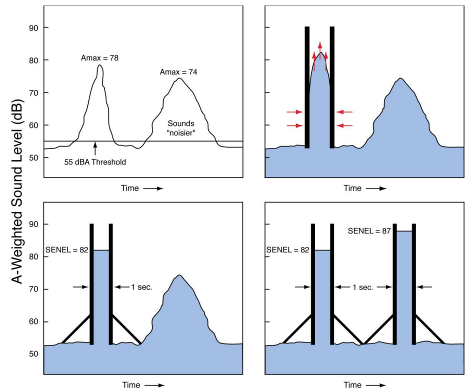
Single Event Noise Metrics: Sound Exposure Level, SEL

- Duration matters: A longer event may seem "noisier," even if it has a lower or equal maximum level
- SEL measures the total "noisiness" of an event by taking duration into account



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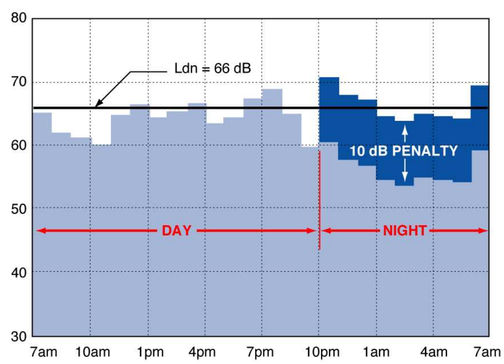
Cumulative Exposure: Day-Night Average Level (DNL)

- Describes 24-hour exposure
- Noise from 10 pm to 7 am is factored up by 10 dB
  - "Penalty" is equal to counting each night aircraft 10 times
- Sometimes abbreviated Ldn
- DNL is the only measure that Part 150 requires us to consider



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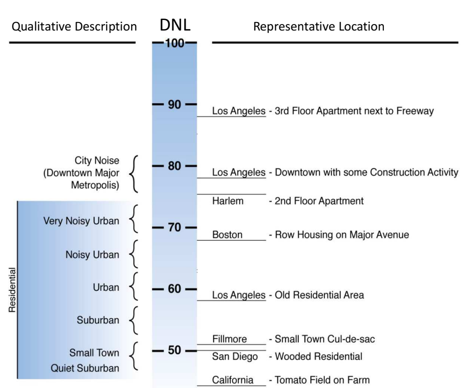
Typical Community DNL Examples



Source: United States Environmental Protection Agency, Information on Levels Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. 14.

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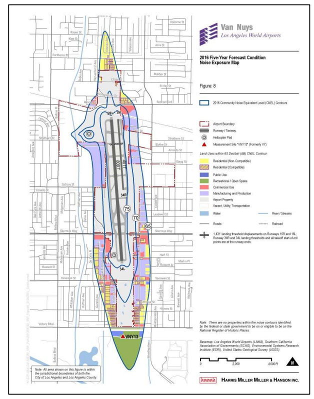
Part 150 Studies Use DNL Contours (refresher)

- Van Nuys (California) Airport example
- FAA requires consideration of 65, 70 and 75 dB DNL contours
- Key consideration is identification of non-compatible land uses within contours
- Part 150 guidelines consider all land uses compatible below 65 dB DNL
- FAA regulations consider a 1.5 dB increase to or above 65 dB DNL to be the threshold significant impact in environmental studies



Interpreting Changes in DNL

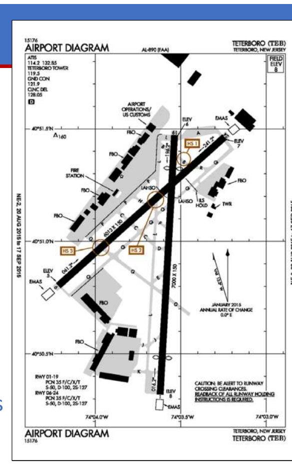
- 1 - 2 dB change in level
  - May be noticeable
  - Abatement may be beneficial
- 2 - 5 dB change in level
  - Generally noticeable
  - Abatement should be beneficial
- Over 5 dB change in level
  - Community reaction is likely

- Differ from previously cited “rules of thumb” for “real-time” change
  - 1 dB threshold of detectability in a laboratory test
  - 3 dB threshold of detectability for a careful listener in a normal environment
  - 6 dB in most day-to-day situations

Noise Metric Summary

- The decibel is a complex logarithmic quantity based on sound pressure
- A-weighted decibels correlate well with how we hear
- Noise levels can be expressed many ways, including but not limited to:
  - Instantaneous maximum (Lmax)
  - Single event dose (SEL)
  - Long-duration exposure (DNL)
- Best metric to use depends on purpose
- FAA requires use of DNL in a Part 150 study
- Part 150 guidelines consider all land uses compatible below 65 dB DNL

Noise Modeling under Part 150



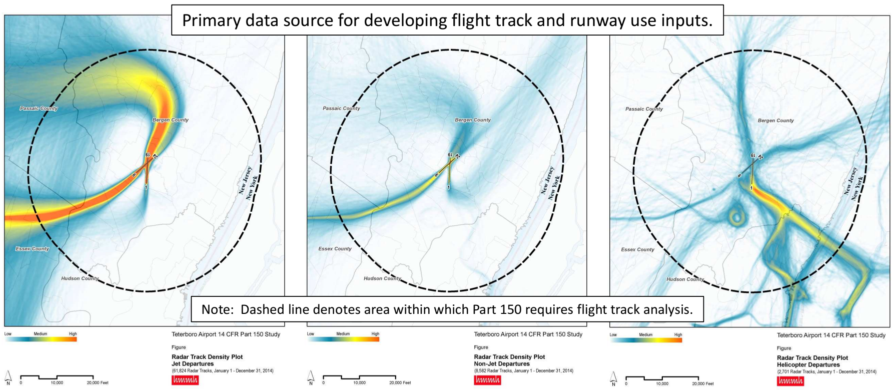
- We must use FAA-approved model
  - FAA's Integrated Noise Model, Version 7.0d (INM 7.0d) was the most current when the study was initiated
- Required inputs
  - Airport layout
  - Annual average meteorological data
  - Terrain
  - Aircraft operations for 2016 and 2021 - *FAA approves*
  - "User-defined modelling inputs" for TEB-specific flight procedures - *FAA approves*
  - Runway utilization rates by aircraft categories
  - Flight track geometry and utilization by aircraft categories
  - Maintenance runup locations and operations

Major Data Sources

- Best available source(s) will be used for each specific category
  - *Airport layout* - PANYNJ drawing files, FAA airport diagram, TEB Airport Layout Plan (ALP)
  - *Meteorological* - NOAA National Climatic Data Center
  - *Terrain* - U.S. Geological Survey
  - *Baseline operations* - ANOMS monitoring system and Compuland
  - *Forecast operations* - FAA's Terminal Area Forecast (TAF) and PANYNJ forecasts
  - *Flight tracks, profiles, and runway use* - 2014 data from ANOMS monitoring system
- Data will be compared to formal and informal procedures
  - FAA Standard Instrument Departure (SID) and approach procedures (APs), etc.
  - PANYNJ and industry noise abatement procedures
- Modelling assumptions will be documented in detail and shared with:
  - All interested stakeholders at workshops and on website
  - **TAC members - *Please offer feedback on sources or assumptions at any time***

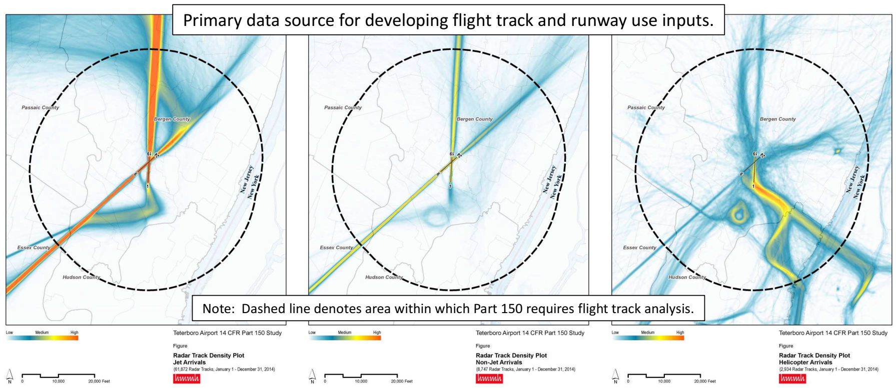
2014 Departure "Density Plots" from ANOMS Data

Primary data source for developing flight track and runway use inputs.



Note: Dashed line denotes area within which Part 150 requires flight track analysis.

2014 Arrival "Density Plots" from ANOMS Data



Existing TEB Noise Abatement Overview

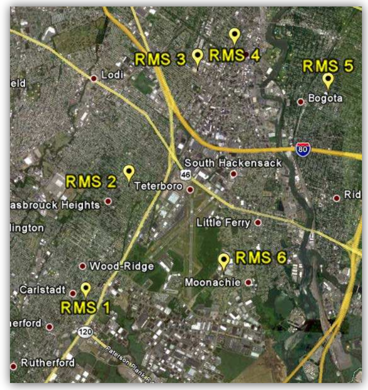
- These measures are currently in place
- In the Noise Compatibility Program phase we will evaluate:
  - The implementation of these measures
  - Their effectiveness
  - Potential revisions
- We also will evaluate:
  - Potential new noise abatement alternatives
  - Potential land use mitigation measures
  - Potential program monitoring, promotion, and implementation measures

Major *Existing* TEB Noise Abatement Measures

- Jet aircraft operations require prior approval of the Airport Manager
- Part 36 Stage 1 and 2 operations (older, noisier jets)
  - Stage I aircraft are banned on a 24-hour basis
  - Voluntary restraint of all Stage 2 operations
  - **Note: Stage 1 and 2 operations will be banned nationwide on January 1, 2016**
- Voluntary restraint of all non-essential flights from 11 pm and 6 am
  - Exceptions for Lifeguard and night cargo operations
- Aircraft that do not comply with voluntary measures are notified via mail
- TEB Operations provides information through "Meet & Greet" procedures

Existing Measured Lmax Limits

- All departures must comply with Lmax limits measured at TEB noise monitors
- Runway 24
  - 80 dBA nighttime (10 pm - 7 am)
  - 90 dBA daytime (7 am to 10 pm)
- Runway 01, 06, and 19
  - 95 dB(A) All Hours.
- Helicopter departures
  - 95 dB(A)



Penalties for Violation of *Existing* Lmax Limits

- Violations are mailed to aircraft owners for measured exceedences
  - 1st and 2nd violations are kept for two years from the date of the violation
  - On 2nd anniversary, 1st violations are expunged and 2nd violations downgraded
- 3rd violation in a two-year period results in permanent banishment of the aircraft from operation at TEB
- Appeals
  - Violations may be appealed within 30 days of receipt of certified letter of violation
  - Appeals must have verifiable and documented mitigating circumstances
  - The Airport Manager is the authority on appeals

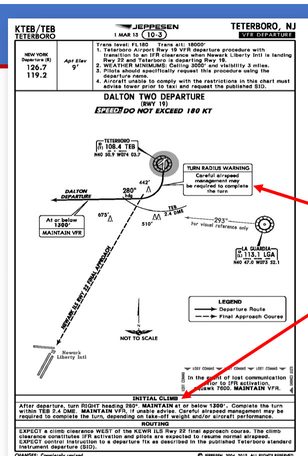
Exceptions to *Existing* Lmax Limits

- Two flight tests are permitted for the purpose of evaluating noise abatement procedures
  - If a noise level is exceeded on one of the test flights, it is not a violation.
- If Runway 19 is closed by NOTAM, the Runway 24 limit shall be 95 dBA
- If the cross-wind exceeds the maximum allowable component in the operator's handbook, the Runway 24 limit shall be 95 dBA
- If, at the Airport Manager's discretion, circumstances occurred that could not have been foreseen prior to departure, noise abatement procedures may be abandoned to assure flight safety

Existing Preferred Noise Abatement Runways

- Flight crews are advised to request preferred noise abatement runways whenever possible
- Preferred Arrival Runway is 01
  - Overflies industrial area on final approach avoiding densely populated Rutherford, Carlstadt, Wood-Ridge, Moonachie communities
- Preferred Departure Runway is 19
  - Noise office and Airport Manager recommend departing 19 between 10 pm and 7 am when Runway 24 noise limit is 80 dBA
  - Avoids densely populated Moonachie, Wood-Ridge, Carlstadt and Rutherford

Existing Dalton Two VFR Departure



PILOTS MUST REQUEST THE **DALTON TWO** FOR RUNWAY 19 FROM CLEARANCE DELIVERY

ATTENTION: TURN RADIUS WARNING AND INITIAL ALTITUDE RESTRICTIONS

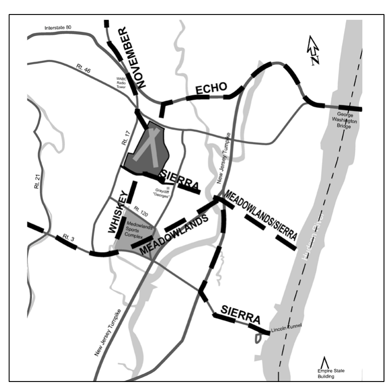
MAINTAIN SAFETY, STRICT COMPLIANCE TO ALL PROCEDURES IS MANDATORY!

Noise abatement purpose is to avoid use of the most noise-sensitive runway (Runway 24) which has the lowest noise limits.

NOT FOR NAVIGATION, CHECK LATEST JEPPESEN OR NOAA FACILITY DIRECTORY UNDER SPECIAL NOTICES FOR UP-TO-DATE INFORMATION.

Existing Helicopter Noise Abatement Routes

- Helicopter operators are advised to:
  - Adhere to routes whenever possible
  - Avoid residential areas
  - Maintain 1,000 feet over residential areas



Not for navigational purposes

Wrap-Up

- Next Meetings
  - 1st Public Information Workshop - Thursday, October 15, 2015, 6 - 8 pm
    - Holiday Inn Hasbrouck Heights, 283 Route 17 South
  - 3rd TAC meeting - Thursday, November 12, 2015, 1- 4 pm
    - Primary topic - Operational noise modeling inputs
  - 4th TAC meeting - Friday, January 29, 2016, 9 am to noon
    - Primary topic - Forecasts and draft noise contours
- TAC member questions, comments, and discussion?
- Public Comments?

Thanks for attending!

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Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Study

Technical Advisory Committee Meeting #3

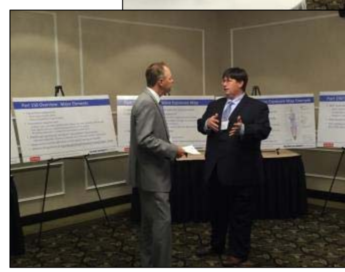
November 12, 2015

Meeting Agenda

- Welcome and introductions
- October 15, 2015 workshop summary
- Study Protocol status
- Progress in development of noise modeling inputs
- Overview of forecasting process
- Initial land use data collection and jurisdiction consultation
- Schedule status and primary topics of upcoming meetings
- TAC discussion
- Public comment opportunity
- Adjournment

Public Workshop Held on October 15, 2015

- 6 to 9 p.m. at the Holiday Inn Hasbrouck Heights
- 12 attendees; 2 written comments
  - Comments were largely input on issues to consider in Noise Compatibility Program phase
- "Open house" style
  - Presentation boards
  - Live WebTrak demonstration
  - PANYNJ and HMMH staff answered questions and comments on a one-on-one basis
- Boards posted on website at http://panynjpart150.com/TEB_PIW.asp



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Study Protocol Status

- Study protocols have been developed for all four PANYNJ Part 150 studies
  - EWR and TEB protocols built on JFK and LGA protocols
- Purposes include defining:
  - Roles and responsibilities of all direct participants, stakeholders, and interested parties
  - Technical aspects (data management, forecasting, noise modeling, land use matters, and identification and evaluation of noise compatibility program alternatives, etc.)
  - Communication strategies, mechanisms, timing, etc.
  - Procedural matters (schedules, deliverables, review processes, etc.)
- The HMMH Team, Port Authority, and FAA participated in the protocol development and will collaborate to implement it (and amend it if necessary)
- TEB protocol will be posted at http://panynjpart150.com/TEB_SP.asp

4

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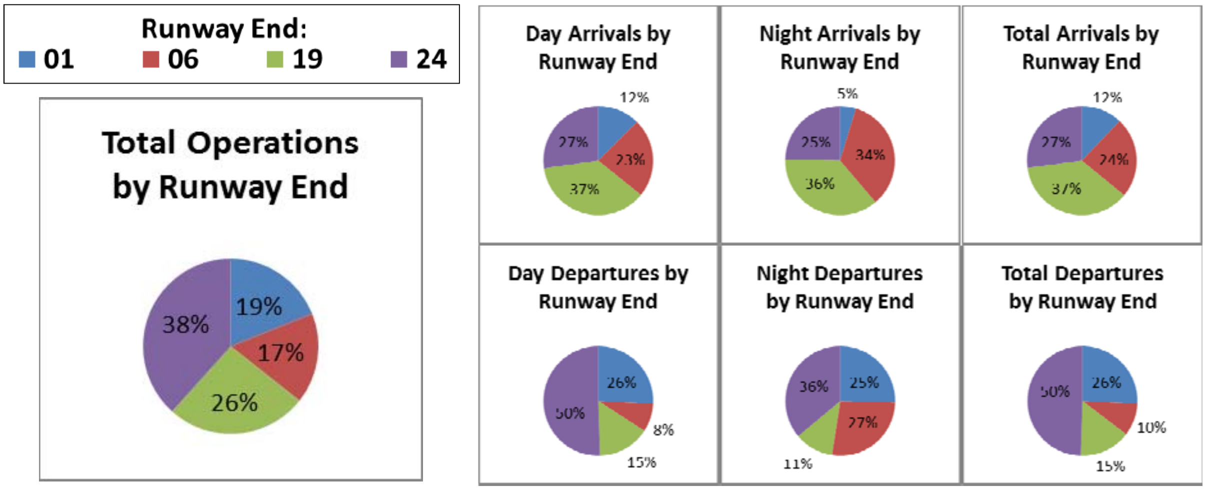
Progress in Developing Modeling Inputs

- Identification of noise modeling groups
  - Single-engine piston props
  - Multi-engine piston props
  - Turboprops
  - Small jets (≤12,500 pounds)
  - Medium jets (>12,500 and ≤41,000 pounds)
  - Large jets (>41,000 pounds)
  - Helicopters
- Tabulation of operations by group and runway (day, night, and total)
- Tabulation of percentage runway use by group (day, night, and total)
- Plot arrival and departure flight track density by group (day and night)

Graphical Runway Use Summaries

- The following pages present graphical summaries of runway use for each of the six fixed-wing noise modeling groups, broken down by:
  - Arrivals day, arrivals night, and arrivals total
  - Departures day, departures night, and departures total
  - Total operations (arrivals and departures)
- The summaries are in the form of "pie charts" depicting percentage runway use on each of the four runway ends; e.g., Runways 01, 06, 19, and 24.
  - Pie charts are used to provide a clear visual basis for comparison of relative runway use.
- The runway use percentages are based on actual runway use for the entire year of operations in 2014.
  - Data were obtained from the TEB Compuland database.

2014 Single Engine Propeller Runway Use



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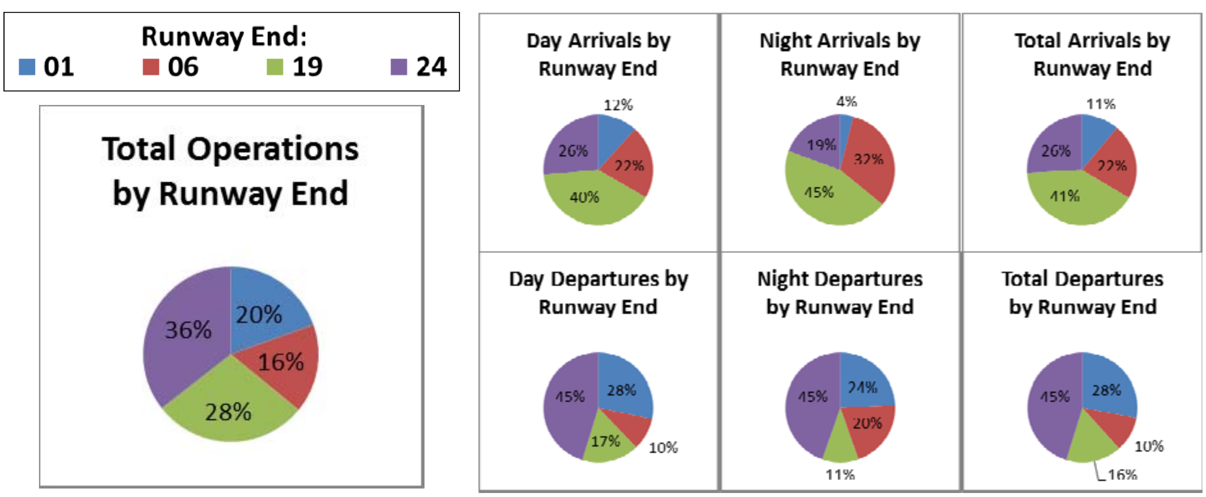
2014 Multi-Engine Propeller Runway Use



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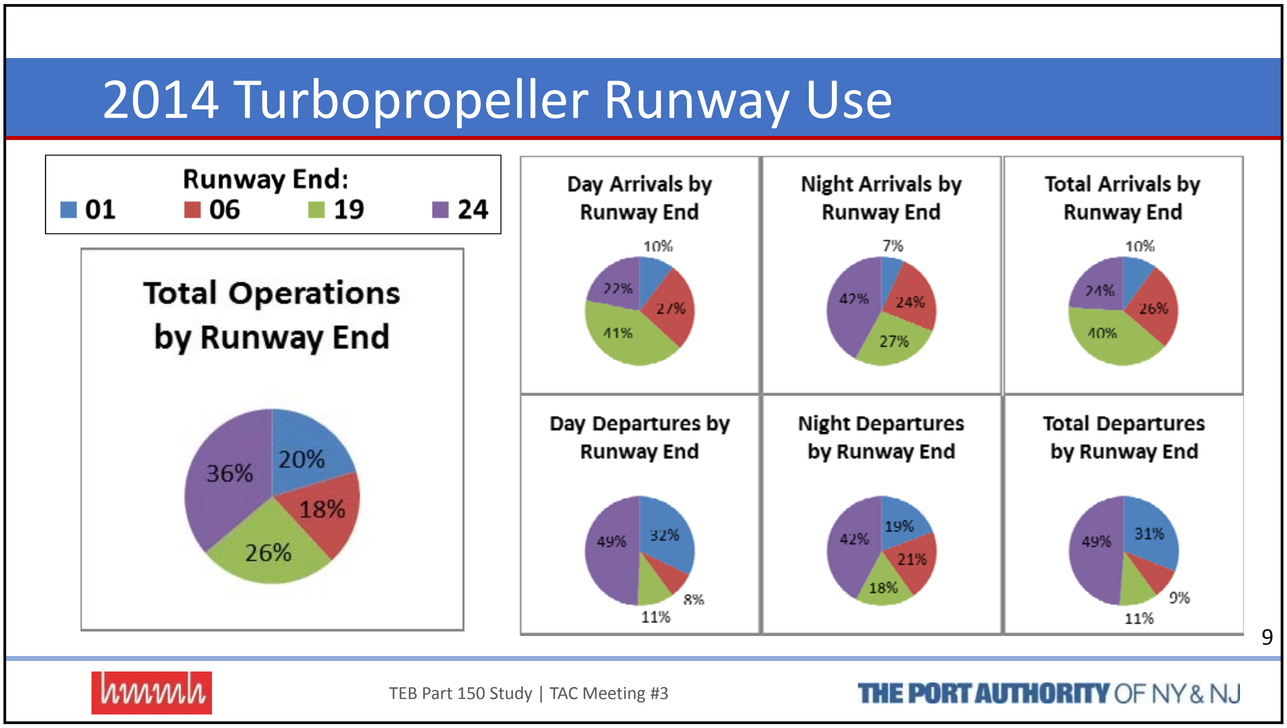
2014 Turbopropeller Runway Use
Runway End:
01 06 19 24
Total Operations by Runway End
20%
18%
26%
36%
Day Arrivals by Runway End
10%
27%
41%
22%
Night Arrivals by Runway End
7%
24%
27%
42%
Total Arrivals by Runway End
10%
26%
40%
24%
Day Departures by Runway End
32%
8%
11%
49%
Night Departures by Runway End
19%
21%
18%
42%
Total Departures by Runway End
31%
9%
11%
49%
9
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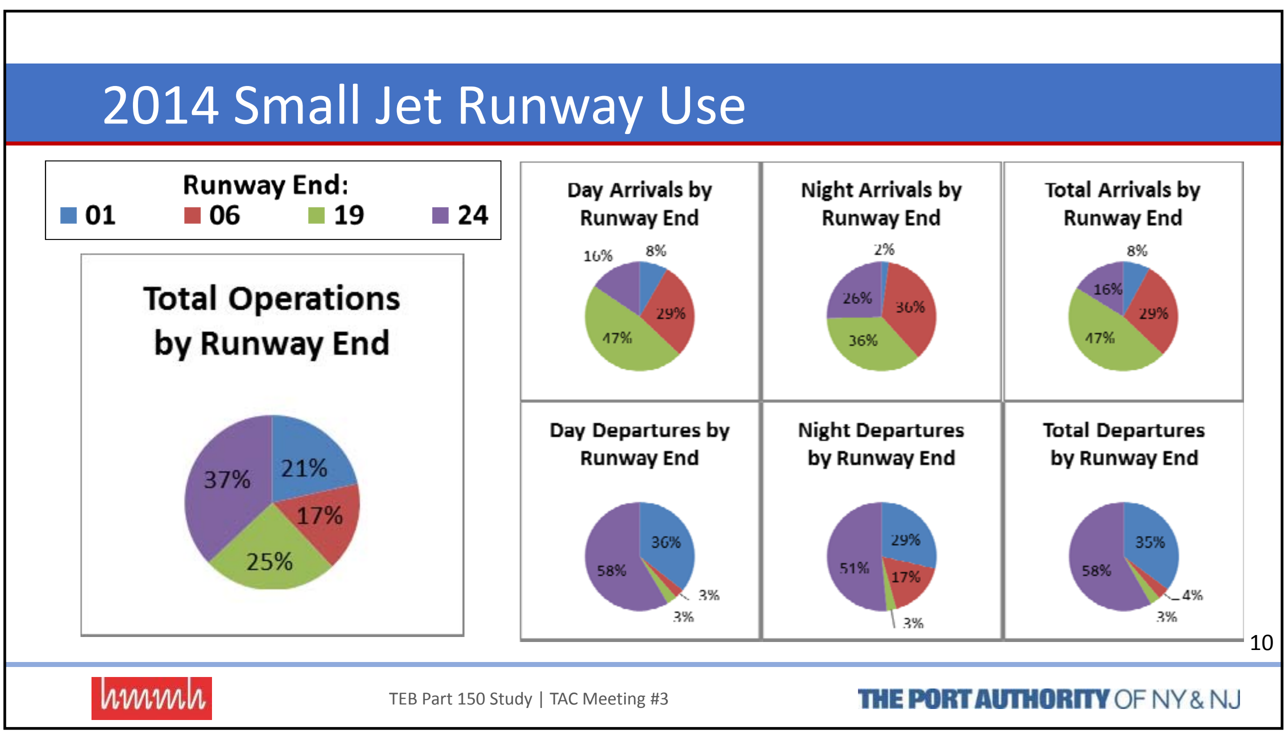
2014 Small Jet Runway Use
Runway End:
01 06 19 24
Total Operations by Runway End
21%
17%
25%
37%
Day Arrivals by Runway End
8%
29%
47%
16%
Night Arrivals by Runway End
2%
36%
36%
26%
Total Arrivals by Runway End
8%
29%
47%
16%
Day Departures by Runway End
36%
3%
3%
58%
Night Departures by Runway End
29%
17%
3%
51%
Total Departures by Runway End
35%
4%
3%
58%
10
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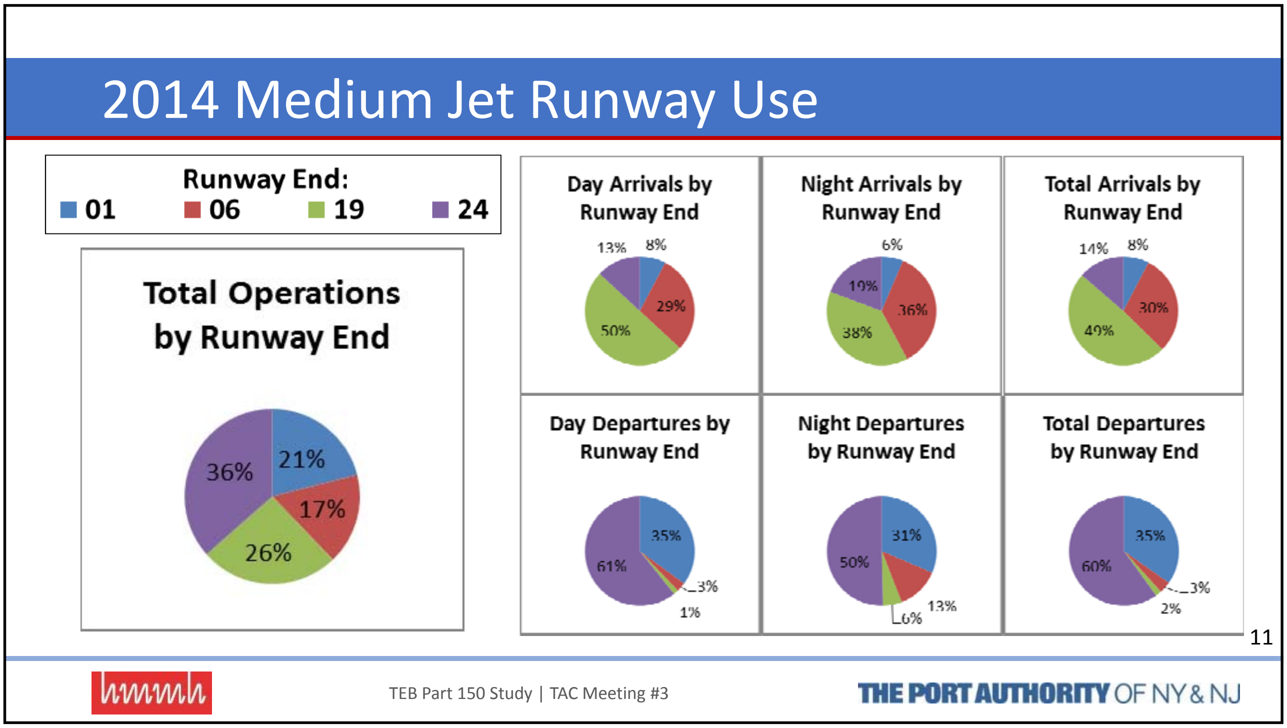
2014 Medium Jet Runway Use
Runway End:
01
06
19
24
Total Operations by Runway End
21%
17%
26%
36%
Day Arrivals by Runway End
8%
29%
50%
13%
Night Arrivals by Runway End
6%
36%
38%
19%
Total Arrivals by Runway End
8%
30%
49%
14%
Day Departures by Runway End
35%
3%
1%
61%
Night Departures by Runway End
31%
13%
6%
50%
Total Departures by Runway End
35%
3%
2%
60%
11
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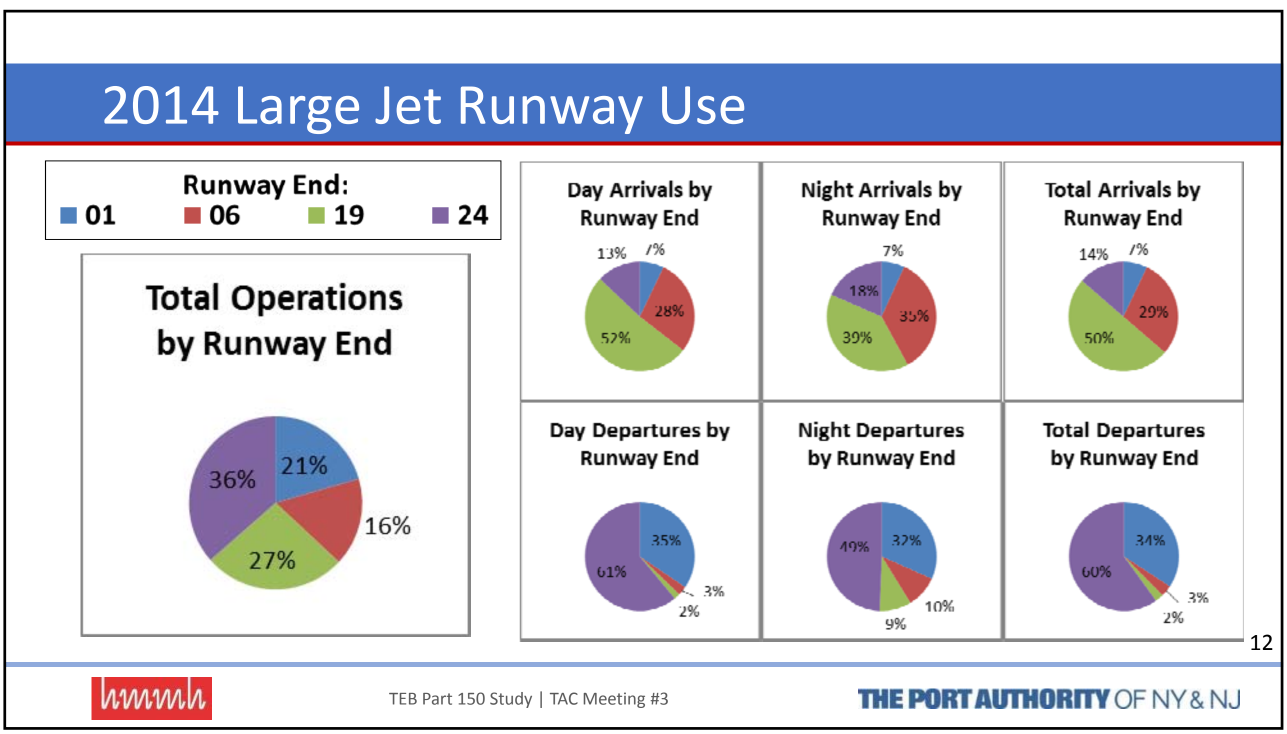
2014 Large Jet Runway Use
Runway End:
01
06
19
24
Total Operations by Runway End
21%
16%
27%
36%
Day Arrivals by Runway End
7%
28%
52%
13%
Night Arrivals by Runway End
7%
35%
39%
18%
Total Arrivals by Runway End
7%
29%
50%
14%
Day Departures by Runway End
35%
3%
2%
61%
Night Departures by Runway End
32%
10%
9%
49%
Total Departures by Runway End
34%
3%
2%
60%
12
TEB Part 150 Study | TAC Meeting #3
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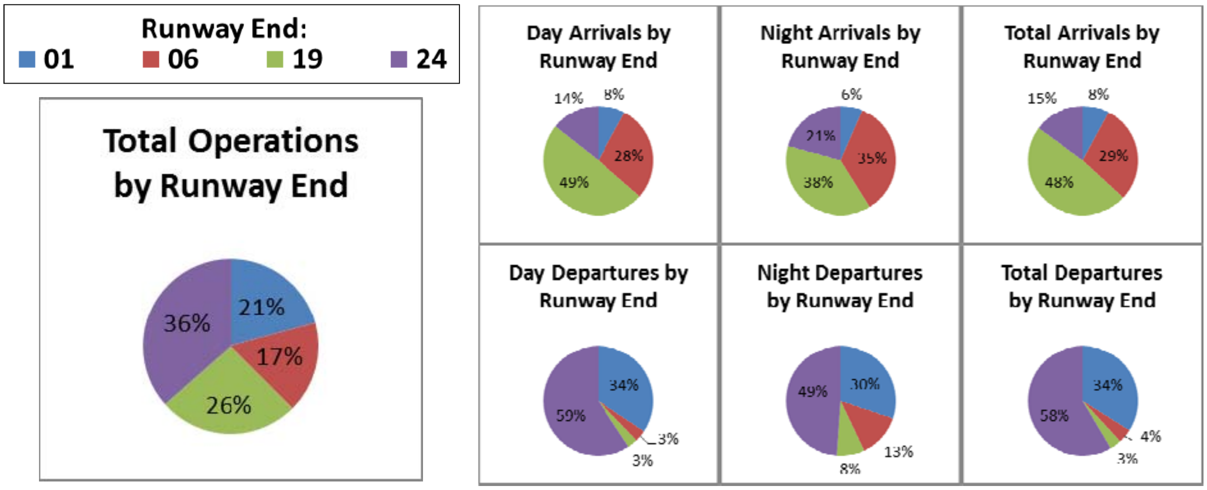
2014 Overall Fixed-Wing Runway Use



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Helicopter Flight Track Origin/Destination Points

- TEB has four primary helicopter routes that follow the same path for arrivals and departures.
- There are no true "helicopter pads" at TEB.
- Noise modeling will use four primary flight track origin points for takeoffs and destination points for landings.
- These origin/destination ("O/D") points are labelled "N," "E," "S," and "W" on this aerial of the airport.

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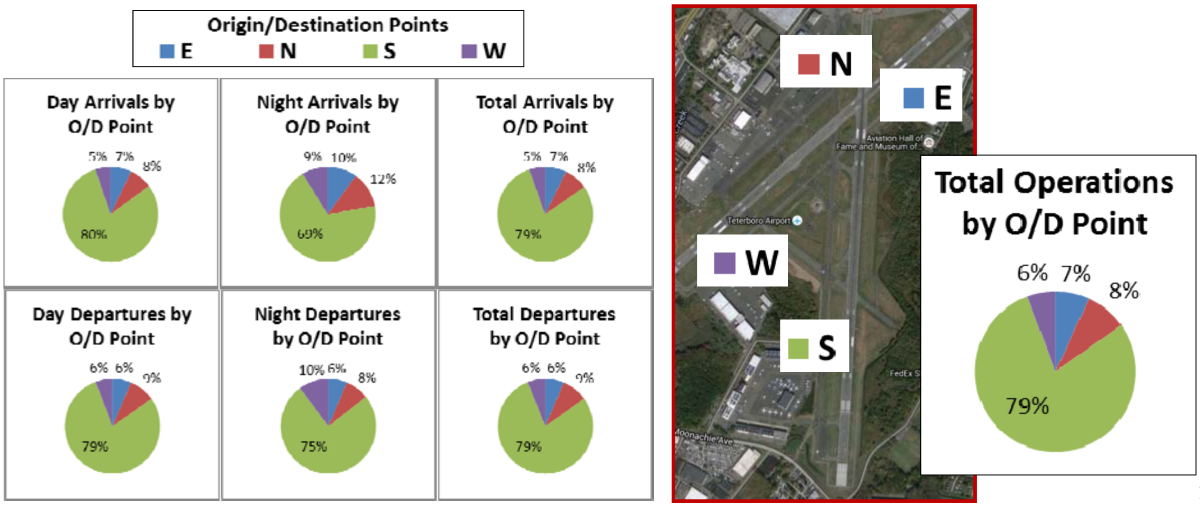
2014 Helicopter Flight Track Origin/Destination Point Use



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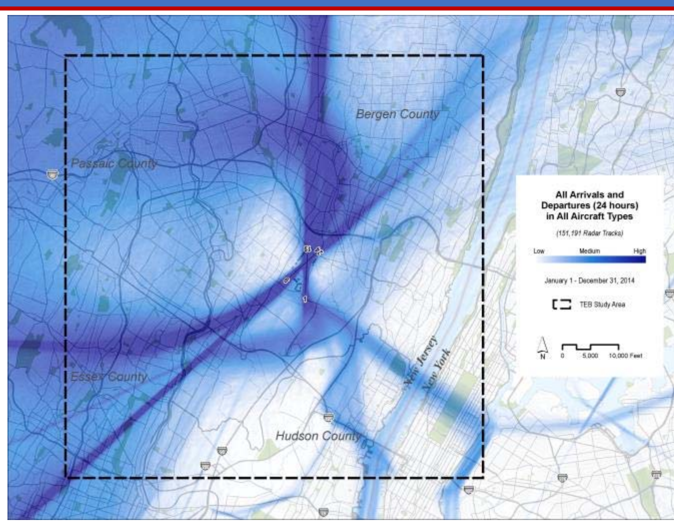
2014 Flight Track Density for All Arrivals and Departures, All Aircraft Types



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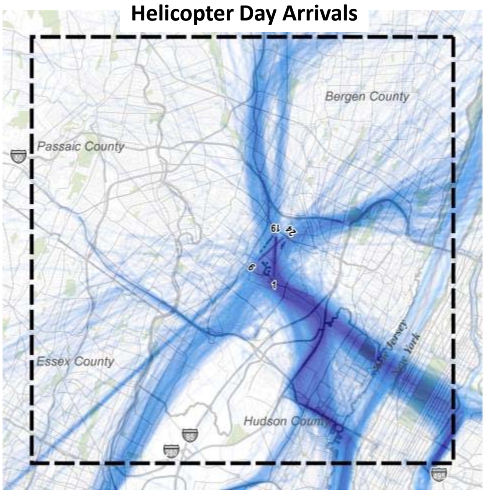
2014 Flight Track Density for Helicopter Arrivals

Helicopter Day Arrivals



< **Helicopter Day Arrivals**
(2,648 Radar Tracks)
Compared to
Helicopter Night Arrivals >
(190 Radar Tracks)

January 1 - December 31, 2014

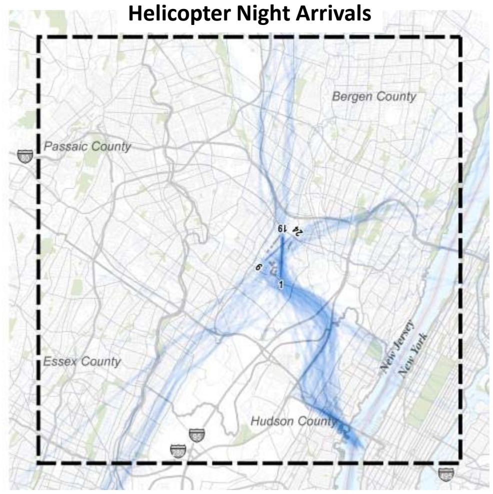
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Helicopter Night Arrivals



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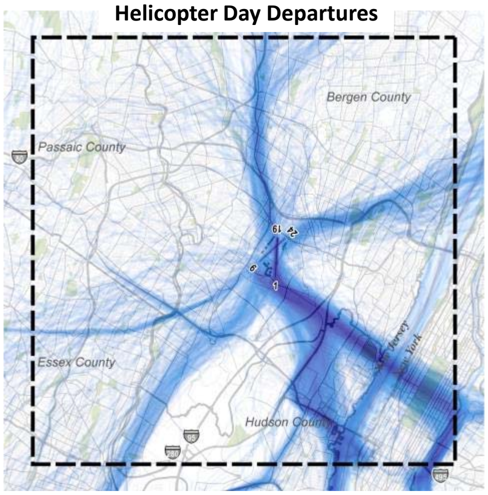
2014 Flight Track Density for Helicopter Departures

Helicopter Day Departures



< **Helicopter Day Departures**
(2,394 Radar Tracks)
Compared to
Helicopter Night Departures >
(205 Radar Tracks)

January 1 - December 31, 2014

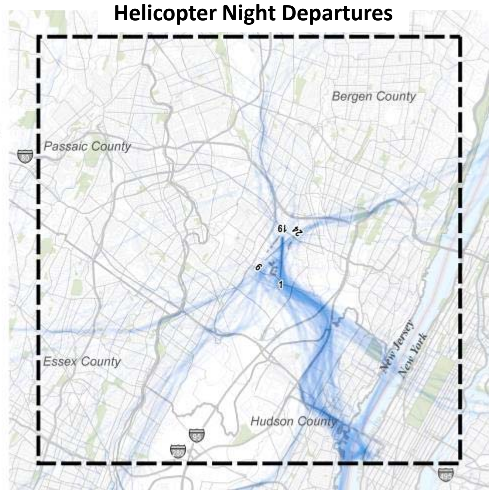
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Helicopter Night Departures



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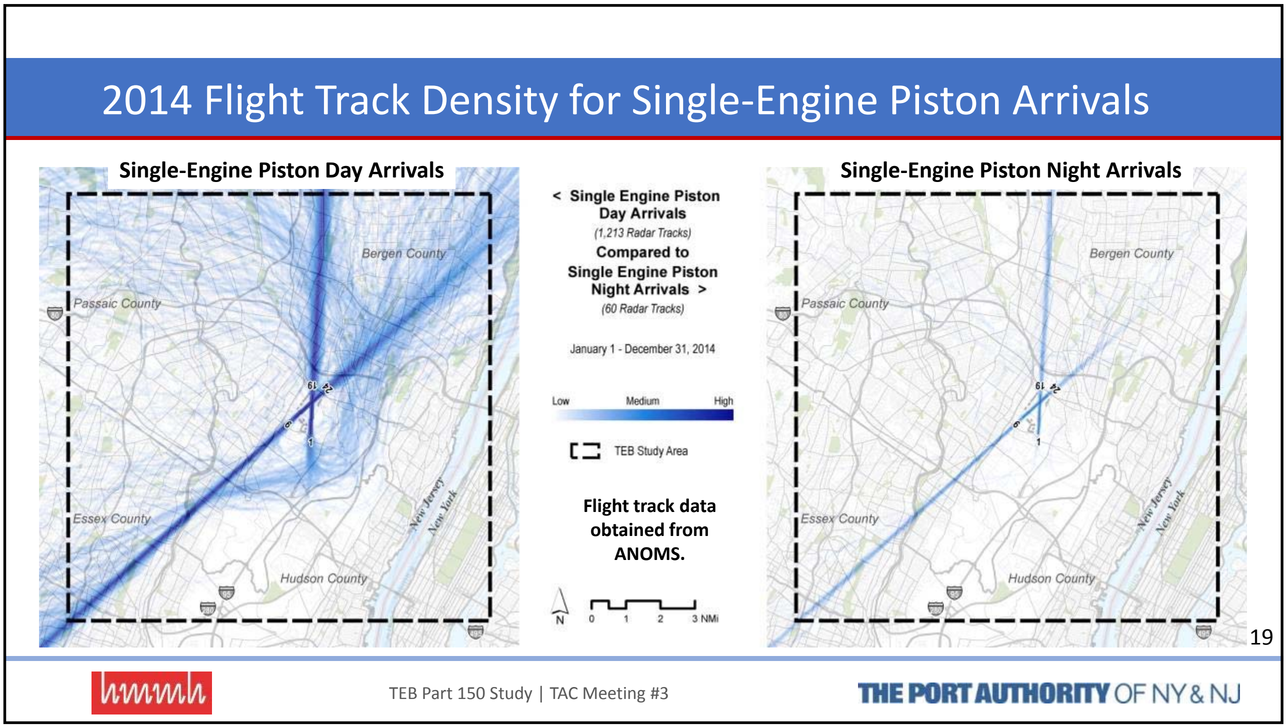
2014 Flight Track Density for Single-Engine Piston Arrivals
Single-Engine Piston Day Arrivals
Single-Engine Piston Night Arrivals
< Single Engine Piston Day Arrivals
(1,213 Radar Tracks)
Compared to
Single Engine Piston Night Arrivals >
(60 Radar Tracks)
January 1 - December 31, 2014
Low
Medium
High
TEB Study Area
Flight track data obtained from ANOMS.
N
0 1 2 3 NMi
Bergen County
Passaic County
Essex County
Hudson County
New Jersey
New York
19
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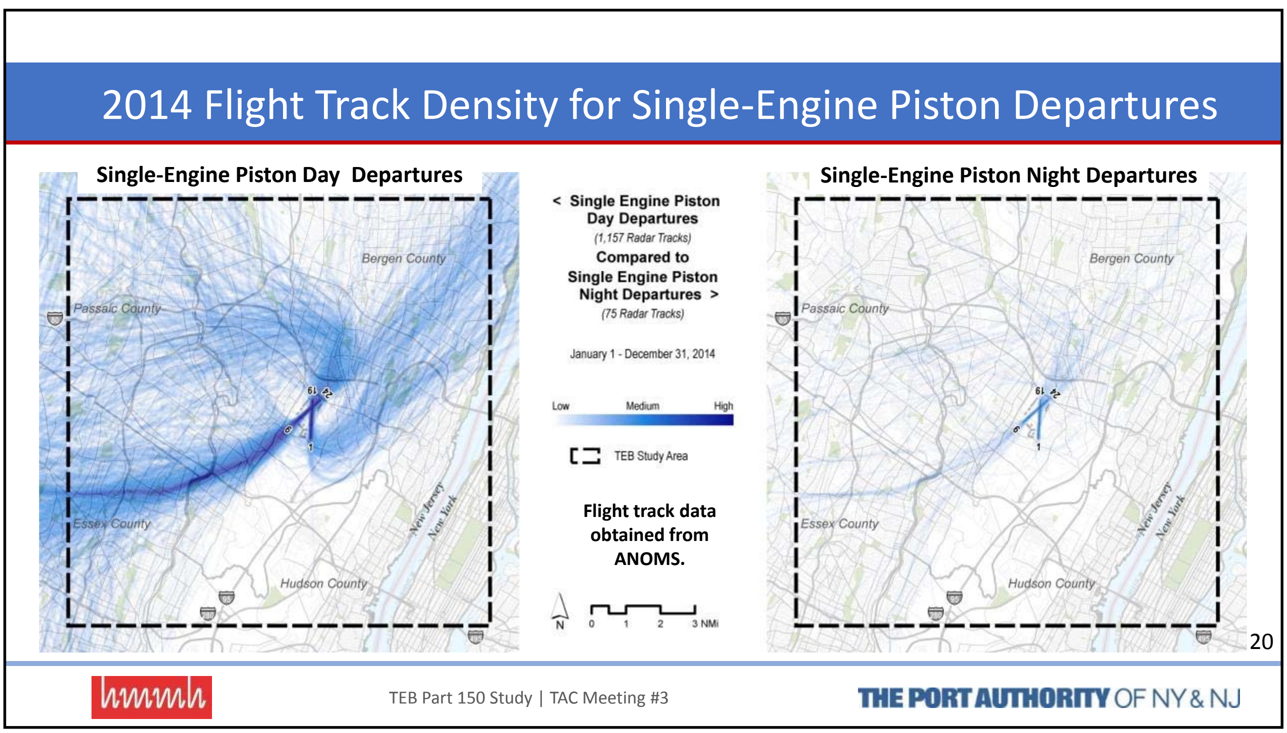
2014 Flight Track Density for Single-Engine Piston Departures
Single-Engine Piston Day Departures
Single-Engine Piston Night Departures
< Single Engine Piston Day Departures
(1,157 Radar Tracks)
Compared to
Single Engine Piston Night Departures >
(75 Radar Tracks)
January 1 - December 31, 2014
Low
Medium
High
TEB Study Area
Flight track data obtained from ANOMS.
N
0 1 2 3 NMi
Bergen County
Passaic County
Essex County
Hudson County
New Jersey
New York
20
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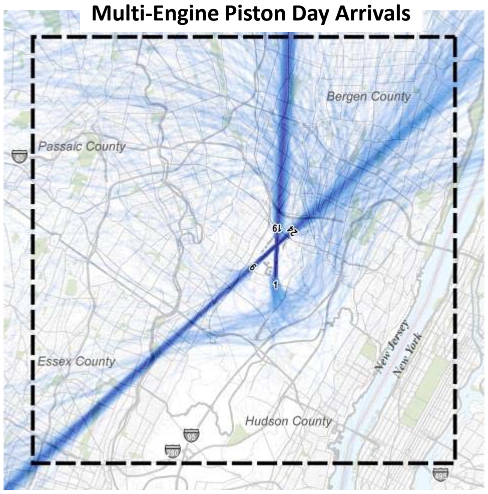
2014 Flight Track Density for Multi-Engine Piston Arrivals

Multi-Engine Piston Day Arrivals



< Multi-Engine Piston Day Arrivals
(963 Radar Tracks)
Compared to
Multi-Engine Piston Night Arrivals >
(81 Radar Tracks)

January 1 - December 31, 2014

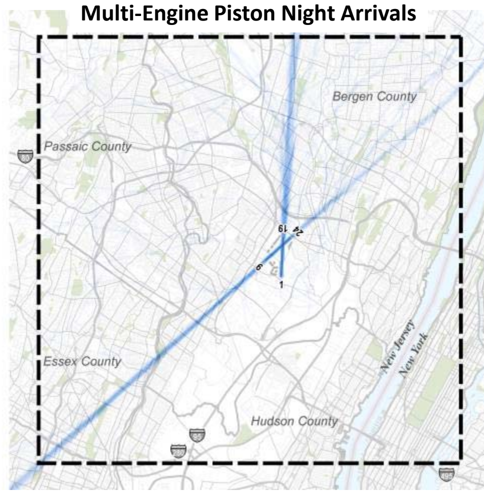
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Multi-Engine Piston Night Arrivals



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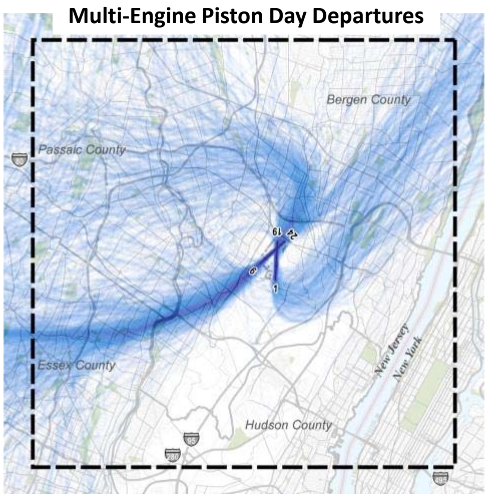
2014 Flight Track Density for Multi-Engine Piston Departures

Multi-Engine Piston Day Departures



< Multi-Engine Piston Day Departures
(915 Radar Tracks)
Compared to
Multi-Engine Piston Night Departures >
(73 Radar Tracks)

January 1 - December 31, 2014

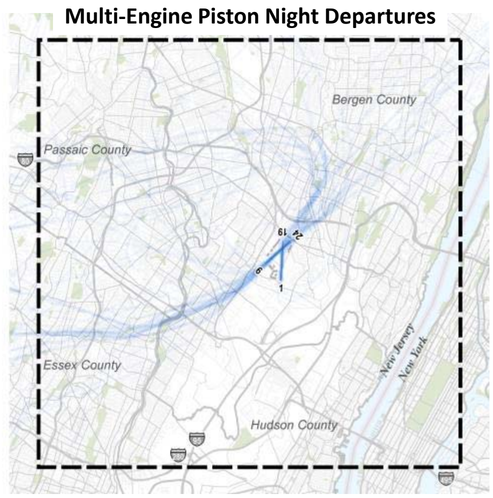
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Multi-Engine Piston Night Departures



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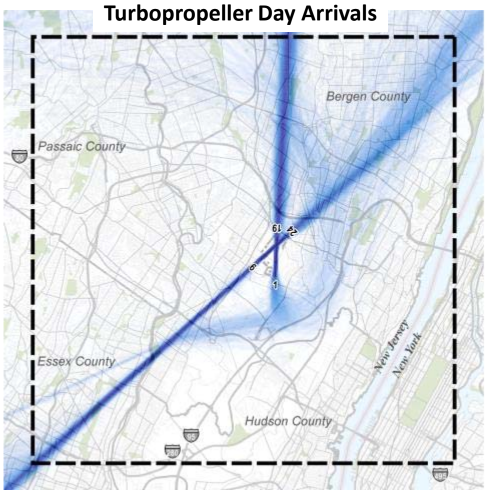
2014 Flight Track Density for Turbopropeller Arrivals

Turbopropeller Day Arrivals



< **Turboprop Day Arrivals**
(5,020 Radar Tracks)

Compared to

Turboprop Night Arrivals >
(537 Radar Tracks)

January 1 - December 31, 2014

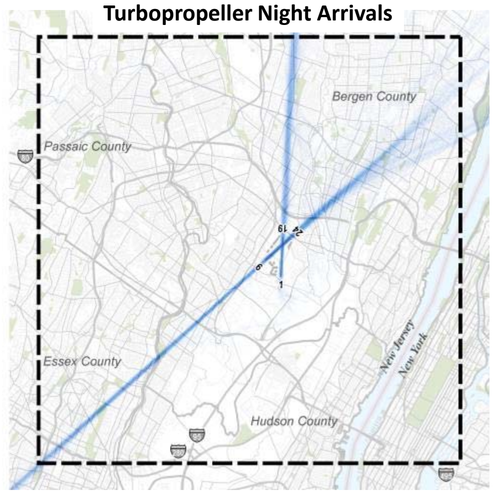
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Turbopropeller Night Arrivals



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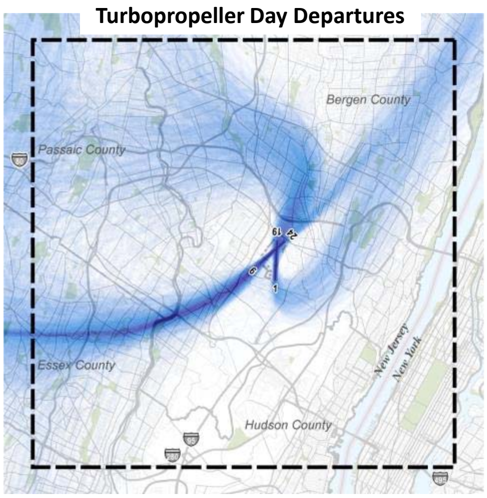
2014 Flight Track Density for Turbopropeller Departures

Turbopropeller Day Departures



< **Turboprop Day Departures**
(4,994 Radar Tracks)

Compared to

Turboprop Night Departures >
(454 Radar Tracks)

January 1 - December 31, 2014

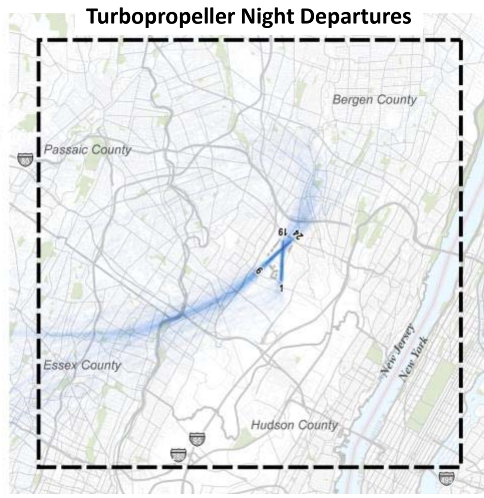
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Turbopropeller Night Departures



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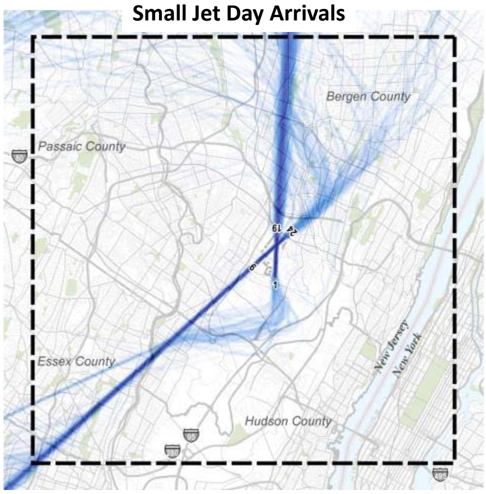
2014 Flight Track Density Small Jet Arrivals

Small Jet Day Arrivals



< Small Jet Day Arrivals
(677 Radar Tracks)
Compared to
Small Jet Night Arrivals >
(41 Radar Tracks)

January 1 - December 31, 2014

Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Small Jet Night Arrivals

25

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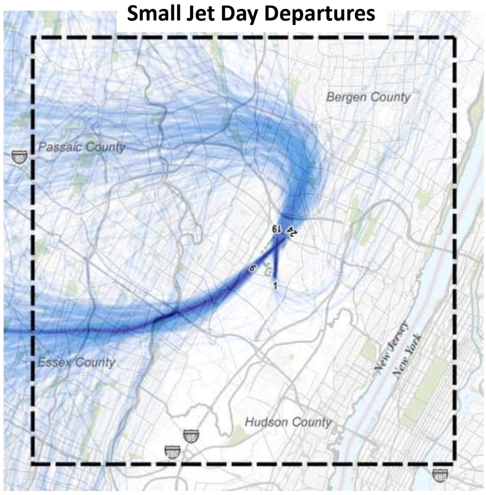
2014 Flight Track Density Small Jet Departures

Small Jet Day Departures



< Small Jet Day Departures
(691 Radar Tracks)
Compared to
Small Jet Night Departures >
(30 Radar Tracks)

January 1 - December 31, 2014

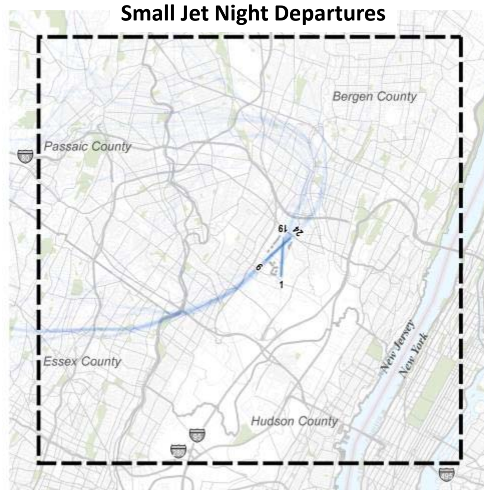
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Small Jet Night Departures



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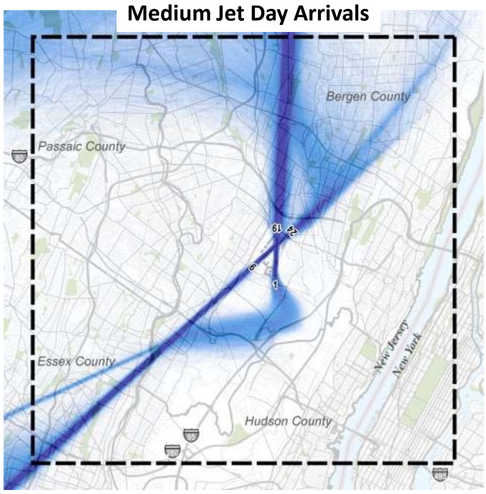
2014 Flight Track Density for Medium Jet Arrivals

Medium Jet Day Arrivals



< **Medium Jet Day Arrivals**
(38,438 Radar Tracks)
Compared to
Medium Jet Night Arrivals >
(3,849 Radar Tracks)

January 1 - December 31, 2014

Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Medium Jet Night Arrivals

27

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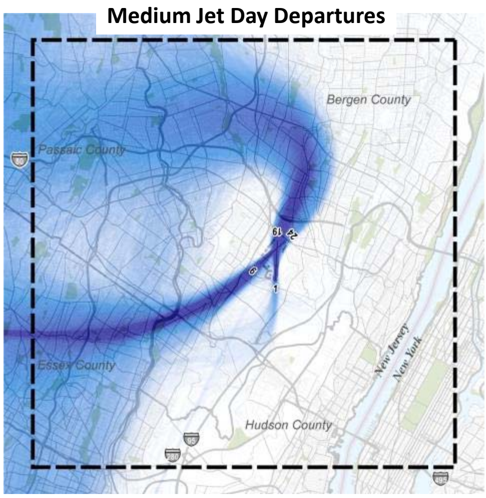
2014 Flight Track Density for Medium Jet Departures

Medium Jet Day Departures



< **Medium Jet Day Departures**
(39,129 Radar Tracks)
Compared to
Medium Jet Night Departures >
(3,113 Radar Tracks)

January 1 - December 31, 2014

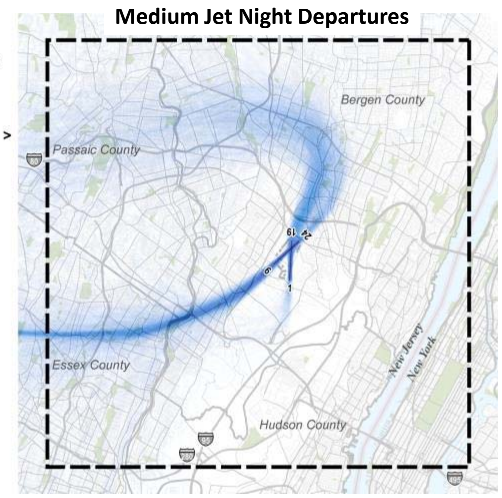
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Medium Jet Night Departures



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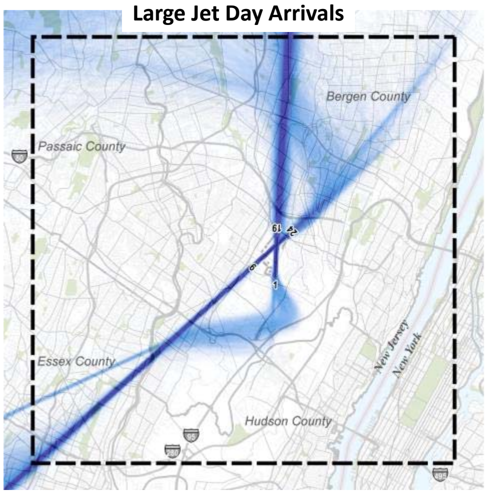
2014 Flight Track Density for Large Jet Arrivals

Large Jet Day Arrivals



< **Large Jet Day Arrivals**
(19,430 Radar Tracks)
Compared to
Large Jet Night Arrivals >
(2,725 Radar Tracks)

January 1 - December 31, 2014

Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Large Jet Night Arrivals

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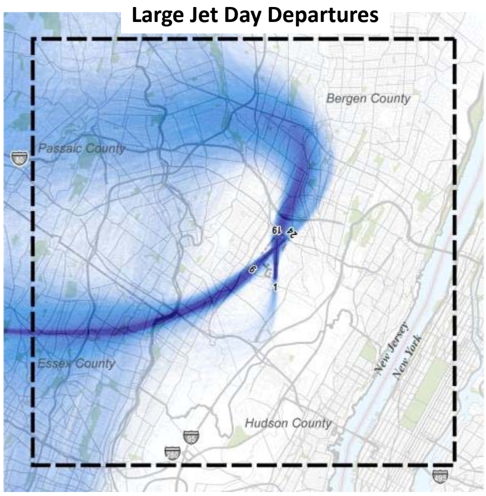
2014 Flight Track Density for Large Jet Departures

Large Jet Day Departures



< **Large Jet Day Departures**
(20,159 Radar Tracks)
Compared to
Large Jet Night Departures >
(1,930 Radar Tracks)

January 1 - December 31, 2014

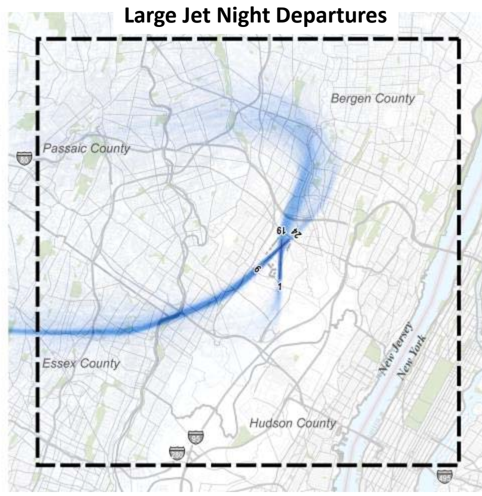
Low Medium High

TEB Study Area

Flight track data obtained from ANOMS.

N 0 1 2 3 NMi

Large Jet Night Departures



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Overview of Forecasting Process

- The FAA approves all aviation forecasts for use in any planning study.
  - FAA's 2014 Terminal Area Forecast (TAF), published 1/15, is the primary reference
  - Excellent agreement between TAF forecast and Port Authority counts for 2014
  - 2016 is the forecast year for the existing condition Noise Exposure Map
  - 2021 is the forecast year for the five-year forecast condition Noise Exposure Map

Year	Status	2014 FAA TAF	TEB ANOMS Count	TEB Compuland Count
2014	Historic	165,670	164,557 (actual)	161,483 (actual)
2016	Forecast	167,952	n.a.	n.a.
2021	Forecast	170,396	n.a.	n.a.

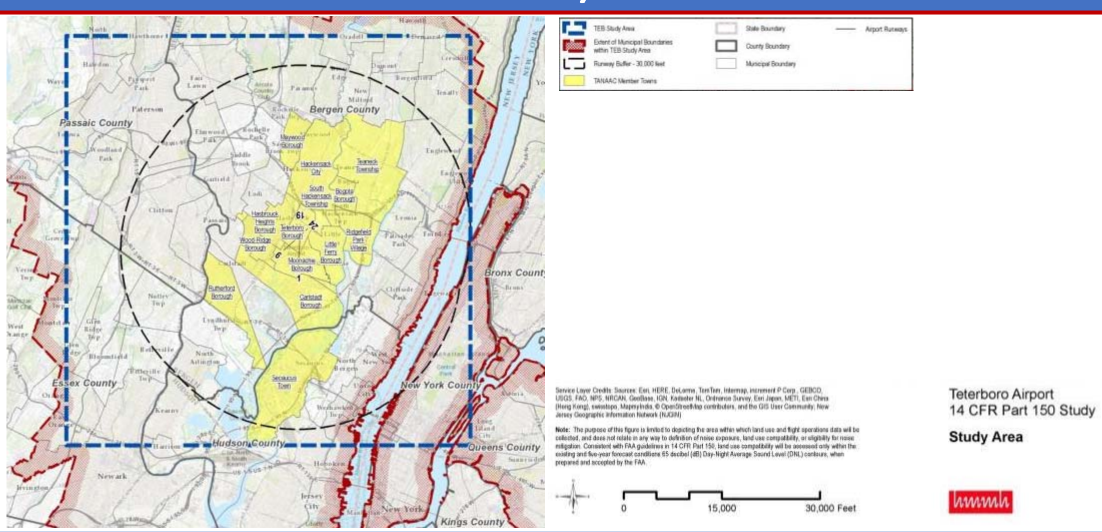
Major Steps in Forecast Process

- Compare and rectify ANOMS and Compuland data
- Generate final 2014 fleet mix for 165,670 operations from TAF
- Use Port Authority's "Airport System Capacity Planning Study" and industry resources to project 2016 and 2021 fleet mixes
- Compare 2016 and 2021 fleet mix forecasts by aircraft type to TEB 2032 fleet mix projection (May 2015 Draft)
- Coordinate all assumptions in advance with PANYNJ and FAA, then TAC

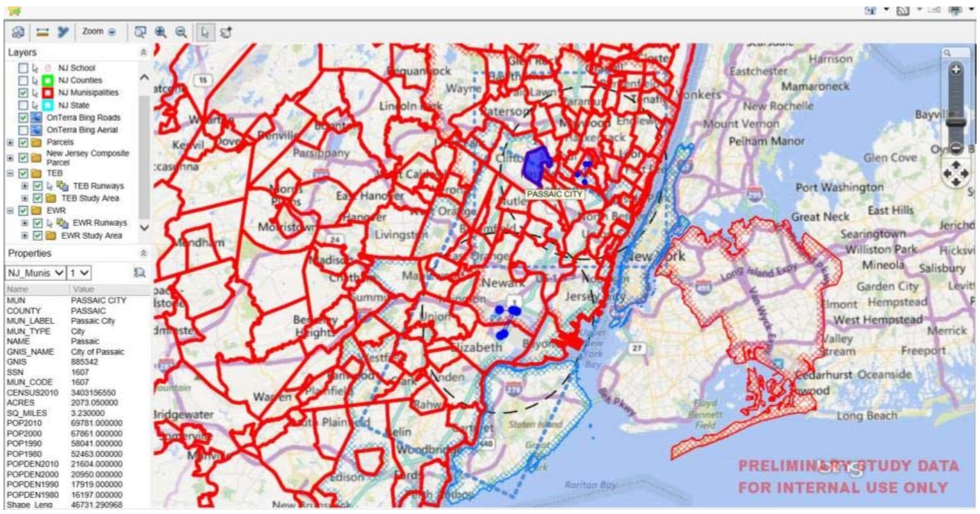
Land Use Data Collection / Jurisdiction Consultation

- Primary data collection steps include:
  - Assemble and review land use, zoning, and population data
  - Identify any local land use policies that address airport operations
  - Create existing land use maps
  - Conduct land use reconnaissance surveys
  - Assess any deficiencies of land use data and corrective approaches
  - Establish on-line web portal mapping and analysis tools for internal team use
- Primary jurisdiction consultation steps include:
  - Initial outreach for data collection purposes (completed)
  - Conduct interviews with land use planners and municipal officials
  - Identify and discuss existing land use policies and strategies
- TEB study area identifies outer boundary (next page)
- Conduct steps concurrent with EWR-related efforts where relevant

TEB 14 CFR Part 150 Study Area



TEB Part 150 Mapping Tools (for internal team use)



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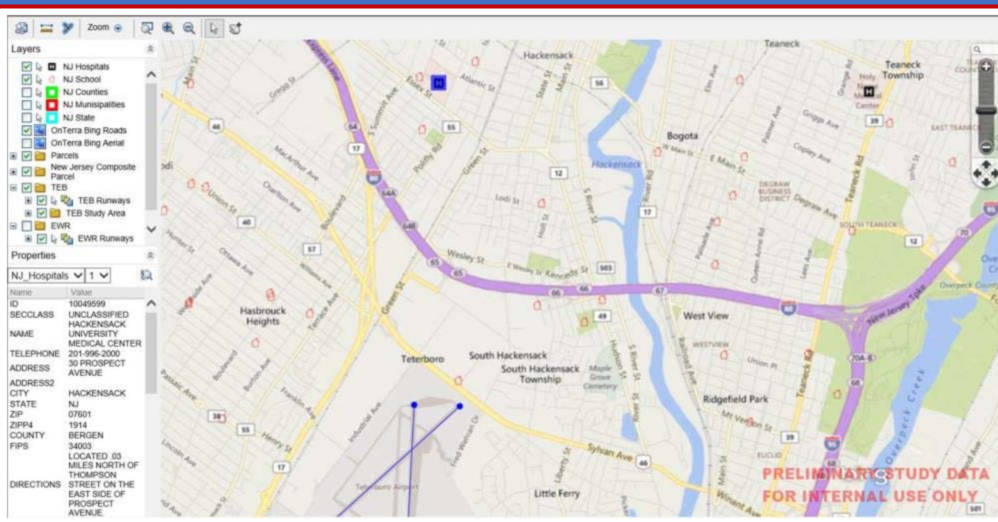
TEB Part 150 Mapping Tools (for internal team use)



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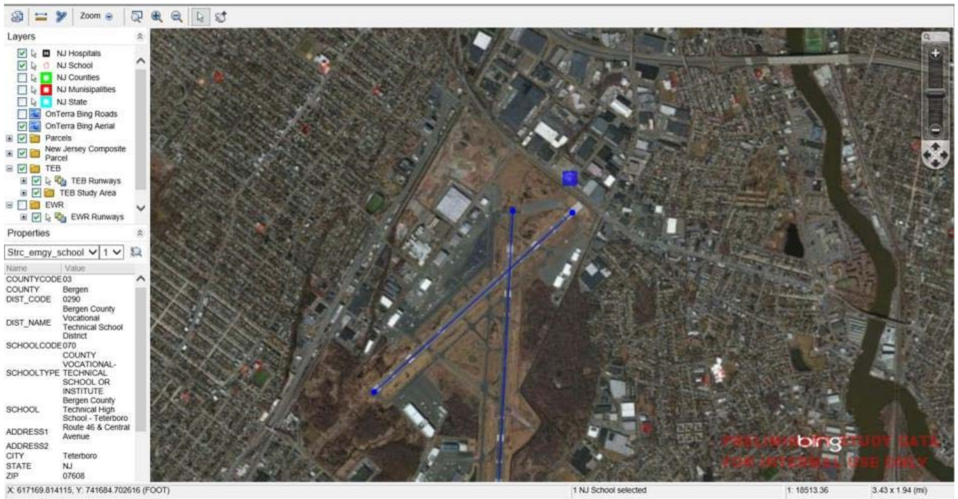
TEB Part 150 Mapping Tools (for internal team use)



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Generalized Part 150 Study Process / Schedule

Develop Study Protocol
- Finalize methodology
- Establish TAC
- Develop project schedule and milestones

Verification
- Existing Noise Exposure Maps & EA's
- Noise complaint data
- GIS and land use data
- Flight track and noise data from ANOMS
- FAA activity forecasts

Develop NEMs
- Develop noise contours for existing and 5-year forecast conditions
- Collect land use data and policies
- Noise impact evaluation for DNL 65-75 dB
- Prepare maps in accordance with 14 CFR Part 150

Develop NCPs
- Identify land use strategies
- Evaluate noise abatement measures
- Develop Noise Compatibility Plan
- Prepare documentation

Meetings
- Technical Advisory Committee
- Part 150 Information Sessions
- Public Meetings/Hearings
- Special Presentations

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Projected TAC & Public Meeting Topics, 2015-6

Anticipated Date	Meeting	Anticipated Topics
July 30, 2015	TAC 1 - ***Completed***	Introduction to Part 150, TAC process, etc.
September 25, 2015	TAC 2 - ***Completed***	Overview of noise modeling process and inputs
October 15, 2015	Workshop 1 - ***Completed***	Introduction to Part 150 and TEB study process
November 2015	TAC 3 - ***Today***	Presentation and discussion of forecasts
January 2016	TAC 4 - 1/29/2016	Present *draft* noise contours / discuss noise issues
March 2016	TAC 5 - 3/30/16 (tentative)	Present land use analyses / discuss compatibility
May 2016	TAC 6 - 5/24/16 (tentative)	Present Draft NEM
July 2016	Workshop 2	Present Draft NEM
July 2016	TAC 7	Present first-round abatement alt. analysis
September 2016	TAC 8	Present second-round abatement alt. analysis
November 2016	TAC 9	Present third-round abatement alt. analysis

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Projected TAC & Public Meeting Topics, 2017

Anticipated Date	Meeting	Anticipated Topics
January 2017	TAC 10	Present first-round compatible land use alternatives
March 2017	TAC 11	Present second-round compatible land use alternatives
May 2017	TAC 12	Recommend abatement and compatibility measures
June 2017	Workshop 3	Present draft NCP recommendations
June 2017	TAC 13	Discuss NCP monitoring and implementation
July 2017	TAC 14	Review NCP recommendations
September 2017	TAC 15	Discuss Draft NCP and public input
September 2017	Final Public Hearing on NCP	Present proposed NCP and revised NEMs

Three TAC meetings are held in reserve for unanticipated needs

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Response to inquiry at Sept. 25, 2015 meeting

Roughly how many Part 150s are currently underway?

- 33 studies are underway.
- Based on FAA grants awarded to airports in FY 2010-2015 to "conduct noise compatibility plan," and other information.

Airports Awarded NCP Grants FY2010-2015			
Akron-Canton Regional (OH)	CAK	LaGuardia (NY)	LGA
Alexandria International (LA)	AEX	Laredo International (TX)	LRD
Baltimore-Washington Int'l (MD)	BWI	Laughlin/Bullhead International (NV)	IFP
Bob Hope (CA)	BUR	Lehigh Valley International (PA)	ABE
Boise Air Terminal/Gowen Field (ID)	BOI	Melbourne International (FL)	MLB
Burlington International (VT)	BTV	Newark Liberty International (NJ)	EWR
Centennial (CO)	APA	Ontario International (CA)	ONT
Chicago/Rockford International (IL)	RFD	Philadelphia International (PA)	PHL
Eastern WV Reg./Shepherd Fld. (WV)	MRB	Phoenix Sky Harbor International (AZ)	PHX
Fresno Yosemite International (CA)	FAT	Portsmouth Int'l at Pease (NH)	PSM
Great Falls International (MT)	GTF	Seattle-Tacoma International (WA)	SEA
Harrisburg International (PA)	MDT	Shreveport Regional (LA)	SHV
Indianapolis International (IN)	IND	Ted Stevens Anchorage Int'l (AK)	ANC
Hawthorne Municipal (CA)	HHR	Teterboro (NJ)	TEB
Jackson Hole (WY)	JAC	Tweed-New Haven (CT)	HVN
John F Kennedy International (NY)	JFK	Westover ARB/Metropolitan (MA)	CEF
Key West International (FL)	EYW		

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Wrap-Up

- Next meeting dates and topics
  - 4th TAC meeting - Friday, January 29, 2016, 9 am to noon
    - Primary topic - Forecasts and draft noise contours
  - 5th TAC meeting - Wednesday, March 30, 2016, 1 to 4 pm
    - Primary topic - Land use analysis
  - 6th TAC - Tentatively Tuesday, May 24, 2016, 1 to 4 pm
    - Primary topic - Present draft Noise Exposure Map
- Accommodating "snow dates"
- TAC member questions, comments, and discussion?
- Public comments?

Thanks for attending!

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Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Study

Technical Advisory Committee Meeting #4

January 29, 2016

Meeting Agenda

- Welcome and introductions
- Final Study Protocol overview
- Part 150 process – review status
- Progress in development of noise modeling inputs
- Information requested at and further feedback on TAC #3
- Schedule topics of upcoming meetings
- TAC discussion
- Public comment opportunity
- Adjournment

Final Study Protocol Overview

- Study protocols have been developed for all four PANYNJ Part 150 studies
  - The Part 150 project teams, Port Authority, and FAA collaborated in developing protocols that address specific airport needs, with consistency across airports as appropriate
- TEB and EWR protocol is posted at http://panynjpart150.com/TEB_SP.asp
- Purposes include defining:
  - Roles and responsibilities of all direct participants, stakeholders, and interested parties
  - Technical aspects (data management, forecasting, noise modeling, land use matters, and identification and evaluation of noise compatibility program alternatives, etc.)
  - Communication strategies, mechanisms, timing, etc.
  - Procedural matters (schedules, deliverables, review processes, etc.)
- *At the 3rd TAC we requested members review the protocol and bring any questions or feedback to this meeting*

Generalized Part 150 Study Process / Schedule

Develop Study Protocol
- Finalize methodology
- Establish TAC
- Develop project schedule and milestones

Primary focus of current efforts

Verification
- Existing Noise Exposure Maps & EA's
- Noise complaint data
- GIS and land use data
- Flight track and noise data from ANOMS
- FAA activity forecasts

Develop NEMs
- Develop noise contours for existing and 5-year forecast conditions
- Collect land use data and policies
- Noise impact evaluation for DNL 65-75 dB
- Prepare maps in accordance with 14 CFR Part 150

Develop NCPs
- Identify land use strategies
- Evaluate noise abatement measures
- Develop Noise Compatibility Plan
- Prepare documentation

Meetings
- Technical Advisory Committee
- Part 150 Information Sessions
- Public Meetings/Hearings
- Special Presentations

Progress in development of modeling inputs

- Presented at previous meeting: Runway and helipad use.
- Today
  - 2016 and 2021 forecast summary (FAA will review detailed forecast and supporting documentation ***Reminder: FAA approves forecast.***)
  - Modeling flight track development process and draft tracks
  - User-defined flight profile development process (Anticipate submitting to FAA in February. ***FAA also approves.***)
  - Airport layout, maintenance runup locations, and meteorological and terrain data
- Next meeting: Present final detailed modeling assumptions
  - Anticipate providing detailed technical memorandum in advance of meeting

Overview of Forecast Process

- PANYNJ is preparing forecasts for each of the four Part 150 studies
- For TEB, primary data sources include:
  - FAA 2014 Terminal Area Forecast (TAF)
  - FAA FY 2015-2035 Aerospace Forecast
  - PANYNJ data
  - TEB ANOMS
  - General Aviation Manufacturers Association
- The PANYNJ forecast provides operations by:
  - Aircraft type
  - Day and Night
  - Arrival and departure
- PANYNJ forecast includes some "unallocated" operations in the jet, turboprop, piston prop, and helicopter categories (196 total annual)
  - RS&H is augmenting the forecast to allocate these operations to specific aircraft types:
    - For jets: Gulfstream 280
    - For piston props: Cirrus SR22 single
    - For turboprops: King Air 300
    - For helicopters: Sikorsky S76

Overview of Forecast Review and Approval

- The TEB study team will assemble full documentation for PANYNJ review, approval, and submission to FAA
- TAC members will be provided copies for review and comment
- ***FAA retains authority for final review and approval of forecasts***
- Full documentation will be provided in the draft Noise Exposure Map
  - Will include FAA comments, PANYNJ responses/adjustments, and FAA approval
  - Will provide all interested parties with the opportunity to review and comment
  - Comments will be addressed as PANYNJ and FAA deem appropriate

Following pages present high-level summary information

PANYNJ Forecast Growth Rates for TEB

- The PANYNJ forecast uses the annual growth rates shown in the first two columns of the following table
- For comparison purposes, the remaining columns display the growth rates from the FAA's 2014 Terminal Area Forecast (TAF) for TEB and the FAA's nationwide 2015 FAA Aerospace Forecasts

Comparison of Growth Rates

Time Period	PANYNJ Adjusted Forecast for All TEB Operations	PANYNJ Adjusted Forecast for TEB Jet Operations Only	2014 FAA Terminal Area Forecast (TAF) for TEB	2015 FAA Aerospace Forecasts for All U.S. G.A. Aircraft (Note)	2015 FAA Aerospace Forecasts for U.S. G.A. Jet Fleet (Note)
2014-2015	1.59%	1.67%	1.01%	-0.37%	1.39%
2014-2016	1.62%	1.70%	0.68%	-0.34%	1.49%
2014-2021	1.73%	1.82%	0.45%	-0.24%	1.92%

Note: FAA Aerospace Forecast excludes experimental, sport and other aircraft

PANYNJ TEB Forecast Commentary

- Business jets are forecast to account for nearly 89% of TEB operations growth
- Helicopters are forecast to represent most other growth
- Turboprop operations are forecast to remain relatively flat
- Piston operations are forecast to decline

2016 - 2021 PANYNJ Forecast for TEB
Draft Subject to FAA Review and Approval Prior to Use in Part 150

Category	2016		2021		2016-2021 Change	
	Operations	% of Ops	Operations	% of Ops	Operations	% of Ops
Jet	142,844	83.5%	157,005	83.9%	14,161	88.9%
Turboprop	13,072	7.6%	13,521	7.2%	449	2.8%
Helicopter	8,992	5.3%	10,522	5.6%	1,530	9.6%
Piston	6,204	3.6%	5,988	3.2%	(216)	-1.4%
Total	171,112	100%	187,036	100%	15,924	100%
Day	155,736	91.01%	170,167	90.98%	14,431	90.6%
Night	15,376	8.99%	16,869	9.02%	1,493	9.4%
Total	171,112	100%	187,036	200%	31,848	100%

TEB Forecast Summary

Draft Material Subject to FAA Review and Approval

Year	Aircraft Type	Arrivals		Departures		Totals			
		Day	Night	Day	Night	Day	Night	Total	% Op'ns
2014 Baseline (Totals from FAA Terminal Area Forecast, Aircraft Type and Day / Night Breakdowns from ANOMS)	Jets	61,788	7,210	63,326	5,655	125,114	12,861	137,975	83.3%
	Turboprops	5,767	713	5,814	666	11,581	1,379	12,960	7.8%
	Piston	2,753	391	2,758	386	5,511	777	6,288	3.8%
	Helicopters	3,868	354	3,843	379	7,711	733	8,444	5.1%
	Total	74,176	8,668	75,741	7,086	149,917	15,750	165,666	100.0%
2016 Existing Condition Noise Exposure Map (PANYNJ Draft Forecast - *Subject to FAA Review and Approval*)	Jets	68,936	7,592	65,551	5,866	129,487	13,357	142,844	83.5%
	Turboprops	5,820	717	5,869	668	11,668	1,384	13,072	7.6%
	Piston	2,715	387	2,720	382	5,435	769	6,204	3.6%
	Helicopters	4,121	378	4,093	401	8,213	779	8,992	5.3%
	Total	81,592	9,074	78,233	7,317	154,803	16,289	171,112	100.0%
2021 Five-Year Forecast Noise Exposure Map (PANYNJ Draft Forecast - *Subject to FAA Review and Approval*)	Jets	70,271	8,288	72,041	6,456	142,262	14,743	157,005	83.9%
	Turboprops	6,029	732	6,083	678	12,111	1,410	13,521	7.2%
	Piston	2,619	375	2,624	371	5,242	746	5,988	3.2%
	Helicopters	4,821	443	4,790	468	9,611	911	10,522	5.6%
	Total	83,740	9,838	85,538	7,973	169,226	17,810	187,036	100.0%

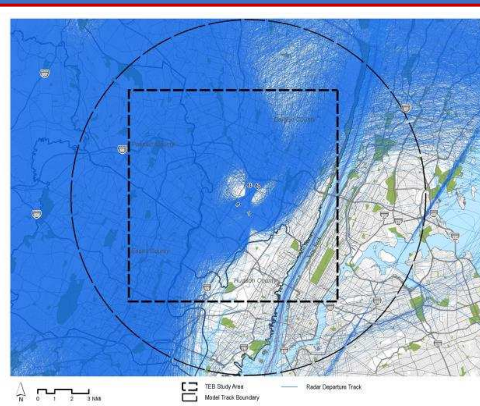
Noise Modeling Flight Track Development

- Tracks have been developed for arrivals and departures for:
  - Jets • Turboprops • Piston props • Helicopters
- "Backbone" tracks are developed for major origin/destination directions
  - "Dispersion" tracks are developed to the sides
- Next slides illustrate how we develop modeling tracks
  - Example is for jet departures from Runway 24 to the south
- Subsequent slides present overall arrival and departure flight track figures for each aircraft group
  - Consulting team will review with FAA representatives
  - Other TAC member review and feedback is encouraged

Departure Track Example

Deliberative Draft Material for Discussion

- Plot of all 2014 departures from all runways

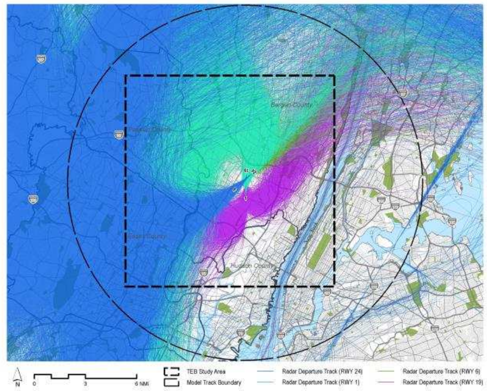


Flight track data obtained from ANOMS.

Departure Track Example

Deliberative Draft Material for Discussion

- Plot of all 2014 departures separated by runway end



Flight track data obtained from ANOMS.

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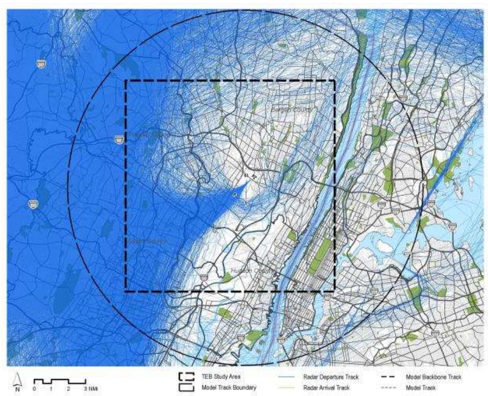
Departure Track Example

Deliberative Draft Material for Discussion

- All 2014 Runway 24 departures



Flight track data obtained from ANOMS.

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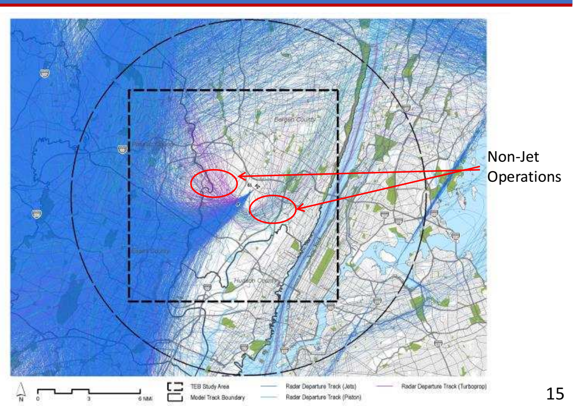
Departure Track Example

Deliberative Draft Material for Discussion

- All 2014 Runway 24 departures by type group
  - Jets in blue
  - Pistons in green
  - Turboprops in purple



Flight track data obtained from ANOMS.

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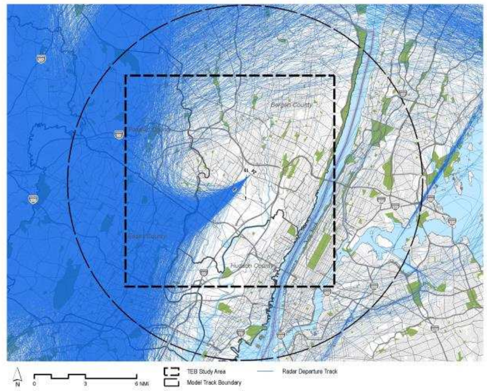
Departure Track Example

Deliberative Draft Material for Discussion

- 2014 Runway 24 jet departures only



Flight track data obtained from ANOMS.

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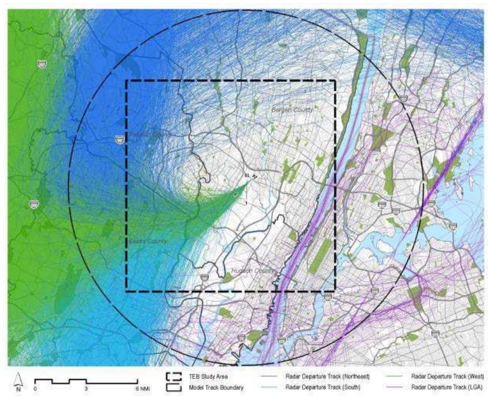
Departure Track Example

Deliberative Draft Material for Discussion

- 2014 Runway 24 jet departures by destination direction
  - Northeast in dark blue
  - South in light blue
  - West in green
  - Other metropolitan area airports in purple (in 2014 there were 100 departures and 135 arrivals - all jets - in this category)



Flight track data obtained from ANOMS.

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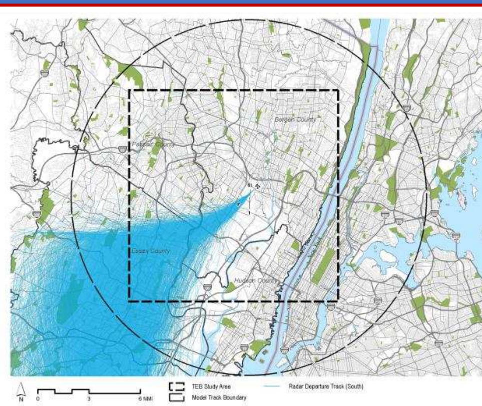
Departure Track Example

Deliberative Draft Material for Discussion

- 2014 Runway 24 jet departures to the south



Flight track data obtained from ANOMS.

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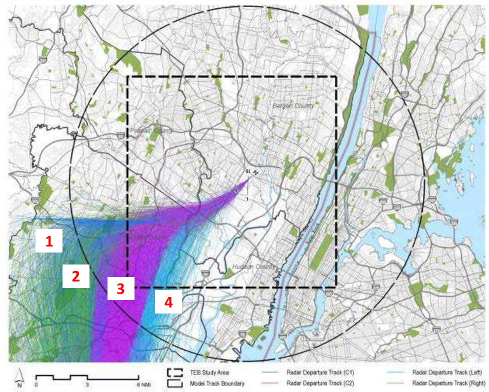
Departure Track Example

Deliberative Draft Material for Discussion

- 2014 Runway 24 jet departures to the south separated into four groups with similar track geometry
  - Nominally named "1" - "4"
  - The number of groups required for modeling purposes will vary by runway end, aircraft type, track direction, etc.

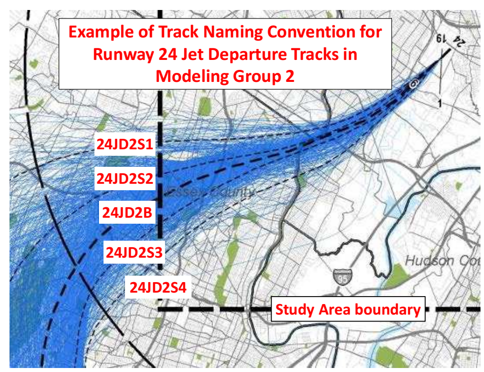


Flight track data obtained from ANOMS.

Departure Track Example

Deliberative Draft Material for Discussion

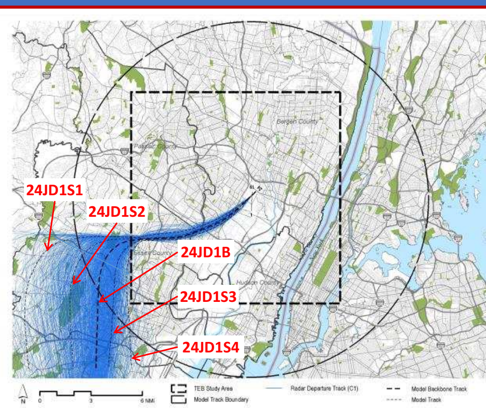
- For each group, five modeling tracks (+/-) are developed
  - A center (or "backbone") track
  - Up to two "dispersion" sub tracks on each side of the backbone
- Example here is for group "2"
- A consistent naming protocol will be used including:
  - Runway #, aircraft group (J, T, P, H) operation type (A or D), group (e.g., 1-4), and backbone (B) or subtrack (e.g., S1-S4)



Departure Track Example

Deliberative Draft Material for Discussion

- Runway 24 jet departures to the south in the "1" group and five associated modeling tracks

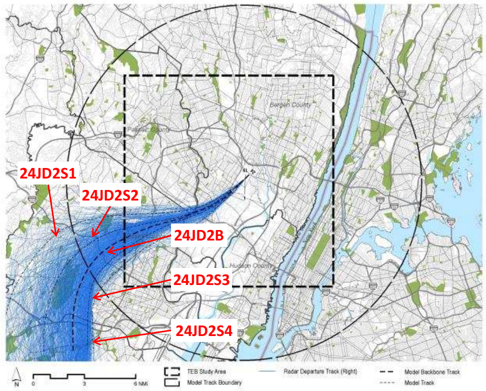


Flight track data obtained from ANOMS.

Departure Track Example

Deliberative Draft Material for Discussion

- Runway 24 jet departures to the south in the “2” group and five associated modeling tracks

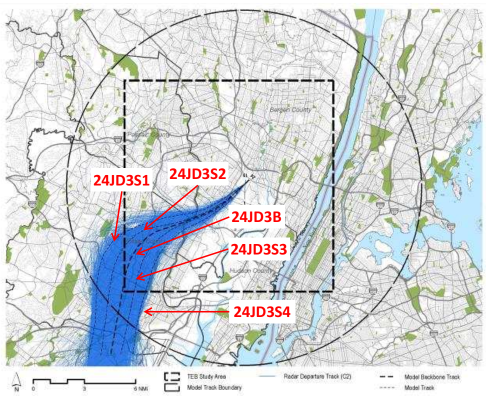


Flight track data obtained from ANOMS.

Departure Track Example

Deliberative Draft Material for Discussion

- Runway 24 jet departures to the south in the “3” group and five associated modeling tracks

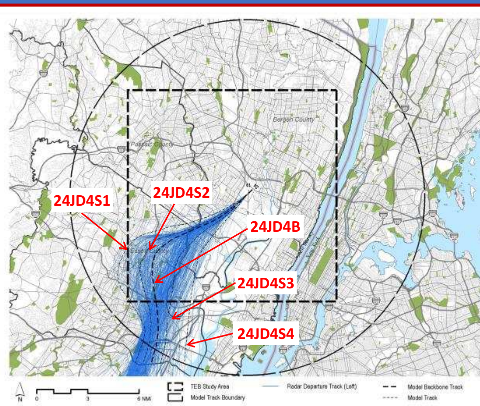


Flight track data obtained from ANOMS.

Departure Track Example

Deliberative Draft Material for Discussion

- Runway 24 jet departures to the south in the “4” group and five associated modeling tracks



Flight track data obtained from ANOMS.

Track Development Summary

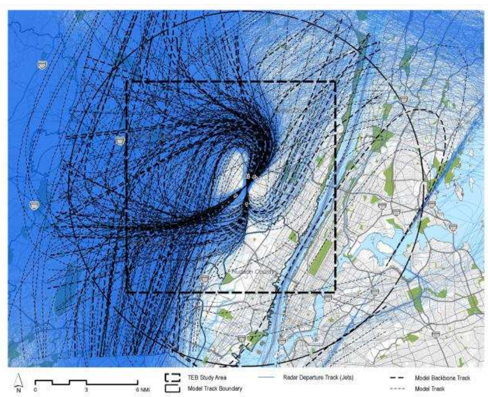
- Process is repeated for arrivals and departures for each runway, aircraft type, direction, and track group
- 1,225 tracks have been developed
  - 257 backbone
  - 968 subtracks
- Background material for next TAC will include:
  - Graphics with each track labeled
  - Table presenting utilization of each track, by runway, aircraft type, etc.

Runway	Arrival Tracks		Departure Tracks	
	Back-bone	Sub-tracks	Back-bone	Sub-tracks
1	11	44	37	142
6	27	100	22	70
16	25	100	20	80
24	33	122	40	158
N_H	4	12	3	8
E_H	4	10	1	4
S_H	13	52	11	44
W_H	4	14	2	8
Total	**121**	**454**	**136**	**514**

All Jet Departure Tracks

Deliberative Draft Material for Discussion

- All Jet departure tracks from all runways
- Radar tracks (64,154)
- INM modeling tracks
  - Backbone tracks (55)
  - Sub-tracks (204)
  - Total model tracks (259)

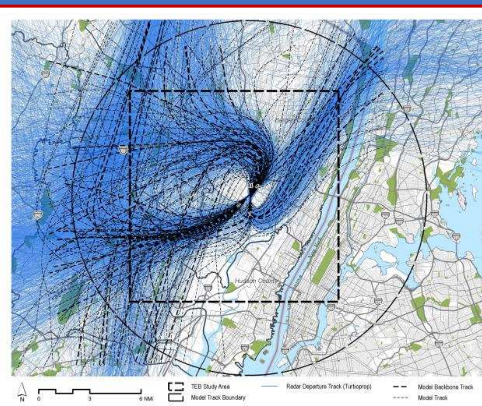


Flight track data obtained from ANOMS.

All Turboprop Departure Tracks

Deliberative Draft Material for Discussion

- All Turboprop departure tracks from all runways
- Radar tracks (5,094)
- INM modeling tracks
  - Backbone tracks (34)
  - Sub-tracks (134)
  - Total model tracks (168)

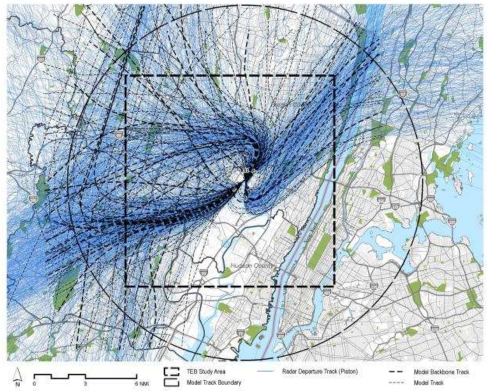


Flight track data obtained from ANOMS.

All Piston Departure Tracks

Deliberative Draft Material for Discussion

- All Piston departure tracks from all runways
- Radar tracks (2,095)
- INM modeling tracks
  - Backbone tracks (30)
  - Sub-tracks (112)
  - Total model tracks (142)



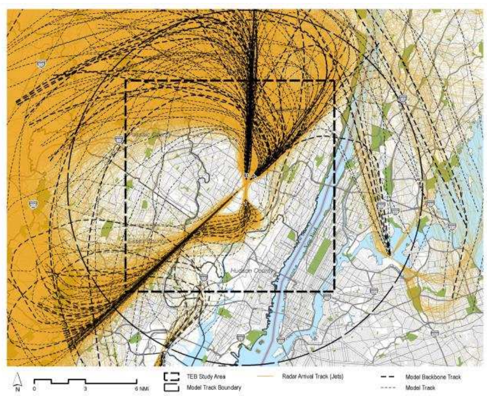
Flight track data obtained from ANOMS.

28

All Jet Arrival Tracks

Deliberative Draft Material for Discussion

- All Jet arrival tracks to all runways
- Radar tracks (63,199)
- INM model tracks
  - Backbone tracks (45)
  - Sub-tracks (170)
  - Total model tracks (215)



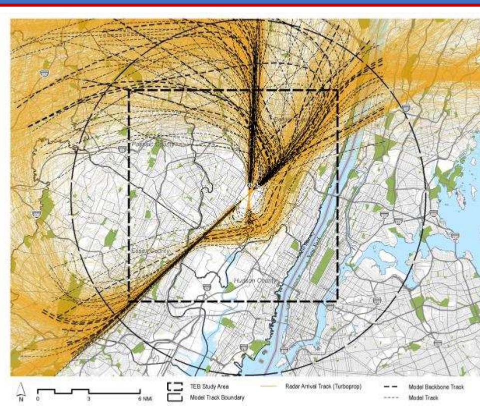
Flight track data obtained from ANOMS.

29

All Turboprop Arrival Tracks

Deliberative Draft Material for Discussion

- All Turboprop arrival tracks to all runways
- Radar tracks (5,148)
- INM model tracks
  - Backbone tracks (26)
  - Sub-tracks (102)
  - Total model tracks (128)



Flight track data obtained from ANOMS.

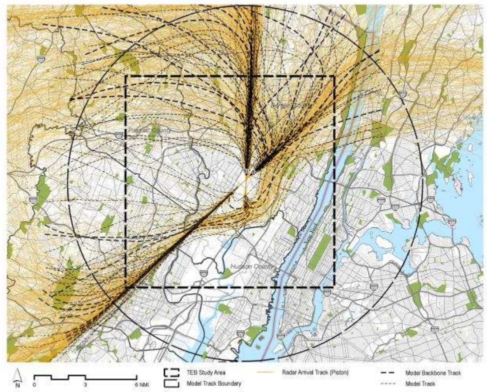
30

All Piston Arrival Tracks

Deliberative Draft Material for Discussion

- All Piston arrival tracks to all runways
- Radar tracks (1,992)
- INM model tracks
  - Backbone tracks (25)
  - Sub-tracks (94)
  - Total model tracks (119)

Flight track data obtained from ANOMS.



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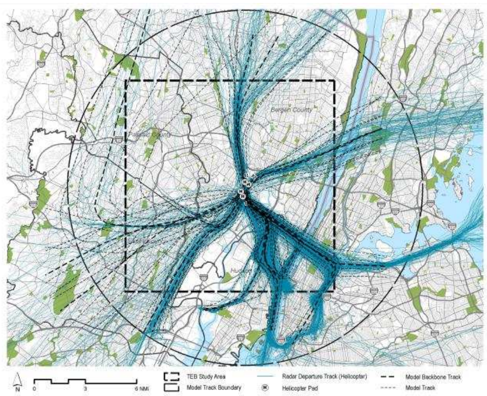
All Helicopter Departure Tracks

Deliberative Draft Material for Discussion

- All Helicopter departure tracks from all pads
- Radar tracks (2,153)
- INM modeling tracks
  - Backbone tracks (17)
  - Sub-tracks (64)
  - Total model tracks (81)

Flight track data obtained from ANOMS.



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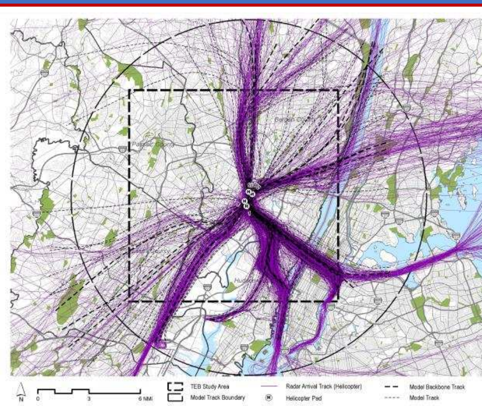
All Helicopter Arrival Tracks

Deliberative Draft Material for Discussion

- All Helicopter arrival tracks to all pads
- Radar tracks (2,422)
- INM modeling tracks
  - Backbone tracks (25)
  - Sub-tracks (88)
  - Total model tracks (113)

Flight track data obtained from ANOMS.



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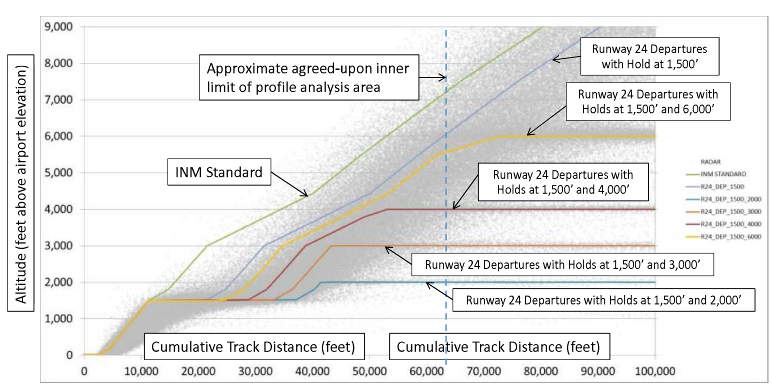
User-Defined Profile Development

- User-defined profiles are required to model climb and descent profiles that differ significantly from standard INM profiles
- User-defined profiles will be developed to model level-flight segments
- Profiles will extend at least 6,000’ beyond study area (approximately 64,000’ from the runway ends at TEB)
- Separate profiles must be developed for each aircraft type
- ***Similar to forecasts, FAA must approve all user-defined profiles***

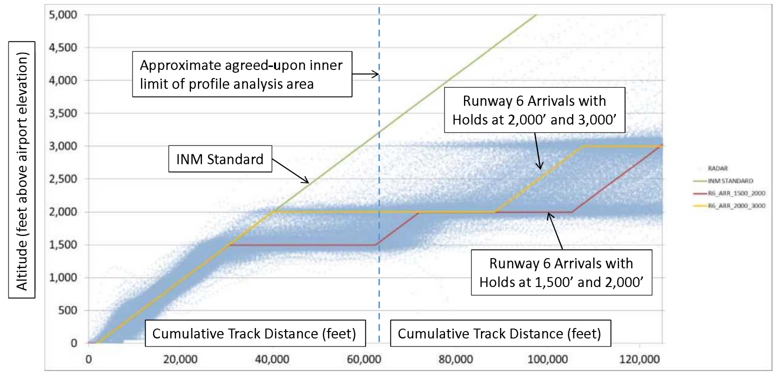
User-Defined Profile Development

- Project Team will prepare proposed user-define profiles and supporting documentation for PANYNJ to submit to FAA for approval
  - Documentation will follow the INM User’s Guide Appendix B “FAA Profile Review Checklist”
- Full documentation will be provided in the draft Noise Exposure Map
  - Will include FAA comments, PANYNJ responses/adjustments, and FAA approval
  - Will provide all interested parties with the opportunity to review and comment
  - Comments will be addressed as PANYNJ and FAA deem appropriate
- The following pages present simple examples of user-defined climb and descent profiles for the Lear 35 INM aircraft type, compared to INM standard profiles and actual ANOMS profiles

User-Defined Lear 35 Climb Profile Examples



User-Defined Lear 35 Descent Profile Examples



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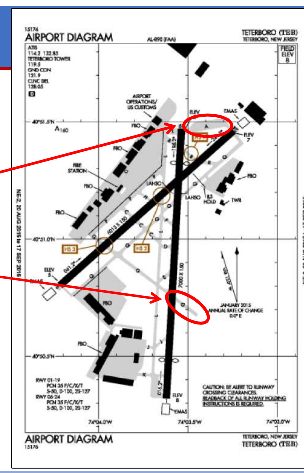
Airport Layout and Runups

- Layout data sources:
  - FAA airport diagram (pictured)
  - PANYNJ drawing files
  - TEB Airport Layout Plan (ALP)
- Runup inputs
  - Primary location - Alpha pad
  - Secondary location - East extension of Taxiway G
  - Aircraft orientation
    - Alpha pad -190 degrees
    - Taxiway G - 010 or 190 degrees
  - Aircraft type
  - Runup time (day or night)
  - Runup duration
  - Runup power setting

Data from AvPorts and PANYNJ logs



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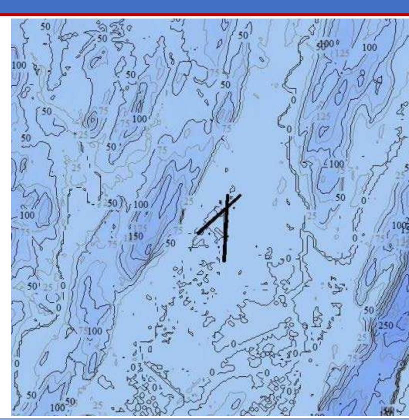
Meteorological and Terrain Data

- Annual-average-day meteorological data obtained from the National Climatic Data Center for 2014
  - Temperature: 54.6°F
  - Pressure: 30.02 inches mercury (Hg)
  - Relative humidity: 59.4%
- Terrain data obtained from United States Geological Survey National Elevation Dataset
  - Data are for a 33-foot grid spacing



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Follow-Up to Last TAC

- Further feedback received from Gabriel Andino, Manager - AvPorts Noise Abatement & Environmental Compliance
  - Runway usage and track density plots are consistent with his observations
  - All tracks shown in density plots are consistent with TEB tracks
- Follow-up information requested at last TAC
  - Comparison of daily Compuland and ANOMS counts
  - Overall annual matching summary comparing 2014 operations counts from ANOMS and Compuland, and identifying percentage matching (overall match was approximately 93-94%)
  - Annual matching detail comparing 2014 operations counts from ANOMS and Compuland, and identifying percentage matching, split by arrival and departure, and day and night
- Spreadsheets provided to PANYNJ for distribution to any interested TAC members

Projected TAC & Public Meeting Topics, 2015-16

Date	Meeting	Major Actual / Anticipated Topics
July 30, 2015	TAC 1 - ***Complete***	Introduction to Part 150, TAC process, etc.
Sept. 25, 2015	TAC 2 - ***Complete***	Overview of noise modeling process and inputs
Oct. 15, 2015	Workshop 1 - ***Complete***	Introduction to Part 150 and TEB study process
November, 12 2015	TAC 3 - ***Complete***	Present draft runway and helipad use, flight track density plots, forecast process, and land use inventory status
January 2016	TAC 4 - ***Today***	Present draft noise modeling flight tracks, forecast summary, and overviews of user-defined flight-profile development process, maintenance run-up modeling, and meteorological and terrain data
March 2016	TAC 5 - 3/30/16	Present final modeling input assumptions
May 2016	TAC 6 - 5/24/16	Present Draft NEM, including draft contours and land use compatibility
July or August 2016	Workshop 2	Present Draft NEM, including draft contours and land use compatibility

Projected TAC & Public Meeting Topics, 2015-16

Date	Meeting	Major Actual / Anticipated Topics
July 2016	TAC 7	Present first-round abatement alt. analysis
September 2016	TAC 8	Present second-round abatement alt. analysis
November 2016	TAC 9	Present third-round abatement alt. analysis
January 2017	TAC 10	Present first-round compatible land use alternatives
March 2017	TAC 11	Present second-round compatible land use alternatives
May 2017	TAC 12	Recommend abatement and compatibility measures
June 2017	Workshop 3	Present draft NCP recommendations
June 2017	TAC 13	Discuss NCP monitoring and implementation
July 2017	TAC 14	Review NCP recommendations
September 2017	TAC 15	Discuss Draft NCP and public input
September 2017	Final Public Hearing on NCP	Present proposed NCP and revised NEMs

Wrap-Up

- Next meeting dates and topics
  - 5th TAC meeting - Wednesday, March 30, 2016, 1 to 4 pm
    - Primary topic - Final modeling input assumptions
  - 6th TAC - Tuesday, May 24, 2016, 1 to 4 pm
    - Primary topic - Draft NEM, including draft contours and land use compatibility
- TAC member questions, comments, and discussion?
- Public comments?
- Thanks for attending!

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Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Study

Technical Advisory Committee Meeting #5

March 30, 2016

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Meeting Agenda

- Welcome and introductions
- Runway 19 "Quiet Visual" Charted Visual Approach Procedure
- Current status of Part 150 process
- Materials submitted to FAA for review and approval
- Noise modeling input memorandum overview
- Land use inventory status
- Schedule and topics of upcoming meetings
- TAC discussion
- Public comment opportunity
- Adjournment

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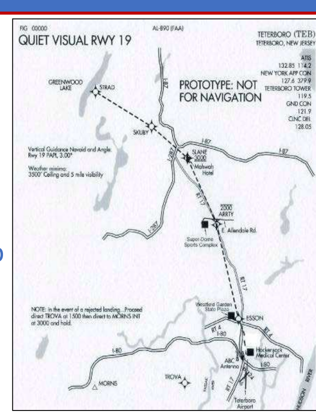
Runway 19 "Quiet Visual" Approach Procedure

- Information provided by FAA at 2/17/16 Teterboro Users Group meeting
  - FAA plans publication on March 31, 2016
  - 180-day test (test is categorically excluded from environmental review)
  - Environmental determination will follow test
- Incorporation in Part 150 Noise Exposure Map to be determined
  - Track geometry and utilization in practice unknown
  - Data from initial test period will be valuable
  - No modeling assumptions at this time



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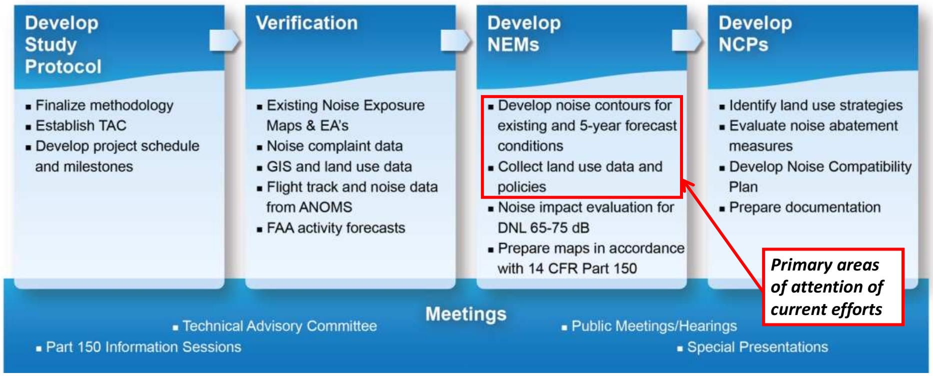
Generalized Part 150 Study Process / Schedule



Materials submitted to FAA for review and approval

- Integrated Noise Model (INM) aircraft-type substitutions
  - INM types to model aircraft that are not available in the INM database as standard aircraft and for which the FAA has not identified pre-approved substitutes
- User-defined aircraft request
  - Gulfstream III/IIB with "hushkit" - older aircraft modified to meet current federal Stage 3 standards in order to operate in the U.S. past December 31, 2015
- Non-standard approach and departure profiles
  - To reflect airspace-related altitude holds
  - To model departures in a heavier weight Gulfstream GV
  - 2016 and 2021 operations forecasts
- ***FAA has approved some requests; others are draft until FAA approves***

INM aircraft-type substitutions

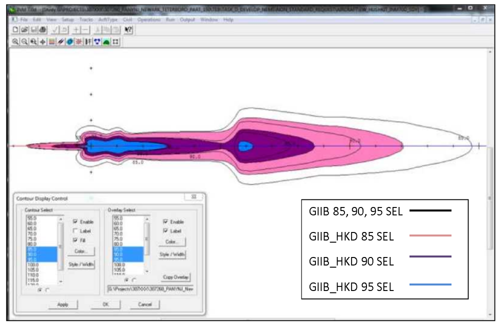
FAA has approved (for this project only) INM types to model aircraft not available in the database and for which the FAA has not identified pre-approved substitutes

#	Aircraft Category	Aircraft Code	Represented Aircraft Models	HMMH-Recommended INM Substitution
1	Jet	E50P	Embraer EMB-500 Phenom 100	CNA510 (Cessna Citation 510 / Mustang)
2	Jet	E55P	Embraer EMB-505 Phenom 300	CNA560E (Cessna Citation 560 Encore)
3	Jet	GLF6	Gulfstream 650/Gulfstream 6	GV (Gulfstream GV)
4	Jet	G280	Gulfstream 280	CL601 (Canadair Challenger 601)
5	Jet	H25B	Raytheon Hawker 700/800, 800XP	LEAR35 (Lear 35)
6	Jet	H25C	Raytheon Hawker 1000	LEAR35 (Lear 35)
7	Jet	GL5T	Bombardier Global 5000	GV (Gulfstream GV)
8	Jet	F20Q	Falcon 20 (Re-engined)	LEAR35 (Lear 35)
9	Jet	FA7X	Falcon 7X	F10062 (Fokker F20 Mark 1000 Fellowship)
10	Jet	LJ40	Learjet 40	LEAR35 (Lear 35)
11	Jet	CL64	Canadair Challenger 604	CL601 (Canadair Challenger 601)
12	Jet	CL65	Canadair Challenger 605	CL601 (Canadair Challenger 601)

User-defined aircraft request: Gulfstream IIB with hushkit

- Standard Gulfstream GIIB only meets federal Stage 2 standards, and is prohibited from operating in the U.S. past Dec. 31, 2015.
- Gulfstream GIIB with hushkit (GIIB_HK) is modified to meet current federal Stage 3 standards
- No significant noise reduction on approach
- Roughly 0.4 to 3.6 decibel (dB) reduction on departure, depending on distance
- ***FAA has approved (for this project only)***

INM 7.0d Screen Shot Comparing Sound Exposure Level (SEL) Single Event Contours for Standard GIIB to Version with Hushkit (GIIB_HK)



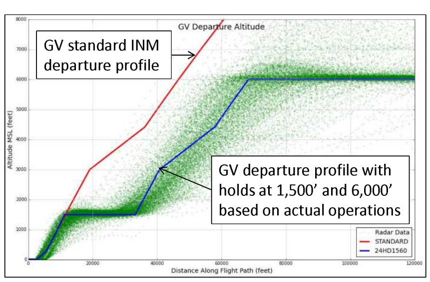
Non-standard approach and departure profiles

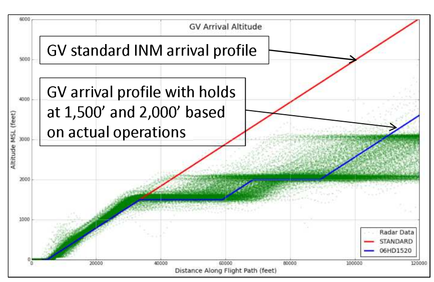
FAA is reviewing proposed user-defined profiles for 17 INM aircraft types that represented just over 90% of the operations at TEB in 2014. (Examples are provided on the next slide.)

Modeling Group	INM Type	Common Name	2014 Annual Operations	Percent of Operations
Medium/Small Jets	LEAR35	Lear 35	21,536	13.0%
Large/Medium Jets	CL601	Canadair Challenger 601	16,172	9.8%
Large/Medium Jets	CL600	Canadair Challenger 600	14,543	8.8%
Large Jets	GV	Gulfstream GV	13,818	8.3%
Large Jets	GIV	Gulfstream GIV	12,296	7.4%
Large Jets	F10062	Dassault Falcon 7X	9,110	5.5%
Medium Jets	CNA560XL	Cessna 560XL Citation Excel	9,024	5.4%
Medium Jets	CNA750	Cessna 750 Citation 10	8,740	5.3%
Medium Jets	MU3001	Proxy for Hawker 400 / Beechjet 400 / Cessna 560 Citation S	6,250	3.8%
Helicopters	S76	Sikorsky S-76	5,786	3.5%
Turboprops	CNA208	Cessna 208 Caravan and proxy for Pilatus PC12	5,402	3.3%
Piston Propellers	GASEPV	Generic single engine piston with variable pitch propeller	5,018	3.0%
Medium Jets	CNA680	Cessna Citation 680 Sovereign	4,834	2.9%
Turboprops	DO228	Dornier 228 and proxy for Beechcraft King Air 300	4,680	2.8%
Medium/Small Jets	CNA525C	Cessna 525 Citation	4,574	2.8%
Medium Jets	CNA560E	Cessna 560 Citation V Encore and proxy for Embraer Phenom 300	4,100	2.5%
Medium/Small Jets	CNA55B	Cessna 550 Citation II Bravo and proxy for Lear 60	3,858	2.3%
			TOTAL	90.4%

Non-standard approach and departure profile examples

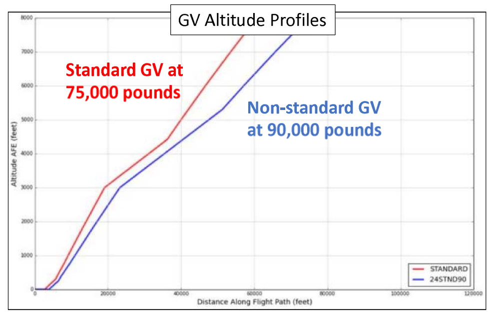
- Examples of types of non-standard profiles ***under review by FAA***
- Purpose is to reflect airspace-related altitude holds, as discussed at last TAC
- GV departure and arrival examples presented below





Non-standard departure profile request

- To model departures in a heavier weight Gulfstream GV
  - GV is used to model most larger corporate jets that fly long distances ("stage lengths"), which requires higher fuel load
  - Includes Gulfstream GV, G6, and G650; Bombardier Global Express and Global 5000
- ***FAA is reviewing***



Example graphic from submission to FAA

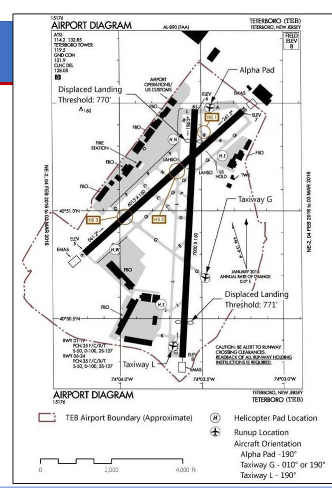
Overview of noise modeling input memorandum

- Physical description of the airport layout (Section 2)
- Aircraft noise and performance characteristics (Section 3)
  - Already covered in previous slides addressing FAA submissions
- Aircraft flight and runup operations (Section 4)
- Runway utilization rates (Section 5)
- Flight track geometry and utilization rates (Section 6)
- Meteorological conditions (Section 7)
- Terrain data (Section 7)

Airport layout details

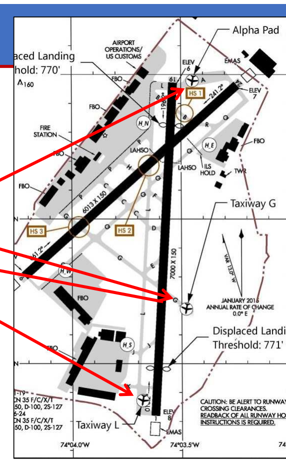
- Runways, helipads, and runup locations
- Most information shared at prior TACs

Runway End	End Latitude and Longitude (Decimal Degrees)	Elevation, feet above mean sea level (MSL)	Length, feet	Threshold Crossing Height, feet	Displaced Landing Threshold, feet
1	40.838681 74.060367	8.4	7,000	58	771
19	40.857864 74.058958	6.4		50	770
6	40.846725 74.070297	4.9	6,013	50	None
24	40.857733 74.054106	6.8		45	None



Aircraft runup operations

- Runup assumptions based on 2014 airport logs
- All runups will be modeled at high-power (93% thrust) at three designated locations:
  - 85% occur on Taxiway A at 190° magnetic heading
  - 5% occur on Taxiway G at 010° magnetic heading
  - 8% occur on Taxiway G at 190° magnetic heading
  - 2% occur on Taxiway L at 190° magnetic heading
- Noise modeling memorandum provides detailed table of day and night runup activity by aircraft type and range of durations
  - Total of 542 runups (286 day, 256 night)
  - Durations range from 1 minute to over 30 minutes



Aircraft flight operations

- Study Protocol states that "FAA's 2014 Terminal Area Forecast (TAF), issued January 2015, will be used as the baseline operational forecast"
- FAA guidance for forecast approval requires that the 5- and 10-year forecasts must differ from the TAF by less than 10% and 15%, respectively
- PANYNJ forecasts meet these standards
- *This is not the only basis for approval; FAA will consider all aspects of the forecasts*
- Noise modeling memo provides full forecast detail

Comparison of 2016 and 2021 PANYNJ Forecasts to 2014 FAA Terminal Area Forecasts

Year	FAA TAF Forecast (January 2015)	PANYNJ Part 150 Forecast	Difference (PANYNJ-TAF)	PANYNJ Percentage Difference from TAF	FAA-Allowable Variation
2016	167,952	171,112	3,160	1.88%	5%
2021	171,016	187,036	16,020	9.37%	10%

Runway and helipad utilization rates

- Based on highly accurate TEB Compuland database
  - Derived from staff observations
- Reviewed in numerical and "pie chart" format at second TAC
  - No corrections suggested
- Noise modeling memorandum includes detailed tabular summaries
  - *Excerpt* for overall fixed-wing use presented below as an illustration

Runway End	Overall Fixed-Wing Runway Utilization Percentages						
	Arrival			Departure			Grand Total
	Day	Night	Subtotal	Day	Night	Subtotal	
01	8%	6%	8%	34%	30%	34%	21%
06	28%	35%	29%	3%	13%	4%	17%
19	49%	38%	48%	3%	8%	3%	26%
24	14%	21%	15%	59%	49%	58%	36%
Subtotal	100%	100%	100%	100%	100%	100%	100%

Flight track geometry and utilization rates

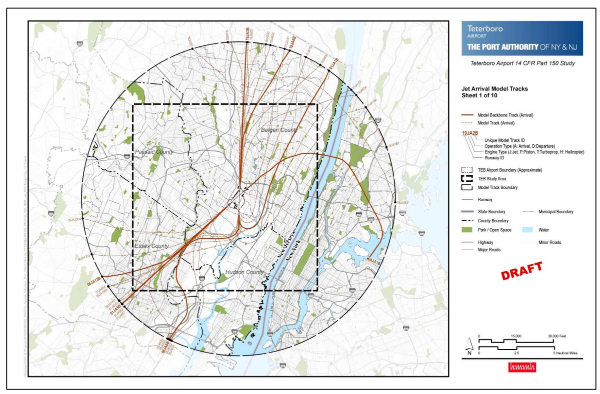
- Large numbers of tracks (1,225 total) requires display on 42 sheets
- Track use presented in separate tables by aircraft category and runway end
- Noise modeling memorandum provides full detail

Numbers of Tracks Developed by Category			
Aircraft Category	Arrival Tracks	Departure Tracks	Total Tracks
Jet	259	215	474
Turbopropeller	168	128	296
Piston Propeller	142	119	261
Helicopter	81	113	194
Total	650	575	1,225

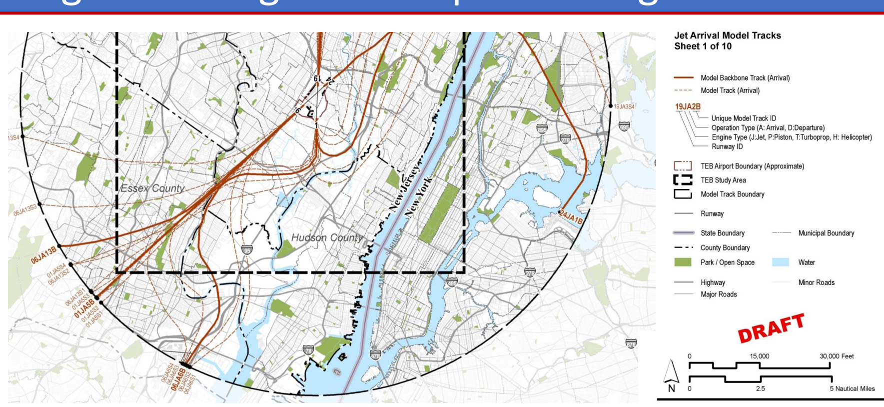
Numbers of Track Sheets by Category			
Aircraft Category	Arrival Track Sheets	Departure Track Sheets	Total Track Sheets
Jet	10	5	15
Turbopropeller	5	5	10
Piston Propeller	6	5	11
Helicopter	3	3	6
Total	24	18	42

Flight track figure example (Jet arrival example)

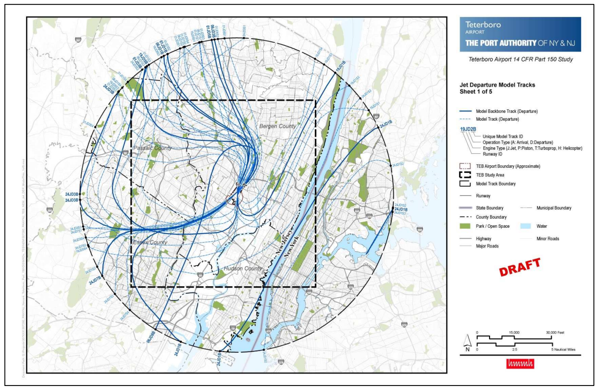
- Backbone tracks
- Sideline tracks
- All tracks labelled
- Tracks clipped at 10.5 nautical mile ring around airport
  - Based on discussion with FAA that it would be appropriate for the tracks to extend one nautical mile beyond the study area



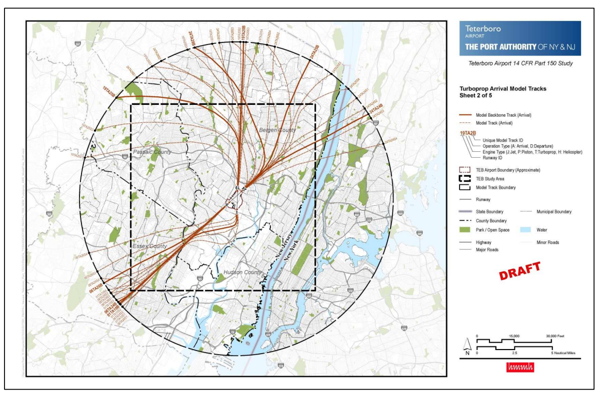
Flight track figure example - enlarged detail



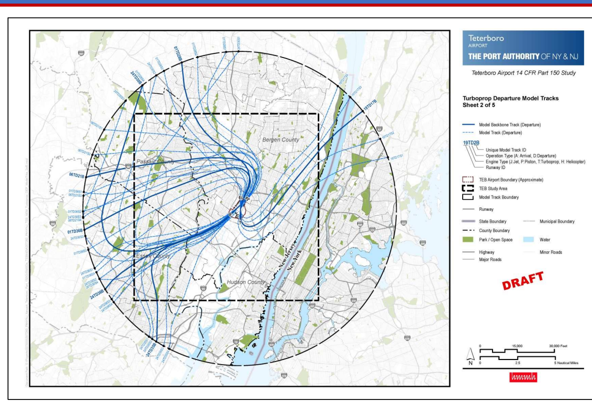
Flight track figure example (Jet departure example)



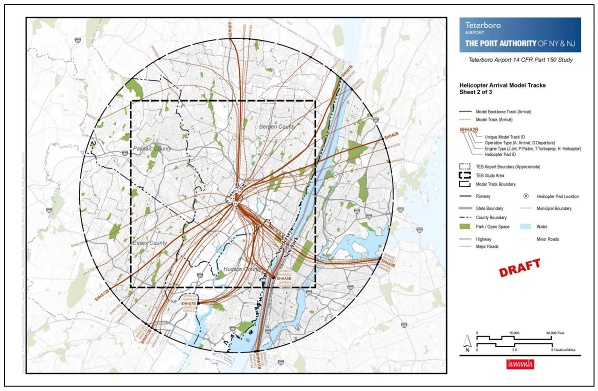
Flight track figure example (Turboprop arrival example)



Flight track figure example (Turboprop departures)



Flight track figure example (Helicopter arrival example)



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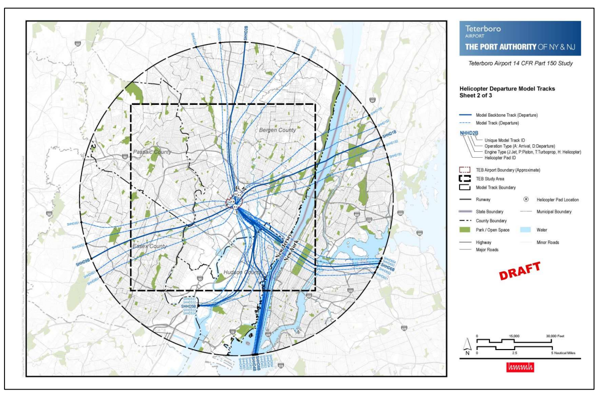
Flight track figure example (Helicopter departures)



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Land use data collection / jurisdiction consultation

- Primary *data collection* steps include:
  - Assemble and review land use, zoning, and population data
  - Identify any local land use policies that address airport operations
  - Create existing land use maps
  - Conduct land use reconnaissance surveys
  - Assess any deficiencies of land use data and corrective approaches
- Primary *jurisdiction consultation* steps include:
  - Initial outreach for data collection purposes
  - Conduct interviews with land use planners and municipal officials
  - Identify and discuss existing land use policies and strategies

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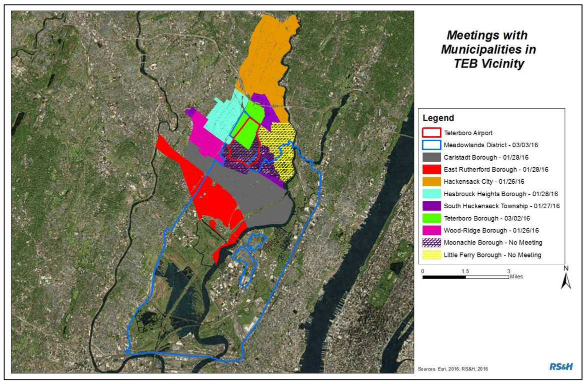
Land Use Data Collection / Jurisdiction Consultation



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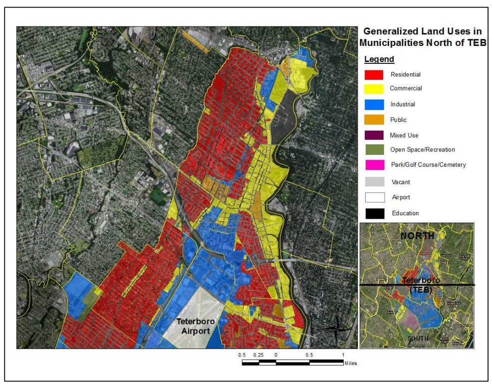
Land Use Data Collection / Jurisdiction Consultation - *North*



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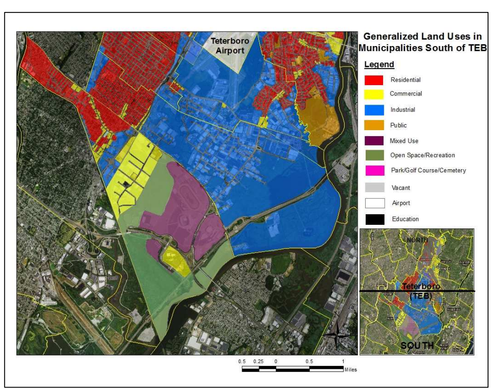
Land Use Data Collection / Jurisdiction Consultation - *South*



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Projected TAC & Public Meeting Topics, 2015-16

Date	Meeting	Major Actual / Anticipated Topics
July 30, 2015	TAC 1 - ***Complete***	Introduction to Part 150, TAC process, etc.
Sept. 25, 2015	TAC 2 - ***Complete***	Overview of noise modeling process and inputs
Oct. 15, 2015	Workshop 1 - ***Complete***	Introduction to Part 150 and TEB study process
November, 12 2015	TAC 3 - ***Complete***	Present draft runway and helipad use, flight track density plots, forecast process, and land use inventory status
January 2016	TAC 4 - ***Complete***	Present draft noise modeling flight tracks, forecast summary, and overviews of user-defined flight-profile development process, maintenance run-up modeling, and meteorological and terrain data
March 2016	TAC 5 - ***Today***	Present final modeling input assumptions
May 2016	TAC 6 - 5/24/16	Present Draft NEM, including draft contours and land use compatibility
July or August 2016	Workshop 2	Present Draft NEM, including draft contours and land use compatibility
July or August 2016	NEM comment period	Workshop 2 will be held during the comment period

Projected TAC & Public Meeting Topics, 2015-16

Date	Meeting	Major Actual / Anticipated Topics
July 2016	TAC 7	Present first-round noise abatement alt. analysis
September 2016	TAC 8	Present second-round abatement alt. analysis
November 2016	TAC 9	Present third-round abatement alt. analysis
January 2017	TAC 10	Present first-round compatible land use alternatives
March 2017	TAC 11	Present second-round compatible land use alternatives
May 2017	TAC 12	Recommend abatement and compatibility measures
June 2017	Workshop 3	Present draft NCP recommendations
June 2017	TAC 13	Discuss NCP monitoring and implementation
July 2017	TAC 14	Review NCP recommendations
September 2017	TAC 15	Discuss Draft NCP and public input
September 2017	Final Public Hearing on NCP	Present proposed NCP and revised NEMs

Wrap-Up

- Next meeting dates and topics
  - 6th TAC - Tuesday, May 24, 2016, 1 to 4 pm
    - Primary topic - Draft NEM, including draft contours and land use compatibility
  - 7th TAC - July 2016 (specific date to be determined)
    - Primary topic - Initial discussion of noise compatibility options; e.g., review of categories that Part 150 requires be considered, solicitation of TAC suggestions, etc.
- TAC member questions, comments, and discussion?
- Public comments?
- Thanks for attending!

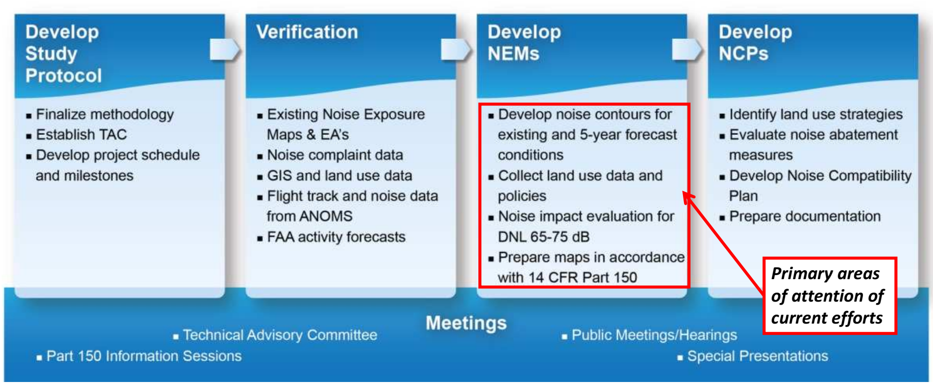
Welcome!

Teterboro Airport
14 CFR Part 150 Noise Compatibility Study
Technical Advisory Committee Meeting #6
May 24, 2016

Meeting Agenda

- Welcome and introductions
- Current status of Part 150 process
- Status of noise model input development, review, and approval
- Preliminary draft 2016 and 2021 contours
- Comparison of measured and modeled DNL
  - Noise monitor site descriptions
- Complaint plots
- Preliminary introduction to Noise Compatibility Planning (NCP) process
- Schedule and topics of upcoming meetings
- TAC discussion
- Public comment opportunity
- Adjournment

Generalized Part 150 Study Process / Schedule



Noise model input development, review, and approval status

- Draft model inputs were shared with the TAC over the past several meetings
  - TAC comments were due on April 15, 2016
  - No comments on draft inputs were received by that date or in the interim
- Final step: FAA review and approval of non-standard flight profiles
  - To reflect airspace-related altitude holds
  - To model departures in a heavier weight Gulfstream GV
  - HMMH has addressed FAA and other stakeholder comments, received operator concurrences, and PA has submitted to FAA for review
- *With FAA approval of non-standard profiles, all model inputs will be final*
  - Land use analyses are postponed until modeling inputs are approved

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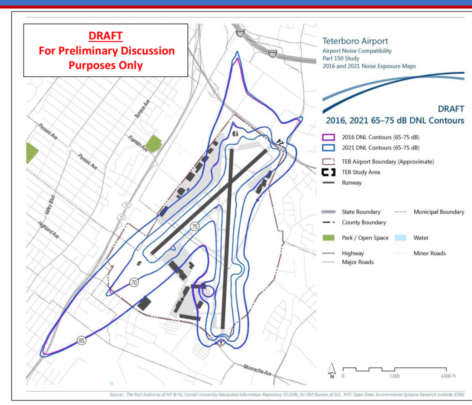
Comparison of Preliminary Draft 2016 and 2021 DNL Contours

- 2021 contours are very slightly larger than those for 2016
- Slight extensions in 2021, compared to 2016, off both ends of Runway 6/24 and the north end of Runway 1/19
- Associated with 9% increase in operations



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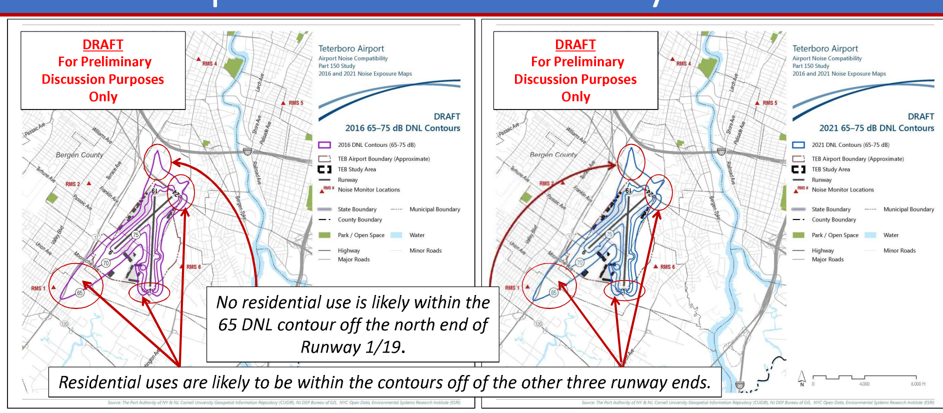
Next Step Will Be Land Use Analysis



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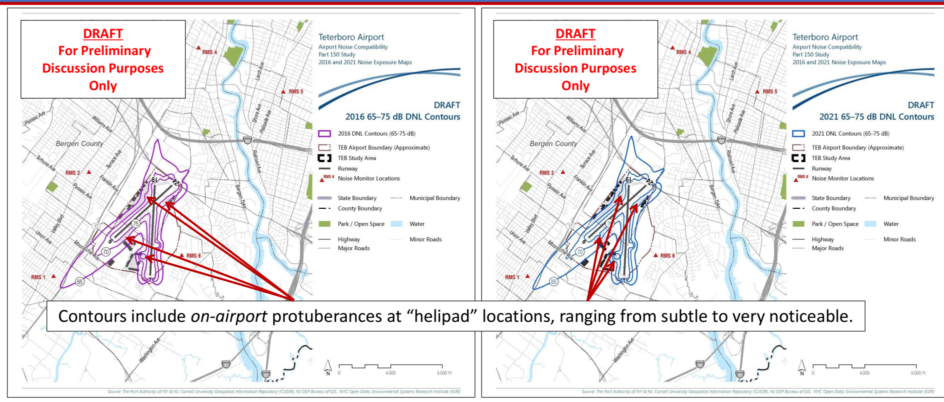
Effect of Helicopter Operations



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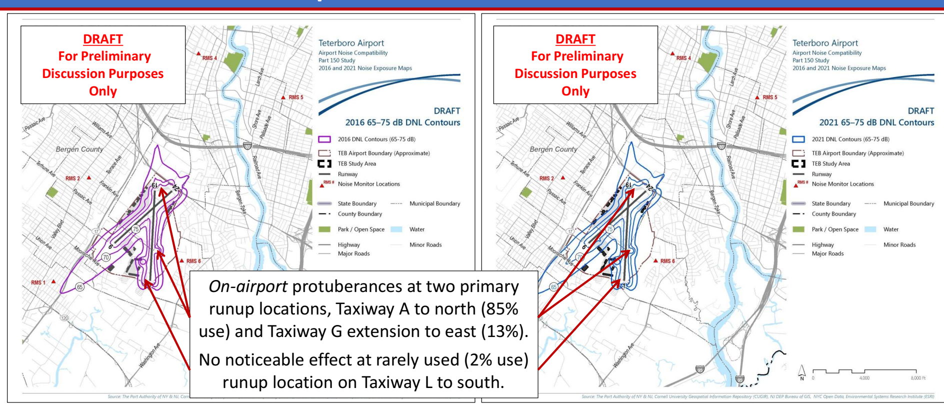
Effect of Runups



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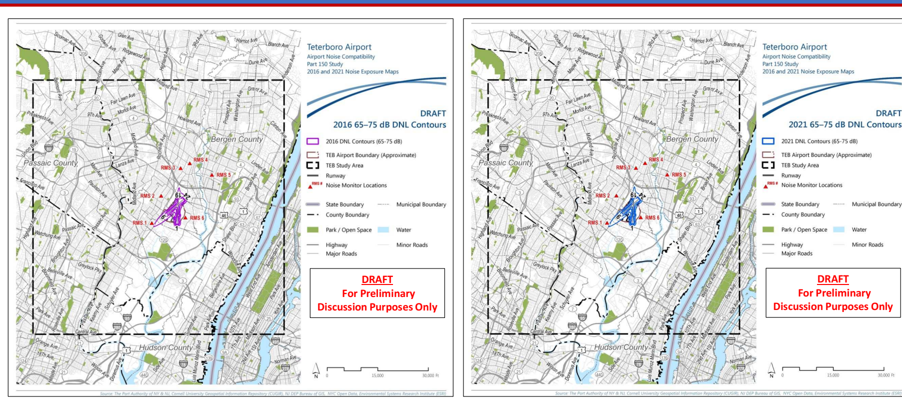
Draft 2016 and 2021 DNL Contours Relative to Study Area



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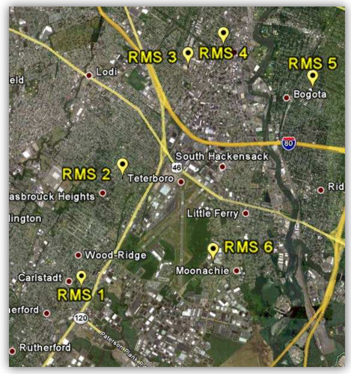
TEB Noise Monitoring Locations

- TEB has six Remote Monitoring Site (RMS) installations
  - RMS 1 - Carlstadt
  - RMS 2 - Hasbrouck Heights
  - RMS 3 - Hackensack Hospital
  - RMS 4 - Hackensack
  - RMS 5 - Bogota
  - RMS 6 - Moonachie

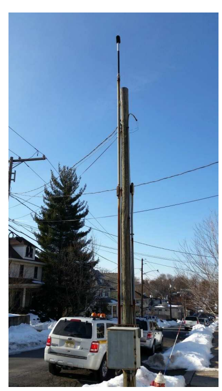


RMS 1 - Carlstadt

- RMS 1 is approximately 1.1 miles (0.9 nautical miles) from the southwest end of Runway 6/24
- The site is approximately 40 feet above mean sea level, approximately 32 feet above airport elevation (approximately 8 feet MSL)
- The site is in a residential neighborhood next to a cemetery
- The site is primarily affected by Runway 24 departures and Runway 06 arrivals

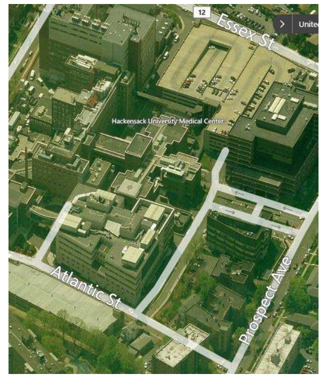
RMS 2 - Hasbrouck Heights

- RMS 2 is approximately 1.2 miles (1.0 nautical miles) west of the north end of Runway 1/19
- The site is approximately 150 feet above mean sea level, approximately 142 feet above airport elevation
- The site is in a residential neighborhood near the fire station
- The site primarily measures sideline noise from operations on both runways.



RMS 3 - Hackensack Hospital

- RMS 3 is on the roof of the Hackensack Medical Center, approximately 1.7 miles (1.5 nautical miles) from the north end of Runway 1/19
- The ground level at the site is approximately 93 feet above mean sea level, approximately 85 feet above airport elevation
- The site at the medical center is in a urban area
- The site primarily measures arrivals to Runway 19 and departures from Runway 01 and 06



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RMS 4 - Hackensack

- RMS 4 is approximately 2.1 miles (1.8 nautical miles) northeast of the north end of Runway 1/19, and approximately the same distances north of the north end of Runway 6/24
- The site is approximately 18 feet above mean sea level, approximately 10 feet above airport elevation
- The site is in a residential area
- The site primarily measures from Runway 01 and 06 departures, and Runway 24 arrivals

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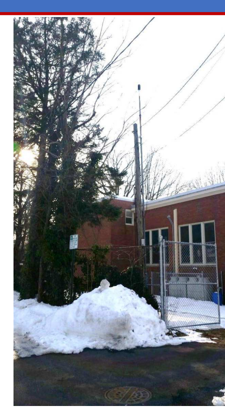
RMS 5 - Bogota

- RMS 5 is behind Bogota High School, approximately 2.2 miles (1.9 nautical miles) northeast of the north end of Runway 6/24
- The site is approximately 150 feet above mean sea level, approximately 142 feet above airport elevation
- The site is in a residential area
- The site primarily measures Runway 06 departures and Runway 24 arrivals



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RMS 6 - Moonachie

- RMS 6 is approximately 0.4 miles (0.4 nautical miles) due east of Runway 1/19
- The site is approximately 7 feet above mean sea level, approximately the same elevation as the airport (8 feet above mean sea level)
- The site is in a commercial area
- The site primarily measures sideline noise from Runway 01/19 and from helicopter operations

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Comparison of Modeled and Measured DNL

RMS #	2016 Modeled DNL [Note]	2014 Measured DNL	2016 Modeled-2014 Measured
1	62	58	+4
2	47	40	+7
3	59	61	-2
4	55	52	+3
5	50	48	+2
6	53	52	+1
Note: Modeled DNL values are preliminary draft estimates for discussion purposes only.			

- Study protocol calls for comparing 2016 modeled to 2014 measurements (operations are reasonably similar)
- Modeled is greater than measured in 5 out of 6 sites
- Modeled estimates are for *ground level* at RMS sites
- Greatest variation (7 dB) is at the site with the least aircraft noise (RMS 2)
- These types of differences are not unusual when measuring well outside 65 DNL, where aircraft DNL is close to or below non-aircraft DNL
- Automated monitoring systems have significant difficulty separating aircraft and non-aircraft noise at these types of locations
- Agreement within 2 dB is unusually close

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Complaint Graphics

- Each figure depicts combined numbers of complaints received in 2014 and 2015
- Prepared for four categories of operations:
  - Jets, props, helicopter, and “unspecified” (where complainant did not identify a specific type)
- Very small numbers of complaints fall outside the boundaries of the figures, even including a buffer beyond the study area (see table below)

Complaint Statistic	Jets	Propeller	Helicopter	Unspecified
Number of complaints within the Study Area	1,345	36	76	1,683
Number of complaints shown on the figure	1,357	36	76	1,692
Number of complaints *not* shown on the figure	36	1	2	12

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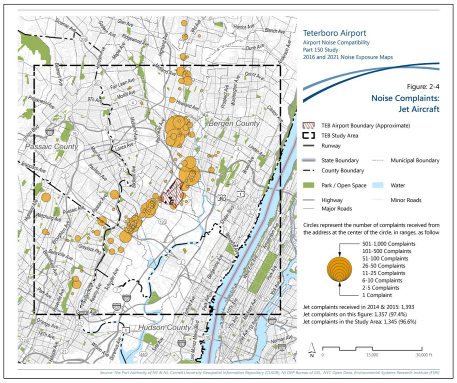
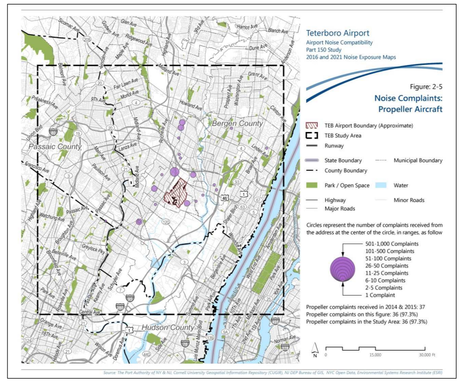
Jet and Propeller Complaints





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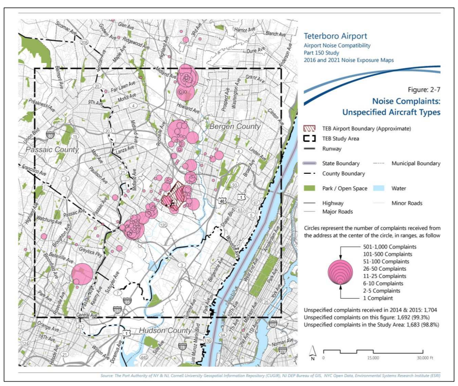
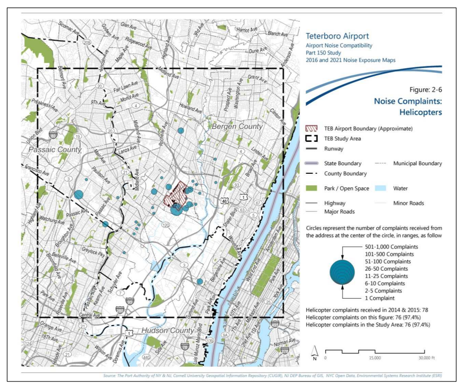
Helicopter and Unspecified Complaints





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Introduction to Noise Compatibility Program Development

- NCP documentation must describe:
  - Development of the program
  - Each measure that the proprietor considered
  - Reasons the proprietor elected to *include* or *exclude* individual measures
  - Entities responsible for implementing each measure
  - Implementation and funding mechanisms
  - The predicted effectiveness of *individual measures* and *the overall program*.
- FAA first *accepts* the NCP as compliant with Part 150 standards
- FAA then reviews and *approves* or *disapproves* individual proposals
  - Approval does not eliminate requirements for formal environmental assessment of any proposal pursuant to the National Environmental Policy Act (NEPA).
  - FAA approval of individual measures is a prerequisite to application for federal funding

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Since Part 150 was promulgated in 1981…

- The industry (airports, consultants, and FAA) has developed a well-understood and well-accepted Part 150 process that:
  - Meets statutory requirements
  - Addresses concerns of industry, government, and community stakeholders
  - Follows a logical progression
  - Is reasonably time-and cost-efficient
  - Provides appropriate outreach, consultation, and “transparency”
- FAA has published clear “checklists” to assist in organizing the process
- The scope of NCP analyses has evolved into consideration of three primary categories of alternatives (noise abatement, land use, and programmatic)
  - All required categories are addressed in a comprehensive and logical fashion

The next two slides summarize this more evolved process

Noise Compatibility Program Development Process

Step 1: Identify Incompatible Land Uses
Existing conditions Noise Exposure Map
Forecast conditions Noise Exposure Map

Step 2: Consider Noise Abatement Strategies
Reduce exposure over incompatible uses
Limit growth in exposure over incompatible uses

Step 3: Consider Land Use Strategies
Mitigate residual incompatible uses
Prevent introduction of new incompatible uses

Step 4: Consider Programmatic Strategies
Implement and ***promote*** measures
Monitor and ***report*** on effectiveness
Update NEMs and ***revise*** NCP as appropriate

Analysis and Selection Process Applied in Steps 2 - 4

- Evaluate effectiveness of each measure in addressing ***objectives***
- Evaluate feasibility (operational, safety, economic, etc.)
- Select preferred “package” of measures
- Identify implementation schedule, responsibilities, budget, funding sources, etc.
- If not recommended, document reasons

Major NCP Strategy Options within Each Category

Noise Abatement Strategies

- Noise abatement flight tracks
- Preferential runway use
- Arrival/departure procedures
- Airport layout modifications
- Noise barriers
- Runup enclosures
- Use restrictions
- Other actions proposed by stakeholders

Land Use Strategies

- Mitigation
  - Land acquisition
  - Sound insulation
  - Avigation easements
- Prevention
  - Land use controls
  - Zoning
  - Building codes
  - Comprehensive plans
  - Real estate disclosures
- Other actions proposed by stakeholders

Programmatic Strategies

- Implementation tools (rules, regulations, ordinances, etc.)
- Promotion, education, signage, etc.
- Monitoring
- Reporting
- NEM updating
- NCP revision
- Other actions proposed by stakeholders

Minimum Scope of NCP Alternatives (Part 150 Sec. B150.7)

- Acquisition of land and interests, including at least air rights, easements, and development rights
- Barriers and acoustical shielding, including soundproofing of public buildings
- Implementation of a preferential runway system.
- Use of flight procedures (including modification of flight tracks)
- Restriction on the use of aircraft based on their noise characteristics, including at least:
  [*Note: Part 161 has added further notice, review, and approval requirements for proposals to restrict many categories of aircraft operations.*]
  - Denial of use of the airport to aircraft types or classes which do not meet Federal noise standards
  - Capacity limitations based on the relative noisiness of different types of aircraft
  - Required use of noise abatement takeoff or approach procedures previously approved as safe by the FAA
  - Landing fees based on FAA certificated or estimated noise emission levels or on time of arrival
  - Partial or complete curfews
- Other actions or combinations of actions which would have a beneficial noise impact
- Other actions recommended for analysis by the FAA for the specific airport

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Projected TAC & Public Meeting Topics, 2015-16

Date	Meeting	Major Actual / Anticipated Topics
July 30, 2015	TAC 1 - ***Complete***	Introduction to Part 150, TAC process, etc.
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3rd quarter 2016	NEM comment period	Workshop 2 will be held during the comment period

26

Projected TAC & Public Meeting Topics, 2015-16

Date	Meeting	Major Actual / Anticipated Topics
July 29, 2016 (1 pm)	TAC 7	Present first-round noise abatement alternative analysis
September 23, 2016 (1 pm)	TAC 8	Present second-round abatement alternative analysis
November 2016	TAC 9	Present third-round abatement alternative analysis
January 2017	TAC 10	Present first-round compatible land use alternatives
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Wrap-Up

- Next meeting dates and topics
  - 7th TAC - July 2016 (specific date to be determined)
    - Land use compatibility analysis
    - Continued discussion of noise compatibility options; e.g., further review of categories that Part 150 requires be considered, solicitation of TAC suggestions, initial noise abatement alternative analyses, etc.
  - 8th TAC - September 2016 (specific date to be determined)
    - Land use compatibility analysis
- TAC member questions, comments, and discussion?
- Public comments?
- Thanks for attending!

Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Study

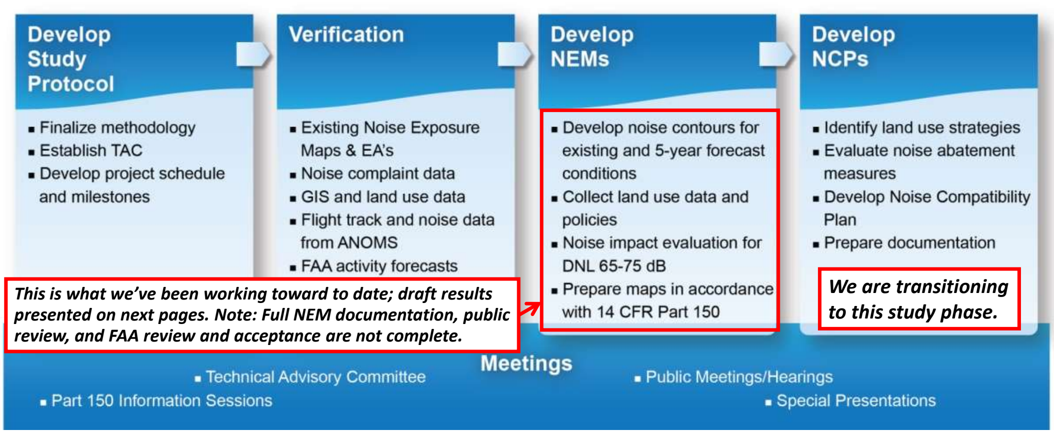
Technical Advisory Committee Meeting #7

July 29, 2016

Meeting Agenda

- Welcome and introductions
- Current status of Part 150 process
- Draft 2016 and 2021 Noise Exposure Map figures and land use analyses
- DNL 55 and 60 dB noise contours
- Response to specific requests at TAC #6
- Continued brainstorming of noise abatement options
- Upcoming Part 150 milestones
- TAC member discussion
- Study schedule update
- Public comment opportunity
- Adjournment

Generalized Part 150 Study Process / Schedule

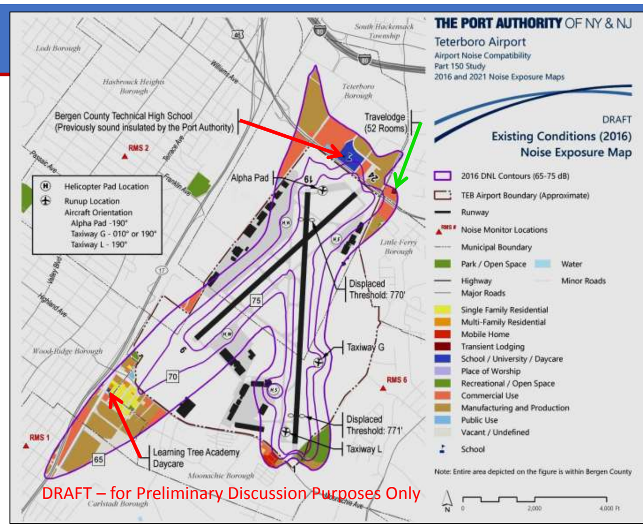


Draft 2016 and 2021 Noise Exposure Maps and Land Use

- *As a refresher,* Part 150 requires depiction of:
  - DNL 65, 70, and 75 dB contours
  - Existing conditions (year of submission; 2016 in this case)
  - Forecast conditions (at least five years in the future; 2021 in this case)
  - Land use information within contours
    - Noise sensitive public buildings, such as schools, places of worship, health care facilities, and properties on or eligible for inclusion in the National Register of Historic Places
    - Identification of all *noncompatible* land uses
    - Jurisdiction(s) responsible for land use controls
    - Generalized land uses and street map
  - Other information
    - Runway layout and airport boundary
    - Flight tracks (may be on supplemental graphics, as in this case)
    - Noise monitoring locations[1]

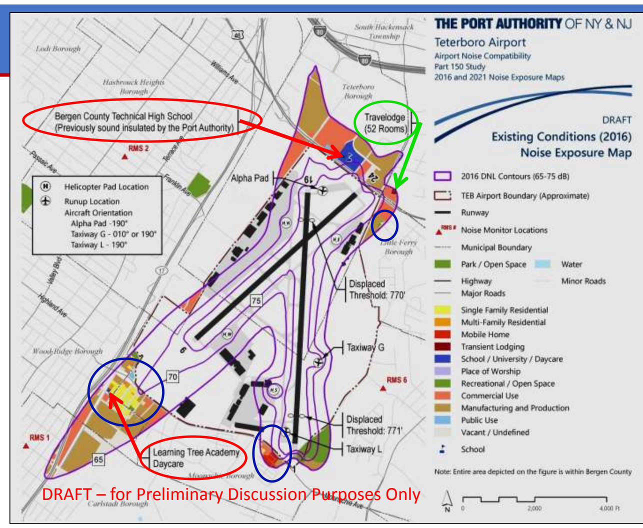
Draft 2016 NEM

- Contains all information required for inclusion on NEM figure
  - Will be presented in NEM document at 1":2,000', as required by Part 150
  - Shows permanent noise monitor locations to the extent feasible (others will be presented on a supplemental graphic, as permitted by Part 150)
  - Flight tracks will be shown on supplemental graphics, as permitted by Part 150



Draft 2016 NEM

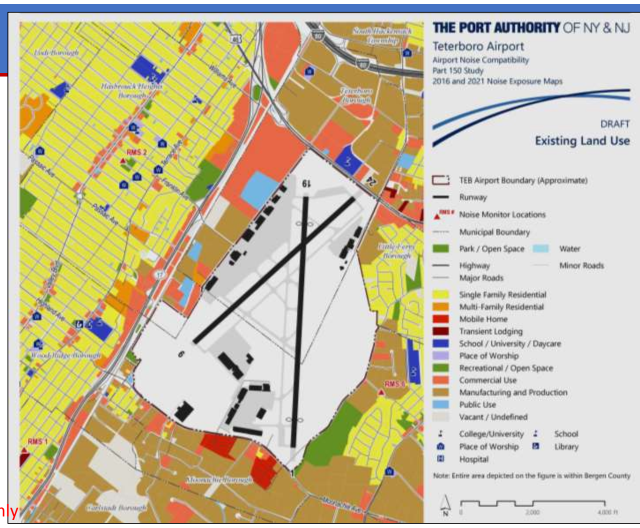
- Non-compatible land uses:
  - Two schools
  - Portion of one transient lodging structure
  - Single family, multifamily, and mobile home residences
    - Slide 9 presents a table with dwelling unit counts and residential population estimates for 2016 and 2021
- Slide 10 summarizes land areas within each contour interval



Land Use

- Figure shows generalized land uses over full area covered in NEM figures
- Part 150 only requires analysis of land use within DNL 65 dB contour
- Noise abatement alternatives may extend contours within this larger area

DRAFT – for Preliminary Discussion Purposes Only



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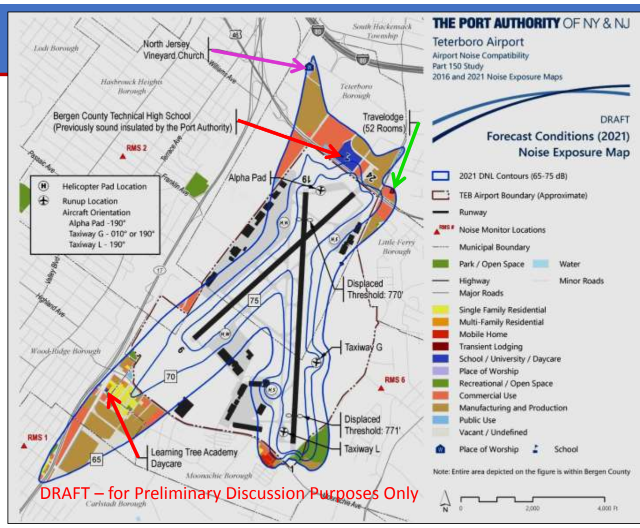
Draft 2021 NEM

- Contains all information required for inclusion on NEM figure
  - Will be presented in NEM document at 1":2,000', as required by Part 150
  - Shows permanent noise monitor locations to the extent feasible (others will be presented on supplemental graphic, as permitted by Part 150)
  - Flight tracks will be shown on supplemental graphics, as permitted by Part 150



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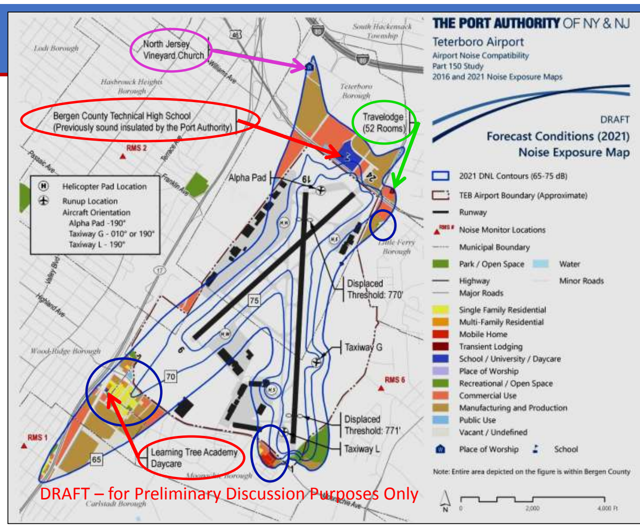
Draft 2021 NEM

- Non-compatible land uses:
  - Portion of one church building (2016 contour did not extend over any portion of structure)
  - Two schools
  - Portion of one transient lodging structure
  - Single family, multifamily, and mobile home residences
    - Slide 9 presents counts and population estimates
- Slide 10 summarizes land areas within each contour interval



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Dwelling units and residential population

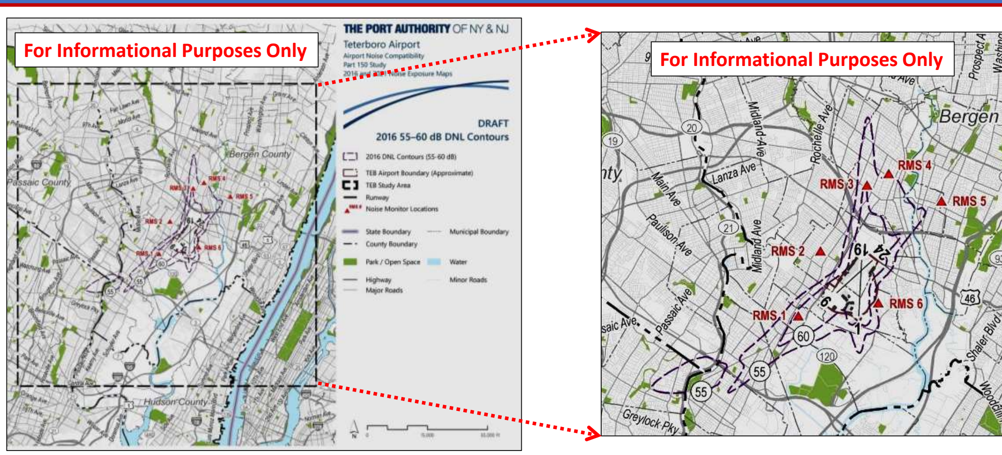
Year	Type of Dwelling	Dwelling Unit Counts within DNL intervals [1]				Estimated Residents within DNL Intervals [2, 3]			
		65-70 dB	70-75 dB	>75 dB	Total	65-70 dB	70-75 dB	>75 dB	Total
2016	Single Family	95	0	0	95	230	0	0	230
	Multi-Family	19	0	0	19	46	0	0	46
	Mobile Home	44	8	0	52	106	19	0	125
	Total	158	8	0	166	382	19	0	401
2021	Single Family	95	5	0	100	230	12	0	242
	Multi-Family	19	2	0	21	46	5	0	51
	Mobile Home	48	10	0	58	116	24	0	140
	Total	162	17	0	179	392	41	0	433

Notes: 1. Based on GIS-based identification of parcels confirmed with direct counts using aerial photography.
2. Estimates based on 2.42 residents per dwelling unit, developed from 2010 U.S. Census block data.
3. Estimated residents within each contour interval rounded to nearest whole number.

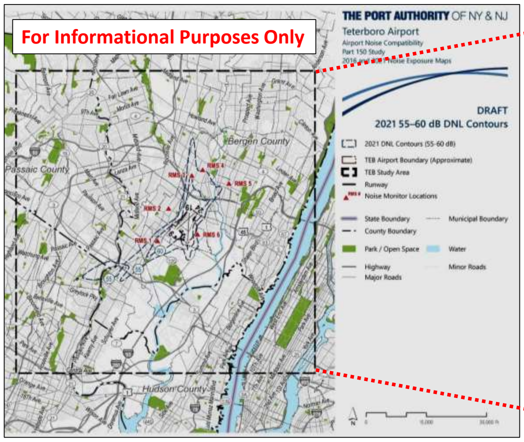
Land Areas within Contour Intervals

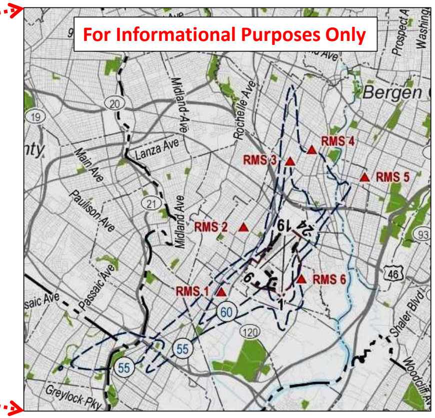
		Total Area in Contour Interval		Area Over Airport Property		Area Over Off-Airport Property	
2016	Contour Interval	Square Miles	Acres	Square Miles	Acres	Square Miles	Acres
	DNL 65-70 dB	0.7	439.1	0.3	209.8	0.4	229.3
	DNL 70-75 dB	0.3	178.7	0.3	166.6	0.0	12.2
	DNL >75 dB	0.3	201.3	0.3	200.2	0.0	1.2
	Total within DNL 65	1.3	819.2	0.9	576.5	0.4	242.7
		Total Area in Contour Interval		Area Over Airport Property		Area Over Off-Airport Property	
2021	Contour interval	Square Miles	Acres	Square Miles	Acres	Square Miles	Acres
	DNL 65-70 dB	0.7	453.6	0.3	210.2	0.4	243.4
	DNL 70-75 dB	0.3	183.3	0.3	169.8	0.0	13.5
	DNL >75 dB	0.3	203.3	0.3	202.1	0.0	1.2
	Total within DNL 65	1.3	840.3	0.9	582.1	0.4	258.2
		Total Area in Contour Interval		Area Over Airport Property		Area Over Off-Airport Property	
Change from 2016 to 2021	Contour interval	Square Miles	Acres	Square Miles	Acres	Square Miles	Acres
	DNL 65-70 dB	0.0	14.5	0.0	0.5	0.0	14.1
	DNL 70-75 dB	0.0	4.6	0.0	3.3	0.0	1.4
	DNL >75 dB	0.0	2.0	0.0	1.9	0.0	0.1
	Total within DNL 65	0.0	21.1	0.0	5.6	0.0	15.5

Supplemental 2016 DNL Contours Relative to Study Area



Supplemental 2021 DNL Contours Relative to Study Area





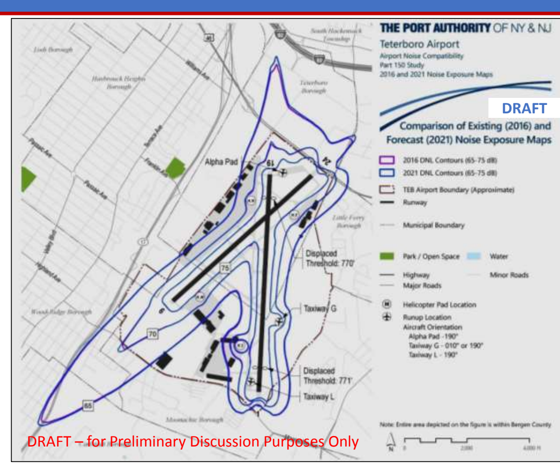
Response to Specific Requests at TAC #6

Requests included:

- Relationship of runway use to contour shape
  - To help understand effect of runway use on shape
- Comparison of day and night complaint plots
  - 24-hour plots were provided at TAC #6
- Measured vs. modeled DNL at Hackensack Hospital with elevation of RMS 3 taken into account
  - To seek improved agreement between measured and modeled

Comparison of Draft 2016 and 2021 DNL Contours

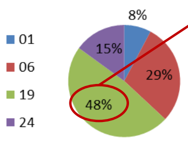
- *Repeat from TAC 6 presentation*
- 2021 contours are slightly larger than those for 2016
- Slight extensions in 2021, compared to 2016, off both ends of Runway 6/24 and the north end of Runway 1/19
- Associated with 9% increase in operations

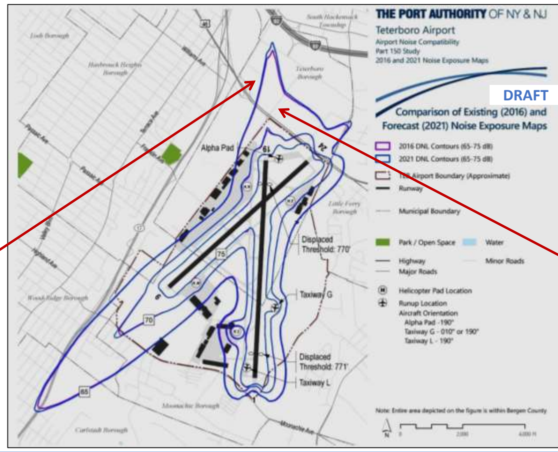


Dominant runway use off north end of Runway 1/19

Primarily affected by Runway 19 arrivals; result in relatively sharp, pointed lobe that is typical signature of arrival noise.

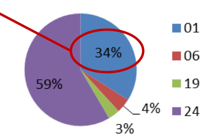
Fixed-Wing Arrivals by Runway End





Runway 1 departures also contribute, but to a lesser extent due to lower utilization; adds bulge in contour lobe nearer runway end.

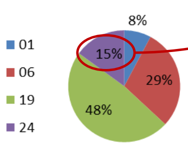
Fixed-Wing Departures by Runway End

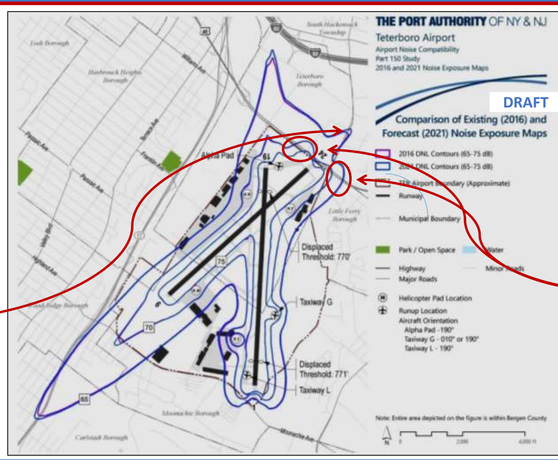


Dominant runway use off north end of Runway 6/24

Primarily affected by Runway 24 arrivals; results in relatively sharp, pointed lobe. Lower use than on Runway 19 results in shorter contour lobe.

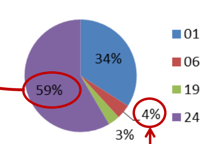
Fixed-Wing Arrivals by Runway End





Runway 24 start-of-takeoff-roll produces lobes to the sides of the runway end.

Fixed-Wing Departures by Runway End

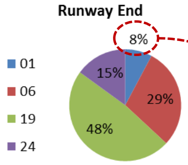


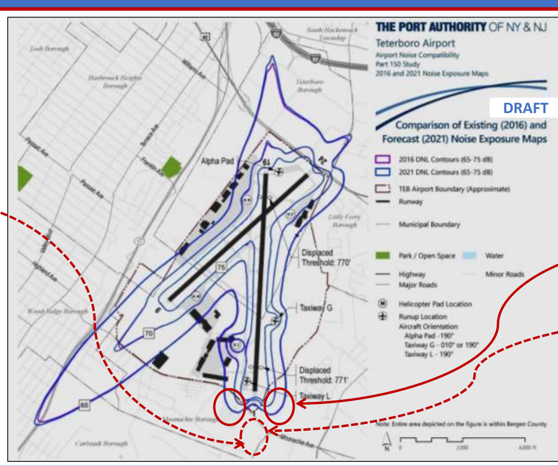
Runway 6 departures have little effect due to very low utilization.

Dominant runway use off south end of Runway 1/19

Least use of any runway end for arrivals is reflected by *absence* of pointed arrival lobe.

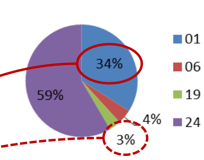
Fixed-Wing Arrivals by Runway End





Runway 1 start-of-takeoff-roll produces lobes to the sides of the runway end

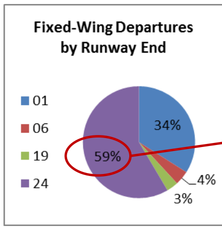
Fixed-Wing Departures by Runway End

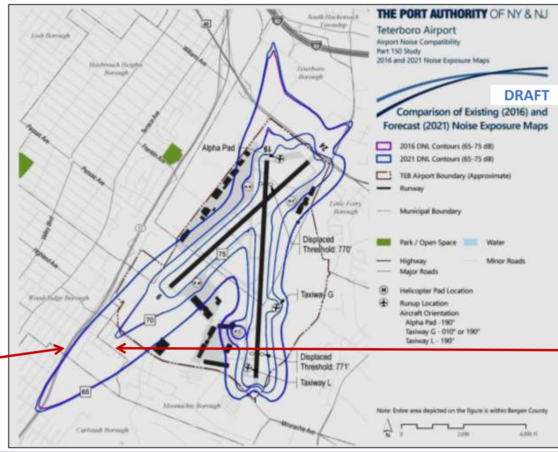


Least use of Runway 19 for departures is reflected by *absence* of departure lobe.

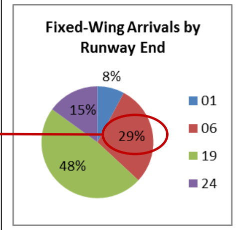
Dominant runway use off south end of Runway 6/24

Highest use of Runway 24 produces relatively *broad* and *elongated* contour lobe that is a typical signature of departure noise.





Pointed shape of 70 dB contour reflects relatively high use of Runway 6 for arrivals.

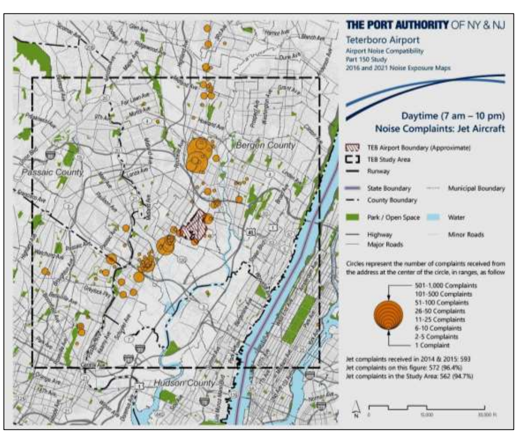


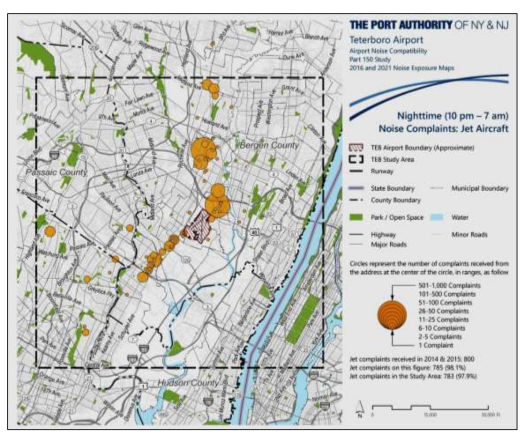
Day and Night Complaint Graphics

- Each figure depicts combined numbers of complaints received in 2014 and 2015
- At the TAC's request, they are presented for day (7 am - 10 pm) and night (10 pm - 7 am) time periods (24-hour totals were provided in the TAC 6 presentation)
- Prepared for four categories of operations:
  - Jets, props, helicopter, and "unspecified" (where complainant did not identify a specific type)
- Small numbers of complaints fall outside the Study Area and the boundaries of the subsequent figures

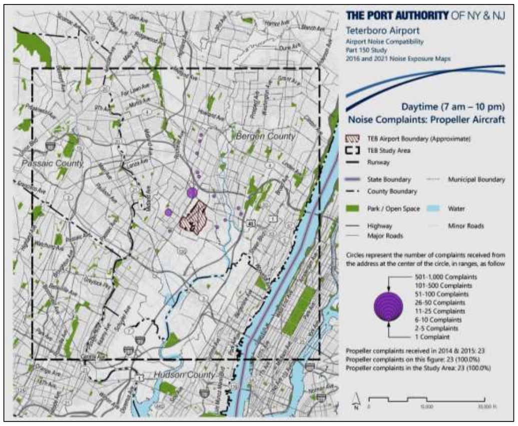
Complaint Statistic	Jets		Propeller		Helicopter		Unspecified	
	Day	Night	Day	Night	Day	Night	Day	Night
Number of complaints within the Study Area	562	783	1,345	23	13	36	61	15
Number of complaints shown on the figure	572	785	1,357	23	13	36	61	15
Number of complaints *not* shown on the figure	21	15	36	0	1	1	2	0

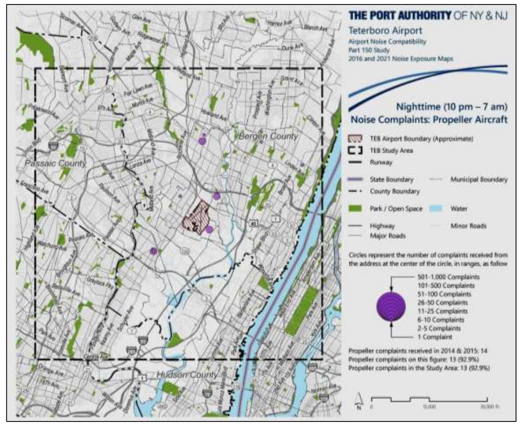
2014 and 2015 Day and Night Jet Complaints





2014 and 2015 Day and Night Propeller Complaints





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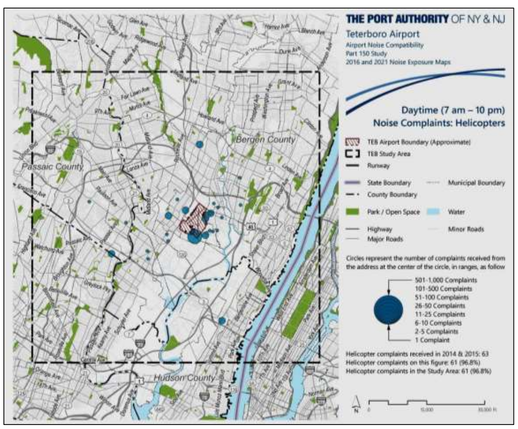
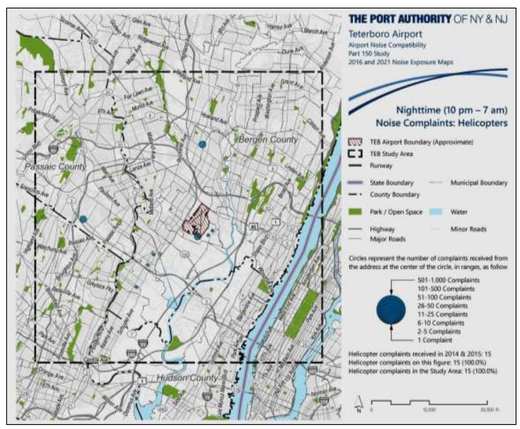
2014 and 2015 Day and Night Helicopter Complaints





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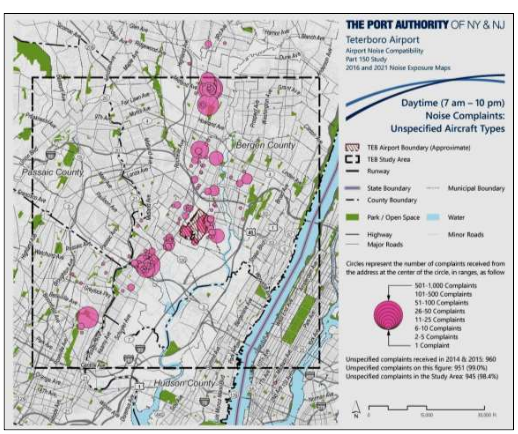
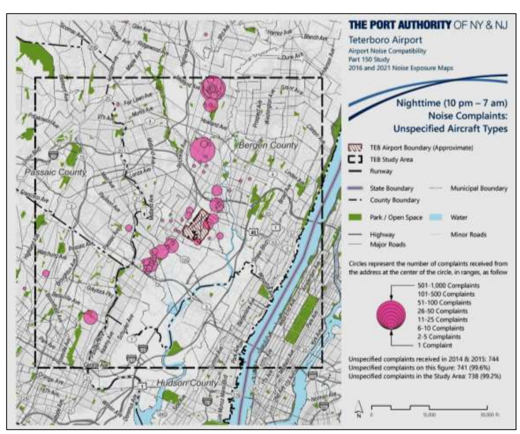
2014 and 2015 Day and Night Unspecified Complaints





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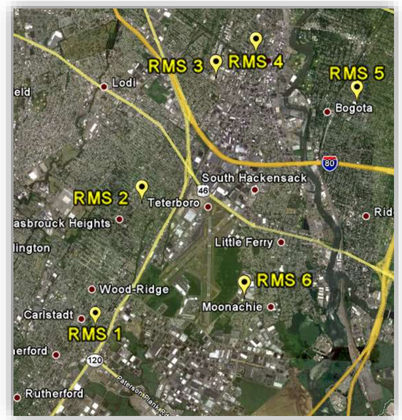
TEB Noise Monitoring Site (RMS) Locations

- TEB has six RMS installations
- Noise modeling results were compared to 2014 measurements at TAC #6
- We have made two revisions:
  - The modeling elevation of RMS 3 was revised to take into account its placement on the roof of Hackensack Hospital, approximately 210' above mean sea level, 202' above airport elevation
    - *Led to improved between measured and modeled DNL*
  - Measured data were obtained for 2015, to supplement 2014 data



2016 Modeled DNL vs. 2014 and 2015 Measured DNL

RMS #	2016 Modeled DNL [Note 1]	2014 Measured DNL	2016 Modeled-2014 Measured
1	62	58	+4
2	47	40	+7
3	61	61	0
4	55	52	+3
5	50	48	+2
6	53	52	+1

1. RMS 3 value updated from TAC 6 to take into account RMS elevation of 210'. Prior ground-elevation modeled estimate was 59 dB. Adjustment led to same measured and modeled values.

RMS #	2016 Modeled DNL [Note 1]	2015 Measured DNL [Note 2]	2016 Modeled-2015 Measured
1	62	58	+4
2	47	39	+8
3	61	62	-1
4	55	53	+2
5	50	45	+5
6	53	52	+1

2. 2015 data were not available for TAC 6 presentation. Measured and modeled agreement at RMS 3 is within 1 dB.

Comparison of Modeled and Measured DNL

- Adjustment of modeled height at RMS 3 improved agreement
- The 2014 and 2015 measured values relate to the 2016 modeled values in a very similar fashion
- Modeled is greater than measured in 5 out of 6 sites
- Greatest variation (7 - 8 dB) is at the site with least aircraft noise (RMS 2)
- These types of differences are not unusual when measuring well outside DNL 65, where aircraft DNL is close to or below non-aircraft DNL
- Automated monitoring systems have significant difficulty separating aircraft and non-aircraft noise at these types of locations
- Agreement within 2 dB is unusually close, even where aircraft noise dominates

Noise Compatibility Program Development Process

Step 1: Identify Incompatible Land Uses
Existing conditions Noise Exposure Map
Forecast conditions Noise Exposure Map

Provided in this presentation

Step 2: Consider Noise Abatement Strategies
Reduce exposure over incompatible uses
Limit growth in exposure over incompatible uses

Let's discuss

Step 3: Consider Land Use Strategies
Mitigate residual incompatible uses
Prevent introduction of new incompatible uses

Step 4: Consider Programmatic Strategies
Implement and ***promote*** measures
Monitor and ***report*** on effectiveness
Update NEMs and ***revise*** NCP as appropriate

Analysis and Selection Process Applied in Steps 2 - 4

- Evaluate effectiveness of each measure in addressing ***objectives***
- Evaluate feasibility (operational, safety, economic, etc.)
- Select preferred "package" of measures
- Identify implementation schedule, responsibilities, budget, funding sources, etc.
- If not recommended, document reasons

Initial identification of noise abatement alternatives

- At TAC 6, committee discussed existing 11 pm - 6 am voluntary curfew
  - Taking steps to improve compliance
  - Consideration of extending hours
- At TAC 2, committee discussed existing preferential runway measures
  - Runway 1 is the preferred arrival runway when landing to the north between 10 pm and 7 am
  - Runway 19 is the preferred departure runway when departing to the south between 10 pm and 7 am
- Focus on nighttime operations offers two potential advantages
  - Lower activity levels at night at TEB, EWR, and other airports reduce potential operational conflicts
  - Each night operation has ten times the effect of the same day operation
- *Recent counts of hour operations and runway use provide a basis for considering potential adjustments to both the voluntary curfew and runway use*

2014 night jet departure runway use - hourly and total

2014 Night Jet Departure Runway Use From Compuland
Numbers of Jet Departures over the Full Year per Night Hour

Hour Starting	Runway End 01	06	19	24	Total
2200	467	150	75	877	1,569
2300	**272**	**101**	**67**	**498**	**938**
0000	**163**	**71**	**55**	**254**	**543**
0100	**91**	**34**	**20**	**124**	**269**
0200	**43**	**20**	**10**	**54**	**127**
0300	**34**	**19**	**17**	**34**	**104**
0400	**63**	**23**	**13**	**53**	**152**
0500	**117**	**66**	**35**	**221**	**439**
0600	444	132	86	565	1,227
Total	1,694	616	378	2,680	5,368

Note: 5,368 night jet departures represent approximately 8% of approximately 71,000 total annual jet departures (day and night).

2014 Night Jet Departure Runway Use From Compuland
Percentages of Jet Departures over the Full Year per Night Hour

Hour Starting	Runway End 01	06	19	24	Total
2200	30%	10%	5%	56%	100%
2300	**29%**	**11%**	**7%**	**53%**	**100%**
0000	**30%**	**13%**	**10%**	**47%**	**100%**
0100	**34%**	**13%**	**7%**	**46%**	**100%**
0200	**34%**	**16%**	**8%**	**43%**	**100%**
0300	**33%**	**18%**	**16%**	**33%**	**100%**
0400	**41%**	**15%**	**9%**	**35%**	**100%**
0500	**27%**	**15%**	**8%**	**50%**	**100%**
0600	36%	11%	7%	46%	100%
Total	32%	11%	7%	50%	100%

Notes: Voluntary night curfew hours are in bold. Percentages may not add to 100% due to rounding.

2014 night jet arrival runway use - hourly and total

2014 Night Jet Arrival Runway Use From Compuland Numbers of Night Jet Arrivals over the Entire Year

Hour Starting	Runway End 01	06	19	24	Total
2200	115	686	932	429	2,162
2300	**92**	**466**	**601**	**320**	**1,479**
0000	**64**	**381**	**397**	**207**	**1,049**
0100	**38**	**248**	**205**	**115**	**606**
0200	**36**	**161**	**108**	**48**	**353**
0300	**18**	**120**	**66**	**38**	**242**
0400	**11**	**90**	**61**	**28**	**190**
0500	**26**	**112**	**93**	**45**	**276**
0600	57	235	261	98	651
Total	457	2,499	2,724	1,328	7,008

Note: 7,008 night jet arrivals represent approximately 10% of approximately 71,000 total annual jet arrivals (day and night).

2014 Night Jet Arrival Runway Use From Compuland Percentages of Night Jet Arrivals over the Entire Year

Hour Starting	Runway End 01	06	19	24	Total
2200	5%	32%	43%	20%	100%
2300	**6%**	**32%**	**41%**	**22%**	**100%**
0000	**6%**	**36%**	**38%**	**20%**	**100%**
0100	**6%**	**41%**	**34%**	**19%**	**100%**
0200	**10%**	**46%**	**31%**	**14%**	**100%**
0300	**7%**	**50%**	**27%**	**16%**	**100%**
0400	**6%**	**47%**	**32%**	**15%**	**100%**
0500	**9%**	**41%**	**34%**	**16%**	**100%**
0600	9%	36%	40%	15%	100%
Total	7%	36%	39%	19%	100%

Notes: Voluntary night curfew hours are in bold. Percentages may not add to 100% due to rounding.

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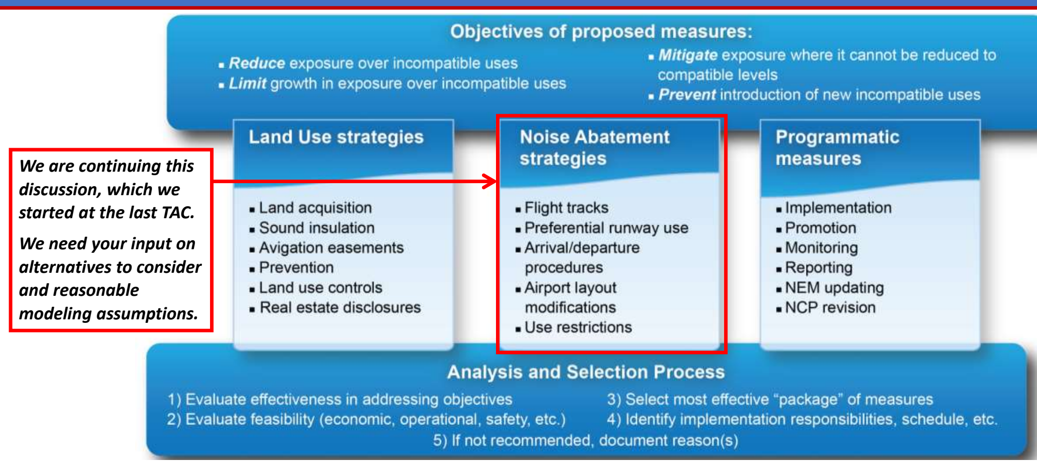
Noise Compatibility Program Development Process



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Noise abatement discussion: Follow-up from last TAC

- What can we do to improve compliance with the voluntary curfew?
  - Would operations simply shift to the "shoulder hours" (10-11 pm and 6-7 am)?
  - If so, there would be no change in DNL. Would people notice the improvement?
- Is it feasible to extend the hours of the voluntary night curfew?
  - Matching the DNL definition of night (10 pm - 7 am) would produce a benefit, if operations shifted to the day
- What could be done to increase night use of Runway 1 for arrivals and Runway 19 for departures?
- How can we develop reasonable modeling assumptions?
- What other noise abatement ideas can you suggest?

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Projected TAC & Public Meeting Topics, 2015-16

Date	Meeting	Major Actual / Anticipated Topics
July 2015	TAC 1 - ***Complete***	Introduction to Part 150, TAC process, etc.
September 2015	TAC 2 - ***Complete***	Overview of noise modeling process and inputs
October 2015	Workshop 1 - ***Complete***	Introduction to Part 150 and TEB study process
November 2015	TAC 3 - ***Complete***	Present initial draft noise modeling inputs and land use inventory status
January 2016	TAC 4 - ***Complete***	Present remaining draft noise modeling inputs
March 2016	TAC 5 - ***Complete***	Present final modeling input assumptions
May 2016	TAC 6 - ***Complete***	Present draft contours and introduce Noise Compatibility Program phase
July 2016	TAC 7 - ***Today***	Present Draft NEM contours and land use compatibility
Sept. 22, 2016	Workshop 2 (6 - 9 pm)	Present Draft NEM contours and land use compatibility
Sept. 23, 2016	TAC 8 (9 am - noon)	Present first-round noise abatement alternative analysis
3rd quarter 2016	NEM comment period	30-day period will overlap Workshop 2

Projected TAC & Public Meeting Topics, 2016-17

Date	Meeting	Major Actual / Anticipated Topics
November 17, 2016	TAC 9 (1 - 4 pm)	Present second-round noise abatement alternative analysis
January 2017	TAC 10	Present first-round compatible land use alternatives
March 2017	TAC 11	Present second-round compatible land use alternatives
May 2017	TAC 12	Recommend abatement and compatibility measures
June 2017	Workshop 3	Present draft NCP recommendations
June 2017	TAC 13	Discuss NCP monitoring and implementation
July 2017	TAC 14	Review NCP recommendations
September 2017	TAC 15	Discuss Draft NCP and public input
September 2017	Final Public Hearing on NCP	Present proposed NCP and revised NEMs

Wrap-Up

- Next meeting dates and topics
  - 2nd Workshop - September 22, 2016 (6-8 pm)
    - Multi-purpose room at the Bergen County Complex in Hackensack
  - 8th TAC - September 23, 2016
    - Presentation and discussion of noise contours, land use analyses, and factors related to first round of noise abatement alternatives. Solicitation of further TAC abatement suggestions.
- TAC member questions, comments, and discussion?
- Public comments?
- Thanks for attending!

Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Study

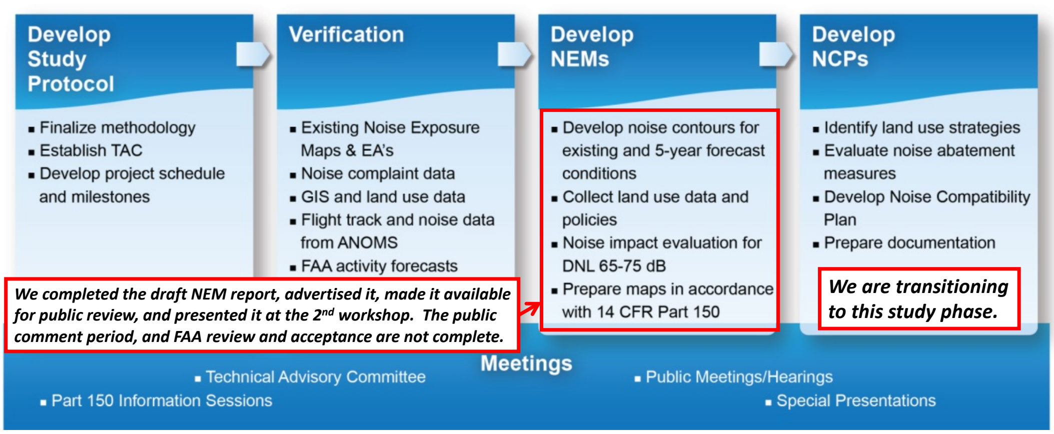
Technical Advisory Committee Meeting #8

September 23, 2016

Meeting Agenda

- Welcome and introductions
- Current status of Part 150 process
- Draft Noise Exposure Map report availability and comment period
- Overview of second public workshop - September 22, 2016
- Overview of NEM report
- Review of NCP discussions from prior TAC meetings
- Discussion of NY/NJ metropolitan airspace relative to TEB operations and abatement measures
- Upcoming Part 150 milestones
- TAC member discussion
- Study schedule update
- Public comment opportunity
- Adjournment

Generalized Part 150 Study Process / Schedule



Draft NEM Report Availability and Comment Period

- Comment period on draft NEM report is from September 15 - October 16
- Draft NEM report is available
  - On the Port Authority website, at: http://panynjpart150.com/TEB_DNEM.asp
  - At two physical locations:
    - TEB Manager's office, 90 Moonachie Avenue, 9:30 am to 4:00 pm (Mon to Fri)
    - Bergen County Plaza, 1st Fl. Multi-Purpose Room, Hackensack, 9:30 am to 4:00 pm (Mon to Fri)
- Draft NEM report availability and comment period advertised through:
  - Legal advertisements in English, Spanish, and Korean newspapers
  - Emailed notices to elected officials
  - Workshop (which was advertised in the above notices, 3rd newsletter, and flyers)
  - TAC meeting

Legal advertisements (September 15 issues except as noted)

- Newark Star Ledger
- Bergen Record
- Hasbrouck Heights Observer (*September 24th issue*)
- Hasbrouck Heights Gazette (*September issue distributed late August*)
- El Especialito (in Spanish)
- Korea Daily (in Korean)
- North Jersey TEB area weeklies
  - Community News (covers Hasbrouck Heights and Woodridge),
  - Little Ferry/Bogota/Ridgefield Hackensack Chronicle
  - South Bergenite

Legal Advertisements

THE PORT AUTHORITY OF NY & NJ

NOTICE OF DRAFT NOISE EXPOSURE MAP (NEM) REPORT
NOTICE OF PUBLIC INFORMATION WORKSHOP

14 Code of Federal (CFR) Part 150
Airport Noise Compatibility Study for
Teterboro Airport

As part of an on-going 14 CFR Part 150 Airport Noise Compatibility Planning Study, the Port Authority of New York and New Jersey (PANYNJ) has completed the Draft Noise Exposure Maps per the requirements of the 14 CFR Part 150 requirements. A notice hereby is given that the copies of the Draft Noise Exposure Map Report is available for public review and comment at the following locations:

LOCATION 1:	**LOCATION 2:**
The Port Authority of NY & NJ	Bergen County Plaza
Teterboro Airport	1st Floor Multi-Purpose Room
90 Moonachie Avenue	One Bergen County Plaza
Teterboro, NJ 07608	Hackensack, NJ 07601
Attn: Terri Lee	Attn: Department of Planning
Hours: 8:30 am to 4:30 pm (Mon to Fri)	Hours: 9:30 am to 4:00 pm (Mon to Fri)

The Draft NEM Report will be available at these locations until the close of the comment period, which is 5:00 PM on October 17, 2016. In addition, a copy of this document may be viewed online at: http://panynjpart150.com/TEB_DNEM.asp

All comments on the Draft Noise Exposure Map (NEM) Report should be sent to: The Port Authority of NY & NJ, 4 World Trade Center,150 Greenwich Street, 18th Floor, New York, NY 10007, Attn: Timothy Middleton. In addition, comments may be emailed to NJPART150@panynj.gov

TETERBORO AIRPORT (TEB) PUBLIC INFORMATION WORKSHOP

Additional information regarding the Part 150 Study, and an opportunity to ask questions and comment on the Draft NEM Report will be available to the Public through an Information Session. The details of the date, time, and location of the workshop are listed below.

DATE: Thursday, September 22, 2016
TIME: 6:00 pm to 9:00 pm
LOCATION: Bergen County Plaza, 1st Floor Multi-Purpose Room
One Bergen County Plaza, Hackensack, NJ 07601

The workshop will be held in an "open house" format from 6 p.m. to 9 p.m. In order to provide the public with the maximum opportunity for one-on-one interaction and sharing of information and concerns you may attend at any time during the three-hour open house.

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the PANYNJ Noise Office at 212-435-3777 or via email at NJPART150@panynj.gov no less than 72 hours before the workshop.

For more information, please call the PANYNJ Noise Office at 212-435-3777 or visit the project website at: http://panynjpart150.com/TEB_homepage.asp

THE PORT AUTHORITY OF NY & NJ

소음노출지도(NEM) 보고서 초안 발표 공지
공공 정보 워크숍 개최 안내
미국연방규정집 제14권 제150부
테터보로 공항 소음방지연구

Port Authority of New York and New Jersey (PANYNJ)는 미국연방규정집 제14권 제150부에 의거하여 계속 진행 중인 테터보로(TEB) 소음방지계획 연구의 일환으로, 동 규정의 요구사항에 따라 소음노출지도(NEM) 보고서 초안 작성을 완료했습니다. 소음노출지도(NEM) 보고서 초안의 사본을 다음 장소에서 배포하오니 내용을 검토하시고 의견 주시기 바랍니다.

위치 1:	**위치 2:**
The Port Authority of NY & NJ	버겐 카운티 플라자(Bergen County Plaza)
테터보로 공항	1층 다목적실(Multi-Purpose Room)
90 Moonachie Avenue	One Bergen County Plaza
Teterboro, NJ 07608	Hackensack, NJ 07601
담당: 테리 리(Terri Lee)	담당: Department of Planning
운영 시간: 오전 8:30 ~ 오후 4:30(월 ~ 금)	운영 시간: 오전 9:30 ~ 오후 4:00(월 ~ 금)

소음노출지도(NEM) 보고서 초안은 의견 제출 마감 시한인 2016년 10월 17일 오후 5:00까지 다음 장소에서 배포됩니다. 또한 다음 링크에서 온라인으로도 해당 사본을 보실 수 있습니다. http://panynjpart150.com/TEB_DNEM.asp

소음노출지도(NEM) 보고서 초안에 대한 의견은 다음 주소로 보내 주십시오. The Port Authority of NY & NJ, 4 World Trade Center,150 Greenwich Street, 18th Floor, New York, NY 10007, Attn: Timothy Middleton. 또한 이메일 NJPART150@panynj.gov 로 보내 주셔도 됩니다.

테터보로 공항(TEB)에 대한 공공 정보 워크숍

일반인을 대상으로 하는 이번 정보 워크숍을 통해 미국연방규정집 제14권 제150부에 의거한 본 연구에 관한 추가 정보를 확인하고 보고서에 대해 질문하거나 의견을 제시할 수 있는 기회를 드립니다. 워크숍 개최 날짜, 시간 및 위치는 다음과 같습니다.

날짜: 2016년 9월 22일 목요일
시간: 오후 6:00 ~ 9:00
위치: 버겐 카운티 플라자(Bergen County Plaza) 1층 다목적실(Multi-Purpose Room)
One Bergen County Plaza, Hackensack, NJ 07601

'오픈 하우스' 형식을 취하는 본 워크숍은 여러분과 일대일로 소통하고 정보 및 관심사를 나누는 기회를 최대한 드릴 수 있도록 오후 6시부터 9시까지 총 3시간 동안 언제든지 중간에 참석하실 수 있습니다.

본 Part 150 공공 정보 워크숍은 장애로 이동에 불편을 겪는 분들도 참석하실 수 있도록 편의를 제공합니다. 언어 통역 서비스를 미리 요청하시면 제공해 드립니다. 통역 서비스가 필요한 경우, 워크숍 개최 시간으로부터 늦어도 72시간 전까지 PANYNJ 소음관리국에 전화 212-435-3777 또는 이메일 NJPART150@panynj.gov 로 연락하여 요청하셔야 합니다.

자세한 정보는 PANYNJ 소음관리국에 전화 212-435-3777로 문의하거나 아래 프로젝트 홈페이지에서 참조하시기 바랍니다. http://panynjpart150.com/TEB_homepage.asp

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AVISO DEL BORRADOR DEL INFORME DEL MAPA DE EXPOSICIÓN AL RUIDO (NEM, POR SUS SIGLAS EN INGLÉS)
AVISO DE TALLER INFORMATIVO PÚBLICO

Código Federal (CFR) 14 Parte 150
Estudio de Compatibilidad de Ruido de Aeropuertos para el Aeropuerto Teterboro

Como parte de un Estudio continuo de planificación de compatibilidad de ruido de aeropuertos 14 CFR Parte 150, la Autoridad Portuaria de Nueva York y Nueva Jersey (The Port Authority of New York & New Jersey, PANYNJ) ha completado el borrador de los Mapas de exposición al ruido de acuerdo a los requisitos del 14 CFR Parte 150. Por medio del presente se informa que las copias del Borrador del Informe de Mapas de Exposición al Ruido están disponibles para revisión y comentarios del público en las siguientes ubicaciones:

UBICACIÓN 1:	**UBICACIÓN 2:**
The Port Authority of NY & NJ	Bergen County Plaza
Aeropuerto Teterboro	1er Piso, Salón multipropósitos
90 Moonachie Avenue, Teterboro, NJ 07608	One Bergen County Plaza, Hackensack, NJ 07601
Atención: Terri Lee	Atención: Departamento de Planificación
Horario: Lunes a viernes de 8:30 a.m. a 4:30 p.m.	Horario: Lunes a viernes de 9:30 a.m. a 4:00 p.m.

El borrador del Informe NEM estará disponible en estos lugares hasta el cierre del período de comentarios, es decir, 17 de octubre de 2016 a las 5 p.m. Además, puede ver una copia de este documento en línea en: http://panynjpart150.com/TEB_DNEM.asp

Todos los comentarios del Borrador del Informe de Mapas de Exposición al Ruido (NEM) deben enviarse a: The Port Authority of NY & NJ, 4 World Trade Center,150 Greenwich Street, 18th Floor, New York, NY 10007, Attn: Timothy Middleton. También se pueden enviar los comentarios por vía electrónica a NJPART150@panynj.gov

TALLER INFORMATIVO PÚBLICO DEL AEROPUERTO TETERBORO (TEB)

Información adicional referente al Estudio Parte 150 y una oportunidad de hacer preguntas y comentarios sobre el Borrador del Informe NEM estarán disponibles al público a través de una Sesión Informativa. Los detalles de la fecha, hora y lugar del taller se indican a continuación.

FECHA: Jueves, 22 de septiembre de 2016
HORA: 6:00 a 9:00 pm
UBICACIÓN: Bergen County Plaza, 1er Piso, Salón multipropósitos
One Bergen County Plaza, Hackensack, NJ 07601

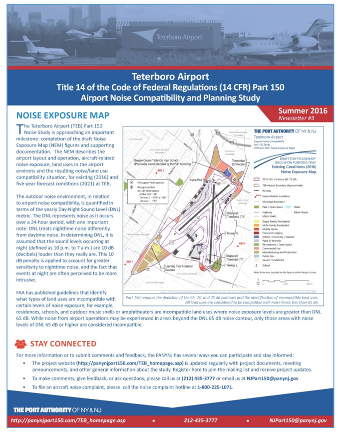
El taller se llevará a cabo en un "open house" de 6 a 9 p.m. Para dar al público la máxima oportunidad de tener una interacción uno a uno y compartir información e inquietudes que pueda tener, acuda a cualquier hora durante el open house de tres horas.

El taller informativo público de la Parte 150 tiene accesibilidad para personas con problemas de movilidad. Hay disponibles servicios de interpretación de idiomas con previa solicitud. Para hacer arreglos para dichos servicios, sírvase comunicarse a la Oficina de Ruido de PANYNJ al 212-435-3777 o por correo electrónico a NJPART150@panynj.gov a más tardar 72 horas antes del taller.

Para obtener más información, llame a la Oficina de Ruido de PANYNJ al 212-435-3777 o visite la página web del proyecto: http://panynjpart150.com/TEB_homepage.asp

Third Newsletter

- Advertised 2nd workshop
- Distributed late August
- Distributed to all parties who have signed up via the website or other methods, and others the PA has added to the website based on prior involvement/interest


Teterboro Airport
Title 14 of the Code of Federal Regulations (14 CFR) Part 150
Airport Noise Compatibility and Planning Study

Summer 2016
Newsletter #3

NOISE EXPOSURE MAP

The Teterboro Airport (TEB) Part 150 Noise Study is approaching an important milestone: completion of the draft Noise Exposure Map (NEM) figures and supporting documentation. The NEM describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs and the resulting noise/land use compatibility situation, for existing (2016) and five-year forecast conditions (2021) at TEB.

The outdoor noise environment, in relation to airport noise compatibility, is quantified in terms of the yearly Day-Night Sound Level (DNL) metric. The DNL represents noise as it occurs over a 24-hour period, with one important note: DNL treats nighttime noise differently from daytime noise. In determining DNL, it is assumed that the sound levels occurring at night (defined as 10 p.m. to 7 a.m.) are 10 dB (decibels) louder than they really are. This 10 dB penalty is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive.

FAA has published guidelines that identify what types of land uses are incompatible with certain levels of noise exposure; for example, residences, schools, and outdoor music shells or amphitheaters are incompatible land uses where noise exposure levels are greater than DNL 65 dB. While noise from airport operations may be experienced in areas beyond the DNL 65 dB noise contour, only those areas with noise levels of DNL 65 dB or higher are considered incompatible.

Part 150 requires the depiction of the 65, 70, and 75 dB contours and the identification of incompatible land uses. All land uses are considered to be compatible with noise levels less than 65 dB.

STAY CONNECTED

For more information or to submit comments and feedback, the PANYNJ has several ways you can participate and stay informed:

- The project website (http://panynjpart150.com/TEB_homepage.asp) is updated regularly with project documents, meeting announcements, and other general information about the study. Register here to join the mailing list and receive project updates.
- To make comments, give feedback, or ask questions, please call us at (212) 435-3777 or email us at NJPart150@panynj.gov
- To file an aircraft noise complaint, please call the noise complaint hotline at 1-800-225-1071.

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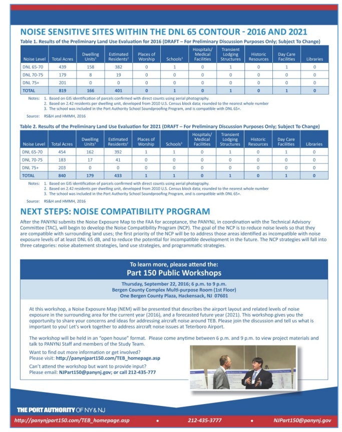
NOISE SENSITIVE SITES WITHIN THE DNL 65 CONTOUR - 2016 AND 2021

Table 1. Results of the Preliminary Land Use Evaluation for 2016 (DRAFT – For Preliminary Discussion Purposes Only; Subject To Change)

Noise Level	Total Acres	Dwelling Units[1]	Estimated Residents[2]	Places of Worship	Schools[3]	Hospitals/ Medical Facilities	Transient Lodging Structures	Historic Resources	Day Care Facilities	Libraries
DNL 65-70	439	158	382	0	1	0	1	0	1	0
DNL 70-75	179	8	19	0	0	0	0	0	0	0
DNL 75+	201	0	0	0	0	0	0	0	0	0
TOTAL	819	166	401	0	1	0	1	0	1	0

Notes: 1. Based on GIS identification of parcels confirmed with direct counts using aerial photography.
2. Based on 2.42 residents per dwelling unit, developed from 2010 U.S. Census block data; rounded to the nearest whole number
3. The school was included in the Port Authority School Soundproofing Program, and is compatible with DNL 65+.

Source: RS&H and HMMH, 2016

Table 2. Results of the Preliminary Land Use Evaluation for 2021 (DRAFT – For Preliminary Discussion Purposes Only; Subject To Change)

Noise Level	Total Acres	Dwelling Units[1]	Estimated Residents[2]	Places of Worship	Schools[3]	Hospitals/ Medical Facilities	Transient Lodging Structures	Historic Resources	Day Care Facilities	Libraries
DNL 65-70	454	162	392	1	1	0	1	0	1	0
DNL 70-75	183	17	41	0	0	0	0	0	0	0
DNL 75+	203	0	0	0	0	0	0	0	0	0
TOTAL	840	179	433	1	1	0	1	0	1	0

Notes: 1. Based on GIS identification of parcels confirmed with direct counts using aerial photography.
2. Based on 2.42 residents per dwelling unit, developed from 2010 U.S. Census block data; rounded to the nearest whole number
3. The school was included in the Port Authority School Soundproofing Program, and is compatible with DNL 65+.

Source: RS&H and HMMH, 2016

NEXT STEPS: NOISE COMPATIBILITY PROGRAM

After the PANYNJ submits the Noise Exposure Map to the FAA for acceptance, the PANYNJ, in coordination with the Technical Advisory Committee (TAC), will begin to develop the Noise Compatibility Program (NCP). The goal of the NCP is to reduce noise levels so that they are compatible with surrounding land uses; the first priority of the NCP will be to address those areas identified as incompatible with noise exposure levels of at least DNL 65 dB, and to reduce the potential for incompatible development in the future. The NCP strategies will fall into three categories: noise abatement strategies, land use strategies, and programmatic strategies.

To learn more, please attend the:
Part 150 Public Workshops

Thursday, September 22, 2016; 6 p.m. to 9 p.m.
Bergen County Complex Multi-purpose Room (1st Floor)
One Bergen County Plaza, Hackensack, NJ 07601

At this workshop, a Noise Exposure Map (NEM) will be presented that describes the airport layout and related levels of noise exposure in the surrounding area for the current year (2016), and a forecasted future year (2021). This workshop gives you the opportunity to share your concerns and ideas for addressing aircraft noise around TEB. Please join the discussion and tell us what is important to you! Let's work together to address aircraft noise issues at Teterboro Airport.

The workshop will be held in an "open house" format. Please come anytime between 6 p.m. and 9 p.m. to view project materials and talk to PANYNJ Staff and members of the Study Team.

Want to find out more information or get involved?
Please visit: http://panynjpart150.com/TEB_homepage.asp

Can't attend the workshop but want to provide input?
Please email: NJPart150@panynj.gov; or call 212-435-777

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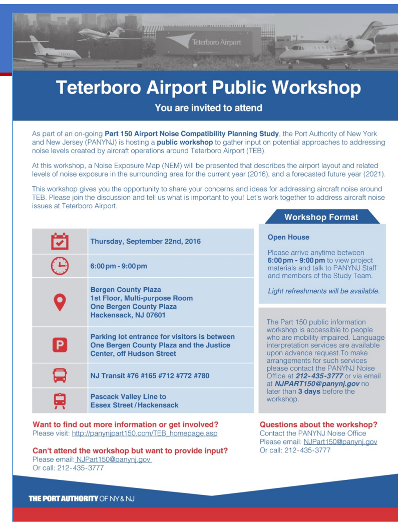
Workshop Flyer

- Re-advertised second workshop
- Distributed mid-September
- Distributed to all parties who have signed up via the website or other methods, and others the PA has added to the website based on prior involvement/interest
- English, Korean, and Spanish versions


Teterboro Airport Public Workshop
You are invited to attend

As part of an on-going **Part 150 Airport Noise Compatibility Planning Study**, the Port Authority of New York and New Jersey (PANYNJ) is hosting a **public workshop** to gather input on potential approaches to addressing noise levels created by aircraft operations around Teterboro Airport (TEB).

At this workshop, a Noise Exposure Map (NEM) will be presented that describes the airport layout and related levels of noise exposure in the surrounding area for the current year (2016), and a forecasted future year (2021).

This workshop gives you the opportunity to share your concerns and ideas for addressing aircraft noise around TEB. Please join the discussion and tell us what is important to you! Let's work together to address aircraft noise issues at Teterboro Airport.

Thursday, September 22nd, 2016

6:00 pm - 9:00 pm

Bergen County Plaza
1st Floor, Multi-purpose Room
One Bergen County Plaza
Hackensack, NJ 07601

Parking lot entrance for visitors is between One Bergen County Plaza and the Justice Center, off Hudson Street

NJ Transit #76 #165 #712 #772 #780

Pascack Valley Line to Essex Street / Hackensack

Workshop Format

Open House

Please arrive anytime between **6:00 pm - 9:00 pm** to view project materials and talk to PANYNJ Staff and members of the Study Team.

Light refreshments will be available.

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the PANYNJ Noise Office at ***212-435-3777*** or via email at ***NJPART150@panynj.gov*** no later than **3 days** before the workshop.

Want to find out more information or get involved?
Please visit: http://panynjpart150.com/TEB_homepage.asp

Can't attend the workshop but want to provide input?
Please email: NJPart150@panynj.gov
Or call: 212-435-3777

Questions about the workshop?
Contact the PANYNJ Noise Office
Please email: NJPart150@panynj.gov
Or call: 212-435-3777

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Overview of 2nd Public Workshop

- Thursday, September 22, 2016 from 6 - 9 p.m.
- Bergen County Plaza, 1st Floor Multi-purpose room, Hackensack
- Seven "stations" (in addition to "Welcome/Sign-In")
  1. Part 150 Overview and Process
  2. Forecast
  3. Land Use
  4. Noise Exposure Map
  5. Where's My House?
  6. Port Authority Flight Tracking and Noise Information System
  7. Next Steps/Public Comments/Document
- Discussion of attendance and other observations by TAC attendees

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Organization of Draft NEM Report

Main Body

- Executive Summary
- Sponsor's Certification (Executed in final submission)
    - FAA Checklist
    - Glossary

1. Introduction
2. Background
3. Land Use
4. Development of Noise Exposure Maps
5. 2016 and 2021 Noise Exposure Maps
6. Stakeholder Engagement

Appendix Volume

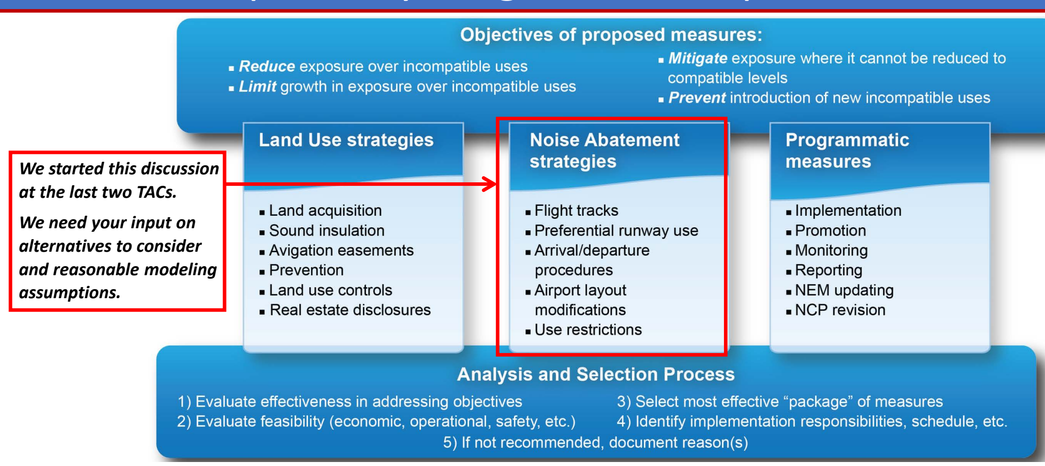
A. Fundamentals of Characterizing Sound, Noise Effects, and Metrics
B. Noise Complaints
C. Land Use
D. Memorandum for Continued Use of INM and Noise Modeling Inputs
E. Supplemental Contours
F. Advisory Committee
G. Public Outreach
H. Comments (Will be included and addressed in final submission to FAA)

Let's take a quick look at the workshop boards that were used last night to summarize the draft NEM.

Workshop Boards

- We will review the workshop boards at this point in the presentation
- For those who wish to review them outside of the TAC meeting, they are available on line at: http://panynjpart150.com/TEB_PIW.asp

Noise Compatibility Program Development Process



Review of NCP Discussions from Prior TAC meetings

- Existing 11 pm - 6 am voluntary curfew
  - What can we do to improve compliance with the voluntary curfew?
    - Would operations simply shift to the "shoulder hours" (10-11 pm and 6-7 am)?
    - If so, there would be no change in DNL. Would people notice the improvement?
  - Is it feasible to extend the hours of the voluntary night curfew?
    - Matching the DNL definition of night (10 pm - 7 am) would produce a benefit, if operations shift to the day
- Existing preferential runway measures
  - Runway 1 is the preferred arrival runway when landing to the north from 10 pm to 7 am
  - Runway 19 is the preferred departure runway when departing to the south from 10 pm to 7 am
  - Can we increase night use of Runway 1 for arrivals and Runway 19 for departures?
- How can we develop reasonable modeling assumptions for these alternatives?
- ***What other noise abatement ideas can you suggest?***

Discussion of NY/NJ Metropolitan Airspace

- Implications relative to TEB operations and abatement measures
- FAA staff will lead the presentation and follow-up discussion

TAC & Public Meeting Topics, 2015-16 *to-date*

Date	Meeting	Major Actual / Anticipated Topics
July 2015	TAC 1 - ***Complete***	Introduction to Part 150, TAC process, etc.
September 2015	TAC 2 - ***Complete***	Overview of noise modeling process and inputs
October 2015	Workshop 1 - ***Complete***	Introduction to Part 150 and TEB study process
November 2015	TAC 3 - ***Complete***	Present initial draft noise modeling inputs and land use inventory status
January 2016	TAC 4 - ***Complete***	Present remaining draft noise modeling inputs
March 2016	TAC 5 - ***Complete***	Present final modeling input assumptions
May 2016	TAC 6 - ***Complete***	Present draft contours and introduce Noise Compatibility Program phase
July 2016	TAC 7 - ***Complete***	Present Draft NEM contours and land use compatibility
Sept. 22, 2016	Workshop 2 - ***Complete***	Present Draft NEM contours and land use compatibility
Sept. 23, 2016	TAC 8	Continue discussion of noise abatement alternatives for consideration
9/15 - 10/16/2016	NEM comment period	***Please review the draft NEM and provide any comments!***

Projected TAC & Public Meeting Topics, 2016-17

Date	Meeting	Major Actual / Anticipated Topics
November 17, 2016	TAC 9 (1 - 4 pm)	Present noise abatement alternative analysis
January 2017	TAC 10	Present additional noise abatement analyses and first-round compatible land use alternatives
March 2017	TAC 11	Present second-round compatible land use alternatives
May 2017	TAC 12	Recommend abatement and compatibility measures
June 2017	Workshop 3	Present draft NCP recommendations
June 2017	TAC 13	Discuss NCP monitoring and implementation
July 2017	TAC 14	Review NCP recommendations
September 2017	TAC 15	Discuss Draft NCP and public input
September 2017	Final Public Hearing on NCP	Present proposed NCP and revised NEMs

Wrap-Up

- Next meeting date and topics
  - 9th TAC - November 17, 2016, 1 - 4 p.m.
    - Presentation and discussion of noise contours, land use analyses, and factors related to first round of noise abatement alternatives.
    - We need your noise abatement analysis suggestions.
- TAC member questions, comments, and discussion?
- Public comments?
- Thanks for attending!

Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Study

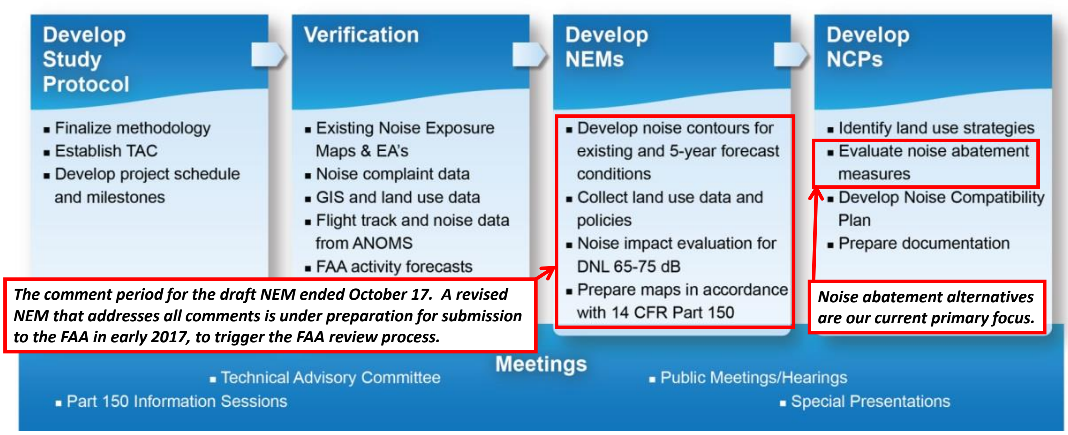
Technical Advisory Committee Meeting #9

November 17, 2016

Meeting Agenda

- Welcome and introductions
- Review current status of Part 150 process
- NEM Status
- NCP noise abatement discussion
- Upcoming Part 150 milestones
- TAC member discussion
- Study schedule update
- Public comment opportunity
- Adjournment

Generalized Part 150 Study Process / Schedule



Draft NEM comment period ended at 5 pm on Oct. 17, 2016

- 22 comments were received *during* the comment period
  - 10 comment forms were submitted at or following the September 22, 2016 workshop
  - One letter was submitted at the September 22, 2016 workshop
  - 11 emails were submitted via the Port Authority's Part 150 website
- Two comments were submitted via the Part 150 website *prior* to the comment period; their content was similar to those received during the comment period
  - These comments also will be documented in the NEM
- A petition supporting the Runway 19 Quiet Visual Approach was submitted with a request that it provided to the FAA for their consideration in that separate study
  - 28 full or partial pages of signatures
  - The petition will not be treated as an Part 150 comment; however other Part 150 comments raised similar issues, so the topic of Runway 19 approaches is covered

General comment categories

- Two comments present detailed questions regarding the preparation of the NEM and requests for related documentation
- Most comments offer observations regarding the effects of aircraft noise, including low, loud, and frequent operations, and request consideration of a range of compatibility measures, such as:
  - Support for the Runway 19 Quiet Visual approach
  - Other noise abatement flight paths
  - "Rotational" or "switched" runway use
  - Noise fees
  - Mandatory restrictions
  - Reduce frequency of operations
  - New runway between Runways 19 and 24
  - Close airport
  - Noise barriers
  - Residential and school sound insulation
  - Payments to residents
  - Other variants of these
- We will provide a detailed summary of these suggestions at the next TAC meeting
- Three comments note the interaction of TEB and EWR operations and noise

Review of NCP Discussions from Prior TAC meetings

- Existing 11 pm - 6 am voluntary restraint from operation
  - What can we do to improve compliance with the voluntary restraint from operation?
    - Would operations simply shift to the "shoulder hours" (10-11 pm and 6-7 am)?
    - If so, there would be no change in DNL. Would people notice the improvement?
  - Is it feasible to extend the hours of the voluntary restraint from operation?
    - Using DNL's 10 pm - 7 am definition of night would only produce a benefit if operations shift to the day
- Existing preferential runway measures
  - Runway 1 is the preferred arrival runway when landing to the north from 10 pm to 7 am
  - Runway 19 is the preferred runway for departures to the south from 10 pm to 7 am
  - Can we increase night use of Runway 1 for arrivals and Runway 19 for departures?
- How can we develop reasonable modeling assumptions for these alternatives?

Analyses requested at TACs and Workshops, and in comments

- Prepare contours presenting the contributions of specific categories of operations to the total DNL, to assist in focusing analyses
  - These types of contours are commonly called "partial" DNL contours
- Consider runway use changes to shift nighttime operations from the southwest end of Runway 6/24 to the south end of Runway 1/19
- Consider daytime use of the Runway 19 Quiet One Visual approach
- Consider a Runway 24 noise abatement departure turn to south
- Consider distributions of operations by day of week and hour of the day
- Review recently approved NCP measures (FAA presentation)
- Minimum scope of NCP analyses identified in Part 150

Note: These requests reflect overlapping input from a variety of TAC members, workshop attendees and commenters. They are not suggestions from any specific individuals or groups.

"Partial" DNL Contributed by Specific Categories of Operations

Categories Considered

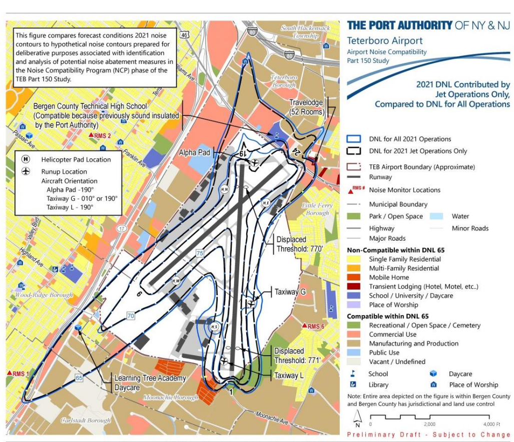
- Jet operations only
- Day (7 pm - 10 am operations only
- Night (10 pm - 7 am) operations only
- Departures only
  - Day departures only
  - Night departures only
- Arrivals only
  - Day arrivals only
  - Night arrivals only

Notes Regarding the Figures

- Each figure compares the *partial* contribution of the specified category of operations to the *total* annual DNL
- We are presenting the results for 2021, since the 2016 and 2021 contours are very similar, with the 2021 contours being slightly larger
- *As noted on the figures, the contours are not Noise Exposure Map figures and are presented for discussion purposes only*

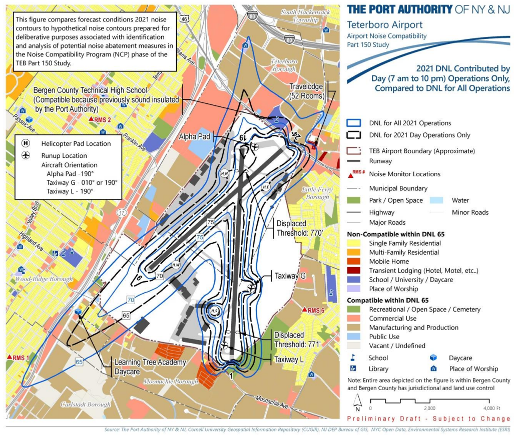
Contribution of Jets Only

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for jet operations only.



Contribution of Day Operations Only

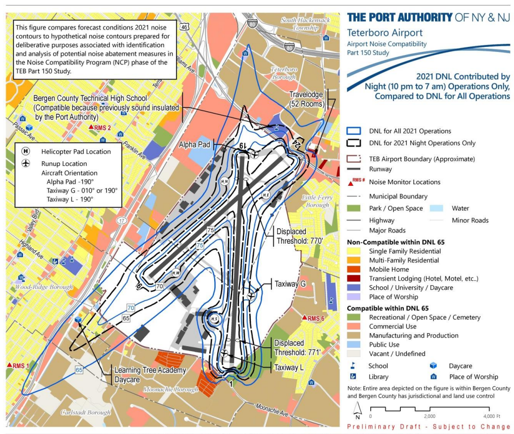
These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for day (7 am - 10 pm) operations only.



10

Contribution of Night Operations Only

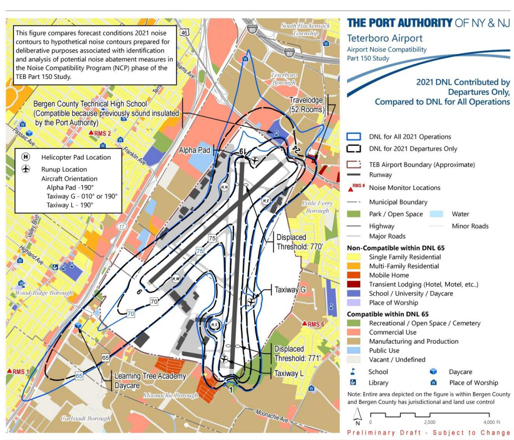
These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for night (10 pm - 7 am) operations only.



11

Contribution of Departures Only

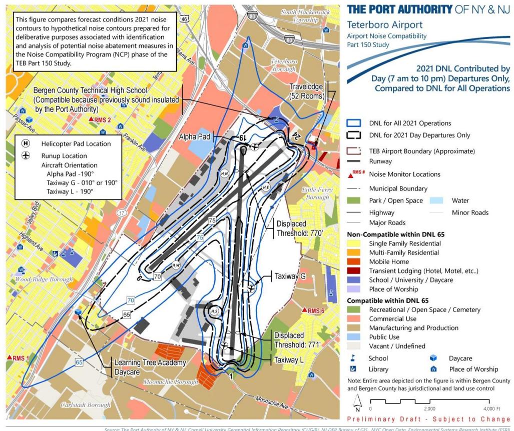
These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for departure operations only.



12

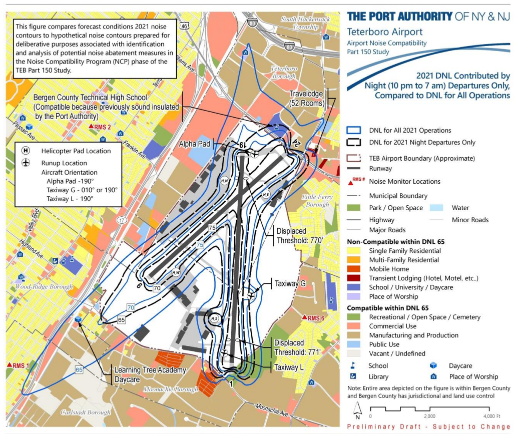
Contribution of Day Departures Only

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for day (7 am - 10 pm) departure operations only.



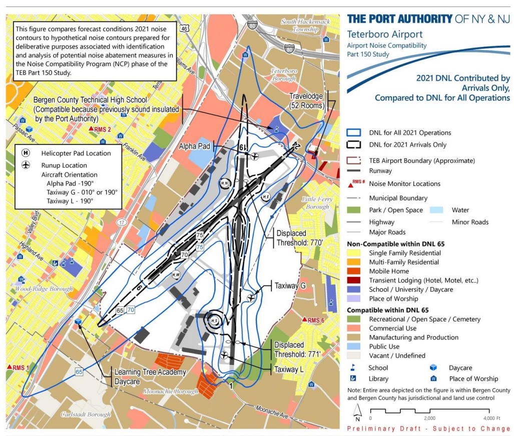
Contribution of Night Departures Only

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for night (10 pm - 7 am) departure operations only.



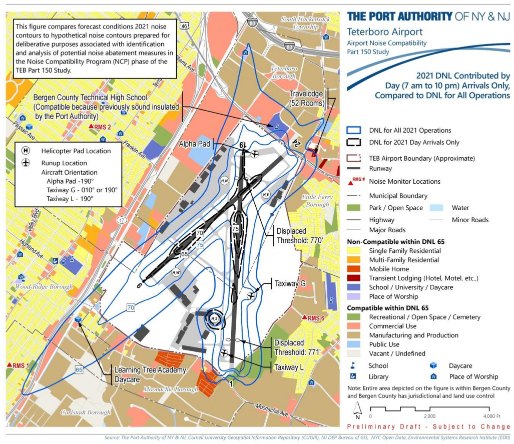
Contribution of Arrivals Only

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for arrival operations only.



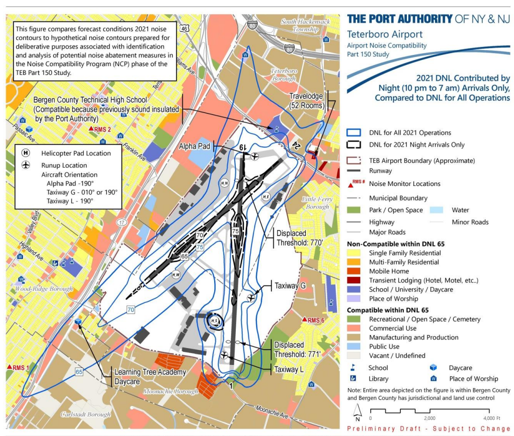
Contribution of Day Arrivals Only

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for day (7 am - 10 pm) arrival operations only.



Contribution of Night Arrivals Only

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL for night (10 pm - 7 am) arrival operations only.



Observations Regarding Partial Contributions to Total Annual DNL

- Jet operations overwhelmingly dominate total DNL
- Departures contribute far more to total DNL than arrivals
- The contributions of daytime and nighttime operations are nearly equal
  - Daytime operations contribute slightly more than nighttime
  - 10 dB night weighting is roughly balanced by larger number of daytime operations
- To obtain a significant change in the DNL 65 contour
  - Must affect jet departures
  - Minimal DNL benefit from changes in arrivals or non-jet operations
  - Changes in night jet departures will provide the greatest benefit relative to the number of operations affected

Analyses requested at TACs and Workshops

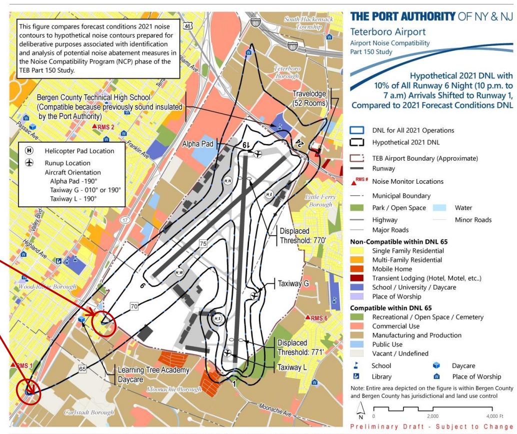
- Consider runway use changes to shift night (10 p.m. -7 a.m.) operations from the southwest end of Runway 6/24 to the south end of Runway 1/19
  - Shift Runway 6 arrivals to Runway 1
  - Shift Runway 24 departures to Runway 19
  - Combine these two shifts
  - In each case, we have tested 10% and 25% shifts in all aircraft types on a 24-hour basis
- Consider the Runway 19 Quiet One Visual approach
  - We have tested use of the procedure by 25% and 50% of daytime jet arrivals on Runway 19
- Consider a Runway 24 turn to south (195°) for all jet departures

Note: The following contours that were prepared in response to these requests are for use in assessing potential changes in noise exposure only; the analyses are not meant to imply that the proposed changes are operationally feasible.

Shift 10% of Runway 6 Night (10 pm - 7 am) Arrivals to Runway 1

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.

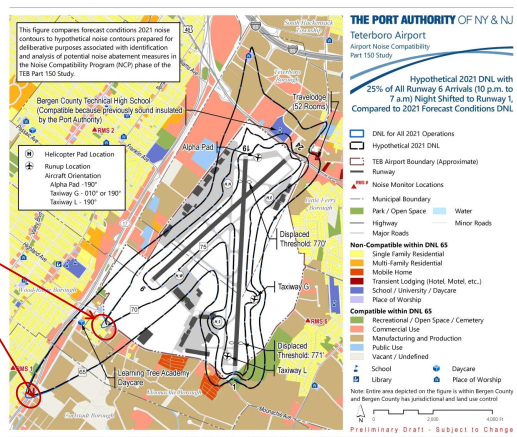
Very slight reduction in contour extent at "tips" of contours



Shift 25% of Runway 6 Night (10 pm - 7 am) Arrivals to Runway 1

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.

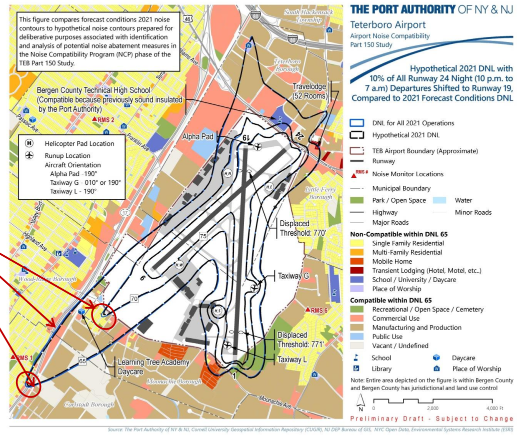
More noticeable reduction in contour extent at "tips" of contours



Shift 10% of Runway 24 Night (10 pm - 7 am) Departures to Runway 19

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.

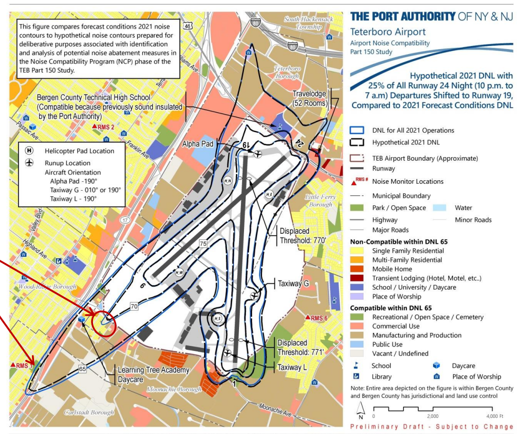
Slight reduction in contour extent at "tips" of contours and along sides of contours



Shift 25% of Runway 24 Night (10 pm - 7 am) Departures to Runway 19

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.

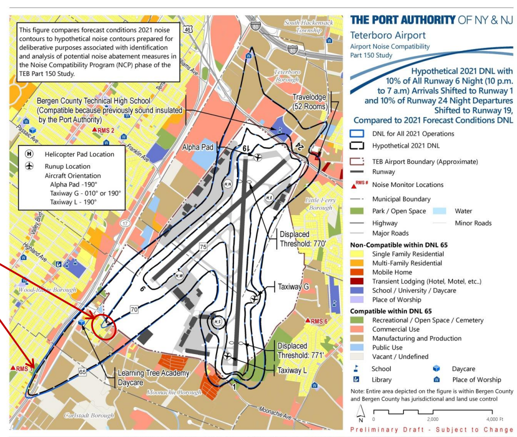
Reduction in contour extent at "tips" of contours and along sides of contours



Shift 10% of Runway 6 Night (10 pm - 7 am) Arrivals to Runway 1 and 10% of Runway 24 Night Departures to Runway 19

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.

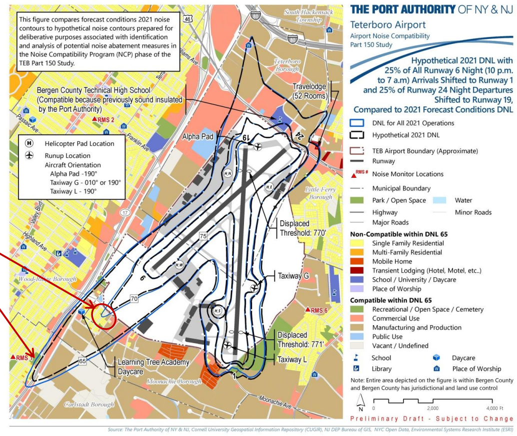
Reduction in contour extent at "tips" of contours and along sides of contours



Shift 25% of Runway 6 Night (10 pm - 7 am) Arrivals to Runway 1 and 25% of Runway 24 Night Departures to Runway 19

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.

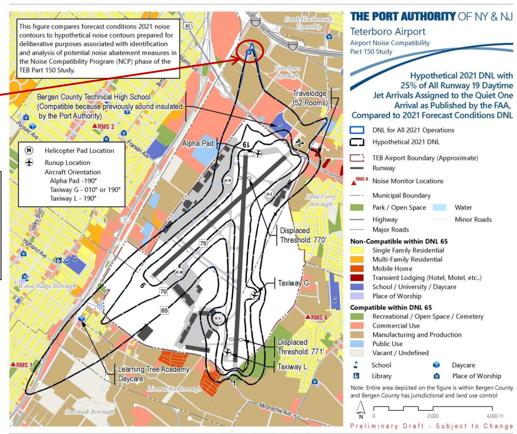
More noticeable reduction in contour extent at "tips" of contours and along sides of contours



Shift 25% of Runway 19 Day (7 am - 10 pm) Jet Arrivals to Quiet One Visual

Very slight reduction in contour extent at "tip" of contours

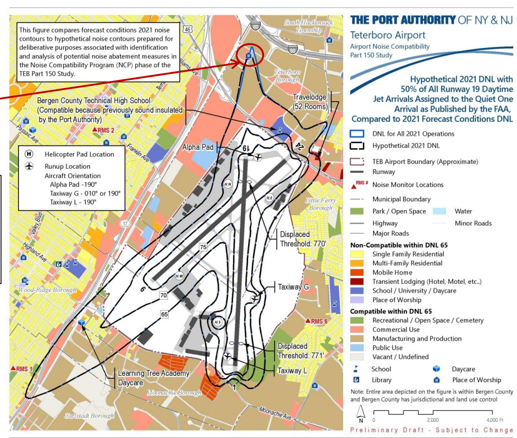
These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.



Shift 50% of Runway 19 Day (7 am - 10 pm) Jet Arrivals to Quiet One Visual

Very slight reduction in contour extent at "tip" of contours

These noise contours are not official Noise Exposure Maps. They compare forecast 2021 DNL for all operations to forecast 2021 DNL assuming operations are shifted as noted.

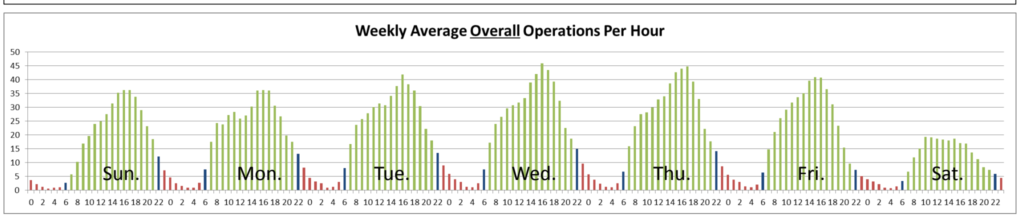


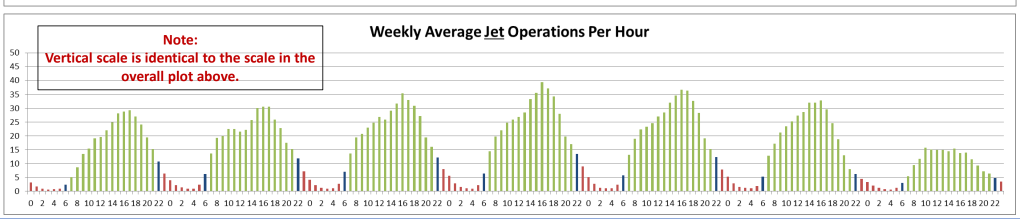
Operations by Day of Week and Hour of Day

- In response to requests for consideration of:
  - Share of operations occurring during DNL night hours (10 pm - 7 am)
  - Share of operations occurring during voluntary restraint hours (11 pm - 6 am)
  - Share of operations occurring during "shoulder" hours (10 - 11 pm and 6 - 7 am)
- Observations:
  - Nearly all night operations are in jets (with the exception of roughly two turboprop operations each weeknight)
  - The operations during the shoulder hours just before and after voluntary restraint hours (10 - 11 pm and 6 - 7 am) ***do not*** reflect a shift from the voluntary restraint period; the decline in operations in the evening and the increase in the morning do not show any "jump" due to the voluntary restraint from operation

Average Annual Oper'ns by Hour Throughout the Week - Total vs. Jets

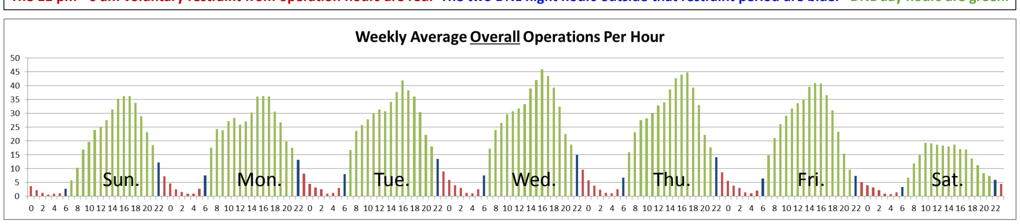
The 11 pm - 6 am voluntary restraint from operation hours are red. The two DNL night hours outside that restraint period are blue. DNL day hours are green.

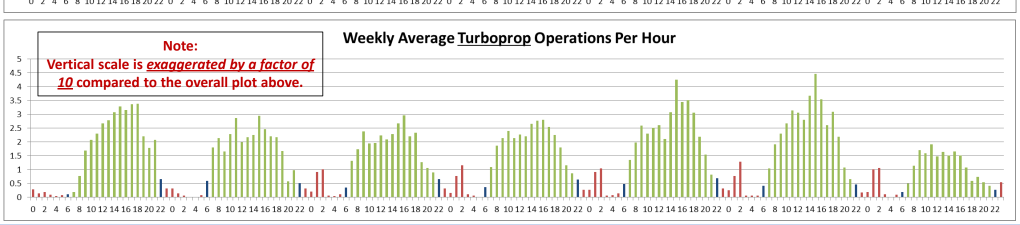




Average Annual Oper'ns by Hour Throughout the Week - Total vs. Turboprops

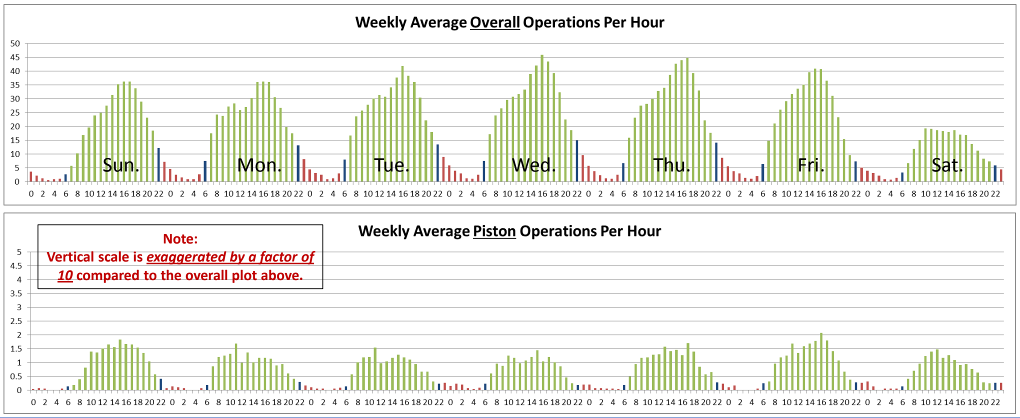
The 11 pm - 6 am voluntary restraint from operation hours are red. The two DNL night hours outside that restraint period are blue. DNL day hours are green.





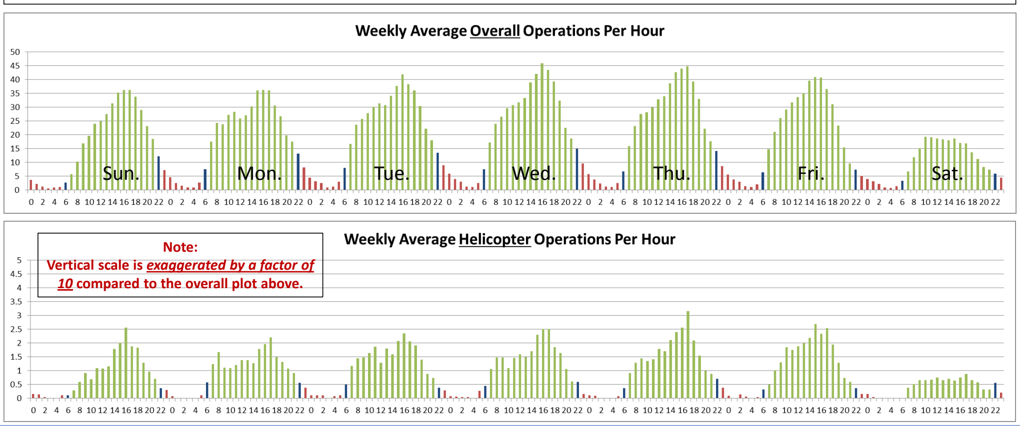
Average Annual Oper'ns by Hour Throughout the Week - Total vs. Piston Props

The 11 pm - 6 am voluntary restraint from operation hours are red. The two DNL night hours outside that restraint period are blue. DNL day hours are green.



Average Annual Oper'ns by Hour Throughout the Week - Total vs. Helicopters

The 11 pm - 6 am voluntary restraint from operation hours are red. The two DNL night hours outside that restraint period are blue. DNL day hours are green.



Recently Approved NCP Measures - FAA

- FAA to provide information.

Minimum Scope of NCP Alternatives (Part 150 Sec. B150.7)

Highlighted categories are noise abatement measures

- Acquisition of land and interests, including at least air rights, easements, and development rights
- ***Barriers*** and acoustical shielding, including soundproofing of public buildings
- ***Implementation of a preferential runway system***
- ***Use of flight procedures (including modification of flight tracks)***
- ***Restriction on the use of aircraft based on their noise characteristics, including at least:***
  [Note: Part 161 has added further notice, review, and approval requirements for use-restriction proposals.]
  - ***Denial of use of the airport to aircraft types or classes which do not meet Federal noise standards***
  - ***Capacity limitations based on the relative noisiness of different types of aircraft***
  - ***Required use of noise abatement takeoff or approach procedures previously approved as safe by the FAA***
  - ***Landing fees based on FAA certificated or estimated noise emission levels or on time of arrival***
  - ***Partial or complete curfews***
- Other actions or combinations of actions which would have a beneficial noise impact
- Other actions recommended for analysis by the FAA for the specific airport

Where do we go from here?

- Further TAC recommendations are encouraged
- FAA and operator input on operational issues is requested

TAC & Public Meeting Topics, 2015-16 *to-date*

Date	Meeting	Major Actual / Anticipated Topics
July 2015	TAC 1 - ***Complete***	Introduction to Part 150, TAC process, etc.
September 2015	TAC 2 - ***Complete***	Overview of noise modeling process and inputs
October 2015	Workshop 1 - ***Complete***	Introduction to Part 150 and TEB study process
November 2015	TAC 3 - ***Complete***	Present initial draft noise modeling inputs and land use inventory status
January 2016	TAC 4 - ***Complete***	Present remaining draft noise modeling inputs
March 2016	TAC 5 - ***Complete***	Present final modeling input assumptions
May 2016	TAC 6 - ***Complete***	Present draft contours and introduce Noise Compatibility Program phase
July 2016	TAC 7 - ***Complete***	Present Draft NEM contours and land use compatibility
Sept. 22, 2016	Workshop 2 - ***Complete***	Present Draft NEM contours and land use compatibility
Sept. 23, 2016	TAC 8 - ***Complete***	Continue discussion of noise abatement alternatives for consideration
9/15 - 10/16/2016	NEM comment period - ***Complete***	

Projected TAC & Public Meeting Topics, 2016-17

Date	Meeting	Major Actual / Anticipated Topics
November 17, 2016	TAC 9 - ***Today***	Present initial noise abatement alternative analyses
January 2017	TAC 10 - *Date and time to be determined*	Present additional noise abatement analyses and first-round compatible land use alternatives
March 2017	TAC 11	Present second-round compatible land use alternatives
May 2017	TAC 12	Recommend abatement and compatibility measures
June 2017	TAC 13	Discuss NCP monitoring and implementation
July 2017	TAC 14	Review NCP recommendations
September 2017	TAC 15	Discuss Draft NCP and public input
September 2017	Final Public Hearing on NCP	Present proposed NCP and revised NEMs

Wrap-Up

- Next meeting date and topics
  - **10th TAC - January 2017 *(specific date and time to be determined)***
    - Presentation and discussion of noise contours, land use analyses, and factors related to first round of noise abatement alternatives
    - We continue to need your noise abatement analysis suggestions
- TAC member questions, comments, and discussion?
- Public comments?
- Thanks for attending!

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Appendix F.3

- Technical Advisory Committee Meeting Summaries

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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #1

14 CFR Part 150 Study – Teterboro Airport

July 30, 2015 – 1:00 PM to 4:00 PM (scheduled time)

Attendees:

TAC Members

Name	Organization/Affiliation
Gabriel Andino	AvPORTS TEB Staff
Peter Botsolas	Bergen County
Andrew Brooks	Federal Aviation Administration (FAA)
Lindsay Butler	FAA
Mario Diaz	Fixed Base Operator (FBO), Landmark Aviation
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)
Joe Fazio	FBO, Atlantic Aviation
Suki Gill	FAA Airports District Office (ADO)
Jeff Gilley	National Business Aviation Administration (NBAA)
Bill Huisman	Aviation Development Council
Peter Korns	NBAA
Peter Kortright	Bergen County
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable
Gary Palm	FAA Airport Traffic Control Tower (ATCT)
John Panarello	AvPORTS
Mike Porcello	FAA TRACON
Al Rabasca	Signature Flight Support
Stephen Reithof	Aircraft Owners and Pilots Association (AOPA)
Jacqueline Vibbert	Signature Flight Support

Study Team

Name	Organization/Affiliation
Kristen Ahlfeld	FHI
Cheryl Albiez	Port Authority of NY & NJ (PANYNJ)
Ted Baldwin	HMMH
Mary Ellen Eagan	HMMH
Ed Knoesel	PANYNJ
Robert Mentzer	HMMH
Timothy Middleton	PANYNJ
Melissa Pineda	FHI
Pramod Saggi	PANYNJ
Renee Spann	PANYNJ
Adeel Yousuf	PANYNJ

Welcome and Introductions

Mary Ellen Eagan (HMMH Study Team Program Manager) began the meeting by welcoming attendees to this first meeting of the Teterboro Airport (TEB) Part 150 Noise Study Technical Advisory Committee (TAC). Attendees introduced themselves. Ms. Eagan introduced the firms that make up the HMMH Part 150 Study Team and had study team members introduce themselves and state their role on the project. Ms. Eagan also explained that TEB TAC members are a diverse group of stakeholders, representing varying airport interests including land use planning, economic development/businesses, fixed-base operators, and the communities surrounding the airport.

TEB Airport Overview

Renee Spann, (PANYNJ/TEB) provided a brief history and overview of TEB, its operations and current management. Ms. Spann also added that TEB was recently voted the busiest business-aircraft airport in the world.

Overview of 14 CFR Part 150

Ted Baldwin (HMMH Study Team Project Manager for TEB) reviewed the regulatory context for the 14 CFR Part 150, more commonly referred to as the Part 150 Noise Compatibility Study. The goal of this study is to determine potential mitigation measures to reduce significant levels of aircraft noise exposure. Mr. Baldwin noted that the PANYNJ is conducting this study on a voluntary basis.

Mr. Baldwin reviewed the two primary elements of the Part 150 Study: the noise exposure map (NEM) and the noise compatibility program (NCP). Mr. Baldwin stated that HMMH has worked on more than 60 Part 150 Studies across the country and reviewed examples of both NEM's and NCP's. Mr. Baldwin explained that the NEM is a very large document and contains the DNL 65+ decibels (dB) noise contours and the land uses that fall within the contours. In order to be accepted by the FAA as compliant with the regulation, the NEM must clearly identify all noise incompatible land uses (e.g., residences, places of worship, schools, healthcare facilities, and historic places); must evaluate noise data for the calendar year of submission and a forecast year at least 5 years from the date of submission. The NCP, as Mr. Baldwin explained, is a plan for eliminating noise incompatibility issues. A large part of the NCP is working with stakeholders to identify appropriate noise and land use abatement measures. The NCP must also be accepted by the FAA as compliant with Part 150 regulations. Once the FAA has found the NEM and NCP in compliance, the agency will approve or disapprove each individual element of the NCP proposal.

Mr. Baldwin reviewed the major deliverables and their expected completion timeframe. The PANYNJ expects to submit the NEM to the FAA by late 2016. Additionally the Study Team anticipates that the PANYNJ will submit the NCP to FAA by 2018.

Mr. Baldwin reviewed the generalized Part 150 Study Process; the study is in the beginning stages and is currently at the Develop Study Protocol stage. He also stated that study will include multiple TAC meetings, specialized information sessions, and public meetings and/or workshops, concluding with a final public hearing. The PANYNJ will be the ultimate decision maker about actions resulting from this study.

Roles & Responsibilities of the Technical Advisory Committee (TAC) members

Mr. Baldwin stressed that the TAC is an advisory group. The TAC will review study inputs, assumptions, analyses, documentation, etc. They will not make final decisions. The Port Authority shall respect and consider the TAC's technical input, but shall retain its responsibility for and final decision making authority on the TEB Part 150 Study.

Up to 18 TAC meetings will be held over the course of the study, and will be scheduled during normal business hours. The TAC members are expected to provide two-way communication between the TAC and their organizations. Mr. Baldwin noted that TAC meetings will be open to the public, and while not advertised in the newspaper with legal notices, meeting announcements are public on the Part 150 project website.

Kristen Ahlfeld (HMMH Study Team) was introduced as the facilitator for the TAC meetings. Her role over the course of the study will be to keep the meetings running on time, ensure the meetings follow the agenda, and ensure that no one member monopolizes discussions.

The next meeting is scheduled for September 25, 2015 from 9AM-12PM at TEB (same location). This meeting will include overviews of the noise modeling process and inputs, noise terminology, and the existing TEB noise abatement program.

The presentation and the schedule for future upcoming TAC meeting will be up on the project website. The invitation for the TAC meeting will include a link to the project website, which will include up-to-date agendas, presentations, meeting notices, etc.

Comments and Questions from TAC Members:

Joseph Lepis, (EWR Noise Community Roundtable) questioned how much money the FAA has for this study? He stated that he had heard that it is not a significant amount of money. He then questioned if there is not a lot of money available for noise abatement, would there be a willingness on the part of FAA and Congress to increase the amount of money spent on the program? Lindsay Butler (FAA) explained that 35% of the discretionary funding portion of the annual airport improvement program (AIP) grant program is set aside for environmental mitigation programs including noise mitigation. The total AIP grant program budget is authorized by annual appropriation and is generally about $3.0-3.5 billion. The annual discretionary funding dollar amount varies year to year based on a number of factors such as entitlement funding, Letters of Intent commitments, and other program funding.

Mr. Lepis also questioned how much contact this study will have with local zoning and planning? Mr. Baldwin explained that this study will be looking at preventing non-compatible land uses in the NCP. He stated that this study will need the buy-in of county and municipal planners so that noise overlay zones, development restrictions, etc. can be incorporated into local comprehensive or master plans.

Mr. Lepis also questioned whether this study would result in the inclusion of real estate disclosures for properties within the DNL 65. Mr. Baldwin stated that the Study Team will consider real estate disclosures as one compatible land use option. The evaluation will include review of existing local regulations, the state realtors' code of ethics, and other related established real estate procedures.

Mr. Lepis also asked whether this study will deal with air? emissions from aircraft. Mary Ellen Eagan stated that the Part 150 Study will deal with noise only and that these studies have nothing to do with air quality. Mr. Baldwin further clarified that when he mentioned *source* emissions earlier in his presentation, that he meant *noise source* emissions.

Jeff Gilley (NBAA) asked about the Integrated Noise Model and its use on this study. Mr. Baldwin stated that the FAA requires the use of FAA noise models, which are constantly evolving. He explained that if we were starting today, the study would be using the Aviation Environmental Design Tool (AEDT). He noted that the AEDT and INM produce identical results at this time, since the FAA directly integrated the computational algorithms, and the aircraft noise and performance data from current version of the INM into the AEDT. Mr Gilley also asked about the amount of general aviation aircraft types in the INM model. Mr Mentzer replied that the latest version of the model includes a wide array of general aviation piston, turboprop and business jet types.

Peter Kortright (Bergen County) asked how the Study Team will advertise for the public meetings. Kristen Ahlfeld explained that the PANYNJ Media Relations Department will place legal advertisements in local English and foreign language newspapers. Mr. Kortright stressed the importance of including the Korean communities in public meetings. Mr. Lepis added that no one reads legal advertisements anymore, so more publicity may be needed.

Closing Remarks

Mr. Baldwin thanked everyone for coming to the meeting. He added that the presentation from this meeting as well as the project schedule will be posted on the project website at http://panynjpart150.com/TEB_homepage . Comments regarding the TEB Part 150 Study can be submitted via email to NJPart150@panynj.gov.

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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #2

14 CFR Part 150 Study – Teterboro Airport

September 25, 2015 – 9:00 AM to 12:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates):

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	✓
Bill Huisman	Aviation Development Council (ADC)	
Stephen Reithof	Aircraft Owners and Pilots Association (AOPA)	✓
Gabriel Andino	AvPORTS TEB Staff	✓
Dan Gardon	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	✓
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	✓
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	✓
Andrew Brooks	FAA	
Lindsay Butler	FAA	✓
Suki Gill	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	✓
Joe Fazio	FBO, Atlantic Aviation	✓
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	✓
Dave Goncalves	FBO, Landmark Aviation	✓

Name	TAC Member Organization/Affiliation	In Attendance
Ken Forester	FBO, Meridian	✓
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguso	FBO, Signature Flight Support, Morristown	✓
Jacqueline Vibbert	FBO, Signature Flight Support	
Jeff Gilley	National Business Aviation Administration (NBAA)	✓
Peter Korns	NBAA	
Eileen O'Brien	Net Jets	
Joe Vukovich	Net Jets	
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	✓
Dave Belastock	Teterboro Users Group (TUG)	

Study Team

Name	Organization/Affiliation
Kristen Ahlfeld	FHI
Melissa Pineda	FHI
Ted Baldwin	HMMH
Mary Ellen Eagan	HMMH
Robert Mentzer	HMMH
Gene Reindel	HMMH
Timothy Middleton	PANYNJ
Pam Phillips	PANYNJ
Pramod Saggi	PANYNJ
Renee Spann	PANYNJ
Adeel Yousuf	PANYNJ

Welcome and Introductions

Mary Ellen Eagan (HMMH Study Team Program Manager) began the meeting by welcoming attendees to the second meeting of the Teterboro Airport (TEB) Part 150 Noise Study Technical Advisory Committee (TAC). Attendees introduced themselves. Ms. Eagan stated that the purpose of the meeting would be to review noise terminology and concepts so that everyone has the same understanding of the technical terms used in Part 150 Studies.

Basic Noise Terminology

Ted Baldwin (HMMH Study Team, Project Manager for TEB) started his presentation by stating that noise is many things including unwanted sound, what we hear, and the vibration of airwaves. We also equate sound or noise with effects including sleep disruption or how much it annoys us.

Mr. Baldwin stated that there are degrees of noise or decibels (dB) of noise and that we use logarithmic scales to express noise levels. We can hear over a very wide range and dB help to compress this range and relate to the way our ears process sound. Mr. Baldwin stated that 0 dB is the threshold of hearing for a healthy young adult. A 1 dB change is the minimum noticeable change; it really takes 6 dB for people to notice a change in their day-to-day lives; and a 10 dB change can seem twice as loud. Mr. Baldwin pointed out that again decibels are logarithmic quantities and therefore ordinary math does not apply. We are more sensitive to small changes and less sensitive to large changes because our ears compress the addition of the sound. Mr. Baldwin noted that other factors such as sound quality, sound duration, and time of day can also affect how sounds are heard.

FAA requires the use of A-weighted sound levels (dBA) which take into account how our ears hear and where they hear the best. Mr. Baldwin also stated that the Part 150 regulation requires the consideration of single noise events and cumulative exposure to noise:

- Single noise event – the simplest way to describe a single noise events is maximum sound level (Lmax). This metric does not take into account the duration of the event. Mr. Baldwin pointed out that sometimes longer events may have a lower Lmax but may seem noisier. Sound exposure levels (SEL) measure the total noisiness of an event by taking duration into account.

- Cumulative exposure – describes the day night average level (DNL), or noise exposure over 24 hours. Mr. Baldwin explained that the DNL takes into account noise exposure for the entire calendar year and includes actual total noise from all aircraft events. Noise that occurs from 10 p.m. to 7 a.m. is assessed a 10 dB penalty, which equates to each night aircraft being counted 10 times or being considered 10 dB louder. Mr. Baldwin noted that DNL is the only noise metric Part 150 requires airports to present and is the only metric that the FAA will consider in approving or disapproving noise compatibility program measures that the Port Authority proposes for FAA approval at the conclusion of the study.

Mr. Baldwin provided some DNL examples and stated that levels of concern are usually around 65 DNL and higher. The HMMH Study Team will be looking at the 60 and 55 DNL contours for informational purposes only. Mr. Baldwin noted that per Part 150 guidelines, all land uses are considered compatible with aircraft noise outside the 65 DNL contour. In terms of changes in DNL, Mr. Baldwin stated that people might notice a 2 dB change, however the change has to be associated with something else for someone to complain about it; a 2 dB to 5 dB change would definitely be noticeable; however TEB airport operations probably would need to double to even get to a 3 dB change. Mr. Baldwin noted that TEB staff is seeing noise levels go down at TEB, which is mainly the result of a really quiet fleet or aircraft so the HMMH Study Team is anticipating the noise contours at TEB to be small.

FAA's Noise Model, Inputs and Data Sources:

Mr. Baldwin stated that Part 150 requires the use of FAA's approved Integrated Noise Model (INM). The HMMH Study Team will use INM version 7.0d, which was the most current version of the model when this study was initiated.

Mr. Baldwin noted that the HMMH Study Team is going to need the best available data to input into the model. The HMMH Study Team will be bringing some of the data to the next TAC meeting for TAC members to review and provide feedback on. Mr. Baldwin pointed out that the most critical data on aircraft operations, including aircraft fleet mix, times of operation, flight tracks, altitude profiles, runway use, etc., are available from the TEB Airport Noise and Operations Monitoring System (ANOMS). The study team has already obtained data from ANOMS for all of calendar year 2014 to serve as the primary basis for development of these inputs. The availability of such complete ANOMS data will greatly enhance the accuracy and efficiency of the modeling process. He noted that FAA requires the development of flight tracks out at least 30,000 feet from each runway end, which will provide a very conservatively large buffer beyond the noise contours.

TEB's Existing Noise Abatement Rules and Regulations:

Gabriel Andino (AvPORTS, TEB) provided an overview of the noise rules currently in effect at TEB. Jet aircraft are the major focus of TEB's existing noise abatement as they typically are louder than propeller aircraft. Mr. Andino stated that Stage 1 aircraft are currently banned from operating at TEB and Stage 2 aircraft receive notification to operate as little as possible. Mr. Andino noted that after an aircraft arrives at TEB for the first time, TEB operations staff meet with the pilot(s) to explain the noise rules.

In terms of operations, Mr. Andino stated that all departures, fixed wing aircraft as well as helicopters, need to comply with TEB's Lmax limits. Mr. Andino noted that, due to its location near residential land uses, Runway 24 is a noise-sensitive runway so there is a tighter restriction on departure noise levels; however the restrictions should be easily attainable with today's aircraft.

Mr. Andino also described TEB's penalties for noise violations of existing Lmax limits. All violations are mailed to aircraft owners; first and second violations are kept on file for two years. Upon the third violation within a two-year period, that aircraft is banned from operating at TEB. Mr. Andino did state, however, that there are some exceptions to existing Lmax limits including testing aircraft to determine compliance with noise abatement procedures; certain wind and weather conditions; or unforeseen circumstances at TEB that would jeopardize safety of flight.

Mr. Andino also noted that flight crews are encouraged to request specific noise abatement runways for arrival or departures whenever they can in order to avoid over flights of residential land uses.

Comments and Questions from TAC Members:

Fred Dressel (TANAAC) asked whether the noise contour model make any allowances for community noise. Mr. Baldwin stated that the noise contours will consider aircraft noise only.

Glenn Morse (United) asked whether the EWR TAC meeting will be the day before the next TEB TAC Meeting. Mr. Baldwin stated that yes, all of the meetings will be held back-to-back, with the order alternating.

Glenn Morse (United) suggested, that since the general public will be allowed to attend these meetings, the HMMH Study Team asks whether there are press in the room when starting all future meetings. Mr. Baldwin agreed with this and Tim Middleton (PANYNJ) added that PANYNJ Media Relations staff will be present at all of the TAC meetings.

Jeff Gilley (NBAA) asked about the number of airports across the country that are involved in conducting Part 150 studies? Mr. Baldwin responded that it is a voluntarily program that approximately 280 airports have entered into; however information is not available on exactly how many are being done right now. Lindsay Butler (FAA) stated that FAA will do some research on this and will report back to the TAC at the next meeting.

Peter Kortright (Bergen County) asked whether the public meeting notices will be available on the web site. Mr. Baldwin stated that all of the information regarding the public workshops will be available on the project web site and then posted the project web site address on the screen http://panynjpart150.com/TEB_homepage.asp.

Closing Remarks

Mr. Baldwin thanked everyone for attending the meeting and announced that the first public workshop for the Part 150 Study is being held on October 15th at the Holiday Inn Hasbrouck Heights from 6 p.m. to 9 p.m. Fred Dressel (TANAAC) suggested that the Port

Authority and the HMMH Study Team should send workshops announcements to each of the borough halls so they can put it on their web sites.

Mr. Baldwin stated that the next TAC meeting would be on November 12th from 1 p.m. to 4 p.m.; no meeting will be held in December; and at the January 29th meeting, the TAC will be having a discussion on forecast and further discussion on the development of the draft noise contours.

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #3

14 CFR Part 150 Study – Teterboro Airport

November 12, 2015 – 1:00 PM to 4:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates):

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	
Bill Huisman	Aviation Development Council (ADC)	
Stephen Reithof	Aircraft Owners and Pilots Association (AOPA)	
Gabriel Andino	AvPORTS TEB Staff	✓
Dan Gardon	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	✓
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	
Andrew Brooks	FAA	✓
Lindsay Butler	FAA	✓
Mark Guiod	FAA	✓
John Moretto	FAA	✓
Suki Gill	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	✓
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	
Joe Fazio	FBO, Atlantic Aviation	
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	
Dave Goncalves	FBO, Landmark Aviation	
Ken Forester	FBO, Meridian	
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguseo	FBO, Signature Flight Support, Morristown	✓
Peter Korns	NBAA	✓
Eileen O'Brien	Net Jets	
Joe Vukovich	Net Jets	
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	
Dave Belastock	Teterboro Users Group (TUG)	

Study Team

Name	Study Team Organization/Affiliation
Kristen Ahlfeld	FHI
Melissa Pineda	FHI
Ted Baldwin	HMMH
Mary Ellen Eagan	HMMH
Robert Mentzer	HMMH
Timothy Middleton	PANYNJ
Pam Phillips	PANYNJ
Renee Spann	PANYNJ
Adeel Yousuf	PANYNJ
Bob Ori	Planning Technology, Inc.
Julie Barrow	RS & H

Name	Study Team Organization/Affiliation
David Full	RS & H
Gary Logston	RS & H

Welcome and Introductions

Kristen Ahlfeld (FHI) began the meeting by welcoming attendees to the third meeting of the Teterboro Airport (TEB) Part 150 Noise Study Technical Advisory Committee (TAC). Attendees introduced themselves. Kristen reviewed the agenda and stated that most of the meeting would focus on a presentation and discussion of the noise modeling process, input data, and forecasting process.

Public Workshop Summary

Kristen also stated that the first public workshop for the TEB Part 150 Study was held in Hasbrouck Heights on October 15th. For those that could not attend the meeting, the presentation boards are located on the TEB Part 150 project web site http://panynjpart150.com/TEB_PIW.asp.

Study Protocol Update

Mary Ellen Eagan (HMMH Study Team Program Manager) stated that the study protocol is complete and is available for review and download on the project web site http://panynjpart150.com/TEB_SP.asp. Tim Middleton (PANYNJ TEB/EWR Part 150 Project Manager) stated that the study protocol will be discussed in more detail at the next TAC meeting in January; he requested TAC members review the study protocol and come to the next meeting prepared to discuss the technical elements in more detail.

Noise Modeling Process & Inputs

Bob Mentzer (HMMH) discussed the progress that has been made in development of the noise modeling inputs (please see the attached presentation for more detail). In terms of the runway use summaries for each of the noise modeling groups, Bob requested that TAC members review each of the charts provided and send questions or comments back to him or Tim. Bob Mentzer (HMMH) requested that all comments or questions be received by the end of November and that we will discuss any questions or comments at the next TAC meeting.

With regard to helicopters, Bob Mentzer described that TEB does not have defined helipads; while there are several landing and takeoff locations around the airport, four primary locations have been identified and will be used in the noise modeling.

Gabriel Andino (AvPORTS TEB) asked if helicopters are modeled with a continuous climb or with level flight after climb. Bob Mentzer stated that the helicopter flight profiles would be based on procedures followed at TEB. HMMH will use radar data to determine vertical profiles along the flight path. Bob Mentzer also noted that helicopters rarely affect the noise contours off airport property; however people who live underneath the flight corridors are always very interested in how helicopters affect noise. HMMH will definitely be modeling helicopters so we can answer those questions.

Bob Mentzer continued his presentation of modeling inputs by describing the 2014 flight track densities for all TEB arrivals and departures by aircraft types. He stated that the density plots shown in the presentation provide a better graphical representation of flight paths rather than line diagrams would. Bob stated that the flight paths developed for the noise modeling will be based on the data used to create the density plots.

Mark Guiod (FAA) observed that the plots of single-engine piston arrivals, multi-engine piston arrivals, and turbopropeller arrivals arriving from the north and northwest and circling to the east of TEB looked like arrivals to Newark Airport (EWR) (Slide 19 of presentation) instead of arrivals to TEB Runway 1.

Gary Palm (FAA) stated it would help him to understand the plots if the Study Team could provide the number of tracks that were used to develop each figure. Bob Mentzer pointed out that the numbers of tracks were listed on each plot, although in a font that might be hard to read. He noted that larger scale pdfs would be emailed to the TAC members and put on the website following the meeting, which would make it easier to see the numbers. Gary requested that the Study Team provide a breakdown of operations by aircraft group by day of the year for the FAA to compare to their counts.

Mark Guiod noted that the numbers of arrivals and departures do not match. Ted Baldwin (HMMH) stated that the flight tracking data source used in ANOMS does not always catch every flight or complete information for every flight, which can lead to this type of difference. For example, Ted stated that small, single-engine prop planes may not show up on the radar. Also, an aircraft may arrive with an IFR flight plan and depart VFR, or vice versa. It is not possible to identify and categorize the VFR legs by aircraft type; we see the track but do not have any identification data for it. In other cases, incorrect flight identification or beacon code data are entered, which makes it impossible to match flight plans to tracks. Gabriel Andino noted that this occurred relatively often. Gabriel asked if it would be possible to compare the Compuland and ANOMS counts of operations, as a way to investigate these matters. Ted and Bob Mentzer agreed to perform such a comparison.

Mark Guiod observed that the data for single-engine props and small jets seem less accurate than what has been presented for JFK and LaGuardia, and asked what data source was being used. Mary Ellen Eagan (HMMH) replied that the same source is being used at all four airports. Ted Baldwin suggested that the TAC members take some time to review the data and identify specific questions for the Study Team to address. He asked again that the TAC members submit their questions by the end of November.

Andrew Brooks (FAA) questioned what percentage of the 2014 Compuland and ANOMS operations matched. Bob Mentzer responded that more than 90 percent of the operations were matched; he said the Study Team will report the exact percentage to the TAC at the January meeting.

Gabriel Andino questioned whether the Study Team knew what runway the large jet arrivals in lower southwestern quadrant of the plot (Slide 29) were going to. Bob Mentzer stated that those planes were headed to Runway 6 but those tracks only occurred in April 2014. Mark Guiod (FAA) concurred and stated that this was a temporary track and is not being flown now, nor would it be flown in the futures. It was agreed that this track would not be modeled in the study.

To conclude his presentation on the noise modeling inputs, Bob Mentzer reminded the TAC members to send their questions, comments, or feedback on the density plots and other data to him or Tim Middleton (PANYNJ) by the end of the month.

Forecasting Process

Gary Logston (HMMH Study Team) presented an overview of the process that will be used to forecast the 2016 existing conditions and the five-year forecast condition for the Noise Exposure Map (NEM). See the attached presentation for more detail (Slides 31 and 32). Tim Middleton (PANYNJ) noted the importance of the forecasts to the study process, and asked TAC members to review the forecasting section of the study protocol and come to the January TAC prepared for a discussion.

Land Use Data Collection

Dave Full (HMMH Study Team) presented an overview of the land use data collection that has occurred to date. Not only has the Study Team sent data collection letters to counties and municipalities within the study area, they will also be verifying the data by driving through various streets in the study area. See presentation for more detailed information (Slides 33 and 34).

Peter Kortright (Bergen County) said that the Study Team should contact Bergen County as the county has land use plans for each of the communities within the study area. He stated that the municipalities employ part-time planners, so plans and other information are not easily acquired. Peter also mentioned that the many changes have occurred to some of the communities south of Route 4 so the Study Team should contact the county for updated GIS data.

Gary Palm (FAA) asked why some communities were shaded in yellow on the TEB study area map. Renee Spann (PANYNJ) stated that the communities shaded in yellow are on the Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC), which has been meeting quarterly since the 1980's.

TEB Mapping Tools

Bob Ori (HMMH Study Team) stated that GIS-based mapping tools are being developed for Study Team use and should be available within the next 6 months. GIS data have been collected; however these data will be supplemented with new or updated data received from the counties/municipalities.

Review of Part 150 Study Process

Ted Baldwin provided a generalized review of the TEB Part 150 Process (see Slides 38-41 of the presentation) by stating that the Study Protocol is available online; the Study Team is in the process of verifying all of the data received so far; and an NEM is expected by the end of next year (2016). A detailed project schedule is included in the study protocol. Ted noted that the current schedule calls for draft noise contours to be presented at the January TAC meeting.

Andrew Brooks stated that the Study Team and TAC should not be surprised if the draft noise contours are not ready for discussion in January. He stated that there are many points that were brought up during the meeting about the data which need to be addressed before the TAC can talk about noise contours

Response to Jeff Gilley's Question in September

Ted Baldwin stated that in September Jeff Gilley (NBAA) had asked about the number of Part 150 studies that were currently underway. Lindsay Butler (FAA) stated that she checked the FAA Part 150 grants and other sources and was able to identify 33 Part 150 studies that are underway at this time. Lindsay noted that more airports could be conducting studies without FAA grants, so the list might be incomplete; she gave Chicago-Rockford as an example and stated that they are just updating their NEM.

Andrew Brooks said that there are many commercial service airports where their Noise Compatibility Program (NCP) may be officially on file and may have programs ongoing that are consistent with their NCP, or just doing an NEM update. He also stated that there is no process in place for retiring airports from the Part 150 process. Lindsay added that FAA is trying to figure out legislatively a process for airports to "get out" of Part 150 once contours have shrunk. Because of extensive work that has been done over the last several years, these four (TEB, EWR, JFK, LGA) will probably be the last airports to enter the program.

Other Comments and Questions from TAC Members

Renee Spann (PANYNJ) asked for clarification on shrinking noise contours and the need for Part 150 Studies in the future. Ted Baldwin stated that general aviation airports similar to TEB have seen contours shrink by 15 to 20 dB, which is very significant. Even though jet aircraft operations are continuing to increase, older, noisier engines are being phased out, so overall aircraft operations are becoming much quieter. Renee added that communities are still in an uproar about noise. They do not care about the 65 DNL, so it is going to be interesting to see how things play out as we move forward.

Lindsay added that FAA is in the midst of conducting noise surveys at 20 airports around the country to test whether the 65 DNL standard is still valid. The results of these surveys would not be published until 2017 and they have no implications on the outcome of this project. However, if FAA moves to the 55 DNL, noise mitigation could potentially be in the trillion dollars. Renee added that there has been a huge burst of development and that without land use policies or ordinances in place, noise impacts could increase exponentially.

Meeting Wrap-Up

Ted Baldwin noted that the next TAC meeting will be Friday, January 29th from 9 a.m. to noon at TEB. Other meetings are as follows:

- TAC meeting #5 – Wednesday, March 30, 2016 from 1 p.m. to 4 p.m.
- TAC meeting #6 – (tentatively) Tuesday, May 24, 2016 from 1 p.m. to 4 p.m.

In the event of snow or a threat of snow, TAC members will receive an email two days prior to the scheduled TAC meeting stating that the meeting is being rescheduled. TAC members will be given several choices for alternate meeting dates and a new meeting will be rescheduled to a new date within two weeks of the original meeting date.

Ted reminded TAC members again to send feedback and questions on the density plots and data to Tim and Bob by the end of the month. He also reminded TAC members to review the study protocol on the project web site and be prepared for a detailed discussion at the January meeting.

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #4

14 CFR Part 150 Study – Teterboro Airport

January 29, 2016 – 9:00 AM to 12:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates):

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	
Bill Huisman	Aviation Development Council (ADC)	✓
Stephen Reithof	Aircraft Owners and Pilots Association (AOPA)	✓
Gabriel Andino	AvPORTS TEB Staff	✓
Michael Fiscus	AvPORTS TEB Staff	✓
Dan Gardon	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	✓
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	
Andrew Brooks	FAA	
Lindsay Butler	FAA	✓
Mark Guiod	FAA	
John Moretto	FAA	

Name	TAC Member Organization/Affiliation	In Attendance
Suki Gill	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	✓
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	✓
Joe Fazio	FBO, Atlantic Aviation	
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	
Dave Goncalves	FBO, Landmark Aviation	
Ken Forester	FBO, Meridian	✓
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguseo	FBO, Signature Flight Support, Morristown	✓
Peter Korns	NBAA	✓
Eileen O'Brien	Net Jets	
Joe Vukovich	Net Jets	
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	✓
Dave Belastock	Teterboro Users Group (TUG)	

Name	TAC Member Organization/Affiliation	In Attendance
Geoff Couture	Teterboro Users Group (TUG)	✓

Study Team

Name	Study Team Organization/Affiliation
Kristen Ahlfeld	FHI
Melissa Pineda	FHI
Ted Baldwin	HMMH
Mary Ellen Eagan	HMMH
Robert Mentzer	HMMH
Ed Knoesel	PANYNJ
Timothy Middleton	PANYNJ
Pam Phillips	PANYNJ
Renee Spann	PANYNJ
Ralph Tragale	PANYN
Adeel Yousuf	PANYNJ
Julie Barrow	RS & H
David Full	RS & H
Gary Logston	RS & H

Welcome and Introductions

Kristen Ahlfeld (FHI) began the meeting by welcoming attendees to the fourth meeting of the Teterboro Airport (TEB) Part 150 Noise Study Technical Advisory Committee (TAC). Attendees introduced themselves.

Study Protocol

Ted Baldwin (HMMH) stated that the Study Protocol has been finalized and has been posted on the project web site http://panynjpart150.com/TEB_SP.asp (see Slide 3 of the presentation)[1]. Since it will be referred to often over the course of the study, Ted encouraged TAC members to review and become familiar with the document as it outlines how the PANYNJ and HMMH will be meeting FAA standards and PANYNJ objectives. Ted requested that TAC members or other interested parties send any questions on the Study Protocol to him or Tim Middleton.

Study Process

Ted Baldwin reviewed the study process and other key upcoming milestones (see Slide 4 of the presentation). The Study Team is now focusing on developing the Noise Exposure Map (NEM), more specifically, developing modeling inputs so that aircraft noise can be modeled as accurately as possible. Ted stated that for the next TAC meeting the Study Team will be presenting a first draft of all of the modeling assumptions. A technical memorandum will be distributed to all TAC members for review prior to the next meeting.

Overview of TEB forecast process and summary

Gary Logston (RS&H) provided an overview of the forecasting process and summarized the forecasts and growth rates being developed for TEB (see Slides 5 through 10 of the presentation). Gary noted that 59 models of aircraft account for 94% of TEB's overall operations; the Study Team will be fleshing this out a bit more so that 100% of operations can be accounted for in the model.

Gary stated that all forecasts are preliminary and subject to FAA approval. All comments from FAA will be included in the final documentation; however the forecasting process cannot move forward without FAA approval of the forecasts.

Noise Modeling Flight Track Development

[1] TAC Presentation materials can be found on the project website (http://www.panynjpart150.com/TEB_TAC.asp) ; slides will be referenced in this meeting summary.

Bob Mentzer (HMMH) provided an update on the noise modeling flight track development, which builds on the density plots of actual radar flight tracks obtained from the PANYNJ Airport Noise & Operations Management System (ANOMS). Those density plots were presented at the last TAC meeting. He described backbone and dispersion modeling tracks and how they were to be used in the model (see Slide 11 of the presentation).

Bob then walked the TAC members through a departure track example illustrating how backbone and dispersion tracks were developed for a subset of TEB jet departures (see Slides 12 through 24 of the presentation), noting that flight tracks will be developed out to 10.5 nautical miles from runway end. Bob stated that the same process was used for arrivals and departures and to date, the Study Team has developed 1,225 tracks (see slide 25 of the presentation).

All flight tracks and background information will be presented at the next TAC meeting. Ted Baldwin also noted that the Study Team is working on how to best present the data to the TAC so that everyone can understand the information.

Gabriel Andino (AvPORTS, TEB) stated that the backbone track on Slide 24 did not seem to be centered. Bob Mentzer replied by saying the Study Team will verify the location, however it was probably just an issue with how the data was being projected on screen due to the resolution difference of the projector and presentation file. Bob reminded the TAC that the tracks are draft and will be further cleaned up and that all of tracks will end at the edge of the study area (depicted as a dashed circle on the slides). Ted Baldwin added that Part 150 requires tracks to be developed so as to extend at least 30,000' from each runway end. However, the Study Team is going twice as far to account for operations specific to TEB; the Study Team wants to make sure that the tracks are not being clipped too soon.

Bob then provided an overview of departure and arrival tracks developed by aircraft type (see Slides 26 through 33 of the presentation). Bob requested that TAC members review the data provided in the presentation and provide comments back to the Study Team so that the flight tracks can be refined and completed.

Bob described the process that will be used to develop user-defined profiles that will account for special departure and arrival patterns at TEB (to reflect altitude holds unique to the New York area airspace) in the noise model. Separate profiles will be developed for each aircraft and all profiles will need to be approved by FAA before they can be modeled (see Slide 34 of the presentation). Ted Baldwin added that the Study Team is working closely with FAA so that the process of developing and approving the profiles is as efficient as possible. Part of the required documentation is user concurrence, which is more difficult at a GA airport because there are so many operators. Ted stated that the Study Team will need to talk to FAA to determine level of concurrence, but the Study Team may need to reach out to many of the TAC members during this process.

Slide 36 of the presentation depicts User Defined climb flight profiles overlaid with actual hold down operations at TEB. Bob added that developing flight profiles that represent the actual flight procedures at TEB will give better results in the noise model. The Study Team will be evaluating each of the tracks that fall within the study area. Tim Middleton (PANYNJ) questioned how the Study Team will determine the number of tracks that will be assigned to each user defined profile. Bob stated that the breakdown will be provided for specific aircraft type within each track group in the final documentation, and that a flight profile will be used for a specific aircraft type based on what the majority of that aircraft type actually flew as documented in the ANOMS data.

Peter Korns (NBAA) questioned what the INM standard is based on and why there is such a difference between INM standard and what is actually flown. Ted Baldwin replied that at other airports, the INM standard is pretty close to actual operations, where there are no altitude restrictions. He added that the goal of this exercise is to make sure that the DNL contours presented in the study are as representative of actual airport operations as technically possible.

Bob closed out his presentation on the noise modeling process with a discussion of airport run-ups, and of terrain and meteorological data (see Slides 38 and 39 of the presentation). He added that airport run-ups will be modeled, however they typically do not affect the contours. Pam Phillips (PANYNJ) questioned why the meteorological data is not broken down seasonally. Bob stated that the data is not broken down because Part 150 requires that we model an average annual day.

Follow-Up from Last TAC Meeting

Ted Baldwin summarized requests for additional information that was requested at the November TAC meeting (see slide 40 of the presentation). Ted noted that ANOMS and Compuland data matched for approximately 93% to 94% of all operations. Since the full detail of the Compuland/ANOMS comparison is a huge spreadsheet, it is too large to present; however the Study Team will share a copy with anyone who would like to see it.

Meeting Wrap-Up

Ted Baldwin (HMMH) noted that the next TAC meeting will be Wednesday, March 30, 2016 from 1 p.m. to 4 p.m. Other meetings are as follows:

TAC Meeting #6 –Tuesday, May 24, 2016 from 1 p.m. to 4 p.m.

July or August- Public Workshop # 2

Ted also reminded TAC members that in the event of snow or a threat of snow, TAC members will receive an email two days prior to the scheduled TAC meeting stating that the meeting is being rescheduled. TAC members will be given several choices for alternate meeting dates and the meeting will be rescheduled to a new date within two weeks of the original meeting date.

Other Comments and Questions from TAC Members

Ken Forester (Meridian) questioned whether the study will do anything different with Piaggio (P180) aircraft. Ted Baldwin replied the study will not call this type of aircraft out because they are not seen very often. Tim Middleton added that Piaggios are a very low percentage of current TEB operations so the study will not be developing any non-standard modeling techniques for that specific aircraft. Committee members agreed that P180 operations had declined significantly and doubted that they would increase dramatically in the future.

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #5

14 CFR Part 150 Study – Teterboro Airport

March 30, 2016 – 2:00 PM to 4:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates)

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	
Bill Huisman	Aviation Development Council (ADC)	✓
Stephen Riethof	Aircraft Owners and Pilots Association (AOPA)	✓
Gabriel Andino	AvPORTS TEB Staff	✓
Michael Fiscus	AvPORTS TEB Staff	✓
Dan Gardon	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	✓
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	✓
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	
Andrew Brooks	FAA	✓
Lindsay Butler	FAA	✓
Mark Guiod	FAA	
John Moretto	FAA	
Suki Gill	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	✓
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	

Name	TAC Member Organization/Affiliation	In Attendance
Joe Fazio	FBO, Atlantic Aviation	✓
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	
Dave Goncalves	FBO, Landmark Aviation	
Ken Forester	FBO, Meridian	✓
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguseo	FBO, Signature Flight Support, Morristown	
Peter Korns	NBAA	
Eileen O'Brien	Net Jets	
Joe Vukovich	Net Jets	✓
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	
Dave Belastock	Teterboro Users Group (TUG)	✓
Geoff Couture	Teterboro Users Group (TUG)	

Study Team

Name	Study Team Organization/Affiliation
Kristen Ahlfeld	FHI
Leslie Black	FHI
Ted Baldwin	HMMH
Jessica Cohen	HMMH
Mary Ellen Eagan	HMMH
Robert Mentzer	HMMH
Timothy Middleton	PANYNJ
Pam Phillips	PANYNJ

Name	Study Team Organization/Affiliation
Teresa Rizzuto	PANYNJ
Renee Spann	PANYNJ
Katie Winfree	PANYNJ
Adeel Yousuf	PANYNJ
Julie Barrow	RS & H
David Full	RS & H
Gary Logston	RS & H

Public

Name	Organization/Affiliation
Paul Berger	The Record
Jessica Goetz	Congressman Pascrell
Fritz Rethage	Hasbrouck Heights/TANAAC

Note: Prior to the start of the Technical Advisory Committee (TAC) meeting, representatives from the FAA gave a presentation on the proposed Runway 19 Quiet Visual Approach. Comments and feedback received during the presentation were collected by the FAA and are not reflected in this summary.

Welcome and Introductions

Kristen Ahlfeld (FHI) began the meeting by welcoming attendees to the fifth meeting of the Teterboro Airport (TEB) Part 150 Noise Study TAC. Attendees introduced themselves.

TAC members were provided with several handouts:

- Draft TEB forecast documentation
- Draft TEB noise modeling input memorandum
- Draft TEB draft noise modeling flight tracks

Ted Baldwin (HMMH) indicated that since this was the fifth meeting of the TAC, any first-time attendees were welcome to remain after the meeting to discuss the Part 150 study background with him or to look on the project website for information at: http://panynjpart150.com/TEB_homepage.asp

Study Process

Ted Baldwin reviewed the study process and other key upcoming milestones (see Slide 4 of the presentation). The Study Team is now focusing on the third phase of the study; more specifically developing modeling inputs so that aircraft noise can be modeled as accurately as possible for the Noise Exposure Map (NEM). Ted stated that the Study Team is preparing to run the model to develop the noise contours for the existing conditions year (2016) and five-year forecast conditions (2021). The materials distributed to the TAC members at this meeting present a draft of the noise modeling assumptions, for the committee members to consider and comment on. A primary purpose of this meeting is to walk the committee through this material, to assist members in deciding where they might wish to focus their attention.

Runway 19 "Quiet Visual" Approach Procedure

Ted Baldwin briefly mentioned that the Runway 19 Quiet Visual approach procedure incorporation in Part 150 Noise Exposure Map is to be determined. Flight track geometry and utilization in practice will be unknown until the test procedure begins. Data from initial test period will be valuable. There are no modeling assumptions at this time.

Materials Submitted to FAA for Review and Approval

Bob Mentzer (HMMH) noted that the draft noise modeling input memorandum identifies four submissions that have been made to the FAA for approval. The first is the forecast of aviation activity at TEB, which was one of the three handouts. The other three submissions that the Study Team has made to the FAA for review and approval include:

- Integrated Noise Model (INM) aircraft substitutions
- User-defined aircraft request
- Non-standard approach and departure profiles

Bob indicated the FAA has approved, for this project only, twelve (12) substitutions for aircraft types that are not currently in the INM database (see Slide 6 of the presentation for the list of substitutions)[1].

Dave Belastock (TUG) stated that he is not familiar with a Gulfstream 6 as shown on Slide 6. Bob responded that the GLF6 term is shorthand for Gulfstream 600/650 aircraft.

Bob noted that one aircraft type is a user-defined request, a Gulfstream IIB with a hushkit, (Slide 7); per federal law, the Gulfstream IIB as of January 1, 2016 is not allowed to fly in contiguous United States without a hushkit. The Gulfstream IIB with a hushkit user-defined aircraft request has been approved for this project by the FAA.

Dave Belastock asked about the Falcon 7X and why that aircraft does not have a recommended substitute. Bob responded that the Falcon 7X is not in the INM database because Falcon has not provided data to FAA and therefore there is no approved substitute. Based on FAA approvals at similar airports, the F10062 is the best match. Dave offered to contact Falcon and coordinate providing the data to the FAA. Ted Baldwin stated that the documentation for the Falcon 7X substitution would be provided to interested TAC members for their review.

Joe Fazio (FBO, Atlantic Aviation) indicated that it may raise a red flag if the Study Team uses data and/or results for equipment from 1960s and 1970s. Gabriel Andino (AvPorts, TEB Staff) added that other Falcons have pre-approved substitutes, just not the 7X. Ted affirmed that FAA has recently approved these same substitutions at three roughly comparable general aviation airports: Naples (FL), Van Nuys (CA), and Fort Lauderdale Executive (FL).

In terms of non-standard approach and departure profiles, Bob noted that there are significant hold downs on approaches to and departures from TEB, therefore it is beneficial to include them in the model. The Study Team analyzed profiles for 17 INM aircraft types that represent approximately 90% of TEB operations (see Slide 8 of the presentation). Non-standard profiles reflecting TEB operations have been submitted to FAA for review. Bob stated that operator concurrence is an important part of the FAA approval process; the Study Team has sent letters to TUG, NBAA, and NetJets requesting their concurrence.

As an illustration of the non-standard profiles, Bob reviewed the departure and arrival profile for a Gulfstream GV (Slide 9), including the average hold down based on radar data, as compared to the standard INM profile. Arrival hold downs at 3,000 feet or above would not be included as the majority are outside the study area. Hold downs at 1,500 and 2,000 feet are most significant and would affect the noise contour.

Dave Belastock noted that the aviation community uses nautical miles and not feet as measure of distance along flight paths. Ted stated that the Study Team can make that terminology change and will use it on all documents going forward where practical.

Bob Mentzer added that one other procedure submitted to the FAA is for the heavier-weight GV (Slide 10) and would be used only for higher stage length departures, which represent about 11% of TEB departures. FAA is currently reviewing this profile.

Overview of Noise Modeling Input Memorandum

Bob Mentzer provided an overview of the Noise Modeling Input Memorandum (Slide 11) and asked the TAC to review and provide comments to the Study Team.

Dave Belastock asked about the inclusion of runup data. Ted Baldwin responded that runups are used for maintenance purposes and will be modeled at high power. Bob noted 542 runups were recorded for the year 2014. He pointed out that Slide 13 indicated approximately half of the runups were at night. Based on feedback from the PANYNJ, The Study Team has determined that was an error related to assuming that the runup logs used 24-hour military time. In fact only one or two runups were conducted during the night (10 p.m. to 7 a.m.). The noise modeling inputs and documentation will be revised to reflect that correction.

In terms of aircraft flight operations (Slide 14), Bob provided a comparison of the FAA's 2014 Terminal Area Forecast (TAF) and the Part 150 forecast; he noted that the FAA has approved the TEB Part 150 forecasts for 2016 and 2021. Pam Phillips (PANYNJ) noted that the Study Team stayed under the 10 percent difference from FAA's TAF for the five- and 10-

[1] TAC Presentation materials can be found on the project website (http://www.panynjpart150.com/TEB_TAC.asp) ; slides will be referenced in this meeting summary.

year flight operations forecasts and questioned whether the Study Team agrees with the number submitted or whether the forecast should be higher. Bob stated that the Study Team agrees with the forecasts as submitted and documented in the handout provided to the TAC at the outset of the meeting.

Andrew Brooks (FAA) added that the allowable variation between the TAF (Terminal Area Forecast) and project forecasts refers to the level of approval required by the agency. The higher the variation, the higher level of FAA approval that is required.

Dave Belastock questioned whether TAF refers to traffic or weather. He added that TAF is a term used by pilots that refers to weather, not traffic. Bob replied that in this case the TAF (Terminal Area Forecast) refers to aviation activity forecasts and not to weather in a terminal area. The Study Team will make note of this acronym double-meaning and takes steps to clarify it in future study documentation.

Bob also provided an overview of runway and helipad utilization rates (see Slide 15) derived from TEB Compuland data. Pam Phillips (PANYNJ) questioned whether the data was from 2014 as there is no reference in the presentation. Ted noted that "2014" is included in the noise modeling memorandum and agreed that future slides should note the year(s) from which data are obtained.

All TAC members in attendance were given a packet containing the flight tracks that will be modeled for TEB. Bob noted that all of the tracks are based on 2014 radar data and that they correlate to the data tables contained in the noise modeling input memorandum. He requested that TAC members review the flight track geometry and provide questions or comments back to the Study Team. Bob then presented an example of a flight track in more detail and described the process for deriving and numbering backbone and dispersion tracks (See slides 17 through 23). Bob noted that, although the flight tracks go out to 10.5 nautical miles, modeling will be taking place primarily inside the dashed box on the figures, as this represents the Part 150 Study Area for TEB.

Dave Belastock questioned the period of time that is measured for the flight track data. Bob responded that the tracks are based on radar data for all of 2014. The data was broken down into modeling groups, runway ends, and then direction off each of the runways.

Tim Middleton (PANYNJ) suggested that Bob review how the table in the modeling memorandum correlates to the flight tracks. Bob stated that the percentages in the tables represent 100 percent for each runway end and 100 percent for each aircraft engine category. Lindsay Butler (FAA) added that the Study Team covered the flight track development in depth at the last TAC meeting and suggested that TAC members go onto the project web site and review the materials if they need a clearer understanding. Ted Baldwin also added that TAC members could call him or Bob and they could walk people through the materials as well.

Land Use Inventory Status

David Full (RS&H) stated that the Study Team is collecting land use, zoning, and demographics/population data within the expected contour area and also identify land use policies that might be useful further along in process. The Study Team has driven the majority of streets within the study area to confirm land use data, and will make corrections if needed.

Interviews are also being conducted to educate community representatives about the Part 150 process; stakeholders include the NJ Sports and Exposition Authority and municipalities which have land use authority within study area (see Slide 25). By regulation, Part 150 requires that every local, state, regional, or federal entity that has jurisdiction over land use within the study area must be consulted. Dave stated that the team has not met with two jurisdictions: Moonachie elected to provide planning documents instead of meeting; and the meeting with Little Ferry will be in April, after the new Town Administrator has taken office.

Dave provided sample maps of generalized land use in the study area (see Slides 26 and 27). All data will be provided at the parcel level and therefore future graphics depicting incompatible land uses will also be provided at the parcel level.

Dave Belastock (TUG) questioned how money is allocated at the local level for mitigating incompatible uses. Andrew Brooks (FAA) stated that the study will identify measures by which the Port Authority, through FAA Airport Improvement Program Grants, could potentially mitigate noise levels at identified incompatible land uses such as sound insulation at schools.

Projected TAC and Public Meeting Topics

Ted Baldwin stated that the draft NEM will be presented at the next TAC meeting in May. In order for that to happen, Tim Middleton (PANYNJ) asked the TAC for feedback on modeling assumptions within two weeks, or by April 15th.

Ted also stated that the Study Team will be scheduling public workshops in August or September to present the draft NEM to the public. The dates for the public workshops have not yet been finalized.

Meeting Wrap-Up

Kristen Ahlfeld (FHI) thanked members of the public who remained after the FAA presentation. She reminded all TAC members that TAC meetings were open to the public and opportunities for public comment are provided at the end of each meeting.

Ted Baldwin (HMMH) noted that TAC meeting #6 will be Tuesday, May 24, 2016 from 1 p.m. to 4 p.m. Other meetings are as follows:

- TAC Meeting #6 –Tuesday, May 24, 2016 from 1 p.m. to 4 p.m.
- TAC Meeting #7 – July 2016
- August or September - Public Workshop # 2

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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #6

14 CFR Part 150 Study – Teterboro Airport

May 24, 2016 – 1:00 PM to 4:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates)

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	
Bill Huisman	Aviation Development Council (ADC)	
Stephen Riethof	Aircraft Owners and Pilots Association (AOPA)	✓
Gabriel Andino	AvPORTS TEB Staff	✓
Michael Fiscus	AvPORTS TEB Staff	✓
Dan Gardon	AvPORTS TEB Staff	✓
John Kastens	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	✓
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	✓
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	
Andrew Brooks	FAA	✓
Lindsay Butler	FAA	✓
Mark Guiod	FAA	
John Moretto	FAA	
Suki Gill	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	
Joe Fazio	FBO, Atlantic Aviation	✓
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	

Name	TAC Member Organization/Affiliation	In Attendance
Dave Goncalves	FBO, Landmark Aviation	
Ken Forester	FBO, Meridian	✓
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguseo	FBO, Signature Flight Support, Morristown	
Peter Korns	NBAA	
Eileen O'Brien	Net Jets	
Karl von Valtier	Net Jets	✓
Joe Vukovich	Net Jets	
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	✓
Dave Belastock	Teterboro Users Group (TUG)	
Geoff Couture	Teterboro Users Group (TUG)	
Jim Dramis	Teterboro Users Group (TUG)	✓

Study Team

Name	Study Team Organization/Affiliation
Kristen Ahlfeld	FHI
Leslie Black	FHI
Ted Baldwin	HMMH
Mary Ellen Eagan	HMMH
Ed Knoesel	PANYNJ
Timothy Middleton	PANYNJ
Pam Phillips	PANYNJ
Renee Spann	PANYNJ
Katie Winfree	PANYNJ
Adeel Yousuf	PANYNJ
David Full	RS & H

Public

Name	Organization/Affiliation
Eric Raboin	The Jones Payne Group

Welcome and Introductions

Kristen Ahlfeld (FHI) began the meeting by welcoming attendees to the sixth meeting of the Teterboro Airport (TEB) Part 150 Noise Study Technical Advisory Committee (TAC). Attendees introduced themselves and received copies of the presentation.

Ted Baldwin (HMMH Project Manager, Teterboro Airport) reviewed the current status of the Part 150 process and schedule. The primary areas of attention of current efforts involve:

- Developing noise contours for existing and 5-year forecast conditions,
- Collecting land use data and policies,
- Noise impact evaluation for DNL 65-75 dB, and
- Preparing maps in accordance with 14 CFR Part 150.

Noise Model Input Development, Review, and Approval Status:

At the March TAC meeting, draft noise model inputs were shared with the TAC for feedback and submitted to the FAA; no comments were received from TAC members. Ted stated that the FAA review and approval of non-standard flight profiles was received by the study team on May 23rd. With this approval, all model inputs are final, and land use analyses will move forward.

Lindsay Butler (FAA) asked if the approval letters will be posted on the project web site. Ted stated that all the approval letters will be presented in an appendix to the Noise Exposure Map (NEM) submission. The TAC members will be notified when that document is available.

Preliminary draft 2016 and 2021 DNL contours (Slide 5 of the presentation)[1] were shown and discussed. Ted explained that when overlaid on each other, it is visually apparent that there is no significant difference between the 2016 and 2021 contours. He stated that it would take a large increase in operations to produce a difference in sound levels, and that a more modern fleet mix is helping to keep the future noise contour stable. Once the contours have been finalized, RS&H, part of HMMH study team, will be conducting a detailed land use analysis. At the July TAC meeting, parcel level land use analyses will be presented for the areas within the 2016 and 2021 65 DNL contours, along with information on discrete sensitive receptors.

Tim Middleton (PANYNJ Project Manager for TEB and EWR Part 150 Studies) asked if land use analyses would only be conducted for the slightly larger 2021 contour. Ted stated that, consistent with Part 150, the analyses will be conducted for both 2016 and 2021.

Ted noted the contours are relatively large for a general aviation airport. Tim Middleton (PANYNJ) observed the contours are similar to those seen before for TEB. He noted that the contours account how aircraft actually fly at TEB, including non-standard procedures, and that the PANYNJ is pleased with the results so far. Lindsay Butler (FAA) asked if these new contours would be compared to past contours. Ted and Tim observed that since no prior Part 150 Study has been done for TEB and it has been a long time since any Federal noise contour analysis has been conducted, there may not be a valid basis for comparison, but that the study team would look into the matter.

Ted reviewed areas where residential land uses fall within the 65 DNL contours, including both ends of Runway 6/24 and the south end of Runway 1/19 (Slide 6 of the presentation).

Ted pointed out the small protuberances in the contours at each of the "helipad" locations (there are no helipads at TEB, but as mentioned in previous TAC meetings, for purposes of noise modeling and consistent with operations at the airport: four locations have been identified as helipads); those effects do not extend off airport (Slide 7 of the presentation). Peter Kortright (Bergen County) questioned whether a vibration analysis would be conducted for helicopters. Ted responded that Part 150 does not include vibration analyses. He added that helicopters can cause secondary noise effects, when the low-frequency noise causes the house to vibrate slightly, resulting in plates, window, or pictures to rattle. The noise levels are not high and have little effect on DNL, but the rattling makes the helicopters noticeable.

Ted noted that the effect of run-ups on the contours (Slide 8 of the presentation) is reflected by on-airport property protuberances at the two primary run-up locations, the Alpha pad to the north (85% use for run-ups) and the Taxiway G extension to the east (13% use).

[1] TAC Presentation materials can be found on the project website (http://www.panynjpart150.com/TEB_TAC.asp); slides will be referenced in this meeting summary.

Ted presented the 2016 and 2021 DNL contours relative to the study area as a whole (Slide 9 of the presentation). He indicated that the study area was defined to include the TANAAC communities and a buffer area to ensure it would encompass the 55 and 60 DNL contours that will be presented for informational purposes only. Ted reminded the attendees that for Part 150 purposes, FAA only considers land uses within the 65 DNL contour and considers all land uses compatible outside of that contour.

Ken Forester (FBO, Meridian) asked whether the "pointy" part of the contour off the north end of Runway 1/19 was associated with takeoff noise. Ted indicated that the long, thin pointy shape of the contour in that area is associated with noise from approaches to Runway 19. Stephen Riethof (AOPA) asked why the south end of that runway does not have a similar "spike." Ted responded that was because aircraft rarely land from the south on that runway, which would be Runway 1 landings. Runway 1 is primarily used for takeoffs to the north. Ted suggested that the study team would present figures showing primary runway use off each runway end at the next TAC meeting to help illustrate how runway use affects contour shape. The committee members thought that would be helpful.

TEB Noise Monitoring Locations

Ted reviewed TEB's six remote noise monitoring station (RMS) installations that have been in place since the mid-1980s (Slide 10 of the presentation). Most are in public locations, high on telephone-like poles near roadways (although not busy roads) within the public right of way. One monitor, RMS #3 is on the roof of Hackensack Hospital. Ted reviewed Slides 10 through 16 of the presentation, which provide detailed information on each RMS.

Comparison of Modeled and Measured DNL

Ted noted that the study protocol calls for comparing modeled DNL for 2016 to 2014 measurements (Slide 17 of the presentation). Modeled results are greater than measured at five of the six RMS sites (RMS 3 was the exception). Modeled estimates are for ground level noise at RMS sites, and the greatest difference was at the RMS 2, which is exposed to the least aircraft noise. Ted noted that agreement within two decibels is considered quite close in terms of accuracy. Gabriel Andino (AvPORTS TEB staff) noted that RMS 3 is on top of a six-story building, which may partially explain why the measured levels are higher than modeled at that site. Ted said the study team will coordinate with Gabe to determine the elevation of RMS 3 and analyze the potential effect on measured levels compared to ground level.

Complaint Graphics

Ted then reviewed overall TEB complaints statistics for 2014 and 2015 (Slide 18 of the presentation). Complaints are self-reported by residents and collected in the Port Authority's ANOMS system by web form submissions and phone calls. Slides 19 and 20 show the geographic distribution of complaints received for jets, propeller aircraft, helicopters, and "unspecified" operations (for cases where a single specific aircraft type was identified). Jim Dramis (Teterboro Users Group) asked how many of the complaints are unique and not from the same person. Ted responded that complaint figures are in the form of circles centered on unique addresses from which complaints are received and that the relative sizes of the circles correspond to the numbers of complaints received from each address. Ted noted that a high percentage of the complaints are about jets and roughly follow the noise contours. Gabe noted that some of the unspecified complaints that are close to the airport may correspond to run-ups.

Introduction to Noise Compatibility Program (NCP) Development

Ted provided an introductory overview of NCP development, the next step in the Part 150 Study, as summarized on Slides 21 through 23. Ted noted that Part 150 requires that the final documentation must reflect that the airport proprietor (in this case, the PANYNJ) make all NCP recommendations, not the consultant, or any other third party. He also noted that for any strategy which is considered but not selected, the final NCP study documentation must provide reasons why. Peter Kortright (Bergen County) asked if the study team has looked at airport overlay zones[2] at other airports. Ted responded that yes, the study team has done overlay zones and cited a recent positive example at the Akron-Canton Airport in Ohio.

Ted reviewed major NCP strategy options in three categories: (1) noise abatement, (2) land use, and (3) programmatic (Slide 24 of the presentation). He noted that the TAC is going to need to get creative to think of ways to move or shrink the contours through noise abatement, given the long history of cooperative efforts at the airport. Ted stated that the

[2] Airport Overlay Zones are designated areas, agreed upon by land use jurisdictions, around an airport that place use restrictions and standards on land use and property development within a defined proximity of an Airport based on a chosen DNL contour.

TAC will get more "bang for their buck" by changing nighttime operations, since one nighttime event is equal to 10 daytime events. Joe Fazio (FBO, Atlantic Aviation) asked about the noise monitoring around the airport and how many of the complaints were night versus daytime. Ted Baldwin said that was a good question that the study team would report at the next meeting. Ted also noted that one of the most important components of an NCP is promotion, through TUG, NBAA, AOPA, in getting the word out that specific noise abatement measures are in place.

Ted noted that Part 150 identifies the minimum scope of NCP alternatives for consideration, as listed on Slide 25. Renee Spann (PANYNJ) questioned how far the analysis of one of those alternatives – a preferential runway system – could go. Ted replied that the study team would analyze this measure as far as possible in terms of noise benefits and implementation-related issues, such as airspace issues, wind, taxi distances, runway crossings, etc. The study team will look at as many factors as the TAC can help with. John Panarello (AvPORTS TEB Staff) asked if the study team and TAC would compile scenarios and then evaluate the pros and cons of each measure. Ted responded affirmatively.

Renee Spann (PANYNJ) noted that TEB has a voluntary preferential runway use program that the FAA cannot implement on a mandatory basis, which diminishes its effectiveness. She expressed concern that changes in airspace and air traffic control procedures might further diminish that effectiveness. She also noted that changes in air traffic control procedures can require enhanced environmental impact review and asked whether the study team will conduct such environmental review for new procedures. Andrew Brooks (FAA) responded that the FAA will consider the noise benefit of any proposal and then any further environmental review that is necessary. Lindsay Butler (FAA) added that the FAA will assess the benefit to the contour, pros and cons, and then look at the environmental reviews later, when TEB seeks to implement the new procedure.

Pam Philips (PANYNJ) questioned whether the Part 150 process could help TEB fast-track new approach/departure procedures under consideration that would reduce minimums or de-conflict TEB and EWR operations; that is, will the Part 150 process help streamline the FAA environmental review process. Andrew Brooks (FAA) responded that the FAA Airports District Office (ADO) and radar control facility (TRACON) will engage in review and discussion of implementation strategies with noise benefits inside the 65 DNL contour. He added that new TEB procedures ready to be published would proceed more quickly on their original track than being folded into the Part 150 process.

Ted noted that preferential runway use procedures could be "informal" or "formal" under FAA regulations and observed that FAA had not approved a formal runway use program since the mid-1980s, and that such approval would be highly unlikely at TEB. Gabriel Andino noted that an informal runway use procedure could be done now but the burden would then be on the airport and operators to get the word out to pilots to make it effective. Renee Spann (PANYNJ) noted that TEB communicates well with the airport users, but that getting the word out to all pilots is difficult and that FAA air traffic control staff could not assist to the level she would like to see. She expressed her belief that a formal program is required to make a preferential runway program effective, but that since it may not be approved it could lead to negative community reaction. John Panarello (AvPORTS TEB Staff) asked if a recommendation for an informal runway use policy that came out of a Part 150 process would carry more weight. Ted responded affirmatively, since if the FAA approved the recommendation, it would be more likely to assist in implementation.

Tim Middleton (PANYNJ) asked the TAC to review the noise modeling input memorandum from last meeting and review the runway usage charts for discussion at the next meeting. He also requested that TAC members begin to brainstorm strategies or measures that could be used to shrink the contours. Ted added that TAC members should not be afraid to bring up any idea, even if it has been considered previously or seems like a remote possibility.

Gabriel Andino (AvPORTS TEB Staff) commented on night runway use and that the airport is less constrained at night. Ted suggested that the study team will consider runway use during the 11 pm – 6 am voluntary curfew period, when winds are calmer, there are less workload issues, and less traffic at EWR.

Ted asked where TAC members should send ideas about noise measures for the NCP. Tim Middleton responded that the TAC should email him and cc Kristen Ahlfeld (FHI) and Ted who will compile for future discussion.

Meeting Wrap-Up

Tim Middleton (PANYNJ) noted the next TAC meeting will be on Friday, July 29, 2016 from 9 a.m. to 12 p.m. Tentative dates for future meetings are as follows:

- TAC Meeting #8 –September 23, 2016 from 1 p.m. to 4 p.m.

- August or September - Public Workshop # 2

Renee Spann (PANYNJ) noted that the study team did not receive the level of participation from communities it desired for the first workshop. She questioned whether the study team would be doing anything to change the format to get more attendance. Tim Middleton (PANYNJ) stated that the study team was going to write some press releases, as well as prepare a local elected officials briefing packet, and possibly place flyers in libraries or schools closer to the airport.

Fred Dressel (TANAAC) noted that as Executive Director of Committee of Mayors, they are going to try to initiate land use review of 14 towns. He noted that the NJ Sports and Exposition Authority, Committee of Mayors, and County Planning Departments should be invited to participate at the public workshop. Renee Spann (PANYNJ) noted that people did not know the previous meeting was an open house format (which she noted is a good format), and that information regarding the workshop format should be provided in the press release. The study team needs to do a better job about informing people about the meeting format, and whether people can drop in at any time. Mary Ellen Eagan (HMMH) noted that at other meetings, a PowerPoint presentation on a loop would be good to have for those expecting a presentation.

Jim Dramis (TUG) noted that Members of TUG will be meeting with FAA in July to discuss the Runway 24 RUUDY FIVE departure. Tim Middleton (PANYNJ) and Gabriel Andino (AvPORTS TEB Staff) stated that they did not believe the issues under discussion would have any negative consequences for noise.

There was discussion of whether active noise cancellation systems could be used to abate aircraft noise. HMMH representatives responded that noise cancellation is only practical in confined environments such as cars, aircraft cabins, or small areas of a factory.

Ted Baldwin (HMMH) thanked Andrew Brooks (FAA) and all his associates for all their hard work in progress made with all the approvals to date.

It was noted that the July 29 TAC Meeting conflicts with Oshkosh fly-in meeting.

Tim Middleton (PANYNJ) will send those who cannot attend the July meeting the final presentation a few days beforehand.

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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #7

14 CFR Part 150 Study – Teterboro Airport

July 29, 2016 – 9:00 AM to 12:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates)

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	
Bill Huisman	Aviation Development Council (ADC)	✓
Stephen Riethof	Aircraft Owners and Pilots Association (AOPA)	✓
Gabriel Andino	AvPORTS TEB Staff	✓
Michael Fiscus	AvPORTS TEB Staff	
Dan Gardon	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	
Andrew Brooks	FAA	✓
Lindsay Butler	FAA	✓
Mark Guiod	FAA	
John Moretto	FAA	
Suki Gill	FAA Airports District Office (ADO)	✓
David Sanchez	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	✓

Name	TAC Member Organization/Affiliation	In Attendance
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	
Joe Fazio	FBO, Atlantic Aviation	
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	
Dave Goncalves	FBO, Landmark Aviation	
Ken Forester	FBO, Meridian	
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguseo	FBO, Signature Flight Support, Morristown	
Peter Korns	NBAA	
Eileen O'Brien	Net Jets	
Joe Vukovich	Net Jets	
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	✓
Dave Belastock	Teterboro Users Group (TUG)	
Geoff Couture	Teterboro Users Group (TUG)	✓
Jim Dramis	Teterboro Users Group (TUG)	✓

Study Team

Name	Study Team Organization/Affiliation
Kristen Ahlfeld	FHI
Leslie Black	FHI
Ted Baldwin	HMMH
Mary Ellen Eagan	HMMH
Bob Mentzer	HMMH

Name	Study Team Organization/Affiliation
Ed Knoesel	PANYNJ
Timothy Middleton	PANYNJ
Pam Phillips	PANYNJ
Renee Spann	PANYNJ
Katie Winfree	PANYNJ
Adeel Yousuf	PANYNJ
David Full	RS&H

Public

No public attendees

Welcome and Introductions

Kristen Ahlfeld (FHI) began the meeting by welcoming attendees to the seventh meeting of the Teterboro Airport (TEB) Part 150 Noise Study Technical Advisory Committee (TAC). Attendees introduced themselves.

Study Process Update

Ted Baldwin (HMMH) noted that the study is at a major turning point, transitioning to the Noise Compatibility Plan (NCP) phase. Moving forward, TAC meetings will focus on developing NCP strategies.

Draft 2016 and 2021 Noise Exposure Maps and Land Use Analysis

Ted Baldwin presented the Draft 2016 Noise Exposure Map (NEM) and highlighted non-compatible land uses (Slides 5 and 6 of the presentation)[1]; he noted that the NEM figures and document will be available for public review and comment in September 2016.

Ted noted that the Port Authority sound insulated the Bergen County Technical High School as part of a previous mitigation program, so it is now a compatible land use. Andrew Brooks (FAA) noted that the "FAA will look to determine what documentation we have on file and share with the study team, if the Port Authority does not have the files.". Ted identified other non-compatible land uses within the DNL 65 dB contour and noted that the biggest cluster of residential use is an area of single- and multi-family dwellings to the southwest of the end of Runway 6.

Generalized land uses within the full area covered in the NEM figures were presented on Slide 7 of the presentation. Fred Dressel (TANAAC) commented that the mobile home park located at the end of Runway 19 is actually two parks, with the park on the west containing 236 mobile homes and the park on the east containing 205 mobile homes.

Ted noted that the 2021 contours are not much different than the 2016 contours (Slide 8 of the presentation); he noted that there is a slight growth in the 2021 contour so that it clips the North Jersey Vineyard Church to the north of Runway 19. Andrew Brooks (FAA) questioned whether the Study Team had collected the zoning for that parcel and whether the parcel is zoned for commercial uses. Dave Full (RS&H) stated that the parcel is zoned commercial, or storefront commercial; he added that the church is a free-standing structure (like a warehouse) and is not in a strip mall. Andrew noted that unless the church is a permanent structure then it probably would not be eligible for sound insulation. He stated that it comes down to facility ownership; if the space is rented from another owner and could be converted to another use, it is not eligible for mitigation. There will be more discussion on this building in future TAC meetings as the NCP process continues.

Lindsay Butler (FAA) indicated that a similar assessment may be needed for the Learning Tree Academy Daycare (southwest of the Runway 6 end) in Moonachie. The assessment would require asking for the facility's curriculum to identify that the academy is a learning institution versus a basic daycare. She noted that the actual amount of time spent each day on learning would determine the facility's eligibility. Dave Full pointed out that the facility was a free standing structure and not part of a residential home.

On Slide 10, Ted reviewed dwelling units and residential population within the DNL 65 dB contour for 2016 and 2021. For both years, dwelling unit counts and the number of people living within are based on Census 2010 block data. Dwelling units may have various population counts depending on if it is a multi family or single family home; the number of dwelling units is relevant because the FAA considers this in the mitigation process.

[1] TAC Presentation materials can be found on the project website (http://www.panynjpart150.com/TEB_TAC.asp); slides will be referenced in this meeting summary.

Slide 11 provided the land areas within the DNL contour intervals. This table also demonstrates that the DNL contours between 2016 and 2021 increase slightly.

Supplemental DNL Contours

Ted noted that supplemental 2016 and 2021 DNL contours have been prepared to show the DNL 60 dB and 55 dB contours and are for informational purposes only; they will be included in an appendix of the NEM document. Bob Mentzer (HMMH) described the reason for the "island" of DNL 55 dB noise to the southwest of the airport. That island is due to departures from Runway 24 that climb to 1,500 feet and then level off to maintain separation with Newark Arrivals. Once they pass this area they are cleared by the TRACON (New York Terminal Radar Approach Control) to resume their climb; the reapplication of power at this point causes an increase in noise levels in the area under the climb.

Response to Specific Requests from TAC #6

There were several questions asked at TAC Meeting #6 that the Study Team was asked to follow-up on or provide additional information:

- At the TAC's request, the relationship of runway use to contour shape was reviewed to help understand the effect of runway use on the shape of the contours. As shown on Slide 15 of the presentation, the slight increase in the contours by 2021 is associated with a 9% increase in operations at TEB. Ted also explained and compared the dominant runway use patterns for Runway 1/19 and Runway 6/24 and the relationship to the shape of the contour in 2016 and 2021 (Slides 16 through 19 of the presentation).
- At the TAC's request, separate complaint plots were presented for day (7 a.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) by aircraft type (Slides 20 through 24 of the presentation). It was noted that most complaints fall inside the study area. Propeller complaints are much more scattered and had the least number of complaints. Helicopter complaints are focused on overhead crossing of properties such as mobile home parks and in the Little Ferry area, directly to the east of the airport away from the route. The unspecified complaints overlay the jet routes, therefore the Study Team assumed that these complaints could be related to jet movements. Gabriel Andino (AvPORTS TEB Staff) commented that these complaints could be related to volume of traffic at a certain time of day.
- At the TAC's request, the DNL estimate at Hackensack Hospital was rerun to take into account the elevation of Remote Monitoring Site (RMS) 3 (Slides 25 through 27 of the presentation). The height adjustment led to an improvement between measured and modeled DNL. The Study Team was also able to obtain measured data for 2015 to supplement 2014 data, therefore better comparisons could be made to 2016 data; the measured and modeled agreement at RMS 3 is within 1 dB. It was noted that FAA does not allow the use of measured data to adjust noise contours.

Noise Compatibility Development Process

Ted noted that NEM phase of the study is almost complete and that the TAC and Study Team will be transitioning to the Noise Compatibility Program (NCP) Development Process. He reviewed the major steps in the NCP phase (Slide 28 of the presentation). Ted added that a goal of the TAC should be to work cooperatively to reduce or minimize the identified incompatible land uses within DNL 65 dB contour.

At TAC Meeting #6, the existing 11 p.m. to 6 a.m. voluntary curfew was discussed. Ted had asked the TAC members to think about how to encourage better compliance with the curfew and how TEB can better advertise the curfew to its operators and customers. Ted noted that fees or penalties would constitute a use restriction, which would trigger a Part 161 Study; very few airports have been successful on obtaining a use restriction under Part 161 and those that did were for Stage 2 aircraft only, which are no longer allowed to operate in the U.S. If TEB was successful in achieving full compliance with the existing voluntary curfew, residents in the study area would likely notice a difference; however, the contour might not be affected if the operations only shifted to the 10 – 11 p.m. and 6 – 7 a.m. shoulder hours, which still are considered nighttime operations in the calculation of DNL. In order to possibly change the contour, a longer curfew period would need to be implemented that would then lead to a reduction in operations during the 10 p.m. to 7 a.m. nighttime period.

Geoff Couture (TUG) commented on the importance of continued messaging about the curfew to pilots. He added that it is not the pilots who want to violate, most times it is the schedule set by clients. Gabriel Andino (AvPORTS/TEB Staff) added that a lot of times pilots are at the whim of the customers; if the airport is open they want to fly, regardless of curfews. Ted commented that at the airport in Naples, FL, there is a sign advertising a 10 p.m. to 7 a.m. noise curfew on blast deflectors so that it can be seen by pilots in the front of the plane and the customer in the back of the plane. Pam Philips (PANYNJ) noted that in addition to the daily outreach Gabriel Andino does on noise, the PANYNJ/TEB annually attends the National Business Aviation Association (NBAA) Schedulers and Dispatchers Conference to share information on TEB; it has been found to be very successful. She also noted that there is high pilot and other aviation staff turnover nationally so constant outreach is important.

Tim Middleton (PANYNJ) asked whether changing curfew hours based on the day of the week could have an effect on overall annual nighttime movements. Ted Baldwin (HMMH) stated that the Study Team would need to look at the data and see when these operations are occurring as they may be seasonal. Gabe Andino (AvPORTS/TEB Staff) added that there is some seasonality. Fred Dressel (TANAAC) commented that the Meadowlands sports complex experiences seasonal use, and there are numerous takeoffs after games/events. At the end of the discussion it was noted that the voluntary curfew is also referred to as a "voluntary restraint from operation" in correspondence since sometimes "curfew" can be inferred as a mandatory rule which it is not the case at TEB.

The discussion shifted to preferential runway use and nighttime movements. The Study Team is aware of the potential conflicts with EWR traffic at night time. Ted stated that he understands that operators have been requesting the Dalton departure off of Runway 19; based on the data, Runway 19 is not used often at night. Ted questioned whether a certain percentage of nighttime departures could be shifted to Runway 19 and what effect that would have on the contours. Gary Palm (FAA) noted the potential conflicts with EWR traffic with use of Runway 19 and also that the TRACON is staffed at lower levels at night.

Pam Philips (PANYNJ) noted that some of the biggest challenges at TEB are with EWR and LGA traffic. De-conflicting TEB from EWR's traffic is a long-term goal; however, it makes things more complicated for the TRACON. Renee Spann (PANYNJ) questioned whether de-conflicting TEB from EWR and LGA would be a goal for Part 150. Lindsay Butler (FAA) stated that a noise benefit has to be shown to comply with the objective of the study, which is to show benefit with the DNL 65 dB contour. Pam Philips (PANYNJ) asked whether more departures on Runway 19 at night would show an improvement. Ted Baldwin (HMMH) responded that the Study Team can test those scenarios to see what type of benefit can be obtained and present it at the next TAC meeting in September. He added that if there is an increase in operations on Runway 1/19 at night for arrivals and departures, the contour could be "pulled in", essentially shrinking the contour to the Southwest of Runway 24; to a possible level that people in Wood Ridge are less affected.

On Slides 30 and 31 of the presentation, Ted reviewed the 2014 night-time runway use for jet arrivals and departures(hourly and total). On Slide 31, for the 2014 night-time jet arrivals, he noted that the volumes increase in the hour preceding and following the voluntary curfew period, with Runway 1 having the lowest use. He noted the possibility of shifting operations from Runway 6 to 1.

Gary Palm (FAA) asked if the Study Team can use data and make adjustments mathematically to show a shift in the contour without running a model. Ted responded that estimates could be made but the real answers will lie in the model run results. Lindsay Butler and Andrew Brooks (FAA) responded that this is the start of the brainstorming phase and the team will evaluate the positive benefits and the negative impacts of each measure brought forward by the TAC and Study Team. Andrew added that is also the reason why it is good that there is broad representation on the TAC so that differing interests are brought forward. Ted Baldwin noted that the Study Team can run some model scenarios with shifting departures from Runway 24 to Runway 19 and present the resulting contours at the next TAC meeting. He cautioned that the TAC needs to be careful as this scenario may shift noise from one community to another. Ted added that, if there is a net benefit, we would to talk to air traffic to see if it is even realistic to fly the procedure.

Gary Palm (PANYNJ) noted that pilots do not want to fly a circle to land approach on the south end of TEB. With the existing obstructions, some pilots are uncomfortable with that procedure. Andrew Brooks (FAA) noted that if an RNAV procedure were to be brought forward for the NCP it does not necessarily mean that on the day the NCP is certified that the procedure would be implemented. The NCP is first step to a procedure being approved; then would come obstruction and environmental assessment. Andrew added that sometimes recommended measures included in the NCP cannot be implemented, therefore in subsequent updates, those measures are removed.

Pam Philips (PANYNJ) asked if an Area Navigation (RNAV) procedure for Runway 1 is developed by FAA and also included in Part 150 Study as a recommended measure, would it be delayed by the Part 150 process. Andrew Brooks (FAA) responded that the procedure development process can go forward concurrently with the Part 150 study. Mary Ellen Eagan (HMMH) noted that it is very important for the Study Team to know about all of the independent efforts going on so that they can inform each other.

Ted stated that the Study Team can run the sensitivity analyses and requested TAC input on reasonable percentages to be shifted. Tim Middleton (PANYNJ) commented that 49% of departures at night are modeled off of Runway 24. Pam Phillips (PANYNJ) stated that it may make sense to go higher based on existing land use off Runway 24 and recommended 80% off Runway 19 and 20% off Runway 24, in a southerly flow. Bob Mentzer (HMMH) commented that it is going to come down to what is actually practicable in terms of air traffic reasons. Andrew Brooks (FAA) agreed and stated that a reality check is needed by the TRACON and that he will make sure that there is TRACON representation at the next meeting. Regarding the shoulder hours for the voluntary curfew, Lindsay Butler (FAA) questioned whether pilots are arriving at 10 p.m. because they know they can get in under the 11 p.m. threshold, or whether it is business/personal schedule and they are flying from the west coast after a 5 p.m. meeting? Gary Palm (FAA) stated that a percentage are trying to beat the deadline; he noted that if you compress the curfew earlier there could be a lot more air traffic issues so everything needs to be balanced.

Ted Baldwin (HMMH) said the study team could do some sensitivity analysis to tease out a pattern between the two hours and determine what the potential benefit may be. Fred Dressel (TANAAC) commented that if the activity is shifted, new annoyance will be created in a very vocal community located to the east of Runway 1. Noise is bothersome in some neighborhoods now and shifting noise is going to be very hard for the community to accept. He added that there is an emotional and psychological affect from the noise. Andrew Brooks (FAA) thanked Fred for his perspective and added that FAA is not in the business of shifting noise. Tim Middleton (PANYNJ) stated that another option could be to change existing operational procedures. He noted that people would not necessarily see a difference if an aircraft was on a similar path but able to climb to a higher altitude than existing procedures; procedural changes could potentially help the contour in Moonachie and Carlstadt.

Bill Huisman (Aviation Development Council) cautioned that the PANYNJ has to be careful when making operational adjustments and the messaging to the public. Pam Phillips (PANYNJ) agreed and stated that a big part of this will be education with respect to perceived vs actual impacts.

Ted Baldwin continued the discussion of the NCP development process by reviewing the categories of strategies that the TAC will be looking at and asked that the TAC members review the questions on Slide 33 and come to the next meeting to discuss strategies related to them as well as others.

Next steps

Kristen Ahlfeld (HMMH Study Team) stated that a public open house workshop will be held on Thursday, September 22, 2016 from 6 p.m. to 9 p.m. in the Multi-purpose Room at the Bergen County Complex in Hackensack, NJ. TAC members were given a workshop flyer.

The next TAC meeting (# 8) will be held on September 23, 2016 from 9 a.m. to 12 p.m.

TAC Meeting #9 will be held on November 17, 2016 from 1 p.m. to 4 p.m.

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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #8

14 CFR Part 150 Study – Teterboro Airport

September 23, 2016 – 9:00 AM to 12:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates)

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	
Bill Huisman	Aviation Development Council (ADC)	
Stephen Riethof	Aircraft Owners and Pilots Association (AOPA)	✓
Gabriel Andino	AvPORTS TEB Staff	✓
Michael Fiscus	AvPORTS TEB Staff	
Dan Gardon	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	✓
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	
Andrew Brooks	FAA	✓
Lindsay Butler	FAA	✓
Mark Guiod	FAA	
John Moretto	FAA	
Suki Gill	FAA Airports District Office (ADO)	✓
David Sanchez	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	✓
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	
Joe Fazio	FBO, Atlantic Aviation	✓
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	
Dave Goncalves	FBO, Landmark Aviation	
Ken Forester	FBO, Meridian	
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguseo	FBO, Signature Flight Support, Morristown	
Peter Korns	NBAA	
Eileen O'Brien	Net Jets	
Joe Vukovich	Net Jets	
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	
Dave Belastock	Teterboro Users Group (TUG)	
Geoff Couture	Teterboro Users Group (TUG)	
Jim Dramis	Teterboro Users Group (TUG)	

Study Team

Name	Study Team Organization/Affiliation
Kristen Ahlfeld	FHI
Leslie Black	FHI
Jessica Ortiz	FHI
Ted Baldwin	HMMH

Name	Study Team Organization/Affiliation
Jessica Cohen	HMMH
Mary Ellen Eagan	HMMH
Rhea Gundry	HMMH
Bob Mentzer	HMMH
Gene Reindel	HMMH
Dominic Scarano	HMMH
Diana Wasiuk	HMMH
Timothy Middleton	PANYNJ
Pam Phillips	PANYNJ
Renee Spann	PANYNJ
Katie Winfree	PANYNJ
Adeel Yousuf	PANYNJ
David Full	RS & H
Gary Logston	RS & H

Public

Name	Organization/Affiliation
None	

Welcome and Introductions

Kristen Ahlfeld (FHI) began the meeting by welcoming attendees to the eighth meeting of the Teterboro Airport (TEB) Part 150 Noise Study TAC and reviewing the agenda. TAC members were provided with a handout of the presentation. Attendees introduced themselves.

Ted Baldwin (HMMH) welcomed TAC members and provided an update on the TEB Part 150 Study Process (Slide 3 of the presentation)[1].

[1] TAC Presentation materials can be found on the project website (http://www.panynjpart150.com/TEB_TAC.asp); slides will be referenced in this meeting summary.

In reference to Slide 4 of the presentation, Kristen stated that the Draft NEM was available for public review and comment; the official NEM comment period is open and runs from September 15th through October 16th. She stated that the document is available online on the project website, at the Bergen County Complex, and in the TEB Airport Manager's office. Kristen encouraged TAC members to review the document and submit comments. She then reviewed the various methods the study team and PANYNJ used to advertise the availability of the NEM and the public workshop (Slides 5 through 8 of the presentation).

TEB Public Workshop Summary

A public workshop for the TEB Part 150 Study was held on Thursday, September 22nd in the Multi-purpose Room at the Bergen County Complex from 6 p.m. to 9 p.m. Kristen described the seven workshop stations that members of the public visited; she also explained that as members of the public entered the workshop, a TEB Part 150 Study Area map was available and they were asked to place a red dot on a town in which they lived.

Ted Baldwin (HMMH) the led TAC members through the presentation boards that were on display at the workshop and highlighted key comments made by the public:

- There was interest in the sound abatement program for schools. Tim Middleton (PANYNJ) added that attendees had noted that there are schools outside the 65 DNL contour that should be evaluated for possible sound insulation. The PANYNJ will look at the list of schools already insulated to understand the history of interactions with each of the schools. Andrew Brooks (FAA) asked if one of the schools noted was the Sylvan School as the FAA has worked extensively with that school and they refused participation; the PANYNJ confirmed the Sylvan School was on the list of schools.
- Some public participants noted that air traffic seemed busier in September compared with summer activity.
- People seemed to know about and understand the 10 dB noise penalty for nighttime operations
- Bob Mentzer (HMMH) noted the public interest in the lower altitudes of flight profiles and mentioned that several members of the public had taken videos on their phones of low-flying planes.

- Dave Full (RS&H) noted that much of the discussion about land use and the land use map pertained to the data collection process.
- Bob Mentzer (HMMH) stated that people appreciated the extraordinary measures that the study team took to develop the flight tracks and profiles and to make sure that current TEB operations were replicated in the model.
  - Gary Palm (FAA) asked whether the study team used a breakdown of arrivals and descent by profile by day over the course of a year. Ted Baldwin responded affirmatively that the study team used that data for all of 2014. Gabriel Andino (AvPorts) noted that TEB has the arrival data tagged by aircraft.
- Bob also noted that the NEM maps with the land uses, presented both at the local and regional scales worked well; people could see if they were outside the 65 DNL contour where they fell within 60 and 55 DNL levels.
- People attending the workshop were most concerned with jets; no workshop attendees commented about helicopter noise.
- Petitions were received from Prospect Avenue Condominium Complex in Hackensack. While the comments from this group have not been compiled yet, it appears that they are in favor of the Runway 19 Quiet Visual approach currently under study by FAA. Since the petitions were received during the public workshop, they will be considered official project comments.

Additional comment forms were distributed and received at the public workshop; all comments submitted at the workshop as well as online will be considered for the Final NEM document. Ted Baldwin (HMMH) noted that all materials from the public workshop are available on the project web site.

Organization of the Draft NEM Report

Ted Baldwin (HMMH) briefly reviewed the contents of the Draft NEM report (Slide 10 of the presentation). He encouraged TAC members to download the document from the project web site and submit any comments or questions.

Review of NCP Discussion from Prior TAC Meetings

At the July TAC meeting, a discussion was started on potential noise abatement strategies that could be considered in the NCP (see Slides 12 and 13 of the presentation).

With regard to the existing TEB voluntary curfew, Ted Baldwin (HMMH) stated that at the Newark Liberty International (EWR) TAC meeting held earlier in the week, a suggestion was made to run daytime and nighttime contours by arrivals and departures; he added that this information will be beneficial for TEB as well, therefore the study team would complete the model runs and bring the analysis back to the next TAC meeting for discussion. Lindsay Butler (FAA) suggested that the study team add caveats to all of the analyses produced for the NCP that these model runs and any new maps are for discussion purposes only.

Tim Middleton (PANYNJ) stated that the majority of the incompatibilities are at the southern end of the airport, therefore the TAC should be looking at NCP measures that will have the greatest impact in that area.

During a discussion of TEB's existing preferential runway measures, Pam Philips (PANYNJ) noted that based on the numbers of requests received from pilots, there is a preference to use Runway 19 for departures at night, however FAA uses Runway 24 most of the time.

Ted requested that the TAC provide the study team with any other recommendations or strategies for noise abatement and stated that the next few TAC meetings will concentrate on the brainstorming and further development of NCP strategies.

Discussion of NY/NJ Metropolitan Airspace

The study team is coordinating with FAA on a special presentation that will provide an overview of the New York/New Jersey airspace and help TAC members get an overall understanding of airspace issues as the group moves forward into the NCP. More information will be distributed to TAC members.

Pam Phillips (PANYNJ) asked whether deconflicting TEB from EWR and LaGuardia (LGA) would fall under the Part 150 Study. Ted agreed that the metropolitan airspace information must be looked at as part of this study. He noted that a webinar may be possibly held with TRACON to discuss the existing air space for the four airports; i.e, TEB, EWR, Kennedy (JFK), and LGA. Tim Middleton (PANYNJ) added that the TACs for all four Part 150 studies would be invited and then move on to more individual conversations in November/December. Arrivals into Runway 1 would be part of the deconflicting process.

Gary Palm (FAA) noted the Rutherford flight path is a combination of Runway 6 arrivals at TEB and also arrivals to EWR. Bob Mentzer (HMMH) commented that workshop attendees requested that arrivals on Runway 6 be fanned out; Mary Ellen Eagan (HMMH) stated she had heard similar comments.

Lindsay Butler (FAA) commented that the FAA has a list of approved/approved-in-part noise abatement measures throughout the country which she will forward to the project team for discussion at the next TAC meeting.

Next Steps

TAC Meeting #9 will be held November 17, 2016 from 1:00 pm to 4:00 pm. The TAC will continue its discussion on noise abatement alternatives. Ted Baldwin (HMMH) reminded TAC members to send any NCP strategies or recommendations to Tim Middleton or Kristen Ahlfeld.

TAC Meeting #10 will be held in January 2017 with a date and time to be confirmed.

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

Technical Advisory Committee #9

14 CFR Part 150 Study – Teterboro Airport

November 17, 2016 – 1:00 PM to 4:00 PM (scheduled time)

Attendees:

TAC Members (and Alternates)

Name	TAC Member Organization/Affiliation	In Attendance
Dan Calipa	AIG Aviation	
Glenn Morse	Airlines, United	
Bill Huisman	Aviation Development Council (ADC)	✓
Stephen Riethof	Aircraft Owners and Pilots Association (AOPA)	✓
Gabriel Andino	AvPORTS TEB Staff	✓
Michael Fiscus	AvPORTS TEB Staff	✓
Dan Gardon	AvPORTS TEB Staff	✓
John Panarello	AvPORTS TEB Staff	✓
Peter Botsolas	Bergen County	
Peter Kortright	Bergen County	
Peter Rothwell	Dassault Falcon Jet	
Harley Aronson	Federal Aviation Administration (FAA)	
Andrew Brooks	FAA	✓
Lindsay Butler	FAA	✓
Mark Guiod	FAA	
John Moretto	FAA	
Suki Gill	FAA Airports District Office (ADO)	✓
David Sanchez	FAA Airports District Office (ADO)	✓
Gary Palm	FAA Airport Traffic Control Tower (ATCT)	✓
Dave Swanson	FAA Flight Standards District Office	
Mike Porcello	FAA TRACON	

Name	TAC Member Organization/Affiliation	In Attendance
Joe Fazio	FBO, Atlantic Aviation	✓
Kevin Pattermann	FBO, Jet Aviation	
Mario Diaz	FBO, Landmark Aviation	
Dave Goncalves	FBO, Landmark Aviation	
Ken Forester	FBO, Meridian	✓
Al Rabasca	FBO, Signature Flight Support	
Pasquale Raguseo	FBO, Signature Flight Support, Morristown	
Alex Gersten	NBAA	✓
Peter Korns	NBAA	✓
Eileen O'Brien	Net Jets	
Joe Vukovich	Net Jets	
Joe Lepis	Newark Airport (EWR) Noise Community Roundtable	
Cheryl Rezendes	New Jersey Sports and Exposition Authority	
Ron Seelogy	New Jersey Sports and Exposition Authority	✓
Fred Dressel	Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)	✓
Dave Belastock	Teterboro Users Group (TUG)	
Geoff Couture	Teterboro Users Group (TUG)	
Jim Dramis	Teterboro Users Group (TUG)	

Study Team

Name	Study Team Organization/Affiliation
Kristen Ahlfeld	FHI
Leslie Black	FHI
Ted Baldwin	HMMH
Mary Ellen Eagan	HMMH
Bob Mentzer	HMMH
Dominic Scarano	HMMH

Name	Study Team Organization/Affiliation
Diana Wasiuk	HMMH
Ed Knoesel	PANYNJ
Timothy Middleton	PANYNJ
Renee Spann	PANYNJ
Ralph Tamburro	PANYNJ
Adeel Yousuf	PANYNJ

Public

Name	Organization/Affiliation
None	

Welcome and Introductions

Kristen Ahlfeld (FHI) began the meeting by welcoming attendees to the ninth meeting of the Teterboro Airport (TEB) Part 150 Noise Study TAC. TAC members were provided with a handout of the presentation. Attendees introduced themselves.

Review of Study Process

Ted Baldwin (HMMH) noted that the study is officially in the Noise Compatibility Program development phase. He noted that the comment period for the Draft Noise Exposure Map and documentation ended October 17, 2016 at 5:00 PM and that the Study Team is currently reviewing comments. Ted stated that a revised draft NEM is expected to be submitted to the PANYNJ shortly; he anticipates a final version being sent to FAA in January 2017.

NEM Status

Ted noted that 22 comments were received on the Draft NEM document; the Study Team is currently reviewing the comments and that the revised NEM will incorporate all of the comments received by the close of the comment period. Ted reviewed the topics of the comments received (see Slides 4 and 5 of the presentation)[1], noting that most of the comments pertained to the NCP. He stated that a petition supporting the Runway 19 Quiet Visual Approach was also submitted as part of the comments. Since that procedure is separate from the TEB Part 150 Study the petition was forwarded to FAA for their consideration. Lindsay Butler (FAA) questioned whether the comments received on the Quiet Visual were in support of the procedure. Ted stated that yes, all of signers were in support of flying the procedure. Tim Middleton (PANYNJ) added that the petition included more than 200 signatures from residents of an apartment complex in Hackensack, north of the airport, all in favor of seeing FAA continue with this approach procedure.

NCP Noise Abatement Discussion

Ted reviewed the noise abatement strategies that were presented and discussed at the two previous TAC meetings (see Slide 6 of the presentation). In terms of compliance with TEB's existing voluntary restraint from operation (11 p.m. to 6 a.m.), he noted that the Study Team prepared additional analyses regarding the potential for a shift in nighttime operations to the "shoulder hours" of 10 p.m. and 7 a.m. The results of this analysis show that in order to receive any noise benefit, as defined for the purposes of Part 150, operations would need to shift from operating during the night (10 p.m. to 7 a.m.) to during the day (7 a.m. to 10 p.m.).

Other analyses requested at TAC meetings and at the public workshops are listed on Slide 7 of the presentation. Ted noted that the Study Team has prepared additional analyses and partial contours for all of the items. Ted stated that one of the requests was to consider turns to the south for departures on Runway 24. Based on discussions with TRACON, that procedure would not work because of the airspace conflicts. Fred Dressel (TANAAC) stated that planes flying to EWR travel down Route 17 and that current TEB departures are underneath that flight path; planes should be flying more easterly. Ralph Tamburro (PANYNJ) stated that if planes are turned too far east, they would be conflicting with LGA traffic. Ted suggested that the Study Team bring some examples and pictures of the flight tracks to the next TAC meeting to show where the air traffic is within the airspace. Fred

[1] TAC Presentation materials can be found on the project website (http://www.panynjpart150.com/TEB_TAC.asp); slides will be referenced in this meeting summary.

noted that his office is located in Lyndhurst and that planes are flying directly over that facility.

Ted turned the meeting over to Lindsay Butler of the FAA for a summary of every measure approved or disapproved by the FAA for Part 150s across the country since 2000. Lindsay added that her presentation can be used as a guideline to show thought process behind some of the measures; a more detailed description of what the measures included; as well as justification for why the measures were approved or disapproved by the FAA for the purposes of Part 150.

In terms of "partial" DNL contours, Bob Mentzer (HMMH) reviewed the categories of TEB operations that were evaluated (see Slide 8 of the presentation). He stated that the Study Team looked at each set of partial operations and modeled them to see what their contribution is to the NEM contour as a whole. Key points and discussion included the following:

- Jets only (Slide 9) – largest contributor to the DNL; defines almost the entire shape of the contour.
- Daytime only operations (Slide 10) – about 3 decibels (dB) smaller than the overall contour, but has the same general shape.
- Night operations only (Slide 11) – very similar to daytime but the contour narrows off Runway 24 (due to more arrivals to Runway 6 than departures from Runway 24 at night). Ted Baldwin (HMMH) added that the day/night operations contribute the same to the DNL and that TEB operations are very balanced.
- Departures only (Slide 12) – the width of the contour is defined by departures.
- Night departures only (Slide 14) – very similar between day and night. Ken Forester (Meridian) questioned why the contour is so different off Runway 6 compared to the daytime. Bob stated the difference can be attributed to higher runway use for departures off Runway 24 and arrivals to Runway 6 during the day.
- Arrivals Only (Slide 15) – does not contribute to width of contour, but the extension of the contour to the north and southwest; overall contribution is much smaller than departures.

Bob summarized the key points of the partial contribution analyses (Slide 18) and stated that in order to shrink the DNL 65 contour, the measures proposed in the NCP must affect jet operations and that changes in nighttime jet departures will provide the greatest noise benefit, while affecting the least number of operations.

To continue the noise abatement discussion, Ted Baldwin noted that the Study Team has prepared analyses for several measures or alternatives that were requested by TAC members or by the public at the workshops:

- Shift 10% of Runway 6 Night (10 pm – 7 am) Arrivals to Runway 1 (Slide 20) – would need good weather and there are obstructions (high radio towers). No discernable change in DNL.
- Shift 25% of Runway 6 nighttime (10 pm – 7 am) Arrivals to Runway 1 (Slide 21) – would pull the community located to the south of TEB outside the 70 DNL contour.
    - Tim Middleton (PANYNJ) questioned why the arrival contour off Runway 1 does not show a larger change under this scenario. Ted stated that there are not than many arrivals to Runway 1.
    - Ken Forester (Meridian) asked Gary Palm (FAA) whether the ATIS system ever allows an arrival to Runway 1. Gary stated that the FAA does advertise that procedure now (The ATIS advertises the ILS to Runway 6 or circle to land to Runway 1 which is optional to the pilot) but noted that circling to Runway 1 during night is completely different than during day and that circling to Runway 1 at night is only used during perfect conditions.
    - Alex Gersten (NBAA) stated that an RNAV procedure would be needed for this shift in order to have a direct approach to Runway 1 rather than circling. Ted noted that it would be possible to circle to Runway 1 but planes would need to stay within TEB airspace. Andrew Brooks (FAA) noted that a procedure direct to Runway 1 would conflict with EWR airspace. Gary Palm (FAA) concurred and stated that the separation would be very narrow.
    - Peter Korns (NBAA) questioned how the shift would work and whether every fourth aircraft would be shifted to Runway 1. Ted stated that over the course

of a 365-day year, 25% of the aircraft currently using Runway 6 would be shifted to Runway 1.

- Shift of 10% of Runway 24 nighttime (10 pm – 7 am) Departures to Runway 19 (Slide 22) – Ted noted that this is the Dalton 2 procedure that is sometimes requested by pilots; he noted that this is very promising as it shows the pilots understand the noise abatement procedure. There is almost no change to the contour with 10% shift.
- Shift 25% of Runway 24 nighttime (10 pm – 7 am) Departures to Runway 19 (Slide 23) – this results in bigger improvement, pulling the 70 DNL contour right to the property line; there is also a small reduction in noise to some of the residential properties along Route 17. Ted noted that most times when this procedure is requested, pilots are told there is an "indefinite delay".
    - Gary Palm (FAA) noted that the delay could be two minutes up to an hour because this procedure is so intricately tied to EWR airspace. He stated that a gap would need to be built within EWR airspace in order for a plane to depart off Runway 19 at TEB. Sometimes traffic sequence is lighter into EWR and they can accommodate TEB. The sporadic use of Runway 19 is a factor because a consistent pattern cannot be established that EWR can program for.
    - John Panarello (AvPORTS, TEB Staff) questioned whether some sort of modeling could be done to give pilots a more exact delay/wait time for this procedure. He noted that even if the delay was 71 minutes, at least the pilot would know.
    - Renee Spann (PANYNJ) questioned whether this scenario was looking at the 10 pm to 7 am period and noted that EWR departures decrease after midnight. She questioned whether the Study Team could look departures on Runway 19 at later times. Ted responded that the Study Team can look at hour by hour statistics for both EWR and TEB to match them up to see where there are the fewest conflicts.
- Shift 10% of Runway 6 nighttime (10 pm – 7 am) Arrivals to Runway 1 and Shift of 10% of Runway 24 nighttime (10 pm – 7 am) Departures to Runway 19 (Side 24) – there is not much benefit from combining these two scenarios.
- Shift 25% of Runway 6 nighttime (10 pm – 7 am) Arrivals to Runway 1 and Shift 25% of Runway 24 nighttime (10 pm – 7 am) Departures to Runway 19 (Slide 25) – under this scenario the population within 70 DNL contour is reduced to zero.
    - Gary Palm (FAA) cautioned that these shifts could not happen simultaneously since one affects south flow and the other affects north flow. Ted stated that the shifts would occur on an individual day basis over an entire year and that the effect would be cumulative.
    - Ken Forester (Meridian) questioned, if the delay for departure on Runway 19 was too long, whether pilots could get in line for departure on Runway 24 even if they have already taxied to Runway 19. Gary Palm (FAA) responded that the delay initially is almost always indefinite when pilots are asking for their initial departure heading, but then when they get to the runway, may have a better idea of time so they can make a decision.
- Shift 25% of Runway 19 Jet Arrivals to Quiet Visual (Slides 26) or shift 50% of Runway 19 Jet Arrivals to Quiet Visual (Slide 27) – Ted noted that there is a little shift in the contours; however it would be over compatible land. For the purposes of Part 150, this procedure would be disapproved by FAA because it would not be reducing incompatible land uses within the DNL 65 contour. Ted also noted that the FAA has made an independent decision not to pursue Quiet Visual approach.

Ted then presented a series of plots of TEB operations by day of week and hour of day (see Slides 28 through 32 of the presentation). He noted that the plots are pretty smooth over the course of the days and that all of the days are very similar when compared to each other. He noted that nighttime period shows a gradual decline and increase during the shoulder hours. This does not reflect an increase in use immediately before or after the Voluntary Restraint from operations period. He then questioned what more can the airport do to encourage compliance with its voluntary restraint from operations from 11 p.m. to 6 a.m. Joe Fazio (Atlantic Aviation) commented that there would be a big challenge trying to communicate a 10 pm to 7 am curfew. He stated that Atlantic Aviation is currently encouraging people to fly before 11 pm. Ted noted that in order to make it a formal restriction, a Part 161 Study would be required, and historically these types of studies are very expensive and unsuccessful in getting approval from FAA.

Bill Huisman (Aviation Development Council) questioned the rationale for not moving forward with the Quiet Visual Approach. Ted stated that the FAA has decided not to pursue this procedure because of lack of participation. He noted that there were issues with design of approach, complexity of flying it and programming it into the FMS could not be done, which created a liability issue. Due to lack of participation, the agency will not pursue making it permanent procedure. Bill noted that it looked like it could result in a significant reduction. Ted responded that for the purposes of Part 150, there needs to be a benefit to the 65 DNL.

Tim Middleton (PANYNJ) reiterated that the Quiet Visual Approach would have no impact on the 65 DNL contour. He stated that there would be a bigger noise impact with more flights arriving on Runway 1 and that this procedure has more of an effect on the southern end of the contour. Ted added that the Study Team will compare the EWR plots to TEB plots to see when there is a lull in operations in order to find common time periods when conflicts would be low and when pilots could expect a light delay on the Dalton 2.

John Panarello (AvPORTS TEB Staff) requested that the Study Team and TAC look at making departures off Runway 19 an instrument procedure. He stated that all options need to be exhausted and that documentation needs to be provided on why it can/cannot be done. He noted technology may be needed and that some of the fleet may not be equipped to fly the procedure, but in terms of noise, the gains from this procedure could be huge.

The discussion circled back to the spreadsheet of NCP measures included in Record of Approvals since 2000 that were recently approved and/or disapproved by FAA. Lindsay Butler (FAA) continued to review 125 recent ROA's and grouped them into similar categories that will be evaluated at TEB as well as Part 161 measures. The spreadsheet provides some additional detail into the reasoning behind why the measured were approved, disapproved, as well as the thought process behind the measures. She noted that all approved measures need to show a benefit to the 65 DNL contour. Lindsay stressed the need to memorialize what has occurred at TEB to date as TEB has been an active group/airport with respect to noise abatement; for example, an active users group (TUG), noise abatement group (TANNAC), and a voluntary nighttime restraint. Operational measures may be constrained by where TEB falls within the airspace. She noted that the spreadsheet will be distributed to TAC members but stated that it is a comprehensive list and not a recipe of NCP measures for TEB.

On Slide 34, Ted reviewed the minimum scope of NCP Alternatives noting that there are 7 major categories that need to be considered. He stated that in terms of noise abatement, the TAC should concentrate on flight tracks and runway use. Renee Spann (PANYNJ) noted that 5% to 6% of TEB's total operations occur during the curfew hours. Ted stated that the Study Team will prepare arrival vs. departure plots for the nighttime hours. Ted encouraged the TAC members to continue to think and provide recommendations for the NCP.

Renee Spann (PANYNJ) questioned what memorializing TEB's existing programs would entail. Lindsay Butler (FAA) stated that she was talking about formal documentation within the NCP so that TEB's existing programs would be documented for the purposes of Part 150. She recommended that the PANYNJ list the programs in the final NCP documentation and get credit for them and even possibly receive funding for those measures to update materials, etc. Alex Gersten (NBAA) noted that NBAA could use those materials for marketing pieces and advertise the TEB noise abatement program to other airports.

John Panarello (AvPORTS TEB Staff) thanked Fred Dressel and Ralph Tamburro for all of their hard work at TEB over the years.

Next Meeting and Wrap-Up

Tim Middleton (PANYNJ) thanked the FAA TRACON for preparation of the Airspace Webinar held on November 9th and noted that the link to view the webinar will be sent to the TAC for those who could not attend.

Bob Mentzer requested that TAC please send any other noise abatement ideas or measures to the Study Team.

Ted noted that TAC Meeting #10 will be held on January 27, 2017 from 9:00 am to 12:00 pm., and will include more discussions of noise contours, land use analyses, and actions related to the first round of land use mitigation alternatives.

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Appendix G

- Public Outreach

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Appendix G.1

- Study Protocol

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Study Protocol for Newark/Liberty International (EWR) and Teterboro (TEB) 14 CFR Part 150 Studies

HMMH Report No. 307260.000
November 2015

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The Port Authority of New York and New Jersey

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1 INTRODUCTION

1.1 Purpose

The Port Authority of New York and New Jersey (Port Authority) has contracted with Harris Miller Miller & Hanson Inc. (HMMH) and a team of sub consultants ('the HMMH Team') for the preparation of two 14 CFR Part 150 Airport Noise and Land Use Compatibility Studies: one for Newark-Liberty International Airport (EWR) and a second for Teterboro Airport (TEB). In order for these Studies and any recommended noise abatement and noise mitigation measures resulting from these Studies to be eligible for federal funding, the Studies must be prepared in accordance with Title 14 of the Code of Federal Regulation Part 150 (14 CFR Part 150). As a result, the Noise Exposure Maps (NEMs) and Noise Compatibility Programs (NCPs) prepared under these Studies will be subject to Federal Aviation Administration (FAA) acceptance and approval, respectively. Therefore, the Port Authority and HMMH Team have agreed to employ a collaborative relationship with guidance from FAA to successfully complete these Studies in accordance with 14 CFR Part 150.

This Study Protocol has been developed to guide each Study; to clarify roles and responsibilities of those involved in each Study; and to delineate the details of the technical aspects of the Studies. The Study Protocol is intended for the internal use of the HMMH Team, the Port Authority, and the FAA and all parties have agreed to its development. After its development and acceptance by all parties, this Protocol may be amended. All three parties will work collaboratively on making required changes that will culminate in written amendments to the study protocol as needed.

1.2 Amendment of the Study Protocol

Once the technical work on the Studies begins, there may be circumstances that require an amendment of the Study Protocol. Such circumstances may include, but are not limited to, a change in the study years, the absence of the required data, or a change in airport operations. Upon identification of a circumstance requiring modification to the Study Protocol, the HMMH Team and the Port Authority, working collaboratively with the FAA would propose changes to Study Protocol. However, the role of the FAA with respect to this protocol would remain strictly advisory. The Study Protocol document title will include the revision number and the date of the approved amendment in the document as well as the filename for ease of knowing which Study Protocol is current.

1.3 Consistency with Scope of Work and Project Budget

While the Study Protocol provides the necessary details for conducting the Studies, it does not replace or add additional deliverables or tasks to the contracted Scope of Work. To the extent that there is disagreement between the Study Protocol and Scope of Work, the Scope of Work shall take precedence. The Study Protocol shall not modify the Scope of Work or Budget without written Port Authority approval and a corresponding contract amendment.

1.4 Public Document

Once finalized, the Study Protocol will be placed on the public website developed for the Studies and will be reviewed with the Technical Advisory Committees (TACs) established for the Studies. However, the Study Protocol will not be modified based on public comment as it is an internal HMMH Team guidance document tied to the contracted Scope of Work.

1.5 Consistency with the John F. Kennedy International and LaGuardia Airports Part 150 Studies

In addition to the 14 CFR Part 150 Studies being prepared for EWR and TEB, the Port Authority has issued a separate contract for the preparation of Part 150 Studies for John F. Kennedy International (JFK) and LaGuardia Airports (LGA). While the New York Studies are completely independent from the New Jersey Studies and are being conducted by separate consultants, it is likely that both Study Teams will benefit from sharing experiences that may be applicable beyond a specific airport or community. Further, there may be instances where interdependencies are noted in a review of air traffic procedures. Therefore, both Study Teams will strive to share relevant experiences with the Port Authority and FAA to the extent practical. The Port Authority will serve as the conduit for conveying the information between the Study Teams and will appropriately address interdependencies to the greatest extent possible.

1.6 Project Closeout

Upon completion of the Studies, the HMMH Team shall confirm delivery of electronic files of the reports, working papers, Integrated Noise Model (INM) files, Geographic Information System (GIS) files and the administrative record for the Studies. The HMMH Team, the Port Authority, and the FAA shall participate in a project closeout meeting to review and discuss possible actions to improve the next Part 150 Updates for both airports.

2 ROLES AND RESPONSIBILITIES OF STAKEHOLDERS

14 CFR Part 150 Studies often involve a diverse set of stakeholders with different roles, responsibilities, and interests in the outcomes of the Studies. This portion of the Study Protocol identifies the various key stakeholders and describes their roles and responsibilities.

2.1 Port Authority of New York and New Jersey

As the operator of Newark-Liberty International Airport (EWR) and owner of Teterboro Airport (TEB), the Port Authority is the sponsor of the Studies and has the overall responsibility for the conduct of the Studies. The Port Authority contracted the HMMH Team, developed the Scope of Work, and approved the Study Protocol.

By virtue of its role on the Studies, the Port Authority is the final decision maker regarding all aspects of the Studies including but not limited to the conduct of the Studies; the composition of the Technical Advisory Committee; the Study Area for each airport; the certification of the accuracy of the Noise Exposure Maps; and the recommended noise abatement, noise mitigation, and administrative measures to be included in the Noise Compatibility Program.

2.2 Federal Aviation Administration

The FAA has well defined roles in the 14 CFR Part 150 process and are distinct for the NEM and NCP elements. For the NEM element, the FAA is responsible for reviewing and accepting the NEMs as being completed in accordance with 14 CFR Part 150 as well as publishing the NEM in the Federal Register. In addition the FAA is responsible for reviewing and approving the aviation forecasts used to develop the aircraft noise exposure contours. For the NCP, the FAA is responsible for publishing the Federal Register notice, handling public comments received from the notice and issuing the Record of Approval (ROA) for the proposed NCP measures. For these particular studies, the FAA has agreed to provide the Port Authority with ongoing assistance in a technical advisory role to ensure consistency with 14 CFR Part 150 requirements and applicable agency guidance.

2.3 Conflict Resolution

The FAA and Port Authority have agreed to work collaboratively on the Studies. Conflict resolution will occur in a timely manner and will be expedited when possible. To the extent that the Port Authority and FAA are unable to resolve an issue at the staff level, both parties have agreed to elevate the issue to the next level of management in their organizations until the conflict is resolved to the mutual satisfaction of both parties.

2.4 Technical Advisory Committees

Experience has shown that most 14 CFR Part 150 Studies benefit from the creation and participation of a Technical Advisory Committee (TAC). The TAC serves several important functions including: representing a broader range of stakeholder groups in the Studies, receiving information about the Studies and sharing it with constituencies; providing input to the Studies; and in some cases, providing technical advice to the Study Team.

In order for the TAC to be effective and to be representative of all of the key stakeholders involved in aircraft noise issues, it must be composed of a diverse group of key stakeholders including, but not limited to, community representatives, aircraft operators/airlines, affected jurisdictions, and land use planners. While representation needs to be broad, the TAC needs to remain a reasonable size so that deliberations are efficient and meetings proceed smartly. The Port Authority will identify potential members to serve on two separate TACs: one for the EWR Study and the other for the TEB Study. <u>It is important to note that the TAC is advisory only to the Studies.</u> That is, the TAC may offer opinions, advice and guidance to the Studies, but the Port Authority has the sole discretion to accept or reject the TAC recommendations in accordance with 14 CFR Part 150.

By virtue of its role as the sponsor of the Studies and as the operator of EWR and TEB, the Port Authority is a member of the TAC. The FAA, as the primary funding agency for the Studies and as the approval authority, is a key member of the TAC. The FAA has stated that the lead FAA contact (AEA-600) will identify which FAA lines of business should attend each meeting, based on the meeting agenda, and will forward the invitation to the appropriate parties.

TAC members and designated alternates will be required to sign a TAC participation agreement, which commits them in writing to attend all TAC meetings throughout the three-year study period, to participate in a professional manner displaying courtesy and a willingness to listen to and consider all viewpoints, and to represent their constituencies' viewpoint, which requires regular communications with the larger group they represent. Each TAC member shall designate in writing a suitable alternate who will participate in TAC meetings when the primary representative is unable to attend. While the alternates are expected to attend all TAC meetings to remain abreast of the Study's progress, only the primary TAC member will be able to participate in discussions during the TAC meetings when both representatives are present. When the Primary TAC member is absent, the alternate will assume the role of the primary representative for that meeting and will participate fully in the TAC discussions.

In general, the TAC will operate on a consensus basis. The facilitator will obtain a sense of the members' position based on the flow of the conversation and the viewpoints being expressed. The facilitator may poll the membership to confirm the consensus opinion. In cases where the TAC seems divided on an issue, the facilitator may conduct a vote to determine the majority opinion. It is important to note that votes will not result in a specific outcome, but represent an advisory position to the Port Authority.

2.5 Interested Public

Members of the public who have an interest in the Studies have a role to play and a responsibility to the Studies' outcome. Members of the general public are encouraged to stay abreast of the Studies' progress by visiting the Studies website, attending TAC meetings *as observers only*, participating in public workshops, submitting comments on the Studies, and attending the public hearing for the Noise Compatibility Program.

3 COMMUNICATION STRATEGY PROTOCOL

The 14 CFR Part 150 Studies being conducted for EWR and TEB will determine existing and future aircraft noise exposure levels in terms of the Day-Night Average Sound Level (DNL) in the vicinity of TEB and EWR, explore measures to improve the noise and land use compatibility, and will include extensive public outreach and involvement programs with many communities, organizations, elected officials, and other stakeholders.

Through various mechanisms, including a Technical Advisory Committee (TAC), public forums, group meetings, a website, and various public documents, stakeholders and those interested in aircraft noise issues will be afforded an ongoing opportunity to learn about the studies and provide input.

The following describes the HMMH Team's strategy for working with the various stakeholders, throughout the 14 CFR Part 150 Studies. This strategy can be refined to adapt to changing circumstances that may occur or as a result of feedback received during the study process. The HMMH Team will defer to the Port Authority Media Relations Office on all matters related to the interaction, outreach and development of messaging with media outlets (print, radio, television, and social media). The Port Authority Media Relations Office will solely determine when, where, and how to utilize the services of the HMMH Team and with which outlets.

3.1 Definition of Teams

Within the larger HMMH Team, smaller sub-teams are tasked with various facets of public outreach:

- **Community Outreach Team–** representatives from HMMH and Fitzgerald & Halliday, Inc. (FHI) will focus on the creation and execution of the meetings of the general public and TAC, and maintain communications with those constituencies;
- **Media Outreach Team –** all media communications will be handled through the Port Authority's Media Relations Office;
- **Government Outreach Team –** all communications with elected leaders and formal community-based groups with a vested interest in the outcome of the study will be handled through the Port Authority's Department of Government and Community Relations – New Jersey;
- **Website Team –** in collaboration with and only solely upon the express, written prior approval from the Port Authority's Media Relations Office, representatives from HMMH and FHI will coordinate with Planning Tech Inc. (PTI) to contribute to the formation of messaging and content that is posted on the 14 CFR Part 150 Studies website.

3.2 Strategy

The purpose of the public involvement and communication effort is to connect with the various stakeholders in the community, as well as with elected leaders and the media, to effectively involve and inform them over the duration of the study process. The HMMH Team will assist the Port Authority in developing and implementing the public involvement and communication strategy. If appropriate, FAA's Office of Communications will be consulted when needed.

As part of this strategy, the HMMH Team and Port Authority will engage in:

- **Message Development:** The HMMH Team will assist the Port Authority in creating a comprehensive set of key messages to be used in all public forums to consistently, clearly and accurately convey the elements of the Studies. The Port Authority will be the primary Point of Contact for all media inquiries; and the HMMH Team, solely upon the express, written prior approval from the Port Authority's Media Relations Office, will coordinate with the Port Authority on the content of those responses.
- **Drafting of Media Materials:** Solely upon the express, written prior approval from the Port Authority's Media Relations Office, the HMMH Team will work with the Port Authority to create news advisories, news releases, and responses to media inquiries, as the TAC and public meeting schedule proceeds, including public notices

before and after each meeting. The Port Authority will approve all content provided to these groups used in these meetings;
- **Media Preparation:** Solely upon the express, written prior approval from the Port Authority's Media Relations Office, the HMMH Team will assist the Port Authority in preparing for the public meetings, including the development of talking points and providing counsel, as requested, on how to convey effective and efficient messages;
- **Reactive Messaging Response:** Solely upon the express, written prior approval of the Port Authority Media Relations Office, the HMMH Team will coordinate with the Port Authority to respond to spontaneous or unscheduled media inquiries that fall outside the timeframe of the regularly scheduled meetings or dissemination of information. The HMMH Team will coordinate with the Port Authority, which in turn will coordinate with FAA, as needed, for supporting technical and background information;
- **Government and Community Inquiries and Tracking:** The HMMH Team will track and respond to inquiries received from elected officials, community boards and stakeholder groups after coordinating with the Port Authority about a response. The HMMH Team will develop and maintain a database listing of all elected officials, community boards and stakeholder groups including relevant contacts, email addresses, phone numbers; as well as provide updates of such communication in a timely fashion;
- **Media Tracking:** The HMMH Team will review all news coverage with the Port Authority in a timely fashion;
- **Website:** The HMMH Team will work with PTI and solely upon the express, written prior approval of the Port Authority Media Relations Office, to coordinate the information released on the public website and assure consistency with the overall project messaging themes. The HMMH Team will also confer with the Port Authority for concurrence regarding the New York 14 CFR Part 150 Studies (JFK and LGA) to ensure consistency in the type and integrity of information disseminated.
- **Meeting Outreach:** The HMMH Team will coordinate with the Government and Community Outreach Teams to communicate TAC and public forum meeting dates and venues via multiple vehicles, including media coverage solely upon the express, written prior approval of the Port Authority's Office of Media Relations, direct communication (email and flyers) and the website. Recipients will include elected officials, community boards, and stakeholder groups. It will also respond to any inquiries concerning these meetings.

3.3 Meeting Creation and Execution

The Community Outreach Team will be responsible for the planning and execution of the various public interactions, including the TAC meetings, Information Sessions, Special Part 150 Study presentations, public meetings, and public hearings.

3.3.1 Technical Advisory Committee Meetings

- **TAC Formation –** Each Study will form a TAC, which will consist of representatives identified by the Port Authority and the HMMH Team, and will include stakeholders, community groups, the FAA, airlines, airport tenants, appointees by elected officials and others. Meeting formats will vary based on goals and objectives for each meeting (see below) and will serve to provide a forum in which topic area experts can discuss and review draft work and provide informed feedback.
  - TAC member, Port Authority, and FAA roles will be consistent with overall roles identified in Sections 2.1, 2.2, and 2.3.
- **Meeting Scheduling –** The HMMH Team will handle all aspects of meeting scheduling and logistics:
  - The HMMH Team will recommend a tentative TAC meeting schedule, including proposed discussion topics for each meeting, for the first year of the project and update it as the study progresses. The schedule will be distributed to TAC members to ensure robust attendance and participation. TAC meetings are expected to occur every two months throughout the duration of the project.
  - TAC meetings will run approximately two (2) hours each and will be held at pre-determined meeting locations within the study area of each respective airport, in a location identified by the HMMH Team in consultation with and approval from the Port Authority. It is anticipated each Study TAC will have up to 18

meetings for a total of up to 36 TAC meetings. The number of TAC meetings may be increased or decreased based on need. Part 150 experience at other comparable airports indicates that 18 meetings per airport should more than satisfy the need for TAC meetings. However, if as the studies progress it appears there might be a need to exceed the total budget for a maximum of 36 TAC meetings between the two airports, the HMMH Team and Port Authority will discuss steps to accommodate the need using available study resources in the most efficient manner possible, and communicate the steps to the TAC in a prompt manner.

- The Port Authority will distribute the invitations to participate in the TAC and to attend the first TAC meeting. The HMMH Team will handle receiving and tracking RSVPs from TAC members or their designee, (via project-specific Port Authority email address and phone voicemail) and maintain the contact list. Reminders and invites for all other future TAC meetings will be sent by the HMMH Team which will also receive and track RSVPs. Invitations and agendas for TAC meetings will be distributed at least two weeks in advance of each session.

- **Meeting Execution -** The HMMH Team will identify specific meeting goals and objectives in advance of each meeting (two weeks prior to each meeting) and the Community Outreach Team will recommend a meeting format (e.g., presentation/Q&A/wrap-up, small break out groups, etc.) based on the goals and objectives. A draft agenda, prepared by the Community Outreach Team and reviewed by the HMMH Team will estimate the time needed for each agenda item. The meeting agenda will be included with the email reminder to each of the TAC members and alternate members.
  - The Community Outreach Team will be responsible for TAC meeting details, including nametags, tent cards, sign-in sheets, easels and other meeting equipment and supplies. All technical meeting materials including presentations (PowerPoint, maps, figures, boards, etc.) will be prepared by the HMMH Team;
  - The Community Outreach Team will serve as the facilitators for the TAC meetings. The HMMH Team assumes that many meetings will require just one facilitator, but some meetings may require an additional facilitator to cover breakout sessions. All technical presentations will be conducted by HMMH Team members;
  - The TAC Meeting facilitators will be responsible for keeping the discussion on-topic and on time and will also draw out points of agreement and action items;
  - Meeting summaries will be prepared by the Community Outreach Team in conjunction with the other consultant team members. The Community Outreach Team will compile all HMMH Team notes and distribute internally for input/review by those HMMH Team members who attended the meeting. The meeting summaries will consist of action items, points of agreement and other key elements of the meeting, and be prepared in a bulleted format with an action item list. Meeting summaries and other meeting materials shared by the HMMH Team will be distributed electronically for review by TAC members in a timely manner.

3.3.2 Information Sessions

14 CFR Part 150 Study Informational Sessions will be scheduled on an as-needed basis (maximum of 6) throughout the course of the study and will be used to communicate with and educate elected officials, community groups, airport noise roundtables, or other organized interest groups about the study process and findings. The FAA will participate in all public meetings and information sessions held for the Part 150 studies.

- **Number of Meetings –** Up to three (3) information sessions are anticipated for the EWR 14 CFR Part 150 Study and up to three (3) information sessions are anticipated for the TEB 14 CFR Part 150 Study, for a total of six (6) information sessions. The agenda/topics for the information sessions will be determined by the Port Authority and the HMMH Team;
-
- **Meeting Content and Agendas –** Information sessions will include a technical presentation, followed by a question and answer session;
  - ;
  - The Community Outreach Team will facilitate the question and answer session, utilizing a carefully structured meeting plan to ensure efficiency and maximum decorum. For example, index cards and pens

can be distributed at the beginning of the meeting to participants that have questions or comments. The participants can write questions or comments on the index card for submission, and the meeting facilitator will read the question or comment aloud at the microphone so the Technical Team can respond. If time runs out before all of the comments are addressed, then the remaining comments will be responded to in writing by the HMMH Team and can be posted on the project website in a reasonable amount of time after the meeting.

- **Community Outreach Team Roles –** The Community Outreach Team will review the draft agenda and content and review technical materials for readability by airport neighbors and other key stakeholders;
  - The Community Outreach Teams will review the content to make sure the message is consistent;
  - Information sessions with elected officials and the media will be facilitated by the Government and Community Outreach Team;
  - Information sessions with community groups, roundtables and other interest groups will be facilitated by the Community Outreach Team;
  - The Community Outreach Team will facilitate the question and answer session, utilizing a carefully structured meeting plan to ensure efficiency and maximum decorum. For example, index cards and pens can be distributed at the beginning of the meeting to participants that have questions or comments. The participants can write questions or comments on the index card for submission, and the meeting facilitator will read the question or comment aloud at the microphone so the Technical Team can respond. If time runs out before all of the comments are addressed, then the remaining comments will be responded to in writing by the HMMH Team and can be posted on the project website in a reasonable amount of time after the meeting.

3.3.3 Special Part 150 Study Presentations

These presentations will follow the same procedures as the Information Sessions described above. Special Part 150 Study Presentations will be scheduled as needed with a maximum of four special presentations – two presentations for each Study – occurring over the course of the project.

3.3.3.1 Public Meetings

Two (2) Public Meetings will be held for each airport for a total of four (4) public meetings. These meetings will be advertised and open to, and intended for, the general public.

- The format of the public meetings will be closely coordinated with the Port Authority; however, these meetings could be conducted in a variety of ways. One recommended format is as a workshop with a series of stations with presentation boards, and members of the HMMH Team on hand to answer questions;
- The Community Outreach Team will develop a flyer for each meeting, prepared in English, and will translate the flyer in up to four (4) languages other than English;
- The Community Outreach Team will recommend media for posting advertisements in local newspapers (including foreign language newspapers) that serve the geographic area of each study. Port Authority Marketing will place the advertisements, in consultation with the Aviation Department and the other Public Affairs units, through its advertising agency. The Community Outreach Team will distribute and/or post flyers in public places (libraries, community centers, etc.) and distribute an electronic version of the flyer to TAC members, community boards, and other stakeholder/interest groups approved by the Port Authority;
- PTI will post the flyer(s) on the project website;
- Solely upon the express, written prior approval of the Port Authority's Media Relations Office, the HMMH Team will work with Port Authority to create and distribute press releases about the public meetings, and contact media and elected officials to inform them about the public meetings;
- Solely upon the express, written prior approval of the Port Authority's Media Relations Office, the HMMH Team will develop supporting media materials for each meeting in coordination with the Port Authority's Media Relations Office;
- The Community Outreach Team, at the request of the Port Authority, can recommend timeframes and messaging that the Port Authority can use on its social media sites. The Port Authority will use its own

discretion to utilize its respective social media sites (Twitter, Facebook, Instagram, etc.) to share the meeting details, time and location with the intent to inform in a timely manner;

- The Community Outreach Team will work with the Port Authority to identify meeting locations, handle all logistics for securing space and assure that they are Americans with Disabilities Act (ADA) accessible and (to the extent possible) public transit accessible.
- The Community Outreach Team will coordinate and secure any A/V equipment needed for the meeting including projectors, sound boards, as well as make a recommendation for language interpretation and sign-language services during the meetings;
- The HMMH Team will prepare and bring presentation boards and PowerPoint presentations;
- The Community Outreach Team will serve as facilitators at stations or at breakout groups as well as for any question and answer sessions; and prepare a brief meeting summary for each public meeting.
- The Community Outreach Team will facilitate any question and answer session, utilizing a carefully structured meeting plan to ensure efficiency and maximum decorum. For example, index cards and pens can be distributed at the beginning of the meeting to participants that have questions or comments. The participants can write questions or comments on the index card for submission, and the meeting facilitator will read the question or comment aloud at the microphone so the Technical Team can respond. If time runs out before all of the comments are addressed, then the remaining comments will be responded to in writing by the HMMH Team in the final NEM report.

3.3.3.2 Public Hearings

Public hearings will be formal events intended to collect written and oral comments concerning the draft Noise Compatibility Program (NCP) prior to its being submitted by the Port Authority to the FAA for review and approval of the recommended NCP measures. These meetings will be advertised and open to the general public. One (1) public hearing will be held for each airport for a total of two (2) public hearings.

- For the public hearings, the Community Outreach Team will develop specific public hearing protocol guidelines that will be distributed to all participants. For example, the guidelines would include an announcement such as "all comments are being recorded and will be responded to in writing in a document that will be posted on the project website;" or a note about addressing the amount of time that commenters can speak, etc.
- Prior to the start of the public hearing, in the same location as the public hearing, the HMMH Team will hold an open house session with a gallery of project boards, staffed by the technical team, for viewing and comment from the public. The open house will be immediately followed by a formal public hearing modeled after a National Environmental Policy Act (NEPA) Environmental Impact Study (EIS)-type public hearing; persons attending the open house would have the opportunity to submit formal comments;
- The Community Outreach Team will staff the "before and after" gallery area and serve as moderators for the public hearings;
- The Community Outreach Team will retain the services of a court reporter for each public hearing;
- Any presentations or presentation boards used at the public hearings will be prepared and given by the HMMH Team;
- The Community Outreach Team will provide a transcript of the meeting and the Technical Team will respond to the comments;
- The Community Outreach Team will accumulate and categorize the comments and distribute them to the HMMH Team for responses;
- The Community Outreach Team will assist with setting up the forum for public comments submitted outside of the public hearing. The public comment period will last 30-days and will conform with guidelines in 14 CFR Part 150 regulations.
- The Port Authority as the owner/operator of the Study airports will be present at the Public Hearings and will work closely with the Community Outreach Team with distribution of information to the Public.
- The FAA will be present at the Public Hearings in its role as regulator, and reviewer of the NCP.

3.4 Public Outreach Materials

All public outreach materials must conform to Port Authority Brand Standards, and will be consistent with the branding and outreach materials used for the 14 CFR Part 150 Studies taking place in New York. Questions regarding the Port Authority Brand shall be directed to the Port Authority's Marketing Department.

Public outreach materials that will be developed in support of the EWR and TEB 14 CFR Part 150 Studies include newsletters and fact sheets. Outreach materials shall be approved by the Port Authority prior to being distributed publicly. Additionally, these materials would be prepared in consultation with the FAA.

3.4.1 Newsletters

The Community Outreach Team, in conjunction with other members of the HMMH Team, will prepare a quarterly newsletter (covering both 14 CFR Part 150 Studies) to be distributed in hard copy and electronic format, to TAC members, community representatives, elected officials, and other interested stakeholders. The HMMH Team will review the newsletter for message consistency. The newsletter will also be posted on the project website. One or more infographics (charts, diagrams and other pictorial presentations that convey technical information and data) may be used either in place of or as a component of the newsletter, in order to communicate potentially complicated information in the most compelling and easily understandable fashion.

3.4.2 Fact Sheet

The Community Outreach Team, in conjunction with the HMMH Team, will prepare one fact sheet for each airport summarizing the 14 CFR Part 150 Study process, the Noise Exposure Maps (NEM), and Noise Compatibility Program (NCP). The fact sheet will be printed in color on 11 x 17 size pages and will be distributed at the Public Hearing.

All of the materials will be prepared in consultation with the FAA; however, the final responsibility for the content of the materials resides with the Port Authority.

Translated versions will be provided of all materials consistent with requirements of Title VI of the Civil Rights Act of 1964 – related to addressing persons with limited English proficiency.

3.5 Media Coordination

A key component of the strategic proposal includes interaction with media. To ensure media are well informed, and in turn inform their audiences, the Port Authority's Media Relations Office, will exclusively engage with media outlets. The HMMH Team will provide background material and suggested responses or "talking points" as needed.

3.6 Government and Community Outreach

In a similar fashion to media outreach, the HMMH Team, in collaboration with and approval from the Port Authority's Government and Community Relations Department (GOCOR- NJ), will engage with community representatives and elected officials to ensure their notification and participation in the 14 CFR Part 150 Studies. The Government and Community Outreach efforts will target the following:

- Federal, State and Local Elected Officials who represent the areas bounded by the study area, including:
  - New Jersey State Governor, Senate Assembly Members representing Bergen County, Essex County, the City of Elizabeth, the City of Newark,
  - New Jersey's two U.S. Senators and Members of Congress representing Bergen County, Essex County, the City of Newark and the City of Elizabeth
  - Bergen County and Essex County Freeholder Executives and Boards
  - Mayors and city/township councils from communities located adjacent to EWR and TEB

- Community Organizations and Chambers of Commerce throughout Bergen, Essex, Hudson, and Union Counties;
- Business groups that serve the air travel industry;
- Members of the Aviation Community
- EWR and TEB airport fixed base operators (FBOs), including:
  - Atlantic Aviation
  - Landmark Aviation
  - Jet Aviation
  - Meridian Teterboro
  - Signature Flight Support
- Community-based stakeholder groups formed around the issue, including:
  - Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)
  - Quiet Skies, NY (Maywood, NJ engaged with this group)
  - Teterboro Users Group (TUG)

The HMMH Team will coordinate with the Port Authority regarding the consideration of other groups that may not be in the immediate vicinity of the airports, based on the final study areas that are developed for the EWR and TEB 14 CFR Part 150 Studies. These may include groups and elected officials that are covered in the New York (JFK and LGA) 14 CFR Part 150 Studies or in other northern New Jersey municipalities.

3.7 Other Strategic Elements

In addition to our media (with any dealings with media outlets solely subject to the express, written prior approval of the Port Authority's Media Relations Office), government and community outreach, the HMMH Team can assist the Port Authority with other efforts to complement this strategy, and give the agency confidence in its public positioning as the study progresses.

3.7.1 Social Media

The HMMH Team will make recommendations to the Port Authority regarding the use of its social media feeds to disseminate information about upcoming meetings and information sessions. The HMMH Team will also monitor social media channels for news and commentary on the 14 CFR Part 150 Studies, and solely upon the express, written prior approval of the Port Authority's Media Relations Office make recommendations for responses or engagement, on a case-by-case basis. The HMMH Team will coordinate with the consultants designing and managing the Part 150 public website, to include essential information and resources throughout the process. Items to be included on the website can consist of: FAQ, Index of Terms, Public Meeting Schedule, and more. The website must conform with the Port Authority Web style guide. Wire frames and design concepts must be approved in advance by Public and Government Affairs (OMR, GOCOR, and Marketing). The consultant also must work with PANYNJ Technology Department (TEC) to coordinate links from the existing PANYNJ website to these pages.

3.7.2 Messaging

The messages conveyed in the public meeting sessions, as well as through the media and directly to government and community stakeholders, will be critically important. Therefore, the effective development and delivery of key messages, in order to clearly define what the 14 CFR Part 150 Study is designed to achieve, should be given great deliberation and care and be subject solely to the express, written prior approval of the Port Authority's Media Relations Office.

Among the messages that would be recommended, to be refined at the Port Authority's discretion, include:

- The 14 CFR Part 150 Studies are designed to identify aircraft noise levels in the vicinity of EWR and TEB;
- The 14 CFR Part 150 Studies will provide multiple opportunities for dialogue with communities – including private residents, businesses, and elected officials – to discuss all facets of the aircraft noise issue;

- The 14 CFR Part 150 Studies will result in noise exposure maps and a series of voluntary recommendations designed to mitigate aircraft noise exposure for affected communities, subject to FAA approval.

These messages, subject to the review and approval of the Port Authority Media Relations Office, Marketing Department and Government and Community Relations Office, would be distributed widely and repeatedly at all public hearings and public meetings, and through correspondence with community and elected officials with whom the HMMH Team will interface throughout the process. Inquiries concerning Airport Improvement Program (AIP) of Passenger Facility Charge (PFC) funding will be directed to the FAA.

3.8 Port Authority Approval Timeframes

As time is of the essence on this project, the Port Authority has agreed to expedite its internal approvals of HMMH Team-provided outreach materials. The Port Authority shall provide the HMMH Team with a single set of consolidated comments within five (5) business days of receipt of draft outreach materials. The Port Authority shall approve final outreach materials within two (2) business days of receipt of the final outreach materials.

Media inquiries will require a more rapid response. The HMMH Team shall forward to the Port Authority any media inquiries within 24 hours of the initial inquiry. The HMMH Team shall identify the content of the proposed response as well as who is the best person to respond. Depending on the nature of the inquiry, the appropriate respondent may be a Port Authority representative, an FAA representative or an HMMH Team member. If needed, FAA Public Affairs will be consulted.

4 DATA MANAGEMENT PLAN

4.1 Purpose

The purpose of this element of the Study Protocol is to define the process by which data will be obtained, validated and tracked throughout the course of the Studies. This includes data standards, filing and organization, roles and responsibilities, and quality control presented as intended actions to identify, gather, maintain, share, secure, and utilize data. For consistency PTI, as a member of the New York and New Jersey Studies teams, is tasked with coordinating data management to ensure consistency between the two teams.

4.2 Data Collection/Validation

Data includes electronic files, audio files, transcripts, and other quantitative and qualitative materials. It includes developed data; converted or transformed existing data; shared or exchanged data; and purchased data. This project will involve the development and acquisition of large amounts of data. Therefore, data management is a critical component to overall project management and technical accuracy.

Significant third party data will be required for this project. To streamline requests and avoid duplication, all external data requests will be submitted through the HMMH Team's PM unless otherwise directed. All data requests will be accompanied by a data request form. (An example of the form has been provided in the appendix). The information in this form will be input into a tracking spreadsheet. (An example of the tracking spreadsheet has been provided in the appendix). The HMMH Team's PM will review the spreadsheet prior to submitting data requests to assure that requests are not duplicated. Data furnished as a result of requests mentioned above will be retained and stored for future use.

To facilitate creation of required metadata for this project, all data files generated or collected will be accompanied by the following information:

1. Name(s) and affiliation(s) of data collector / developer and date of data production
2. Data source / citations to the original sources from which data were obtained
3. Location in the data file(s) and information on file formats, linkages, and similar
4. Copies of the original data collection forms and instruments
5. List of abbreviations and other conventions (should be standardized and described)
6. A description of data which may include: observational, raw or derived, models, simulations, curriculum materials, software, images

For data collected through internet or web-based sources, the information obtained will be captured either in a Word document (copied and pasted) or PDF (printed from website to PDF) and saved into the appropriate data file location. Because web page content and format vary significantly, the following information should be recorded to the greatest extent practical.

- Author / editor name
- Title of the article
- Web site name
- Edition or version number
- Web site owner or sponsor if available
- Date of publication (DD MM YYYY, use n.d. for "no date"). Pay careful attention to "autodating" websites that update each day and may obscure when the information was actually created / published
- The word Web to indicate that as source
- The date the site was accessed
- The URL (web address) of the document
- The Airport for which the data is being obtained (TEB, EWR or both)

4.3 File Management

Critical to this project is the ability to manage large amounts of data in a variety of data formats in a consistent and repeatable filing system. The electronic file management will ensure HMMH Team members can:

- Locate and browse for files easily
- Distinguish different files and versions of files within a folder
- Prevent confusion with file sharing and multiple users / editors
- Prevent data loss by accidental overwriting or file deletion
- Facilitate archiving and long term storage of data as well as data retrieval

A data library will be developed and housed on the HMMH Team's internal website (SharePoint) and the HMMH Team's PM will assure there is a consistent folder naming and structure. The file structure and format of that library will be developed and disseminated to all HMMH Team members.

Documents and data intended to be shared among the team will be hosted on a SharePoint server to which team members will have user accounts and password-protected access. The SharePoint server will be the primary repository of project records (e.g., project reports, outreach materials, correspondence, etc.). Modeling, noise, and geo-spatial data will be stored on HMMH servers.

4.4 Project Documentation

In conjunction with the folder templates developed for the data library, the HMMH Team's PM will develop and disseminate a document naming convention. Since individuals accessing files may be running different operating systems or different versions of a system, it is important that the convention will allow a file to be recognized in as many different environments as possible. A new file name should be created with each version of a document uploaded or forwarded for team use. A standard file naming convention facilitates readily identifying all necessary descriptive information independent of where it is stored. Files named in accordance with the naming convention will include:

- Avoiding illegal characters (e.g. : > < " / \ | ? * : ^ $)
- Avoiding spaces in file names/paths in order to avoid breaking hyperlinks. Use the underscore "_" instead
- Use shortened, capitalized names for the ***originating*** organization, such as: HMMH, FHI, RS&H, etc.
- Including date of creation or revision at the beginning for the filename, using YYYYMMDD to facilitate easy sorting
- Including a shortened description of the subject, (e.g., ProjDesc, Noise, LandUse, Outreach, etc.)
- Consistent conventions for version control (i.e. FNL=final, DFT=draft, v02 = version)

A typical series of filenames for a document and its edits created by RS&H on June 3rd, edited with comments by Mary Ellen Eagan on June 7th and revised by RS&H on June 9th would look like:

- "RS&H_20150603_Outreach_DFT_v01.docx"
- "RS&H_20150607_Outreach_DFT_v01(MEE).docx"
- "RS&H_20150609_Outreach_DFT_v02.docx"

Project documents will be shared within the HMMH Team. Each team member will be given a unique username and password, allowing access to upload, download, and edit documents stored in folders on the project website.

4.5 Quality Control

Project data will be checked and certified by designated team member(s). This verification will be done by an individual other than the person collecting the data. Details of the data quality control will be documented in the project quality control plan. These include:

- When in the data lifecycle QA/QC is occurring

- Level of QA/QC required for specific data types
- Who is responsible for each level of QA/QC
- How the QA/QC steps will be documented
- How transcribed or copied data will be checked for errors against the original data set

The designated QA/QC officer for this project will designate the team members (or project roles) for QA/QC for specific data collection and management efforts.

4.6 Conflict Resolution

In the event that conflicting data are received, the HMMH Team will evaluate the data and make a recommendation/determination on how to proceed. Minor data issues with limited potential to impact the results of the project will be resolved within the HMMH Team. More significant data issues will be coordinated through the Port Authority PM via weekly update calls, in email form or via memorandum (as may be appropriate). Delays in the resolution of data conflicts have the potential to significantly impact the project timeline. Conflict resolution will occur in a timely manner and will be expedited when possible. When needed, there will be layers of elevation within the Port Authority and FAA to facilitate resolution.

4.7 Security and Backup

The HMMH Team will secure all working and final documents with reliable hardware, software, procedures, and protocols. This includes network firewalls to safeguard all electronic devices and files, system-wide virus protection, redundant backup and archiving procedures, and secure hard copy storage and retrieval. For the Studies data stored on the internal website will be backed up weekly by Planning Technology, Inc. (PTI). The data will be stored and backed up on servers that are located in highly secure facilities. Specific data may be additionally backed up to DVD or similar "hard copy" to protect against a single-point failure. The HMMH Team's Information Technology specialist(s) will be engaged to ensure that backups are being done properly and at prescribed intervals. This also insures that multiple team members will know where all data are being stored and how to access the data. Backups will be kept for seven (7) years after final project completion in archive.

4.8 Archiving, Retrieval and Removal

Upon project completion and acceptance by the Port Authority, PTI will retain and archive the data collected for the project. Twelve (12) months after project completion the data will be transferred to an archival storage repository. Archiving will be fully documented and periodic integrity checks will be conducted to assure data are intact. Project specific and unique identifiers for citation, migration, recovery and retrieval will be established. This will assure that if archived data are needed, they can be retrieved efficiently and completely.

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5 AVIATION ACTIVITY FORECAST PROTOCOL

5.1 Introduction

Traditionally, the development of an aviation forecast addresses a relatively consistent set of parameters and is typically prepared as a basis of determining adequacy or inadequacy of airport facilities to meet the project level of demand over a specified timeframe. While these forecasts provide a significant component of the data required to support the development of aircraft noise exposure contours, they do not typically meet all of the requisite data requirements. As a result, existing forecasts are usually used to supply requisite information such as the aircraft fleet mix, however, additional detail must be derived to provide the data required for development of aircraft noise exposure contours. Derivative forecasts provide the additional detail required for the noise modeling effort. The development of noise exposure contours is based both on the compilation of a base year of aircraft activity statistics, aircraft fleet mix, engine type, time of day, stage length considerations and runway utilization data, as well as the development of a projection of these same factors for the five-year future condition.

As part of the current 14 CFR Part 150 studies for EWR and TEB, a forecast must either be developed or an existing forecast needs to be identified for use in the development of Noise Exposure Maps and the associated Noise Compatibility Programs in accordance with 14 CFR Part 150 guidelines. Two existing forecasts have been identified for potential use in the EWR and TEB 14 CFR Part 150 Studies: the FAA-approved 2012 Port Authority forecast for EWR and TEB, which has served as the basis for several Port Authority planning efforts to date, and the FAA's Terminal Area Forecast (TAF), which is updated annually for all airports in the National Plan of Integrated Airport Systems (NPIAS), and serves as the official forecast of the agency. For the purposes of the 14 CFR Part 150 Studies for both EWR and TEB, the FAA's 2014 TAF (issued January 2015) will be used as the baseline operational forecast. The TAF will be used for the following reasons:

1. The FAA has determined that the Port Authority's most recent (2012) FAA-approved forecast would require development of supplemental information to allow for its use in the 14 CFR Part 150 Studies.
2. The TAF contains the most current information regarding historic and projected aircraft operations at each of the airports. As a result, the Port Authority believes that the utilization of the current TAF for EWR and TEB is logical, appropriate, and justifiable as a basis for meeting the needs associated with the 14 CFR Part 150 Studies.
3. The current TAF is the FAA's official forecast, which "…is prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. In addition, state aviation authorities and other aviation planners use the TAF as a basis for planning airport improvements." Use of the TAF would reduce the potential for an extended forecast development and review period and related delays in the development of the NEM's for each airport.
4. The FAA's TAF is commonly used as one of the many inputs for development forecasts for use in an array of planning studies, 14 CFR Part 150 Studies, and other environmental studies subject to FAA review and approval.

As described in subsequent sections, the year 2016 has been chosen as the base year for the noise analysis as it is anticipated that 2016 will be the year of submission of the EWR and TEB Noise Exposure Maps to the FAA. The 2021 forecast INM inputs will use the 2016 baseline conditions aircraft operations, fleet mix, and runway use data as a starting point and incorporate adjustments, as will be described, to reflect the expected changes in operations and fleet mix over the five-year period.

5.2 Terminal Area Forecast Considerations

While the FAA indicated concurrence with the use of the TAF as the basis for EWR and TEB 14 CFR Part 150 Studies, the FAA noted that potential adjustments to the forecasts associated with the possible impact of constraints on the projected level of activity at EWR may be warranted. In addition, historical trends in activity at TEB indicate that the January 2015 TAF values for the study period may be too low, and thus may warrant adjustment. Detailed justifications will be provided wherever adjustments are proposed.

The FAA noted that the latest EWR TAF represents an unconstrained projection of passengers and aircraft operations activity and, as a result, the TAF does not take into account the potential influence and/or impact that existing constraints at EWR could have on the future EWR activity levels. Due to this concern, the FAA indicated that the Port Authority would need to assess and define the extent, if any, that constraints might potentially limit the growth of operational activity at EWR within the planning horizon of the 14 CFR Part 150 Studies and make adjustments to the operational levels in the TAF to reflect the impact of constraints on future projected activity. The analysis would determine if constraints result in a limitation on total operations between 2016 and 2021 or if the level of demand could be accommodated. Based on a review of current operational trends, it is likely that constraints will not come in to play until sometime after 2016. If total operations are constrained, the analysis would then assess how the airline industry might respond to the available capacity. For example, the airlines may use larger seating capacity aircraft or schedule flights outside of peak periods. The Port Authority will base this analysis on its extensive background of data and understanding of the New York/New Jersey market and the airline strategies for serving that market. Significant analytical work has been previously performed as a part of other Port Authority planning efforts and this material will be consulted for its value in defining constraining factors, determining when the constraints arise, and establishing how these factors would impact the number and complexion of operational activity at the Port Authority commercial airports.

A final consideration associated with the use of the FAA's TAF for the EWR 14 CFR Part 150 Study is that the projected operational levels are focused on a 5-year period and any adjustment to passenger growth and affiliated fleet mix projections ultimately derived are applicable only to 14 CRF Part 150 analyses and are not intended for use as a basis for any other planning effort. Facility planning efforts typically use an unconstrained forecast and consider a longer planning period (20 years).

5.3 Forecast Development

Newark Liberty International Airport:

The Port Authority will assess the potential impacts of operational constraints to define the extent of impact, if any, that these constraints might have on the level and complexion of operational activity at EWR. If appropriate, an adjusted total operational level will be prepared to reflect the operational conditions at EWR using a multi-step process:

1. Review the underlying assumptions employed by the FAA's Forecast and Performance Analysis Division in the development of the EWR TAF. Review the analysis of constraints related to the EWR 2012 Port Authority forecast process and other relevant planning efforts to determine their potential current applicability.
2. Review and update, if necessary, analysis of the current distribution of available slots between carriers at EWR and their actual utilization to determine what, if any, unused hourly and daily slot capacity exists by day and time.
3. Using the actual 2014 fleet aircraft operations and mix data processed by the HMMH Team from the Port Authority's Airport Noise and Operations Management System (ANOMS) and published reports of airline fleet composition and airline aircraft orders, the Port Authority will identify the potential fleet changes that would be reasonable to assume as occurring given the potential passenger and cargo market demand. The Port Authority will develop assumptions relative to how these fleet decisions may or may not change given the potential impact of the current limitations/constraints at the New York/New Jersey Airports. Assumptions will be fully discussed and coordinated with the FAA so as to be parallel.
4. Review airline route networks and existing aircraft allocation decisions with major airlines to determine the ability of airlines to serve the New York/New Jersey market with larger aircraft than others' markets. Factors to be considered include how airlines utilize their aircraft and the decision factors that drive the allocation of aircraft assets to specific markets. This analysis will need to recognize that airlines have few domestic routes where aircraft can be specifically ordered or configured for the market.
5. Identify the additional aircraft operations level based upon the current usage of EWR slots and the availability of any unused slots on an hourly or daily basis.

6. Adjust the passengers per plane for each airline based upon their activity to up-gauge aircraft serving the New York/New Jersey market taking into consideration fleet availability, other markets served, experience with fleet up-gauging at other capacity constrained airports and airline business considerations.
7. Evaluate current airline load factors by carrier to determine the extent, if any, that growth in passenger demand may be partially accommodated by some upward expansion of load factors.
8. Compute annual aircraft operations and annual passenger volumes based on the constrained activity profiles.

Teterboro Airport:

1. Review the underlying assumptions employed by the FAA's Forecast and Performance Analysis Division in the development of the TEB TAF.
2. Consider the applicability of the TAF annual operations forecast for 2016 and 2021 in light of recent historical operations data and propose adjustment where necessary.
3. Use Airport System Capacity Planning Study for 2013 TEB fleet mix data and compare with 2014 actual data for TEB based on merged ANOMS and Compuland data to develop the 2014 fleet mix.
4. Use FAA General Aviation forecast trend data from the FAA Aerospace Forecasts: FY 2015 to 2035 and industry sources (e.g., GAMA, NBAA) to identify trends for fleet mix changes to Baseline 2016 and Forecast 2021.
5. Evaluate FBO and tenant expansion plans and any indicated fleet mix changes identified in the Airport System Capacity Planning Study.
6. Develop 2016 and 2021 fleet mix operations forecast from trends analysis and Airport System Capacity Planning Study data with projections to 2032.

As described above, the Port Authority will develop a formal forecast document for each airport with supporting narrative and tabular data. The forecast document will outline the basis/rationale of each of the assumptions developed, supporting documentation for the assumptions, data sources, and methodologies. Also included for EWR will be analytical outputs from the assessment of constraints on the TAF and the resultant projection of operational activity and resultant passenger level for the 2016 &2021 14 CFR Part 150 planning period. The documents will be consistent with the FAA Guidance Document "Review and Approval of Aviation Forecast June 2008" and will include a comparison of the recommended forecasts to the Port Authority's 2012 approved forecast. After receiving FAA approval, the derivative aviation forecast for use in INM will be developed and submitted to the FAA for approval.

5.4 Derivative Aviation Forecast Data for Noise Modeling

The following sections describe a general overview of the guiding protocols for the development of the base-year and five-year derivative aviation forecasts for EWR and TEB Noise Modeling efforts.

1. Radar data and operational data for calendar year 2014 will provide the aircraft information, time of day of operations and trip length information needed for the application of the forecast data to the input of the noise model.
2. A baseline will be generated from the Port Authority ANOMS consisting of aircraft flight track information, aircraft identification and operational data for calendar year 2014 (supplemented with Compuland data at TEB). The Port Authority will provide the aircraft type information, time of day of operations and trip length information needed for the application of the forecast data to the input of the noise model. It should be noted that runway use and flight track development will replace the data during the two-month runway closure at EWR in 2014 with the same two-month period in 2013 when there was no runway closure at EWR.
3. The HMMH Team will utilize the Port Authority Part 150 Forecast data for the 2016 and 2021 noise model inputs. HMMH will document how the data will be augmented for use in the noise model. The Team will not initiate work on data inputs to the model until the Port Authority has reviewed this approach and approved the process. The HMMH Team will utilize the Part 150 Forecasts for EWR and TEB and apply additional aircraft information, time of day and trip length information to develop:
   a) 2016 existing conditions forecasts.
   b) 2021 future conditions forecasts.

4. The Part 150 Forecast data to be defined partially from the existing Port Authority aviation forecasts and augmented by additional Port Authority data or other industry data sources includes the following items:
   a) Aircraft Fleet Mix (Aircraft Make and Model) for commercial, commuter, charter, air cargo, general aviation (including helicopter) and government/military on an annual basis;
   b) Aircraft Engine Type as derived from data contained in the 2013/2014 JP Fleets directory or other suitable source; (a single aircraft model can be equipped with a variety of engine types and thrust ratings)".
   c) Time of day of operations by aircraft fleet mix (split between daytime defined as 7:00:00 a.m. to 9:59:59 p.m. and nighttime defined as 10:00:00 p.m. to 6:59:59 a.m.);
   d) Aircraft departure stage length;
   e) Assigned runway heading for arrivals and departures (i.e., runway use percentages).

5.5 Forecast Technical Memorandum

As the Part 150 Forecast data is developed, the HMMH Team will coordinate with the Port Authority's PM and Aviation Forecasting Manager to review the information that has been developed, define potential issues, discuss approaches to mitigating possible data deficiencies, assess the extent to which the derivative data meets the requirements of the noise model (INM 7.0d) and 14 CFR Part 150, and generate documentation describing accepted methodologies and assumptions.

1. The Part 150 Forecast information developed by the Port Authority will record data sources used in the effort, identify assumptions employed in the Part 150 Forecast effort, and summarize the methodologies employed.
2. The aircraft noise modelers will identify the format for the aviation forecast data and affiliated derivative forecast data for use in the aircraft noise exposure contour development process.
3. A narrative section summarizing the approach to the development of the Part 150 Forecast and base year data will be prepared by the Port Authority and HMMH Team for inclusion in the 14 CFR Part 150 documentation. This narrative section may be incorporated either as text to the primary document or as a referenced appendix to the 14 CFR Part 150 Studies. The narrative will summarize assumptions, methodologies, data sources, analytical steps and the findings for use in defining the five-year future aviation forecast and affiliated derivative data for both the base year and the five year projection of activity.
4. Coordination meetings with Port Authority and/or FAA staff will occur as needed over the course of the derivative forecast development effort.
5. The Port Authority will formally submit the 2016 and 2021 forecasts to the FAA for review and approval prior to commencing noise modeling aircraft operations for the 14 CFR Part 150 Studies.

6 AIRCRAFT NOISE MODELING PROTOCOL

6.1 Introduction

This section of the Study Protocol describes the methodology for modeling aircraft noise exposure using the FAA's Integrated Noise Model (INM) Version 7.0d. The FAA requires the use of the INM in 14 CFR Part 150 Studies; both to develop Noise Exposure Maps (NEMs) and to assess noise exposure levels associated with the implementation of noise abatement measures evaluated during the development of the Noise Compatibility Program (NCP). The INM is designed to model aircraft noise exposure associated with a single airport, therefore separate INM analyses will be conducted for the EWR and TEB 14 CFR Part 150 Studies.

In general, the INM will be used to:

- Generate "existing" conditions NEMs for EWR and TEB. The NEMs will be representative of conditions at EWR and TEB for calendar year 2016, which is the year when the NEMs will be submitted to the FAA for review and acceptance.
- Generate NEMs for the future 5-year forecast condition (2021).
- Document aircraft noise exposure levels for potential operational noise abatement alternatives developed during the NCP portion of the EWR and TEB Studies.

The following topics are discussed in the remaining sections of the Aircraft Noise Modeling protocol: the INM; INM inputs; aircraft noise measurements; aircraft noise contours; noise exposure maps; noise data tables; noise compatibility programs; and supplemental noise metrics.

6.2 Integrated Noise Model

The INM was developed by the FAA using methods and calculations from the Society of Automotive Engineers (SAE) International's Aerospace Information Report (AIR) 1845, *Procedure for the Calculation of Airplane Noise in the Vicinity of Airports*. The INM is the FAA-approved, industry-accepted tool for determining the cumulative effect of aircraft noise exposure around airports. Statutory requirements for INM use are defined in 14 CFR FAR Part 150, Airport Noise Compatibility Planning, and FAA Order 1050.1F, *Policies and Procedures for Considering Environmental Impacts*.

The airport-specific information required by INM includes both physical and operational data. The physical data includes airfield geometry (i.e., runway locations and utilization) the altitude of the airfield, weather, and terrain data. Operational data includes the number and types of aircraft operating at the airport and the three-dimensional flight trajectories of aircraft arriving and departing from an airport.

The INM calculates noise exposure levels at a series of grid points, and produces noise exposure contours based on the grid point results. Within the INM program, there are three elements which process the input data:

- **Flight Module –** Definition of three-dimensional flight trajectories with associated aircraft performance characteristics based on manufacturer-supplied data.
- **NPD Database –** Noise-Power-Distance (NPD) curves based on FAR Part 36 measured certification flights. The curves indicate the single-event noise level based on the level of thrust used and the distance between the aircraft and a receiver on the ground.
- **Acoustic Module –** Sound propagation algorithms to account for reduction in noise levels based on the distance traveled, atmospheric conditions, and source-to-receiver geometry.

6.3 INM Input Data

The INM uses airport-specific inputs to produce noise level outputs. Each of the INM inputs is described in detail in the following sections.

6.3.1 Weather/Meteorological Data

The INM accounts for the influences of meteorological conditions on aircraft performance and atmospheric sound absorption. When specified by the User, the INM uses temperature and relative humidity to calculate atmospheric absorption coefficients[1], which in turn are used to adjust standard NPD curve levels[2]. The average-annual meteorological conditions that can be defined in the INM are:

- Average annual temperature (degrees Fahrenheit)
- Average annual barometric pressure (inches of mercury)
- Average annual relative humidity (percent)
- Average annual headwind (knots)

Calendar year 2014 meteorological data for weather stations near EWR and TEB will be obtained from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center. All modeled cases for EWR will use identical meteorological data. All modeled cases for TEB will use identical meteorological data. The default average headwind in the INM is 8 knots[3]. This value will be used for all modeled cases for both EWR and TEB.

6.3.2 Terrain Data

National Elevation Dataset (NED) terrain data in Gridfloat format will be acquired from the U.S. Geological Survey and input into the INM study files developed for EWR and TEB. The terrain in a region can affect how sound propagates across the ground. The INM uses terrain information to adjust source-to-receiver distances when computing noise levels. Separate terrain data files will be acquired for EWR and TEB although it is anticipated that the geographic coverage of the terrain data files will overlap.

6.3.3 Runway Layout

Information regarding the existing (2016) airfield layout at EWR and TEB will be acquired from the Port Authority. The study team will also work with Port Authority staff to determine if there are planned airfield development projects at EWR or TEB within the next five years that could affect runway threshold locations or elevations. Any modifications expected to be in place in 2016 would be incorporated into the existing NEM and any modification expected to be in place by 2021 would be included in the future NEM. The study team will use information obtained from the Port Authority to develop tables summarizing existing airfield conditions and future airfield conditions at EWR and TEB. The following data will be used to define the existing conditions and future conditions runways in INM:

- Runway end coordinates (latitude/longitude)
- Runway end elevation (Mean Seal Level or MSL feet)
- Runway width (feet)
- Distance of any displaced arrival or takeoff thresholds (feet)
- Glide Slope (degrees)
- Threshold crossing height (feet)

[1] The atmospheric absorption coefficients are calculated using information developed by SAE International's Aviation Noise Committee and documented in SAE Aerospace Recommended Practice (ARP) 866A, *Standard Values of Atmospheric Absorption as a Function of Temperature and Humidity*.
[2] The standard NPD curves are calculated using atmospheric absorption coefficients defined in SAE-AIR-1845.
[3] The default average headwind in the INM is 8 knots, which is the value used in the SAE-AIR-1845 equations. The average airport headwind can be modified for individual runways at an airport by specifying a percentage change from the airport average.

6.3.4 Aircraft Operations

For aircraft noise exposure calculations using the DNL metric, aircraft operations associated with the annual average day (AAD) are used in the INM. The number of annual operations[4] by each INM aircraft type is divided by 365 to arrive at the AAD by INM aircraft type. This representation of airport activity does not reflect any particular day, but gives an accurate picture of the character of operations throughout the year. Use of the AAD is required by the FAA in 14 CFR Part 150 studies.

Information provided in the Part 150 forecast for 2016 and 2021 will be divided by 365 in order to generate AAD operations for the existing conditions scenario (both airports).

6.3.5 Aircraft Fleet Mix

6.3.5.1 Existing Conditions Aircraft Fleet Mix

To develop the existing conditions aircraft fleet mix, data will be extracted from the Port Authority's Airport Noise and Operations Management System (ANOMS). The ANOMS is a computer system that stores FAA-generated information (e.g., flight tracks) and Port Authority-generated information (e.g., measured noise level) about each aircraft operation that occurs at EWR and TEB. Information collected by the Port Authority's ANOMS for aircraft operations originating or terminating at EWR or TEB includes: type of operation (i.e., an arrival or a departure); flight identification number (identifying the airline and the airline's flight number), date and time when the operation occurred; and a three-dimensional description of the aircraft's arrival or departure trajectory to, or from, a runway end. A complete set of calendar year 2014 operations data for TEB will be extracted from the Port Authority's ANOMS. For EWR a slightly different procedure will be used as a runway was closed for maintenance during April through May 2014. Therefore data from January – March 2014 and June – December 2014 will be extracted from the Port Authority's ANOMS. These will be augmented with data from April and May of the prior year (2013) to have a full year's data that reflects normal operations. These data will be classified using the following categories:

- Domestic Carriers
- International Carriers
- Cargo (Domestic & International)
- Commuter/Air Taxi
- General Aviation
- Military
- Helicopter[5]

Each operation will be assigned an INM aircraft type (or FAA-approved substitute) based on the aircraft type identified in the ANOMS data and the corresponding aircraft in the INM's system databases.

For commercial aircraft, the specific INM aircraft/engine combinations will be assigned using the aircraft registration data available from the ANOMS system. This allows for the best use of the investment that the Port Authority has made in the ANOMS system. For those operations lacking registration data, a comparison with information contained in JP Airline Fleets 2013/2014 for each of the air carriers that operate at EWR or TEB will be made. For all other aircraft categories, an INM aircraft type (or FAA-approved substitute) will be assigned using information from the following sources:

- Aircraft Registration Number (N-Number)
- JP Airline Fleets 2013/2014
- Interviews with EWR/TEB Airport management and/or Air Traffic Control (ATC) staff
- Interviews with Fixed Based Operators

[4] An aircraft operation is defined as either one arrival or one departure (an arrival of an aircraft and the departure of the same aircraft equals two operations).
[5] Only helicopter operations that arrive at or depart from EWR and TEB will be modeled in the INM.

The HMMH Team will develop aircraft fleet mix tables for EWR and TEB showing the percentage of operations performed in 2014 by INM aircraft type. These fleet mix percentages will be applied to the AAD operations figures calculated for EWR and TEB from the Part 150 Forecast data. The resulting tables (i.e., one table for EWR and one table for TEB) will present annual average day operations by INM aircraft type under existing conditions for the anticipated year of submittal, 2016.

6.3.5.2 Future Conditions Aircraft Fleet Mix

Time of day splits and trip length information will be applied to the future (2021) conditions aircraft fleet mix tables for EWR and TEB developed from the Part 150 forecast. (See Chapter 5 – Aviation Activity Forecasts for greater detail on the forecasting methodology.)

6.3.6 INM Aircraft Substitutions

The INM 7.0d system database includes 164 unique aircraft/engine combinations for common aircraft. However, the database does not include all aircraft that are in operation today. For certain aircraft types, the FAA has identified pre-approved substitute aircraft for use in the INM. This pre-approved substitution list includes 270 aircraft types.

For aircraft that are not in the INM system or pre-approved substitution databases, an appropriate similar aircraft will be selected. It should be noted that the use of any non-standard INM input requires written approval from the FAA. For these aircraft an appropriate substitute aircraft will be identified and documented in a letter sent to the FAA's New York Airports District Office (ADO) for distribution to the appropriate FAA departments for review and approval. Supporting text identifying the reason for the selected substitute aircraft will be included in the letter. This text may include supporting aircraft noise certification data, where applicable.

The HMMH team will coordinate with the JFK and LGA Studies Team to develop the list of all general aviation substitution aircraft consistent among all four airports. The FAA request and approval for these aircraft will be provided separately for all four airports (EWR, JFK, LGA, and TEB).

6.3.7 Departure Stage Length

Departure stage length refers to the non-stop distance an aircraft travels after departing from an airport. The stage length determines the gross takeoff weight assigned to each aircraft type. The aircraft weight serves as the basis for determining the appropriate departure climb altitude and thrust profiles used for modeling purposes. The INM provides multiple stage lengths for larger aircraft included in the system database and substitute's database. Most small aircraft in the INM only have one departure stage length profile.

The approach that will be taken to assign departure stage lengths to aircraft operating at EWR and TEB under existing and future conditions is described below.

6.3.8 Arrival and Departure Profiles

Aircraft altitude profiles (i.e., the distance an aircraft is above ground) are defined separately from ground tracks in the INM. The INM includes default or "standard" arrival and departure profiles, which are defined by aircraft manufacturers. These profiles define the altitude, speed, and thrust levels of an aircraft. The standard departure profiles are defined from the airport's mean sea level elevation or "field elevation" to 10,000 feet above field elevation (AFE). The standard arrival profiles are defined as starting from 6,000 feet AFE and continue to the airport field elevation.

Each aircraft in the INM database includes one or more standard departure profiles, but only one arrival profile. As described above, an aircraft's "departure stage length" is defined as the distance the aircraft flies from the origin airport to the destination airport. This factor is considered because aircraft traveling greater distances are generally heavier due to the need to carry additional fuel and therefore, the aircraft climb at a slower rate. To account for this variance in aircraft weight the INM contains up to nine departure climb profiles (corresponding to different stage lengths from 500 nautical miles (NM) to greater than 6,500 NM). For arrivals, the INM standard profiles reflect a three degree angle of descent.

The actual climb or descent profiles utilized at an airport may differ from the INM standard profiles. For example, an analysis of radar data may show that aircraft are climbing at a slower or faster rate, or that arriving aircraft are levelling-off during approach. Within the INM, the "procedure steps" defining the standard profile may be modified to better match aircraft altitudes and speeds shown in radar data. For departures, the user must define the altitude, climb rate, and speed along the profile. For arrivals, the user must define the altitude and speed along the profile.

Data will be collected from the Port Authority's ANOMS that identifies aircraft departure and arrival profiles for a selection of aircraft operating at EWR and TEB. These data will be reviewed and modifications to certain INM standard profiles for specific aircraft will be identified, as necessary. Separate evaluations will be conducted for EWR and TEB. As required, the HMMH Team will use the results of these evaluations to develop user-defined profiles in the INM.

For example, at EWR there are departures to the south from Runway 22L/R which pass over the southern end of Staten Island which are held at 6,000 feet for 10 to 15 miles and at TEB there are departures from Runway 24 which climb to 1,500 feet and level off and then climb to 2,000 feet past 4.5 miles from the airport. These profiles for various INM types will need to be constructed for the INM model and approved by FAA.

User-defined profiles must be approved by the FAA's Office of Environment and Energy (see the INM User's Guide, Appendix B – FAA Profile Review Checklist). Documentation of the profile input parameters, resulting noise exposure levels compared to the standard profile, and validation from the aircraft manufacturer or operator must be submitted to the FAA for review and approval. The review process also requires a demonstration of the benefit[6] – in terms of resulting noise exposure levels – of modeling the user-defined profile instead of the standard profiles. It should be noted that in some cases, a user-defined profile may better reflect radar data but have a negligible effect on the size/extents of DNL contours.

6.3.9 Time of Day

As identified previously, the INM applies a "weighting" penalty to aircraft operations that occur during the nighttime period (10:00:00 pm to 6:59:59 am) - the sound levels are increased by a 10 decibel-weighting penalty (equivalent to a 10-fold increase in aircraft operations) before the 24-hour value is computed. The ANOMS data mentioned in Section 6.3.5.1 above will be used to identify the percentage of operations at EWR and TEB that occurred during the daytime and nighttime hours.

For arrival operations, the percentages of operations by specific INM aircraft type that occurred during the nighttime hours will be calculated. Separate calculations will be performed for EWR and TEB. These percentages will then be applied to the corresponding aircraft operations in the 2016 AAD fleet mix tables developed for EWR and TEB.

For departure operations, the percentages of operations by specific INM aircraft type and by departure stage length that occurred during the nighttime hours will be calculated. Separate calculations will be performed for EWR and TEB. These percentages will then be applied to the corresponding aircraft/stage length combination in the 2016 AAD fleet mix tables developed for EWR and TEB.

Time of day information used to model future (2021) conditions at EWR and TEB will be identical to time of day data used to model existing (2016) conditions. If, during the course of the EWR and TEB 14 CFR Part 150 Studies, information is provided that demonstrates that the flight schedules at EWR or TEB will change in the future, then the future conditions INM input will be modified accordingly. Aviation activity forecasts previously developed by

[6] The demonstration of benefit is expressed in terms of the change in Sound Exposure Level (SEL) dB levels at prescribed locations and must support how the user-defined profiles more accurately model the aircraft performance in terms of altitude, speed, and thrust.

the Port Authority will be reviewed carefully to determine if flight schedules at EWR or TEB are anticipated to change in the future.

6.3.10 Runway Utilization

Aircraft arriving to a runway have a different noise signature compared to those departing from a runway. It is for this reason that runway use is an important factor in determining the noise exposure around an airport.

The HMMH Team will develop runway use tables for the EWR and TEB existing (2016) conditions scenarios using an entire year's worth of data from the Port Authority. As mentioned in Section 6.3.5.1 above, the procedure for EWR will be slightly different from that used for TEB, due to the need to correct for a temporary runway closure at EWR. Runway utilization for TEB will rely upon calendar 2014 ANOMS data whereas runway utilization at EWR will rely upon January – March 2014 and June – December 2014 data augmented by April-May 2013 data. The runway use tables developed for EWR and TEB will identify the specific INM aircraft type, operation type (arrival/departure), and the runway identifier. The runway use percentages data developed for EWR will be applied to the 2016 AAD fleet mix table for EWR. The runway use percentages data developed for TEB will be applied to the 2016 AAD fleet mix table for TEB.

Runway use data for the future (2021) conditions analyses for EWR and TEB will be developed as part of the aviation activity forecast task and confirmed through interviews with Port Authority and FAA ATC staff.

6.3.11 Flight Tracks

The INM uses airport-specific ground tracks and vertical flight profiles to compute three-dimensional flight trajectories. In order to create aircraft flight tracks in the INM, the same 12-month sample of radar arrival and departure tracks that were extracted for EWR (most of 2014 and part of 2013) and TEB (all of 2014) from the Port Authority's ANOMS would be used. Separate radar data samples will be collected for EWR and TEB. The sample data will be used to develop flight tracks in the INM that are representative of annual average day conditions. The collected samples will include flight tracks from all runways and helipads at EWR and TEB and will include flight tracks for operations occurring during daytime and nighttime hours. The sample ANOMS flight tracks will be sorted and reviewed based on the following parameters:

- Arrivals/Departures
- INM Aircraft Type
- Stage Length (for departures only)
- Daytime/Nighttime
- Runway

From this review, aircraft flight tracks will be developed in the INM. The INM aircraft flight tracks will be representative of annual average day conditions at EWR and TEB under existing (2016) conditions. It is anticipated that flight tracks used to model future (2021) conditions at EWR and TEB will be identical to the existing conditions flight tracks. If, during the course of the EWR and TEB 14 CFR Part 150 studies, information is provided that demonstrates that flight tracks/flight patterns at EWR or TEB will change in the future, then the future conditions INM input will be modified accordingly.

6.3.12 Aircraft Engine Run-ups

In addition to aircraft in flight, the INM also includes the capability to model aircraft engine run-ups. Run-ups typically occur on the airfield following the completion of maintenance on aircraft engines. The HMMH Team will acquire Port Authority aircraft engine run-up logs for evaluation. If aircraft engine run-ups are considered to represent a substantial component of the overall aircraft noise exposure at EWR and TEB, aircraft engine run-ups will be modeled in the INM. The following data are required to model aircraft engine run-ups in the INM:

- Aircraft type

- Location where the run-up occurred (latitude/longitude)
- Aircraft heading during run-up
- Time when the run-up occurred (start time and end time)
- Engine thrust setting (pounds or percent)
- Duration of the event
- Number of engines running

Separate aircraft engine run-up analyses will be performed for EWR and TEB.

6.4 Noise Measurements Data

There are 3 permanent and 1 portable noise monitoring stations in the vicinity of EWR and 6 permanent noise monitoring stations in the vicinity of TEB. Using state-of-the-art technology, the PANYNJ can monitor noise levels and link aircraft noise events or complaints to specific flights and aircraft types. The Port Authority's WebTrak software allows the public to watch the movement of aircraft within the New York metropolitan area and to see aircraft noise levels associated with specific flights as they pass over or near one of the monitoring stations. WebTrak also provides information regarding airline carrier, aircraft type, altitude, and origin/destination airports.

With assistance from the Port Authority, the HMMH Team will collect one calendar year (2014) of aircraft and community noise levels data for monitoring stations near EWR and near TEB. The HMMH Team will use the noise measurements data to develop summary tables describing aircraft noise levels, community/ambient noise levels, and total noise levels (i.e., the sum of aircraft and community noise levels) at the monitoring station locations.

In addition to developing the summary tables described above, the HMMH Team will conduct a limited comparison of measured aircraft noise levels (i.e., DNL at the location of the noise monitoring stations) and predicted aircraft noise levels (DNL values calculated by the INM). The comparison of measured and predicted DNL values will be limited to those noise monitoring stations located within the existing (2016) conditions DNL 65 and greater noise contours.

Differences between the measured and modeled DNL values will be identified. To the extent possible, the reason for differences greater than plus or minus 2 dB DNL will be described. The noise monitoring data will only be used for comparisons and not used to calibrate the noise model.

6.5 Noise Contours

Noise exposure values of DNL 65, 70, and 75 are typically used as the criterion levels for 14 CFR Part 150 noise analyses. For the EWR and TEB 14 CFR Part 150 studies continuous contours of DNL 55, DNL 60, DNL 65, DNL 70, and DNL 75 will be developed using the INM and NMPlot, a Microsoft Windows application for viewing and editing sets of geographically referenced data points. Three specific ranges of noise exposure will be depicted on the noise exposure maps developed for EWR and TEB: (1) DNL 75 dB and higher, (2) DNL 70 dB to 75 dB, and (3) DNL 65 dB to 70 dB. Population analysis and identification of noncompatible land uses will be conducted for the areas exposed to aircraft noise of DNL 65 dB and greater. Table 1 of 14 CFR Part 150 considers areas exposed to aircraft noise level below 65 dB DNL to be compatible with noise from aircraft operations. The DNL 55 dB and 60 dB contours are being provided for informational purposes and only on separate figures labelled as such along with the 65 dB, 70 dB and 75 dB contours in an appendix to the main document.

6.6 Noise Exposure Maps

DNL contours, when depicted on a land use base map, form the NEM. A NEM is a scaled, geographic depiction of an airport, its noise contours, and existing land uses in surrounding areas. The HMMH Team will develop existing (2016) conditions and future (2021) conditions NEMs for EWR and TEB (four NEMs total). The NEMs and supporting documentation (i.e., the NEM Report) will be submitted to the FAA for review and acceptance in 2016. The 2016 and 2021 NEMs developed for EWR and TEB will comply with map scale and data requirements as specified in paragraphs A150.101, A150.103, A150.105 and 150.21 of 14 CFR Part 150. All elements required by 14

CFR Part 150 will be depicted on the NEMs developed for EWR and TEB including the locations of noise sensitive public buildings and properties on or eligible for inclusion in the National Register of Historic Places within the DNL 65 dB contour.

6.7 Noise Data Tables

A variety of data tables will be developed using the noise contours generated for the NEM Report. Similar data tables will be developed in support of the evaluation of operational noise abatement alternatives during the development of the EWR and TEB NCP Reports – See Section 10.0. These data tables are described below.

6.7.1 Contour Area and Population

Population and household estimates will be developed using aircraft noise contours developed using the INM, geographic information system (GIS) software, and U.S. Census Block Data for 2010. Separate population and household figures will be calculated for EWR and TEB for three ranges of noise exposure: (1) DNL 75 dB and higher, (2) DNL 70 dB to 75 dB, and (3) DNL 65 dB to 70 dB. Population and household figures will be reported by County.

For informational purposes only, the population within the DNL 55-60 dB and 60-65 dB contour areas will be estimated using the 2010 U.S. Census Block data.

6.7.2 Land Area

Noise compatible and noncompatible land uses, per 14 CFR Part 150 Table 1 (Table 1 below), will be identified for land parcels within areas exposed to aircraft noise of DNL 65 and greater. Separate analyses will be conducted for EWR and TEB and for existing conditions and future conditions. Area, in square miles, categorized as either compatible or noncompatible will be calculated and tabulated.

Table 1 - Part 150 Noise / Land Use Compatibility Guidelines

Source: Part 150, Appendix A, Table 1

Land Use		Yearly Day-Night Average Sound Level, DNL, in Decibels (Key and notes on following page)					
		<65	65-70	70-75	75-80	80-85	>85
Residential Use							
Residential other than mobile homes and transient lodgings		Y	N(1)	N(1)	N	N	N
Mobile home park		Y	N	N	N	N	N
Transient lodgings		Y	N(1)	N(1)	N(1)	N	N
Public Use							
Schools		Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes		Y	25	30	N	N	N
Churches, auditoriums, and concert halls		Y	25	30	N	N	N
Governmental services		Y	Y	25	30	N	N
Transportation		Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking		Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use							
Offices, business and professional		Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment		Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade--general		Y	Y	Y(2)	Y(3)	Y(4)	N
Utilities		Y	Y	Y(2)	Y(3)	Y(4)	N
Communication		Y	Y	25	30	N	N
Manufacturing and Production Use							
Manufacturing general		Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical		Y	Y	25	30	N	N
Agriculture (except livestock) and forestry		Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding		Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction		Y	Y	Y	Y	Y	Y
Recreational Use							
Outdoor sports arenas and spectator sports		Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters		Y	N	N	N	N	N
Nature exhibits and zoos		Y	Y	N	N	N	N
Amusements, parks, resorts and camps		Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation		Y	Y	25	30	N	N

Key to Table 1

SLUCM: Standard Land Use Coding Manual.

Y (Yes): Land use and related structures compatible without restrictions.
N (No): Land use and related structures are not compatible and should be prohibited.

NLR: Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35: Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dBA must be incorporated into design and construction of structure.

Notes for Table 1

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dBA and 30 dBA should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dBA, thus, the reduction requirements are often started as 5, 10, or 15 dBA over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30

(8) Residential buildings not permitted.

6.7.3 Noise Sensitive Sites

As part of the Land Use Protocol, the locations of noise sensitive public buildings and properties on or eligible for inclusion in the National Register of Historic Places within the limits of the DNL 65 contour will be identified and the latitude/ longitude coordinate (in decimal degrees) will be recorded. The number of noise sensitive public buildings and historic properties exposed to aircraft noise of DNL 65 dB and greater will be identified and tabulated. Separate analyses will be conducted for EWR and TEB and for existing conditions and future conditions.

6.7.4 Noise Grid Point Analysis

Using the geographic coordinate information described above, noise sensitive sites in the vicinity of EWR and TEB that are exposed to aircraft noise of DNL 65 dB and greater will be input into the INM as a location point and the DNL will be calculated (to the one-tenths decimal place) and documented for both existing (2016) conditions and future (2021) conditions. Noise exposure at each of the location points will be reported, to the one-tenths decimal place. Separate analyses will be conducted for EWR and TEB and for existing conditions and future conditions.

6.8 Noise Evaluations for the Noise Compatibility Program

Following the FAA's acceptance of the NEMs, a series of operational noise abatement alternatives will be identified during the preparation of the NCP. An NCP includes the measures proposed by the airport owner that potentially reduce existing non-compatible land uses within the airport vicinity and to prevent the introduction of additional non-compatible land uses in the future DNL 65 dB and greater noise contours.

Analysis of noise compatibility program alternatives will be conducted in accordance with standards set forth in §150.23 and Part 150 Appendix B. Alternatives will be considered and presented in accordance with the categories prescribed in Sec. B150.7(a), i.e.:

(1) Noise abatement alternatives for which the airport operator has adequate implementation authority.

(2) Noise abatement alternatives for which the requisite implementation authority is vested in a local agency or political subdivision governing body, or a state agency or political subdivision governing body.

(3) Noise abatement options for which requisite authority is vested in the FAA or other Federal agency.

Consistent with Sec. B150.7(b), at a minimum, the Port Authority "shall analyze and report on the following alternatives, subject to the constraints that the strategies are appropriate to the specific airport," including:

(1) Acquisition of land and interests therein, including, but not limited to air rights, easements, and development rights, to ensure the use of property for purposes which are compatible with airport operations.

(2) The construction of barriers and acoustical shielding, including the soundproofing of public buildings.

(3) The implementation of a preferential runway system.

(4) The use of flight procedures (including the modifications of flight tracks) to control the operation of aircraft to reduce exposure of individuals (or specific noise sensitive areas) to noise in the area around the airport.

(5) The implementation of any restriction on the use of airport by any type or class of aircraft based on the noise characteristics of those aircraft. Such restrictions may include, but are not limited to—

(i) Denial of use of the airport to aircraft types or classes which do not meet Federal noise standards;

(ii) Capacity limitations based on the relative noisiness of different types of aircraft;

(iii) Requirement that aircraft using the airport must use noise abatement takeoff or approach procedures previously approved as safe by the FAA;

(iv) Landing fees based on FAA certificated or estimated noise emission levels or on time of arrival; and

(v) Partial or complete curfews.

(6) Other actions or combinations of actions which would have a beneficial noise control or abatement impact on the public.

(7) Other actions recommended for analysis by the FAA for the specific airport.

The noise abatement operational alternatives developed during the EWR and TEB 14 CFR Part 150 Studies will be modeled individually in the INM to evaluate each alternative's effectiveness in reducing noncompatible land uses within the limits of the DNL 65 and greater noise contours. Up to 10 operational noise abatement alternatives are anticipated to be modeled for EWR and TEB (i.e., 20 operational abatement measures anticipated to be evaluated). However, more measures may be explored if deemed necessary. The operational abatement measures will be modeled in the INM using future (2021) conditions operations, runway utilization, time of day, and flight trajectory data.[7]

[7] Consistent with Sec. B150.7(b), the Port Authority will analyze all potential operational strategies appropriate to the specific airport. Examples of potential noise abatement operational alternatives may include, but are not limited to: voluntary compliance with informal preferential runway use programs, voluntary use of noise abatement departure procedures, voluntary use of noise abatement arrival procedures, published instrument approach and departure procedures, noise abatement flight paths, noise abatement ground procedures (e.g., taxi

Noise data tables will be developed for all operational abatement measures evaluated during the development of the NCP Reports for EWR and TEB. The DNL 65, 70, and 75 dB contours will be computed for each alternative and depicted on separate figures showing the projected effectiveness of each measure. The noise contours will be used to determine the number of persons, households, and noise sensitive sites within the DNL 65 and greater noise contours for each alternative. DNL values at noise sensitive sites within the DNL 65 and greater noise contours will be calculated and tabulated. The noise data tables developed for the operational abatement measures will be compared to the data tables developed for the future (2021) conditions NEM described in Sections 6.7.

Following a review of each alternative's effectiveness in reducing noncompatible land uses, final recommended programs will be identified for EWR and TEB. The operational noise abatement options that comprise the recommended program for EWR will be modeled cumulatively in the INM. The operational noise abatement options that comprise the recommended program for TEB will be modeled cumulatively in the INM.

The DNL 65, 70, and 75 dB contours will be prepared. The noise contours will be used in determining the number of persons, households, and noise sensitive sites within the DNL 65 and greater noise contours for each alternative. The DNL values at each of the noise sensitive sites within the DNL 65 and greater contours for the recommended program will also be calculated and tabulated.

6.9 Supplemental Noise Metrics

Past research by the Federal Interagency Committee on Noise (FICON) suggests that the use of supplemental noise metrics (i.e., metrics other than DNL) in transportation noise studies can be useful to address various public concerns and to help the public better understand noise impacts.[8] The FAA chiefly uses supplemental noise metrics in Environmental Impact Statements (EISs) to further describe aircraft noise impacts for specific noise-sensitive locations (e.g., parks, wildlife refuges, and historic properties) or situations where there could be a significant noise effect. Supplemental noise metrics are sometimes used in 14 CFR Part 150 studies to provide additional information to members of the public regarding changes in noise exposure that would result from specific noise abatement alternatives and scenarios.

FAA guidance suggests that supplemental noise analyses be tailored to address specific community concerns (e.g., sleep disturbance, speech interference, etc.) and the types of community activities that are potentially affected by aircraft noise. The Port Authority and the HMMH Team will identify which metrics will be used based on discussion with the TAC and needs of the study.

routes or hold points, runup procedures, locations, and orientations, etc.), voluntary restraint of nighttime operations, etc.

[8] FICON. Federal Interagency Review of Selected Airport Noise Analysis Issues. 1992.

7 LAND USE PROTOCOL

In order to collect and facilitate the large amounts of land use data required for the Studies, an internal technical land use group comprised of representatives from HMMH, RS&H, and PTI was formed. The technical land use group will focus on issues concerning the quantification of impacts to land uses and populations as specified in 14 CFR Part 150 stemming from aircraft related noise. The technical group will coordinate their efforts closely with the Port Authority management team throughout the Part 150 process. The following are protocols that will guide the activities of the team over the course of the Studies.

7.1 Study Areas

Figures 1 and 2 depict the Study Areas for the EWR and TEB 14 CFR Part 150 Studies, respectively. The Study Areas identify the absolute outer limit of the overall scope of any data collection, analyses, outreach, or other investigations. Pursuant to 14 CFR Part 150, detailed land use data collection will be conducted within the 65 dB DNL contours once determined. Parcel-level land use data collection and analyses will be limited to the 65 dB DNL contours ultimately prepared in the two studies. Population counts and analysis will be limited to the 55 dB DNL contours. The Study Areas are sufficiently extensive that it is unlikely those contours will extend outside their perimeters.

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community; New Jersey Geographic Information Network (NJGIN)

Note: The purpose of this figure is limited to depicting the area within which land use and flight operations data will be collected, and does not relate in any way to definition of noise exposure, land use compatibility, or eligibility for noise mitigation. Consistent with FAA guidelines in 14 CFR Part 150, land use compatibility will be assessed only within the existing and five-year forecast conditions 65 decibel (dB) Day-Night Average Sound Level (DNL) contours, when prepared and accepted by the FAA.

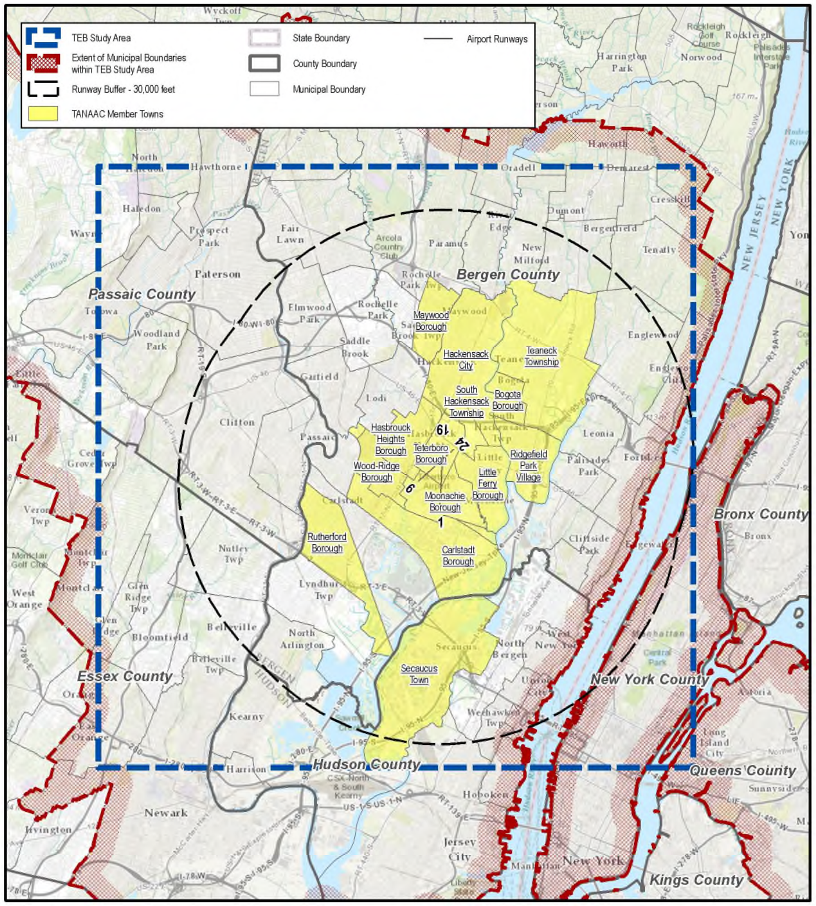
0 15,000 30,000 Feet

Newark Liberty International Airport
14 CFR Part 150 Study

Study Area

hmmh

Figure 1 Study Area for the EWR 14 CFR Part 150 Study



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community; New Jersey Geographic Information Network (NJGIN)

Note: The purpose of this figure is limited to depicting the area within which land use and flight operations data will be collected, and does not relate in any way to definition of noise exposure, land use compatibility, or eligibility for noise mitigation. Consistent with FAA guidelines in 14 CFR Part 150, land use compatibility will be assessed only within the existing and five-year forecast conditions 65 decibel (dB) Day-Night Average Sound Level (DNL) contours, when prepared and accepted by the FAA.

0 15,000 30,000 Feet

Teterboro Airport
14 CFR Part 150 Study

Study Area

hmmh

Figure 2 Study Area for the TEB 14 CFR Part 150 Study

7.1.1 EWR Study Area Considerations

Figure 1 presents geographic information considered in the development of proposed EWR study areas:

- A 30,000 feet buffer around all runways' ends and centerlines. This line almost looks like a circle around the airport. It is required under the Part 150 guidelines to consider and present flight tracks out to 30,000 feet from the end of each runway.[9]
- An estimated area based on previously prepared noise contours for EWR[10], to accommodate the Day-Night Average Sound Level (DNL) noise exposure contours from 75 dB to 55 dB.

The Study Area is a rectangle defined by FAA's 30,000 feet flight track buffer and extends along the direction of the parallel runways to contain the expected DNL contour of 55 dB.

7.1.2 TEB Study Area Considerations

Figure 2 presents geographic information considered in the development of proposed TEB study areas:

- A 30,000 foot buffer around both runways. The figure depicts this line, which looks like a slightly elongated circle around the airport. It is particularly significant under Part 150, because the regulation requires that Noise Exposure Maps consider and present flight tracks out to at least 30,000 feet from the end of each runway.[11]
- The jurisdictional boundaries of the 14 municipalities that make up the Teterboro Airport Noise Abatement Advisory Committee (TANAAC). The figure also shows these boundaries.
- An estimated area based on previously prepared noise contours for TEB[12] to accommodate Day-Night Average Sound Level (DNL) noise exposure contours from 75 dB to 55 dB.

The Study Area is a rectangle that uses the FAA's 30,000 foot flight track buffer as the starting point, with slight extensions in three directions:

- To the south to encompass all of Secaucus Town.
- To the north to encompass areas under the proposed Runway 19 charted visual procedure.
- To the west where prior noise contours prepared for the Port Authority indicate that departure "hold downs" may extend noise contours.

[9] Sec. A150.103(b)(1) states:

(b) Except as provided in paragraph (c) of this section, the following information must be obtained for input to the calculation of noise exposure contours:

(1) A map of the airport and its environs at an adequately detailed scale (not less than 1 inch to 2,000 feet) indicating runway length, alignments, landing thresholds, takeoff start-of-roll points, airport boundary, and flight tracks out to at least 30,000 feet from the end of each runway.

[10] These contours are not shown, because they were prepared for internal deliberative purposes only and were never formally adopted.

[11] Sec. A150.103(b)(1) states:

> (b) Except as provided in paragraph (c) of this section, the following information must be obtained for input to the calculation of noise exposure contours:
>
> (1) A map of the airport and its environs at an adequately detailed scale (not less than 1 inch to 2,000 feet) indicating runway length, alignments, landing thresholds, takeoff start-of-roll points, airport boundary, and **flight tracks out to at least 30,000 feet from the end of each runway**. [emphasis added]

[12] These contours are not shown, because they were prepared for internal deliberative purposes only and were never formally adopted.

7.2 Land Use Designations

A consistent set of land use designations will be developed in coordination with the New York Studies Team to reconcile a diverse array of various land use classifications schemes that exist between the multiple jurisdictions anticipated to be within the general study area boundaries, such as the State of New Jersey, the Cities of Newark and Teterboro, and Bergen, Essex, Hudson, Middlesex and Union Counties. The HMMH Team will coordinate and share these classifications with the Port Authority, so that they may be shared with the consultant team preparing 14 CFR Part 150 Studies for JFK and LGA. This classification system will take into account features including type of use, intensity or density of use, dwelling type, and standard land use classification systems routinely employed in land use planning. The HMMH Team will develop a single land use mapping classification scheme for use throughout the study areas, which could also be applied to other airports within the Port Authority system in support of 14 CFR Part 150 studies. Noise sensitive institutional land uses will be classified by the specific use involved (examples include, but are not limited to: religious facilities, schools, hospitals, institutional group homes, libraries, nursing homes, museums, etc.). Examples of data sources will include but may not be limited to the following:

- State of New Jersey Land Use / Land Cover Update (2007)
- ESRI - Residences, number and types of noise sensitive facilities, such as houses of worship, schools, hospitals, (frequently updated); ESRI proprietary data (frequently updated);
- Essex County, Union County, Bergen County, and Hudson County Land Records databases (assuming this is economically available)
- U.S. Census Bureau - Businesses, Minority and Low-Income Populations; census tract and potentially block specific; and,
- Land use mapping by study area on an individual jurisdictional basis.

7.3 Electronic Document Filing Structure

An electronic document/data filing structure will be established in cooperation with the Port Authority to store scanned versions of land use plans, zoning codes, and related documents and computer files obtained from the jurisdictions located within the defined study areas for the EWR and TEB 14 CFR Part 150 Studies. This structure will be used to logically classify information collected over the course of the EWR and TEB Studies and to facilitate the ease of retrieving project-related planning maps, documents, data, methodologies, analyses, memoranda and correspondence collected and/or developed as a part of the land use planning elements of the noise compatibility planning effort. The land use database will be accessible to HMMH Team members and Port Authority representatives via a password protected web-based site maintained by Planning Technology, Inc. (PTI). This structure will be coordinated with the electronic document/data filing structures established for other major components of the 14 CFR Part 150 Studies, including, but not limited to, noise analyses, derivative forecasts development, public outreach and stakeholder involvement. Separate land use directories will be developed for EWR and TEB. Where materials have been collected in hard copy version, these materials will be electronically scanned at a resolution that provides full legibility of text and graphical elements to create an electronic version that will be added to the data repository.

The land use directory would be structured along the following general categories of data required as a part of land use element of the 14 CFR Part 150 Studies:

- Study Area (EWR and TEB)
- Land Use Plan Data by Individual Political Jurisdictions by Study Area including but not limited to:
  - Jurisdictional boundaries mapping
  - Most current approved Comprehensive Community Plans/General Plans by political jurisdiction[13]

[13] Most communities will have some form of Comprehensive City or Village plan, or this information may be covered under the Comprehensive Plan for a larger jurisdiction such as a Township or County.

  - Existing and future land use data files (as available) and existing and future land use mapping Special District or Sector Plans within the Study Area by jurisdiction
  - Policy Plans establishing community vision, goals, objectives and implementation steps that relate to land use compatibility by jurisdiction
  - Land use classification systems by jurisdiction
  - Open space and environmental features plans by jurisdiction
  - Historic properties mapping and lists by jurisdiction
  - Existing soundproofed facility mapping or list of uses mitigated
  - Historic building permit mapping/records (aggregated number issued by jurisdiction, location and type) to the extent available by jurisdiction.
- Land Use Controls by Individual Political Jurisdiction including, but not limited to:
  - Zoning Ordinances by Jurisdiction
  - Zoning maps/overlay district mapping by jurisdiction
  - Subdivision regulations by jurisdiction
  - Environmental protection ordinances
  - Existing noise ordinances by jurisdiction
  - Discretionary project review procedures and criteria by jurisdiction
  - Building codes by jurisdiction
- Population and housing count data including, but not limited to:
  - Population by census tract and census block by jurisdiction as available;
  - Census tract/block mapping by Study Area and/or Jurisdiction;
  - Dwellings units by census tract/block;
  - Census data updates since 2010 by study area/jurisdiction;
  - Population/trend studies by study area/jurisdiction
- Population projections by jurisdiction and supporting basis including, but not limited to:
  - Future Growth Risk (based on five-year future noise contour horizon)
  - Land redevelopment efforts by Study Area/Jurisdiction underway or approved by study area/jurisdiction;
  - Major reuse trends in the Study Areas involving conversion from compatible to non-compatible uses (such as significant loft conversions);
  - Major development projects by Study Area/Jurisdiction approved or in the pipeline involving non-compatible uses.

The land use technical group of the HMMH Team will make use of the most recent and/or complete versions of land use planning data available at the time of the commencement of the noise exposure/compatibility planning efforts for EWR and TEB. It is recognized that due to the multiplicity of jurisdictions that may be incorporated into the study areas, the availability of a single source of land use data with an appropriate level of detail is unlikely. Where sources vary, these situations will be noted and the rationale for the use of a specific source over another will be provided to the Port Authority for their consideration and acceptance prior to the use of a data source in the Studies. The rationale/assumptions will be incorporated into the documentation for each Study.

7.4 Land Use Maps and Population Analysis

Land use information will be incorporated into a GIS mapping base that will serve as the basis for study area(s) mapping and for the population analysis. This GIS database will be hosted by the HMMH Team, accessible only to approved users. It is anticipated that existing zoning designations and their affiliated characteristics (permitted uses, densities, and conditional uses) will vary considerably from jurisdiction to jurisdiction within the Study

Areas. Each jurisdiction's specific zoning categories will be both mapped and discussed in relation to land use compatibility criteria set forth in 14 CFR Part 150.[14]

Future land use will be derived based on the most current future land use planning documentation available for each jurisdiction within the Study Areas. Where future land use plans are in progress (being revised, developed, etc.) at the time of data collection, the HMMH Team will, to the extent possible, identify potential options to address the uncertainty created by the pending nature of available data and discuss these with the Port Authority PM to define a recommendation for addressing the necessary information. In cooperation with the Port Authority PM and other relevant technical experts of Port Authority, the HMMH Team will coordinate with the specific jurisdiction(s), where a definitive source of future land use issue has arisen, to develop a future land use concept for the five-year future condition consistent with the jurisdiction's expectations.

Population and dwelling unit count data will be derived from the 2010 Decennial Census developed by the U.S. Census Bureau, and will be based on census block level information. Additional data sources will be reviewed to determine if population information more recent than the 2010 Decennial Census is available. If the review of the data sources indicates that more recent information of similar granularity (i.e., census block and tract level) and fidelity is available, the 2010 Decennial Census data would be augmented for the analysis. Census block data will be mapped and incorporated into the GIS database for use in subsequent population and non-compatible land use quantification.

Census block boundaries will be overlaid atop a recent aerial photograph that encompasses each Study Area and clearly displays the existing pattern of residential and non-residential development.

Data collection associated for land use will be compiled as a single effort and will not be continually updated and refreshed during the course of the Studies. This will enable the HMMH Team to proceed with other project analyses using a consistent data set throughout the Studies. The data collection period will be determined through collaboration between the consultant team and the Port Authority after all of the jurisdictions to be included within the two Study Areas are identified. A schedule will then be determined for contacting these jurisdictions to obtain the most recent data available.

7.5 Coordination with Local Land Use Planning Agencies

Initial contact will need to be made with appropriate political jurisdictions within the Study Areas for the EWR and TEB 14 CFR Part 150 Studies to both identify and collect relevant land use related data, studies and mapping. Further, over the course of the 14 CFR Part 150 Studies effort, follow up contacts with some or all of the jurisdictions will be necessary to clarify questions that may arise, request follow up information or to discuss land use related 14 CFR Part 150 project items. The land use technical group anticipates that all initial contact with Study Area jurisdictions whether this contact is with an elected official or with staff level employees will be initiated through the Port Authority PM, or his/her designee within the Port Authority, unless otherwise directed by the Port Authority. This initial contact is intended to inform representatives of the jurisdictions in the Study Areas that the project team would like to connect with the appropriate representative to identify, discuss and collect land use related studies, data, development trends and other information necessary for the land use component of the 14 CFR Part 150 planning effort.

The land use technical group will undertake an initial internet search by jurisdiction within the Study Areas to define an initial set of land use planning data/documents available in the public domain, and will collect and evaluate the available information that may have applicability to the Studies.

Prior to the Port Authority making initial contact with jurisdictions, the land use technical group will compile a list of studies and information by general type that are typically necessary as a part of a land use analysis component of a 14 CFR Part 150 Study. The list may include but is not necessarily limited to:

[14] Consolidation of zoning is problematic as the nature of the permitted and conditional uses may vary considerably and also the manner in which the ordinance addresses permitted uses can be markedly different (pyramid format, performance based, traditional).

- comprehensive plans;
- small area sector plans;
- zoning and subdivision ordinances;
- historic site listings;
- development review criteria and approval processes by jurisdiction;
- building codes;
- existing land use databases/mapping;
- redevelopment districts and plans;
- future land use mapping; and
- development trends reports or data.

This list will be coordinated with and reviewed by the Port Authority PM to obtain approval of the materials being requested. The list will take into consideration studies and data materials previously collected or compiled by the Port Authority, and will utilize these sources to the extent that the data remains accurate and relevant to the EWR and TEB 14 CFR Part 150 Studies. One such example may involve listings of historic sites within the study areas for both airports.

7.6 Coordination with the Port Authority

The land use technical group will work with the Port Authority to develop a listing of contacts by jurisdiction within the Study Areas for use in collecting relevant and needed data. Using this list, and with the concurrence of the Port Authority, the land use technical group will undertake the scheduling of inventory meetings with the identified land use representatives of each jurisdiction to discuss data needs. The meetings between the land use technical group members and representatives from the jurisdictions in the study area will be coordinated with the Port Authority PM. The involvement of Port Authority staff in the meetings will be at the discretion of the Port Authority PM, and this involvement will be determined prior to initiation of the meeting effort.

As the 14 CFR Part 150 Studies progress, additional discussions between land use technical group members and representatives of study area jurisdictions will be of value to the planning effort. These subsequent communications are often associated with questions concerning local plans, ordinances or other documentation and to clarify these points or to discuss other land use related project issues relevant to the individual jurisdiction. For each discussion, a concise agenda will be generated to provide a guide for the discussion. As these needs arise, the land use technical group will coordinate with the Port Authority PM prior to contacting the jurisdiction. This coordination will be to discuss the technical item or issue, and to confirm that:

- The item or issue does not require the direct participation of Port Authority representatives;
- Further discussion of the specific item is required;
- Direct involvement of the Port Authority PM or his/her designee in the discussion with the specific jurisdiction is required, at which point a decision can be made as to whether this coordination should take place in person or via conference call;
- The issue is of a sensitive nature and needs to be vetted within the Port Authority management structure before discussion with the jurisdiction. This discussion will be conducted by the Port Authority PM or other senior members of staff; or
- Some combination of one or more of the above.

Internal team communications and coordination of effort is critical. Collection of land use related materials will be closely coordinated with other data acquisition actions of other team members to avoid multiple requests for information to the same agencies. The land use technical group proposes to coordinate its data collection efforts through the EWR Project Director (HMMH) and the TEB Project Director (HMMH) as well as with the Port Authority PM. The Port Authority PM will coordinate data collection efforts between the New York and New Jersey teams for areas where the study areas overlap. HMMH's Project Directors will be aware of study-related data needs associated with other analytical components of the 14 CFR Part 150 Study process as well as the dates and requirements associated with project coordination meetings occurring as a part of both study efforts. As a result, HMMH's Project Directors will be able to facilitate the consolidation and coordination of HMMH Team efforts. For example, collection of GIS data should be closely coordinated with the collection of land use materials to avoid duplication of requests. The internal web portal, being established for the project, will help coordinate and mitigate the potential for duplicate and/or unnecessary data collection once the initial inventory process has been completed.

7.7 Identification of Land Use Mitigation Alternatives

An element of the identification and evaluation of potential land use mitigation alternatives will include the convening of a land use technical conference involving jurisdictions located in the Study Areas. A separate technical conference will be held for each of the Study Areas. The land use technical meeting will be facilitated by senior members of the project team with involvement and participation by the Port Authority PM and technical staff and will be formatted as a technical workshop. Extensive preparation of discussion materials will occur prior to the meeting and will include items such as:

- Sample noise overlay zoning provisions;
- Examples of compatibility issues within existing zoning districts in the Study Area and possible steps to resolve these;
- Delineation of federal requirements relative to land use mitigation (notably the new soundproofing program guidance letter);
- Summaries of land use compatibility mitigation strategies employed by communities in other parts of the United States and how these have been implemented and received in the community.
- Description of the specific compatibility option, its role, implementation responsibilities, how it may support other actions, potential positive factors as well as limitations and/or negative features.
- Suggestions concerning zoning ordinance permitted or conditional uses allowed by community.
- Discussion of discretionary project review procedures routinely used by planning and zoning authorities in the Study Areas during the evaluation of development proposals, and the ability of communities to apply development conditions on proposed land development in areas exposed to aircraft noise associated with operations at EWR and/or TEB.

The goal of the land use technical meetings is to discuss land use compatibility principles and apply these to specific issues existing in individual jurisdiction or multiple jurisdictions in each Study Area. Additionally, this meeting provides a forum for discussing potential options to resolve land use compatibility considerations and to obtain input relative to the feasibility or viability of applying the mitigation techniques on a jurisdiction by jurisdiction basis within the Study Areas.

Consideration of land use mitigation measures will include potential actions that will be guided by 14 CFR Part 150 requirements and will involve preventative (e.g., comprehensive plan amendments that incorporate noise compatibility and updated zoning ordinances and/or zoning overlays) measures and mitigation (e.g., land acquisition and sound insulation) measures:

Potential land use mitigation techniques will be developed in collaboration with the Port Authority prior to their presentation to stakeholders or the public. Coordination with public and governmental affairs specialists on the HMMH Team and internal to the Port Authority will occur during the development of evaluation criteria for the noise mitigation measures, and during the actual evaluation of potential noise mitigation measures.

Each mitigation technique identified will be evaluated against a set of criteria based on standard criteria typically employed in 14 CFR Part 150 analyses for assessment of land use mitigation. The evaluation will consider both the value of an action in mitigating current impacts and the value of an action in precluding future land use impacts around both airports. A generalized set of criteria are provided below to present an idea of the type of factors to be considered. Potential factors include but are not limited to:

- Reduction in impacted population and noise sensitive units by contour interval
- Extent of reduced impacts in areas of higher noise exposure
- Extent to which a given measure mitigates the future noise impacts

- Administrative responsibility for the measure and level of complexity to implement
- Implementation costs (both to communities and to the Port Authority)
- Overall effectiveness of each measure
- Stakeholder and Community Input
- Consistency with local and state statute

8 PROJECT MEASURES

This section of the Study Protocol describes the document review timeframes, the project schedule and project deliverables.

8.1 Document Review Timeframes

Commitment to timely document review by the Port Authority and the FAA will be critical to maintaining the project schedule. Two sets of documents, one for each airport, will be delivered at the same time to allow a consistent level of review and cohesive comment development. The following review time periods are agreed to by each party for each major project deliverable:

- **Port Authority –** Port Authority will complete reviews in 35 calendar days (30 days plus 5 for comment resolution and compilation) or 25 business days. A single set of consolidated comments and edits will be provided by the Port Authority in MS Word's Track Changes format.
- **Federal Aviation Administration –** The FAA will perform concurrent line of business reviews and return comments within 35 days (25 business days) of receipt of draft documents. A single set of consolidated comments will be provided by the FAA in a comment-response matrix.
- **Timeframe for Revisions –** The HMMH Team anticipates most revisions will be completed within 21 days (15 business days) of receipt of a consolidated set of comments. However, this is subject to the number of comments and the additional analysis required in order to be responsive to the comments.

8.2 Project Milestone Schedule

A detailed project schedule will be maintained and updated monthly throughout the project to track project milestones and allow monitoring and control of project progress. The schedule will detail major tasks, deliverables, review periods, and public and agency meetings. Estimated start dates, time periods and completion dates will be identified. Additional milestone or critical path elements may be added to the schedule during the course of the study to facilitate project tracking. The project schedule will be produced in Microsoft Project 2007 or 2010 format and will be provided in 11 inch by 17 inch PDF format. A draft project schedule is provided in the appendix.

8.3 List of Project Deliverables

There will be a series of technical memoranda and small-scale work products developed during the project to facilitate decision making. Primary work products will include at least the following:

1. Study Protocol, including Project Schedules for the studies. (This document.)
2. Recommendation memorandum on stakeholder participation program. (Incorporated in this document.)
3. Recommendation memoranda related to composition and operation of Technical Advisory Committees for the Studies. (One for each airport.)
4. Data request memoranda. (One for each airport.)
5. Noise modeling input memoranda, covering inputs other than the aviation activity forecasts. (One for each airport.)
6. Aviation activity forecast memoranda. (One for each airport.)
7. Memoranda evaluating historical noise monitoring data. (One for each airport.)
8. Draft and Final NEM reports consisting of noise contour maps for submission to the FAA for acceptance providing all the INM inputs and GIS information for both current and future years. (Separate reports for each airport.)
9. Technical Memoranda listing the final recommended noise abatement and mitigation measures and/or combination of both (i.e., screening criteria and the reason(s) why the recommended measures were selected or dropped from further consideration). (Separate memoranda for each airport.)

10. Preliminary draft Part 150 Study reports for Port Authority and FAA review, including both NEM and NCP components of the Studies. (Separate reports for each airport.)
11. Final draft Part 150 Study report (consisting of both NEM and NCP components of the Study) for formal FAA and public review submittal. (Separate reports for each airport.)
12. Preliminary final Part 150 Study report (consisting of both NEM and NCP components of the Study), with revisions made to the report based on comments received during public review period, for Port Authority and FAA review (responses to comments shall be incorporated in the appendix to the final report). (Separate reports for each airport.)
13. Final Part 150 Study Report for public release. (Separate reports for each airport.)
14. Executive summary of the Final Part 150 Study report outlining the entire Part 150 Study process, findings, recommendations, and implementation schedule for recommended program measures. (Separate reports for each airport.)

Each of these primary work products will be submitted in Adobe Acrobat (.pdf), Microsoft Word-and Excel-compatible files on a CD (or other compatible media), or electronic access to the files will be provided via download. With the exception of item 1, all the reports listed above shall be prepared separately for EWR and TEB airports.

The following details the number of printed copies of reports that will be produced by the HMMH Team:

1. Up to 25 printed copies of the Draft Part 150 NEM reports for each airport. (Listed under item 8 above.)
2. Up to 100 printed copies of the Final Part 150 NEM reports for each airport. (Listed under item 8 above.)
3. Up to 25 printed copies of the technical memoranda listing recommended noise abatement and mitigation measures for each airport. (Listed under item 9 above.)
4. Up to 25 printed copies of the preliminary draft Part 150 Study reports for Port Authority and FAA review for each airport. (Listed under item 10 above.)
5. Up to 50 printed copies of the final draft Part 150 Study reports, including both NEM and NCP components of the Study for each airport. (Listed under item 11 above.)
6. Up to 25 printed copies of the preliminary final Part 150 Study reports, including both NEM and NCP components of the Study for each airport. (Listed under item 12 above.)
7. Up to 100 printed copies of the final Part 150 Study reports, including both NEM and NCP components of the Study for each airport. (Listed under item 13 above.)
8. Up to 100 copies of the executive summary of the final Part 150 Study reports (listed under item 14 above) for each airport. (Listed under item 14 above.)
9. Up to 25 printed copies of other memoranda and reports prepared during the study process.

APPENDIX A. EXAMPLE DATA REQUEST FORM

TO BE COMPLETED BY REQUESTOR			
Name		**Contact Number**	
Firm		**Email Address**	
Description of Data Required			
Purpose/Context *(what the data is required for)*			
Frequency *(circle as appropriate)*	*One-Time Request*	*Monthly*	*Other:*
Request Date		**Required Date**	
Format Required *(Table, Map, Spreadsheet, Word, etc.) – please specify*		**Intended Audience** *(if applicable)*	

TO BE COMPLETED BY DATA CUSTODIAN		
Received By:	Date:	File Location:

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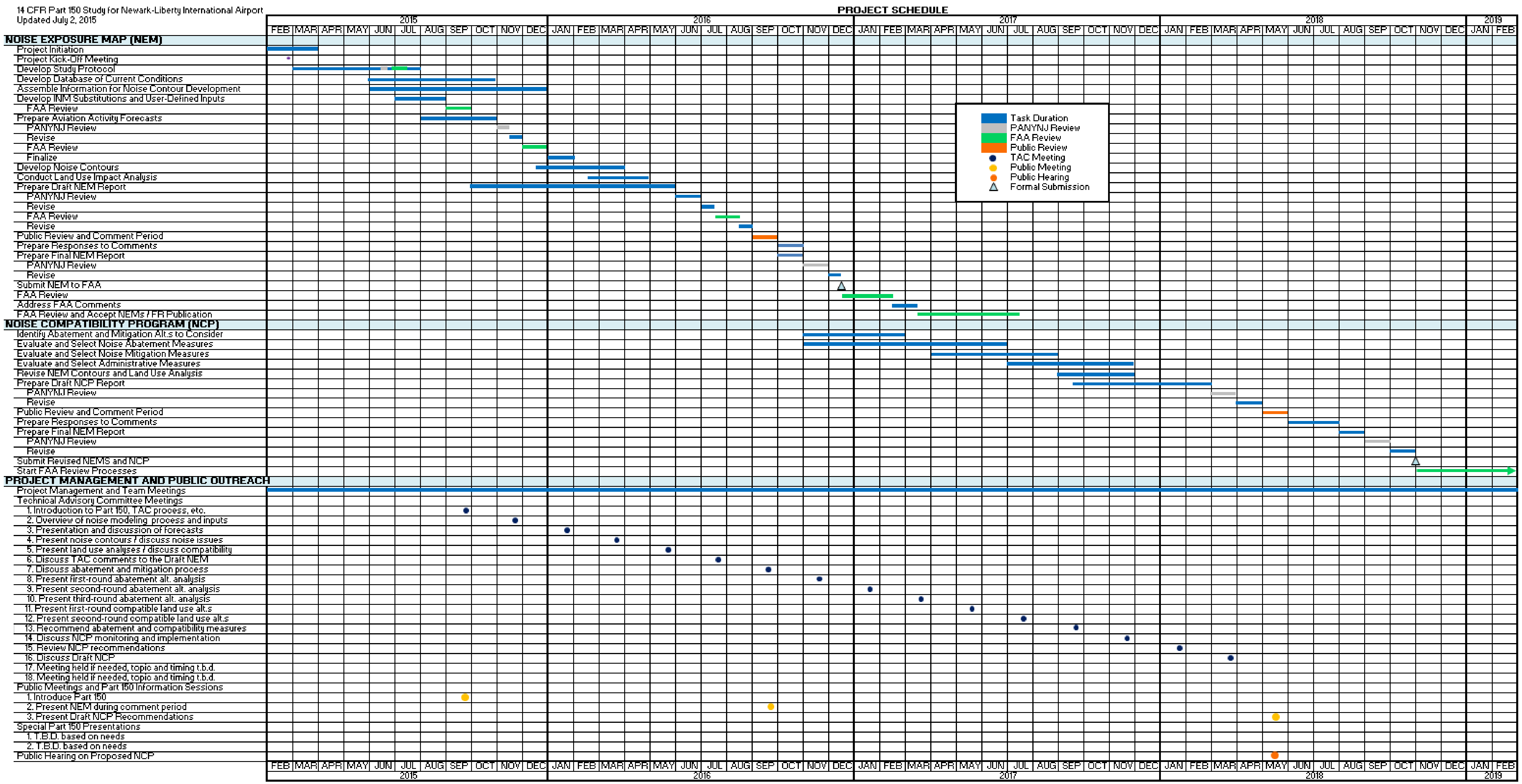
DRAFT EWR PROJECT SCHEDULE
PORT AUTHORITY OF NEW YORK AND NEW JERSEY

APPENDIX B. DRAFT EWR PROJECT SCHEDULE



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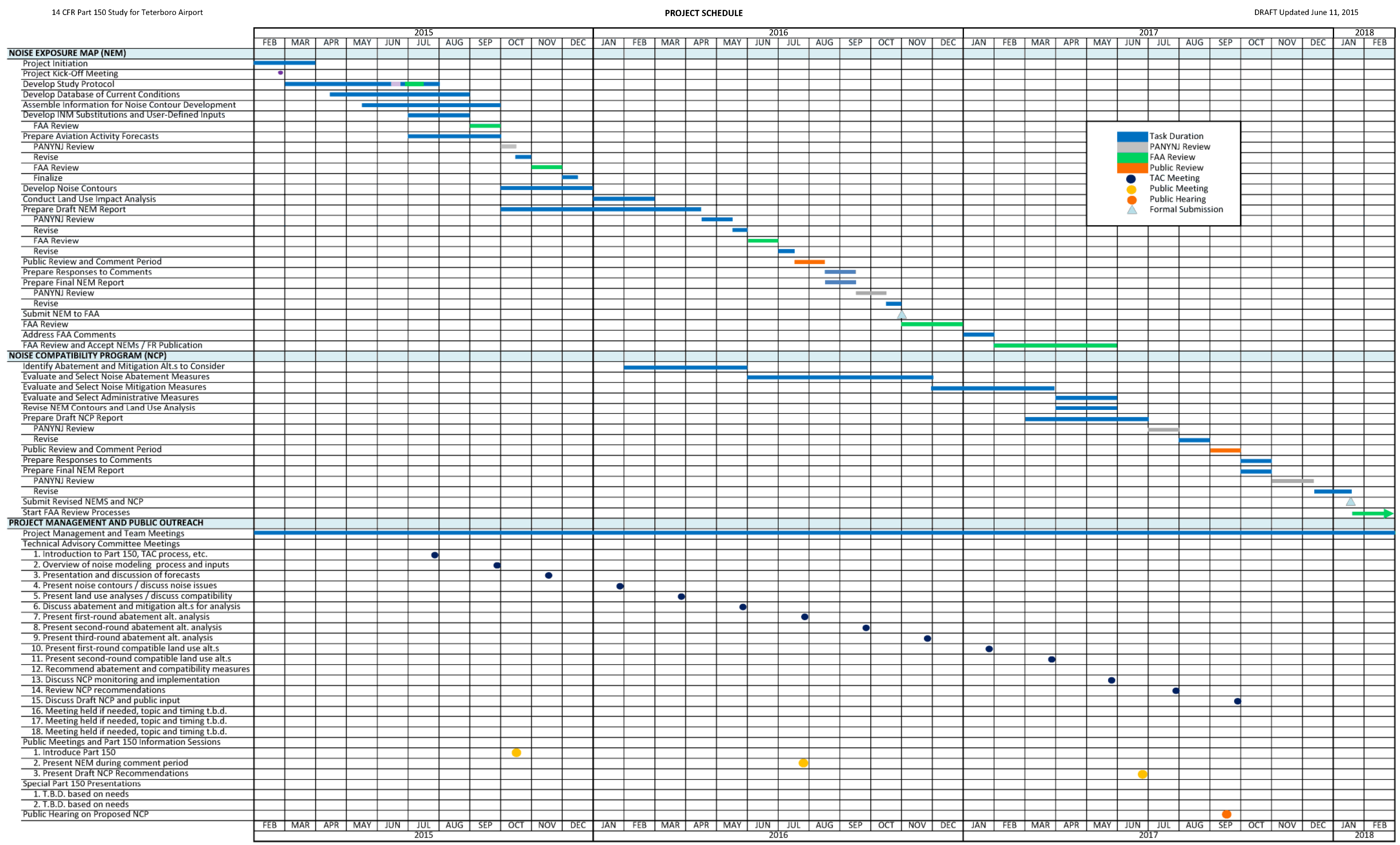
DRAFT TEB PROJECT SCHEDULE
PORT AUTHORITY OF NEW YORK AND NEW JERSEY

APPENDIX C. DRAFT TEB PROJECT SCHEDULE



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Appendix G.2

- Newsletters

Teterboro Airport
Title 14 of the Code of Federal Regulations (14 CFR) Part 150
Airport Noise Compatibility and Planning Study

Fall 2015
Newsletter

PART 150 NOISE COMPATIBILITY STUDY BACKGROUND

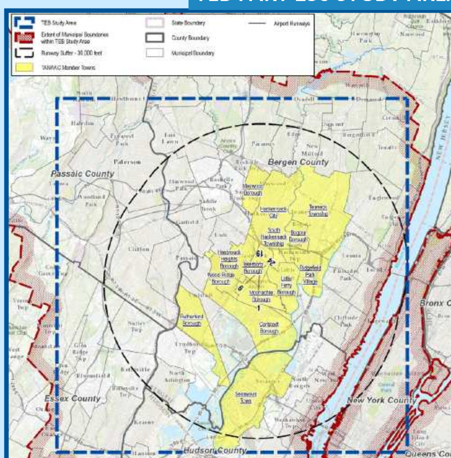
Title 14 CFR Part 150, Airport Noise Compatibility Planning, was issued by the Federal Aviation Administration (FAA) as a final rule in January 1985. Part 150 describes a voluntary process airports can follow to describe current and five-year forecast airport-related noise exposure; identify areas where land uses are incompatible with that exposure; identify ways to address those incompatibilities; and otherwise seeks reasonable and practical means to noise over sensitive land uses such as dwellings, schools, healthcare facilities, places of worship, and historic properties.

A Part 150 study has two major elements: a **Noise Exposure Map** and a **Noise Compatibility Program**:

- **The Noise Exposure Map (NEM)** describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs and the resulting noise/land use compatibility situation, for existing and five-year forecast conditions.
- The **Noise Compatibility Program (NCP)** identifies and supports a collection of proposed actions that the airport, local jurisdictions, airport users, and other stakeholders can take to minimize noise issues. The NCP development process involves working with stakeholders on policies and procedures to include in the program.

Both the NEM and the NCP must be accepted by the FAA as being compliant with the Part 150 regulations. Once the FAA has accepted the NEM and the NCP as compliant, the FAA will then approve or disapprove each individual element of the NCP proposal.

TEB PART 150 STUDY AREA



The Teterboro Airport (TEB) Part 150 Study Area identifies the outer limit for data collection, analyses, public outreach, and other study initiatives. It extends significantly beyond the area required by the Part 150 regulation and associated FAA guidelines, and encompasses all of the 14 municipalities that make up the Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC).

STAY CONNECTED

For more information or to submit comments and feedback, the PANYNJ has several ways you can participate and stay informed:

- The project website **(http://panynjpart150.com/TEB_homepage.asp)** is updated regularly with project documents, meeting announcements, and other general information about the study. Register here to join the mailing list and receive project updates.
- To make comments, give feedback, or ask questions, please call us at **(212) 435-3777** or email us at **NJPart150@panynj.gov**
- To file an aircraft noise complaint, please call the noise complaint hotline at **1-800-225-1071.**

STUDY TEAM

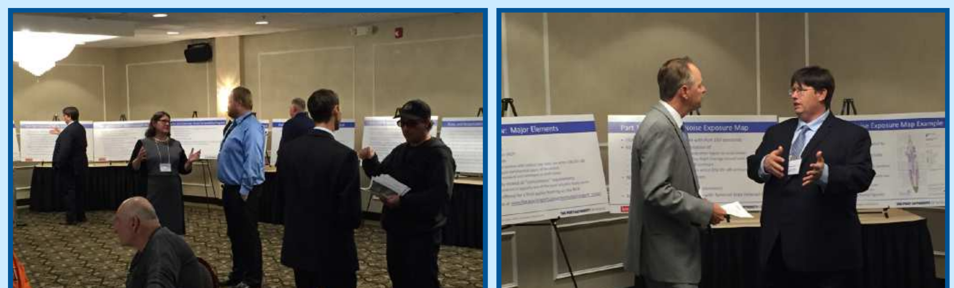
The Port Authority of New York and New Jersey (PANYNJ) has hired a team of experienced noise consultants (HMMH) to conduct the TEB Part 150 Study. A Technical Advisory Committee (TAC), representing a full-range of airport operation, business, and county and municipal stakeholders will provide oversight and guidance as well as assist with public outreach.

STUDY SCHEDULE

The TEB Part 150 began in the first quarter of 2015 and is scheduled to be submitted to the FAA for final review in the fourth quarter of 2017. Public workshops and briefings will be held at several key points in the study process, to permit all interested parties to review assumptions, baseline data, forecasts, draft results, and to provide feedback and suggestions.

PROJECT NEWS

The first public workshop was held at the Holiday Inn Hasbrouck Heights on the evening of October 15th, where the public met with PANYNJ, the FAA, and members of the Study Team. During the workshop, residents and business owners had the opportunity to browse project information and discuss components of the study with team members. The presentation boards can be viewed and downloaded from the project website **http://panynjpart150.com/TEB_homepage.asp**, under the "Documents/ Public Information Workshop" page.



Members of the PANYNJ and the Study Team speak with members of the public at a workshop on October 15th in Hasbrouck Heights.

Please visit the project web site ***http://panynjpart150.com/TEB_homepage.asp*** for the most recent project information.

Teterboro Airport
Title 14 of the Code of Federal Regulations (14 CFR) Part 150
Airport Noise Compatibility and Planning Study

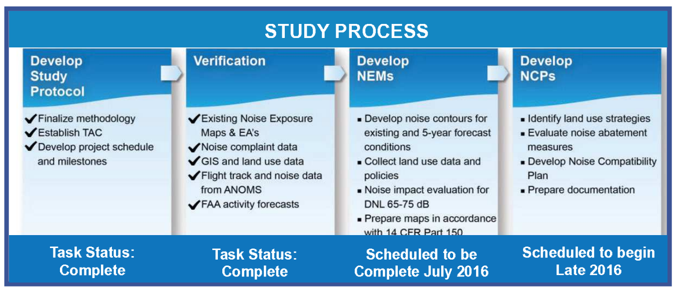
March 2016
Newsletter #2

STUDY UPDATE

The Teterboro Airport (TEB) Part 150 Noise Study is well under way. The Technical Advisory Committee (TAC) has been meeting regularly and the Study Team is continuing to make progress on several key milestones.

Throughout the summer and fall of 2015, the Study Team, together with the Federal Aviation Administration (FAA) and the Port Authority of New York and New Jersey (PANYNJ), developed a Study Protocol which outlines how the Part 150 Studies will be conducted for both TEB and Newark Liberty International Airport (EWR). The Study Protocol also outlines agency roles and responsibilities, methodologies for data collection and analysis, and lists project deliverables and key milestones. The Study Protocol can be viewed and downloaded from the project web site at: **http://panynjpart150.com/TEB_SP.asp.**

Currently much of the focus of the TEB Part 150 Study is on the collection and verification of data and the development of the Noise Exposure Maps (NEM). Two NEMs will be developed for the Part 150 Study: a 2016 map showing existing conditions, and a 2021 map showing future conditions. Runway use and flight track information is based on the full year 2014 data. The Study Team has been working with the FAA and the PANYNJ to collect and review runway usage data and to develop flight tracks which most accurately represent how aircraft are currently flown at TEB. Per the Part 150 regulations, the Study Team is also developing a five-year forecast for conditions at TEB for the year 2021, which will account for the types and number of aircraft that are expected to be flown at TEB and any changes to the airspace around TEB that would affect where aircraft are flown in the future. All of this information will be used to develop the noise contours for the NEM. The Draft NEM will be sent to FAA for review in the summer of 2016.



The TEB Part 150 Study was initiated by PANYNJ in early 2015. This graphic shows the key elements of the TEB Part 150 Study and the tasks to be completed under each. The Noise Compatibility Program (NCP) is scheduled to begin in late 2016; the Draft NCP is expected to be submitted to FAA for review and approval in the 4th quarter 2017.

STAY CONNECTED

For more information or to submit comments and feedback, the PANYNJ has several ways you can participate and stay informed:

- The project website **(http://panynjpart150.com/TEB_homepage.asp)** is updated regularly with project documents, meeting announcements, and other general information about the study. Register here to join the mailing list and receive project updates.
- To make comments, give feedback, or ask questions, please call us at **(212) 435-3777** or email us at **NJPart150@panynj.gov**
- To file an aircraft noise complaint, please call the noise complaint hotline at **1-800-225-1071.**

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TECHNICAL ADVISORY COMMITTEE OVERVIEW

Experience has shown that most 14 CFR Part 150 Noise Studies benefit from the creation and participation of a Technical Advisory Committee (TAC). The TAC serves several important functions including: representing a broader range of stakeholder groups in the study; receiving information about the study and sharing it with their respective organization; and providing technical input and guidance to the study and the Study Team. The PANYNJ has invited a diverse group of stakeholders to be on the TEB TAC including:

- Community representatives: members of the Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC) and the Newark Airport Community Roundtable
- Airport Management and Fixed Based Operators: AvPorts, Atlantic Aviation, Landmark Aviation, Meridian Teterboro, Signature Flight Support, Jet Aviation
- Pilots/Airport Users: Teterboro Users Group, Aircraft Owners and Pilots Association
- Business organizations: National Business Aviation Association, Aviation Development Council
- Local and regional land use planners: Bergen County, New Jersey Sports and Exposition Authority (formerly Meadowlands Commission)
- Federal Aviation Administration (FAA): Local and District Offices, Tower Operations, Air Traffic
- TAC meetings are open to the public

The TEB TAC has met 4 times since July 2015 and has discussed topics such as the Part 150 Study Process, aircraft noise terminology, as well as technical data that will be entered into the noise model including aircraft flight tracks and runway usage data. It is important to note, however that the role of the TAC is advisory; the TAC may offer opinions, advice and guidance on the Part 150 Study, but the PANYNJ has the sole discretion to accept or reject the TAC recommendations in accordance with 14 CFR Part 150 regulations.

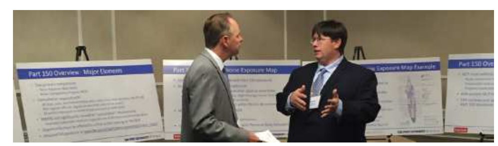
The TEB TAC has scheduled two meetings over the next three months: **Wednesday, March 30, 2016 at 1 p.m.** and **Tuesday, May 24, 2016 at 1 p.m.**; both meetings will be held in the Manager's Conference Room at TEB (90 Moonachie Avenue, Teterboro, NJ). Members of the public are encouraged to attend these meetings to learn more about the Part 150 process and aircraft noise in general. Opportunities for public comment will be provided at both meetings. More information about the TEB TAC including meeting announcements, presentations, and meeting summaries can be viewed and downloaded from the project web site at **http://panynjpart150.com/TEB_TAC.asp.**

LAND USE DATA COLLECTION

The TEB Part 150 Study Team is currently collecting local land use data and reviewing local land use policies. Working through the municipalities within the TEB study area, the Study Team is collecting available master plans, zoning and subdivision ordinances, development codes, existing/future land use databases and mapping, redevelopment plans, and information on development trends. All of this data will be used during the development of the NEM to identify areas where sensitive land uses such as dwellings, schools, healthcare facilities, places of worship and historic properties are incompatible with aircraft noise exposure.

PUBLIC WORKSHOP

A second public workshop for the TEB Part 150 Noise Study is being scheduled for late summer/early fall 2016. Please check the project web site for more information **http://panynjpart150.com/TEB_homepage.asp.**



Please visit the project web site ***http://panynjpart150.com/TEB_homepage.asp*** for the most recent project information.

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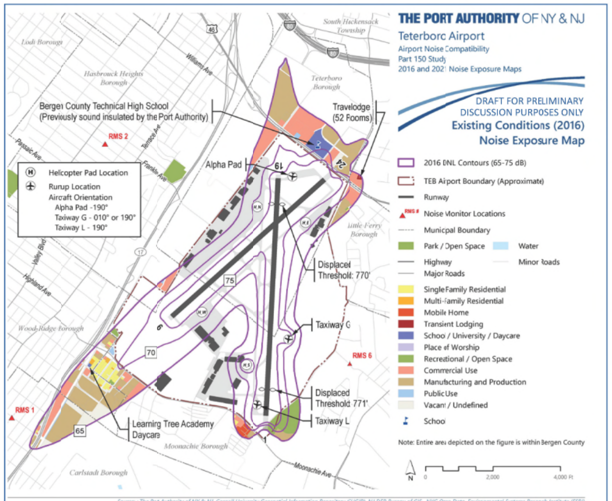
Teterboro Airport
Title 14 of the Code of Federal Regulations (14 CFR) Part 150 Airport Noise Compatibility and Planning Study

Summer 2016
Newsletter #3

NOISE EXPOSURE MAP

The Teterboro Airport (TEB) Part 150 Noise Study is approaching an important milestone: completion of the draft Noise Exposure Map (NEM) figures and supporting documentation. The NEM describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs and the resulting noise/land use compatibility situation, for existing (2016) and five-year forecast conditions (2021) at TEB.

The outdoor noise environment, in relation to airport noise compatibility, is quantified in terms of the yearly Day-Night Sound Level (DNL) metric. The DNL represents noise as it occurs over a 24-hour period, with one important note: DNL treats nighttime noise differently from daytime noise. In determining DNL, it is assumed that the sound levels occurring at night (defined as 10 p.m. to 7 a.m.) are 10 dB (decibels) louder than they really are. This 10 dB penalty is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive.



Part 150 requires the depiction of the 65, 70, and 75 dB contours and the identification of incompatible land uses. All land uses are considered to be compatible with noise levels less than 65 dB.

FAA has published guidelines that identify what types of land uses are incompatible with certain levels of noise exposure; for example, residences, schools, and outdoor music shells or amphitheaters are incompatible land uses where noise exposure levels are greater than DNL 65 dB. While noise from airport operations may be experienced in areas beyond the DNL 65 dB noise contour, only those areas with noise levels of DNL 65 dB or higher are considered incompatible.

STAY CONNECTED

For more information or to submit comments and feedback, the PANYNJ has several ways you can participate and stay informed:

- The project website **(http://panynjpart150.com/TEB_homepage.asp)** is updated regularly with project documents, meeting announcements, and other general information about the study. Register here to join the mailing list and receive project updates.
- To make comments, give feedback, or ask questions, please call us at **(212) 435-3777** or email us at **NJPart150@panynj.gov**
- To file an aircraft noise complaint, please call the noise complaint hotline at **1-800-225-1071**.

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NOISE SENSITIVE SITES WITHIN THE DNL 65 CONTOUR - 2016 AND 2021

Table 1. Results of the Preliminary Land Use Evaluation for 2016 (DRAFT – For Preliminary Discussion Purposes Only; Subject To Change)

Noise Level	Total Acres	Dwelling Units[1]	Estimated Residents[2]	Places of Worship	Schools[3]	Hospitals/ Medical Facilities	Transient Lodging Structures	Historic Resources	Day Care Facilities	Libraries
DNL 65-70	439	158	382	0	1	0	1	0	1	0
DNL 70-75	179	8	19	0	0	0	0	0	0	0
DNL 75+	201	0	0	0	0	0	0	0	0	0
TOTAL	**819**	**166**	**401**	**0**	**1**	**0**	**1**	**0**	**1**	**0**

Notes: 1. Based on GIS identification of parcels confirmed with direct counts using aerial photography.
2. Based on 2.42 residents per dwelling unit, developed from 2010 U.S. Census block data; rounded to the nearest whole number
3. The school was included in the Port Authority School Soundproofing Program, and is compatible with DNL 65+.

Source: RS&H and HMMH, 2016

Table 2. Results of the Preliminary Land Use Evaluation for 2021 (DRAFT – For Preliminary Discussion Purposes Only; Subject To Change)

Noise Level	Total Acres	Dwelling Units[1]	Estimated Residents[2]	Places of Worship	Schools[3]	Hospitals/ Medical Facilities	Transient Lodging Structures	Historic Resources	Day Care Facilities	Libraries
DNL 65-70	454	162	392	1	1	0	1	0	1	0
DNL 70-75	183	17	41	0	0	0	0	0	0	0
DNL 75+	203	0	0	0	0	0	0	0	0	0
TOTAL	**840**	**179**	**433**	**1**	**1**	**0**	**1**	**0**	**1**	**0**

Notes: 1. Based on GIS identification of parcels confirmed with direct counts using aerial photography.
2. Based on 2.42 residents per dwelling unit, developed from 2010 U.S. Census block data; rounded to the nearest whole number
3. The school was included in the Port Authority School Soundproofing Program, and is compatible with DNL 65+.

Source: RS&H and HMMH, 2016

NEXT STEPS: NOISE COMPATIBILITY PROGRAM

After the PANYNJ submits the Noise Exposure Map to the FAA for acceptance, the PANYNJ, in coordination with the Technical Advisory Committee (TAC), will begin to develop the Noise Compatibility Program (NCP). The goal of the NCP is to reduce noise levels so that they are compatible with surrounding land uses; the first priority of the NCP will be to address those areas identified as incompatible with noise exposure levels of at least DNL 65 dB, and to reduce the potential for incompatible development in the future. The NCP strategies will fall into three categories: noise abatement strategies, land use strategies, and programmatic strategies.

To learn more, please attend the:

Part 150 Public Workshops

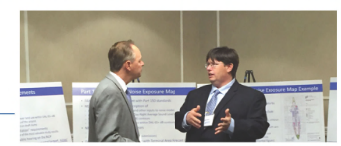
Thursday, September 22, 2016; 6 p.m. to 9 p.m.
Bergen County Complex Multi-purpose Room (1st Floor)
One Bergen County Plaza, Hackensack, NJ 07601

At this workshop, a Noise Exposure Map (NEM) will be presented that describes the airport layout and related levels of noise exposure in the surrounding area for the current year (2016), and a forecasted future year (2021). This workshop gives you the opportunity to share your concerns and ideas for addressing aircraft noise around TEB. Please join the discussion and tell us what is important to you! Let's work together to address aircraft noise issues at Teterboro Airport.

The workshop will be held in an "open house" format. Please come anytime between 6 p.m. and 9 p.m. to view project materials and talk to PANYNJ Staff and members of the Study Team.

Want to find out more information or get involved?
Please visit: **http://panynjpart150.com/TEB_homepage.asp**

Can't attend the workshop but want to provide input?
Please email: **NJPart150@panynj.gov; or call 212-435-777**



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Appendix G.3

- Public Workshops

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Appendix G.3.1

- Newspaper public notice advertisements

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October 2015 The Gazette Newspaper - PAGE 31

The Port Authority of New York & New Jersey
NOTICE OF PUBLIC INFORMATION WORKSHOP
14 Code of Federal (CFR) Part 150
Airport Noise Compatibility Planning Study for Teterboro Airport

The Port Authority of New York & New Jersey will be hosting a public information workshop in October 2015 to provide information regarding the Title 14 Code of Federal Regulations Part 150 (14 CFR Part 150) Airport Noise Compatibility Planning Study for Teterboro (TEB) Airport. The workshop will include guided displays that will present information regarding the 14 CFR Part 150 Study process, the project schedule, noise metrics, and methods used to quantify aircraft noise exposure. A second public information workshop will be conducted in the Spring of 2016 to provide information regarding the primary products of the 14 CFR Part 150 Study – the 2016 and 2021 Noise Exposure Maps.

The workshop will be held in an "open house" format from 6 p.m. to 8 p.m. on the date listed below. No formal presentation will be given in order to provide the public with the maximum opportunity for one-on-one interaction and sharing of information and concerns. You may attend the workshop at any time during the two-hour open house.

TEB PUBLIC INFORMATION WORKSHOP

DATE: Thursday, October 15, 2015
TIME: 6:00PM - 8:00PM
LOCATION: Holiday Inn Hasbrouck Heights
283 Route 17 South, Hasbrouck Heights, NJ 07604

For more information, please visit the project websites at:
http://panynjpart150.com/TEB_homepage.asp

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the Noise Office at (212) 435-3860 or via email at NJPART150@panynj.gov no later than (3) days before the workshops for which the services are being requested.

Real Estate Insight

By Mary Ellen Courtney

The Realtor as Transition Counselor

In real estate, there's a lot of advice out there, it seems, for first-time home-buyers – but what about advice for last-time home-sellers?

I read recently that aging seniors are projected to move out of from 10.5 to 11.5 million housing units before 2020 and from 14.5 to 15 million between 2020 and 2030.

That's a lot homes coming on to market in the next 15 years, the vast majority being owner occupied. The reasons for selling run the gamut, from having too much home to maintain or afford to being isolated from family support to being unable to make the modifications necessary to continue living there comfortably and safely.

As a result, we realtors are called in to act, not only in our primary function, but also as what we call 'transition counselors'.

In fact, an increasing number of us specialize *(earning sometimes professional designations)* in helping seniors and their families during real estate transitions, preparing them both emotionally and logistically for this important next move. A lot of the questions we're asked come from the children of elderly parents. Here are a few…

• When is the right time to begin the 'move process'?

In my view, it's never too early to begin the psychological process. While the actual move may be months or sometimes years away, the emotional preparation should begin much earlier. Fear holds many seniors back from making a move that they could or should take. It's only natural; we're all 'victims', more or less, of comfort and stability.

But with careful planning and consulting with family, friends, lawyers, financial advisors and us realtors, fear can be mitigated and positive steps can be taken. Conversely, a crisis situation is not a favorable time for judicious decision making.

• Should the elderly parents' house be sold before or after they move?

In my experience with transitioning elder home owners, this really depends on what each seller is comfortable with.

In an ideal situation, the house or unit will be prepped before it is to be put on the market. Some sellers embrace this process while others are not comfortable with or capable of handling the decluttering and staging aspects. Often, the required changes are too overwhelming and should be handled after the current owner has vacated.

And then there is the issue of showings, the scheduling of which may be difficult/inconvenient for older people. In the end, the entire transition team working with the elder home seller should confer and help decide what is best for him/her.

• When is it best to sell an elder's home who is on Medicaid?

There are so many questions about what could/should happen to the family home if a senior has to apply for Medicaid assistance. I'm not a lawyer here, so the first thing I always suggest is a consultation with an attorney who specializes in these kinds of issues.

That being said, it is commonly understood that the Medicaid agency will have a lien against the house to recover what it may have paid for the elder's care when the house is sold – whether that be now or when the elder passes away.

But there is a benefit to keeping the house, inasmuch as the Medicaid payment is usually substantially less than the private pay rate for nursing homes.

If you sell the house, the elder will go off Medicaid and you'll have to spend down the proceeds at the private rate. So, for that reason, it would seem that you're generally better off delaying the sale of the house.

As an example: if the private pay rate for the nursing home is $10,000 a month, but the state pays $7,000/month for your parent's care then you ultimately save about $3,000 every month you delay selling the property.

But then again, for the best advice on this subject I recommend that consult with a good local elder law attorney….

Mary Ellen Courtney is owner of Real Living Gateway Realtors, 201-288-0004. www.GatewayToHomes.com ###

PAGE 2 - THE OBSERVER Thursday, September 24, 2015

ALL AROUND the TOWN

BIRTHDAYS

Happy 40th Birthday to Steven Reyngoudt who celebrates on September 24.

Birthday greetings are sent to Mike Trepicchio who celebrates on September 24.

Birthday wishes go out to Jason DeLorenzo who celebrates on September 24.

Happy Birthday to Jonathan Hauptman who celebrates on September 25.

Birthday greetings are sent to Jacki DiGregorio who celebrates on September 25.

Birthday wishes go out to Mia Gagliano who celebrates on September 26.

Happy Birthday to Jaime Castellanos who celebrates on September 26.

Birthday greetings are sent to Rich Cannici who celebrates on September 26.

Birthday wishes go out to Catherine Castellanos who celebrates on September 27.

Happy Birthday to Alexis Blanco who celebrates on September 29.

Birthday greetings are sent to Brianna Blanco who celebrates on September 29.

Birthday wishes go out to Nicole Blanco who celebrates on September 29.

Happy Birthday to Lisa Hodulik who celebrates on September 29.

ANNIVERSARIES

Happy Anniversary to Ray & Laura French who celebrate on September 26.

Anniversary wishes go out to John & Lucy Cappadona who celebrate on September 27.

Happy Anniversary to Eric & Lisa Mason who celebrate on September 29.

* * *

ATTENTION READERS: If you'd like to see your birthday or anniversary in this column, let us know. E-mail us at theobssubscribe@verizon.net or mail your copy to P.O. Box 445, Hasbrouck Heights, 07604. Announcements must be resubmitted each year in writing. No announcements will be accepted by phone.

Elks Donation to Euclid School

On Wednesday, September 17, Hasbrouck Heights Elks Lodge No. 1962 Exalted Ruler John Brandle, Jr., along with Lodge Secretary and North East District Deputy Joyce Powell, presented an American Flag to Euclid School Principal Michael Sickels. District Deputy Joyce Powell also presented Mr. Sickels with an Elks Heritage Corner Kit which includes The Bill of Rights, Declaration of Independence, The Constitution, The Monroe Doctrine, and The Gettysburg Address. The Hasbrouck Heights Elks Lodge is part of the Benevolent and Protective Order of Elks whose main focus is the youth of our community, our veterans, and our special needs children. Pictured left to right: John Brandle Jr.;Michael Sickels; Joyce Powell.

Hometown Happenings

Date	Time	Organization	Event	Place
Sept 26	10 - 2 pm	HHPD	Operation Take Back	Public Safety Building
	10:30 - 3:30	Town	Town Day	Woodland Park
	2 pm	Library	Indian Culture Celebration	Library
Sept 27	4-7 pm	Library	BATSTOCK	Library
Sept 28	4-6 pm	Board of Health	Flu Vaccine	Senior Center

The Port Authority of New York & New Jersey
NOTICE OF PUBLIC INFORMATION WORKSHOP
14 Code of Federal (CFR) Part 150
Airport Noise Compatibility Planning Study for Teterboro Airport

The Port Authority of New York & New Jersey will be hosting a public information workshop in October 2015 to provide information regarding the Title 14 Code of Federal Regulations Part 150 (14 CFR Part 150) Airport Noise Compatibility Planning Study for Teterboro (TEB) Airport. The workshop will include guided displays that will present information regarding the 14 CFR Part 150 Study process, the project schedule, noise metrics, and methods used to quantify aircraft noise exposure. A second public information workshop will be conducted in the Spring of 2016 to provide information regarding the primary products of the 14 CFR Part 150 Study – the 2016 and 2021 Noise Exposure Maps.

The workshop will be held in an "open house" format from 6 p.m. to 8 p.m. on the date listed below. No formal presentation will be given in order to provide the public with the maximum opportunity for one-on-one interaction and sharing of information and concerns. You may attend the workshop at any time during the two-hour open house.

TEB PUBLIC INFORMATION WORKSHOP

DATE: Thursday, October 15, 2015
TIME: 6:00PM-8:00PM
LOCATION: Holiday Inn Hasbrouck Heights
283 Route 17 South, Hasbrouck Heights, NJ 07604

For more information, please visit the project websites at:
http://panynjpart150.com/TEB_homepage.asp

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the Noise Office at (212) 435-3860 or via email at NJPART150@panynj.gov no later than (3) days before the workshops for which the services are being requested.

The Free Public Library of Hasbrouck Heights
proudly presents
the fourth and final of the Multicultural Celebration Series
Focus on Asian Influences in our Community

Celebration of Indian Culture

Saturday, Sept. 26, 2015 at 2 pm

Traditional Entertainment with Refreshments, Dance Performances, & Music by Kulture Kool, Indian Culture Center of Northern New Jersey

The Free Public Library of Hasbrouck Heights
320 Boulevard in Hasbrouck Heights, NJ

To register, visit us at http://hasbrouckheights.bccls.org or call (201) 288-0488

Funded by the New Jersey Council for the Humanities

US & World 미국/국제 중앙일보

5

쿠바 간 교황 "미국과 관계 회복은 화해 모델"

시진핑 첫 국빈 방미 …'증신석의' 이룰까

LOTTO당첨번호

- MEGA MILLIONS 9월 18일 17 34 35 51 65 (7)
- NY TAKE FIVE 9월 19일 4 18 19 21 25
- NY LOTTO 9월 19일 1 4 20 32 41 58 (25)
- POWER BALL 9월 19일 12 17 26 43 48 (24)
- NJ CASH FIVE 9월 20일 6 8 23 28 32
- NJ PICK SIX 9월 17일 17 23 41 45 46 48 (0)

The Port Authority of New York & New Jersey

공공 정보 워크숍 개최 안내

미국연방규정집(CFR) 제14권 제150부

테터보로 공항

소음방지계획 연구 정보

오는 2015년 10월, The Port Authority of New York & New Jersey(뉴욕 뉴저지 항만청)에서 공공 정보 워크숍을 개최합니다. 본 워크숍에서는 미국연방규정집 제14권 제150부(14 CFR Part 150)에 해당하는 테터보로(TEB) 공항의 소음방지계획에 대한 정보를 알려 드릴 계획입니다. 이번 워크숍에서는 14 CFR Part 150 연구 과정, 프로젝트 일정, 소음 측정 기준, 항공기 소음 노출 계산 방법에 대한 정보를 설명과 함께 보여 드리는 자리도 마련했습니다. 제2차 공공 정보 워크숍은 2016년 봄에 개최될 예정으로, 14 CFR Part 150 연구의 주요 결과물인 '2016년도 및 2021년도 소음노출지도'에 관한 정보를 제공해 드립니다.

워크숍은 아래 날짜에 오후 6시부터 8시까지 '오픈 하우스' 형식으로 진행됩니다. 또한 참석자 여러분과 일대일로 소통하고 정보 및 관심사를 나누는 기회를 최대한 마련하기 위해 별도의 정식 프레젠테이션 없이 진행됩니다. 2시간의 오픈 하우스 시간 동안 언제든지 참석하실 수 있습니다.

테터보로 공항에 대한 공공 정보 워크숍

날짜: 2015년 10월 15일 목요일
시간: 오후 6~8시
장소: Holiday Inn Hasbrouck Heights
283 Route 17 South, Hasbrouck Heights, NJ 07604

자세한 정보는 프로젝트 웹 사이트에서 확인하시기 바랍니다:
http://panynjpart150.com/TEB_homepage.asp

본 Part 150 공공 정보 워크숍은 영어로 이동에 불편을 겪는 분들도 참석하실 수 있도록 편의를 제공합니다. 언어 통역 서비스를 미리 요청하시면 제공해 드립니다. 통역 서비스가 필요한 경우, 워크숍 실시일로부터 늦어도 3일 전까지 소음관리국에 전화 (212) 435-3880번 또는 이메일 NJPART150@panynj.gov로 연락하여 요청하셔야 합니다.

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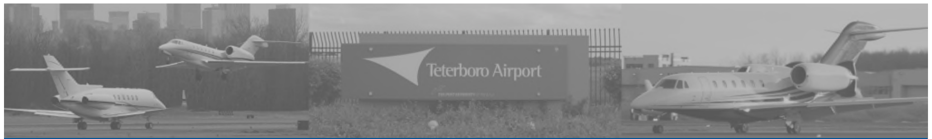


Teterboro Airport Public Workshop

You are invited to attend

As part of an on-going **Part 150 Airport Noise Compatibility Planning Study**, the Port Authority of New York and New Jersey (PANYNJ) is hosting a **public workshop** to gather input on potential approaches to addressing noise levels created by aircraft operations around Teterboro Airport (TEB).

At this workshop, a Noise Exposure Map (NEM) will be presented that describes the airport layout and related levels of noise exposure in the surrounding area for the current year (2016), and a forecasted future year (2021).

This workshop gives you the opportunity to share your concerns and ideas for addressing aircraft noise around TEB. Please join the discussion and tell us what is important to you! Let's work together to address aircraft noise issues at Teterboro Airport.

Thursday, September 22nd, 2016

6:00 pm - 9:00 pm

Bergen County Plaza
1st Floor, Multi-purpose Room
One Bergen County Plaza
Hackensack, NJ 07601

Parking lot entrance for visitors is between One Bergen County Plaza and the Justice Center, off Hudson Street

NJ Transit #76 #165 #712 #772 #780

Pascack Valley Line to Essex Street / Hackensack

Workshop Format

Open House

Please arrive anytime between **6:00 pm - 9:00 pm** to view project materials and talk to PANYNJ Staff and members of the Study Team.

Light refreshments will be available.

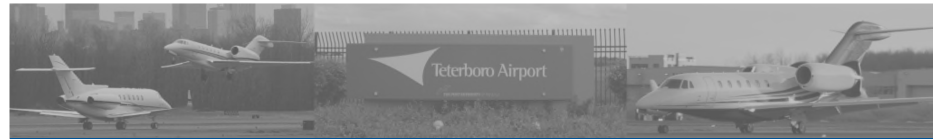
The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request.To make arrangements for such services please contact the PANYNJ Noise Office at ***212-435-3777*** or via email at ***NJPART150@panynj.gov*** no later than **3 days** before the workshop.

Want to find out more information or get involved?
Please visit: http://panynjpart150.com/TEB_homepage.asp

Can't attend the workshop but want to provide input?
Please email: NJPart150@panynj.gov
Or call: 212-435-3777

Questions about the workshop?
Contact the PANYNJ Noise Office
Please email: NJPart150@panynj.gov
Or call: 212-435-3777

THE PORT AUTHORITY OF NY & NJ



Taller público sobre el Aeropuerto Teterboro

Lo invitamos

Como parte de un **Estudio continuo de planificación de compatibilidad de ruido de aeropuertos Parte 150**, la Autoridad Portuaria de Nueva York y Nueva Jersey (The Port Authority of New York & New Jersey, PANYNJ, por sus siglas en inglés) llevará a cabo un taller público para obtener información sobre posibles enfoques sobre cómo abordar los niveles de ruido creados por las operaciones de aviación en los alrededores del Aeropuerto Teterboro (TEB).

En este taller se presentará un Mapa de Exposición al Ruido (NEM, por sus siglas en inglés) que describe la distribución del aeropuerto y los niveles relacionados con la exposición al ruido en el área vecina para el año actual (2016) y un año futuro pronosticado (2021).

Este taller la ofrece la oportunidad de compartir su opinión e ideas para lidiar con el ruido de aviones en los alrededores de TEB. ¡Participe en el debate y díganos qué es importante para usted! Trabajemos juntos para abordar los problemas de ruido de aviones en el Aeropuerto Teterboro.

Jueves 22 de septiembre de 2016

6:00 a 9:00 p.m.

Bergen County Plaza
1er Piso, Sala Multipropósitos
One Bergen County Plaza
Hackensack, NJ 07601

La entrada al estacionamiento de visitantes se encuentra entre One Bergen County Plaza y el Centro de Justicia, desde Hudson Street.

NJ Transit #76 #165 #712 #772 #780

Línea de Pascack Valley a Essex Street/Hackensack

Formato del taller

Open House

Por favor asista entre **6:00 y 9:00** p.m. para ver los materiales del proyecto y hablar con el personal de PANYNJ y los miembros del Equipo del estudio.

Habrá refrigerios ligeros.

Los talleres informativos públicos de la Parte 150 tienen accesibilidad para personas con problemas de movilidad. Hay disponibles servicios de interpretación de idiomas con previa solicitud. Para hacer arreglos para dichos servicios, sírvase comunicarse a la Oficina de Ruido al ***212-435-3777*** o por correo electrónico a ***NJPART150@panynj.gov*** a más tardar **3 días** antes del taller.

¿Quiere obtener más información o participar?
Visite: http://panynjpart150.com/TEB_homepage.asp

¿No puede asistir al taller pero quiere colaborar con su opinión?
Envíe un mensaje a: NJPart150@panynj.gov
O llame al: 212-435-3777

¿Tiene preguntas sobre el taller?
Comuníquese a la Oficina de Ruido de PANYNJ
Envíe un mensaje a: NJPart150@panynj.gov
O llame al: 212-435-3777

THE PORT AUTHORITY OF NY & NJ

테터보로 공항(TEB) 공공 워크숍

여러분을 초대합니다

Port Authority of New York and New Jersey (PANYNJ)는 현재 진행 중인 Part 150 테터보로(TEB) 소음방지계획 연구의 일환으로 공공 워크숍을 개최하고 있습니다. 이 워크숍은 테터보로 공항(TEB)에서의 항공기 운항에 따른 소음 문제를 해결할 방안을 모색하고자 의견을 취합하는 자리가 될 것입니다.

이 워크숍에서는 공항 배치도를 기준으로 금년(2016년)과 향후(2021년)에 위치별 소음 노출도가 각각 어떻게 되는지를 시각화한 소음노출지도(NEM)를 보실 수 있습니다.

워크숍을 통해 테터보로 공항(TEB) 주변 소음으로 인한 우려사항 및 문제 해결 방안을 함께 논의하는 기회를 누리게 됩니다. 여러분께서 중요하게 생각하시는 문제를 다루게 될 이번 워크숍에 꼭 참석하시기 바랍니다! 테터보로 공항(TEB) 소음 문제에 대처하기 위해 다함께 힘을 모읍시다.

2016년 9월 22일 목요일	
오후 6:00 ~ 오후 9:00	
버겐 카운티 플라자(Bergen County Plaza) 1st Floor, Multi-purpose Room One Bergen County Plaza Hackensack, NJ 07601	
방문객 주차장 입구는 One Bergen County Plaza와 Justice Center 사이에 있습니다.	
NJ Transit #76 #165 #712 #772 #780	
Pascack Valley Line의 Essex Street / Hackensack 에서 하차	

워크숍 형식

오픈 하우스

오후 6:00 ~ 오후 9:00 사이에 도착하시면 언제든지 프로젝트 자료도 보고 PANYNJ 직원 및 연구팀 구성원들과 대화도 나누실 수 있습니다.

가벼운 다과가 마련됩니다.

본 Part 150 공공 정보 워크숍은 장애로 이동에 불편을 겪는 분들도 참석하실 수 있도록 편의를 제공합니다. 언어 통역 서비스를 미리 요청하시면 제공해 드립니다. 통역 서비스가 필요한 경우, 워크숍 실시일로부터 늦어도 3일 전까지 PANYNJ 소음관리국에 전화 ***212-435-3777*** 또는 이메일 ***NJPART150@panynj.gov*** 로 연락하여 요청하셔야 합니다.

자세한 정보를 알고 싶거나 직접 참여하고 싶으십니까?
다음 사이트를 방문하십시오: http://panynjpart150.com/TEB_homepage.asp

워크숍에 참석할 수는 없지만 의견을 제출하고 싶으십니까?
이메일로 보내 주십시오: NJPart150@panynj.gov
또는 전화로 알려 주십시오: 212-435-3777

워크숍에 대해 문의사항이 있으십니까?
PANYNJ 소음관리국에 문의하십시오.
이메일로 문의하십시오: NJPart150@panynj.gov
또는 전화로 문의하십시오: 212-435-3777

THE PORT AUTHORITY OF NY & NJ

PAGE 8 THURSDAY, SEPTEMBER 15, 2016 THE STAR-LEDGER, AFFILIATED WITH NJ.COM

PUBLIC NOTICE AUCTION

Notice is hereby given that Col. Lee M. Fox Auctions, on behalf of The Port Authority of NY & NJ will sell at Public Auction at 10 am, Sat., Sept. 24, 2016 at The Port Authority of NY & NJ Impound Facility, End of Brewster Road, North Area, Newark Liberty International Airport the following Motor Vehicles which came into the possession of The Port Authority of NY & NJ through Impound or other:

YEAR	MAKE	MODEL	VIN
1999	NISSAN	MAXIMA	JN1CA21AXXM301135
1999	LINCOLN	TOWN CAR	1LNHM81W8XY690922
2005	FORD	FREESTYLE	1FMZK05105GA17331
2003	HONDA	ODYSSEY	5FNRL18093B062642
1999	DODGE	DAKOTA	1B7GG22X8XS164210
2003	ACURA	TL	19UUA56713A058134
1996	TOYOTA	COROLLA	2T1BA02E4TC146605
2004	CHRYSLER	PACIFICA	2C8GF684X4R333789
1996	DODGE	GRAND CARAVAN	2B4GP4435TR623823
2002	HONDA	CIVIC	1HGEM22942L074798
1999	JEEP	GRAND CHEROKEE	1J4GW58SXXC750931
1999	CADILLAC	ESCALADE	1GYEK13R1XR406367
2006	NISSAN	TITAN	1N6AA06B66N576601
1997	HONDA	CIVIC	2HGEJ662XVH543536
2003	MERCURY	MOUNTAINEER	4M2DU86W23ZJ36737
2002	MAZDA	PROTÉGÉ	JM1BJ246021480375
2005	SCION	TC	JTKDE177550001463
1995	TOYOTA	AVALON	4T1GB11E6SU013609
2002	CHEVROLET	CAVALIER	1G1JC524727184543
1997	MERCEDES	C230	WDBHA23E4VF565292
1997	CHEVROLET	MAILBU	1G1ND52MXV6157930
1996	MERCURY	SABLE	1MELM50U6TA646139
2006	SUZUKI	FORENZA	KL5JD56Z16K400678
2002	JAGUAR	S-TYPE	SAJDA03N12FM39408
1991	CHEVROLET	GEO TRACKER	2CNBJ18U6M6921666
2001	FORD	ECONOLINE	1FMRE11W31HA39598
2002	HONDA	ACCORD	1HGCG16552A009891
1998	BUICK	REGAL	2G4WF5211W1599611
2001	FORD	F-150	1FTRX18L21NA40771
2002	MERCURY	MOUNTAINER	4M2ZU86EX2UJ24778
2000	NISSAN	SENTRA	1N4DL01DXYC171817
2001	DODGE	GRAND CARAVAN	2B4GP44G51R194439
2002	HONDA	CIVIC	1HGEM21282L021297
1993	TOYOTA	COROLLA	2T1AE04E5PC015749
2000	JEEP	GRAND CHEROKEE	1J4GW48S5YC407522
2003	HYUNDAI	SONATA	KMHWF35H83A869450

Inspection time 9 am until 10 am on sale date. Pick-up and removal of vehicles paid in full on day of sale: day of sale until 2 pm and 9/26/16 - 9/30/16, 8 am until 2 pm. Any vehicles left over after 9/30/16 will be considered abandoned. For questions on terms or other information call 609-970-5163. Some titles will be RESALEABLE TITLES NJ. DMV Form OS/SS-88. Other titles will be JUNK and SALVAGE TITLES.

Sales Site: From New Jersey Turnpike Exit 14, follow signs to Port Newark/North Area. Take right lane and, follow signs for Airport Traffic North Area. At the second traffic light make a right then a left onto Brewster Rd at the Next Traffic Light. Stay on Brewster Rd. pass P6 Economy Parking Lot, pass Buildings #80, #11 & #79 on left. Curves to the left and you will see "PA Police Impound Lot." Arrow pointing right. Make right and follow Brewster Rd. to end. Free parking available.

Payment Terms: All Transactions on Auction Day Must be Paid-In-Full at Time of Purchase by CASH or OFFICIAL BANK CHECK ONLY. No Credit Cards Accepted. No Personal or Business Checks Accepted.

September 15, 2016 $289.80

STATEHOUSE

PTSD victims may get medical

Susan K. Livio *For The Star-Ledger*

Gov. Chris Christie signed a bill into law Wednesday that would add post-traumatic stress disorder to the list of conditions that would qualify sufferers for medical marijuana, a move long sought by combat veterans.

Christie said he supported the bill because an estimated 20 percent of veterans returning from the Iraq and Afghanistan suffer from this "debilitating" illness.

Other means of treatment would have be tried first before a doctor could recommend cannabis, to prevent "misuse," according to the governor.

"The mere potential of abuse by some should not deter the state from taking action that may ease the daily struggles of veterans and others who legitimately suffer from PTSD," Christie wrote.

Christie has been reluctant in the past to broaden admissions to the medical marijuana program. The law creating it gives the state health com
whether new medical conc
The governor has resisted
law, which he has complai

Lawmakers praised the
"I am pleased that Gov.
tion that finally empowers
PTSD patients with this i
Sen. Joseph Vitale (D-Mid

State law recognizes si
for medical marijuana if t
otrophic lateral sclerosis
sclerosis; terminal cancer;
tory bowel disease, includi
nal illness with a prognosi

People with seizure disc
table skeletal muscular sp
if conventional medicine h

THE PORT AUTHORITY OF NY & NJ

NOTICE OF DRAFT NOISE EXPOSURE MAP (NEM) REPORT
NOTICE OF PUBLIC INFORMATION WORKSHOP

14 Code of Federal (CFR) Part 150
Airport Noise Compatibility Study for
Teterboro Airport

As part of an on-going 14 CFR Part 150 Airport Noise Compatibility Planning Study, the Port Authority of New York and New Jersey (PANYNJ) has completed the Draft Noise Exposure Maps per the requirements of the 14 CFR Part 150 requirements. A notice hereby is given that the copies of the Draft Noise Exposure Map Report is available for public review and comment at the following locations:

LOCATION 1:
The Port Authority of NY & NJ
Teterboro Airport
90 Moonachie Avenue
Teterboro, NJ 07608
Attn: Terri Lee
Hours: 8:30 am to 4:30 pm (Mon to Fri)

LOCATION 2:
Bergen County Plaza
1st Floor Multi-Purpose Room
One Bergen County Plaza
Hackensack, NJ 07601
Attn: Department of Planning
Hours: 9:30 am to 4:00 pm (Mon to Fri)

The Draft NEM Report will be available at these locations until the close of the comment period, which is 5:00 PM on October 17, 2016. In addition, a copy of this document may be viewed online at: http://panynjpart150.com/TEB_DNEM.asp

All comments on the Draft Noise Exposure Map (NEM) Report should be sent to: The Port Authority of NY & NJ, 4 World Trade Center,150 Greenwich Street, 18th Floor, New York, NY 10007, Attn: Timothy Middleton. In addition, comments may be emailed to NJPART150@panynj.gov

TETERBORO AIRPORT (TEB) PUBLIC INFORMATION WORKSHOP

Additional information regarding the Part 150 Study, and an opportunity to ask questions and comment on the Draft NEM Report will be available to the Public through an Information Session. The details of the date, time, and location of the workshop are listed below.

DATE: Thursday, September 22, 2016
TIME: 6:00 pm to 9:00 pm
LOCATION: Bergen County Plaza, 1st Floor Multi-Purpose Room
One Bergen County Plaza, Hackensack, NJ 07601

The workshop will be held in an "open house" format from 6 p.m. to 9 p.m. In order to provide the public with the maximum opportunity for one-on-one interaction and sharing of information and concerns you may attend at any time during the three-hour open house.

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the PANYNJ Noise Office at 212-435-3777 or via email at NJPART150@panynj.gov no less than 72 hours before the workshop.

For more information, please call the PANYNJ Noise Office at 212-435-3777 or visit the project website at: http://panynjpart150.com/TEB_homepage.asp

HOME

FROM 1

The unemployment rate ho
ered above 5 percent in Ne
Jersey, while the rest of t
nation and the Northeast f
to 4.8 percent.

Meanwhile, recent co
lege graduates are strappe
with debt — with the avera
debt load of a 2014 gradua
topping $28,000, accordi
to the Institute for Colle
Access and Success.

A gender divide is at wo
as well. On a national leve
women are still more likely
live with a spouse or partne
according to Pew Researc
Center.

A few 35- to 64-year-ol
chose to stay home, but t

The Record

NORTH JERSEY'S TRUSTED SOURCE

Ad Number:
Insertion Number:
Size:
Color Type:

Publication Date: 09/15/2016

This E-Sheet(R) is provided as conclusive evidence that the ad appeared in the publication detailed above.

Esposa de Donald Trump demanda periódico

EFE

NOTICIAS DE FAMOSOS QUE ANDAN EN

LÍOS

¡ESTA SEMANA!

Melania Trump prepara medidas legales contra el "Daily Mail" por difamación.

Melania Trump, esposa del candidato republicano a la Casa Blanca, Donald Trump, prepara acciones legales contra el diario británico "The Daily Mail" por un artículo que ella considera difamatorio sobre su pasado, informaron sus abogados.

Melania y Donald. Twitter.com

"La señora Trump ha avisado a varios medios de sus reclamaciones contra ellos, incluido el 'Daily Mail', por hacer declaraciones falsas y difamatorias sobre que ella supuestamente fue una 'prostituta' en los años noventa", afirmó el abogado Charles Harder.

"Todas esas declaraciones son falsas al cien por cien, muy dañinas para su reputación y personalmente hirientes", señaló Harder en un comunicado enviado al diario especializado "Politico".

Según el letrado, la esposa de Trump "entiende que los medios tienen un cierto margen en una campaña presidencial, pero mentir completamente sobre ella de esta manera excede todos los límites del reporte apropiado de noticias y la decencia humana".

El abogado se refiere a un artículo publicado el pasado día 19 por el "Daily Mail" que cuestiona la biografía y la carrera como modelo de Melania Trump, de origen esloveno y casada con el candidato presidencial republicano desde 2005.

Harder fue recientemente noticia en la prensa estadounidense por representar al actor y exluchador Hulk Hogan en el caso contra el fundador de la empresa mediática Gawker Media, Nick Denton.

La Demanda de Hulk Hogan

Denton se declaró bancarrota tras la millonaria condena impuesta a su compañía por violar la privacidad Hogan.

Peter Thiel, magnate de Silicon Valley y admirador de Donald Trump, financió el litigio de Hogan contra Gawker, que en 2007 publicó una información que dio a conocer su homosexualidad.

Univision compra website del lío

El portal es uno de los sitios que pertenece a Nick Denton, que se declaró recientemente en bancarrota y que hace dos días fue adquirido por Univision en una subasta por unos 135 millones de dólares.

Leo DiCaprio en accidente de auto

El actor Leonardo DiCaprio y su pareja, la modelo Nina Agdal, salieron ilesos de un accidente de tráfico durante el fin de semana en los Hamptons, una conocida zona de playa cerca de Nueva York, informaron varios medios locales. El suceso tuvo carácter leve, según portavoces de la Policía de la zona, que confirmaron que nadie fue hospitalizado.

THE PORT AUTHORITY OF NY & NJ

AVISO DEL BORRADOR DEL INFORME DEL MAPA DE EXPOSICIÓN AL RUIDO (NEM, POR SUS SIGLAS EN INGLÉS)
AVISO DE TALLER INFORMATIVO PÚBLICO

Código Federal (CFR) 14 Parte 150
Estudio de Compatibilidad de Ruido de Aeropuertos para el Aeropuerto Teterboro

Como parte de un Estudio continuo de planificación de compatibilidad de ruido de aeropuertos 14 CFR Parte 150, la Autoridad Portuaria de Nueva York y Nueva Jersey (The Port Authority of New York & New Jersey, PANYNJ) ha completado el borrador de los Mapas de exposición al ruido de acuerdo a los requisitos del 14 CFR Parte 150. Por medio del presente se informa que las copias del Borrador del Informe de Mapas de Exposición al Ruido están disponibles para revisión y comentarios del público en las siguientes ubicaciones:

UBICACIÓN 1:
The Port Authority of NY & NJ
Aeropuerto Teterboro
90 Moonachie Avenue, Teterboro, NJ 07608
Atención: Terri Lee
Horario: Lunes a viernes de 8:30 a.m. a 4:30 p.m.

UBICACIÓN 2:
Bergen County Plaza
1er Piso, Salón multipropósitos
One Bergen County Plaza, Hackensack, NJ 07601
Atención: Departamento de Planificación
Horario: Lunes a viernes de 9:30 a.m. a 4:00 p.m.

El borrador del Informe NEM estará disponible en estos lugares hasta el cierre del período de comentarios, es decir, 17 de octubre de 2016 a las 5 p.m. Además, puede ver una copia de este documento en línea en: http://panynjpart150.com/TEB_DNEM.asp

Todos los comentarios del Borrador del Informe de Mapas de Exposición al Ruido (NEM) deben enviarse a: The Port Authority of NY & NJ, 4 World Trade Center,150 Greenwich Street, 18th Floor, New York, NY 10007, Attn: Timothy Middleton. También se pueden enviar los comentarios por vía electrónica a NJPART150@panynj.gov

TALLER INFORMATIVO PÚBLICO DEL AEROPUERTO TETERBORO (TEB)

Información adicional referente al Estudio Parte 150 y una oportunidad de hacer preguntas y comentarios sobre el Borrador del Informe NEM estarán disponibles al público a través de una Sesión Informativa. Los detalles de la fecha, hora y lugar del taller se indican a continuación.

FECHA: Jueves, 22 de septiembre de 2016
HORA: 6:00 a 9:00 pm
UBICACIÓN: Bergen County Plaza, 1er Piso, Salón multipropósitos
One Bergen County Plaza, Hackensack, NJ 07601

El taller se llevará a cabo en un "open house" de 6 a 9 p.m. Para dar al público la máxima oportunidad de tener una interacción uno a uno y compartir información e inquietudes que pueda tener, acuda a cualquier hora durante el open house de tres horas.

El taller informativo público de la Parte 150 tiene accesibilidad para personas con problemas de movilidad. Hay disponibles servicios de interpretación de idiomas con previa solicitud. Para hacer arreglos para dichos servicios, sírvase comunicarse a la Oficina de Ruido de PANYNJ al 212-435-3777 o por correo electrónico a NJPART150@panynj.gov a más tardar 72 horas antes del taller.

Para obtener más información, llame a la Oficina de Ruido de PANYNJ al 212-435-3777 o visite la página web del proyecto: http://panynjpart150.com/TEB_homepage.asp

People 사람 사람 | 중앙일보

2016년 9월 15일 목요일 7

" '감정 조절' 이 건강한 사회 만드는 비결이다"

THE PORT AUTHORITY OF NY & NJ

소음노출지도(NEM) 보고서 초안 발표 공지
공공 정보 워크숍 개최 안내
미국연방규정집 제14권 제150부
테터보로 공항 소음방지연구

다음 장소에서 배포하오니 내용을 검토하시고 의견 주시기 바랍니다

위치 1:
The Port Authority of NY & NJ
테터보로 공항
90 Moonachie Avenue
Teterboro, NJ 07608

위치 2:
버겐 카운티 플라자(Bergen County Plaza)
1층 다목적실(Multi-Purpose Room)
One Bergen County Plaza
Hackensack, NJ 07601
담당: Department of Planning

http://panynjpart150.com/TEB_DNEM.asp

The Port Authority of NY & NJ, 4 World Trade Center,150 Greenwich Street, 18th Floor, New York, NY 10007, Attn: Timothy Middleton. 또한 이메일 NJPART150@panynj.gov 로 보내 주셔도 됩니다.

테터보로 공항(TEB)에 대한 공공 정보 워크숍

일시: 2016년 9월 22일 목요일
시간: 오후 6:00 - 9:00
위치: 버겐 카운티 플라자(Bergen County Plaza) 1층 다목적실(Multi-Purpose Room)
One Bergen County Plaza, Hackensack, NJ 07601

http://panynjpart150.com/TEB_homepage.asp

Thursday, September 15, 2016 THE OBSERVER - PAGE 5

LIBRARY NEWS AND EVENTS

Multicultural Celebration with Italian Light Opera

The Hasbrouck Heights Library continues its Multicultural Celebration programming with a tribute spotlight on Italy. A colorful and lively performance by the Hudson Lyric Opera Company will take place on Sat., Sept. 17, from 2 to 3 p.m. in the Senior Center in the Municipal Building. The music selections will all be songs from well-known and popular Italian light opera. Refreshments will be served. Registration is requested and admission is free. Please call (201) 288- 0488 or log on to http://hasbrouckheights.bccls.org and go to calendar.

Celebrate Baseball Hero Ted Williams

As part of our "Monday Afternoon at the Library" series of free seminars, the Library is pleased to invite guest speaker Rick Feingold from the Cooperstown Symposium on Baseball and American Culture at the National Baseball Hall of Fame to talk about the legendary Ted Williams. It will be held in the Library's conference room from 3 to 4 p.m. 2016 marks the 75th anniversary of Williams' record-setting season as we also take a look at his military service between two wars.

Presenter Feingold has written for the Boston Herald and Christian Science Monitor on the subject of baseball.

To register, call (201) 288-0488 or log on to http://hasbrouckheights.bccls.org and go to calendar. Watch for future presentations and lectures that takes place on the third Monday of every month and check the Library's schedule of events.

Republican Club News

Event Honoring Gonzalez and Buckman Sept. 22

The Hasbrouck Heights Republican Club is holding a special event to honor Council members David Gonzalez and Sonya Buckman on Thurs., Sept. 22 at the Holiday Inn on Route 17 South in Hasbrouck Heights. The doors open at 6:30 p.m. and the event will run from 7:00 to 10:00 p.m. Ticket price is $55 per person and a table of ten is $500. For reservations, tickets or more information contact Ron Kistner at (201) 288-6998.

Police Blotter

GAS LEAK

About 1:20 p.m. on Sept. 5, a motorist flagged down Ptl. Anthony Rossillo in the area of Oak Grove and Paterson Avenues to advise that there was an odor of natural gas. Ptl. Michael DeSimone also responded and the odor had dissipated. PSE&G arrived, was drilling test holes, and a supervisor was to respond.

JUVENILE INCIDENTS

About 12:30 a.m. on Sept. 6, Ptl. Domenick D'Amico and Ptl. Michael Renna requested EMS for an intoxicated juvenile on Bell Ave. HH Ambulance 603 and the youth's parents responded and the officers checked the area for the location of a house party. All information was obtained and turned over to the Juvenile Bureau.

THEFT

About 5:25 p.m. on Sept. 6, Ptl. Sean Woodbridge was detailed to a Route 17 North gas station on a report of a theft. All information was obtained for a report.

***

About 7:20 p.m. on Sept. 7, a cell phone was reported stolen from Pep Boys. Ptl. John Cambridge was detailed and obtained all information for a report. The matter was turned over to the Detective Bureau.

FIRE

About 7:45 p.m. on Sept. 6, a fire was reported at a Harrison Ave. address. Ptl. Christopher Connors, Ptl. John Cambridge, Det. Joseph Armeli, and the HH Fire Department were detailed. The fire was extinguished and the HHFD cleared the scene.

DOG BITE

About 10:25 a.m. on Sept. 7, Ptl. Kevin Condal reported catching a dog on Cleveland Ave. Another person had also stated that they were bit by the same dog when they were also trying to catch him. The owners of the dog had called headquarters while Ptl. Condal was transporting the dog to the animal shelter. The officer returned the dog to its owner. The person arrived at headquarters to report the dog bite, but refused EMS. All information was obtained for a report and dog bite forms were completed and faxed to the Health Department.

DISORDERLY CONDUCT

About 12 p.m. on Sept. 8, a report of disorderly conduct was received from a Route 46 West address. Ptl. Kevin Condal and Lt. Ian Robertson responded and reported that the matter was settled. The officers transported one person home to a Kipp Ave. address.

ANIMAL COMPLAINTS

About 2:20 p.m. on Sept. 8, Ptl. Kevin Condal checked the area of Route 17 North near Route 46 East for a deer that was reported in the area. The deer was gone when the officer arrived.

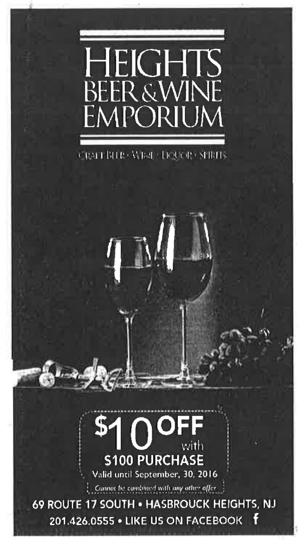
TRAFFIC ENFORCEMENT

About 2:45 p.m. on Sept. 8, during traffic enforcement in the area of Roosevelt and Terrace Avenues, Lt. Michael Colaneri, Jr., Ptl. Kevin Condal, Det. John Behr, Det. Joseph Armeli, and Ptl. John Cambridge found a person to have an active ACS warrant out of Atlantic County. Two people were transported to headquarters. The Atlantic County Prosecutors Office stated that the warrant was not active. One person was placed under arrest and the matter was turned over to the Detective Bureau.

SUSPICIOUS PERSON

About 10:15 a.m. on Sept. 9, Det. John Behr reported a suspicious person on the Boulevard and Jefferson Ave. Ptl. Jarett Cooke was detailed to assist.

Continued on page 12



THE PORT AUTHORITY OF NY & NJ

NOTICE OF DRAFT NOISE EXPOSURE MAP (NEM) REPORT
NOTICE OF PUBLIC INFORMATION WORKSHOP
14 Code of Federal (CFR) Part 150 Airport Noise Compatibility Study for Teterboro Airport

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Teterboro, NJ 07608
Attn: Terri Lee
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1st Floor Multi-Purpose Room
One Bergen County Plaza
Hackensack, NJ 07601
Attn: Department of Planning
Hours: 9:30 am to 4:00 pm (Mon to Fri)

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TETERBORO AIRPORT (TEB) PUBLIC INFORMATION WORKSHOP

Additional information regarding the Part 150 Study, and an opportunity to ask questions and comment on the Draft NEM Report will be available to the Public through an Information Session. The details of the date, time, and location of the workshop are listed below.

DATE: Thursday, September 22, 2016
TIME: 6:00 pm to 9:00 pm
LOCATION: Bergen County Plaza, 1st Floor Multi-Purpose Room
One Bergen County Plaza, Hackensack, NJ 07601

The workshop will be held in an "open house" format from 6 p.m. to 9 p.m. In order to provide the public with the maximum opportunity for one-on-one interaction and sharing of information and concerns you may attend at any time during the three-hour open house.

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the PANYNJ Noise Office at 212-435-3777 or via email at NJPART150@panynj.gov no less than 72 hours before the workshop.

For more information, please call the PANYNJ Noise Office at 212-435-3777 or visit the project website at: http://panynjpart150.com/TEB_homepage.asp

NJ Hall of Fame Holds 43rd Induction Dinner

Enjoy Meeting People? Become a Docent!

The Aviation Hall of Fame and Museum at Teterboro Airport is seeking volunteer tour guides (docents) who enjoy meeting people.

Volunteer docents lead informative museum tours of displays, punctuated with brief historical accounts of New Jersey's aviation pioneers, heroes and events.

Go to www.njahof.org and check out the self guided tour. Flexible hours. Free training and support. No experience necessary.

For additional information, call Roger at 201-967-0419, or Shea at 201-288-6344. ###

The New Jersey Aviation Hall of Fame announced the 2016 Inductees into The Aviation Hall of Fame.

The new Inductees will receive their bronze plaques at the 43rd Annual Induction Dinner on September 27, 2016, at The Fiesta Ballroom, in Wood-Ridge.

The public is invited to attend. Dinner tickets are $110 each. There will be a cash bar. For tickets or more information, please call 201-288-6344.

The 2016 Inductees include:

• William McE Miller, Jr. - longtime Princeton resident, Chairman and CEO of Aeron Corporation. Visionary designer of the "Aerobody," a hybrid airship/airplane designed to carry outsized cargo or serve as a military airborne surveillance platform *(subject of early 1970s book: "The Deltoid Pumpkinseed)"* His DYNAIRSHIP, Aereon III and VectoRotor designs still hold multiple patents. Post-war Naval Aviator and F-4U carrier pilot

• Janine K. Iannarelli - Fair Lawn. One of first woman biz jet brokers *(recently on the cover of Aviation for Women magazine)*. "Industry Icon" and champion of business aviation, her company is best known as a marketer of pre-owned Dassault aircraft. Her company, Par Aviation Ltd., is incorporated in NJ and has its HQ in Houston. Janine has been a member of the Texas Aerospace & Aviation Advisory Committee since 2014 *(by Governor's appointment)*. She also was the keynote speaker on her career in business aviation at a major event in fall 2014 called "Women Driving Business." In 2016, she was made a member of European Business Aviation Association's Associate Members Advisory Council. Finalist, Texas Businesswomen of the Year 2016.

•. Robert Cenker - East Windsor. Selected by RCA as a Payload Specialist; and approved by NASA to fly on the space shuttle Columbia on Space Shuttle Mission 61-C. During the six day mission, *(January 12 to 18, 1986)*, he performed a variety of physiological tests, observed the deployment of the RCA Satcom Ku-1 satellite, and operated the primary experiment, an infrared imaging camera. In completing this flight, Mr. Cenker traveled over 2.1 million miles in 96 Earth orbits and logged over 146 hours in space. ###

The New Jersey Aviation Hall of Fame was founded in 1972 and was the first state aviation hall of fame in the nation. Its goal is the preservation of the Garden State's 221 years of aviation and space heritage.

The Aviation Hall of Fame & Museum of New Jersey is located at Teterboro Airport. It is open Tuesday through Sunday from 10 a.m. to 4 p.m. For more information: www.njahof.org ###

Remember to Fly Your Flag September 11th

September 11th Remembrance Services

• **Hasbrouck Heights** will hold a short service at 7 p.m. on September 11, at the Firemen's 9-11 Memorial at The Circle.

• **Little Ferry** will hold a service on September 9 at 9 a.m. at the Memorial School.

• **Moonachie** will hold a service on September 11, at 11 a.m. at the Memorial located at Borough Hall. Rain or shine.

• **Rutherford** will hold their service at 7 p.m. at Lincoln Park on September 11.

• **Wood-Ridge** is holding a Memorial Service at Veterans Memorial Park located on Valley Boulevard on Sunday, September 11, at 9 a.m. ###

VFW Hosts 9-11 and POW-MIA Service

Little Ferry VFW Post 809 will host a Remembrance Service for 9-11 and POW-MIA on Sunday, September 11, 2016, at 2 p.m., at the VFW Post Home, 100 Main Street, Little Ferry.

There will be a special tribute to a Veteran. Light refreshments. Public is invited. For more information, call Adele at 201-641-2298. ###

Aviation Museum

Aviation Hall of Fame
Monday - Sunday
10 a.m. to 4 p.m.
$8 Adults • $6 Seniors & Children
Group Tours • Birthday Parties Available
400 Fred Wehran Drive, Teterboro
201-288-6344 • www.njahof.org

Teterboro Airport Public Workshop

You are invited to attend

As part of an on-going **Part 150 Airport Noise Compatibility Planning Study**, the Port Authority of New York and New Jersey (PANYNJ) is hosting a **public workshop** to gather input on potential approaches to addressing noise levels created by aircraft operations around Teterboro Airport (TEB).

At this workshop, a Noise Exposure Map (NEM) will be presented that describes the airport layout and related levels of noise exposure in the surrounding area for the current year (2016), and a forecasted future year (2021).

This workshop gives you the opportunity to share your concerns and ideas for addressing aircraft noise around TEB. Please join the discussion and tell us what is important to you! Let's work together to address aircraft noise issues at Teterboro Airport.

Thursday, September 22nd, 2016

6:00 pm - 9:00 pm

Bergen County Plaza
1st Floor, Multi-purpose Room
One Bergen County Plaza
Hackensack, NJ 07601

Parking lot entrance for visitors is between One Bergen County Plaza and the Justice Center, off Hudson Street

NJ Transit #76 #165 #712 #772 #780

Pascack Valley Line to Essex Street / Hackensack

Workshop Format

Open House

Please arrive anytime between **6:00pm - 9:00pm** to view project materials and talk to PANYNJ Staff and members of the Study Team.

Light refreshments will be available.

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the PANYNJ Noise Office at **212-435-3860** or via email at **NJPART150@panynj.gov** no later than **3 days** before the workshop.

Want to find out more information or get involved?
Please visit: http://panynjpart150.com/TEB_homepage.asp

Can't attend the workshop but want to provide input?
Please email: NJPart150@panynj.gov
Or call: 212-435-3777

Questions about the workshop?
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Please email: NJPart150@panynj.gov
Or call: 212-435-3777

THE PORT AUTHORITY OF NY & NJ

Ad Number:
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Advertiser:
Section/Page/Zone: A/A004/
Description:

HackensackChronicle

Publication Date: 09/16/2016

GOVERNMENT

Township to continue study of puppy mill ban

BY STEPHANIE NODA
News Editor

SOUTH HACKENSACK – The township committee plans to further study a proposed ban of puppy and kitten mills that many municipals have adopted across the county before considering any resolution of its own.

"I don't want to do something hastily that would leave us open to a challenge," said Mayor Gary Brugger during the Sept. 1 township meeting.

Municipal Attorney David Nasta said the ordinance was brought on by a situation in April at Paramus's Just Pups pet store, where police found 67 puppies left unattended in a van.

Towns such as Emerson, Upper Saddle River, East Rutherford, and Hackensack have already passed ordinances that ban the selling of animals that come from puppy and kitten mills in their pet stores. The Humane Society of the United States estimates that 10,000 puppy mills produce more than 2,400,000 puppies a year in the United States and most dogs and cats from pet shops come from these mills, according to a resolution passed by Hackensack on June 28.

"I think half of them are going to be subject to challenge," said Nasta of ordinances that were adopted by other municipalities. "I don't think we have that issue; we don't have a large retail area."

THE PORT AUTHORITY OF NY & NJ

NOTICE OF DRAFT NOISE EXPOSURE MAP (NEM) REPORT

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BERNADETTE MARCINIAK/STAFF PHOTOGRAPHER

Preparing for a sale

Laurie Carbone leads a Home Staging program at the Horizon House in Fort Lee on Sept. 8 to tell community members the best way to stage their homes for an upcoming sale.

HACKENSACK

Fashion for Philanthropy event will help children's hospital

Fashion for Philanthropy, an exclusive fall fashion event to benefit the Joseph M. Sanzari Children's Hospital at Hackensack-UMC, will be held on Thursday, Sept. 22 at the Shops at Riverside in Hackensack. VIP pre-event reception is at 5 p.m., with cocktails and small plates at 6 p.m., welcome and trend presentation at 7 p.m. and a fashion runway show at 7:30 p.m. Tickets cost $250 for VIP, and $175 for general seating. RSVP at HackensackUMCFoundation.org.

Got hometown news?

Press releases must be in *Hackensack Chronicle* office by Monday, noon, for possible inclusion in the following Friday's edition. Fax press releases to 201-568-4360, mail to 210 Knickerbocker Road, Cresskill, NJ 07626-1890 , or email to hackensack@northjersey.com.

ATTENTION RESIDENTS

Submit local news/events to the paper

Do you have any local news or story ideas that you would like to share with the newspaper?

Ridgefield Park Patriot is looking for local events and press releases to possibly share with the community. Residents are encouraged to submit press releases/ photos about your projects, programs and events around town.

Email Megan Burrow, editor, at burrow@northjersey.com with your name, number and story idea or call 201-894-6721.

THE PORT AUTHORITY OF NY & NJ

NOTICE OF DRAFT NOISE EXPOSURE MAP (NEM) REPORT
NOTICE OF PUBLIC INFORMATION WORKSHOP

14 Code of Federal (CFR) Part 150 Airport Noise Compatibility Study for Teterboro Airport

As part of an on-going 14 CFR Part 150 Airport Noise Compatibility Planning Study, the Port Authority of New York and New Jersey (PANYNJ) has completed the Draft Noise Exposure Maps per the requirements of the 14 CFR Part 150 requirements. A notice hereby is given that the copies of the Draft Noise Exposure Map Report is available for public review and comment at the following locations:

LOCATION 1:
The Port Authority of NY & NJ
Teterboro Airport
90 Moonachie Avenue
Teterboro, NJ 07608
Attn: Terri Lee
Hours: 8:30 am to 4:30 pm (Mon to Fri)

LOCATION 2:
Bergen County Plaza
1st Floor Multi-Purpose Room
One Bergen County Plaza
Hackensack, NJ 07601
Attn: Department of Planning
Hours: 9:30 am to 4:00 pm (Mon to Fri)

The Draft NEM Report will be available at these locations until the close of the comment period, which is 5:00 PM on October 17, 2016. In addition, a copy of this document may be viewed online at: http://panynjpart150.com/TEB_DNEM.asp

All comments on the Draft Noise Exposure Map (NEM) Report should be sent to: The Port Authority of NY & NJ, 4 World Trade Center, 150 Greenwich Street, 18th Floor, New York, NY 10007, Attn: Timothy Middleton. In addition, comments may be emailed to NJPART150@panynj.gov

TETERBORO AIRPORT (TEB) PUBLIC INFORMATION WORKSHOP

Additional information regarding the Part 150 Study, and an opportunity to ask questions and comment on the Draft NEM Report will be available to the Public through an Information Session. The details of the date, time, and location of the workshop are listed below.

DATE: Thursday, September 22, 2016
TIME: 6:00 pm to 9:00 pm
LOCATION: Bergen County Plaza, 1st Floor Multi-Purpose Room
One Bergen County Plaza, Hackensack, NJ 07601

The workshop will be held in an "open house" format from 6 p.m. to 9 p.m. In order to provide the public with the maximum opportunity for one-on-one interaction and sharing of information and concerns you may attend at any time during the three-hour open house.

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the PANYNJ Noise Office at 212-435-3777 or via email at NJPART150@panynj.gov no less than 72 hours before the workshop.

For more information, please call the PANYNJ Noise Office at 212-435-3777 or visit the project website at: http://panynjpart150.com/TEB_homepage.asp

HEALTH

Flu shots offered at senior center

BY KRISTEN AGNES
Staff Writer

As flu season quickly approaches, Ridgefield Park senior citizens have the opportunity to receive a flu vaccine at the village Senior Center.

With the colder weather beginning in just a few weeks, residents age 65 and older are encouraged to get vaccinated soon.

On Sept. 13, the Ridgefield Park Senior Center in conjunction with Rite Aid offered its first flu shot clinic and will schedule another in the future if more residents request additional clinics.

"We don't have anything scheduled right now, but any senior interested in getting the vaccine should call the senior center and we will try and schedule another clinic," said Tara Prestigiacomo, senior center director.

The clinic is offered through JPL Pharmacy and is free for seniors with Medicare.

She encourages all seniors to look into getting a flu shot and to contact the center if they still have not had one.

Each flu season, various pharmacies and local health departments offer free or discounted flu shots to help prevent the spread of this potentially life-threatening illness.

The Center for Disease Control (CDC) recommends anyone over the age of six months should get the vaccine, however, those with a compromised immune system are most at risk of catching the flu.

According to the CDC website, "The flu also can make chronic health problems worse. For example, people with asthma may experience asthma attacks while they have the flu, and people with chronic congestive heart failure may experience a worsening of this condition triggered by flu."

While most flu symptoms are not life-threatening – such as muscle aches, fever and fatigue – pneumonia, bronchitis, sinus and ear infections can develop in elderly patients if the flu is left untreated.

Residents interested in finding out more information about flu shots can call the Ridgefield Park Senior Center at 201-641-1220.

Email: agnes@northjersey.com

GOVERNMENT

Township to continue study of puppy mill ban

BY STEPHANIE NODA
News Editor

SOUTH HACKENSACK – The township committee plans to further study a proposed ban of puppy and kitten mills that many municipals have adopted across the county before considering any resolution of its own.

"I don't want to do something hastily that would leave us open to a challenge," said Mayor Gary Brugger during the Sept. 1 township meeting.

Municipal Attorney David Nasta said the ordinance was brought on by a situation in April at Paramus's Just Pups pet store, where police found 67 puppies left unattended in a van.

Towns such as Emerson, Upper Saddle River, East Rutherford, and Hackensack have already passed ordinances that ban the selling of animals that come from puppy and kitten mills in their pet stores. The Humane Society of the United States estimates that 10,000 puppy mills produce more than 2,400,000 puppies a year in the United States and most dogs and cats from pet shops come from these mills, according to a resolution passed by Hackensack on June 28.

"I think half of them are going to be subject to challenge," said Nasta of ordinances that were adopted by other municipalities. "I don't think we have that issue; we don't have a large retail area."

BERNADETTE MARCINIAK/STAFF PHOTOGRAPHER

Preparing for a sale

Laurie Carbone leads a Home Staging program at the Horizon House in Fort Lee on Sept. 8 to tell community members the best way to stage their homes for an upcoming sale.

THE PORT AUTHORITY OF NY & NJ

NOTICE OF DRAFT NOISE EXPOSURE MAP (NEM) REPORT
NOTICE OF PUBLIC INFORMATION WORKSHOP

14 Code of Federal (CFR) Part 150 Airport Noise Compatibility Study for Teterboro Airport

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LOCATION 1:
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90 Moonachie Avenue
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One Bergen County Plaza
Hackensack, NJ 07601
Attn: Department of Planning
Hours: 9:30 am to 4:00 pm (Mon to Fri)

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TETERBORO AIRPORT (TEB) PUBLIC INFORMATION WORKSHOP

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For more information, please call the PANYNJ Noise Office at 212-435-3777 or visit the project website at: http://panynjpart150.com/TEB_homepage.asp

HACKENSACK

Fashion for Philanthropy event will help children's hospital

Fashion for Philanthropy, an exclusive fall fashion event to benefit the Joseph M. Sanzari Children's Hospital at Hackensack-UMC, will be held on Thursday, Sept. 22 at the Shops at Riverside in Hackensack. VIP pre-event reception is at 5 p.m., with cocktails and small plates at 6 p.m., welcome and trend presentation at 7 p.m. and a fashion runway show at 7:30 p.m. Tickets cost $250 for VIP, and $175 for general seating. RSVP at HackensackUMCFoundation.org.

Got hometown news?

Press releases must be in *Hackensack Chronicle* office by Monday, noon, for possible inclusion in the following Friday's edition. Fax press releases to 201-568-4360, mail to 210 Knickerbocker Road, Cresskill, NJ 07626-1890 , or email to hackensack@northjersey.com.

Appendix G.3.2

- Presentation Materials

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Teterboro Airport
Title 14 Code of Federal Regulations Part 150 Study

What is a 14 CFR Part 150 Study?

Title 14 Code of Federal Regulations (CFR) Part 150, Airport Noise Compatibility Planning, was issued by the Federal Aviation Administration (FAA) as a final rule in January 1985. 14 CFR Part 150 sets forth the methodology and procedures to be followed when preparing aircraft noise exposure maps and developing airport/airport environs land use compatibility programs.

14 CFR Part 150 studies typically consist of two primary components: (1) the Noise Exposure Map (NEM) report, which contains detailed information regarding existing and 5-year forecast airport/aircraft noise exposure patterns, and (2) the Noise Compatibility Program (NCP), which includes descriptions and an evaluation of noise abatement and noise mitigation options/programs applicable to an airport.

Has a 14 CFR Part 150 Study been prepared for Teterboro Airport (TEB)?

Although the Port Authority of New York and New Jersey has a long history of addressing noise exposure from aircraft operations at TEB, this is the first 14 CFR Part 150 Study for TEB. The Port Authority is also preparing 14 CFR Part 150 studies for Newark Liberty International Airport (EWR), John F. Kennedy International Airport (JFK), and LaGuardia Airport (LGA) concurrent with the TEB 14 CFR Part 150 study.

Why is the Port Authority undertaking a 14 CFR Part 150 Study for TEB?

In response to growing community concerns about aircraft noise, Governor Christie directed the Port Authority to undertake 14 CFR Part 150 Studies for TEB and EWR. Governor Christie directed the Port Authority to open a full and thorough dialogue with the impacted communities while also pursuing a noise study to better address the issue. Port Authority Aviation Director Thomas Bosco said, "The Port Authority understands it must strive to be a good neighbor in the communities where its airports are located." He added, "We will seek noise mitigation with the FAA where feasible."

The 14 CFR Part 150 Study for TEB will identify areas that are not compatible with significant levels of aircraft noise exposure and will recommend measures for mitigating aircraft noise impacts to the greatest extent feasible.

What will the Port Authority produce during the TEB 14 CFR Part 150 Study?

The 14 CFR Part 150 Study must be prepared in accordance with guidance provided in the 14 CFR Part 150 regulations. The FAA has prepared checklists for the NEM and NCP which must be followed to ensure compliance with 14 CFR Part 150. As part of the TEB 14 CFR Part 150 Study, the Port Authority and its consultant will quantify existing (2016) and forecast (2021) aircraft noise exposure levels in the vicinity of TEB. The Port Authority will also develop supporting documentation explaining the process used to calculate existing and forecast aircraft noise exposure levels. The TEB NEM Report will provide the Port Authority with a set of NEMs that identify areas exposed to aircraft noise of day-night average sound level

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(DNL) 65 decibels (dB) and higher. The NEMs will be submitted to FAA for review and acceptance. Additional maps will be created for informational purposes only to show the existing and forecast DNL 55 dB contours. These maps will not be included in the formal submittal of the NEM to FAA.

After the TEB NEMs are complete, the Port Authority and its consultants will examine potential measures for minimizing TEB's noise impact. The Port Authority will consider a range of feasible mitigation measures including operational, remedial, preventative, and administrative measures. The measures providing the greatest potential to minimize the noise impacts from aircraft operations at TEB will be forwarded to the FAA for review and approval. Certain measures may require FAA funding to be implemented (e.g., sound insulation). Only those measures approved by the FAA will be eligible for federal funding.

How long will the TEB 14 CFR Part 150 Study take to complete?

14 CFR Part 150 Studies vary in duration depending on a number of factors including, but not limited to, the complexity of the airport operations and local airspace, availability of data, the public outreach process, and agency review periods. The estimated duration of the TEB 14 CFR Part 150 Study is approximately three to four years. The Port Authority is committed to taking the time required to provide the FAA with NEMs and an NCP for TEB that meet requirements of 14 CFR Part 150.

Where can I get more information?

General information, project reports and public workshop materials, including presentation boards, will be uploaded to the project website at http://panynjpart150.com/TEB_homepage.asp as they become available.

How can I get involved?

14 CFR Part 150 encourages the participation of citizens and public agencies. The Port Authority will convene several public information workshops during the 14 CFR Part 150 Study process. This public information workshop is being held to introduce the TEB 14 CFR Part 150 Study. We anticipate that the second public information workshop will be convened next spring to present key study findings.

The Port Authority is interested in hearing from you if aircraft noise is a concern. To file an aircraft noise complaint, the airport noise complaint hotline is 1-800-225-1071. Comments regarding the TEB 14 CFR Part 150 Study can be submitted at the public workshop or by (1) email to NJPART150@panynj.gov or (2) by calling (212) 435-3777, or (3) by mailing them to the Port Authority at the following address:

14 CFR Part 150 Study
Attn: New Jersey Part 150 Project Manager
Aviation Department
The Port Authority of New York & New Jersey
4 World Trade Center
150 Greenwich Street – 18th Floor
New York, NY 10006

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Holiday Inn Hasbrouck Heights
Teterboro Airport

Welcome to the Public Information Workshop for the TEB Airport 14 CFR Part 150 Study

The meeting is designed as an "open house" with various stations with study information available for review. Members of the HMMH Study Team and Port Authority Representatives are available for one-on-one discussion and to answer questions regarding the materials located at each station.

Sign-in	Welcome
Station #1	CFR Part 150 Overview
Station #2	CFR Part 150 Roles and Responsibilities
Station #3	TEB Part 150 Process, Schedule, and Study Area
Station #4	CFR Part 150 Noise Terminology
Station #5	Noise Modeling Overview
Station #6	TEB/Airport Overview
Station #7	Port Authority Information, Contacts, and Website
Station #8	Public Comments

See reverse for station layout ▶

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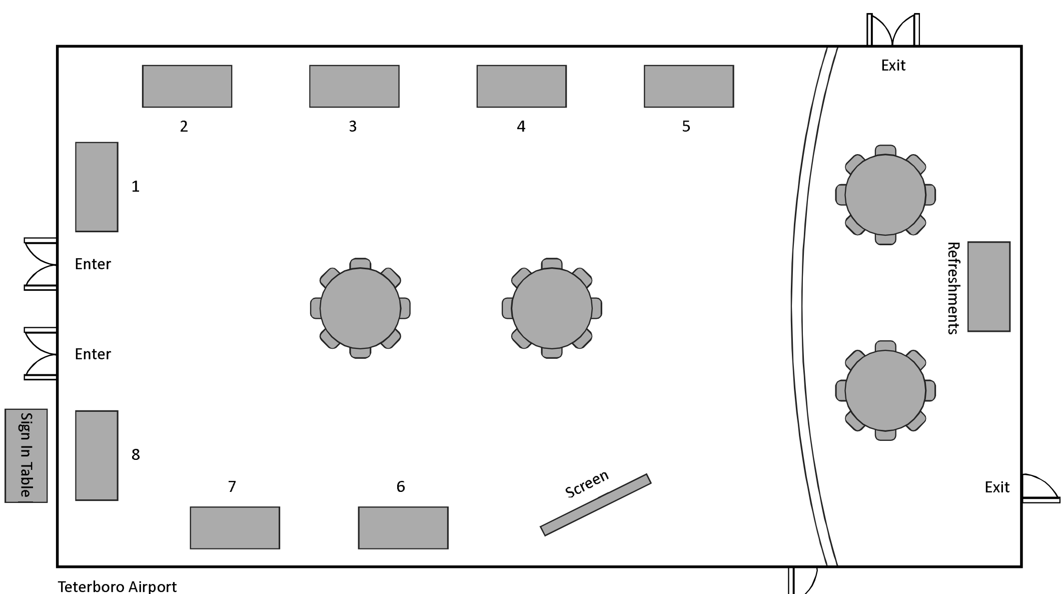
Holiday Inn Hasbrouck Heights
Teterboro Airport



Teterboro Airport
Title 14 CFR Part 150 Study
Public Information Workshop #1
October 15, 2015

See reverse for station list ▶

THE PORT AUTHORITY
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Estudio del Título 14 del Código de Regulaciones Federales Parte 150 del Aeropuerto Teterboro

¿Qué es un Estudio CFR 14 Parte 150?
La Administración Federal de Aviación (FAA, por sus siglas en inglés) emitió el Título 14 del Código de Regulaciones Federales (CFR, por sus siglas en inglés) Parte 150 como regla final en enero de 1985. 14 CFR Parte 150 establece los métodos y procedimientos que se deben seguir al preparar mapas de exposición al ruido de aviones y desarrollar programas de compatibilidad para el uso de suelo de aeropuertos/cercano a los aeropuertos.

Por lo general, los estudios de 14 CFR Parte 150 consisten de dos componentes principales: (1) el Mapa de Exposición al Ruido (NEM, por sus siglas en inglés), que contiene información detallada referente a los patrones de exposición al ruido de aeropuertos/aviones existentes y de 5 años futuros, y (2) el Programa de Compatibilidad de Ruido (NCP, por sus siglas en inglés), que incluye descripciones y una evaluación de opciones/programas de abatimiento y mitigación del ruido correspondientes a un aeropuerto.

¿Se ha preparado un Estudio 14 CFR Parte 150 para el Aeropuerto Teterboro (TEB, por sus siglas en inglés)?
Aunque la Autoridad Portuaria de Nueva York y Nueva Jersey tiene una larga historia de lidiar con la exposición al ruido de operaciones de aviación en TEB, éste es el primer Estudio 14 CFR Parte 150 para TEB. La Autoridad Portuaria está preparando estudios 14 CFR Parte 150 para el el Aeropuerto Internacional Liberty de Newark (EWR, por sus siglas en inglés), el Aeropuerto Internacional John F. Kennedy (JFK), y el Aeropuerto LaGuardia (LGA, por sus siglas en inglés) concurrentes con el estudio 14 CFR Parte 150 de TEB.

¿Por qué lleva a cabo la Autoridad Portuaria un Estudio 14 CFR Parte 150 para TEB?
En respuesta a crecientes inquietudes de la comunidad sobre el ruido de aviones, el Gobernador Christie ordenó a la Autoridad Portuaria llevar a cabo Estudios 14 CFR Parte 150 para TEB y EWR. El Gobernador Christie indicó a la Autoridad Portuaria abrir un diálogo completo con las comunidades afectadas mientras se realiza un estudio del ruido para lidiar mejor con el asunto. Thomas Bosco, Director de Aviación de la Autoridad Portuaria dijo: "La Autoridad Portuaria lo entiende y debe esforzarse por ser un buen vecino de las comunidades donde están ubicados los aeropuertos". Añadió, "Buscaremos la mitigación del ruido con la FAA donde sea factible".

El Estudio 14 CFR Parte 150 para TEB identificará las áreas que no son compatibles con niveles significativos de exposición al ruido de aviones y recomendará medidas para mitigar los efectos del ruido de aviones hasta el mayor punto factible.

¿Qué producirá la Autoridad Portuaria durante el Estudio 14 CFR Parte 150 de TEB?
El Estudio 14 CFR Parte 150 se debe preparar en conformidad con los lineamientos provistos en las regulaciones 14 CFR Parte 150. La FAA ha preparado listas de verificación para el NEM y NCP, las cuales se deben seguir para asegurar el cumplimiento con 14 CFR Parte 150. Como parte del Estudio 14 CFR Parte 150 de TEB, la Autoridad Portuaria y su consultor cuantificarán los niveles de exposición al ruido de aviones existentes (2016) y futuros (2021) en la cercanía de TEB. Asimismo, la Autoridad Portuaria desarrollará documentación de apoyo explicando el proceso seguido para calcular los niveles de

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exposición al ruido de aviones existentes y futuros. El Informe del NEM de TEB proveerá a la Autoridad Portuaria un conjunto de NEM que identifiquen áreas expuestas al ruido de aviones con un nivel de sonido promedio de día y noche (DNL, por sus siglas en inglés) de 65 decibeles (dB) y más. Los NEM se presentarán a la FAA para su revisión y aceptación. Se crearán mapas adicionales únicamente para propósitos informativos a fin de indicar los contornos existentes y futuros de DNL de 55 dB. Estos mapas no se incluirán en la presentación formal del NEM a la FAA.

Después de que se completen los NEM de TEB, la Autoridad Portuaria y sus consultores examinarán las posibles medidas para reducir al mínimo el efecto del ruido de TEB. La Autoridad Portuaria considerará una variedad de medidas factibles de mitigación, incluyendo medidas operativas, remediadoras, preventivas y administrativas. Las medidas que provean el mayor potencial para minimizar los efectos del ruido de operaciones de aviación en TEB se enviarán a la FAA para su revisión y aprobación. Ciertas medidas podrán requerir la implementación de fondos de la FAA (por ejemplo, aislamiento de sonido). Sólo las medidas aprobadas por la FAA serán elegibles para fondos federales.

¿Cuánto tardará en completarse el Estudio 14 CFR Parte 150 de TEB?
La duración de los Estudios 14 CFR Parte 150 varía dependiendo de un número de factores, entre ellos: la complejidad de las operaciones del aeropuerto y del espacio aéreo local, la disponibilidad de datos, el proceso de alcance del público y los períodos de revisión de la agencia. La duración estimada del Estudio 14 CFR Parte 150 de TEB es aproximadamente de tres a cuatro años. La Autoridad Portuaria está comprometida en dedicar el tiempo necesario para proveer a la FAA con NEM y un NCP para TEB que cumplan con los requisitos de 14 CFR Parte 150.

¿Dónde puedo obtener más información?
Información general, informes del proyecto y materiales de talleres públicos, incluyendo presentaciones, se subirán a la página Web: http://panynjpart150.com/TEB_homepage.asp, conforme estén disponibles.

¿Cómo puedo participar?
14 CFR Parte 150 anima la participación de los ciudadanos y agencias públicas. La Autoridad Portuaria organizará varios talleres informativos públicos durante el proceso del Estudio 14 CFR Parte 150. Este taller informativo público se lleva a cabo para introducir el Estudio 14 CFR Parte 150 de TEB. Anticipamos que el segundo taller informativo público se llevará a cabo la próxima primavera para presentar los hallazgos del estudio.

A la Autoridad Portuaria le interesa escuchar su opinión si le preocupa el ruido de las aeronaves. Para presentar una queja de ruido de aviones, comuníquese a la línea telefónica para quejas de ruido de aeropuertos al 1-800-225-1071. Puede presentar sus comentarios referentes al Estudio 14 CFR Parte 150 de TEB en el taller público o (1) por vía electrónica a NJPART150@panynj.gov o (2) por correo dirigiéndose a siguiente dirección de la Autoridad Portuaria:

14 CFR Part 150 Study
Attn: New Jersey Part 150 Project Manager
Aviation Department
The Port Authority of New York & New Jersey
4 World Trade Center
150 Greenwich Street – 18th Floor
New York, NY 10006

THE PORT AUTHORITY OF NY & NJ

Holiday Inn Hasbrouck Heights
Aeropuerto Teterboro

Bienvenido al Taller informativo público para el Estudio 14 CFR Parte 150 del Aeropuerto TEB

La reunión es al estilo “Casa Abierta” con diversas estaciones con información del estudio disponible para revisión. Los miembros del Estudio HMMH y los representantes de la Autoridad Portuaria están disponibles para hablar personalmente con el público y responder preguntas sobre los materiales ubicados en cada estación.

Registración	Bienvenida
Estación 1	Descripción General de CFR Parte 150
Estación 2	Funciones y Responsabilidades de CFR Parte 150
Estación 3	TEB Parte 150 Proceso, Horario, y Área de Estudio
Estación 4	Terminología de Ruido para CFR Parte 150
Estación 5	Descripción General de Modelada de Ruido
Estación 6	Aeropuerto TEB Descripción General
Estación 7	Autoridad Portuaria Información, Contactos, and Sitio Web
Estación 8	Comentarios Público

Ver diseño de estaciónes al reverso ▶

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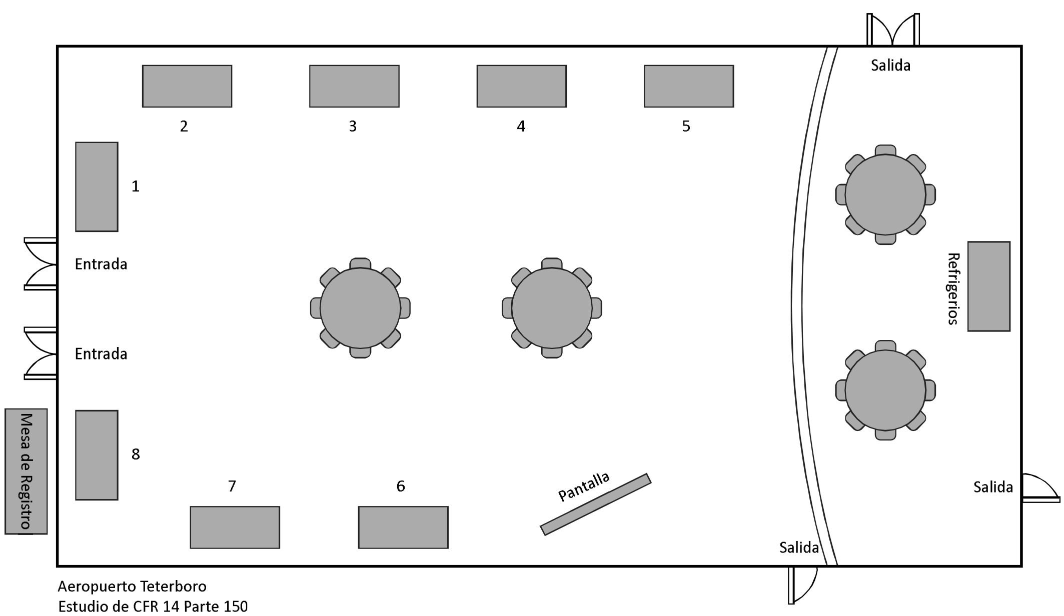
Holiday Inn Hasbrouck Heights
Aeropuerto Teterboro



Aeropuerto Teterboro
Estudio de CFR 14 Parte 150
Taller Informativo Público 1
15 de octubre de 2015

Ver lista de estaciones al reverso ▶

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테터보로 공항
미국연방규정집 제14권 제150부에 대한 연구

미국연방규정집 제14권 제150부에 대한 연구란 무엇입니까?
연방항공청(FAA)은 1985년 1월에 미국연방규정집(CFR) 제14권 제150부에 해당하는 공항소음방지계획을 최종 규정으로서 발표한 바 있습니다. CFR 제14권 제150부는 항공기 소음노출지도를 작성하고 공항/공항환경 토지이용 적합구역 프로그램을 개발할 때 따라야 할 방법론 및 절차를 규정합니다.

CFR 제14권 제150부 연구는 보통 다음 2가지 주요 요소로 구성됩니다. (1) 소음노출지도(NEM) 보고서- 공항/공항소음노출의 기존 및 향후 5년 예상 패턴에 관한 상세 정보 수록.(2) 공항소음방지 프로그램(NCP) – 공항에 적용 가능한 소음저감 및 소음경감 옵션/프로그램에 대한 설명 및 평가 포함.

테터보로 공항(TEB)에 대해 CFR 제14권 제150부 연구가 마련되었습니까?
Port Authority of New York and New Jersey는 테터보로 공항에서 운항하는 항공기로부터의 소음 노출에 오랜 기간 동안 대처하여 왔으나, 이 공항에 대해 CFR 제14권 제150부 연구를 실시한 것은 이번이 처음입니다. 또한 Port Authority는 테터보로 공항에 대한 CFR 제14권 제150부 연구와 함께 뉴욕 리버티 국제공항(EWR), 존 F. 케네디 국제공항(JFK), 라구아디아 공항(LGA)에 대한 CFR 제14권 제150부 연구도 동시에 준비하고 있습니다.

Port Authority가 테터보로 공항에 대해 CFR 제14권 제150부 연구를 수행하는 이유는 무엇입니까?
항공기 소음에 관한 지역사회의 우려가 높아지는 데 대응하고자 크리스티 주지사는
Port Authority에 테터보로 공항과 뉴왁 리버티 국제공항에 대한 CFR 제14권 제150부 연구 수행을 지시했습니다. 또한 크리스티 주지사는 소음의 영향을 받고 있는 지역사회와 허심탄회하고 폭넓게 대화를 나누는 한편 당면한 문제에 더 잘 대처할 수 있도록 소음 연구를 수행할 것을 Port Authority에 지시했습니다. Port Authority 항공부문 이사인 Thomas Bosco는 "우리는 소속 공항이 위치한 지역사회에 폐를 끼치지 않도록 최선을 다해야 함을 잘 알고 있습니다."라고 이야기합니다. 그리고 "연방항공청과 함께 소음 경감을 위해 실행 가능한 방법을 찾도록 할 것입니다."라고 덧붙였습니다.

테터보로 공항에 대한 CFR 제14권 제150부 연구에서는 상당히 높은 수준의 공항 소음 노출에 적합하지 않은 지역을 파악한 후 이들 지역이 받는 항공기 소음의 영향을 경감해 줄 최대한 이용 가능한 방안을 권고할 것입니다.

Port Authority는 테터보로 공항에 대한 CFR 제14권 제150부 연구 기간 중에 어떤 결과물을 산출하게 됩니까?
CFR 제14권 제150부 연구는 동 규정에 명시된 지침에 따라 이루어집니다. 연방항공청은 소음노출지도 및 공항소음방지 프로그램이 CFR 제14권 제150부를 반드시 준수할 수 있도록 이에 대한 체크리스트를 마련했습니다. CFR 제14권 제150부 연구의 일환으로 Port Authority와 자문기관에서 테터보로 공항 인근의 항공기 소음 노출에 대한 기존(2016년) 및 향후 예상(2021년) 수준을 수치적으로 산출할 것입니다. 또한 Port Authority는 항공기 소음 노출의 기존 및 향후 예상 수준을 산출하는 프로세스에 대한 근거 문서를 작성할 것입니다. Port Authority는 테터보로 공항의 소음노출지도 보고서를 통해 주간-야간 평균 소음 수준(DNL) 65데시벨(dB) 이상에 노출된 지역을 표시한 소음노출지도 세트를 제공할 것입니다. 그리고 이 지도 세트를 연방항공청에 제출하여 검토 및 수락을 받을 예정입니다. 그 외 지도들은 기존 및 향후 예상 주간-야간 평균 소음 수준 55데시벨(dB) 등고선을 보여 주는 정보제공용으로 작성되었습니다. 이 추가적인 지도들은 연방항공청에 정식으로 제출할 소음노출지도에는 포함되지 않습니다.

THE PORT AUTHORITY
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테터보로 공항의 소음노출지도가 완성되면 Port Authority와 자문기관에서 테터보로 공항의 소음 영향을 최소화할 잠재적인 방안들을 검토할 것입니다. Port Authority는 운영, 시정, 예방, 행정 차원의 방안 등 실행 가능한 다양한 소음 경감 방안을 고려할 것입니다. 이 가운데 테터보로 공항의 항공기 운항에서 비롯되는 소음의 영향을 가장 효과적으로 최소화할 것으로 보이는 방안을 연방항공청에 제출하여 검토 및 수락을 받을 예정입니다. 방음 시설을 비롯한 일부 방안의 경우, 실행하려면 연방항공청으로부터 재원을 조달받아야 할 수 있습니다. 연방항공청의 승인을 받은 방안에 한해 연방 차원의 재원을 조달받을 자격이 주어집니다.

테터보로 공항에 대한 CFR 제14권 제150부 연구를 완료하려면 얼마나 걸립니까?
CFR 제14권 제150부 연구는 여러 요인에 따라 기간이 달라집니다. 공항 운영 및 해당지역 공역의 복잡성 정도, 데이터 유무, 공공 홍보 프로세스, 기관 검토 기간 등이 그러한 요인에 포함됩니다. 테터보로 공항에 대한 CFR 제14권 제150부 연구 기간은 약 3~4년이 될 것입니다. Port Authority는 CFR 제14권 제150부의 요건을 충족하는 소음노출지도 및 공항소음방지 프로그램을 충분한 시간을 들여 작성하여 연방항공청에 제출하고자 합니다.

어디에서 자세한 정보를 얻을 수 있습니까?
일반 정보, 프로젝트 보고서, 공공 워크숍 자료(프레젠테이션 보드 포함)가 마련되는 대로 웹사이트 http://panynjpart150.com/TEB_homepage.asp에 업로드될 예정입니다.

어떻게 하면 참여할 수 있습니까?
CFR 제14권 제150부는 시민 및 공공기관의 참여를 적극 권장합니다. Port Authority는 CFR 제14권 제150부 연구 기간 동안 공공 정보 워크숍을 여러 차례 개최할 예정입니다. 이번 공공 정보 워크숍에서는 테터보로 공항에 대한 CFR 제14권 제150부 연구를 소개합니다. 내년 봄에 개최되는 두 번째 공공 정보 워크숍에서는 연구를 통해 발견한 핵심 내용을 알려 드릴 것입니다.

Port Authority는 항공기 소음 문제를 겪으시는 주민분들의 고충을 듣고자 합니다. 항공기 소음으로 인한 고충을 접수하려면 공항소음으로 인한 고충 신고 핫라인 전화 1-800-225-1071로 연락하시기 바랍니다. 테터보로 공항에 대한 CFR 제14권 제150부
연구에 대해 의견을 알려 주시려면 (1) 이메일 NJPART150@panynj.gov 또는 (2) Port Authority에 아래 주소로 관련 내용을 보내 주시기 바랍니다:

14 CFR Part 150 Study
Attn: New Jersey Part 150 Project Manager
Aviation Department
The Port Authority of New York & New Jersey
4 World Trade Center
150 Greenwich Street – 18th Floor
New York, NY 10006

THE PORT AUTHORITY OF NY & NJ

Holiday Inn Hasbrouck Heights
테터보로 공항

테터보로 공항에 대한 **CFR** 제**14**권 제**150**부 연구를 위한 공공 정보 워크숍에 오신 것을 환영합니다

이 회의는 부스별로 자유롭게 연구 정보를 찾아볼 수 있는 '오픈 하우스' 형식으로 진행됩니다. HMMH 연구팀 및 Port Authority 담당자들이 참석자들과 일대일로 상담하고 부스별 진시 자료에 관한 질문에 답변해 드립니다.

참가 등록	환영
제1부스	CFR 제150부 개관
제2부스	CFR 제150부 역할 및 책임
제3부스	테터보로 공항 제150부 연구 절차, 일정, 분야
제4부스	CFR 제150부 소음 관련 용어
제5부스	소음 모델링 개관
제6부스	테터보로 공항/공항 개관
제7부스	Port Authority 정보, 연락처, 웹 사이트
제8부스	주민 의견

부스 위치도는 뒷면에 나와 있습니다. ▶

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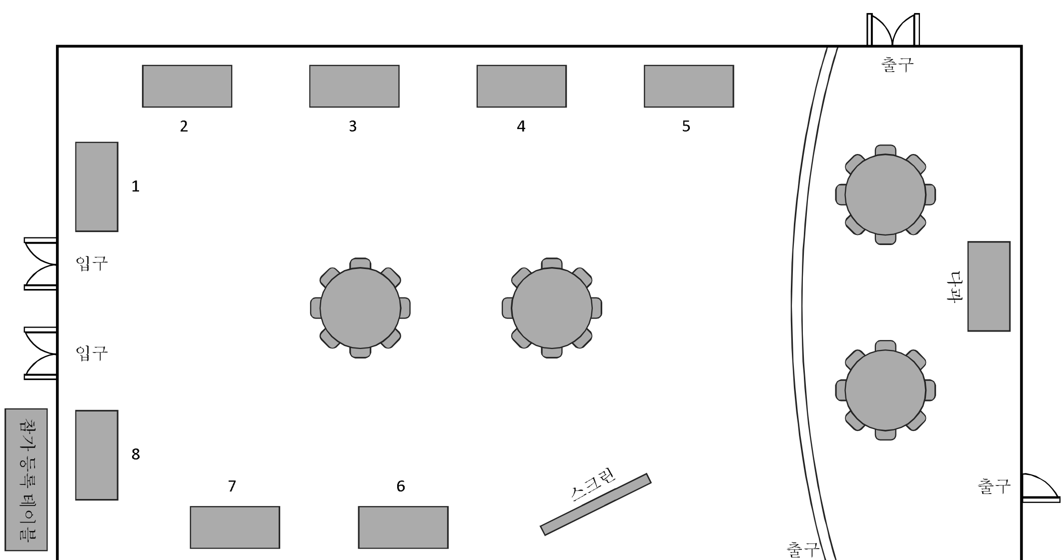
Holiday Inn Hasbrouck Heights
테터보로 공항



테터보로 공항
CFR 제14권 제150부 연구
제1회 공공 정보 워크숍
2015년 10월 15일 목요일

부스 목록은 뒷면에 나와 있습니다.▶

THE PORT AUTHORITY OF NY & NJ

14 CFR Part 150 Airport Noise Compatibility Planning Study: Teterboro Airport (TEB)

For project information, please see our website at:
PANYNJpart150.com

To submit a formal comment, please email or call us at:
NJPart150@panynj.gov
(212) 435-3777

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14 CFR Part 150 Study
Teterboro Airport
Public Information Workshop #1
October 15, 2015

Comment Form

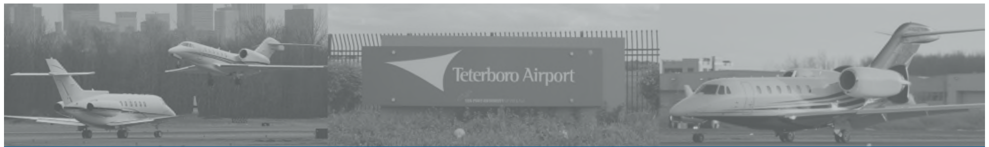
Please use the space below to provide your questions and comments regarding the 14 CFR Part 150 Study for Teterboro Airport. Your comments and/or questions will be reviewed and considered during the Study. Your participation in the process is appreciated. If you wish to receive future project updates, please provide your contact information below.

Name: Organization:

Street Address: City: State: Zip:

Tel: Email:

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information (PIP) in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask in your comment to withhold from public review your personal identifying information, that cannot be guaranteed.



Teterboro Airport Public Workshop

You are invited to attend

As part of an on-going **Part 150 Airport Noise Compatibility Planning Study**, the Port Authority of New York and New Jersey (PANYNJ) is hosting a **public workshop** to gather input on potential approaches to addressing noise levels created by aircraft operations around Teterboro Airport (TEB).

At this workshop, a Noise Exposure Map (NEM) will be presented that describes the airport layout and related levels of noise exposure in the surrounding area for the current year (2016), and a forecasted future year (2021).

This workshop gives you the opportunity to share your concerns and ideas for addressing aircraft noise around TEB. Please join the discussion and tell us what is important to you! Let's work together to address aircraft noise issues at Teterboro Airport.

	Thursday, September 22nd, 2016
	6:00 pm - 9:00 pm
	Bergen County Plaza **1st Floor, Multi-purpose Room** **One Bergen County Plaza** **Hackensack, NJ 07601**
P	**Parking lot entrance for visitors is between One Bergen County Plaza and the Justice Center, off Hudson Street**
	NJ Transit #76 #165 #712 #772 #780
	Pascack Valley Line to Essex Street / Hackensack

Workshop Format

Open House

Please arrive anytime between **6:00 pm - 9:00 pm** to view project materials and talk to PANYNJ Staff and members of the Study Team.

Light refreshments will be available.

The Part 150 public information workshop is accessible to people who are mobility impaired. Language interpretation services are available upon advance request. To make arrangements for such services please contact the PANYNJ Noise Office at **212-435-3880** or via email at **NJPART150@panynj.gov** no later than **3 days** before the workshop.

Want to find out more information or get involved?
Please visit: http://panynjpart150.com/TEB_homepage.asp

Can't attend the workshop but want to provide input?
Please email: NJPart150@panynj.gov
Or call: 212-435-3777

Questions about the workshop?
Contact the PANYNJ Noise Office
Please email: NJPart150@panynj.gov
Or call: 212-435-3777

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Let's work together to address noise issues at Teterboro Airport

Tell us what is important to you!

As part of an on-going ***Part 150 Airport Noise Compatibility Planning Study***, the Port Authority of New York and New Jersey (PANYNJ) is hosting a **public workshop** to gather input on potential approaches to addressing airport noise around Teterboro Airport (TEB).

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	Bergen County Plaza **1st Floor, Multi-purpose Room** **One Bergen County Plaza** **Hackensack, NJ 07601**
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Workshop Format

Open House

Please arrive anytime between **6:00 pm - 9:00 pm** to view project materials and talk to PANYNJ Staff and members of the Study Team.

Light refreshments and activities for children will be available.

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Or call: 212-435-3777

Questions about the workshop?
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Please email: NJPart150@panynj.gov
Or call: 212-435-3880

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Multi-purpose Room, Bergen County Complex

Welcome to the Public Information Workshop for the TEB Airport 14 CFR Part 150 Study

The meeting is designed as an "open house" with various stations with study information available for review. Members of the HMMH Study Team and Port Authority Representatives are available for one-on-one discussion and to answer questions regarding the materials located at each station.

Sign-in	Welcome
Station #1	14 CFR Part 150 Overview and Process
Station #2	TEB Part 150 Forecast
Station #3	TEB Part 150 Land Use Map
Station #4	TEB Part 150 Noise Exposure Map (NEM)
Station #5	"Where's My House?"
Station #6	Port Authority Flight Tracking and Noise Information System
Station #7	Next Steps/Public Comments/Documents

See reverse for station layout ▶

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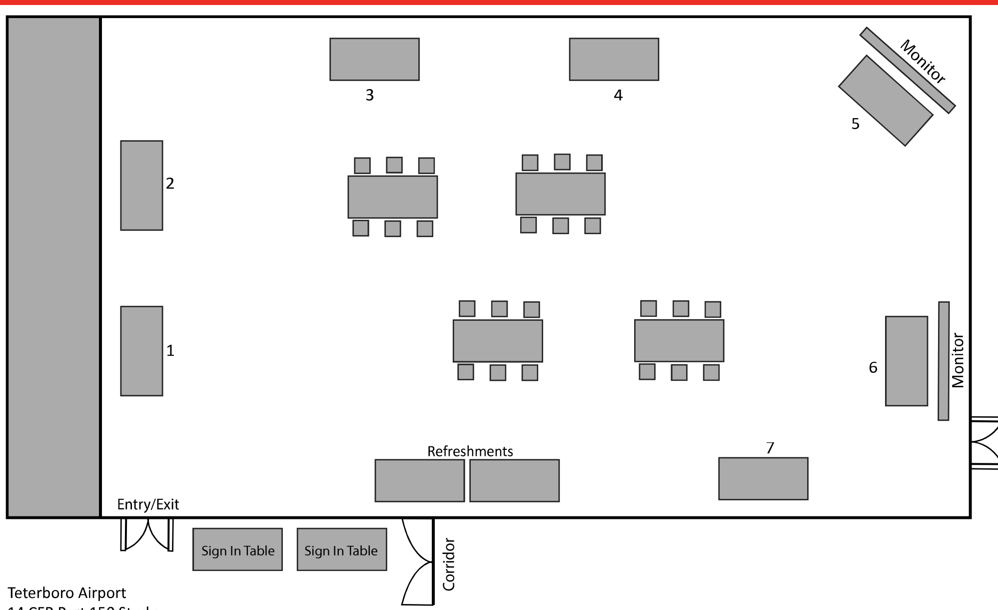
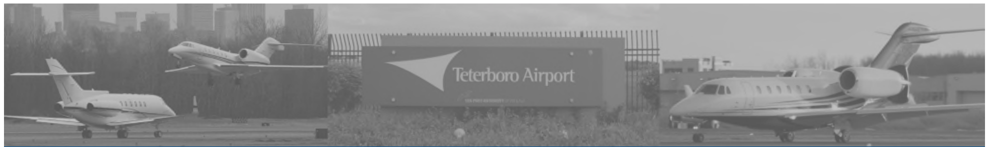
Multi-purpose Room, Bergen County Complex



Teterboro Airport
14 CFR Part 150 Study
Public Information Workshop #2
September 22, 2016

See reverse for station list ▶



Teterboro Airport Public Workshop

You are invited to attend

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6:00 pm - 9:00 pm
Bergen County Plaza **1st Floor, Multi-purpose Room** **One Bergen County Plaza** **Hackensack, NJ 07601**
Parking lot entrance for visitors is between One Bergen County Plaza and the Justice Center, off Hudson Street
NJ Transit #76 #165 #712 #772 #780
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Workshop Format

Open House

Please arrive anytime between **6:00 pm - 9:00 pm** to view project materials and talk to PANYNJ Staff and members of the Study Team.

Light refreshments will be available.

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Can't attend the workshop but want to provide input?
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Or call: 212-435-3777

Questions about the workshop?
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Please email: NJPart150@panynj.gov
Or call: 212-435-3777

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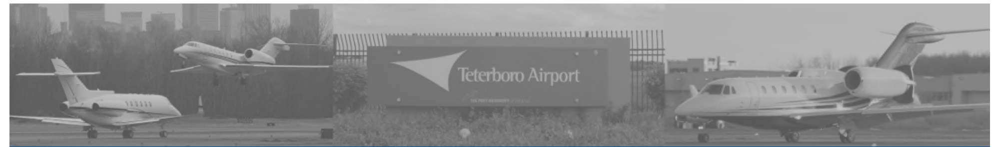

Taller público sobre el Aeropuerto Teterboro

Lo invitamos

Como parte de un **Estudio continuo de planificación de compatibilidad de ruido de aeropuertos Parte 150**, la Autoridad Portuaria de Nueva York y Nueva Jersey (The Port Authority of New York & New Jersey, PANYNJ, por sus siglas en inglés) llevará a cabo un taller público para obtener información sobre posibles enfoques sobre cómo abordar los niveles de ruido creados por las operaciones de aviación en los alrededores del Aeropuerto Teterboro (TEB).

En este taller se presentará un Mapa de Exposición al Ruido (NEM, por sus siglas en inglés) que describe la distribución del aeropuerto y los niveles relacionados con la exposición al ruido en el área vecina para el año actual (2016) y un año futuro pronosticado (2021).

Este taller la ofrece la oportunidad de compartir su opinión e ideas para lidiar con el ruido de aviones en los alrededores de TEB. ¡Participe en el debate y díganos qué es importante para usted! Trabajemos juntos para abordar los problemas de ruido de aviones en el Aeropuerto Teterboro.

Jueves 22 de septiembre de 2016
6:00 a 9:00 p.m.
Bergen County Plaza **1er Piso, Sala Multipropósitos** **One Bergen County Plaza** **Hackensack, NJ 07601**
La entrada al estacionamiento de visitantes se encuentra entre One Bergen County Plaza y el Centro de Justicia, desde Hudson Street.
NJ Transit #76 #165 #712 #772 #780
Línea de Pascack Valley a Essex Street/Hackensack

Formato del taller

Open House

Por favor asista entre **6:00 y 9:00** p.m. para ver los materiales del proyecto y hablar con el personal de PANYNJ y los miembros del Equipo del estudio.

Habrá refrigerios ligeros.

Los talleres informativos públicos de la Parte 150 tienen accesibilidad para personas con problemas de movilidad. Hay disponibles servicios de interpretación de idiomas con previa solicitud. Para hacer arreglos para dichos servicios, sírvase comunicarse a la Oficina de Ruido al ***212-435-3777*** o por correo electrónico a ***NJPART150@panynj.gov*** a más tardar **3 días** antes del taller.

¿Quiere obtener más información o participar?
Visite: http://panynjpart150.com/TEB_homepage.asp

¿No puede asistir al taller pero quiere colaborar con su opinión?
Envíe un mensaje a: NJPart150@panynj.gov
O llame al: 212-435-3777

¿Tiene preguntas sobre el taller?
Comuníquese a la Oficina de Ruido de PANYNJ
Envíe un mensaje a: NJPart150@panynj.gov
O llame al: 212-435-3777

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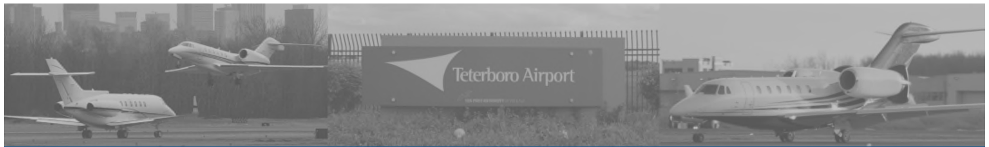

테터보로 공항(TEB) 공공 워크숍

여러분을 초대합니다

Port Authority of New York and New Jersey (PANYNJ)는 현재 진행 중인 Part 150 테터보로(TEB) 소음방지계획 연구의 일환으로 공공 워크숍을 개최하고 있습니다. 이 워크숍은 테터보로 공항(TEB)에서의 항공기 운항에 따른 소음 문제를 해결할 방안을 모색하고자 의견을 취합하는 자리가 될 것입니다.

이 워크숍에서는 공항 배치도를 기준으로 금년(2016년)과 향후(2021년)에 위치별 소음 노출도가 각각 어떻게 되는지를 시각화한 소음노출지도(NEM)를 보실 수 있습니다.

워크숍을 통해 테터보로 공항(TEB) 주변 소음으로 인한 우려사항 및 문제 해결 방안을 함께 논의하는 기회를 누리게 됩니다. 여러분께서 중요하게 생각하시는 문제를 다루게 될 이번 워크숍에 꼭 참석하시기 바랍니다! 테터보로 공항(TEB) 소음 문제에 대처하기 위해 다함께 힘을 모읍시다.

2016년 9월 22일 목요일

오후 6:00 ~ 오후 9:00

버겐 카운티 플라자(Bergen County Plaza)
1st Floor, Multi-purpose Room
One Bergen County Plaza
Hackensack, NJ 07601

방문객 주차장 입구는
One Bergen County Plaza와
Justice Center 사이에 있습니다.

NJ Transit #76 #165 #712 #772 #780

Pascack Valley Line의 Essex Street / Hackensack 에서 하차

워크숍 형식

오픈 하우스

오후 6:00 ~ 오후 9:00 사이에 도착하시면 언제든지 프로젝트 자료도 보고 PANYNJ 직원 및 연구팀 구성원들과 대화도 나누실 수 있습니다.

가벼운 다과가 마련됩니다.

본 Part 150 공공 정보 워크숍은 장애로 이동에 불편을 겪는 분들도 참석하실 수 있도록 편의를 제공합니다. 언어 통역 서비스를 미리 요청하시면 제공해 드립니다. 통역 서비스가 필요한 경우, 워크숍 실시일로부터 늦어도 3일 전까지 PANYNJ 소음관리국에 전화 ***212-435-3777*** 또는 이메일 ***NJPART150@panynj.gov*** 로 연락하여 요청하셔야 합니다.

자세한 정보를 알고 싶거나 직접 참여하고 싶으십니까?
다음 사이트를 방문하십시오: http://panynjpart150.com/TEB_homepage.asp

워크숍에 참석할 수는 없지만 의견을 제출하고 싶으십니까?
이메일로 보내 주십시오: NJPart150@panynj.gov
또는 전화로 알려 주십시오: 212-435-3777

워크숍에 대해 문의사항이 있으십니까?
PANYNJ 소음관리국에 문의하십시오.
이메일로 문의하십시오: NJPart150@panynj.gov
또는 전화로 문의하십시오: 212-435-3777

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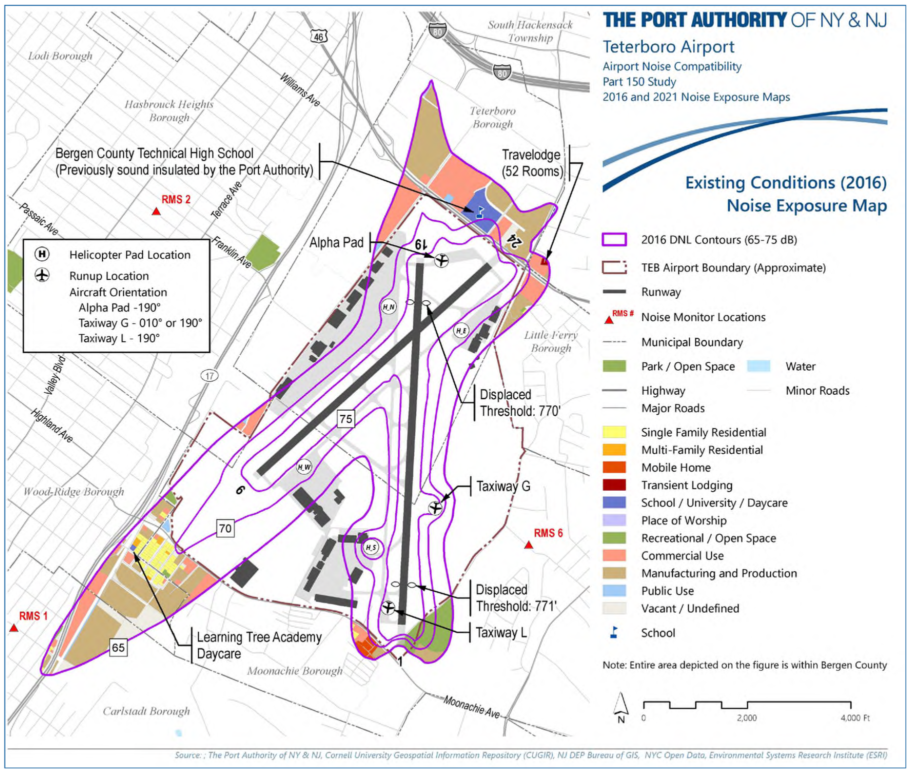
Teterboro Airport
Title 14 of the Code of Federal Regulations (14 CFR) Part 150
Airport Noise Compatibility and Planning Study

Existing Conditions (2016) Noise Exposure Map
Draft – for Preliminary Discussion Purposes Only



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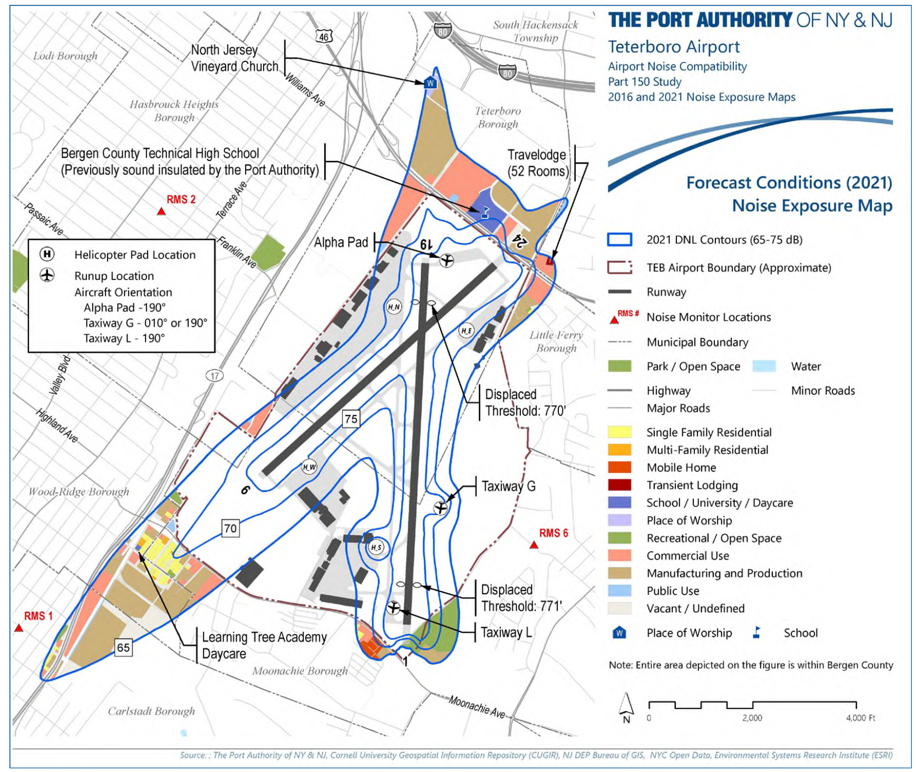
Teterboro Airport
Title 14 of the Code of Federal Regulations (14 CFR) Part 150
Airport Noise Compatibility and Planning Study

Forecast Conditions (2021) Noise Exposure Map
Draft – for Preliminary Discussion Purposes Only



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Teterboro Airport (TEB)
Title 14 Code of Federal Regulations Part 150 Study

PART 150 NOISE COMPATIBILITY STUDY BACKGROUND

Title 14 CFR Part 150, Airport Noise Compatibility Planning, was issued by the Federal Aviation Administration (FAA) as a final rule in January 1985. Part 150 describes a voluntary process airports can follow to describe current and five-year forecast airport-related noise exposure; identify areas where land uses are incompatible with that exposure; identify ways to address those incompatibilities; and otherwise seeks reasonable and practical means to reduce noise over sensitive land uses such as dwellings, schools, healthcare facilities, places of worship, and historic properties.

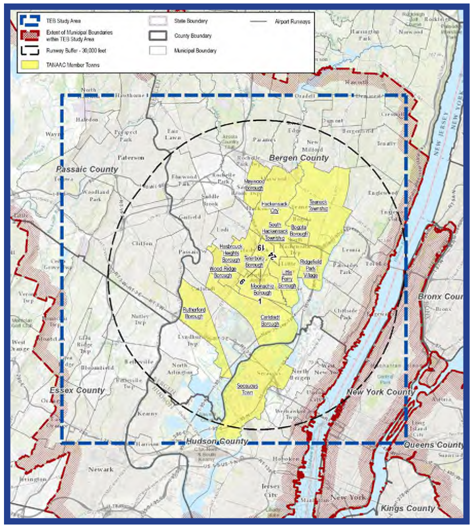
In response to growing community concerns about aircraft noise, Governor Christie directed the PANYNJ to undertake the Part 150 Study for TEB; however, the PANYNJ has a long history of addressing noise exposure from aircraft operations at the airport. The PANYNJ is also currently preparing Part 150 studies for Newark Liberty International Airport (EWR), John F. Kennedy International Airport (JFK), and LaGuardia Airport (LGA) concurrent with the TEB 14 CFR Part 150 study.

A Part 150 study has two major elements: **Noise Exposure Maps** and a **Noise Compatibility Program:**

- **The Noise Exposure Maps (NEM)** describe the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs and the resulting noise/land use compatibility situation, for existing (2016) and five-year forecast conditions (2021).

- **The Noise Compatibility Program (NCP)** identifies and supports a collection of proposed actions that the airport, local jurisdictions, airport users, and other stakeholders can take to minimize noise issues. The NCP development process involves working with stakeholders on policies and procedures to include in the program.

Both the NEM and the NCP must be accepted by the FAA as being compliant with the Part 150 regulations. Once the FAA has accepted the NEM and the NCP as compliant, the FAA will then approve or disapprove each individual element of the NCP proposal.



The TEB Part 150 Study Area identifies the outer limit for data collection, analyses, public outreach, and other study initiatives. It extends significantly beyond the area required by the Part 150 regulation and associated FAA guidelines, and encompasses all of the 14 municipalities that make up the Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC).

PART 150 STUDY TEAM AND TECHNICAL ADVISORY COMMITTEE

The PANYNJ has hired a team of experienced noise consultants (HMMH) to conduct the TEB Part 150 Study. A Technical Advisory Committee (TAC), representing a full-range of airport operation, business, and county and municipal stakeholders will provide oversight and guidance as well as assist with public outreach.

Experience has shown that most 14 CFR Part 150 Noise Studies benefit from the creation and participation of a TAC. The TAC serves several important functions including: representing a broader range of stakeholder groups in the study; receiving information about the study and sharing it with their respective organization; and providing technical input and guidance to the study and the Study Team. The PANYNJ has invited a diverse group of stakeholders to be on the TEB TAC including:

- Community representatives: members of the Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC) and the Newark Airport Community Roundtable
- Airport Management and Fixed Based Operators: AvPorts, Atlantic Aviation, Landmark Aviation, Meridian Teterboro, Signature Flight Support, Jet Aviation
- Pilots/Airport Users: Teterboro Users Group, Aircraft Owners and Pilots Association
- Business organizations: National Business Aviation Association, Aviation Development Council
- Local and regional land use planners: Bergen County, New Jersey Sports and Exposition Authority (formerly Meadowlands Commission)
- Federal Aviation Administration (FAA):Local and District Offices, Tower Operations, Air Traffic

All TAC meetings are open to the public. The TEB TAC has met 8 times since July 2015 and has discussed topics such as the Part 150 Study Process, aircraft noise terminology, technical data needed for the noise model, land uses within the noise contours, as well as preliminary approaches and strategies for reducing aircraft noise exposure. It is important to note, however that the role of the TAC is advisory; the TAC may offer opinions, advice and guidance on the Part 150 Study, but the PANYNJ has the sole discretion to accept or reject the TAC recommendations in accordance with 14 CFR Part 150 regulations.

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TEB PART 150 STUDY PROCESS AND SCHEDULE

STUDY PROCESS

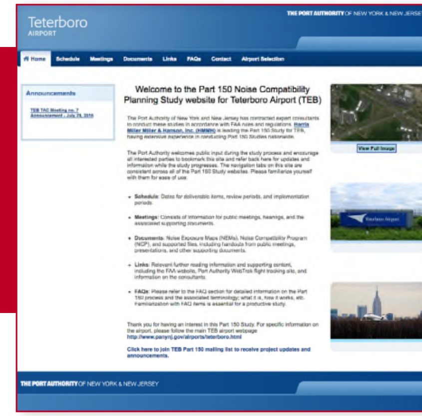
Develop Study Protocol	Verification	Develop NEMs	Develop NCPs
✓Finalize methodology ✓Establish TAC ✓Develop project schedule and milestones	✓Existing Noise Exposure Maps & EA's ✓Noise complaint data ✓GIS and land use data ✓Flight track and noise data from ANOMS ✓FAA activity forecasts	✓Develop noise contours for existing and 5-year forecast conditions ✓Collect land use data and policies ✓Noise impact evaluation for DNL 65-75 dB ✓Prepare maps in accordance with 14 CFR Part 150	▪ Identify land use strategies ▪ Evaluate noise abatement measures ▪ Develop Noise Compatibility Plan ▪ Prepare documentation
Task Status: Complete	Task Status: Complete	Task Status: Complete	Scheduled to begin Late 2016

The TEB Part 150 Study was initiated by PANYNJ in early 2015. This graphic shows the key elements of the TEB Part 150 Study and the tasks to be completed under each. The Noise Compatibility Program (NCP) is scheduled to begin in late 2016; the Draft NCP is expected to be submitted.

Part 150 Studies vary in duration depending on a number of factors including, but not limited to, the complexity of the airport operations and local airspace, availability of data, the public outreach process, and agency review periods. The estimated duration of the TEB Part 150 Study is approximately three to four years. The PANYNJ is committed to taking the time required to provide the FAA with NEMs and an NCP for TEB that meet requirements of 14 CFR Part 150.

To date, much of the focus of the TEB Part 150 Study has been on the collection and verification of data and the development of the Noise Exposure Maps (NEM). Two NEMs will be developed for the Part 150 Study: a 2016 map showing existing conditions, and a 2021 map showing future conditions. Runway use and flight track information is based on the full year 2014 data. The Study Team worked closely with the FAA and the PANYNJ to collect and review runway usage data and to develop flight tracks which most accurately represent how aircraft are currently flown at TEB. Per the Part 150 regulations, the Study Team also developed a five-year forecast for conditions at TEB for the year 2021, which will account for the types and number of aircraft that are expected to be flown at TEB and any changes to the airspace around TEB that would affect where aircraft are flown in the future. All of this information was used to develop the noise contours for the NEM. The Draft NEM will be sent to FAA for review in the summer of 2016. After approval of the NEMs, the Study Team, in coordination with the PANYNJ and the TAC, will begin to develop the NCP, which will identify specific approaches and strategies to reduce noise exposure to identified incompatible land uses.

PUBLIC OUTREACH



14 CFR Part 150 encourages the participation of citizens and public agencies. The PANYNJ is undertaking several measures to make sure the public is kept informed of project activities:

- **TEB Part 150 Study Website:**
  http://panynjpart150.com/TEB_homepage.asp is updated regularly with project documents, meeting announcements, and other general information about the study. Members of the public can register here to join the mailing list and receive project updates.
- **Public Workshops:**
  PANYNJ is interested in obtaining public input on the study and will therefore be conducting several public workshops over the course of the project. The first workshop for the TEB Part 150 Study was held in October 2015 to introduce 14 CFR Part 150 to the public. The second TEB Part 150 public workshop is being held on **Thursday, September 22, 2016 in the Multi-purpose Room of the Bergen County Complex (One Bergen County Plaza, Hacksensack, NJ) from 6 p.m. to 9 p.m.**
- **Project Newsletters:**
  The PANYNJ publishes quarterly newsletters containing the latest information about the project. All newsletters can be found on the project web site **http://panynjpart150.com/TEB_homepage.asp.**
- **TEB TAC Meetings:**
  All TAC meetings are open to the public. The TEB TAC has scheduled two meetings over the next three months: **Friday, September 23, 2016 at 9 a.m.** and **Thursday, November, 17, 2016 at 1 p.m.;** all meetings are held in the Manager's Conference Room at TEB (90 Moonachie Avenue, Teterboro, NJ). Members of the public are encouraged to attend these meetings to learn more about the Part 150 process and aircraft noise in general. Opportunities for public comment are provided at all meetings. More information about the TEB TAC including meeting announcements, presentations, and meeting summaries can be viewed and downloaded from the project web site at **http://panynjpart150.com/TEB_TAC.asp.**
- To make comments, give feedback, or ask questions regarding the TEB Part 150 Study, please call **(212) 435-3777** or email **NJPart150@panynj.gov.**
- To file an aircraft noise complaint, please call the noise complaint hotline at **1-800-225-1071.**

NEXT STEPS/NCP STRATEGY DEVELOPMENT

After the approval of the NEMs by the FAA later this year, the PANYNJ, in coordination with the TAC, will begin to develop the NCP. The goal of the NCP is to reduce noise levels so that they are compatible with surrounding land uses. Over the next year the following process will be applied to determine feasible approaches for reducing and mitigating airport noise at TEB:

Noise Compatibility Program Development Process

Step 1: Identify Incompatible Land Uses
Existing conditions Noise Exposure Map
Forecast conditions Noise Exposure Map

Step 2: Consider Noise Abatement Strategies
Reduce exposure over incompatible uses
Limit growth in exposure over incompatible uses

Step 3: Consider Land Use Strategies
Mitigate residual incompatible uses
Prevent introduction of new incompatible uses

Step 4: Consider Programmatic Strategies
Implement and ***promote*** measures
Monitor and ***report*** on effectiveness
Update NEMs and ***revise*** NCP as appropriate

Analysis and Selection Process Applied in Steps 2 - 4
- Evaluate effectiveness of each measure in addressing ***objectives***
- Evaluate feasibility (operational, safety, economic, etc.)
- Select preferred "package" of measures
- Identify implementation schedule, responsibilities, budget, funding sources, etc.
- If not recommended, document reasons

The NCP strategies will fall into three categories: noise abatement strategies, land use strategies, and programmatic strategies. Potential strategy options that could be recommended in the NCP include:

Major NCP Strategy Options within Each Category

Noise Abatement Strategies
- Noise abatement flight tracks
- Preferential runway use
- Arrival/departure procedures
- Airport layout modifications
- Noise barriers
- Runup enclosures
- Use restrictions
- Other actions proposed by stakeholders

Land Use Strategies
- Mitigation
  - Land acquisition
  - Sound insulation
  - Avigation easements
- Prevention
  - Land use controls
  - Zoning
  - Building codes
  - Comprehensive plans
  - Real estate disclosures
- Other actions proposed by stakeholders

Programmatic Strategies
- Implementation tools (rules, regulations, ordinances, etc.)
- Promotion, education, signage, etc.
- Monitoring
- Reporting
- NEM updating
- NCP revision
- Other actions proposed by stakeholders

The Draft NCP is expected to be submitted to the FAA for review and approval in late 2017. TAC and public involvement will continue to be an important part of this study; therefore the PANYNJ is encouraging the continued participation of elected officials, municipal planners, and members of the public from within the affected jurisdictions.

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Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Planning Study

Public Information Workshop #1

October 15, 2015

Part 150 Overview

- Federal Aviation Administration (FAA) developed the Part 150 Program in response to the federal Aviation Safety and Noise Abatement Act of 1979 ("ASNA")
- Codified under Title 14 of the Code of Federal Regulations (CFR) Part 150
  - Formal *citation* is "14 CFR Part 150," informal is "Part 150"
  - Formal *title* is "Airport Noise Compatibility Planning"
- *Voluntary* FAA-defined process for airport noise studies
  - 250+ airports have participated
- *Why do airports participate*? Primary reasons include:
  - Provides access to FAA funding of some approved measures
  - Well-established, understood, accepted, and comprehensive process

Part 150 Overview

- In response to ASNA, Part 150 prescribes standards and systems for:
  - Measuring noise
  - Estimating cumulative noise exposure using computer modeling
  - Describing noise exposure
  - coordinating with local land use agencies
  - documenting the analytical process
  - Submitting the documentation to FAA
  - FAA and public review processes
  - FAA approval or disapproval process

Part 150 Overview: Major Elements

- Two primary components
  - Noise Exposure Map (NEM)
  - Noise Compatibility Program (NCP)
- Consultation required with
  - All local, state, and federal entities with control over land use within DNL 65+ dB
  - FAA regional officials, regular aeronautical users of the airport
  - All parties interested in review of and comment on draft items
- PANYNJ will significantly exceed all "consultation" requirements
  - Improved stakeholder relations is typically one of the most valuable study results
- Opportunity must be offered for a final public hearing on the NCP
- Detailed FAA guidance at www.faa.gov/airports/environmental/airport_noise/

TEB Part 150 Study | Public Information Workshop #1

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Part 150 Overview: Noise Exposure Map

- FAA "accepts" NEM as compliant with Part 150 standards
- NEM must include detailed description of
  - Airport layout, aircraft operations, and other inputs to noise model
  - Aircraft noise exposure in terms of Day-Night Average Sound Level (DNL)
  - Land uses within DNL 65+ decibel (dB) contours
  - Noise / land use compatibility statistics within DNL 65+ dB contours
- NEM must address two calendar years
  - Year of submission
  - Forecast (at least five years from year of submission)
- FAA reviews forecasts for consistency with Terminal Area Forecast (TAF)

TEB Part 150 Study | Public Information Workshop #1

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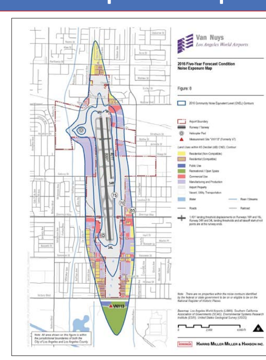
Part 150 Overview: Noise Exposure Map Example

- Van Nuys Airport (California)
  - Similar to TEB, one of three airports operated by Los Angeles World Airports (LAWA)
- NEM Major graphical components include:
  - DNL 65, 70 and 75 dB contours
  - Information detailed within the 65 dB DNL contour:
    - Generalized land use categories
    - Historic properties, schools, places of worship, health care facilities, other "discrete" sensitive uses
    - Clear identification of all noncompatible land uses
    - Jurisdiction(s) responsible for land use controls
  - Flight tracks (typically on supplemental figures)



TEB Part 150 Study | Public Information Workshop #1

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Part 150 Overview: Noise Compatibility Program

- NCP must address three major categories of proposed actions
  - Noise abatement measures
  - Compatible land use measures
  - Program implementation
- FAA *accepts* NCP for review
- FAA reviews and *approves* or *disapproves* proposals as compliant with Part 150 standards on an element-by-element basis

Part 150 Overview: Noise Compatibility Program

- Noise abatement measures can:
  - Shrink noise contours or move them away from noncompatible uses
  - Make changes to aircraft operations, airport layout, flight track and runway use, etc.
  - Note: Study will build on TEB's well-established noise abatement program
- Compatible land use measures can:
  - Address existing noncompatible uses
  - Prevent introduction of new noncompatible uses
- Program implementation includes:
  - Required actions, responsible parties, costs
  - NEM and NCP review and update processes

Roles and Responsibilities: Noise Compatibility

Defined by "FAA Noise Abatement Policy Statement" (November 1976)

- Federal Government – controls noise by regulating source emissions, managing air traffic, and providing funding and technical assistance for noise remediation projects
- State and Local Government – can affect land use near airports by zoning, planning, development, and regulation
- Aircraft operators – can affect noise generation by flight scheduling, improving fleet equipment and changing cockpit procedures
- Air travelers and shippers - bear the costs of reducing noise levels since they, by demand, generate the noise
- Current and potential residents – seek to act in an informed manner to understand the impacts of noise
- Airport operators - plan and implement noise compatibility measures

Roles and Responsibilities: Part 150 Overall

- **The Port Authority**
  - Directs study - it is the Port Authority's project
  - Submits NEM and NCP documentation to FAA
- **FAA**
  - Provides input to, reviews and assists with analysis of noise abatement flight procedures
  - "Accepts" documentation and "approves" NCP measures
  - Responsible for implementation of noise abatement flight procedures
  - Assists in funding eligible measures in all three categories
- **Local governments**
  - Provide input to recommended land use measures
  - Implement and enforce land use measures to maintain and improve noise compatibility
- **All stakeholders, including aviation interests, residents, and other interested parties**
  - Monitor study process, provide input, assist with implementation

Roles and Responsibilities: Teterboro TAC

- The Technical Advisory Committee (TAC) is advisory to the Port Authority solely for purposes of the TEB Part 150 Study, including
  - Review of study inputs, assumptions, analyses, documentation, etc.
  - Input, advice, and guidance related to NEM and NCP development
- TAC members are expected to provide two-way communication between the TAC and their organizations / constituents
- The Port Authority shall respect and consider TAC input, but must retain overall responsibility for the Part 150 Study and NCP recommendations
- The TAC and Port Authority recognize FAA is responsible for accepting NEM and NCP submissions and for approving NCP proposals

Roles and Responsibilities: TEB TAC Makeup

- TAC composed of stakeholders representing all significant interests
  - Key agencies; e.g., Port Authority, FAA, AvPORTS
  - Local land use jurisdictions; e.g., Bergen County
  - Airport tenants and users; e.g., fixed base operators (FBOs), NetJets, etc.
  - Aviation trade associations; e.g., National Business Aviation Association (NBAA), Aircraft Owners and Pilots Association (AOPA),
  - Established advisory bodies; e.g., Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC), Teterboro Users Group (TUG)
  - Newark/Liberty International (EWR) Noise/Community Roundtable
- Members serve on a voluntary basis without compensation

Part 150 Study Process

Develop Study Protocol
- Finalize methodology
- Establish TAC
- Develop project schedule and milestones

Verification
- Existing Noise Exposure Maps & EA's
- Noise complaint data
- GIS and land use data
- Flight track and noise data from ANOMS
- FAA activity forecasts

Develop NEMs
- Develop noise contours for existing and 5-year forecast conditions
- Collect land use data and policies
- Noise impact evaluation for DNL 65-75 dB
- Prepare maps in accordance with 14 CFR Part 150

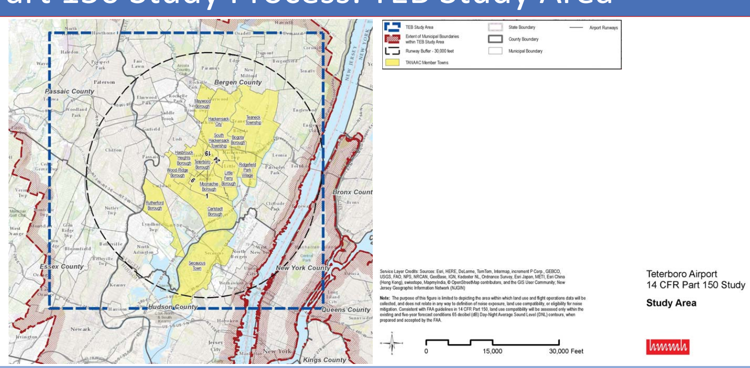
Develop NCPs
- Identify land use strategies
- Evaluate noise abatement measures
- Develop Noise Compatibility Plan
- Prepare documentation

Meetings
- Technical Advisory Committee
- Part 150 Information Sessions
- Public Meetings/Hearings
- Special Presentations

Part 150 Study Process: Anticipated Schedule

TEB Part 150 Milestone	Anticipated Date
Project initiation	February 2015
Project kickoff meeting with FAA	March 2015
Public Information Workshop – Introduce Project	October 2015
Public Information Workshop – Present Noise Exposure Map	Fall 2016
Submit Noise Exposure Map to FAA for acceptance	Late 2016
Develop preliminary noise compatibility program measures	Spring 2017
Evaluate noise compatibility program measures	Summer/Fall 2017
Finalize recommended Noise Compatibility Program	Winter 2017/2018
Public Hearing – Present Noise Compatibility Program	Spring 2018
Submit Noise Compatibility Program to FAA for approval of measures	Fall 2018

Part 150 Study Process: TEB Study Area

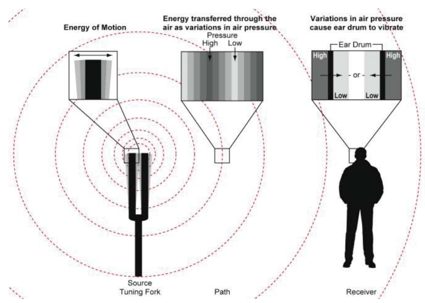


Noise Terminology

- Sound vs. noise
- The decibel scale (dB)
- The A-weighted decibel (dBA)
- Single event noise metrics - Lmax and SEL
- Cumulative exposure metric - DNL

Noise Terminology: What is "Noise"?

- Sound is pressure variation our ears can detect
  - o An objective quantity
- Noise is "unwanted sound"
  - o A subjective quantity
- We relate sound and noise by considering effects
  - o Annoyance
  - o Speech interference
  - o Sleep disruption



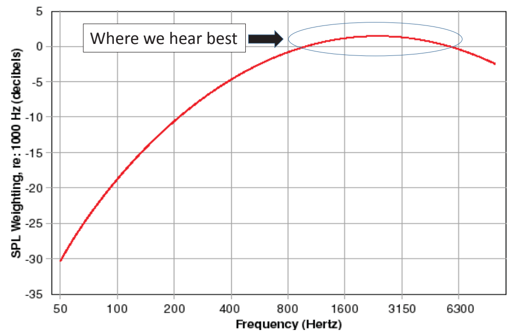
Noise Terminology: The Decibel Scale

- We use a *logarithmic* scale – *decibels, or dB* to express sound levels and noise levels
- *Why?*
  - o We hear sound pressures over a HUGE range
  - o Decibels compress this range to match the way we interpret sound pressures
    - 0 to 140 dB
    - Equates to 0.000000003 to 0.003 lbs. per sq. inch
  - o *We "hear" in decibels*

"Energy"	dB	Common sounds
100,000,000,000,000	140	Near a jet engine at start of takeoff
10,000,000,000,000	130	Threshold of pain
1,000,000,000,000	120	On stage at a loud rock concert
100,000,000,000	110	
10,000,000,000	100	Jack hammer at 6 feet
1,000,000,000	90	
100,000,000	80	Vacuum cleaner at user's ear
10,000,000	70	Vacuum cleaner at 10 feet
1,000,000	60	Normal speech
100,000	50	
10,000	40	Quiet residential area
1,000	30	
100	20	Whisper
10	10	
1	0	Threshold of hearing
0.1	-10	

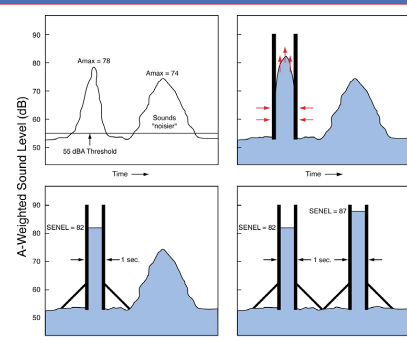
Noise Terminology: A-Weighted Sound Level

- Our ear is not equally sensitive to all frequencies
- A-weighted decibels (dBA) measure sound the way we “hear” it
- Part 150 specifies dBA metrics to describe
  - Single events
  - Cumulative exposure
- Consistent with worldwide practice



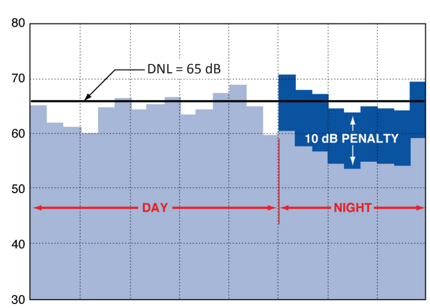
Noise Terminology: Sound Exposure Level, SEL

- Duration matters: A longer event may seem “noisier,” even if it has a lower or equal maximum level
- SEL measures the total “noisiness” of an event by taking duration into account

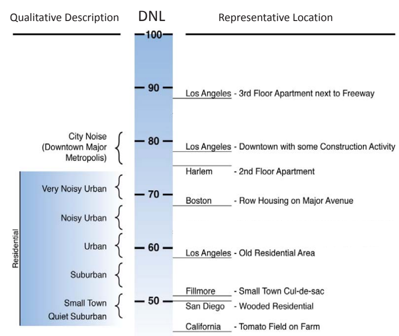


Noise Terminology: Day-Night Average Level (DNL)

- Average 24-hour exposure over the course of a year
- Noise from 10 pm to 7 am is factored up by 10 dB
  - “Penalty” is equal to counting each night aircraft 10 times
- Sometimes abbreviated Ldn
- DNL is the only measure that Part 150 requires us to consider



Noise Terminology: Typical Community DNL



Source: United States Environmental Protection Agency, Information on Levels Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. 14.

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Noise Terminology: Noise Metric Summary

- The decibel is a complex logarithmic quantity based on sound pressure
- A-weighted decibels correlate well with how we hear
- Noise levels can be expressed many ways, including but not limited to:
  - Instantaneous maximum (Lmax)
  - Single event dose (SEL)
  - Long-duration exposure (DNL)
- Best metric to use depends on purpose
- FAA requires use of DNL in a Part 150 study to evaluate compatibility
- Part 150 guidelines consider all land uses compatible below 65 dB DNL

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Noise Modeling

- We must use FAA-approved model
  - FAA’s Integrated Noise Model, Version 7.0d (INM 7.0d) was the most current when the study was initiated
- Required inputs
  - Airport layout
  - Annual average meteorological data
  - Terrain
  - Aircraft operations for 2016 and 2021 - *FAA approves*
  - “User-defined modelling inputs” for TEB-specific flight procedures - *FAA approves*
  - Runway utilization rates by aircraft categories
  - Flight track geometry and use by aircraft categories
  - Maintenance runup locations and operations

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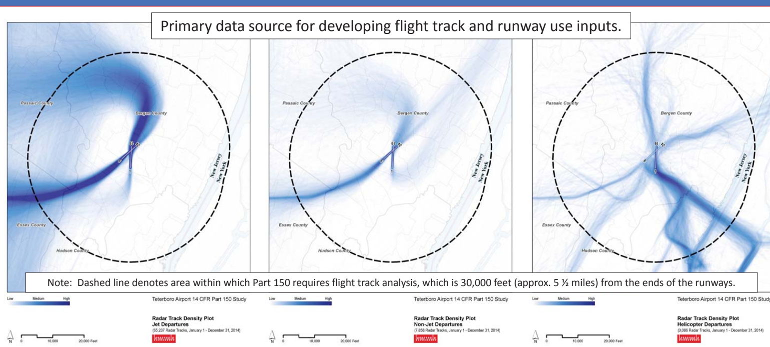
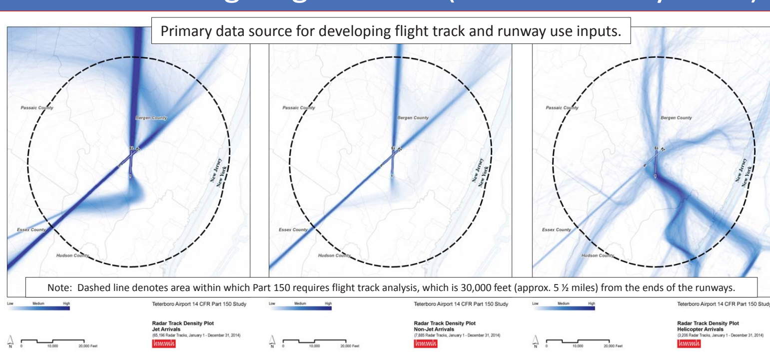
Noise Modeling: Major Data Sources

- Best available source(s) will be used for each specific category
  - *Airport layout* - PANYNJ drawing files, FAA airport diagram, EWR Airport Layout Plan (ALP)
  - *Meteorological* - NOAA National Climatic Data Center
  - *Terrain* - U.S. Geological Survey
  - *Baseline operations* - ANOMS monitoring system
  - *Forecast operations* - FAA's Terminal Area Forecast (TAF) and PANYNJ forecasts
  - *Flight tracks, profiles, and runway use* - 2014 data from ANOMS (Airport Noise & Operations Monitoring System) and FAA National Offload Program
- Data will be compared to formal and informal procedures
  - FAA Standard Instrument Departure (SID) and approach procedures (APs), etc.
  - Industry noise abatement procedures
- Modelling assumptions will be documented in detail and shared with:
  - All interested stakeholders at workshops and on website

Noise Modeling: Flight Tracks (Departure Density Plots)

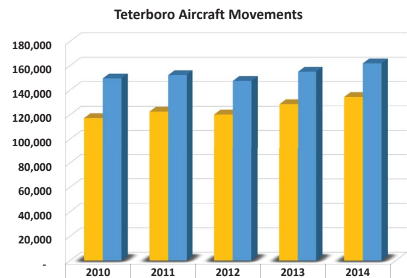


Noise Modeling: Flight Tracks (Arrival Density Plots)



Teterboro Airport Overview

- A brief history
  - PA purchased in 1949 and operated for 20 years
  - 30-year lease with Pan Am in 1969
- PANYNJ resumed airport operation in 2000
  - Operations and maintenance contract with AFCO AvPORTS, LLC
- Since 2000, $155 million spent on major projects



	2010	2011	2012	2013	2014
Jets	117,193	122,514	120,140	128,608	134,267
Total	149,530	152,247	147,476	155,032	161,842

Teterboro Airport Overview

- Existing airport facilities
  - 826 Acres
  - 5 fixed base operators
  - 6 terminals
  - 27 hangars
  - 3 fuel farms
  - 2 customs facilities
  - Engineered materials arresting systems (EMAS) on Runways 6, 19, and 24

Port Authority Project Contacts and Websites

- Timothy Middleton, Program Manager - EWR and TEB Part 150 Studies
- Adeel Yousuf, Manager – Noise Office
- Address emails to NJPart150@panynj.gov
- TEB Part 150 Website provides most relevant information
  - Will be updated regularly for public outreach purposes
  - TAC will receive direct notices
  - http://panynjpart150.com/TEB_homepage.asp
- Port Authority noise information website provides broader information
  - www.panynj.gov/airports/aircraft-noise-information

Comments

- Please submit comments in the manner that is most convenient for you
  - Fill out a comment sheet and leave it today
  - Take the sheet with you and mail or email it to the PANYNJ
  - Write a letter and mail or email it
  - Submit via the study website
- We will consider all comments, address them as appropriate, include them in the study documentation, and provide copies to the FAA
- ***Thank you for your participation!***

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Welcome!

Teterboro Airport

14 CFR Part 150 Noise Compatibility Planning Study

Public Information Workshop #2

September 22, 2016

TEB Part 150 Study | Public Information Workshop #2

THE PORT AUTHORITY OF NY & NJ

Roles and Responsibilities: Part 150 Overall

- **The Port Authority**
  - Directs study - it is the Port Authority's project
  - Submits NEM and NCP documentation to FAA
- **FAA**
  - Provides input to, reviews and assists with analysis of noise abatement flight procedures
  - "Accepts" documentation and "approves" NCP measures
  - Responsible for implementation of noise abatement flight procedures
  - Assists in funding eligible measures in all three categories
- **Local governments**
  - Provide input to recommended land use measures
  - Implement and enforce land use measures to maintain and improve noise compatibility
- **All stakeholders, including aviation interests, residents, and other interested parties**
  - Monitor study process, provide input, assist with implementation

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Roles and Responsibilities: Teterboro TAC

- The Technical Advisory Committee (TAC) is advisory to the Port Authority solely for purposes of the TEB Part 150 Study, including
  - Review of study inputs, assumptions, analyses, documentation, etc.
  - Input, advice, and guidance related to NEM and NCP development
- TAC members are expected to provide two-way communication between the TAC and their organizations / constituents
- The Port Authority shall respect and consider TAC input, but must retain overall responsibility for the Part 150 Study and NCP recommendations
- The TAC and Port Authority recognize FAA is responsible for accepting NEM and NCP submissions and for approving NCP proposals

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Roles and Responsibilities: TEB TAC Makeup

- TAC composed of stakeholders representing all significant interests
  - Key agencies; e.g., Port Authority, FAA, AvPORTS
  - Local land use jurisdictions; e.g., Bergen County
  - Airport tenants and users; e.g., fixed base operators (FBOs), NetJets, etc.
  - Aviation trade associations; e.g., National Business Aviation Association (NBAA), Aircraft Owners and Pilots Association (AOPA),
  - Established advisory bodies; e.g., Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC), Teterboro Users Group (TUG)
  - Newark/Liberty International (EWR) Noise/Community Roundtable
- Members serve on a voluntary basis without compensation

School Soundproofing Program

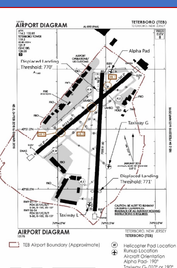
- The Port Authority has long taken an active role in the communities it serves. In 1983, the Port Authority first made a commitment to ensure that students in schools close to its airports always have a quiet learning environment. That commitment continues today with the soundproofing work the Port Authority has done in 77 schools around its airports. This includes five schools that are impacted by Teterboro and soundproofing was completed in 2012.
- A total of over $38 million USD has been invested in soundproofing these schools which serve over 2,000 students in the area surrounding TEB.

The scope of the soundproofing program includes the following:

- Acoustic windows, insulation, ventilation and air conditioning
- Specifications that meet federal procurement guidelines
- Sponsorship and administration of federal requirements by the Port Authority
- Reimbursement of schools by the Port Authority for consultants and contractors
- Opportunities for local contractors
- Support of DBE goals approved annually by the FAA

The project is contingent upon federal funding.

Airport Overview



TETERBORO AIRPORT

827 acres of land
15 acres of undeveloped land
$380 million in upgrades
3 new hangars:
two 40,000 sq ft & one 30,000 sq ft

ECONOMY

14,900 jobs
$868 million in annual wages
$2.3 billion annual sales

AIRFIELD & LANDSIDE FACILITIES

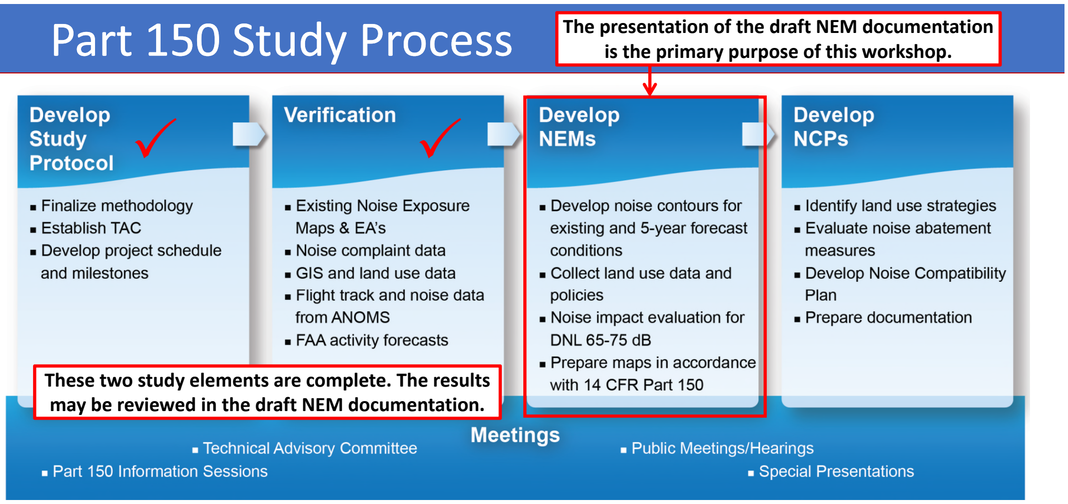
23 hangars
570,000 sq ft
Tenant locations total:
252,000 sq ft

RUNWAY LAYOUT

Two intersecting runways
Runway 6-24 is 6,013 ft long, 150 ft wide
Runway 1-19 (N/S) is 7,000 ft long and 150 ft wide
Approximately 4.2 miles of taxiways

REGIONAL CONTEXT

Part 150 Study Process

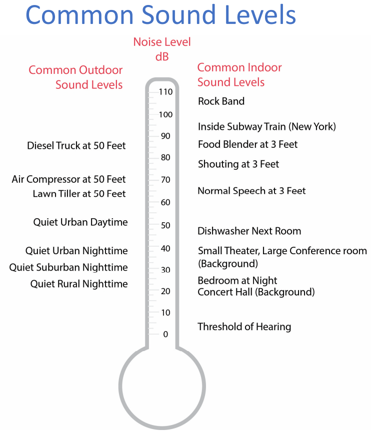


Part 150 Study Timeline

TEB Part 150 Milestone	Anticipated Date
Project initiation	February 2015
Project kickoff meeting with FAA	March 2015
Public Information Workshop– Introduce Project	October 2015
Public Information Workshop– Present Noise Exposure Map	September 2016
Submit Noise Exposure Map to FAA for acceptance	December 2016
Develop preliminary Noise Compatibility Program measures	Spring 2017
Evaluate Noise Compatibility Program measures	Spring/Summer 2017
Finalize recommended Noise Compatibility Program	Fall 2017
Public Hearing– Present Noise Compatibility Program	Fall 2017
Submit Noise Compatibility Program to FAA for approval of measures	January 2018

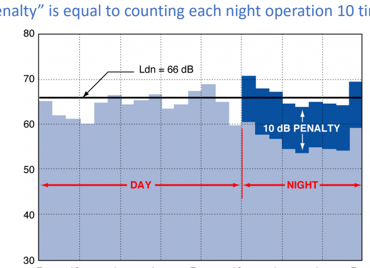
Noise Terminology

Common Sound Levels



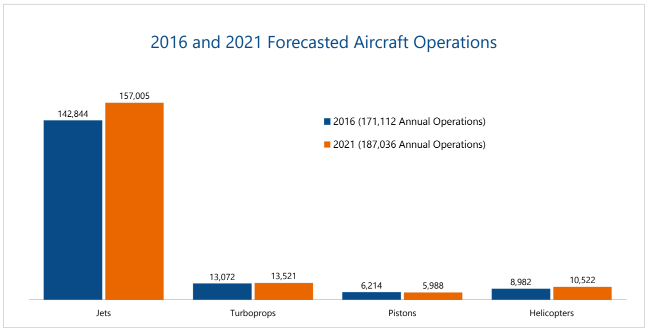
Day-Night Average Sound Level (DNL)

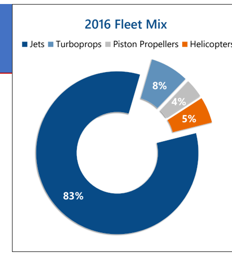
- DNL is the only metric Part 150 requires us to consider
- Computed in the FAA's Integrated Noise Model (INM)
- DNL is an average 24-hour exposure over the course of a year
- Noise from 10 pm to 7 am is factored up by 10 dB
  - "Penalty" is equal to counting each night operation 10 times

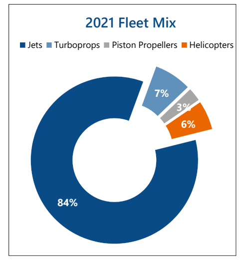


Operations / Forecast

- The Port Authority and the Study Team developed the detailed forecast
- FAA approved forecast as consistent with its "Terminal Area Forecast"

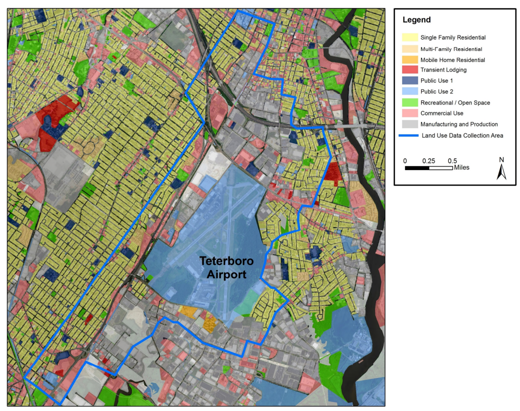






Land Use – Process and Jurisdiction

- Primary data collection steps include:
  - Assemble and review land use, zoning, and population data
  - Identify local land use policies that address airport operations
  - Create existing land use maps
  - Conduct land use reconnaissance surveys
  - Assess and address any deficiencies of land use data
- Primary jurisdiction consultation steps:
  - Conduct initial outreach for data collection purposes
  - Interview land use planners and municipal officials
  - Identify and discuss existing land use policies and strategies



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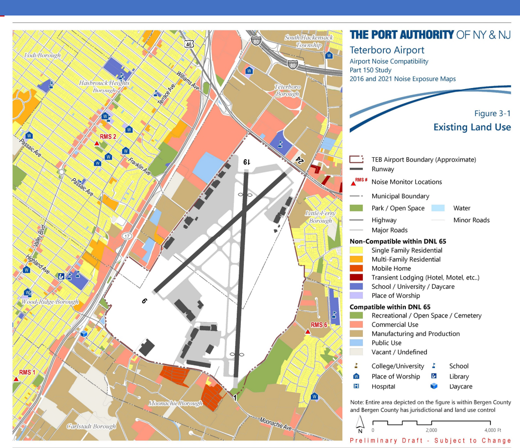
Land Use Map

- Generalized land uses over full area covered in NEM figures
- Part 150 only requires analysis of land use within 65 DNL
- Noise abatement alternatives may extend contours within this larger area



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Land Use – Part 150 Land Use Compatibility Guidelines

Land Use	Yearly Day-Night Average Sound Level, DNL, in Decibels (Key and notes on following page)					
	<65	65-70	70-75	75-80	80-85	>85
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade--general	Y	Y	Y(2)	Y(3)	Y(4)	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Key

SLCUM: Standard Land Use Coding Manual.

Y(Yes): Land use and related structures compatible without restrictions.

N(No): Land use and related structures are not compatible and should be prohibited.

NLR: Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35: Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dBA must be incorporated into design and construction of structure.

Notes

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dBA and 30 dBA should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dBA, thus, the reduction requirements are often started as 5, 10, or 15 dBA over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30

(8) Residential buildings not permitted.

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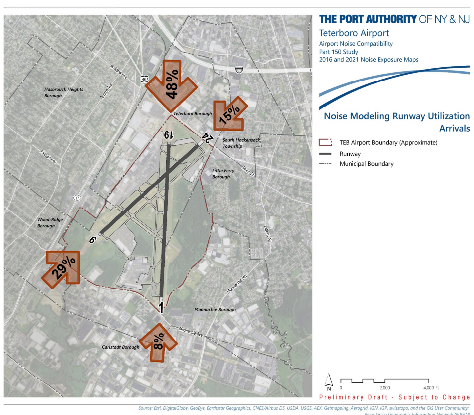
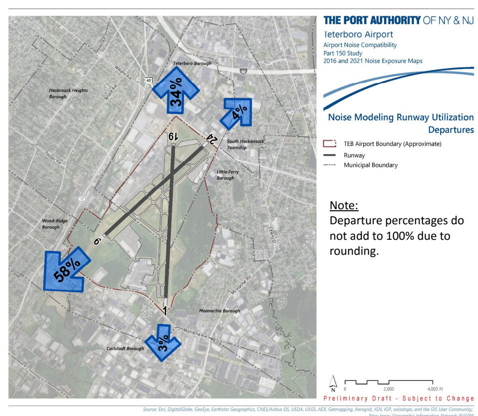
Noise Model Inputs – Runway Utilization





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Noise Model Inputs – Flight Track Creation Process

Step 1:

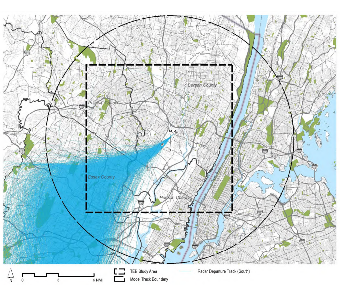
- Select a group of tracks
- Example: Jet departures on Runway 24 to the south

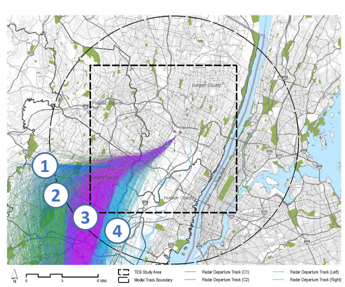
Step 2:

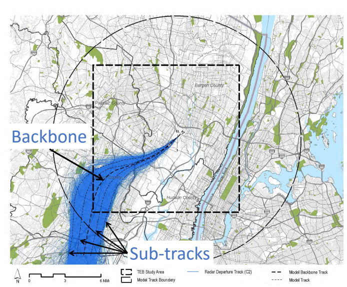
- Separate into bundles
- Example: Four bundles

Step 3:

- Create model tracks for each bundle
- Example: Bundle #3







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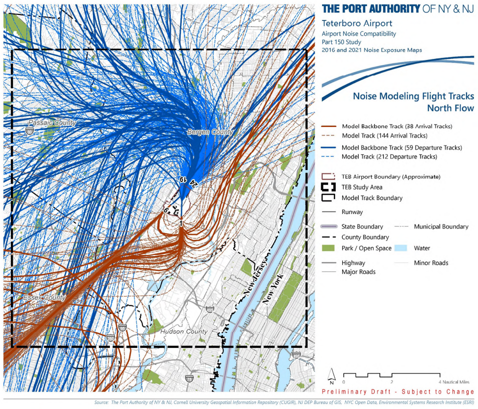
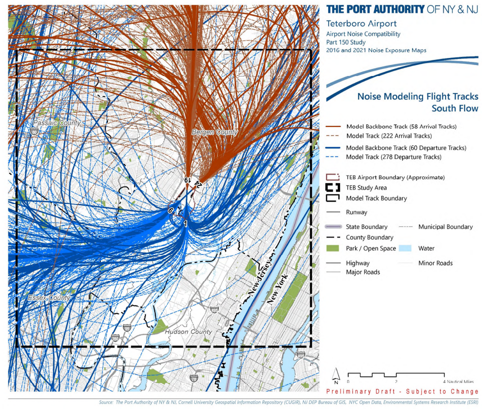
Noise Model Inputs – Modeled Fixed-Wing Flight Tracks





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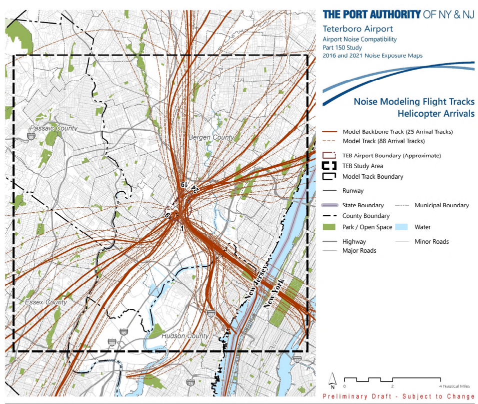
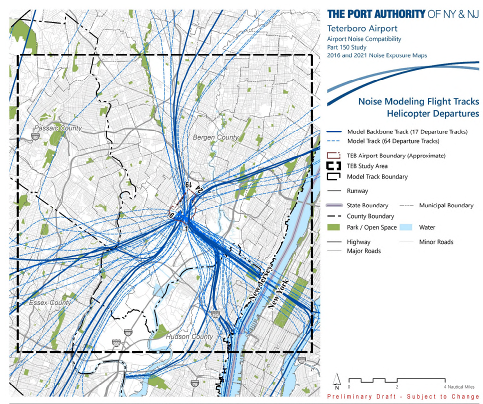
Noise Model Inputs – Helicopter Flight Tracks





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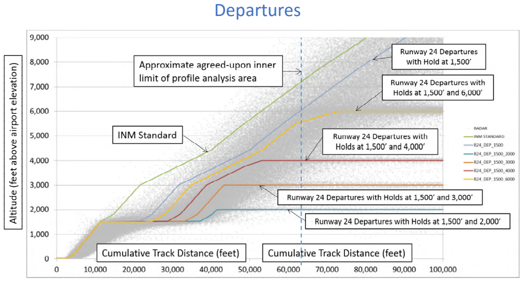
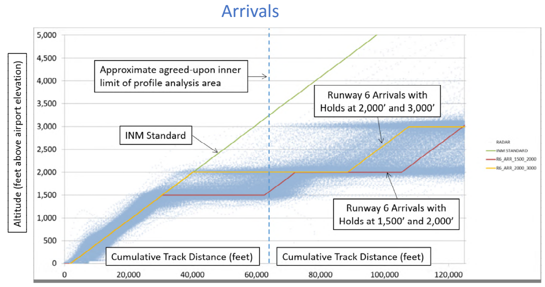
Noise Model Inputs – User-Defined Flight Profiles

- Purpose is to reflect airspace-related altitude holds
- Lear 35 departure and arrival examples presented below
- FAA has reviewed and approved

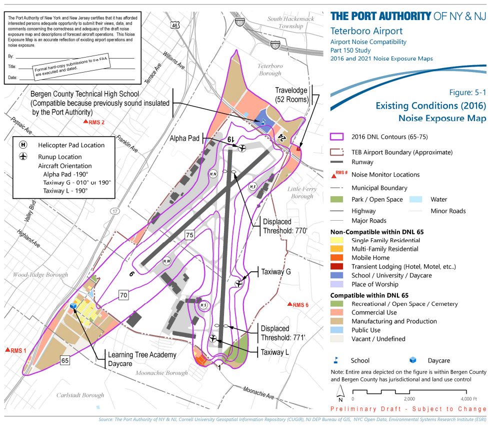
Departures



Arrivals



Noise Exposure Map – 2016 NEM



Residential Units within 2016 65 DNL Contour Interval

Year	Metric	Dwelling Units within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2016	Single Family	95	0	0	95
	Multi-Family	19	0	0	19
	Mobile Home	44	8	0	52
	Total	158	8	0	166

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

Population within 2016 65 DNL Contour Interval

Year	Metric	Population within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2016	Single Family	230	0	0	230
	Multi-Family	46	0	0	46
	Mobile Home	106	19	0	125
	Total	382	19	0	401

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

Noise Sensitive Sites within 2016 65 DNL Contour

Year	Noise Sensitive Site	Type	Address	Town
2016	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
	Bergen County Technical School (Previously Sound Insulated)	School	504 US-46	Teterboro

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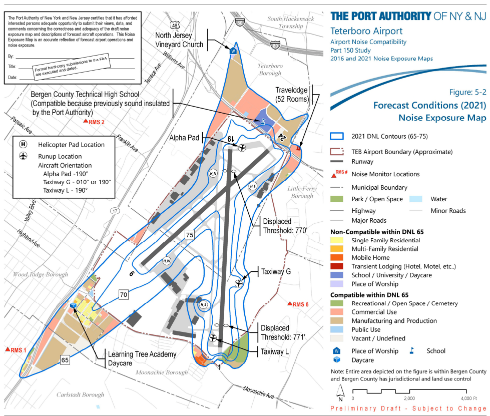
Noise Exposure Map – 2021 NEM



Residential Units within 2021 65 DNL Contour Interval

Year	Metric	Dwelling Units within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2021	Single Family	95	5	0	100
	Multi-Family	19	2	0	21
	Mobile Home	48	10	0	58
	Total	162	17	0	179

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

Population within 2021 65 DNL Contour Interval

Year	Metric	Population within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2021	Single Family	230	12	0	242
	Multi-Family	46	5	0	51
	Mobile Home	116	24	0	140
	Total	392	41	0	433

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

Noise Sensitive Sites within 2021 65 DNL Contour

Year	Noise Sensitive Site	Type	Address	Town
2021	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
	Bergen County Technical School (Previously Sound Insulated)	School	504 US-46	Teterboro
	North Jersey Vineyard Church	Church	370 North St.	Teterboro

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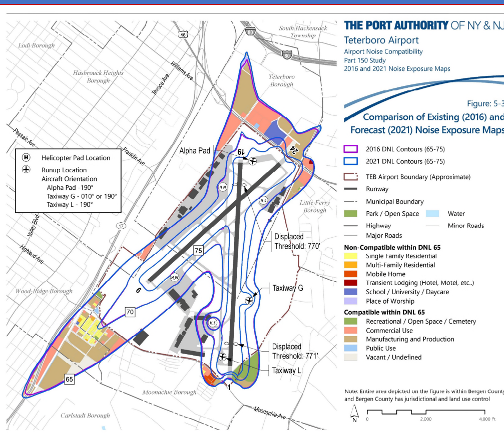
Noise Exposure Map – 2016 and 2021 NEMs



Compatible and Non-Compatible Land Area within the 2016 and 2021 65 DNL Contours

Year	Land Use within the 65 DNL	Area Outside Airport Boundary (Square Miles)
2016	Compatible	0.344
	Non-Compatible	0.035
	Total	0.379
2021	Compatible	0.365
	Non-Compatible	0.038
	Total	0.403

Source: HMMH, 2016

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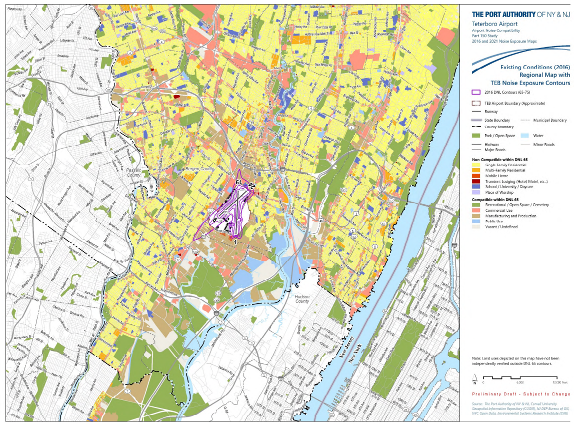
2016 DNL Contours with Regional Land Use



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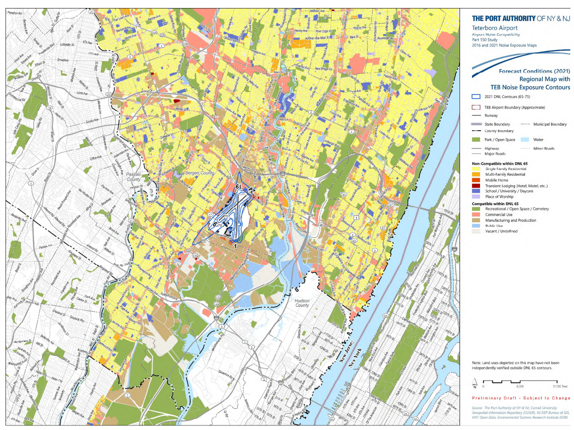
2021 DNL Contours with Regional Land Use



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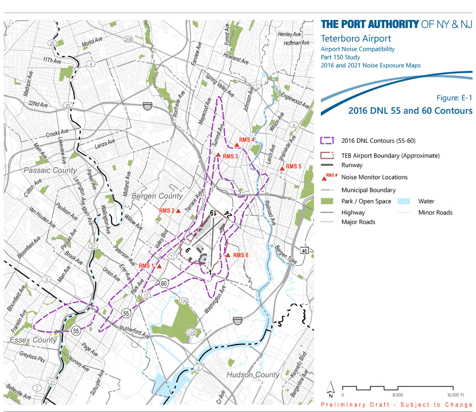
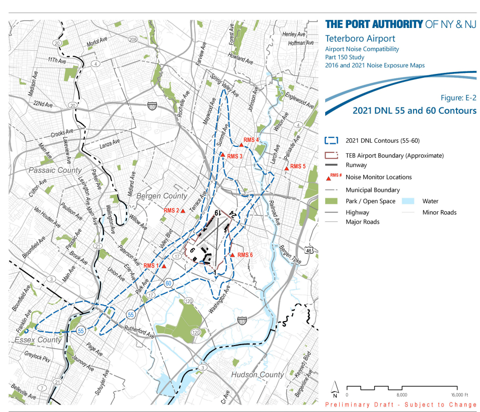
DNL 55 and 60 Contours





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Noise Compatibility Program (NCP) Overview

Step 1: Identify Incompatible Land Uses
Existing conditions Noise Exposure Map
Forecast conditions Noise Exposure Map

Step 2: Consider Noise Abatement Strategies
Reduce exposure over incompatible uses
Limit growth in exposure over incompatible uses

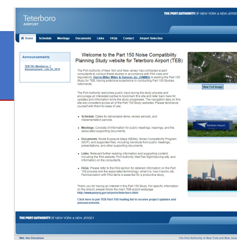
Step 3: Consider Land Use Strategies
Mitigate residual incompatible uses
Prevent introduction of new incompatible uses

Step 4: Consider Programmatic Strategies
Implement and ***promote*** measures
Monitor and ***report*** on effectiveness
Update NEMs and ***revise*** NCP as appropriate

Analysis and Selection Process Applied in Steps 2 - 4

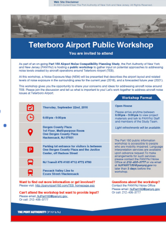
- Evaluate effectiveness of each measure in addressing ***objectives***
- Evaluate feasibility (operational, safety, economic, etc.)
- Select preferred "package" of measures
- Identify implementation schedule, responsibilities, budget, funding sources, etc.
- If not recommended, document reasons

Stay Connected

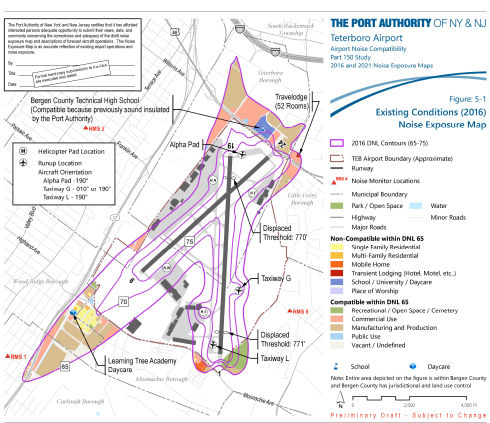


For more information or to submit comments and feedback, the PANYNJ has several ways you can participate and stay informed:

- The project website is updated regularly with project documents, meeting announcements, and other general information about the study. Register here to join the mailing list and receive project updates. **http://panynjpart150.com/TEB_homepage.asp**
- To make comments, give feedback, or ask questions, please email us at **NJPart150@panynj.gov** or call us at **(212) 435-3777**.
- To file an aircraft noise complaint, please call the noise complaint hotline at **1-800-225-1071**.
- The Port Authority noise information website provides broader information. **www.panynj.gov/airports/aircraft-noise-information.html**



Noise Exposure Map – 2016 NEM



Residential Units within 2016 65 DNL Contour Interval

Year	Metric	Dwelling Units within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2016	Single Family	95	0	0	95
	Multi-Family	19	0	0	19
	Mobile Home	44	8	0	52
	Total	158	8	0	166
Source: 2010 US Census Block Data, RS&H, HMMH, 2016					

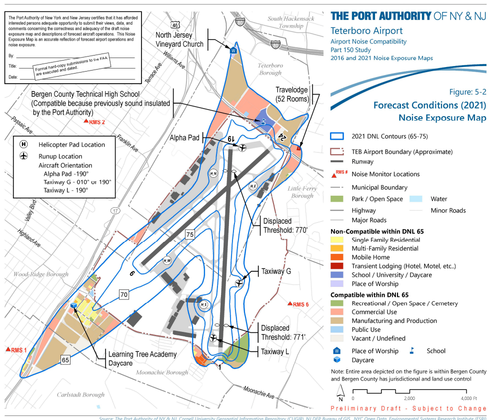
Population within 2016 65 DNL Contour Interval

Year	Metric	Population within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2016	Single Family	230	0	0	230
	Multi-Family	46	0	0	46
	Mobile Home	106	19	0	125
	Total	382	19	0	401
Source: 2010 US Census Block Data, RS&H, HMMH, 2016					

Noise Sensitive Sites within 2016 65 DNL Contour

Year	Noise Sensitive Site	Type	Address	Town
2016	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
	Bergen County Technical School (Previously Sound Insulated)	School	504 US-46	Teterboro

Noise Exposure Map – 2021 NEM



Residential Units within 2021 65 DNL Contour Interval

Year	Metric	Dwelling Units within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2021	Single Family	95	5	0	100
	Multi-Family	19	2	0	21
	Mobile Home	48	10	0	58
	Total	162	17	0	179

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

Population within 2021 65 DNL Contour Interval

Year	Metric	Population within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2021	Single Family	230	12	0	242
	Multi-Family	46	5	0	51
	Mobile Home	116	24	0	140
	Total	392	41	0	433

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

Noise Sensitive Sites within 2021 65 DNL Contour

Year	Noise Sensitive Site	Type	Address	Town
2021	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
	Bergen County Technical School (Previously Sound Insulated)	School	504 US-46	Teterboro
	North Jersey Vineyard Church	Church	370 North St.	Teterboro

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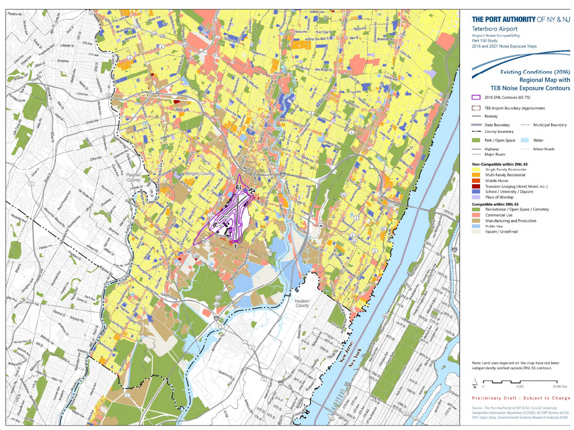
2016 DNL Contours with Regional Land Use



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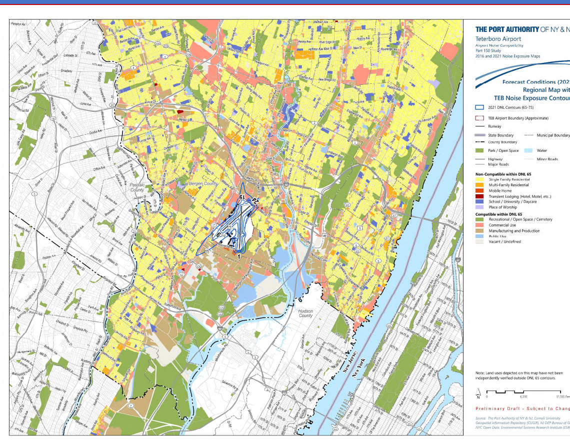
2021 DNL Contours with Regional Land Use



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Appendix H

- Public Comments

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Appendix H.1

▪ Summary of Comments

As discussed in Chapter 6, this appendix presents a table that summarizes and reproduces the comments received during the public comment period for the draft NEM (and also two related comments submitted via the Part 150 website prior to the comment period). Appendix H.2 includes scanned copies of the comments. The following items were entered into the table for each comment:

- first and last name (and title, if applicable)
- affiliation/organization, if applicable
- address (city only)
- the medium in which the comment originated – Comment Form, electronic mail, letter
- comment identification number (including sub-identification number for comments addressing multiple topics)
- comment topic (general categories addressed in each comment)
- verbatim transcription each comment, broken down into separate topics, where multiple topic categories were addressed
- response to each comment topic raised

All comments were entered verbatim, as accurately as feasible for handwritten comments. Typographical or grammatical errors were not corrected.

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
Kevin McVey	Resident	Maywood	Comment Form	1.1	Thanks	I appreciate your efforts on this project and the people who worked this workshop this evening.	The Port Authority appreciates this recognition of its efforts and of all stakeholders to participate in the Part 150 process.
				1.2	Public Participation	Planenoise.com is frustrating because you need to fill out each field every time you submit a complaint. Can you streamline that for active users who submit multiple complaints a day? I've submitted more than 25 complaints in an afternoon. Seems there should be an easier way.	Feedback on the PlaneNoise tool will be considered in the evaluation of "programmatic measures" in the Noise Compatibility Program (NCP) phase of the Part 150 study.
				1.3	Public Participation	You have too many websites to submit info and complaints, planenoise.com and njpart150@panynj.gov, why?	The two websites cited in this comment have separate purposes: 1) The "PlaneNoise.com" web form (http://www.planenoise.com/panynj/daPRAbr9/) is an element of the Port Authority's continuing noise abatement program outreach, to provide all interested parties with an online means for providing feedback on any aircraft noise issue of concern. The noise complaint telephone line (800.225.1071) provides an alternative format for submission of complaints. These complaint mechanisms preceded the Part 150 studies and will continue after the studies are complete. 2) The "njpart150@panynj.gov" email address is provided for the specific purpose of permitting interested parties to submit questions or comments related to the Part 150 studies, for the duration of the studies only.
				1.4	Flight Routes, Frequency, and Altitudes	I cannot use my backyard on Friday through Sunday or during any large event, like the Superbowl, due to frequency, and noise of arriving jets. If I sit with guests in my backyard during an arriving aircraft, I have to pause conversation till the jet passes due to low flying, noisy jets. When you have to do that every two-three minutes, during peak time, it is unbelievably frustrating. Also I cannot keep windows on the back of my house open when the weather is nice. The frequency/noise interrupts my regular life. I cannot hear my television and in the morning hours, arrivals wake me from my sleep.	The Noise Exposure Map (NEM) phase of the Part 150 study (which this document addresses) considers aircraft operations, associated modeled noise levels, and resulting noise / land-use compatibility conditions for 2016 and 2021, in the manner and detail required by 14 CFR Part 150. Part 150 (specifically Sec. 150.9, "Designation of noise systems") requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses which are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use the noise effects of individual aircraft operations or the frequency of operations during specific time periods as a basis for determining land-use compatibility – such as the interference with speech, sleep, or watching television that you have cited. As discussed in Chapter 4 and Appendix D of this NEM documentation, the calculation of DNL takes into account the noise contribution of every aircraft operation that takes place over each entire analysis year, so both busy and slow periods are taken into account, including busy time periods of the type you have noted. Furthermore, as noted in Section 1.5 of this document, DNL adds a 10 decibel weighting to all noise occurring at night; i.e., between 10 pm

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
							and 7 am. This weighting is equivalent to considering the effect of each nighttime aircraft operation to be the same as 10 identical daytime operations. Therefore, the study places particular emphasis on the effects of the night operations cited by this commenter. In the Noise Compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Those measures will encompass a broad range of noise abatement options, including – but not limited to – options that address means to abate the noise of aircraft arrivals such as you have cited which overfly Maywood and other jurisdictions north of TEB. Part 150 Sec. B150.7 identifies the categories of "noise control alternatives that must be considered and presented."
				1.5	Thanks	I would like to thank one of your consultants, Ted, for his patience and thoroughness and Gabriel Andino from Teterboro Airport for his patience and information.	The Port Authority appreciates this recognition of its efforts and of all stakeholders to participate in the Part 150 process.
				1.6	Public Participation	There seems to be many years before this study ends and I offer my assistance as a resident/homeowner to help in any way. Thank you.	The Port Authority appreciates all offers for assistance. Chapter 6 of this document summarizes all mechanisms that the Port Authority is using to provide opportunities for stakeholders to participate in the Part 150 process. The Port Authority website provides an address (panynjpart150.com/TEB_homepage.asp) for interested parties to use to keep abreast of the study process and progress. A link on the bottom of that webpage opens a form to use to join the TEB Part 150 Study mailing list to receive project updates and announcements.
Carol Skiba	Resident	Hasbrouck Heights	Comment Form	2.1	Flight Routes, Frequency, and Altitudes	At one time, jets approached TEB from west to east over the ridge that runs from Hasbrouck Heights through Carlstadt. It was determined that the air traffic tower was not high enough to clearly see these approaching jets and that approach was terminated. However, over the past 2 years this approach has been increasingly used by low-flying helicopters on approach to TEB. As they pass over my home the floor vibrates, the crystal dishes in my chandelier shake, the metal mini-blinds vibrate loud enough to hear in the living room, as does the metal sculpture on the bedroom wall. After eliminating the west to east jet approach and restoring a good percentage of quality of life to the	TEB noise office staff members have had multiple communications with this commenter regarding this matter and have conducted specific investigations into the operations she references, using the TEB operations monitoring system, and through discussions with FAA air traffic control staff and helicopter operators. Based on those investigations and discussions, the TEB staff have determined that the helicopter operations she notices over her Hasbrouck Heights neighborhood most likely result from instructions the FAA occasionally must give helicopters approaching to land at TEB to hold on the west side of the airport until other arriving or departing aircraft have cleared the airspace immediately over the airport. If the helicopters are approaching TEB from the east, they may be instructed to overfly the airport and hold on the west side, before turning back to land from the west. The FAA only instructs pilots to follow this routing if required to safely separate aircraft.

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
						residents, it is like a slap in the face to these residents to have this approach used by low-flying helicopters. My question in this regard is if it was deemed unsafe for jets, how is it now safe for helicopters? These low flying helicopters have not used this approach in the past. To continue to allow them to negatively impact the residents in the community will only serve to devalue home owner's investments in their costly property, impact the structural integrity of those costly property and devalue the worth of these properties. The residents did not get any notice that their property would be damaged by low-flying helicopters and have no remedy at hand. Having recently painted the interior of my home, since the increasing numbers of helicopters has created cracks in my newly painted walls. These helicopters need to fly over the industrial areas surrounding the airport and not the residential areas impacting families and quality of life.	As shown in six figures depicting the helicopter noise modelling flight tracks in Appendix D, Attachment A, few helicopters operate on the west side of the airport. The great majority of helicopter operations follow the voluntary helicopter routes depicted n Figure 2.7 of the Noise Exposure Map (NEM) document. The modeling tracks and use rates were developed from a full year of actual operations (2014). Based on that full year of data, the types of operations to which the commenter refers represent less than 0.1% of all helicopter operations; too infrequent to model. In the Noise Compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses Those measures will encompass a broad range of noise control options, including – but not limited to – consideration of helicopter operations, to the extent they lead to noncompatible land use in your neighborhood of Hasbrouck Heights or other areas around the airport. Part 150 Sec. B150.7 identifies the categories of "noise control alternatives that must be considered and presented."
Sabrina Picinic	Resident	not provided	E-mail	3.1	Public Workshop Date	Subject: Re: Notice: Teterboro Airport Noise Compatibility Planning Study Public Information Workshop - September 22, 2016 This workshop is scheduled the same evening as back to school night for my child so I will not be able to attend.	All materials used at the September 22, 2016 public workshop are available for download at the project web site: http://panynjpart150.com/TEB_PIW.asp.
Stephen Aljian	Resident	not provided	E-mail	4.1	Flight Routes, Frequency, and Health Effects	Subject: Air traffic over prospect avenue in Hackensack My only urgent request is that pilots use the new route into Teterboro airport to give the residents a brake from the jets coming in for a landing day and night every 5 min. We have lost ALL quality of life on Prospect Avenue in Hackensack. I live at 277 Prospect Avenue 18th floor and it is like living in an airport. The noise and FALLOUT from the corporate jets which filter down on our terraces and pools, there	The Noise Exposure Map (NEM) phase of the Part 150 study (which this document addresses) considers aircraft operations, associated modeled noise levels, and resulting noise / land-use compatibility conditions for 2016 and 2021, in the manner and detail required by 14 CFR Part 150. Part 150 (specifically Sec. 150.9, "Designation of noise systems") requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses which are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use the frequency of operations during specific periods as a basis for determining land-use compatibility. This Study has a specific focus on noise exposure and does not analyze aircraft emissions, safety issues, or human health effects

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
						is a health issue here. As for the noise, it is unbearable to live here. This study does not address our problems in this city - I reviewed it online. What we need is for the jets to land at Teterboro by a route that does not fly low over the high rise buildings and Hackensack University Medical Center.	related to aircraft operations. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines. Where jet operations result in noise / land-use incompatibilities, alternative jet routes, altitudes, and other options will be considered in the NCP phase of the study. For example, to address the issue of aircraft noise over the Hackensack University Medical Center and in the Prospect Avenue area of Hackensack that you have cited (as well as other communities north of the airport), this evaluation will include consideration of approaches to Runway 19 that overfly the Route 17 corridor; i.e., the “new route” that you cited.
William Petersen	Resident	Hackensack	Comment Form	5.1	Noise Fees	In my view, the noise abatement study should include the question of whether the aircraft using Teterboro should pay a noise abatement fees that would be paid to towns most affected by the noise.	In the Noise Compatibility Program (NCP) phase, the Port Authority will consider measures to reduce noise over noncompatible areas, limit growth in noise over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. 14 CFR Part 161 “Notice and Approval of Airport Noise and Access Restrictions” (specifically Section 161.5, “Definitions”) defines ”noise fees” to be a type of "noise or access restriction." The discussion of "noise fees" and their possible applicability to TEB will be discussed during the NCP phase of the study, as required by Part 150 Sec. B150.7, which identifies the categories of “noise control alternatives that must be considered and presented.” In reviewing restrictive options, the evaluation will take into account the fact that airport sponsors, such as the Port Authority, who accept an FAA grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The primary basis for this obligation is Airport Sponsor Assurance 22, “Economic Nondiscrimination.” See https://www.faa.gov/airports/aip/grant_assurances/.
				5.2	Flight Routes, Frequency, and Altitudes	I live directly under the arrival flight path and cannot sit in my backyard on weekends due to the noise of planes 500 feet above every 90 seconds.	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150. Part 150 (specifically Sec. 150.9, “Designation of noise systems”) requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses which are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use the frequency of operations during specific periods as a basis for determining land-use compatibility. As discussed in Chapter 4 and Appendix D of this NEM documentation, the calculation of DNL does take into account the

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
							noise contribution of every aircraft operation that takes place over each entire analysis year, so both busy and slow periods are taken into account, including busy weekend days such as you have cited. In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Those measures will encompass a broad range of noise control options, including – but not limited to – consideration of arrival operations extent they lead to noncompatible land use in your neighborhood of Hackensack or other areas around the airport. Part 150 Sec. B150.7 identifies the categories of "noise control alternatives that must be considered and presented."
Deirdre Beitel	Resident	Rutherford	Comment Form	6.1	Fleet Mix	Since the last public meeting on this topic - nothing has improved and in fact gotten worse. Some of the same noisy planes are still in use for over 15 years.	Please note that pursuant to requirements established by laws passed by the U.S. Congress, the FAA establishes aircraft noise certification standards set forth in 14 CFR Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification." Under 14 CFR Part 91, Subpart I, "Operating Noise Limits, " FAA has set dates for the phase out of older noisier civil aircraft operations in the U.S. based on 14 CFR Part 36 certification status. As of January 1, 2016, the regulation banned operations nationwide in the two noisiest categories of jets; i.e., Stage 1 and 2). As discussed in Chapter 2 of the NEM, in 2002 the Port Authority adopted a local ban on Stage 1 jets and a voluntary restraint on operation of Stage 2 jets, one of the first airports to undertake such local action. Section 4.2 of this document summarizes the forecast operations for calendar years 2016 and 2021. Appendix D.1 presents detailed documentation of the data on which the forecasts were based, the steps followed in developing the forecasts, and the FAA's approval of the forecasts. Those forecast reflect the transition of the jet fleet over time to include fewer operations in older, noisier aircraft, and an increased share of operations in newer and quieter models.
				6.2	Interference with speech and television	You can not hear the TV or a conversation when some planes go overhead.	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by Part 150. Part 150 (specifically Sec. 150.9, "Designation of noise systems") requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses which are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use noise effects associated with individual aircraft operations as the basis for determining land use

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
							compatibility, such as interference with watching television or carrying on a conversation, which this commenter cites as particular concerns. In the Noise Compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Those measures will encompass a broad range of noise control options, including measures to address noncompatible land use in your neighborhood of Rutherford or other areas around the airport. Part 150 Sec. B150.7 identifies the categories of "noise control alternatives that must be considered and presented."
				6.3	Nighttime Noise	They fly all night long forget 11pm to 6am and the dirt from the fuel is disgusting.	This Noise Exposure Map (NEM) study phase is focused on identifying noncompatible land uses in terms of DNL. As noted in Section 1.5 of this document, DNL adds a 10 decibel weighting to all noise occurring at night; i.e., between 10 pm and 7 am. This weighting is equivalent to considering the effect of each nighttime aircraft operation to be the same as 10 identical daytime operations. Therefore, the study places particular emphasis on the effects of the night operations cited by this commenter. As noted in Chapter 2, under "Noise Abatement Measures," the Port Authority requests that operators voluntarily restrain from operation between 11 pm and 6 am. Means to improve compliance with this voluntary measure will be considered in the NCP phase. As specified in 14 CFR Part 150 A Sec. 150.1, "Scope and purpose," Part 150 studies focus on noise exposure and noise compatibility, not reduction of aircraft emissions.
Michael Piccirillo	Resident	Moonachie	Comment Form	7.1	Flight Routes, Runway Use, and Sound Barriers	I live in the direct path of a runway. I would like to know about sound barriers or redirection of incoming to outgoing flights. Can the planes enter/leave from another location/runway?	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150. Part 150 (specifically Sec. 150.9, "Designation of noise systems") requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. In the Noise Compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Those measures will encompass a broad range of noise control options, including – but not limited to – the sound barriers, flight

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
							routing, and runway utilization options that this commenter suggests for addressing noise in Moonachie. The purpose of the NCP evaluation is consideration of arrival operations extent they lead to noncompatible land use in Moonachie or other areas around the airport. Part 150 Sec. B150.7 identifies the categories of "noise control alternatives that must be considered and presented."
Paul Incaliatere	Resident	Hackensack	Comment Form	8.1	Flight Frequency, Routes Nighttime Restrictions	There are too many departures from Teterboro Airport, night and day. Too many late night/early morning departure heading north -- more restrictions are needed. On 9/22/16 11 flights between 11:50 pm and 12:55 am. They start again at 5:27am.	This Noise Exposure Map (NEM) study phase is focused on identifying noncompatible land uses. As noted in Section 1.5 of this document, DNL adds a 10 decibel weighting to all noise occurring at night; i.e., between 10 pm and 7 am. This weighting is equivalent to considering the effect of each nighttime aircraft operation to be the same as 10 identical daytime operations. Therefore, the study places particular emphasis on the effects of the night operations cited by this commenter. As noted in Chapter 2, under "Noise Abatement Measures," the Port Authority requests that operators voluntarily restrain from operation between 11 pm and 6 am. The Noise Compatibility Program (NCP) phase will consider means to improve compliance with this voluntary measure. The NCP phase also will consider non-restrictive noise abatement runway use and flight track procedures to reduce noise exposure over noncompatible areas. These options will include preferential runway use that could reduce operations over communities within the DNL 65 noise contour off of each runway end, such as in Hackensack off the north end of Runway 1/19, as cited by this commenter. With regard to considering more restrictions, as this commenter suggests, the evaluation will take into account the fact that airport sponsors, such as the Port Authority, who accept an FAA grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The primary basis for this obligation is Airport Sponsor Assurance 22, "Economic Nondiscrimination." See https://www.faa.gov/airports/aip/grant_assurances/.
				8.2	Noise Fees	Jets with loud engines should be fined. How about $10,000 for each occurrence. That would stop/curtail the noise. Then give it back to property owners/towns to reduce our property taxes. *We need change!*	In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. 14 CFR Part 161 "Notice and Approval of Airport Noise and Access Restrictions" (specifically Section 161.5, "Definitions") defines "noise fees" to be a type of "noise or access restriction." The discussion of "noise fees" and their possible applicability to TEB will be discussed

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							during the NCP phase of the study, as required by Part 150 Sec. B150.7, which identifies the categories of "noise control alternatives that must be considered and presented." In reviewing restrictive options, the evaluation will take into account the fact that airport sponsors, such as the Port Authority, who accept an FAA grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The primary basis for this obligation is Airport Sponsor Assurance 22, "Economic Nondiscrimination." See https://www.faa.gov/airports/aip/grant_assurances/.
Erica Cetin	Resident	Hackensack	Comment Form	9.1	Interference with Speech and Television	The planes are too loud. When sitting on my terrace, we have to stop talking because we can't hear each other. I have to close the windows when I'm on the phone or watch TV. I'm located north of Teterboro, so the planes are landing (arrivals).	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses which are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airport s to base land-use compatibility decisions on individual aircraft operations, such as the landings from the north that this commenter cites. Part 150 also does not permit airports to use noise effects related to specific activities, such as interference with speech communication, telephone calls, or listening to the television, which this commenter cites, as a basis for determining land-use compatibility. In the Noise compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. One of the measures to be considered is an approach to Runway 19 that overflies the Route 17 corridor north of the airport. That measure would address landings approaching TEB from the north that pass over Hackensack, which this commenter cites.
				9.2	Runway Use	Please look into rotation so we don't have the noise all the time.	The NCP phase of the study also will consider preferential runway use.
				9.3	Public Participation	(Please add me to the mailing list for updates - ejcetin@gmail.com). Thanks.	You have been added to the mailing list. Any interested party may do so by accessing the TEB Part 150 Study mailing list sign up form at: http://www.panynjpart150.com/TEB_Mail_List.asp
Kathlean Salvo	Resident	Hackensack	Comment Form	10.1	School Sound Insulation	Fanny Meyer Hillers Elementary School (56 Longview Avenue, Hack) was	As discussed in Section 5.2 of this document, there are two schools – the Bergen County Technical High School and the Jersey College

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						promised to be air-conditioned and sound proofed over 10 years ago in Hackensack. St. Francis, on Lodi Street, Elementary School was completed and Jackson Ave Elementary School on Washington Ave were done. When questioned when it would be done we were told that the FAA had run out of money. When will you have enough money to do it?? It is very difficult to hear the teacher when the planes go over and the windows are closed or opened. The building shakes.	School of Nursing– within the 65 DNL contour for either 2016 or 2021. The Port Authority has previously sound insulated the Bergen County Technical High School, so it is considered compatible. Schools exposed to less than DNL 65 are not eligible for sound insulation under 14 CFR Part 150 and related FAA funding guidelines (e.g., FAA Order 5100.38D, "Airport Improvement Program Handbook," Table C-5, "Examples of Prohibited Projects/Costs for Noise Mitigation)". The Port Authority has no record of any commitment ever being made to sound insulate the Fannie Meyer Hillers School, which is exposed to DNL less than DNL 65 for 2016 and 2021. See Section 2.5 of this document for a discussion and full list of schools that have been sound insulated around TEB, regardless of their location relative to the 2016 and 2021 DNL contours.
				10.2	Interference with Speech on School Grounds	The school ground becomes very difficult to hear one another.	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use speech interference for determining land-use compatibility. In the Noise Compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, including any schools exposed to greater than or equal to DNL 65 for either 2016 or 2021.
Dawn Avagliano	Resident	Rutherford	Comment Form	11.1	TEB/EWR Interaction	One of the things that I would like to see is a comparison chart/graph that shows the paths and contours of NEWARK (Liberty Airport) traffic <u>versus</u> TETERBORO. Do they cross over each other? Could we see the difference in total number of flights?	Pursuant to 14 CFR Part 150, the TEB Noise Exposure Map (NEM) must focus solely on noise from TEB operations and the Newark (EWR) NEM must focus solely on noise from operations at EWR. The studies will comply with 14 CFR Part 150 requirements and FAA guidelines for its implementation. The FAA and PANYNJ have agreed to evaluate each airport individually and not add results together for multiple airports. Part 150 does not provide for adding noise exposure from multiple airports. Comparisons of flight paths, noise contours, and numbers of operations at EWR are not relevant to the TEB Part 150. To the extent that operations at TEB and EWR might potentially conflict, the FAA has developed procedures for dividing the airspace and/or coordinating operations at the two airports to ensure the operations are safely separated.

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				11.2	Air Traffic Control	Is there a territory where Teterboro flights CANNOT go?	No. The FAA has exclusive authority over the control of aircraft operations in the National Airspace System. The FAA can route aircraft through any airspace that it considers safe.
				11.3	Flight Routes	Could we move some of the flight paths over the Meadowlands or swamps, where the residential capacity is smaller? Could we move the flight paths over the traffic of Route 17 and commercial businesses instead of the residential zones? I am extremely concerned about the environmental DANGERS with the increase of so many more LOW flying airplanes.	In the Noise Compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Part 150 Sec. B150.7 identifies the categories of "noise control alternatives that must be considered and presented." Alternative flight routes to and from the south of the airport will be considered to address incompatible land uses in Rutherford and other communities in the area.
Cynthia Chovan-Dalton	Resident	Rutherford	Comment Form	12.1	EWR Part 150 Study	Given that flight patterns at Teterboro are strongly affected by flight patterns of Newark-bound aircraft, it would be helpful to also see any studies of Newark noise abatement.	The Newark (EWR) Noise Exposure Map (NEM) document is posted at http://panynjpart150.com/EWR_DNEM.asp. That document contains the most current and detailed assessment of Newark noise exposure. The Noise Compatibility Program (NCP) phase of that study will consider EWR noise abatement. Pursuant to 14 CFR Part 150, the TEB Noise Exposure Map (NEM) must focus solely on noise from TEB operations and the Newark (EWR) NEM must focus solely on noise from operations at EWR. The studies will comply with 14 CFR Part 150 requirements and FAA guidelines for its implementation. The FAA and PANYNJ have agreed to evaluate each airport individually and not add results together for multiple airports. Part 150 does not provide for adding noise exposure from multiple airports. To the extent that operations at TEB and EWR might potentially conflict, the FAA has developed procedures for dividing the airspace and/or coordinating operations at the two airports to ensure the operations are safely separated.
				12.2	Classroom Learning Interference	It would also be helpful to see more on strategies for noise abatement, like soundproofing. Even though my 5 year old's school in Rutherford has been soundproofed with Port Authority funds, she says her teacher still has to stop teaching when planes fly overhead.	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use classroom learning interference for determining land-use compatibility. In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, including any schools exposed to greater than or equal to DNL 65 for either 2016 or 2021.

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							However, as discussed in Section 5.2 of this document, there are two schools – the Bergen County Technical High School and the Jersey College School of Nursing– within the 65 DNL contour for either 2016 or 2021. The Port Authority has previously sound insulated the Bergen County Technical High School, so it is considered compatible. Schools exposed to less than DNL 65 are not eligible for sound insulation under 14 CFR Part 150 and related FAA funding guidelines (e.g., FAA Order 5100.38D, "Airport Improvement Program Handbook," Table C-5, "Examples of Prohibited Projects/Costs for Noise Mitigation)". The Port Authority has no record of any commitment ever being made to sound insulate the Fannie Meyer Hillers School, which is exposed to DNL less than DNL 65 for 2016 and 2021. See Section 2.5 of this document for a discussion and full list of schools that have been sound insulated around TEB, regardless of their location relative to the 2016 and 2021 DNL contours.
Regina DiPasqua	Resident	Hackensack	Comment Form	13.1	Sound Insulation Program	When will Hillers School, 56 Longview, Hackensack be soundproofed? It was promised years ago.	As discussed in Section 5.2 of this document, there are two schools – the Bergen County Technical High School and the Jersey College School of Nursing– within the 65 DNL contour for either 2016 or 2021. The Port Authority has previously sound insulated the Bergen County Technical High School, so it is considered compatible. Schools exposed to less than DNL 65 are not eligible for sound insulation under 14 CFR Part 150 and related FAA funding guidelines (e.g., FAA Order 5100.38D, "Airport Improvement Program Handbook," Table C-5, "Examples of Prohibited Projects/Costs for Noise Mitigation)". The Port Authority has no record of any commitment ever being made to sound insulate the Fannie Meyer Hillers School, which is exposed to DNL less than DNL 65 for 2016 and 2021. See Section 2.5 of this document for a discussion and full list of schools that have been sound insulated around TEB, regardless of their location relative to the 2016 and 2021 DNL contours.
				13.2	Runway Use	Why aren't the runways switched up more? Too many land or take off on the same runway (48% land + 50% takeoff).	Runway use alternatives will be analyzed in the Noise compatibility Program (NCP) phase of this study.
				13.3	Flight Routings	The Route 17 landing approach needs to be utilized more. How can the FAA encourage pilots to do so?	An approach to Runway 19 that overflies the Route 17 corridor will be analyzed in the NCP phase of this study.
John Binetti	All Pro Audio Video	Moonachie	Comment Form	14.1	Runway Use	Decrease flights from Runway 24	In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure and limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Runway use alternatives will be analyzed in the NCP phase of this study.
				14.2	Aircraft Design	Design planes quieter and safer	Please note that pursuant to requirements of laws passed by the U.S. Congress, the FAA establishes aircraft certification standards related

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							to both noise and safety. The Port Authority defers to the FAA on these matters. Under 14 CFR Part 91, Subpart I, "Operating Noise Limits," FAA has set dates for the phase out of older noisier civil aircraft operations in the U.S. based on 14 CFR Part 36 certification status. As of January 1, 2016, the regulation banned operations nationwide in the two noisiest categories of jets; i.e., Stage 1 and 2). As discussed in Chapter 2 of the NEM, in 2002 the Port Authority adopted a local ban on Stage 1 jets and a voluntary restraint on operation of Stage 2 jets, one of the first airports to undertake such local action.
				14.3	Runway Use	Bring more flights to Runway 19	Runway use alternatives will be analyzed in the NCP phase of this study.
				14.4	Runway Layout	Build another runway between Runways 24 and 19 (SW)	Airport layout alternatives will be considered in the NCP phase of this study.
				14.5	Runway Use	Eliminate Runway 24 Departures	Runway use alternatives will be analyzed in the NCP phase of this study.
				14.6	Flight Routings	New runway Departures south of warehouses	Flight track alternatives will be considered in the NCP phase of this study.
				14.7	Environmental Impact	The flights affect quality of life of residents on several levels including noise -- health -- safety.	The FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines. With regard to safety, the FAA has all jurisdiction over control of aircraft operations, and assigns the highest priority to safety.
Nicholas Gisonde	Resident	Hackensack	Letter	15.1	Flight Frequency and Health Effects	I have lived in Hackensack, NJ for over a year now and I can longer sit ideally bye and live with the constant sound of corporate jets flying directly over my apartment all hours of the day and night. This memorial-day weekend, these planes started their landing pattern into Teterboro Airport at 4:30 in the morning and didn't end until 10:30 in the evening - over 75 jets planes had landed at three-minute intervals - the sound was insidious and made me ill.	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. As noted in Section 1.5 of this document, DNL adds a 10 decibel weighting to all noise occurring at night; i.e., between 10 pm and 7 am. This weighting is equivalent to considering the effect of each nighttime aircraft operation to be the same as 10 identical daytime operations. As noted in Chapter 2, under ""Noise Abatement Measures,"" the Port Authority requests that operators voluntarily restrain from operation between 11 pm and 6 am. The NCP phase will consider means to improve compliance with this voluntary measure. The NCP phase also will consider non-restrictive noise abatement runway use and flight track procedures to reduce noise exposure over noncompatible areas. Part 150 does not permit airports to use the frequency of operations during specific periods as a basis for determining land-use compatibility. As discussed in Chapter 4 and Appendix D of this NEM

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							documentation, the calculation of DNL does take into account the noise contribution of every aircraft operation that takes place over each entire analysis year, so both busy and slow periods are taken into account. This Study has a specific focus on noise exposure and does not analyze human health effects related to aircraft operations. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines.
				15.2	Health Effects	I have never heard anything as loud. One has to question the negative effect on the mental health of so many men, women, and children who live in these buildings on Prospect Avenue.	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use the frequency of operations during specific periods as a basis for determining land-use compatibility. This Study has a specific focus on noise exposure and does not analyze aircraft emissions, safety issues, or human health effects related to aircraft operations. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines. Where jet operations result in noise / land-use incompatibilities, alternative jet routes, altitudes, and other options will be considered in the NCP phase of the study. For example, to address the issue of aircraft noise in your area north of the airport, this evaluation will include consideration of approaches to Runway 19 that overfly the Route 17 corridor.
				15.3	Flight Altitudes	These corporate jets fly dangerously close to the rooftops of most of the buildings - they fly seven days a week and in all kinds of weather as well.	The NCP phase of the study will consider changes in aircraft routes and altitudes to address noise levels over noncompatible land uses exposed to DNL greater than or equal to 65 dB.
				15.4	Public Participation	Please keep me informed as to how I might make my anger and frustration heard!	You have been added to the mailing list. All affected parties are encouraged to submit noise complaints online via the Port Authority noise complaint web form (http://www.planenoise.com/panynj/daPRAbr9/) or the noise complaint telephone line (800.225.1071).
				15.5	General Comment	Life is two short!	Comment noted.
Annika Cioffi	Resident	Rutherford	E-mail	16.1	Flight Frequency, Interference	Subject: 14 CFR Part 150 Airport Noise Compatibility Planning Study: Teterboro Airport (TEB)	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the

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					with Television, and Nighttime Operations	I lived on 85 Chestnut Street in Rutherford NJ from 2001 to 2007. During that time, the noise from Teterboro flights was extremely intrusive in our daily lives. Often when watching tv in the evenings, we would have to increase and decrease the volume to combat the noise. Now that we live on 27 Wingra Avenue, Rutherford, and now the time I notice the noise is after the kids go to bed, around 10pm and it continues all night. Flight after flight after flight after flight. It severely impacts our quality of life here in Rutherford, which is already impacted by light pollution, the smell of the Passaic River and the stress of living in North Jersey in general.	manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use noise effects on specific activities – such as listening to TV or sleep disturbance – as a basis for determining land-use compatibility. However, as noted in Section 1.5 of this document, DNL adds a 10 decibel weighting to all noise occurring at night; i.e., between 10 pm and 7 am. This weighting is equivalent to considering the effect of each nighttime aircraft operation to be the same as 10 identical daytime operations. As noted in Chapter 2, under "Noise Abatement Measures," the Port Authority requests that operators voluntarily restrain from operation between 11 pm and 6 am. The Noise Compatibility Program (NCP) phase will consider means to improve compliance with this voluntary measure. The NCP phase also will consider non-restrictive noise abatement runway use and flight track procedures to reduce noise exposure over noncompatible areas to the extent they extend over Rutherford and other communities. This Study has a specific focus on noise exposure and does not analyze aircraft emissions, safety issues, or human health effects related to aircraft operations. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines.
				16.2	Flight Profiles	When I lived in Newport Beach, CA, I lived near Irvine's John Wayne Airport. The residents there all came together and changed the regulation for the airport to increase quality of life. They changed the flight takeoff pattern to a steeper increase which solved the problem and gave a thrill-but-still-safe ride to all passengers. I offer this to you as a possible way around this issue. Perhaps you could take a look at these articles and use this possibility to curb this problem here in NJ. http://www.ocweekly.com/news/john-wayne-airport-named-among-10-scariest-6458589 http://www.ocair.com/generalaviation/noise/	Noise abatement departure profiles will be considered in the NCP phase of this study.

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						http://articles.latimes.com/1998/apr/13/local/me-38832 America's scariest airport could pack thrills as FAA considers 'S-curve' takeoff"	
Beth Schmais	Resident	Rutherford	E-mail	17.1	Public Participation	Subject: Comment Deadline Can you tell me what the deadline is for submitting comments on the Teterboro noise study?	The deadline for comments on the draft Noise Exposure Map (NEM) report was October 17, 2016. Comments received after the deadline will be addressed in the final report.

Claudia Kerr	Resident	Rutherford	E-mail	18.1	Public Participation	Subject: Air Traffic Noise & Pollution in Rutherford, NJ
						Gentlemen,
						I was made aware of the study being done in regard to the impact of air traffic to and from Teterboro Airport on local towns by an article in the Bergenite. I was not aware of the September 22nd meeting but have signed up now for email notifications of future information.
							The September 22, 2016 meeting was advertised on the project website (http://panynjpart150.com/TEB_homepage.asp), and in numerous print publications, including the:
							• Hasbrouck Heights Gazette (September issue distributed late August),
							• September 24, 2016 edition of the Hasbrouck Heights Observer, and
							• September 15, 2016 editions of the following publications:
							  ○ Newark Star Ledger,
							  ○ Bergen Record,
							  ○ El Especialito (in Spanish),
							  ○ Korea Daily (in Korean), and
							  ○ three North Jersey TEB area weeklies:
							    ▪ Community News, which covers Hasbrouck Heights and Woodridge,
							    ▪ the Little Ferry / Bogota / Ridgefield Hackensack Chronicle, and
							    ▪ the South Bergenite).
							Thank you for signing up for future notifications.

				18.2	Flight Frequency, and Health Effects	I am writing to advise you of the of the experience of my husband and myself this year living in Rutherford. We have lived here since 1976 and have experienced air traffic constantly increasing. We not only have traffic from Teterboro but also frequent helicopters that travel back and forth east and west. I am not aware of the origins of these helicopters. The air traffic noise and pollution has been constant and very annoying. The planes are close, frequent and disturbing to us in our home and on our property. We are very concerned about the impact of the current air traffic and possible increasing air traffic on our home and town. The air	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use the frequency of operations during specific periods as a basis for determining land-use compatibility. Section 4.2 of this document summarizes the forecast operations for calendar years 2016 and 2021. Appendix D.1 presents detailed documentation of the data on which the forecasts were based, the steps followed in developing the forecasts, and the FAA's approval of the forecasts. Those forecast reflect the transition of the jet fleet over

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						traffic affects the residents daily lives, the quality of our lives and our health. As I write this email I sit inside my home, with the windows closed, hearing loudly yet another plane close by overhead. There was a plane a few minutes before and I am sure another will follow in a few minutes. This is unacceptable.	time to include fewer operations in older, noisier aircraft, and an increased share of operations in newer and quieter models. Helicopter operations arriving to or departing from TEB were incorporated into the NEM modeling as shown in six figures depicting the helicopter noise modelling flight tracks in Appendix D, Attachment A,. The great majority of helicopter operations follow the voluntary helicopter routes depicted n Figure 2.7 of the NEM document. The modeling tracks were developed from a full year of actual operations (2014). This Study has a specific focus on noise exposure and does not analyze aircraft emissions or human health effects related to aircraft operations. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines.
				18.3	Flight Frequency and Routing	Air traffic patterns need to be changed and future additions to flights should not be considered. I am aware that we live in a metropolitan area but that does not mean that consideration should not be given to the quality of life to those who reside nearby to airports. Teterboro was not always such a busy airport. Air traffic has increased substantially.	In the Noise Compatibility Program (NCP) phase of this study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. These analyses will include consideration of noise abatement flight paths and runway use patterns. The FAA considers restrictions on the number of flight operations at an airport a type of "noise or access restriction." These types of measures, and their possible applicability to Teterboro Airport will be discussed during the NCP phase of the study. In reviewing restrictive options, the evaluation will take into account the fact that airport sponsors, such as the Port Authority, who accept an FAA grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The primary basis for this obligation is Airport Sponsor Assurance 22, “Economic Nondiscrimination.” See https://www.faa.gov/airports/aip/grant_assurances/.
				18.4	Pollution, and Health Effects	I add my concerns to those of others who have voiced their experiences regarding the control of air traffic over Rutherford. I expect that consideration to our concerns of quality of life, pollution (both air & noise) and health will be fair when the study is completed.	As noted in the response to your second comment, this Study has a specific focus on noise exposure and does not analyze aircraft emissions, other pollutants, or human health effects related to aircraft operations. However, the FAA did take quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines.
Beth Schmais	Resident	Rutherford	E-mail	19.1	14 CFR Part 150 Land Use Compatibility	Subject: Comment-TEB PART 150 Study	This Noise Exposure Map (NEM) phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and

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					Guidelines and Speech interference	I'm writing to express my concerns about the current noise situation near Teterboro airport and the conclusions of the noise study. My understanding is that the noise study will state that the noise level in my neighborhood (Ridge Rd in Rutherford) is within the FAA guidelines. I feel this not an accurate assessment of the situation. We have been living with the noise of planes coming in to land directly overhead very low and extremely loud - so loud that it is impossible to even conduct a conversation even when indoors with the windows closed. This happens every 2-3 minutes for hours, sometimes for days or even weeks. I don't think there is any way this can be considered an acceptable level of noise.	noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use noise effects such as speech interference associated with individual aircraft operations or the frequency of operations during specific periods as a basis for determining land-use compatibility. In the Noise Compatibility Program (NCP) phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. 14 CFR Part 150, specify 65 dB DNL as the threshold for residential land use being incompatible with aircraft noise. The FAA's threshold does not mean you are not affected by aircraft noise. However, the FAA will only approve measures that reduce noncompatible land uses exposed to DNL greater than or equal to 65 dB. Those measures often provide ""spillover"" benefit to areas with lesser DNL.
				19.2	Air Traffic Control, Flight Frequency	I feel strongly that decisions on how and when planes land should not be based solely on what is convenient for the airport and the users of private and corporate jets but should take into consideration the impact on the people on the ground. A well-established quiet residential neighborhood is being turned into a landing strip and becoming unlivable. The increased air traffic has a detrimental effect on the ability of people to have quiet enjoyment of their homes and is damaging to property values-officials who regulate this airport should have a responsibility to take this into consideration.	Noise abatement flight paths and runway use alternatives will be considered in the NCP phase of this study. The response to this commenter's preceding comment addresses Part 150 land use compatibility guidelines and compatibility planning."
				19.3	Flight Routing	Clearly there are routes the planes can take to land (the east side of Route 17) that do not have the same impact on residential neighborhoods and the route can be varied so one neighborhood does not bear the brunt of airport traffic. I feel strongly that the FAA and the Port	An approach to Runway 19 that overflies the Route 17 corridor will be analyzed in the NCP phase of this study. The NCP phase of the study also will consider other noise abatement flight tracks and runway use. The Port Authority is conducting this Part 150 study on a voluntary basis, with extensive FAA cooperation, which reflects the two agencies' recognition of the importance of addressing aircraft noise effects.

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						Authority have the responsibility to ensure that the appropriate action is taken to address the adverse impact Teterboro is having on surrounding residential neighborhoods.	
				19.4	Use of Noise Model	The real life experience of those of us suffering through this on ground should be prioritized in the conclusions of this study- versus basing the decisions solely on computer simulations.	14 CFR Part 150 requires airports to use an FAA-approved noise model to calculate noise exposure for operations for the existing conditions and a five-year forecast cases (2016 and 2021 in this study). As discussed in Chapter 4 and Appendix D of this NEM documentation, "real-life" data on operations over a full calendar year were used in developing the modeling inputs, including flight tracks, runway use, altitude profiles, fleet mix, and more. 2014 was used because it was the last full year for which data were available when the study commenced in 2015. Table 5-5 on page 5-8 of the NEM document shows that the modeled noise exposure is actually higher than the noise exposure measured by most of TEB's permanent noise monitoring sites.
				19.5	Thanks	Thanks for your consideration.	The Port Authority appreciates this recognition of its efforts and of all stakeholders to participate in the Part 150 process.
Len Goldberg	Resident	Rutherford	E-mail	20.1	Noise Fees	Subject: Teterboro NOISE I don't mind putting up with the noisy Teterboro jet airplane takeoffs that fly over my home at 88 West Newell Avenue, Rutherford, NJ, if I get paid for the inconvenience and devaluation to my property. How about just $1 for each over-flight and you also included each and every citizen of Rutherford and paid them as much. That would work out to be about $20,000 for each over-flight.	This Noise Exposure Map (NEM) study phase is focused on identifying noncompatible land uses in terms of DNL. In the Noise Compatibility Program (NCP) phase, the Port Authority will consider measures to reduce noise over noncompatible areas, limit growth in noise over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. 14 CFR Part 161 "Notice and Approval of Airport Noise and Access Restrictions" (specifically Section 161.5, "Definitions") defines "noise fees" to be a type of "noise or access restriction." The discussion of "noise fees" and their possible applicability to TEB will be discussed during the NCP phase of the study, as required by Part 150 Sec. B150.7, which identifies the categories of "noise control alternatives that must be considered and presented." In reviewing restrictive options, the evaluation will take into account the fact that airport sponsors, such as the Port Authority, who accept an FAA grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The primary basis for this obligation is Airport Sponsor Assurance 22, "Economic Nondiscrimination." See https://www.faa.gov/airports/aip/grant_assurances/.

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				20.2	Noise Limits	---OR--- IMPOSE A MAXIMUM DB NOISE REGULATION THAT IS 50% LOWER THAN CURRENT STANDARDS	Please note that pursuant to requirements established by laws passed by the U.S. Congress, the Port Authority defers to the FAA on the establishment and enforcement of noise standards, under 14 CFR Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification." Under 14 CFR Part 91, Subpart I, "Operating Noise Limits, " FAA has set dates for the phase out of older noisier civil aircraft operations in the U.S. based on 14 CFR Part 36 certification status. As of January 1, 2016, the regulation banned operations nationwide in the two noisiest categories of jets; i.e., Stage 1 and 2). As discussed in Chapter 2 of the NEM, in 2002 the Port Authority adopted a local ban on Stage 1 jets and a voluntary restraint on operation of Stage 2 jets, one of the first airports to undertake such local action. In the NCP phase of the study, the Port Authority will assess noise abatement categories such as flight tracks, runway use, arrival and departure procedures, etc.
				20.3	Close Airport	---OR--- CLOSE THE AIRPORT DOWN	Airport sponsors, such as the Port Authority, who accept an FAA grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The primary basis for this obligation is Airport Sponsor Assurance 22, "Economic Nondiscrimination." See https://www.faa.gov/airports/aip/grant_assurances/.
Palmer Yale	Resident	Rutherford	E-mail	21.1	Flight Routes	Subject: Rutherford, NJ and the Part 150 Airport Noise Compatibility Planning Study Please include Rutherford, New Jersey in the Part 150 Airport Noise Compatibility Planning Study and all studies that might decrease or stop planes flying over Rutherford, NJ. Rutherford is in the flight path of both departing and arriving planes in and out of Teterboro airport and many of the planes are too low, too loud, and pollute our town. We want no more planes to fly over our town. I urge the people making decisions at the Port Authority to remove Rutherford from the flight paths used by Teterboro. There are other flight paths that go over non-residential areas of the Meadowlands and it is these areas and flight paths that should be used, NOT the ones currently over Rutherford and other nearby towns.	Rutherford is included in the TEB Part 150 Study Area (Figure 2-3) and is also a member of the Teterboro Noise Abatement Advisory Committee (TANAAC). In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses.

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						Residents of Rutherford experience poorer quality lives due to the constant noise and pollution of Teterboro planes.	
				21.2	Restrict Operations	I also urge the Port Authority to curb and cancel the expansion of Teterboro airport as this will allow more and larger aircraft to pollute our air and decrease our quality of life.	There are no current plans to expand Teterboro Airport. With regard to curbing any improvements at TEB, it must be noted that airport sponsors, such as the Port Authority, who accept an FAA grant offer are also accepting conditions and obligations associated with the grant assurances. These include obligations to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The primary basis for this obligation is Airport Sponsor Assurance 22, "Economic Nondiscrimination." See https://www.faa.gov/airports/aip/grant_assurances/.
Marylou Tibaldo-Bongiorno, Co-Chair	Forest Hill Community Association, Air Traffic Control Committee	Newark	E-mail	22a.1	Measured versus Modeled Noise Exposure	Subject: Part 150 NEM Questions from FHCA-ATC Questions: 1. Our PANYNJ Noise Monitor registered 55.2 DNL in 2015 as the cumulative result of TEB and EWR planes. a. Why is Forest Hill excluded from Appendix E (55 - 60 dB DNL Contours) of TEB's Part 150 NEM?	Section 5.3 of this NEM document discusses reasons that measured and modeled noise levels may not agree. Table 5-5 on page 5-8 of the NEM document shows that the modeled noise exposure is actually higher than the noise exposure measured by most of TEB's permanent noise monitoring sites. As shown in Figures E-1 and E-2 in Appendix E, the 55 DNL contours for 2016 and 2021, respectively, only extend slightly further than half way from TEB to Forest Hill. With regard to cumulative noise from TEB and EWR operations, pursuant to 14 CFR Part 150, the TEB NEM must focus solely on noise from TEB operations and the EWR NEM must focus solely on noise from operations at EWR. Forest Hills was not "excluded" from the supplemental contours presented in Appendix E. The supplemental contours were based on noise modeling undertaken in the manner documented in Chapter 4 and Appendix D; the contours are not based on municipal boundaries.
				22a.2	EWR's Part 150 Study	b. Is Forest Hill included in EWR's Part 150 NEM?	Yes, Forest Hill is included in the Study Area for each airport. Please see the EWR NEM document posted on the web at http://panynjpart150.com/EWR_DNEM.asp
				22a.3	14 CFR Part 150 Guidelines / Regulations	c. How does the Part 150 Study address communities with 55+ DNL that are impacted by multiple airports?	Pursuant to 14 CFR Part 150, the TEB NEM must focus solely on noise from TEB operations and the EWR NEM must focus solely on noise from operations at EWR. The studies will comply with 14 CFR Part 150 requirements and FAA guidelines for its implementation. The FAA and PANYNJ have agreed to evaluate each airport individually and not add results together for multiple airports. Part 150 does not provide for adding noise exposure from multiple airports.
				22a.4	TEB/EWR Interaction	Per our Technical Requirement list submitted to you on 9.24.15 (attached), we specifically requested in para I: "Provide composite NEM and Excel sheets which	As noted in the response to the preceding comment, pursuant to 14 CFR Part 150, the TEB NEM must focus solely on noise from TEB operations and the EWR NEM must focus solely on noise from operations at EWR. This topic was discussed at the 7th EWR TAC

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						show total noise impacts due to both airports (EWR and TEB) added together.	meeting on September 21, 2016. The summary for that meeting states the following: *The PANYNJ response was provided to the TAC request for grid results from each of the four airport Part 150 studies. Tim Middleton (PANYNJ) responded that each study is individualized for each airport. Identical responses were provided to the TAC meetings for the JFK and LGA Part 150 studies. 'The Study Team will provide model output in graphical (contours) format and tabular (noise at existing noise monitoring locations) format, which will provide the direct comparison of measured and modeled values. See Study Protocol for further discussion. Excel tables of the data will not be provided. The studies will comply with 14 CFR Part 150 requirements and FAA guidelines for its implementation. The FAA and PANYNJ have agreed to evaluate each airport individually and not add results together for multiple airports.' There is no combined data and, therefore, no combined grid map between the airports.* The full summary of that EWR TAC meeting is available at: http://panynjpart150.com/AdminPages/GetProjectFile.asp?a=EWR4&f=EWR%20TAC%20Meeting%20No.%207%20Summary%20-%20Sept%2021,%202016.pdf
				22a.5	Public Participation	2. What is the protocol for community response to these NEMs? a. Should we email comments to this address: NJPART150STUDIES@panynj.gov? b. Is there a meeting where we can address our comments and receive a response? c. Deadlines?	You have followed one of several proper protocols by submitting comments via email. The NJPART150STUDIES@panynj.gov email address is the appropriate one to use. The Port Authority also will accept comments delivered by mail or in person at public meetings. As this matrix indicates, the Port Authority is presenting all comments in a verbatim fashion in the NEM documents for each applicable airport. All TAC meetings and workshops are open to the public and include opportunity for public comment. Responses will be provided at the meetings or subsequent meetings, if research is required. Meeting notices are provided on the project website at: http://panynjpart150.com/TEB_meetings.asp. You may sign up to receive notification of meetings at: http://panynjpart150.com/TEB_Mail_List.asp. The deadline for submitting comments on the draft TEB NEM was October 17, 2016. However, all comments received over the course of the entire study will be addressed in the Noise Compatibility program (NCP) document; the draft of that document is anticipated to be made available for public comment in late 2017.
				22a.6	Thanks	Thank you for your attention to our requests.	The Port Authority appreciates this recognition of its efforts and of all stakeholders to participate in the Part 150 process.
Marylou Tibaldo-Bongiorno, Co-Chair	Forest Hill Community Association, Air Traffic	Newark	E-mail Attach't	22b.01	Data Used in NEM Development, 14 CFR Part	In cooperation with our NY Bi-state partners the Forest Hill Community Association –Air Traffic Committee in Newark, NJ submits the following	As discussed in Chapter 4 and Appendix D of this NEM documentation, ""real-life"" data on operations over a full calendar year were used in developing the modeling inputs, including flight tracks, runway use, altitude profiles, fleet mix, and more. 2014 was

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	Control Committee				150 Requirements	requirements to be considered for the EWR Part 150 TAC **Part 150 Technical Requirements:** To be considered during development of the protocols and Noise Exposure Maps (NEMs) for the Part 150 Study. A. Consider all relevant flight tracks and profile data to help assure accurate representation of all contours including the 60 and 55 DNL contours.	used because it was the last full year for which data were available when the study commenced in 2015. 1,225 "backbone" and "dispersion" flight tracks were developed from the actual operations. Those flight tracks are depicted in 42 figures presented in Attachment A to Appendix D. 14 CFR Part 150 does not require mapping of 55 and 60 DNL. The Port Authority has decided to go beyond the requirements of Part 150 and have had 55 and 60 DNL contours prepared. They are presented in Appendix E of the NEM document, for informational purposes only.
				22b.02	Data Used in NEM Development	B. Analysis to include tracks and profile data for aircraft using Visual Flight Rules (VFR), Hold-Down Modes, or other operating modes that may impact the accuracy of noise contours in the NEM.	As discussed in Chapter 4 and Appendix D of this NEM documentation, "real-life" data on operations over the full 2014 calendar year were used in developing the modeling inputs, including flight tracks and altitude profiles. User-defined departure and approach profiles that reflect hold-down modes under both visual and instrument flight rules (VFR and IFR) were developed, submitted to the FAA for approval, and - with that approval - utilized in the modeling. Appendix D.3 presents the full technical detail.
				22b.03	14 CFR Part 150 Guidelines / Regulations	C. Use actual take off gross weights or average load factors for operations at each of the NY airports. Demonstrate sample results using Stage length as a surrogate for Take Off Gross Weight (TOGW).	Sections 6.3.7 and 6.3.8 of the Part 150 Study Protocol describe the FAA-prescribed approach for assessing and assigning stage lengths as a surrogate for aircraft takeoff weights. The Study protocol is available for review at: http://panynjpart150.com/AdminPages/GetProjectFile.asp?a=TEB2&f=Study%20Protocol%20for%20EWR%20and%20TEB%2014%20CFR%20Part%20150%20Studies%20-%20November%202015.pdf Aircraft operators do not provide airports with actual takeoff weights; commercial operators consider this information proprietary. Therefore, there is no way to obtain actual takeoff weights. If the altitude profile data that we obtain from the year of radar data suggest that the observed profiles differ enough from standard INM profiles to merit adjustment, an airport sponsor will submit user-defined profiles to the FAA for approval for use in the noise modeling effort. The FAA reviewed and approved all of the noise modeling inputs, including all user-defined inputs, as documented in detail in Appendix D.
				22b.04	Data Used in NEM Development	D. Use all data and radar tracks from ALL months.	As discussed in the response to Comment 22b.01, and in Chapter 4 and Appendix D of this NEM documentation, "real-life" data on operations over the full 2014 calendar year were used in developing the modeling inputs, including flight tracks, runway use, altitude profiles, fleet mix, and more.
				22b.05	Forecast NEM Assumptions	E. Consider New and upcoming changes to our airspace and procedures:	Slots, Multiple Runway Operations (MRO), operations taking advantage of Wake Recat, and the perimeter rule are not relevant to TEB.

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						-- Include normal growth of slot usage and any other slot changes which may become known in the study period. Will new slot rule already announced (for comment) be considered? -- Include consideration of Multiple Runway Operations (MRO) and operations taking advantage of Wake Recat which may become known in the study period. Wake Recat procedures are currently, at least partially in effect. Will use of 2014 as base year show the true impact of Wake Recat over the 5 years interval understudy for NEM's? -- Include consideration of any perimeter rule changes which may become known in the study period. -- Incorporate remaining tasks under Airspace Redesign and NextGen which may include Required Navigation Performance (RNP) procedures, Continuous Descent Approaches (CDA) as well as implementation any other tasks/changes that may be identified during the study period. F. Consider cutoff date for inclusion in INM/ADET models for any new or potential changes above."	Airspace redesign and NextGen matters, which may include Required Navigation Performance (RNP) procedures, Continuous Descent Approaches (CDA), and implementation any other tasks/changes that may be identified during the study period will be considered in the NCP phase of the study. For development of the NEMs, 14 CFR Part 150 provides for the incorporation of upcoming changes that will have an effect on the noise contours if the changes have received all required approvals and are expected to be completed/implemented within the time period covered by either NEM; i.e., by the end of 2016, for the existing conditions NEM, or by the end of 2021 for the forecast conditions NEM. This NEM includes all such approved changes expected to be completed or implemented through 2021. As noted in the Executive Summary, the noise contours for this study were prepared using the Integrated Noise Model (INM). This project began prior to the release of the Aviation Environmental Design Tool (AEDT). See discussion in Chapter 4 and Appendix D, Page D-1. The INM is an FAA-approved, industry-accepted tool for determining the cumulative effect of aircraft noise exposure around airports.
				22b.06	14 CFR Part 150 Guidelines / Regulations	G. Periodically use noise monitors for model data refinement and verification of modeling results. Report results of the comparisons to the Technical Advisory Committee. When will we see a first refinement/verification check using noise meter readings against model predictions?	14 CFR Part 150 prohibits the use of noise monitoring data to refine the noise exposure contours generated by the INM. Part 150 requires airports to use an FAA-approved noise model to calculate noise exposure for operations for the existing conditions and a five-year forecast case (2016 and 2021 in this study). As discussed in Chapter 4 and Appendix D of this NEM documentation, "real-life" data on operations over a full calendar year were used in developing the modeling inputs, including flight tracks, runway use, altitude profiles, fleet mix, and more. 2014 was used because it was the last full year for which data were available when the study commenced in 2015. Table 5-5 on page 5-8 of the NEM document shows that the modeled noise exposure is actually higher than the noise exposure measured by most of TEB's permanent noise monitoring sites.

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				22b.07	Use of Noise Model versus Measurements	H. Model outputs shall be provided in graphical and Excel formats or their equivalents. Excel format to include: census track information, latitude and longitude data and any other information needed to allow a reader to compare model and actual noise levels at noise monitor locations.	The noise monitor locations are depicted on Figure 2-5. Section 5.3 provides a comparison of measured and modeled results, which shows that the modeled noise exposure is actually higher than the noise exposure measured by most of TEB's permanent noise monitoring sites.
				22b.08	TEB/EWR Interaction	I. Provide composite noise exposure maps and Excel sheets which show total noise impacts due to both airports (EWR and Teterboro) added together.	The TEB and EWR studies will comply with 14 CFR Part 150 requirements and FAA guidelines for its implementation. The FAA and PANYNJ have agreed to evaluate each airport individually and not add results together for multiple airports. Part 150 does not provide for adding noise exposure from multiple airports.
				22b.09	Flight Track Development	J. Please explain criteria for averaging tracks to come up with standardized tracks in the INM/AEDT model.	Chapter 4 presents a detailed discussion of the manner in which the noise modelling flight tracks were developed. As discussed in Chapter 4 and Appendix D of this NEM documentation, "real-life" data on operations over a full calendar year were used in developing the modeling inputs, including flight tracks, runway use, altitude profiles, fleet mix, and more. 2014 was used because it was the last full year for which data were available when the study commenced in 2015. 1,225 "backbone" and "dispersion" flight tracks were developed from the actual operations. Those flight tracks are depicted in 42 figures presented in Attachment A to Appendix D.
				22b.10	INM/AEDT accuracy	K. Included estimate of INM/AEDT accuracy/tolerance for DNL values developed from the model used.	14 CFR Part 150 requires airports to use an FAA-approved noise model to calculate noise exposure for operations for the existing conditions and a five-year forecast case (2016 and 2021 in this study). As discussed in Chapter 4 and Appendix D of this NEM documentation, "real-life" data on operations over a full calendar year were used in developing the modeling inputs, including flight tracks, runway use, altitude profiles, fleet mix, and more. 2014 was used because it was the last full year for which data were available when the study commenced in 2015. INM is the FAA-approved model for use during the TEB Part 150 Study. It is beyond the scope of the Part 150 study to compare, contrast, or estimate the accuracy of the INM..
				22b.11	Part 150 Guidelines / Regulations	Additional requests: 1. Require PANYNJ to: -- Do yearly updates of Noise Exposure Maps -- Submit requests for mitigation funding when number or people impacted within the 65 DNL/55DNL contour increases.	The NEM document is part of a voluntary process being undertaken by the Port Authority to investigate means to mitigate aircraft noise. TEB's Part 150 study, i.e. the NEM and NCP components, will be updated in accordance with FAA criteria regarding changes in conditions that warrant any updates. The NCP phase of the study will consider land use compatibility measures and their eligibility for federal funding assistance, and include plans for monitoring changes in noise exposure that might affect the areas of eligibility.

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David Rothblatt	Resident	Rutherford	E-mail	23.1	Complaint Submission	Subject: Comment TEB Part 150 Study I am writing to express my concern for the amount of airplane noise at and around my house in Rutherford. I have utilized the online form to complain in the past but that form is inadequate because it only allows the checking of one box. The planes are too frequent, too loud, too close and rampantly running during the restricted overnight hours.	If you are having trouble using the web form, you may contact the Teterboro Noise Abatement Office at 201.288.8828; staff in the office will be able to assist you with the submittal of individual noise complaints.
				23.2	Flight Profiles	I attended the noise study presentation in Hackensack and am now familiar with the frameworks and mission of that study. I take exception with some of the premises of the study. The idea of measuring noise exposure by computer modeling of the aircrafts does not take into account willful deviation from the inferred position created by the computer model. Whether this is at operator or airport discretion is not discernible but the low height of these planes could not possibly result in an acceptable yearly averaged noise quotient. All of this results in an excess of noise on a nearly continuous basis over my house and that of my neighbors.	14 CFR Part 150, specifically Section A150.103, “Use of computer prediction model,” requires airports to use an FAA-approved noise model to calculate noise exposure for operations for the existing conditions and a five-year forecast case (2016 and 2021 in this study). As discussed in Chapter 4 and Appendix D of this NEM documentation, "real-life" data on operations over a full calendar year were used in developing the modeling inputs, including flight tracks, runway use, altitude profiles, fleet mix, and more. 2014 was used because it was the last full year for which data were available when the study commenced in 2015. User-defined departure and approach profiles that reflect hold-down modes under both visual and instrument flight rules (VFR and IFR) were developed, submitted to the FAA for approval, and - with that approval - utilized in the modeling. Appendix D.3 presents the full technical detail. 1,225 "backbone" and "dispersion" noise-modeling flight tracks were developed from the actual operations. Those flight tracks are depicted in 42 figures presented in Attachment A to Appendix D. Table 5-5 on page 5-8 of the NEM document shows that the modeled noise exposure is actually higher than the noise exposure measured by most of TEB's permanent noise monitoring sites.
				23.3	Flight Routing	Rutherford was settled in the 1600’s and incorporated as a borough in 1881. There have been families living here long before anyone had the idea to use private airplanes. Now, with hundreds of thousands of flights so close to our houses, the noise nuisance that these flights represent significantly impinge, by definition, on the quiet enjoyment of our homes and backyards. This would all be an intractable problem if there were not any alternate routes for the planes to take which would keep them flying above unincorporated and nearly unincorporated	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, “Designation of noise systems”, which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use noise effects, such as speech interference,- associated with individual aircraft operations or the frequency of operations during specific periods as a basis for determining land-use compatibility. As discussed in Chapter 4 and Appendix D of this NEM documentation, the calculation of DNL does take into account the noise contribution of every aircraft operation that

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						areas. Thankfully, there is an abundance of those areas east of Route 17 where the noise would not be as big a problem for residents.	takes place over each entire analysis year, so both busy and slow periods are taken into account. In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Noise abatement “routing (flight tracks) will be a major focus of that effort.
				23.4	Health Effects	I realize that the scope of this complaint is strictly noise but I would be remiss if I didn’t at least mention the other tentacles of the nuisance that the planes present. The fuel dumps and other environmental impact plus the danger of a momentous crash which combined with the noise, proximity, frequency and timing of the arrivals and departures, creates a threat and nuisance so extreme that it poses a substantial threat to the physical and mental health of individuals and families in Rutherford.	This Study has a specific focus on noise exposure and does not analyze aircraft emissions, other pollutants, or human health effects related to aircraft operations. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines. As noted in the response to Comment 42, please note that pursuant to requirements of laws passed by the U.S. Congress, the FAA regulates matters related to safety. The Port Authority defers to the FAA on these matters.
				23.5	Flight Routing	Send the flights over the Meadowlands and the abundant unincorporated land beginning with the landfill east of Schuyler Avenue then over the Meadowlands Sports Complex and the industrial parks of Moonachie, problem solved.	In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Noise abatement flight tracks will be a major focus of that effort.
Cynthia Chovan-Dalton	Resident	Rutherford	E-mail	24.1	Flight Routing	Subject: Part 150 study I attended the open house on the Part 150 study, which I found very helpful. I submitted a comment at the open house, but fell I need to expand on those limited remarks, based on further experience of living with the constant noise and further research. Teterboro Airport is located in the middle of residential communities that existed long before the airport. It was built literally across the street. As such it should have never been allowed to develop into the busy commercial airport it has become. It is an excessive burden on the surrounding communities. Noise abatement strategies must be taken to eliminate this impact on	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, “Designation of noise systems”, which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses which are compatible or noncompatible with specific DNL exposures. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines. Part 150 does not permit airports to use the frequency of operations during specific periods as a basis for determining land-use compatibility. As discussed in Chapter 4 and Appendix D of this NEM documentation, the calculation of DNL does take into account the noise contribution of every aircraft operation that takes place over each entire analysis year, so both busy and slow periods are taken into account.

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
						the quality of life in all of these communities. Not reduce, eliminate. And not just the ones immediately adjacent to the airport, as outline in the study, all the communities under the current flight path. 1. Flight paths must be changed so that arriving and departing flights do not fly over residential areas. Flight patterns are changed when a runway is closed for maintenance so it is possible to change. New flight patterns must be developed.	In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses. Noise abatement flight tracks will be a major focus of that effort.
				24.2	Nighttime Restrictions	2. The "voluntary" restrictions of not flying in or out of Teterboro between 11 pm and 6 am must become mandatory. The restrictions are a joke. No one is following them. I have been awakened by all hours of the night by Teterboro flights, sometimes 5 or 6 an hour flying only a few hundred feet above our homes.	This NEM study phase is focused on identifying noncompatible land uses in terms of DNL. As noted in Section 1.5 of this document, DNL adds a 10 decibel weighting to all noise occurring at night; i.e., between 10 pm and 7 am. This weighting is equivalent to considering the effect of each nighttime aircraft operation to be the same as 10 identical daytime operations. As noted in Chapter 2, under "Noise Abatement Measures," the Port Authority requests that operators voluntarily restrain from operation between 11 pm and 6 am. The NCP phase will consider means to improve compliance with this voluntary measure. The NCP phase also will consider non-restrictive noise abatement runway use and flight track procedures to reduce noise exposure over noncompatible areas. The Port Authority is legally obligated to the FAA to operate and maintain the airport in a safe and serviceable condition, not grant exclusive rights, mitigate hazards to airspace, and use airport revenue properly. The FAA considers mandatory flight curfews a type of "noise or access restriction." These types of measures and their possible applicability to Teterboro Airport will be discussed during the NCP phase of the study.
				24.3	Speech Interference, Classroom Learning Interference	3. Jets cannot fly under 2,000 feet in residential areas. I live under the departure path where planes fly between 1,200 and 1,500 feet over my house, according to the Port Authority's WebTrak page. Arriving flights fly as low as 700 feet over Rutherford. At such altitudes, even at 1,500 feet it is impossible to carry on a conversation in my backyard. It is unbearable for those directly under the arriving flights, such as my children's schools. Despite sound proofing my	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). As documented in Chapter 4 and Appendix D, the Port Authority took great care to develop the noise contours presented for these two years to take into account actual flight paths and altitudes throughout the study area. In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
						daughter says her teacher has to occasionally stop speaking because of the jets. And areas of my son's school are not soundproofed at all and teachers must stop teaching every 90 seconds. I work from home some days and I have to make sure my windows are closed when I am talking on the phone so I can hear. Don't talk about allowable decibels. Come spend a day in our backyards, or sleep overnight in our town, before justifying any flights over our town.	areas, including residences and any schools exposed to DNL greater than or equal to 65 dB for either 2016 or 2021.
				24.4	Flight Frequency	4. The frequency MUST be reduced. Planes are flying low over our houses ever 75-90 seconds for hours each day. Even if they were flying at a higher altitude, the constant interruptions are unacceptable. You simply cannot operate a busy commercial airport in a residential area.	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures. Part 150 does not permit airports to use noise effects – such as speech interference -- associated with individual aircraft operations or the frequency of operations during specific periods as a basis for determining land-use compatibility. As discussed in Chapter 4 and Appendix D of this NEM documentation, the calculation of DNL does take into account the noise contribution of every aircraft operation that takes place over each entire analysis year, so both busy and slow periods are taken into account. In the NCP phase of the Part 150 study, the Port Authority will consider measures to reduce noise exposure over noncompatible areas, limit growth in noise exposure over noncompatible areas, mitigate aircraft noise where it cannot be reduced to compatible levels, and prevent introduction of new noncompatible land uses.
				24.5	Environmental Impact	5. Although I understand that Part 150 is a noise abatement study, the Port Authority also needs to examine the environmental impacts on surrounding towns, especially given the frequency of the flights over these towns. There are several studies documenting negative environmental impacts in areas near airports from chemical pollution as well as noise pollution.	This NEM phase of the Part 150 study considers aircraft operations, associated modeled noise levels, and noise / land-use compatibility conditions for 2016 and 2021, in the manner required by 14 CFR Part 150, specifically Sec. 150.9, "Designation of noise systems", which requires airports to quantify noise exposure in terms of the Day-Night Average Sound Level (DNL). The purpose of the NEM phase is to identify land uses that are compatible or noncompatible with specific DNL exposures.

Commenter Name	Affiliation / Organization	Commenter NJ City	Comment Medium	Comment sub-ID	Comment Topic(s)	Comment	Response to Comment
						The current situation is unacceptable and should have never been allowed to reach this point. Something must be done to restore the quality of life to towns such as Rutherford, Carlstadt, Moonachie, Hackensack, and others.	Part 150 does not permit airports to use the frequency of operations during specific periods as a basis for determining land-use compatibility. This Study has a specific focus on noise exposure and does not analyze aircraft emissions, other pollutants, or human health effects related to aircraft operations. However, the FAA took quality of life and health considerations into account in developing the Part 150 land-use compatibility guidelines.

Appendix H.2

- Comment Forms

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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

14 CFR Part 150 Study
Teterboro Airport
Public Information Workshop #1
October 15, 2015

Comment Form

Please use the space below to provide your questions and comments regarding the 14 CFR Part 150 Study for Teterboro Airport. Your comments and/or questions will be reviewed and considered during the Study. Your participation in the process is appreciated. If you wish to receive future project updates, please provide your contact information below.

I Appreciate your Efforts on this project And the people who worked this workshop this evening -

- Planenoise.com is frustrating because you need to fill out each field every time you submit a complaint. Can you streamline that for Active users who submit multiple complaints a day? I've submitted more than 25 complaints in an Afternoon. Seems there should be an easier way

- you have too many websites to submit info and complaints Plane noise.com and NJPART150@PANYNJ.gov - why?

Name: Kevin McVey   Organization:
Street Address: 172 E. Magnolia Ave City: Maywood State: NJ Zip: 07607
Tel: 917-716-4051   Email: KMNY2009@AOL.Com

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information (PIP) in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask in your comment to withhold from public review your personal identifying information, that cannot be guaranteed.

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- I CAN NOT USE MY BACKYARD ON FRIDAY thru SUNDAY or During Any large event, like the SuperBowl, Due to Frequency, AND NOISE OF ARRIVING Jets. If I sit w/guests in My backyard during an Arriving Aircraft, I have to pause conversation till the Jet passes due to low flying, noisy jets. When you have to do that every two-three minutes, during peak time, ITS unbelievably frustrating. Also I CAN NOT Keep windows on the BACK of My house open when the weather is NICE. The Frequency/NOISE interrupts my regular life. I CAN NOT hear My Television And In The Morning hours, ARRIVALS WAKE Me FROM my sleep ——

Name: Kevin McVey   Organization:
Street Address: 172 E. MAGNOLIA AVE City: MAYWOOD State: NJ Zip: 07607
Tel: 917-716-4051   Email: KMNY2009@AOL.COM

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- I would like to Thank one of your Consultants, TED for his patience and thoroughness ~~and~~ AND GABRIEL ANDINO from Teterboro Airport for his patience AND Information -

- There seems to be many years before this Study ENDS AND I offer My ASSTANCE AS A Resident/Homeowner to help in Any way

Thank you

Name: Kevin McVey Organization:

Street Address: 172 E. MAGNOLIA AVE City: MAYWOOD State: NJ Zip: 07607

Tel: 917-716-4051 Email: KMNY2009@AOL.com

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information (PIP) in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask in your comment to withhold from public review your personal identifying information, that cannot be guaranteed.

PAGE THREE Kevin McVey

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At one time, jets approached TEB from West
to East over the ridge that runs from Hasbrouck
Heights through Carlstadt. It was determined
that the air traffic tower was not high enough
to clearly see these approaching jets & that
approach was terminated. However, over
the past 2 years this approach has been
increasingly used by low-flying helicopters
on approach to TEB. As they pass over my
home, the floor vibrates, the crystal dishes
in my chandelier shake, the metal mini-blinds
vibrate loud enough to hear in the living
room, as does the metal sculpture on the
bed room wall. After eliminating the West →

Name: Carol J. Skiba Organization:
Street Address: 191 Field Avenue City: Hasbrouck Hts State: NJ Zip: 07604
Tel: 201-288-2906 Email: vermontskibums@aol.com

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to east jet approach & restoring a good percentage
of quality of life to the residents, it is like a
slap in the face to these residents to have this
approach used by low flying helicopters. My question
in this regard is if it was deemed unsafe for
jets, how is it now safe for helicopters?

These low flying helicopters have not used
this approach in the past. To continue to allow
them to negatively impact the residential
community will only serve to devalue home-
owners' investments in their costly property, impact
the structural integrity of those costly property &
devalue the worth of those properties. The
residents did not get any notice that their
property would be damaged by low-flying
helicopters & have no remedy at hand.

Having recently painted the interior of my
home, since the increasing numbers of
helicopters has created cracks in my newly
painted walls.

These helicopters need to fly over the
industrial areas surrounding the airport &
not the residentials areas impacting
families + quality of life.

3

From: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Sent: Monday, October 24, 2016 1:39 PM
To: Kristen Ahlfeld; Leslie Black; Robert C. Mentzer; Ted Baldwin; Jessica L. Cohen; Bradley M. Dunkin
Subject: FW: Notice: Teterboro Airport Noise Compatibility Planning Study Public Information Workshop - September 22, 2016

From: Sabrina Picinic [mailto:ssabrina7979@aol.com]
Sent: Friday, September 16, 2016 8:03 PM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: Re: Notice: Teterboro Airport Noise Compatibility Planning Study Public Information Workshop - September 22, 2016

This workshop is scheduled the same evening as back to school night for my child so I will not be able to attend.

-----Original Message-----
From: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Sent: Fri, Sep 16, 2016 3:53 pm
Subject: Notice: Teterboro Airport Noise Compatibility Planning Study Public Information Workshop - September 22, 2016

Good Afternoon,

As part of the ongoing Part 150 Study for Teterboro Airport, The Port Authority of New York & New Jersey will be hosting a public information workshop on Thursday, September 22nd, 2016 from 6:00pm-9:00pm at the:

Bergen County Plaza - 1st Floor Multi-Purpose Room
One Bergen County Plaza
Hackensack, NJ 07601

At this workshop, a Noise Exposure Map (NEM) will be presented that describes the Teterboro (TEB) Airport layout and related levels of noise exposure in the surrounding area for the current year (2016), and a forecasted future year (2021).

The workshop will be held in an "open house" format from 6 p.m. to 9 p.m. In order to provide the public with the maximum opportunity for one-on-one interaction and sharing of information and concerns you may attend at any time during the three-hour open house.

Attached to this e-mail is the PDF flyer for the public workshop; please share with anyone who may have interest.

For more information on the Part 150 study for TEB, please visit the Port Authority's dedicated website at:

http://www.panynjpart150.com/TEB_homepage.asp

You may also subscribe to the mailing list for email updates on the study at:

http://panynjpart150.com/TEB_Mail_List.asp

The Draft Noise Exposure Map report is available for Public review and Comment at:

http://www.panynjpart150.com/TEB_DNEM.asp

You have received this e-mail because you have submitted noise complaints regarding Teterboro Airport in the past year, and/or you requested to be a part of updates on the Part 150 study. We encourage you to share this flyer and workshop information with your friends and neighbors.

We look forward to your attendance on September 22nd

Please call 212-435-3777 if you have any questions. Thank you.

TEB Part 150 Study Mailing List
Aviation Noise Office
The Port Authority of NY & NJ
http://www.panynjpart150.com/TEB_homepage.asp
(212) 435-3777

NOTICE: THIS E-MAIL AND ANY ATTACHMENTS CONTAIN INFORMATION FROM THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY AND AFFILIATES. IF YOU BELIEVE YOU HAVE RECEIVED THIS E-MAIL IN ERROR, PLEASE NOTIFY THE SENDER IMMEDIATELY, PERMANENTLY DELETE THIS E-MAIL (ALONG WITH ANY ATTACHMENTS), AND DESTROY ANY PRINTOUTS.

4

From: Middleton, Timothy <tmiddleton@panynj.gov>
Sent: Monday, September 26, 2016 11:27 AM
To: Ted Baldwin; Robert C. Mentzer; Mary Ellen Eagan; Jessica L. Cohen; Kristen Ahlfeld; Leslie Black
Subject: FW: Air traffic over prospect avenue in Hackensack

TEB Part 150 comment. See below.

-----Original Message-----
From: Stephen Aljian [mailto:stephenaljian@yahoo.com]
Sent: Thursday, September 22, 2016 6:40 PM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: Air traffic over prospect avenue in Hackensack

My only urgent request is that pilots use the new route into Teterboro airport to give the residents a brake from the jets coming in for a landing day and night every 5 min. We have lost ALL quality of life on Prospect Avenue in Hackensack. I live at 277 Prospect Avenue 18th floor and it is like living in an airport.
The noise and FALLOUT from the corporate jets which filter down on our terraces and pools, there is a health issue here. As for the noise, it is unbearable to live here.

This study does not address our problems in this city - I reviewed it online.

What we need is for the jets to land at Teterboro by a route that does not fly low over the high rise buildings and Hackensack University Medical Center.

Stephen Aljian

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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

14 CFR Part 150 Study
Teterboro Airport
Public Workshop #2
September 22, 2016

Comment Form

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In my view, the noise abatement study should include the question of whether the aircraft using Teterboro should ~~have~~ pay a noise abatement fees that would be paid to towns most affected by the noise. I live directly under the arrival flight path and cannot sit in my backyard on weekends due to the noise of planes 500 feet above every 90 seconds.

Name: William Peterson Organization:
Street Address: 319 Maple Hill Dr City: Hackensack State: Zip: 07601
Tel: 201-880-0408 Email: petersenb@optonline.net

Please email completed comment forms to:
NJPart150@panynj.gov

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly-available at any time. While you can ask within your comment to have your personal information withheld from public review, that request cannot be guaranteed.

THANK YOU FOR YOUR PARTICIPATION

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Since the last public meeting on this topic - nothing has improved & in fact gotten worse -
Some of the same noisey planes are still in use for over 15 yrs -

You can not hear the TV or a conversation when some planes go overhead - They fly all night long forget [illegible] & the dirt from the fuel is dissgusting -

Name: Deirdre Bartel Organization:
Street Address: 217 Ridge Rd City: Rutherford State: NJ Zip: 07070
Tel: 201-933-6761 Email:

Please email completed comment forms to:
NJPart150@panynj.gov

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I LIVE IN the DIRECT PATH OF A RUNWAY. I would like to KNOW ABOUT SOUND BARRIERS or RE DIRECTION OF INCOMING & OUTGOING flights. CAN the planes ENTER/LEAVE FROM ANOTHER LOCATION/RUNWAY

Name: Michael Piccinillo Organization:
Street Address: 20 OAK ST City: MOONACHIE State: NJ Zip: 07074
Tel: 201-636-4002 Email: mpiccinillo@nj.rr.com

Please email completed comment forms to:
NJPart150@panynj.gov

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There are too many departures from Teterboro Airport, night + Day.
Too many late night/early morning departures heading North - More restrictions are needed. On 9/22/16 11 flights between 11:50 PM + 12:55 AM. They started again at 5:27 AM - Jets with loud engines should be fined. How about $10,000.00 for each occurrence. That would stop/Curtail the Noise. → Then Give it back to Property owners/towns, to reduce our Property taxes.
* We need a Change! *

Name: [illegible signature] Organization: Resident
Street Address: 43 Broadway City: Hackensack State: NJ Zip: 07601
Tel: 201-343-6161 Email: mri523@aol.com

Please email completed comment forms to:
NJPart150@panynj.gov

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly-available at any time. While you can ask within your comment to have your personal information withheld from public review, that request cannot be guaranteed.

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The planes are too loud. When sitting on my terrace, we have to stop talking ~~to~~ because we can't hear each other. I have to close the windows when I'm on the phone or watch TV.
I'm located north of ~~the~~ Teterboro, so the planes are landing (arrivals).
Please look ~~[illegible]~~ into rotation ~~of~~ so we don't have the noise all the time.

(Please add me to mailing list for updates. ejcetin@gmail.com)
Thanks

Name: Esra Cetin Organization:
Street Address: 277 Prospect Ave City: Hackensack State: NJ Zip: 07601
Tel: Email: ~~e~~ ejcetin@gmail.net

Please email completed comment forms to:
NJPart150@panynj.gov

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56 Longview Ave

Fanny Meyer Hillers Elementary School HACK was promised to be Air conditioned + sound proofed over 10 yrs ago in Hackensack. St. Francis on Lodi St Elementary School was completed + Jackson Ave Elementary School on Washington Ave were done.

When question when it would be done we were told that the FAA had run out of money.. When will you have enough money to do it??

It is very difficult to hear the teacher when the planes go over and the windows are closed or opened. The Building shakes. The school ground becomes very difficult to hear one another.

Name: Kathleen Salvo Organization:

Street Address: 184 Hudson St City: HACK State: NJ Zip: 0760

Tel: 201 981 7848 Email: kats184@optonline.net

Please email completed comment forms to:
NJPart150@panynj.gov

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One of the things that I would like to see is a comparison chart/graph that shows the paths + contours of NEWARK (Liberty Airport) Traffic Versus TETERBORO. Do they cross over each other? Could we see the difference in total # of flights?

Is there a territory where Teterboro flights CANNOT go?

Could we move some of the flight paths over the Meadowlands or swamps where the residential capacity is smaller?

Could we move the flight paths over the traffic of Route 17 and commercial businesses instead of the residential ~~zones~~ zones?

Name: Dawn Avagliano Organization:

Street Address: 130 Mountain Way City: Rutherford State: NJ Zip: 07070

Tel: 917-318-5064 Email: hipstergrrlie@hotmail.com

I am extremely concerned about the environmental DANGERS with the increase of so many more LOW flying airplanes.

Please email completed comment forms to:
NJPart150@panynj.gov

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Given that flight patterns at Teterboro are strongly affect by flight patters of Newark-bound aircraft, it would be helpful to also see any studies of Newark noise abatement.

It would also be helpful to see more on strategies for noise abatement, like soundproofing. Even though my 5 year old's school in Rutherford has been soundproofed with port Authority funds she says her teacher still has to stop teaching when planes fly overhead.

Name: Cynthia Chovan-Dalton Organization:
Street Address: 36 Riverview Ave City: Rutherford State: NJ Zip: 07070
Tel: 201-710-1721 Email: cynthiachovan@yahoo.com

Please email completed comment forms to:
NJPart150@panynj.gov

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly-available at any time. While you can ask within your comment to have your personal information withheld from public review, that request cannot be guaranteed.

THANK YOU FOR YOUR PARTICIPATION

13

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

14 CFR Part 150 Study
Teterboro Airport
Public Workshop #2
September 22, 2016

Comment Form

Please use the space below to provide your questions and comments regarding the 14 CFR Part 150 Study for Teterboro Airport. Your comments and/or questions will be reviewed and considered during the Study. Your participation in the process is appreciated. If you wish to receive future project updates, please provide your contact information below.

When will Hillers School, 56 Longview, Hackensack be Sound proofed? It was promised years ago.

Why aren't the runways switched up more? Too many land or take off on the Same runway (48% land & 50%+ take off)

The Rote 17 landing approach needs to be utilized more. How can the FAA encourage pilots to do so?

Name: Regina DiPasqua Organization:
Street Address: 377 Parker Ave City: Hackensack State: NJ Zip: 07601
Tel: 201-681-5167 Email: threeboyziii@aol.com

Please email completed comment forms to:
NJPart150@panynj.gov

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly-available at any time. While you can ask within your comment to have your personal information withheld from public review, that request cannot be guaranteed.

THANK YOU FOR YOUR PARTICIPATION

14

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

14 CFR Part 150 Study
Teterboro Airport
Public Workshop #2
September 22, 2016

Comment Form

Please use the space below to provide your questions and comments regarding the 14 CFR Part 150 Study for Teterboro Airport. Your comments and/or questions will be reviewed and considered during the Study. Your participation in the process is appreciated. If you wish to receive future project updates, please provide your contact information below.

- Decrease flights from Runway 24
- Design planes quieter and safer.
- Bring more flights to Runway 19
- Build another runway between Runways 24+/19 (SW)
- Eliminate Runway 24 Departures
- New Runway Departures South of warehouses

The flights affect quality of life of residents on several levels including noise - health - safety.

Name: JOHN BINETTI Organization: ALL PRO AUDIO VIDEO
Street Address: 18 BERGER ST. City: MOONACHIE State: NJ Zip: 07074
Tel: 201-933-1555 Email: allpro6@gmail.com

Please email completed comment forms to:
NJPart150@panynj.gov

Please note that comments can only be accepted with the full name and address of the individual commenting. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly-available at any time. While you can ask within your comment to have your personal information withheld from public review, that request cannot be guaranteed.

THANK YOU FOR YOUR PARTICIPATION

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9/8/16

To whom it may concern.

I have lived in Hackensack, New Jersey for over a year now and I can longer sit ideally bye and live with the constant sound of corporate jets flying directly over my apartment all hours of the day and night.

This memorial-day weekend these planes started their landing pattern into Teterboro Airport at 4:30 in the morning and didn't end until 10:30 in the evening – over 75 jets planes had landed at three-minute intervals – the sound was insidious and made me ill.

I have never heard anything as loud. One has to question the negative effect on the mental health of so many men, women and children who live in these buildings on Prospect Avenue.

These corporate jets fly dangerously close to the rooftops of most of the buildings - they fly seven days a week and in all kinds of weather as well.

Please keep me informed as to how I might make my anger and frustration heard!

Life is two short!

Nicholas A. Gisonde

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From: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Sent: Monday, October 24, 2016 1:39 PM
To: Kristen Ahlfeld; Leslie Black; Robert C. Mentzer; Ted Baldwin; Jessica L. Cohen; Bradley M. Dunkin
Cc: Middleton, Timothy
Subject: FW: 14 CFR Part 150 Airport Noise Compatibility Planning Study: Teterboro Airport (TEB)

From: Annika [mailto:mammika@verizon.net]
Sent: Sunday, September 25, 2016 9:29 AM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: 14 CFR Part 150 Airport Noise Compatibility Planning Study: Teterboro Airport (TEB)

14 CFR Part 150 Airport Noise Compatibility Planning Study: Teterboro Airport (TEB)

Annika Cioffi, 201-531-0209, 27 Wingra Avenue, Rutherford, NJ 07070, mammika@verizon.net
I lived on 85 Chestnut Street in Rutherford NJ from 2001 to 2007. During that time, the noise from Teterboro flights was extremely intrusive in our daily lives. Often when watching tv in the evenings, we would have to increase and decrease the volume to combat the noise.
Now that we live on 27 Wingra Avenue, Rutherford, and now the time I notice the noise is after the kids go to bed, around 10pm and it continues all night. Flight after flight after flight after flight. It severely impacts our quality of life here in Rutherford, which is already impacted by light pollution, the smell of the Passaic River and the stress of living in North Jersey in general.
When I lived in Newport Beach, CA, I lived near Irvine's John Wayne Airport. The residents there all came together and changed the regulation for the airport to increase quality of life. They changed the flight takeoff pattern to a steeper increase which solved the problem and gave a thrill-but-still-safe ride to all passengers. I offer this to you as a possible way around this issue. Perhaps you could take a look at these articles and use this possibility to curb this problem here in NJ.
http://www.ocweekly.com/news/john-wayne-airport-named-among-10-scariest-6458589
http://www.ocair.com/generalaviation/noise/
http://articles.latimes.com/1998/apr/13/local/me-38832
America's scariest airport could pack thrills as FAA considers 'S-curve' takeoff

America's scariest airport could pack thrills as FAA considers 'S-c...
By Rory Carroll
FAA considering takeoff route for California's John Wayne airport to further muffle noise over wealthy neigh...

1

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From: Middleton, Timothy <tmiddleton@panynj.gov>
Sent: Monday, September 26, 2016 11:39 AM
To: Ted Baldwin; Robert C. Mentzer; Kristen Ahlfeld; Leslie Black; Mary Ellen Eagan; Jessica L. Cohen
Subject: FW: Comment Deadline

One more comment.

-----Original Message-----
From: NJPART150STUDIES
Sent: Monday, September 26, 2016 11:36 AM
To: Beth Schmais <bschmais@gmail.com>
Subject: RE: Comment Deadline

Good morning,

The deadline for comments on the Teterboro Airport Noise Exposure Map (NEM) report is October 17, 2016. The study will continue to the second phase after this deadline. Comments received after the deadline will be addressed in the final report.

Thank you for your interest in the Part 150 study.

TEB Part 150 Study Mailing List
Aviation Noise Office
The Port Authority of NY & NJ
http://www.panynjpart150.com/TEB_homepage.asp
(212) 435-3777

-----Original Message-----
From: Beth Schmais [mailto:bschmais@gmail.com]
Sent: Monday, September 26, 2016 9:42 AM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: Comment Deadline

Hi,

Can you tell me what the deadline is for submitting comments on the Teterboro noise study?

Thanks.

Sent from my iPhone

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From: Middleton, Timothy <tmiddleton@panynj.gov>
Sent: Thursday, October 13, 2016 10:17 AM
To: Kristen Ahlfeld; Leslie Black; Ted Baldwin; Robert C. Mentzer; Mary Ellen Eagan
Cc: Yousuf, Adeel
Subject: FW: Air Traffic Noise & Pollution in Rutherford, NJ

Comment for the TEB Part 150 (see below).

-----Original Message-----
From: Claudia Kerr [mailto:claudia4.kerr@gmail.com]
Sent: Tuesday, October 04, 2016 11:28 AM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: Air Traffic Noise & Pollution in Rutherford, NJ

Gentlemen,
I was made aware of the study being done in regard to the impact of air traffic to and from Teterboro Airport on local towns by an article in the Bergenite. I was not aware of the September 22nd meeting but have signed up now for email notifications of future information. I am writing to advise you of the of the experience of my husband and myself this year living in Rutherford. We have lived here since 1976 and have experienced air traffic constantly increasing. We not only have traffic from Teterboro but also frequent helicopters that travel back and forth east and west. I am not aware of the origins of these helicopters.

The air traffic noise and pollution has been constant and very annoying. The planes are close, frequent and disturbing to us in our home and on our property. We are very concerned about the impact of the current air traffic and possible increasing air traffic on our home and town. The air traffic affects the residents daily lives, the quality of our lives and our health. As I write this email I sit inside my home, with the windows closed, hearing loudly yet another plane close by overhead. There was a plane a few minutes before and I am sure another will follow in a few minutes. This is unacceptable. Air traffic patterns need to be changed and future additions to flights should not be considered. I am aware that we live in a metropolitan area but that does not mean that consideration should not be given to the quality of life to those who reside nearby to airports. Teterboro was not always such a busy airport. Air traffic has increased substantially.

I add my concerns to those of others who have voiced their experiences regarding the control of air traffic over Rutherford. I expect that consideration to our concerns of quality of life, pollution (both air & noise) and health will be fair when the study is completed.

Sincerely,
Mrs. Claudia Kerr

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From: Middleton, Timothy <tmiddleton@panynj.gov>
Sent: Thursday, October 13, 2016 2:15 PM
To: Kristen Ahlfeld; Leslie Black; Ted Baldwin; Robert C. Mentzer; Jessica L. Cohen
Cc: Yousuf, Adeel
Subject: FW: Comment-TEB PART 150 Study

Another Comment on the TEB NEM Report.

From: Beth Schmais [mailto:bschmais@gmail.com]
Sent: Monday, October 10, 2016 7:59 AM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: Comment-TEB PART 150 Study

I'm writing to express my concerns about the current noise situation near Teterboro airport and the conclusions of the noise study.

My understanding is that the noise study will state that the noise level in my neighborhood (Ridge Rd in Rutherford) is within the FAA guidelines. I feel this not an accurate assessment of the situation. We have been living with the noise of planes coming in to land directly overhead very low and extremely loud - so loud that it is impossible to even conduct a conversation even when indoors with the windows closed. This happens every 2-3 minutes for hours, sometimes for days or even weeks. I don't think there is any way this can be considered an acceptable level of noise.

I feel strongly that decisions on how and when planes land should not be based solely on what is convenient for the airport and the users of private and corporate jets but should take into consideration the impact on the people on the ground. A well-established quiet residential neighborhood is being turned into a landing strip and becoming unlivable.

The increased air traffic has a detrimental effect on the ability of people to have quiet enjoyment of their homes and is damaging to property values-officials who regulate this airport should have a responsibility to take this into consideration.

Clearly there are routes the planes can take to land (the east side of Rt 17) that do not have the same impact on residential neighborhoods and the route can be varied so one neighborhood does not bear the brunt of airport traffic. I feel strongly that the FAA and the Port Authority have the responsibility to ensure that the appropriate action is taken to address the adverse impact Teterboro is having on surrounding residential neighborhoods.

The real life experience of those of us suffering through this on ground should be prioritized in the conclusions of this study-versus basing the decisions solely on computer simulations.

Thanks for your consideration.

Beth Schmais
219 Ridge Rd
Rutherford, NJ

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From: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Sent: Monday, October 24, 2016 1:39 PM
To: Kristen Ahlfeld; Leslie Black; Robert C. Mentzer; Ted Baldwin; Jessica L. Cohen; Bradley M. Dunkin
Cc: Middleton, Timothy
Subject: FW: Teterboro NOISE

From: Len Goldberg [mailto:lgamertel@aol.com]
Sent: Wednesday, October 12, 2016 4:53 PM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: Teterboro NOISE

I don't mind putting up with the noisy Teterboro jet airplane takeoffs that fly over my home at 88 West Newell Avenue, Rutherford, NJ, if I get paid for the inconvenience and devaluation to my property. How about just $1 for each over-flight and you also included each and every citizen of Rutherford and paid them as much. That would work out to be about $20,000 for each over-flight.

---OR---

IMPOSE A MAXIMUM DB NOISE REGULATION THAT IS 50% LOWER THAN CURRENT STANDARDS.

--- OR---

CLOSE THE AIRPORT DOWN.

Len Goldberg
lgamertel@aol.com

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From: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Sent: Thursday, October 20, 2016 10:17 AM
To: Ted Baldwin; Robert C. Mentzer; Jessica L. Cohen; Kristen Ahlfeld; Leslie Black; Middleton, Timothy
Subject: FW: Rutherford, NJ and the Part 150 Airport Noise Compatibility Planning Study

TEB 150 Comment.

From: palmer yale [mailto:palmeryale@hotmail.com]
Sent: Friday, October 14, 2016 3:20 PM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Cc: palmer yale <palmeryale@hotmail.com>
Subject: Rutherford, NJ and the Part 150 Airport Noise Compatibility Planning Study

Palmer Yale
199 Woodland Ave
Rutherford, NJ 07070
917-224-6365
palmeryale@hotmail.com

Please include Rutherford, New Jersey in the Part 150 Airport Noise Compatibility Planning Study and all studies that might decrease or stop planes flying over Rutherford, NJ.
Rutherford is in the flight path of both departing and arriving planes in and out of Teterboro airport and many of the planes are too low, too loud, and pollute our town. We want no more planes to fly over our town.
I urge the people making decisions at the Port Authority to remove Rutherford from the flight paths used by Teterboro. There are other flight paths that go over non-residential areas of the Meadowlands and it is these areas and flight paths that should be used, NOT the ones currently over Rutherford and other nearby towns.
Residents of Rutherford experience poorer quality lives due to the constant noise and pollution of Teterboro planes.
I also urge the Port Authority to curb and cancel the expansion of Teterboro airport as this will allow more and larger aircraft to pollute our air and decrease our quality of life.

Palmer Yale
199 Woodland Ave
Rutherford, NJ 07070
917-224-6365
palmeryale@hotmail.com

22a

Subject: RE: Part 150 NEM Questions from FHCA-ATC

From: Bonpix [mailto:bonpix@verizon.net]
Sent: Friday, October 14, 2016 10:17 AM
To: Middleton, Timothy <tmiddleton@panynj.gov>
Cc: Ken Kroll <kmkworks@aol.com>; Jeff Morgan <jeffmorgan7588@gmail.com>; Shadia Saleh <sal.shadia@gmail.com>; msheehan17@regis.org
Subject: Part 150 NEM Questions from FHCA-ATC

Dear Mr. Middleton-

I'm writing on behalf of the Forest Hill Community Association-Air Traffic Committee in Newark, NJ.

Questions:

1. Our PANYNJ Noise Monitor registered 55.2 DNL in 2015 as the cumulative result of TEB and EWR planes.
a. Why is Forest Hill excluded from Appendix E (55 - 60 dB DNL Contours) of TEB's Part 150 NEM?
b. Is Forest Hill included in EWR's Part 150 NEM?
c. How does the Part 150 Study address communities with 55+ DNL that are impacted by multiple airports?

Per our Technical Requirement list submitted to you on 9.24.15 (attached), we specifically requested in para I: "Provide composite NEM and Excel sheets which show total noise impacts due to both airports (EWR and TEB) **added together.**"

2. What is the protocol for community response to these NEMs?
a. Should we email comments to this address: NJPART150STUDIES@panynj.gov?
b. Is there a meeting where we can address our comments and receive a response?
c. Deadlines?

Thank you for your attention to our requests,

Marylou Tibaldo-Bongiorno, filmmaker
Newark Resident
FHCA-ATC Co-Chair

cc:
Kenneth M. Kroll
Newark Resident
Chair – FHCA-ATC

Committee Members: Jeff Morgan, Shadia Saleh, and Mack Sheehan

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22b

FOREST HILL COMMUNITY ASSOCIATION
www.fhcanewark.org
Newark New Jersey

Part 150 Technical Requirements

In cooperation with our NY Bi-state partners the
Forest Hill Community Association –Air Traffic Committee in Newark, NJ
submits the following requirements to be considered for the EWR Part 150 TAC

Part 150 Technical Requirements:

To be considered during development of the protocols and Noise Exposure Maps (NEMs) for the Part 150 Study.

A. Consider all relevant flight tracks and profile data to help assure accurate representation of all contours including the 60 and 55 DNL contours.

B. Analysis to include tracks and profile data for aircraft using Visual Flight Rules (VFR), Hold-Down Modes, or other operating modes that may impact the accuracy of noise contours in the NEM.

C. Use actual take off gross weights or average load factors for operations at each of the NY airports. Demonstrate sample results using Stage length as a surrogate for Take Off Gross Weight (TOGW).

D. Use all data and radar tracks from ALL months.

E. Consider New and upcoming changes to our airspace and procedures:

- Include normal growth of slot usage and any other slot changes which may become known in the study period. Will new slot rule already announced (for comment) be considered?
- Include consideration of Multiple Runway Operations (MRO) and operations taking advantage of Wake Recat which may become known in the study period. Wake Recat procedures are currently, at least partially in effect. Will use of 2014 as base year show the true impact of Wake Recat over the 5 years interval understudy for NEM's?
- Include consideration of any perimeter rule changes which may become known in the study period.
- Incorporate remaining tasks under Airspace Redesign and NextGen which may include Required Navigation Performance (RNP) procedures, Continuous Descent

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Approaches (CDA) as well as implementation any other tasks/changes that may be identified during the study period.

F. Consider cutoff date for inclusion in INM/ADET models for any new or potential changes above.

G. Periodically use noise monitors for model data refinement and verification of modeling results. Report results of the comparisons to the Technical Advisory Committee. When will we see a first refinement/verification check using noise meter readings against model predictions?

H. Model outputs shall be provided in graphical and Excel formats or their equivalents. Excel format to include: census track information, latitude and longitude data and any other information needed to allow a reader to compare model and actual noise levels at noise monitor locations.

I. Provide composite noise exposure maps and Excel sheets which show total noise impacts due to both airports (EWR and Teterboro) **added together**.

J. Please explain criteria for averaging tracks to come up with standardized tracks in the INM/AEDT model.

K. Included estimate of INM/AEDT accuracy/tolerance for DNL values developed from the model used.

Additional requests:

1. Require PANYNJ to:

- Do yearly updates of Noise Exposure Maps
- Submit requests for mitigation funding when number or people impacted within the 65 DNL/55DNL contour increases.

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From: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Sent: Thursday, October 20, 2016 10:23 AM
To: Ted Baldwin; Robert C. Mentzer; Jessica L. Cohen; Kristen Ahlfeld; Leslie Black; Middleton, Timothy
Subject: FW: Comment TEB Part 150 Study

One more comment.

From: David Rothblatt [mailto:davidcrothblatt@gmail.com]
Sent: Sunday, October 16, 2016 4:35 PM
To: NJPART150STUDIES <NJPART150STUDIES@panynj.gov>
Subject: Comment TEB Part 150 Study

I am writing to express my concern for the amount of airplane noise at and around my house in Rutherford. I have utilized the online form to complain in the past but that form is inadequate because it only allows the checking of one box. The planes are too frequent, too loud, too close and rampantly running during the restricted overnight hours. I attended the noise study presentation in Hackensack and am now familiar with the frameworks and mission of that study. I take exception with some of the premises of the study. The idea of measuring noise exposure by computer modeling of the aircrafts does not take into account willful deviation from the inferred position created by the computer model. Whether this is at operator or airport discretion is not discernible but the low height of these planes could not possibly result in an acceptable yearly averaged noise quotient. All of this results in an excess of noise on a nearly continuous basis over my house and that of my neighbors. Rutherford was settled in the 1600's and incorporated as a borough in 1881. There have been families living here long before anyone had the idea to use private airplanes. Now, with hundreds of thousands of flights so close to our houses, the noise nuisance that these flights represent significantly impinge, by definition, on the quiet enjoyment of our homes and backyards. This would all be an intractable problem if there were not any alternate routes for the planes to take which would keep them flying above unincorporated and nearly unincorporated areas. Thankfully, there is an abundance of those areas east of Route 17 where the noise would not be as big a problem for residents. I realize that the scope of this complaint is strictly noise but I would be remiss if I didn't at least mention the other tentacles of the nuisance that the planes present. The fuel dumps and other environmental impact plus the danger of a momentous crash which combined with the noise, proximity, frequency and timing of the arrivals and departures, creates a threat and nuisance so extreme that it poses a substantial threat to the physical and mental health of individuals and families in Rutherford. Send the flights over the Meadowlands and the abundant unincorporated land beginning with the landfill east of Schuyler Avenue then over the Meadowlands Sports Complex and the industrial parks of Moonachie, problem solved.

David Rothblatt
219 Ridge Rd
Rutherford, NJ 07070

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Subject: Fw: Part 150 study

From: Cynthia Chovan-Dalton (cynthiachovan@yahoo.com)

To: njpart150@panynj.com;

Date: Tuesday, October 18, 2016 6:08 AM

I tried emailing this before the deadline, but got this response after the deadline that it didn't go through. Please accept these comments on the Part 150 study.

this message has now been returned twice.

----- Forwarded Message -----
From: Cynthia Chovan-Dalton <cynthiachovan@yahoo.com>
To: "NJpart150@panynj.com" <NJpart150@panynj.com>
Sent: Sunday, October 16, 2016 2:39 PM
Subject: Part 150 study

I attended the open house on the Part 150 study, which I found very helpful. I submitted a comment at the open house, but feel I need to expand on those limited remarks, based on further experience of living with the constant noise and further research.

Teterboro Airport is located in the middle of residential communities that existed long before the airport. It was built literally across the street. As such, it should never have been allowed to develop into the busy commercial airport it has become. It is an excessive burden on the surrounding communities. Noise abatement steps must be taken to eliminate this impact on the quality of life in all of these communities. Not reduce, eliminate. And not just the ones immediately adjacent to the airport, as outline in the study, but all the communities under the current flight paths.

1. Flight paths must be changed so that both arriving and departing flights do not fly over residential areas. Flight patterns are changed when a runway is closed for maintenance, so it is possible to change. New flight patterns must be developed.

2. The voluntary "restrictions" of not flying in or out of Teterboro between 11 pm and 6 am must become mandatory. The restrictions are a joke. No one is following them. I have been awakened at all hours of the night by Teterboro flights, sometimes 5 or 6 an hour flying only a few hundred feet over our homes.

3. Jets cannot fly under 2,000 feet over residential areas. I live under the departure flight path, where plans fly between 1,200 and 1,500 feet over my house, according to the Port Authority's webtrak page. Arriving flights fly as low as 700 feet over Rutherford. At such altitudes, even at 1,500 feet, it is impossible to carry on a conversation in my backyard. It is unbearable for those directly under the arriving flights, such as my children's schools. Despite sound proofing, my daughter says her teacher has to occasionally stop speaking because of the jets. And areas of

my son's school are not soundproofed at all, and teachers must stop teaching every 90 seconds. I work from home some days, and I have to make sure my windows are closed when I am talking on the phone so I can hear. Don't talk about allowable decibels. Come spend a day in our backyards, or sleep overnight in out town, before justifying any flights over our town.

4. The frequency MUST be reduced. Planes are flying low over our houses every 75-90 seconds for hours each day. Even if they were flying at a higher altitude, the constant interruptions are unacceptable. You simply cannot operate a busy commercial airport in a residential area.

5. Although I understand that Part 150 is a noise abatement study, the Port Authority needs to also needs to examine the environmental impacts on surrounding towns, especially given the frequency of flights over these towns. There are several studies documenting negative environmental impacts in areas near airports from chemical pollution as well as noise pollution.

The current situation is unacceptable, and should never have been allowed to reach this point. Something must be done to restore the quality of life to towns such as Rutherford, Carlstadt, Moonachie, Hackensack, and others.

Sincerely,
Cynthia Chovan-Dalton
36 Riverview Avenue
Rutherford, NJ 07070
cynthiachovan@yahoo.com

Sent from Yahoo Mail on Android

Print

https://mg.mail.yahoo.com/neo/launch?.rand=22km441hapgg4#3155...

Subject: Failure Notice

From: MAILER-DAEMON@yahoo.com (MAILER-DAEMON@yahoo.com)

To: cynthiachovan@yahoo.com;

Date: Monday, October 17, 2016 2:44 PM

Sorry, we were unable to deliver your message to the following address.

<NJpart150@panynj.com>:
Mail server for "panynj.com" unreachable for too long :

--- Below this line is a copy of the message.

Received: from [98.138.101.129] by nm11.bullet.mail.ne1.yahoo.com with NNFMP; 16 Oct 2016 18:41:16 -0000
Received: from [98.138.89.173] by tm17.bullet.mail.ne1.yahoo.com with NNFMP; 16 Oct 2016 18:41:16 -0000
Received: from [127.0.0.1] by omp1029.mail.ne1.yahoo.com with NNFMP; 16 Oct 2016 18:41:16 -0000
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Received: from jws200192.mail.ne1.yahoo.com by sendmailws152.mail.ne1.yahoo.com; Sun, 16 Oct 2016 18:41:16 +0000; 1476643276.452
Date: Sun, 16 Oct 2016 18:39:02 +0000 (UTC)
From: Cynthia Chovan-Dalton <cynthiachovan@yahoo.com>
Reply-To: Cynthia Chovan-Dalton <cynthiachovan@yahoo.com>
To: "NJpart150@panynj.com" <NJpart150@panynj.com>
Message-ID: <1934202960.698494.1476643142539@mail.yahoo.com>
Subject: Part 150 study
MIME-Version: 1.0
Content-Type: multipart/alternative;
boundary="----=_Part_698493_1782970132.1476643142535"
References: <1934202960.698494.1476643142539.ref@mail.yahoo.com>
Content-Length: 9388

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