CHAPTER 9
AIRCRAFT AND AIRPORT OPERATIONS
NOISE ABATEMENT AND MITIGATION ALTERNATIVES

The purpose of this chapter is to document various aircraft and airport operational noise abatement and mitigation actions that are currently in place at OSU Airport, as well as those that were considered during this 14 CFR Part 150 Study, to reduce land use incompatibility with aircraft noise around OSU Airport. A full range of alternatives was examined based on the requirements of the Federal Aviation Regulation (FAR) Part 150, as well as input from the Part 150 Committee, The Ohio State University Airport staff, and the general public.

As mentioned previously, the goal of the 14 CFR Part 150 Study is to reduce or eliminate noise-sensitive land uses within the 65 dB DNL contour. As shown in Chapter 6 of this document, there are no noise sensitive land uses within the existing and future (2014) 65 dB DNL contours. Traditionally, 14 CFR Part 150 Studies use the DNL metric for evaluating alternatives in the Noise Compatibility Program (NCP) portion of the Study. Because noise-sensitive land uses do not exist within the existing or future 65 dB DNL contours, the NCP portion of the Study will be using supplemental metrics to analyze whether the population exposed to single-event aircraft noise levels can be reduced. Evaluation of NCP measures for OSU Airport adhered to the following established criteria:

- Develop a balanced and cost effective program for reducing noise without limiting airport utility, aviation efficiency, or adversely affecting safety

- Improve the overall noise environment, while not shifting noise from one community to another

- Measures for reducing the highest noise levels affecting the greatest number of people, without adversely affecting one community over another, will be given highest priority

- NCP measures must be technically and legally feasible, and approved by the FAA (flight procedures) and local governments (land use measures)

- Measures subject to FAR Part 161 evaluation will not be part of the study recommendations

The following airport and aircraft operational issues were identified for consideration during the 14 CFR Part 150 Study:

Training Activity

- Increase Training Pattern Altitude
- Change Training Pattern Location
- Alternate Training Patterns
- Change Training Hours to Coincide with FAA Nighttime Definition
- Improve Pilot Training Techniques
- Require Training Fleet at OSU Airport To Use Other Airports

Fixed Wing Aircraft Operations

- Establish Preferential Runway Use
- Establish Continuous Descent Approach (CDA)
- Establish Precision Approaches
- Develop Noise Barriers/Ground Run-Up Enclosures
- Enhance Restriction on Head-to-Head Operations
- Establish Noise Abatement Departure Profiles
- Change Arrival and Departure Procedures Related to Turns

Helicopter Operations

- Change Arrival and Departure Paths
- Review Published Procedures
- Review Altitudes for Arrivals and Departures

Arriving and Departing Aircraft

- Review Power and Pitch Settings for Propeller Aircraft
- Review Arrival and Departure Paths
- Establish Area Navigation (RNAV) Procedures
- Establish a Scatter Departure Pattern
- Remove All Altitude Restrictions
- Establish a Side-Step Approach for Runway 27R
- Publish a Visual Approach Procedure
- Review 050 Departure Heading

Options Required for Review Under FAR Part 150

- Implement Curfews
- Implement Noise Related Landing Fees
- Limit the Number or Type of Operations or Type of Aircraft

Other

- Review Ground Run-Up and Taxi Restrictions
- Establish a Maximum Aircraft Noise Restriction
- Establish FAR Part 36 Noise Limits
- Review Noise Abatement Guidelines

The aforementioned 31 aircraft and airport operational noise abatement and mitigation alternatives were evaluated. The evaluation resulted in 12 specific aircraft and airport operational noise abatement and mitigation recommendations, as shown below.

Recommended Operational Noise Abatement and Mitigation Alternatives

- Align downwind leg of training pattern south of OSU Airport with Bethel Road
- Establish map exhibiting noise sensitive areas
- Enhance language regarding head-to-head operations
- Discuss head-to-head operations with pilots
- Enhance helicopter published procedures
- Continue educating pilots on the importance of optimum propeller settings

- o Establish preferential arrivals paths
- o Establish preferential departure paths
- o Establish RNAV procedures
- o Publish visual approach procedures
- o Add language regarding nighttime noise sensitivity to Noise Abatement Guidelines

Further discussion on the evaluation of each aircraft and airport operational noise abatement and mitigation alternative, and any associated recommendation, can be found below.

9.1 TRAINING ACTIVITY

Training activity at an airport refers to the operations conducted by student pilots, or pilots practicing their flying skills, that are conducted in a closed pattern near the airport. These operations, typically called touch-and-go operations, consist of the aircraft arriving and departing the airport without coming to a full stop on the runway. The touch-and-go pattern is a rounded rectangle shaped flight track consisting of a departure, a turn to downwind, a downwind, a turn to base, and final approach.

For OSU Airport, several residents expressed their concerns related to training activity. The concerns referred primarily to the location of the training pattern, the altitude of the training pattern, and the repetitive nature of the operations. Several alternatives were suggested for review to address these concerns. Each of these alternatives is discussed below.

9.1.1 Increase Training Pattern Altitude

The current pattern altitude is approximately 1,900 feet above Mean Sea Level (MSL), resulting in a pattern altitude of approximately 1,000 feet Above Ground Level (AGL); the airfield elevation is approximately 900 feet MSL. To achieve a noticeable reduction[1] in noise levels on the ground, the pattern altitude would need to be increased to approximately 2,900 feet MSL, or 2,000 feet AGL, which would result in approximately a six-decibel reduction in noise on the ground. The Class C airspace for Port Columbus International Airport lies over the top of OSU Airport at 2,500 feet MSL. Discussions with Air Traffic Control (ATC) personnel indicated all OSU Airport pattern altitudes would need to remain below the Class C airspace floor and with adequate safety margins. The altitude increase needed to achieve a noticeable noise reduction on the ground would penetrate the Port Columbus International Airport Class C airspace and, therefore, is not possible.

Incremental increases, up to the 1,000-foot increase discussed above, were reviewed and were also determined to not be possible due to the narrow distance between the current pattern altitude and the Class C airspace altitude for Port Columbus International Airport. These two airspace classifications are currently separated by an altitude buffer of 600 feet. ATC personnel stated it is necessary to keep that 600-foot buffer in place for safety; therefore, the training pattern altitude should not be raised. Decreasing the 600-foot altitude buffer would increase the likelihood that aircraft in the training pattern would potentially encroach upon the Class C airspace of Port Columbus International Airport. In addition, any increase in altitude less than 1,000 feet would not result in a noticeable change in noise level on the ground.

An alternative approach is to have the training aircraft climb to pattern altitude prior to commencing any turns. Currently the pattern altitude is typically reached when aircraft are on the downwind

[1] FAA requires a five-decibel reduction for certain noise mitigation measures in recognition that a five-decibel reduction is needed to be noticeable to most people.

portion of the pattern (flying parallel to the airfield). While this would not raise the pattern altitude, it would prevent the aircraft from continuing their climb through a turn potentially decreasing noise exposure on the ground. Establishing an altitude to achieve prior to commencing a turn versus asking the pilot to locate a landmark on the ground could also help to further fan the turning portion of the training pattern due to the different operating characteristics of the individual aircraft.

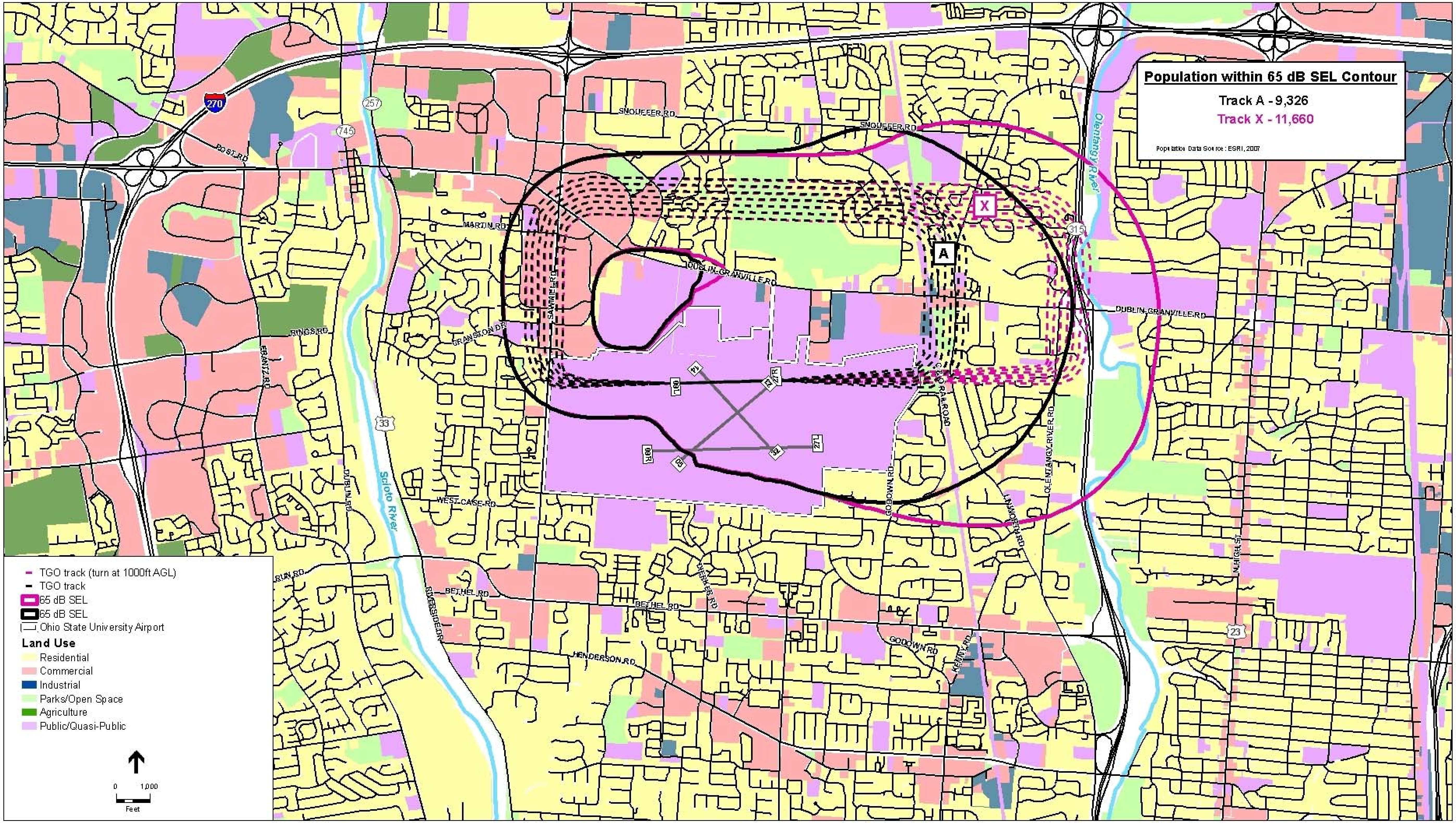
To perform this analysis, Single Exposure Level (SEL) contours were used to depict the noise levels generated by a single aircraft operation. The 65 dB SEL contour was chosen to ensure the contour encompassed the entire training pattern. **Figure 9-1** depicts the existing training pattern (see Track A on **Figure 9-1**) as well as the alternative training pattern that would result if aircraft were to climb to pattern altitude (1,000 feet AGL) before turning (see Track B on **Figure 9-1**). The location of the alternative training pattern was based on the operating characteristics of the aircraft modeled, the C172, given the distance that would be required from takeoff to reach the 1,000-foot AGL pattern altitude. **Figure 9-1** also depicts the 65 dB SEL contours for each of these two scenarios. As can be seen, having the aircraft climb to pattern altitude prior to commencing any turns extends the overall training pattern to the east by approximately 5,000 feet. This extension in turn creates a larger contour, which encompasses more area and potentially more people in the 65 SEL contour.

To determine the differences in noise exposure, population estimates were used to determine the number of people residing within the noise contour. When preparing population counts for contours in a Part 150 study, only residential dwellings are considered. Schools and churches are not counted separately because the population using those facilities is transient. Also, counting school and church enrollments would result in a double-count of the residents who live in the surrounding neighborhoods. Still, these structures are specifically identified as sensitive land uses in the Part 150 Study. Phase 1 of the Part 150 Study included a map displaying such noise sensitive land uses. Also, FAA guidelines state that all land uses outside the 65 DNL contour are considered to be compatible with airport operations. As shown in Phase 1 of the Part 150 Study, the 65 DNL contour remains on Airport property. As a result, no noise-sensitive land uses, such as residential units, schools, or churches, are within the 65 DNL contour. A discussion of any effects of aircraft noise on noise-sensitive land uses as a result of an extension to the Airport’s north runway would be included in environmental review documentation prepared in compliance with the National Environmental Policy Act (NEPA). In accordance with FAA guidelines on the implementation of NEPA, this environmental review documentation is required before the Airport could proceed with an extension to the north runway.

Having the aircraft climb to pattern altitude prior to initiating any turns encompasses approximately 11,660 people within the 65 dB SEL contour compared to the existing training pattern which encompasses approximately 9,326 people in the 65 dB SEL contour. Because the extended training pattern increased the amount of people encompassed within the 65 dB SEL contour, it is not recommended for implementation.

Recommendations: **(A)** The Study does not recommend increasing the pattern altitude to 2,900’ MSL because it would violate the Class C airspace fro Port Columbus International Airport. **(B)** The Study does not recommend incremental increases to the pattern altitude because it would decrease the safety margin between the pattern altitude and the Class C

FIGURE 9-1
CNA172 SEL CONTOUR COMPARISON – EXISTING TRAINING PATTERN VS. ALTERNATIVE TRAINING PATTERN



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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airspace for Port Columbus International Airport. In addition, incremental increases to the pattern altitude will not result in a noticeable change in noise levels on the ground. **(C)** The Study does not recommend training aircraft climb to pattern altitude prior to commencing a turn because it will increase the number of people exposed to single-event aircraft noise compared to aircraft following the existing training pattern.

9.1.2 Change Training Pattern Location

To avoid shifting noise from one community to another, an area of compatible land use (e.g., an industrial corridor) would need to be identified to focus the training pattern over. To the north of the Airport, there are no compatible land use corridors that could be used to concentrate the training pattern over. State Route (SR) 161/W. Dublin-Granville Road, located north of the Airport, is too close to the airfield to locate the complete downwind portion of the training pattern over it. Interstate 270 is located too far to the north, which would cause the training pattern to be too large, would affect additional communities, and would cause potential conflicts with aircraft arriving or departing both OSU Airport and Port Columbus International Airport. In addition, if Runway 9L/27R is extended, it is anticipated that most of the training activity will shift to Runway 9R/27L, which would provide a reduction in training noise in the neighborhoods north of the airfield.

If Runway 9L/27R is extended and the majority of the training activity switches to Runway 9R/27L, there is a potential opportunity to further concentrate the training activity over the commercial corridor along Bethel Road (Bethel Road is located farther away from the airfield than SR 161/W. Dublin-Granville Road is to the north.) Currently, some training occurs to the south of OSU Airport where the training aircraft appear to follow Bethel Road, with the natural spreading of the tracks that occurs due to the different operating characteristics of the aircraft and the pilots.

An additional analysis was completed to determine whether there would there be any potential noise benefits if Bethel Road could be followed more closely. **Figure 9-2** presents this analysis. This figure presents the current location of the training pattern for Runway 9R/27L, as well as a future alternative using a more condensed concentration of training aircraft over Bethel Road. Because the DNL or SEL contour would not likely be affected by the further concentration of training aircraft, a Time Above (TA) analysis was completed to determine the potential change in noise exposure on the local population. The TA analysis determines the amount of time above a certain noise level that a location experiences for the annual-average day. **Figure 9-2** also presents the TA analysis completed for this alternative. As can be seen from the analysis there would be no change to the noise exposure for the local population by concentrating more flights over Bethel Road. While the analysis does not show a change in noise exposure, it is still recommended that the training pattern south of the airfield should follow Bethel Road as much as possible since it would occur over a commercial corridor, with higher ambient noise levels, that is a compatible land use for aircraft overflights.

Recommendation: This Study recommends the downwind leg of the training pattern south of OSU Airport be aligned with Bethel Road to the greatest extent practical since the commercial land uses along Bethel Road are a compatible land use for aircraft overflights and have a higher ambient noise level.

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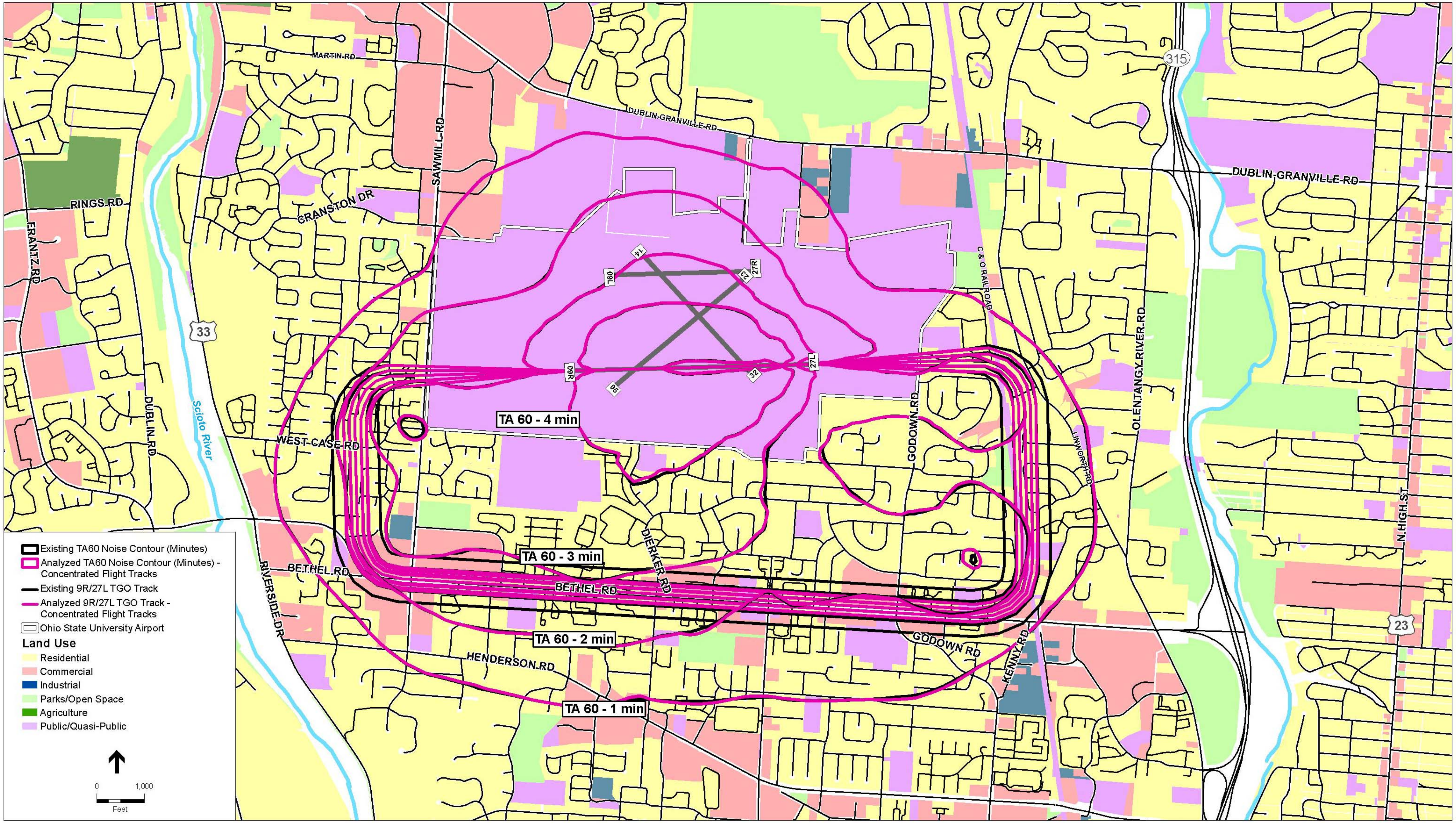
FIGURE 9-2
SOUTH TRAINING PATTERN COMPARISON – CONCENTRATION OVER BETHEL ROAD



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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9.1.3 Alternate Training Patterns

Comments regarding training patterns often request the training pattern be shared with other communities around an airport by alternating which pattern is used or by using a fanning pattern to spread out the noise. Specifically at OSU Airport, comments were received requesting the training pattern be fanned to spread the noise.

A review of the radar flight track data for the existing training pattern indicated a natural fanning of the operations already occurs due to pilot/controller techniques, wind/weather conditions, aircraft type, and other aircraft operating in the pattern or in the vicinity of OSU Airport. A review of the flight tracks associated with training activity clearly demonstrates this variability and indicates the pattern is dispersed. The pattern also extends out farther during the warm-weather months due to an increase in density altitude which decreases the aircraft climb performance. Due to the location of the Class C airspace of Port Columbus International Airport that overlies OSU Airport, and the Class C airspace east of OSU Airport, extending any portion of the pattern to the east is not possible.

Recommendation: This Study does not recommend changes for alternating the existing training patterns.

9.1.4 Change Training Hours to Coincide with FAA Nighttime Definition

The existing Noise Abatement Guidelines for OSU Airport prohibit touch-and-go operations at night between the hours of 11:00 p.m. and 7:00 a.m. Residents affected by noise from aircraft in the training pattern requested that hours during which OSU Airport currently prohibits touch-and-go operations be changed to be consistent with FAA's definition of nighttime for noise analysis purposes, which is 10:00 p.m. to 7:00 a.m. This proposal was discussed with the University Flight Education department to determine if this would place an undue burden on their students. Through those discussions it was determined while few training flights take place between 10:00 p.m. and 11:00 p.m., those that do are necessary so that the students can complete their training. For the purpose of nighttime training, night is defined as one hour after sunset until one hour before sunrise. During the summer months, nighttime often does not occur until after 10:00 p.m. due to the time change. The students must have the opportunity to complete the necessary nighttime training throughout the year; therefore, extending the nighttime prohibition on touch-and-go operations to 10:00 p.m. to 7:00 a.m. would not be acceptable. .

Recommendation: This Study does not recommend changing the existing nighttime prohibition on touch-and-go operations to be between 10:00 p.m. and 7:00 a.m. because it would limit access to training aircraft during certain times of the year.

9.1.5 Improve Pilot Training Techniques

Comments were received from the local residents requesting the training techniques used by the flight training institutions located at OSU Airport be reviewed and improved. The improvement sought by most local residents is to better educate the student pilot regarding how to fly their plane quietly and to educate the student pilot about the noise sensitive nature of the local residents.

There are five flight training institutions at OSU Airport. These include the University Flight Education program and four flight clubs. The University Flight Education Program is the largest training facility at OSU Airport and will be the focus of the discussion in this section of the document. The curriculum used at the flight school is based on a FAR Part 141 procedures manual that has been approved by the FAA. The development of the procedures manual used in the curriculum to teach student pilots how to fly was developed with the Noise Abatement Guidelines for OSU Airport in mind, and has incorporated those elements of the Guidelines related to propeller-driven aircraft into the manual and flight training program.

Students are taught to remain at a minimum altitude of 1,000 feet AGL when flying over populated areas, and remain at a minimum altitude of 500 feet AGL over unpopulated areas. These altitudes do not apply when the aircraft is in the process of taking off or landing. Students are also taught to use best climb speed and angle for departures. The University Flight Education program also restricts students from performing touch-and-go operations between the hours of 11:00 p.m. and 7:00 a.m., consistent with the current OSU Airport Noise Abatement Guidelines. All of the program guidelines are enforced to the best ability of the University Flight Education department. No changes to the training curriculum are recommended since it has already been approved by the FAA as satisfactory in meeting FAA requirements.

While there are no changes being recommended for the training curriculum, there are some things that can be implemented to stress to the students the sensitive nature of the area around OSU Airport. The area where the students sign-in for their training flights includes displays of noise abatement procedures for airports in the surrounding area to which the student pilots may fly. This ensures that the student pilots are made aware of all noise abatement procedures. Information regarding the OSU Airport noise abatement guidelines is not displayed because the information is incorporated into their training curriculum. To further reinforce the importance of the Noise Abatement Guidelines for OSU Airport, information on the Noise Abatement Guidelines should be prominently displayed where the student pilots can see them. In addition, it would be beneficial to develop a map highlighting those areas around OSU Airport that are considered noise sensitive. This would not mean those areas would not receive overflights, but would bring the noise-sensitive nature of the areas around OSU Airport to the attention of the student pilots. This information should be displayed for the University Flight Education department as well as all Flight Clubs based at OSU Airport that conduct flight training.

Recommendations: **(A)** This Study does not recommend any changes to the formal training curriculum of the University Flight Education or any of the Flight Clubs located at OSU Airport. **(B)** This Study recommends that information on the Noise Abatement Guidelines for OSU Airport, including a large scale map depicting the local noise sensitive areas, should be prominently displayed in an area where student pilots sign-in for their training flights to further stress the noise-sensitive nature of the local communities.

9.1.6 Require Training Fleet at OSU Airport To Use Other Airports

The University Flight Education department is the largest training operator at OSU Airport. Because it is the largest training operator, residents have requested that the fleet of the University Flight Education department be required to fly to other airports in the region to conduct their flight training.

University Flight Education training aircraft leave OSU Airport to train at other airports, as appropriate. It should also be noted that students from other airports will, as appropriate, train at OSU Airport. Training at other airports is necessary for student pilot curriculums do to cross-country flight requirements and becoming familiar with the different airspace classifications. When training elsewhere is not required, it is far more efficient from the standpoint of fuel consumption and student training costs for the aircraft to remain in the training pattern at OSU Airport. To mandate a certain amount of training activity must take place at other airports in the region would significantly increase the cost for the student pilots by increasing fuel burn and additional time in aircraft rental. The increase in costs for students would hinder the University's ability to maintain a flight education program.

Recommendation: This Study does not recommend changes to require aircraft from University Flight Education to train at other airports.

9.2 FIXED WING AIRCRAFT OPERATIONS

As with most airports that have jet aircraft operations, jet aircraft operations at OSU Airport garner a significant amount of the noise complaints submitted by people in the local communities. Because of the orientation of the runways at OSU Airport, the majority of the concerns regarding noise from jet aircraft operations come from the residential areas east and west of the airfield. Flight tracks can sometimes be adjusted to overfly compatible land uses. These adjustments are more feasible on departures compared to arrivals due to the nature of the aircraft operating characteristics and the need for arriving aircraft to be in line with the runway from several miles away.

9.2.1 Establish Preferential Runway Use

Airports often establish preferred runways to use for noise abatement when operating conditions permit. Typically, preferred runways are identified because the flight patterns associated with that runway fly over noise compatible land uses, which decreases the amount of noise exposure to noise-sensitive land uses. Comments were received from people in the local communities regarding this topic requesting that preferential runways be identified and used. Several comments specifically requested a more even distribution of runway use at OSU Airport.

To a great extent, weather conditions, primarily wind speed and direction, dictate which runways are used at airports for arrivals and departures; aircraft design requires aircraft to depart and land into the wind. In addition to weather conditions, length of runway also is crucial to ensure the aircraft has enough runway length to safely land or takeoff. The vast majority of operations at OSU Airport operate on the two parallel runways, Runway 9R/27L and Runway 9L/27R, due to prevailing wind conditions and runway lengths. In a given year, OSU Airport operates in a west flow (arrivals and departures on Runways 27L and 27R) approximately 70 percent of the time. This operational flow is based on weather conditions as well as operational flow of Port Columbus International Airport, which is located in close proximity to OSU Airport.

The current use of the airfield has the training activity primarily using the north runway (Runway 9L/27R) for touch-and-go operations. The majority of all operations at OSU Airport primarily use the south runway (Runway 9R/27L) including single-engine piston, large twin, and jet aircraft. As a result of the prevailing winds, the crosswind runways are used infrequently. This split of operations between the Runway 9R/27L and 9L/27R is based primarily on operating characteristics. The training aircraft use the north runway, Runway 9L/27R, for touch-and-go operations. The training aircraft are smaller and slower aircraft and are generally separated away from the jet and twin-engine propeller-driven aircraft to keep the airfield running efficiently and safely. The south runway, Runway 9R/27L, is the longest runway at OSU Airport and is used by the aircraft requiring longer runways for arrivals and departures, such as jets and twin-engine propeller-driven aircraft. Aircraft requiring longer runways also are generally the high-performance aircraft that have faster take-off and approach speeds. Because of these different operating dynamics, it is not possible to change the runway use without significantly affecting the efficient use of the airfield.

In the future, if Runway 9L/27R is extended as described in the Master Plan, it would be the longest runway at the Airport. If that occurs, runway use is expected to change over time from the current conditions. With an extended north runway, it is anticipated that some of the jet and twin-engine propeller-driven aircraft will use the north runway immediately because of its longer available length. The use by these aircraft is expected to increase as the anticipated hangar developments on the north side of the airfield occur. As higher performance aircraft use the north runway, the training activity is anticipated to switch to the south runway. The primary reason for this is to separate the higher and lower performing aircraft so the airfield can continue to operate safely and efficiently.

The noise exposure maps developed in the first phase of this Study showed no incompatible land uses within the current and future 65 DNL contours. Adjusting the runway uses to be more evenly distributed, east versus west, would likely extend the contours further to the east and would encompass residential uses within the 65 DNL contour. This would be creating a noise impact that does not exist with the current operation of the airfield.

As mentioned previously, weather conditions are one of the primary factors in determining which runways are used. Additional factors that need to be considered for OSU Airport are the operating flow of Port Columbus International Airport, which is located approximately nine miles from OSU Airport and whose airspace is located above and east of OSU Airport, and the fact that no noise-sensitive land uses exist within the existing and future 65 DNL contours. Since air traffic control has influence over the runways used based on weather and operating conditions, they may at times be able to split operations between the two parallel runways that may have the potential to reduce noise from a single-event level on communities surrounding OSU Airport. Because of the many factors discussed here regarding the safe and efficient operation of the airfield, it is not feasible to develop a formal preferential runway use for the Airport.

Recommendation: This Study does not recommend a preferential runway use program for OSU Airport because of potential impacts to the safe and efficient operation of the airfield.

9.2.2 Establish Continuous Descent Approach

The use of a Continuous Descent Approach (CDA) for arriving aircraft requires the aircraft to line up with the runway and begin their three-degree approach more than 30 nautical miles from the airport. When a CDA is used, the noise benefits are generally experienced in an area about 10 to 15 nautical miles from the approach end of the runway. If CDAs were implemented at OSU Airport, the areas that would benefit from the use of a CDA are well beyond those areas most affected by aircraft operations at OSU Airport. In addition, OSU Airport is in west flow approximately 70% of the time which would indicate the arrivals coming from the east would be the ones targeted for using the CDA. However, due to the proximity of Class C airspace associated with Port Columbus International Airport, ATC personnel indicated implementation of a CDA for Runways 27L or 27R at OSU Airport would not be possible.

Recommendation: This Study does not recommend establishing and using a CDA for OSU Airport due to conflicting airspace with Port Columbus International Airport and it does not result in any reduction in noise to areas most affected by aircraft noise.

9.2.3 Establish Precision Approaches

Establishing a precision approach procedure for a runway end would provide precise vertical and lateral guidance and would allow aircraft to fly more consistent arrivals from an altitude and geographic location standpoint. It is important to note that when such a procedure is established, not all aircraft can use the precision procedure; aircraft must have the proper avionics in the cockpit to use the procedure. Currently, there is a precision instrument arrival procedure at OSU Airport for Runway 9R. Runway 9R has an Instrument Landing System (ILS) approach. The other runway ends at OSU Airport do not have an ILS approach due to lack of land required for the installation, lack of operational need, and existing obstructions. In the future, if Runway 9L/27R is extended, an ILS precision approach is anticipated to be established for Runway 27R. This would give OSU Airport a precision approach in both east flow and west flow and provide a back-up approach when one of the precision approaches is down for repair or a particular runway is closed. In addition, while not technically classified as a precision approach, because altitude guidance is not provided, OSU Airport also has Global Positioning System (GPS) approaches for Runways 9R and 27L.

As mentioned previously, the primary benefit for a precision approach from a noise perspective is keeping the aircraft at a consistent height on arrival. Most aircraft, even when not on a precision approach, are fairly close in their range of altitudes due to their close proximity to the airfield. To achieve a noticeable reduction in noise, aircraft would need to double their altitude. At the distances where an aircraft would be on a precision approach, within three miles of the runway threshold, it is not possible to double the aircraft altitude and conduct a safe approach. While the installation of a precision approach may not have a significant reduction in noise levels around OSU Airport, it will provide some guidance for pilots to ensure they are at the prescribed arrival altitude which may be perceived by the some individuals as a noise benefit. Therefore, from a noise standpoint, installing a precision approach will not achieve a significant noise benefit.

Recommendation: The Study recommendations do not include establishing additional precision approaches for noise abatement purposes at OSU Airport. Any precision approach that is established will be done primarily for safety reasons. If Runway 9L/27R is extended, the anticipated addition of an ILS precision approach to Runway 27R will provide improved altitude guidance to arriving aircraft which may be perceived as a noise benefit.

9.2.4 Develop Noise Barriers/Ground Run-Up Enclosures

Communities located close-in to airports often experience noise exposure from aircraft operating on the airfield. This noise exposure can consist of taxiing aircraft, aircraft located on the ramp running auxiliary power units, or aircraft landing at the airport and using thrust reversers to slow down. Depending on the noise source and receiver locations, noise barriers may provide some relief for the noise exposure caused by ground operations.

A noise barrier is an obstruction to the path of sound transmission. Barriers can include walls, earth mounds (or berms), buildings, or extremely dense vegetation. In the case of barriers, neighbors are shielded from the noise source (aircraft) as long as the barrier is close to the source or receiver (noise sensitive site), is solid, and sufficiently breaks the line-of-sight from the noise source to the receiver. Barriers can potentially provide noise reduction benefits for residences immediately adjacent to an airport from aircraft ground operations. Once an aircraft becomes airborne and there is a direct line of sight from the aircraft to the receiver, barriers have no further effect on reducing sound levels.

To be effective, a barrier needs to be very close to the source of noise and/or very close to the receiver. Examples of effective barriers are those used along interstate highways. That is, the barriers are close to the source and the receivers. With respect to aircraft, due to aircraft operational safety requirements, barriers cannot be constructed very close to the source (aircraft).

In addition, by placing barriers close to the receiver, the distance from the source of noise at OSU Airport is so far that a barrier would be ineffective for ground-based noise related to taxiing aircraft, aircraft located on the ramp running auxiliary power units, aircraft using reverse thrust on landing, and start-of-takeoff roll from aircraft departures. There are very few engine maintenance run-ups at OSU, and those that do occur are conducted in areas that are shielded from residential neighborhoods. Based on these facts, engine maintenance run-ups are not considered a significant noise problem at OSU Airport. Even though not considered a noise problem, OSU Airport has instituted a program to place landscape mounds along the south side of OSU Airport along West Case Road to provide a buffer for residents in close proximity to the ramps and taxiways at OSU Airport.

Recommendation: The Study recommendations do not include establishing noise barriers or a ground run-up enclosure for OSU Airport because run-ups are not considered to be a significant noise problem. OSU Airport will continue with its program to build landscape mounds on the south side of OSU Airport along West Case Road.

9.2.5 Enhance Restriction on Head-to-Head Operations

Community members have reported hearing noise that they attribute to “U-turns”, or more commonly described as head-to-head operations, during the nighttime hours. This term at OSU Airport refers to an aircraft arriving on Runways 27L or 27R and later departing on Runways 9R or 9L; flying over the same communities on departure as on arrival. OSU Airport staff indicated this practice occurred in the past on an infrequent basis at night, but is discouraged now due to concerns about safety and noise. The pilot-in-command of an aircraft has the authority to request a certain runway for arrival or departure, and ATC personnel try and accommodate those requests when safety and operating conditions permit. During the nighttime hours, the OSU Airport ATC Tower is closed and traffic levels are much lower. Operating conditions are not as constrained as during the daytime hours.

Because this is reported to occur during the nighttime hours, when the Air Traffic Control Tower (ATCT) at OSU Airport is closed, it is difficult to prevent this type of activity from occurring. As mentioned previously, the occurrence of head-to-head operations at night has dropped due to OSU Airport staff outreach to aircraft operators. The Noise Abatement Guidelines for OSU Airport states that arrival-departure pairs should use the same runway. OSU Airport should add language to this line item in the Noise Abatement Guidelines to make it clearer that this is referring to head-to-head operations. OSU Airport staff should also continue the outreach to pilots on this issue, especially when instances of the head-to-head operation occur.

Recommendations: **(A)** This Study recommends adding language to the Noise Abatement Guidelines making it clearer that head-to-head operations are discouraged during the hours when the ATCT is closed. **(B)** This Study also recommends discouraging head-to-head operations be periodically discussed with pilots to continue educating them on the noise implications of this practice.

9.2.6 Establish Noise Abatement Departure Profiles

Depending on the location of a community in relation to the end of the runway, noise abatement departure altitude profiles may provide some benefit to the noise exposure experienced from aircraft departure. Noise abatement departure profiles effect climb rates and altitudes by dictating when aircraft adjust flap and power settings to reduce noise exposure on the ground.

There are two different types of Noise Abatement Departure Profiles (NADPs): Close-in Community and Distant Community. The Close-in Community NADP is intended to provide noise reduction for noise-sensitive areas located in close proximity to the departure end of an airport runway. Noise reduction with this NADP is typically noticed within three to five miles from the departure end of the runway. The Distant Community NADP is intended to provide noise reduction for noise-sensitive areas located more distant from the departure end of an airport runway. Noise reduction is typically noticed within five to eight miles from the departure end of the runway. Because the OSU Airport is surrounded by noise sensitive uses, and there are no compatible use corridors over which the NADP could be flown, the use of either NADP will shift noise from one community to another. Currently the Noise Abatement Guidelines for OSU Airport encourages the use of reduced thrust or quiet climb procedures and these measures should be continued.

Recommendation: This Study does not recommend establishing the use of NADPs at OSU Airport because noise would shift from one community to another, which is inconsistent with the goals of this Study.

9.2.7 Change Arrival and Departure Procedures Related to Turns

Community members have commented that aircraft departures are louder when the aircraft is turning while in flight, especially when the turn is quite sharp. Requests have been made by local residents to have the aircraft reduce their bank angle on the turns to reduce the noise exposure on the ground.

When an aircraft is turning, the bank angle determines the radius and length of the turn (i.e., the distance covered by the turn portion of the aircraft flight path). Aircraft cannot make a “flat” turn, where no bank angle is required, and will always have some degree of bank angle. The bank angle of the turn is typically standard for an aircraft and is based on the operating performance of the aircraft as well as the comfort level of the occupants of the aircraft. The greater the bank angle in a turn, the more g forces (gravity exerted against the body) the occupants of the aircraft will experience, and the subsequent increase in the likelihood of becoming ill. It is often the perception of people on the ground that the increase in the bank angle of the turn causes more noise because the aircraft is applying more power to maintain lift. In reality, the power settings are not changed on the aircraft when a change in bank angle occurs. Power settings are determined by the phase of flight and changed if needed to maintain proper separation from other aircraft in the vicinity. Decreasing the bank angle of a turn, which would make the radius of the turn larger, would result in the flight pattern extending out to greater distances away from the Airport. While this may decrease the noise on the ground for the residents located under the original turn location, it will increase the noise for residents located under the new turn location because that location previously did not have the aircraft overflight.

In addition to moving noise from one location to another, there are other factors to consider as well. To the east of OSU Airport, there are airspace constraints that limit how far the flight patterns can extend due to conflicting air traffic with Port Columbus International Airport operations. Altering the arrival or departure bank angles for aircraft east of OSU Airport would extend the flight patterns significantly into Port Columbus airspace creating potential conflicts on a consistent basis. To the west of the Airport, the majority of jet aircraft typically depart straight out to the Scioto River before commencing any turns. This allows jet aircraft to gain altitude and subsequently lower the noise levels experienced on the ground.

Recommendation: This Study does not recommend the establishment of parameters for bank angle of aircraft on arrival or departure from OSU Airport due to airspace constraints and the goal of not shifting noise from one community to another.

9.3 HELICOPTER OPERATIONS

Helicopter operations occur at most airports in the U.S. and primarily consist of medical flights and those associated with law enforcement activities. Because of these primary uses, flights occur at all hours of the day, often with a concentration during the nighttime hours. The sound of helicopter operations is very different from fixed wing operations and one that many citizens notice and recognize. This is due to the design of the helicopter and its operating characteristics, such as its ability to hover at a constant altitude in a given location. Because their operating characteristics are different than fixed wing aircraft, helicopter operations at most airports are separated from other aviation activities as much as possible. Generally, the location of the arrival and departure corridors for helicopters is separate from fixed wing aircraft, and the altitude of the those arrival and departure procedures are generally kept lower than fixed wing aircraft for safety reasons.

9.3.1 Change Arrival and Departure Paths

Helicopter operations are different from aircraft operations in both sound produced and the physical aspects of the flight patterns. The majority of helicopter operations at OSU Airport are related to medical emergency flights or law enforcement activities. These types of operations occur at all hours of the day as the need arises. Some community members have requested OSU Airport change the operating patterns of the helicopters to reduce the amount of noise exposure on local residents by using local highways and waterways as flight paths.

The current paths used by the helicopters operating at OSU Airport are the result of collaboration several years ago between ATC personnel and the helicopter operators to determine the best path locations into and out of OSU Airport from both an operational standpoint and a way to reduce helicopter noise exposure over noise-sensitive land uses. The vast majority of the helicopters departing OSU Airport are operations related to medical emergencies. Their final destination varies greatly based on where the medical emergency is located and flight paths are dictated by the quickest path to reach the destination. The majority of the arrivals come from south and east of OSU Airport where several medical centers are located. Due to the time-sensitive nature of the departure operations, only the arrival paths were reviewed for potential changes.

As mentioned previously, the majority of the helicopter arrivals occur from south and east of the Airport. The procedure directs the helicopters to proceed to the north following SR 315 and report to ATC when crossing Bethel Road. The helicopters are then directed to proceed direct to the intersection of Godown and West Case Roads. This procedure keeps the helicopters over SR 315 as long as possible, which lessens the noise exposure on residents. The transition from SR 315 to the airfield must cross over residential areas because no corridor of compatible land use exists in this area. Without a corridor of compatible land uses to fly over, no alternatives exist for new helicopter procedures.

Recommendation: This Study does not recommend changes to arrival and departure corridors for helicopter operations for OSU Airport due to previous review of this topic by ATC and the operators and the lack of a compatible land use corridor to transition to the Airport.

9.3.2 Review Published Procedures

In 2005, the Airport, ATC, and MedFlight signed a letter of agreement for noise abatement procedures for all MedFlight and Omniflight helicopters. These two entities make up the majority of the helicopter flights at OSU Airport. The procedures developed for this letter of agreement represent the published helicopter procedures in use today at OSU Airport. These procedures include information on minimum altitudes, reporting points, and land based markers for pilots to use when navigating to and from OSU Airport. A significant amount of time was spent by the invested parties to develop these procedures to minimize noise in the surrounding neighborhoods.

A review was conducted on the published procedures to determine if additional information should be provided to help clarify the procedures. The procedures are quite detailed and provide the unfamiliar pilot with a great deal of information to ensure he or she stays on the preferred course. It would be helpful if the graphics associated with the arrival and departure procedures highlighted the noise-sensitive areas around OSU Airport. Identifying noise-sensitive areas on the published procedures does not mean those areas will not have overflights; it simply alerts the pilot to be aware there are noise-sensitive areas around OSU Airport.

Recommendation: This Study recommends OSU Airport staff work with the helicopter operators to identify noise-sensitive land uses on the graphics that accompany the published helicopter procedures.

9.3.3 Review Altitudes for Arrivals and Departures

As mentioned previously, ATC personnel and the helicopter operators worked together collaboratively several years ago to establish the best arrival and departure routes for OSU Airport. Part of that discussion focused on the altitude of the helicopter operations that would help reduce noise exposure and would ensure proper separation from other air traffic including fixed wing aircraft. Because safety is the first priority, no alternatives exist to make adjustments to the helicopter altitudes beyond the measures already undertaken.

Recommendation: This Study does not recommend changes to altitudes for arrivals and departures for helicopter operations for OSU Airport due to previous review of this topic by ATC and the operators and the need for safety regarding operations.

9.4 ARRIVING AND DEPARTING AIRCRAFT

The majority of complaints at airports are related to arriving and departing aircraft. OSU Airport is no exception. Departing aircraft are a significant source of complaints because aircraft departures are generally considered to be the noisiest operation at an airport. Arriving aircraft are also a significant source of complaints primarily because arriving aircraft are seen as being low to the ground, especially when close to the airport.

9.4.1 Review Power and Pitch Settings for Propeller Aircraft

Propeller power and pitch settings are chosen based on the operating needs of an aircraft at that point in its flight. The correct settings are crucial for ensuring the aircraft achieves the appropriate thrust for safe flight. There are instances where the power and pitch settings can be adjusted to reduce noise without affecting the safe performance of the aircraft.
The majority of the aircraft based at OSU Airport single engine and twin piston aircraft. Many of the single engine aircraft have fixed pitch propellers, including the vast majority of the training aircraft,

which greatly limits the ability to cut back power to reduce noise exposure on the ground. Some of the itinerant aircraft using OSU Airport may have a variable pitch propeller that may allow for changes when conditions permit. Depending on the aircraft and flight conditions, some twin-engine propeller aircraft can reduce power slightly once reaching an altitude between 500 feet and 1,000 feet AGL. Each arrival and departure operation is unique and the decision to change the power and/or pitch settings is completely up to the pilot in command; they must make the decision based on what is needed to safely operate the aircraft. The OSU Airport Noise Abatement Guidelines requests pilots use reduced thrust and/or quiet climb procedures when operationally and safely practicable. OSU Airport staff has brought this to the attention of pilots during various meetings and through distribution of the Noise Abatement Guidelines. Since the pilot-in-command has final decision on safe operation of his or her aircraft, it is not possible to mandate the use of reduced power and pitch settings at OSU Airport. The use of this technique should continue to be stressed to the pilots using OSU Airport.

Recommendation: This Study recommends OSU Airport continue to stress to pilots the technique of using reduced power and/or appropriate pitch settings to reduce noise exposure on surrounding communities.

9.4.2 Revise Arrival and Departure Paths

Many comments received from people in communities around OSU Airport requested that the arrival and departure corridors be changed, with most requests asking for the corridors to be changed to follow local highways or bodies of water. Comments on arrivals and departures were received from both east and west of OSU Airport. More comments were received about departures versus arrivals, but that is to be expected at most airports since aircraft departures are louder than arrivals. To the west of OSU Airport, comments received were for both arrivals and departures and from people in communities located primarily off the direct centerline of the two parallel runways. Comments received from the east of OSU Airport were on both arrival and departures, with more emphasis placed on departures. As with the people in communities located west of OSU Airport, people in communities located east of OSU Airport aligned with the centerline of the parallel runways commented more on arrival operations. The comments received regarding departures east of OSU Airport came from people in communities located due east of the parallel runway and northeast of OSU Airport along the 050 degree departure corridor.

9.4.2.1 Arrival Paths

OSU Airport operates in a west flow, aircraft arriving from the east and departing to the west, about 70 percent of the time in a given year. With the majority of operations occurring in a west flow, the people in communities east of OSU Airport receive noise primarily from arriving aircraft. As mentioned previously, there are airspace constraints east of OSU Airport which makes the current arrival procedures necessary for safety reasons. While no changes can be made to the existing arrival procedures, additional technical analysis was conducted on the existing arrival headings, both east and west of OSU Airport, to determine if one is more beneficial for use from a noise standpoint when conditions permit. The analysis conducted used both a jet aircraft and a propeller-driven aircraft since both have different operating characteristics and noise exposure footprints.

Sound Exposure Level (SEL) contours were used for the analysis because they represent a single arriving aircraft. Analysis for the existing condition was based on the south runway, since it is the most commonly used runway by jets and propeller aircraft. The future analysis used the north runway since it is anticipated jets and twin-propeller aircraft will also use that runway if it is extended. It is not appropriate to show SEL contours on both runways on the same map because the contours depict a single aircraft operation. Both runways will be used in the future, and the use of both runways is depicted in the future DNL contours included in the Noise Exposure Map (NEM) document.

The number of SEL contours used for each analysis was based on the number of commonly used arrival paths by each aircraft type for each runway end based on radar flight track data used in the development of the NEMs. An 80 dB SEL contour was used for both the jet aircraft arrival and the propeller aircraft arrival. The 80 dB SEL value was chosen for the two aircraft types to ensure a contour large enough to extend to residential areas was used for the analysis.

The population count within each SEL contour provides an indication of which corridor would be best to use when conditions permit by having the fewest people within the SEL contour. As mentioned previously, when preparing population counts for contours in a Part 150 study, only residential dwellings are considered. Schools and churches are not counted separately because the population using those facilities is transient. Also, counting school and church enrollments would result in a double-count of the residents who live in the surrounding neighborhoods. Still, these structures are specifically identified as sensitive land uses in the Part 150 Study. Phase 1 of the Part 150 Study included a map displaying such noise sensitive land uses. Also, FAA guidelines state that all land uses outside the 65 DNL contour are considered to be compatible with airport operations. As shown in Phase 1 of the Part 150 Study, the 65 DNL contour remains on Airport property. As a result, no noise-sensitive land uses, such as residential units, schools, or churches, are within the 65 DNL contour. A discussion of any effects of aircraft noise on noise-sensitive land uses as a result of an extension to the Airport's north runway would be included in environmental review documentation prepared in compliance with the National Environmental Policy Act (NEPA). In accordance with FAA guidelines on the implementation of NEPA, this environmental review documentation is required before the Airport could proceed with an extension to the north runway.

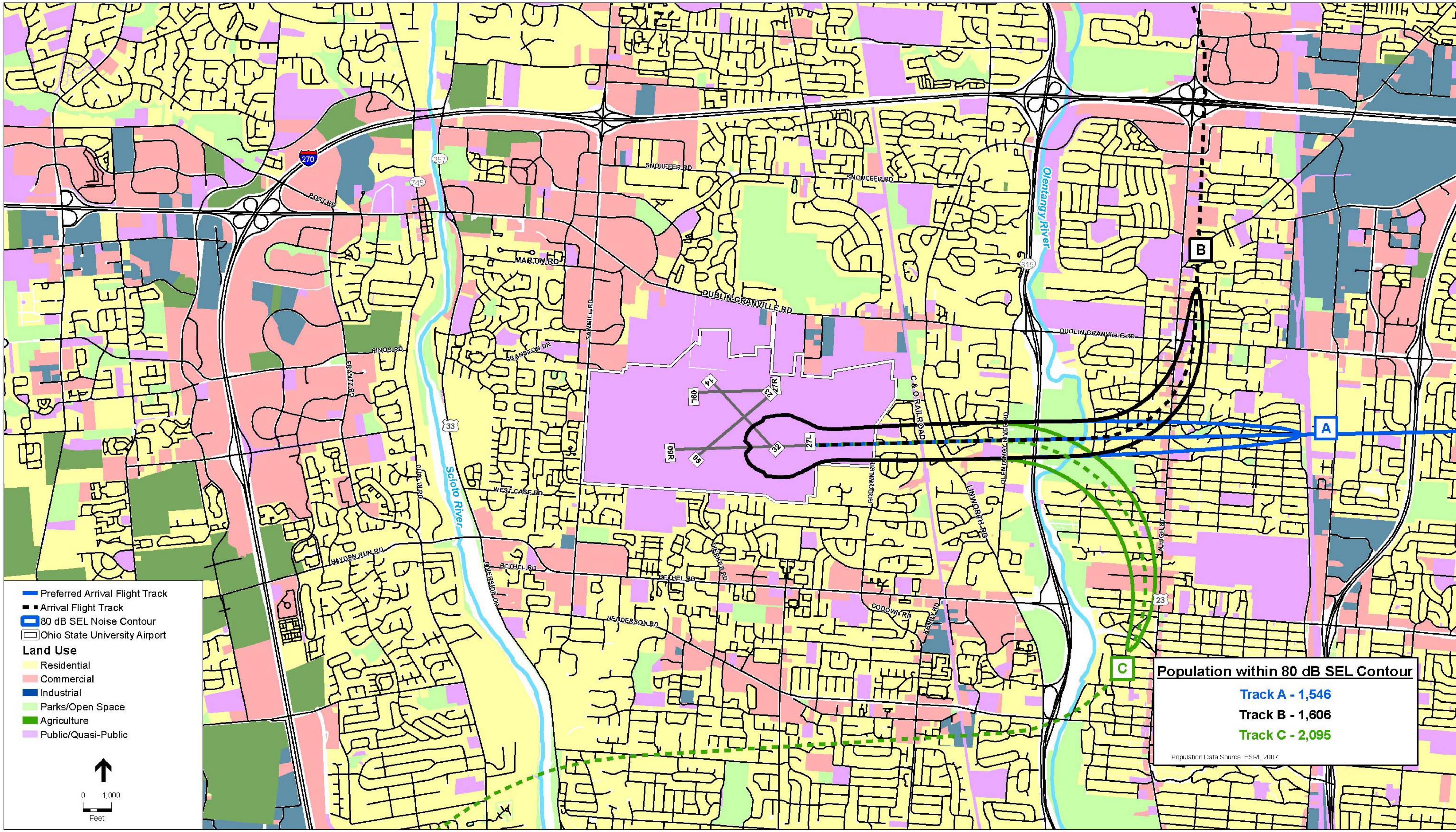
It is important to note the population counts are meant to provide an order of magnitude of population contained within each SEL contour versus actual number of people. The census data used for the population estimates is from the 2000 census and represents the most recent available data for the population estimates. Since the time when the 2000 census was conducted, developments may have occurred which may have included the addition of new residential structures.

Figure 9-3 presents the existing jet aircraft arrival analysis from the east. Currently, jet aircraft arrive primarily on Runway 27L when in west flow. Based on the analysis in this figure, it appears arrival path A should be used when conditions permit. This arrival path is the straight in arrival path and the SEL contour had the least number of people within the contour. **Figure 9-4** presents the propeller aircraft arrival analysis from the east. Currently, propeller aircraft arrive primarily on Runway 27L when in west flow. Based on the analysis in these figures, arrival path A on Runway 27L should be used when conditions permit. While the differences in the population counts between the different arrival paths are quite small, this arrival path results in the least number of people within the SEL contour. For the future scenario, more jet operations are expected to operate on Runway 9L/27R if this runway is extended. An estimate of the flight patterns to be used in the future if Runway 9L/27R is extended was used to make a determination on which arrival corridor would be best to use on a voluntary basis and when conditions permit. **Figure 9-5** presents the future jet arrival analysis from the east on Runway 27R. Based on the analysis, arrival path A on Runway 27R should be used when conditions permit. **Figure 9-6** presents the future propeller arrival analysis from the east on Runway 27R. As can be seen from the analysis, the population counts for each arrival path are very similar. Arrival path A has the least number of people within the SEL contour and should be used as conditions permit.

Figure 9-7 presents the existing jet aircraft arrival analysis from the west. Currently, jet aircraft arrive primarily on Runway 9R when in east flow. To the west of OSU Airport are several large areas of commercial/industrial corridors that could be used more extensively to reduce the number of people exposed to aircraft noise when possible. As to the east of OSU Airport, the arrival patterns to the west of OSU Airport are scattered. This analysis looked at the primary arrival paths as well as one additional arrival path that are not used as frequently. This less frequently used arrival path was included in the analysis because it presented a path that uses more of the commercial/industrial corridor, which limits the number of people exposed to aircraft noise. When conditions permit, jet aircraft arrivals from the west should be directed to use arrival path D on **Figure 9-7**. This arrival path is similar to the more heavily used arrival path A, but takes the aircraft over more of the commercial/industrial land uses. **Figure 9-8** presents the propeller aircraft arrival analysis from the west.

Currently, propeller aircraft primarily use Runway 9R for arrivals in east flow. Based on the analysis in these figures, arrival path A on Runway 9R should be used when conditions permit. While the differences in the population counts between the different arrival paths are quite small, this arrival path offers the least number of people within the SEL contour.

FIGURE 9-3
EXISTING JET AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 27L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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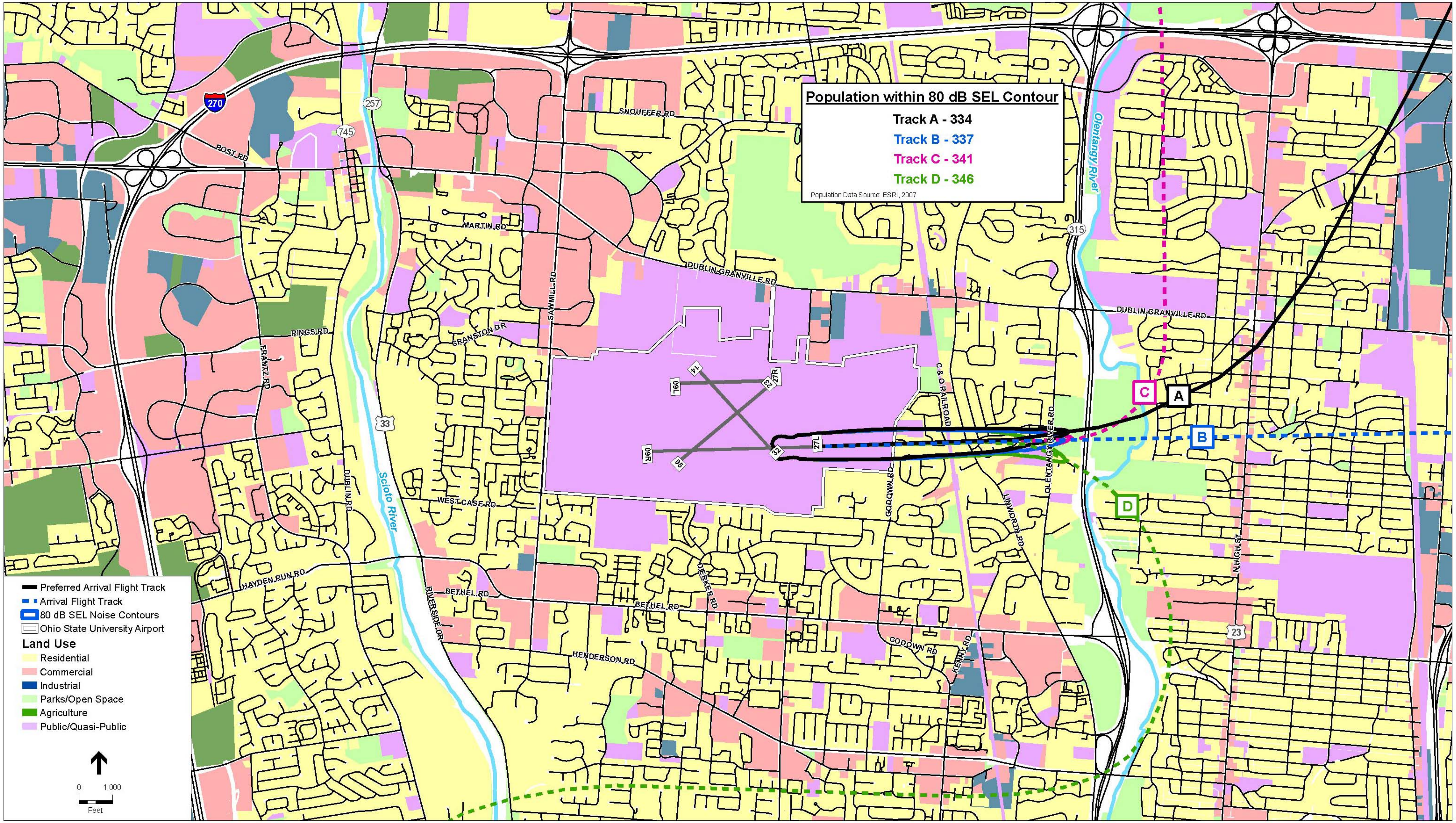
FIGURE 9-4
EXISTING PROPELLER AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 27L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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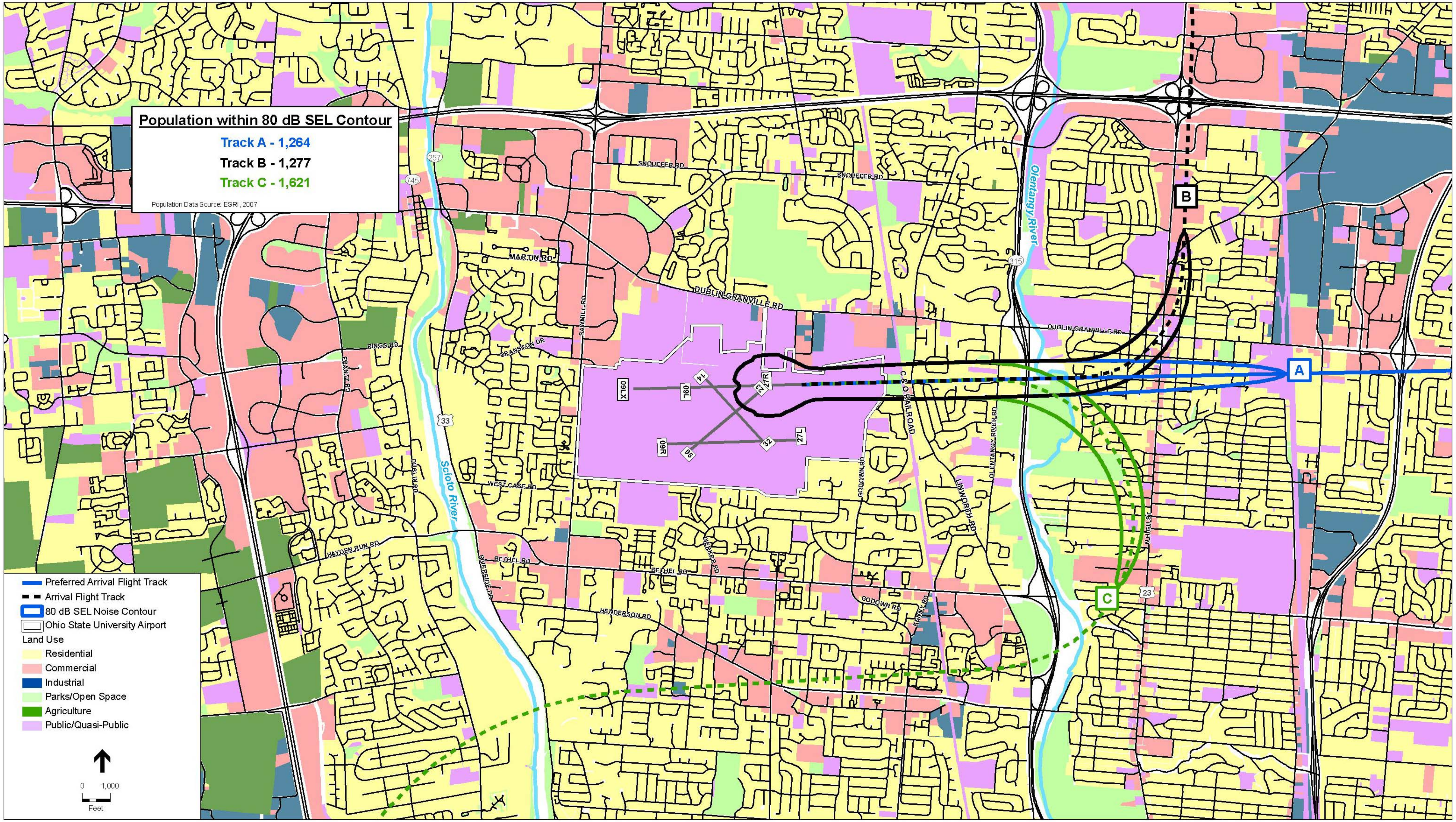
FIGURE 9-5
FUTURE JET AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 27R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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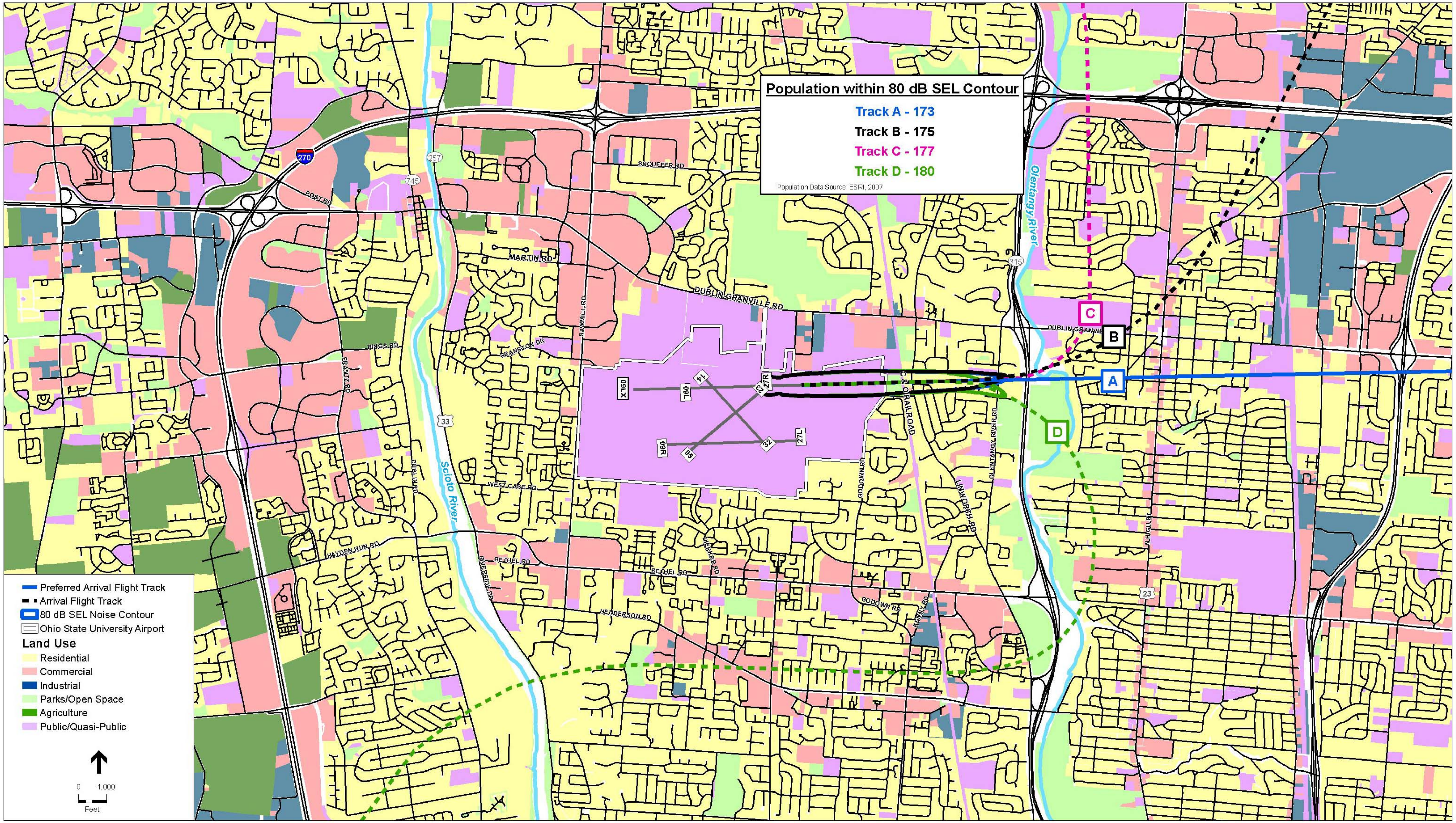
FIGURE 9-6
FUTURE PROPELLER AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 27R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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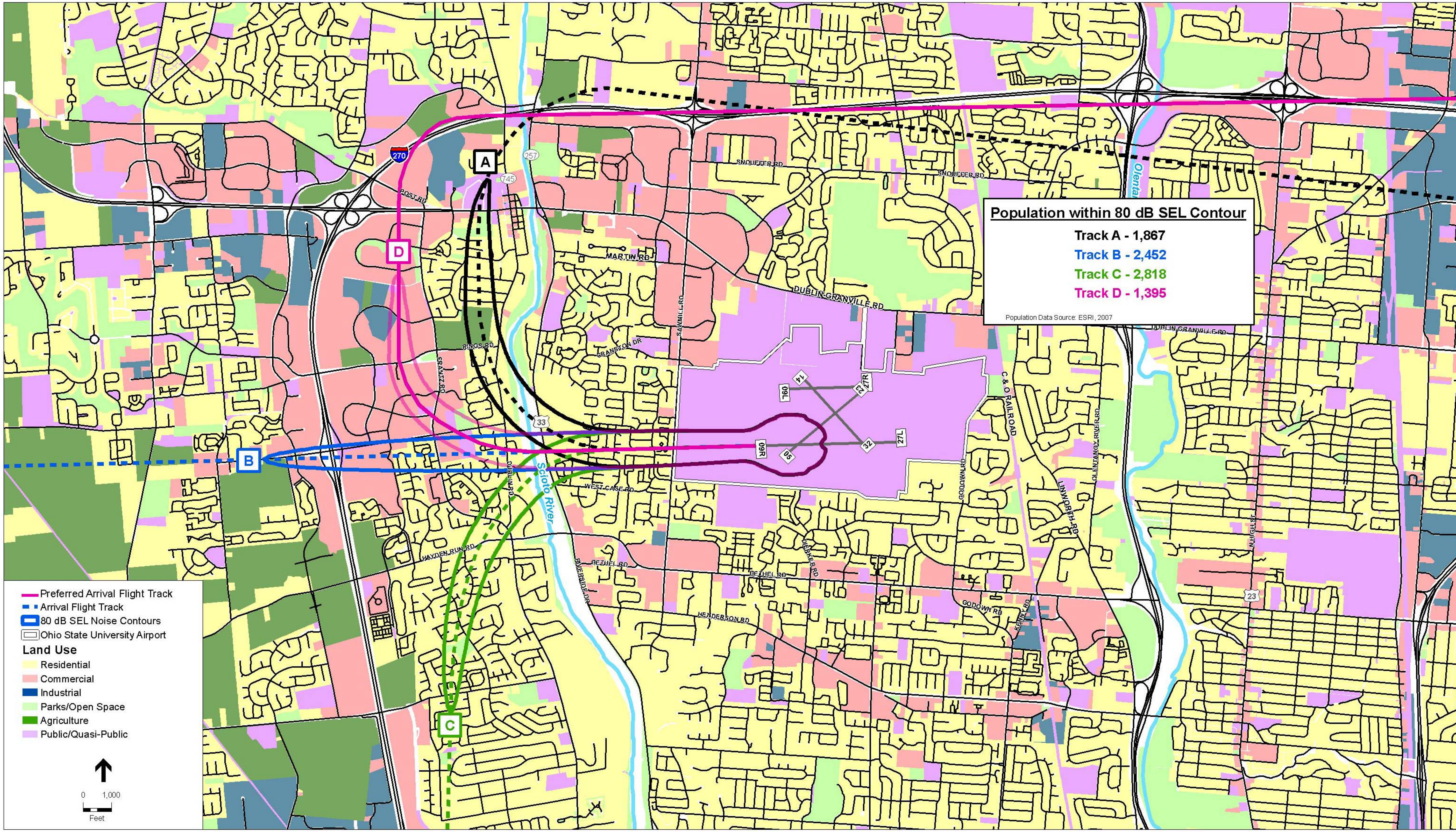
FIGURE 9-7
EXISTING JET AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 9R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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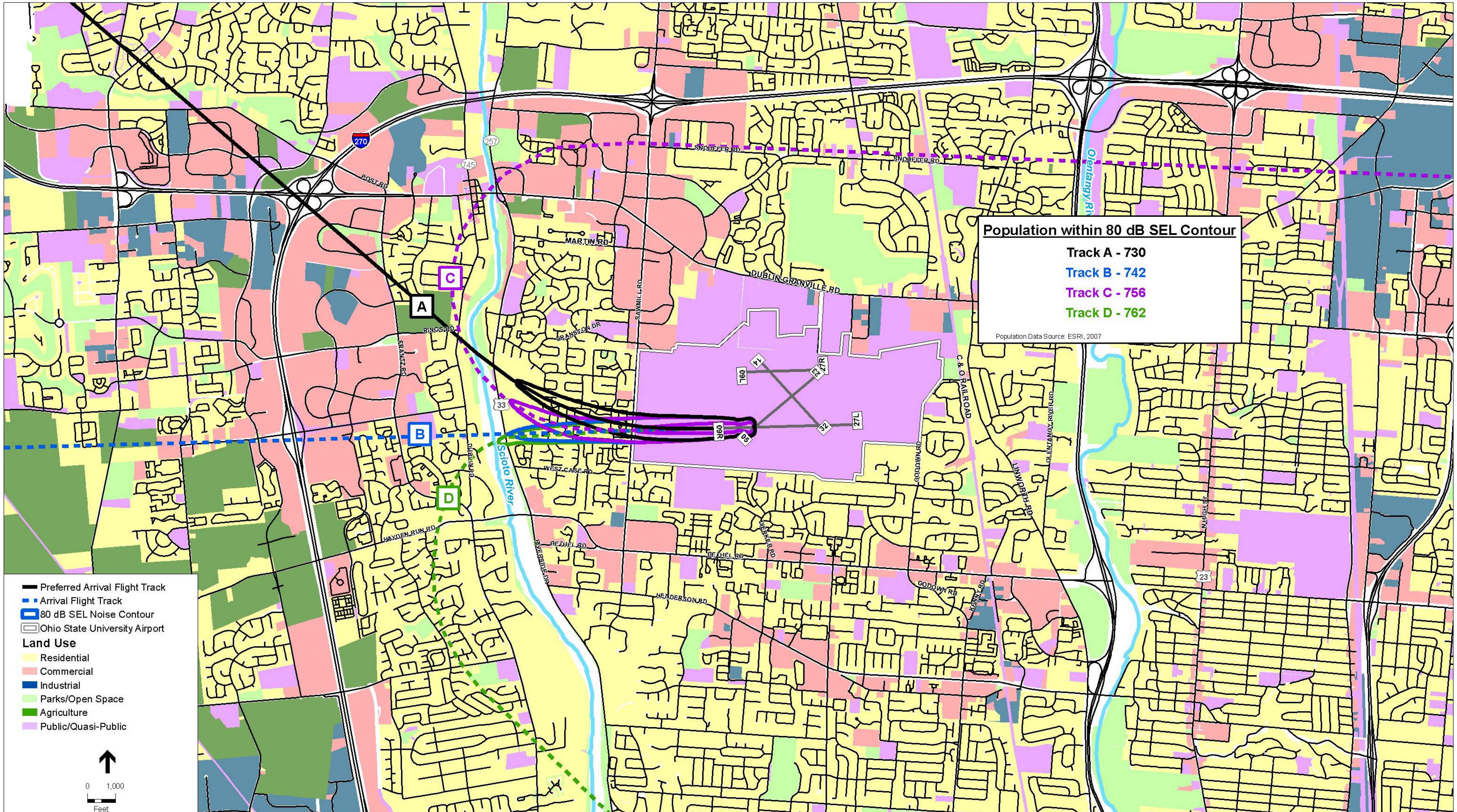
FIGURE 9-8
EXISTING PROPELLER AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 9R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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As mentioned previously, more jet operations are expected to use Runway 9L/27R in the future if the runway is extended. Twin-engine propeller-driven aircraft may also use Runway 9L/27R in the future. An estimate of the flight patterns to be used in the future if Runway 9L/27R is extended was used to make a determination on which arrival paths would be best to use when conditions permit. Large areas of commercial/industrial corridors exist west of OSU Airport. These commercial/industrial corridors were taken into consideration in determining what future arrival path would have the fewest number of people located within the SEL contour.

Figure 9-9 presents the future jet arrival analysis from the west on Runway 9L. Based on the analysis, arrival path D on Runway 9L should be used when conditions permit. The population estimate contained within the SEL contour for arrival path D is significantly less than the other arrival paths analyzed. **Figure 9-10** presents the future propeller arrival analysis from the west on Runway 9L. Arrival path A has the least number of people within the SEL contour and should be used on a voluntary basis as conditions permit.

The arrival paths identified in this section as having the fewest people within the SEL contours should be used when conditions permit, both during the day and during the nighttime hours when the ATCT is closed for OSU Airport. OSU Airport staff should identify these arrival paths as preferred arrival paths during the nighttime hours as part of their noise abatement guidelines. This information should also be shared with pilots and operators at OSU Airport through all channels of communication available.

Recommendation: This Study recommends OSU Airport work with ATC to have arriving aircraft use arrival paths, with the fewest number of people exposed to aircraft noise, when operating conditions permit. These arrival paths will also be identified as the preferred paths for use during the nighttime hours when the ATCT at OSU Airport is closed, subject to conditions permitting, and educate the pilots on these procedures through all channels of communication available.

9.4.2.2 Departure Paths

The vast majority of comments received during this Study related to the use of the 050 degree departure heading when aircraft depart to the east from OSU Airport. Comments received ranged from requesting this departure procedure to be discontinued, to requests to vary the location where the turn to the 050 degree heading occurs. As mentioned previously, the Class C airspace of Port Columbus International Airport dictates the current arrival and departure procedures to ensure the safe separation of OSU Airport traffic from Port Columbus International Airport aircraft traffic. The concern of using the 050 degree departure heading was discussed with ATC personnel from OSU Airport and Port Columbus International Airport. ATC personnel for Port Columbus International Airport confirmed that when OSU Airport aircraft are departing to the east, the turn to the 050 degree heading must remain in place as a departure procedure to avoid conflicts with aircraft operating to and from Port Columbus International Airport. Delaying the turn to the 050 degree heading until reaching Interstate 71 was suggested by people in the communities east of OSU Airport. However, ATC personnel indicated delaying the turn would place the departing aircraft from OSU Airport into Port Columbus International Airport's airspace and raise the potential for air traffic conflicts, which would compromise safety.

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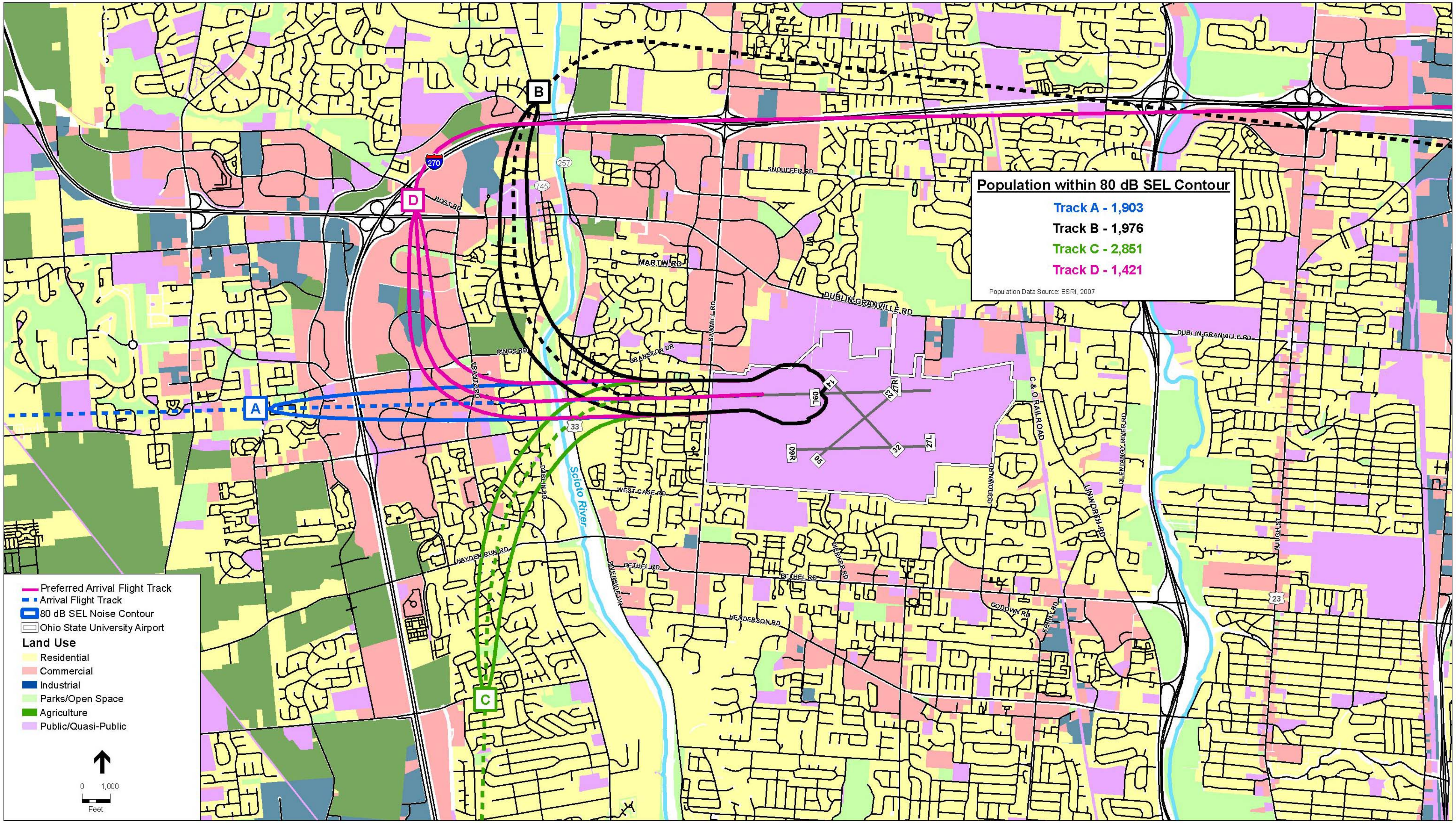
FIGURE 9-9
FUTURE JET AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 9L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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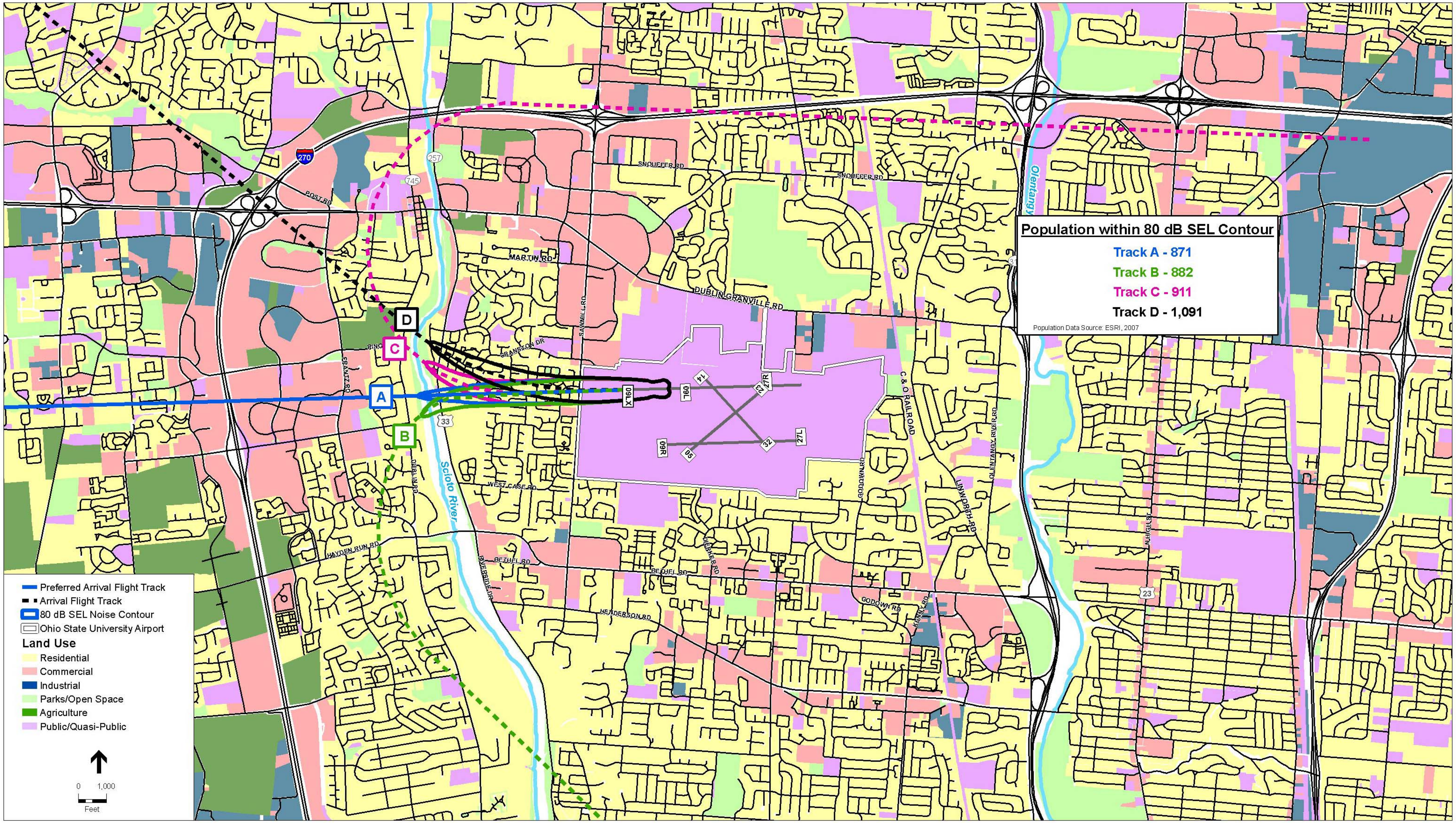
FIGURE 9-10
FUTURE PROPELLER AIRCRAFT ARRIVAL ANALYSIS – RUNWAY 9L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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To the west of OSU Airport, several comments were received requesting departures fly runway heading until reaching the Scioto River or Interstate 270 before turning. Based on discussions with ATC personnel at both OSU Airport and Port Columbus International Airport, it was determined the current departure procedure for aircraft to the west calls for the aircraft to fly straight to the Scioto River prior to commencing any turns. While not all aircraft may follow this procedure on a consistent basis, an analysis of the operations revealed that the majority of the aircraft follow this procedure, and ATC instructs the pilots to do so when conditions permit.

While no changes can be made to the existing departure procedures, additional technical analysis was conducted on the existing departure paths, both east and west of OSU Airport, to determine if one is more beneficial for use from a noise standpoint when conditions permit. The analysis conducted used both a jet aircraft and a propeller aircraft since both have different operating characteristics and noise exposure footprints. SEL contours were used for the analysis because they represent a single departing aircraft. Analysis for the existing condition was based on the south runway, since it is the most commonly used runway by jets and propeller aircraft. The future analysis used the north runway since it is anticipated jets and twin-propeller aircraft will also use that runway if it is extended. It is not appropriate to show SEL contours on both runways on the same map because the contours depict a single aircraft operation and the runways would not be used for simultaneous departures. Both runways will be used in the future, and the use of both runways is depicted in the future DNL contours included in the NEM document.

The number of SEL contours used for each analysis was based on the number of commonly used departure paths by each aircraft type for each runway end based on radar flight track data used in the development of the NEMs. An 85 dB SEL contour was used for both the jet aircraft departure and the propeller aircraft departure. The 85 dB SEL value was chosen for the two aircraft types to ensure a contour large enough to extend to residential areas was used for the analysis.

The population count within each SEL contour provides an indication of which corridor would be best to use when conditions permit by having the fewest people within the SEL contour. As mentioned previously, when preparing population counts for contours in a Part 150 study, only residential dwellings are considered. Schools and churches are not counted separately because the population using those facilities is transient. Also, counting school and church enrollments would result in a double-count of the residents who live in the surrounding neighborhoods. Still, these structures are specifically identified as sensitive land uses in the Part 150 Study. Phase 1 of the Part 150 Study included a map displaying such noise sensitive land uses. Also, FAA guidelines state that all land uses outside the 65 DNL contour are considered to be compatible with airport operations. As shown in Phase 1 of the Part 150 Study, the 65 DNL contour remains on Airport property. As a result, no noise-sensitive land uses, such as residential units, schools, or churches, are within the 65 DNL contour. A discussion of any effects of aircraft noise on noise-sensitive land uses as a result of an extension to the Airport's north runway would be included in environmental review documentation prepared in compliance with the National Environmental Policy Act (NEPA). In accordance with FAA guidelines on the implementation of NEPA, this environmental review documentation is required before the Airport could proceed with an extension to the north runway.

It is important to note the population counts are meant to provide an order of magnitude of population contained within each SEL contour versus actual number of people. The census data used for the population estimates is from the 2000 census and represents the most recent available data for the population estimates. Since the time when the 2000 census was conducted, developments may have occurred which may have included the addition of new residential structures.

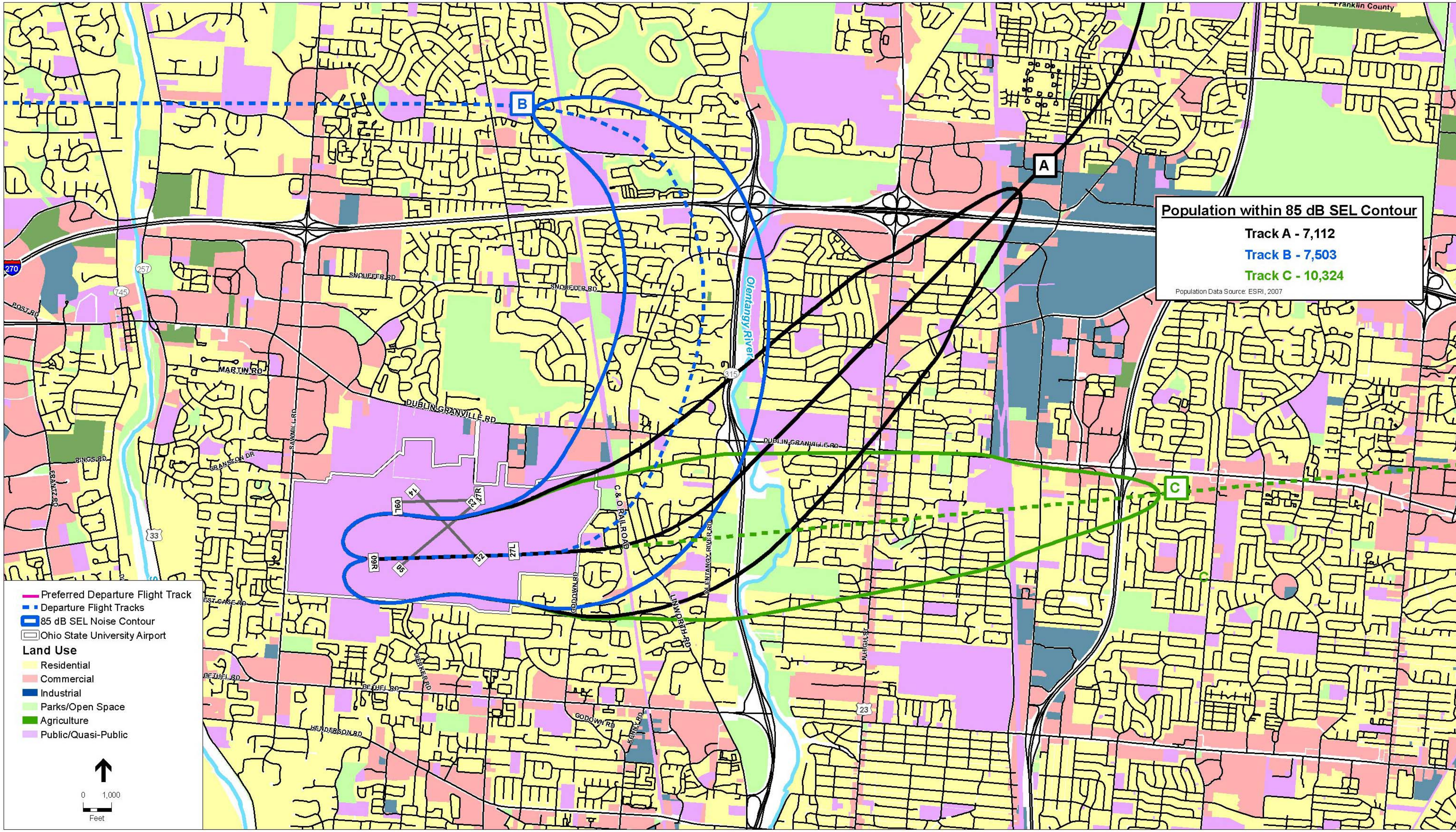
Figure 9-11 presents the existing jet aircraft departure analysis to the east. Currently, jet aircraft depart primarily on Runway 9R when in east flow. Based on the analysis in this figure, it appears departure path A should be used when conditions permit. **Figure 9-12** presents the propeller aircraft departure analysis to the east. Currently, propeller aircraft primarily use Runway 9R for departures in east flow. Based on the analysis in these figures, departure path A on Runway 9R should be used when conditions permit. For the future scenario, jet operations are expected to move operations to Runway 9L/27R if the runway is extended. Twin-engine propeller-driven aircraft are expected to use both runways. An estimate of the flight patterns to be used in the future if Runway 9L/27R is extended was used to make a determination on which departure path would be best to use when conditions permit. **Figure 9-13** presents the future jet departure analysis to the east on Runway 9L. Based on the analysis, departure path A on Runway 9L should be used when conditions permit. **Figure 9-14** presents the future propeller aircraft departure analysis to the east on Runway 9L. As can be seen from the analysis, the population counts for several of the departure paths are similar. Departure path A has the least number of people within the SEL contour and should be used as conditions permit.

Currently, jet aircraft depart primarily on Runway 27L when in west flow. To the west of OSU Airport are several large areas of commercial/industrial corridors that could be used more extensively to reduce the number of people exposed to aircraft noise when possible.

Similar to the east of OSU Airport, the departure patterns to the west of OSU Airport are dispersed. **Figure 9-15** presents the existing jet aircraft departure analysis to the west on Runway 27L. This analysis looked at the primary departure paths as well as one additional departure path that are not used as frequently. This less frequently used departure path was included in the analysis because it presented a departure path that flies over more of the commercial/industrial corridor, which limits the number of people exposed to aircraft noise. When conditions permit, jet aircraft departures to the west should be directed to use the departure path D on **Figure 9-15**. This departure path is similar to departure path A, but takes the aircraft over more of the commercial/industrial land uses. This departure path also takes the aircraft to the Scioto River before making any turns. **Figure 9-16** presents the propeller aircraft departure analysis to the west. Currently, propeller aircraft primarily use Runway 27L for departures to the west. Based on the analysis in these figures, departure path A on Runway 27L has the least population within the SEL contour analyzed. However, beyond the SEL contour analyzed, departure path A continues over more residential development. Departure path B, while presenting a higher population count within the SEL contour analyzed, continues over more commercial/industrial land uses. Based on this, departure path B should be used when conditions permit.

As mentioned previously, more jet operations are expected to occur on Runway 9L/27R in the future if the runway is extended. Twin-engine propeller-driven aircraft may also use Runway 9L/27R in the future. An estimate of the flight patterns to be used in the future if Runway 9L/27R is extended was used to make a determination on which departure path would be best to use when conditions permit. As mentioned previously, large areas of commercial/industrial corridors exist west of OSU Airport. These commercial/industrial corridors were taken into consideration in determining what future departure path would have the fewest number of people located within the SEL contour.

FIGURE 9-11
EXISTING JET AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 9R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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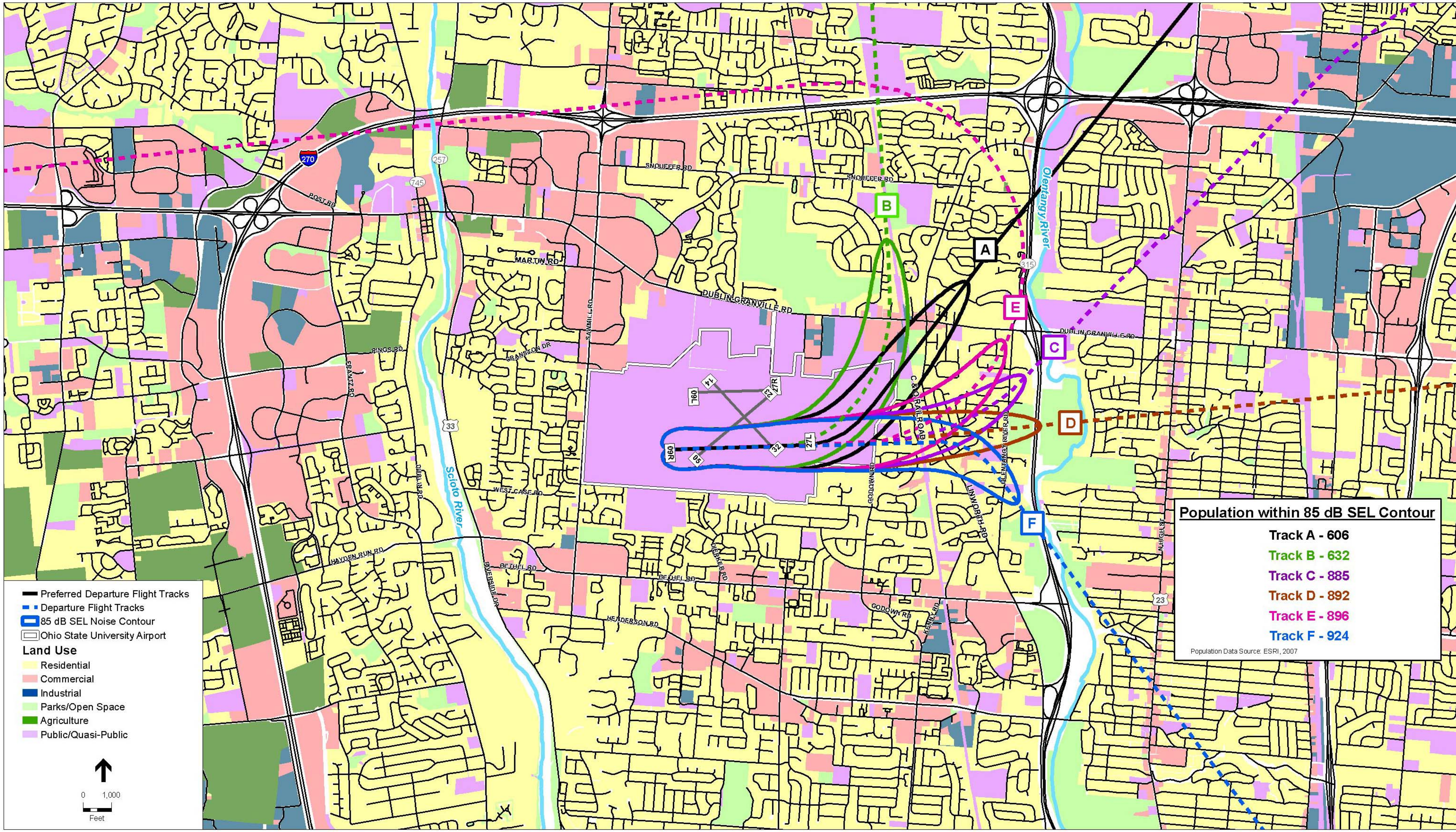
FIGURE 9-12
EXISTING PROPELLER AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 9R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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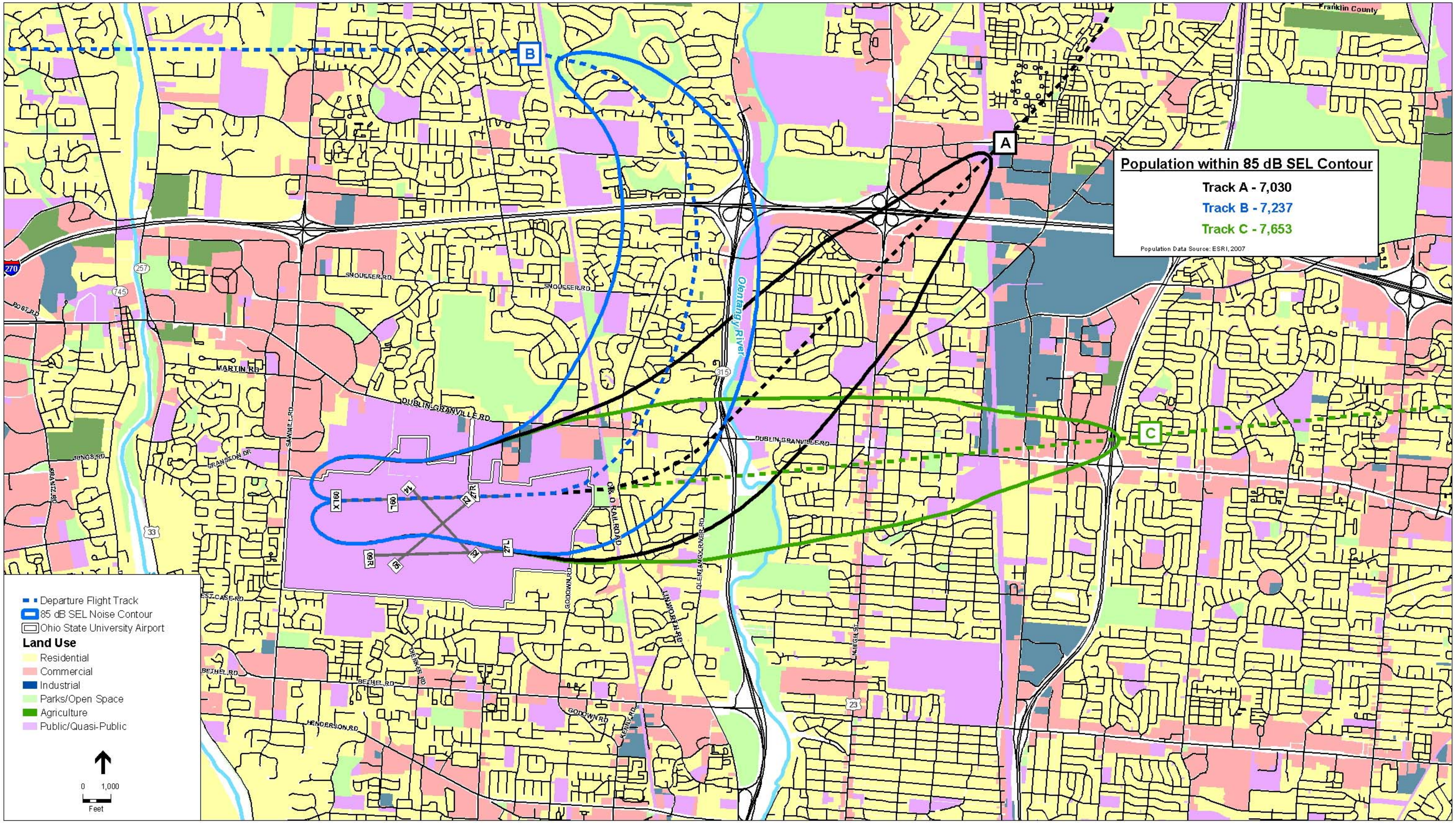
FIGURE 9-13
FUTURE JET AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 9L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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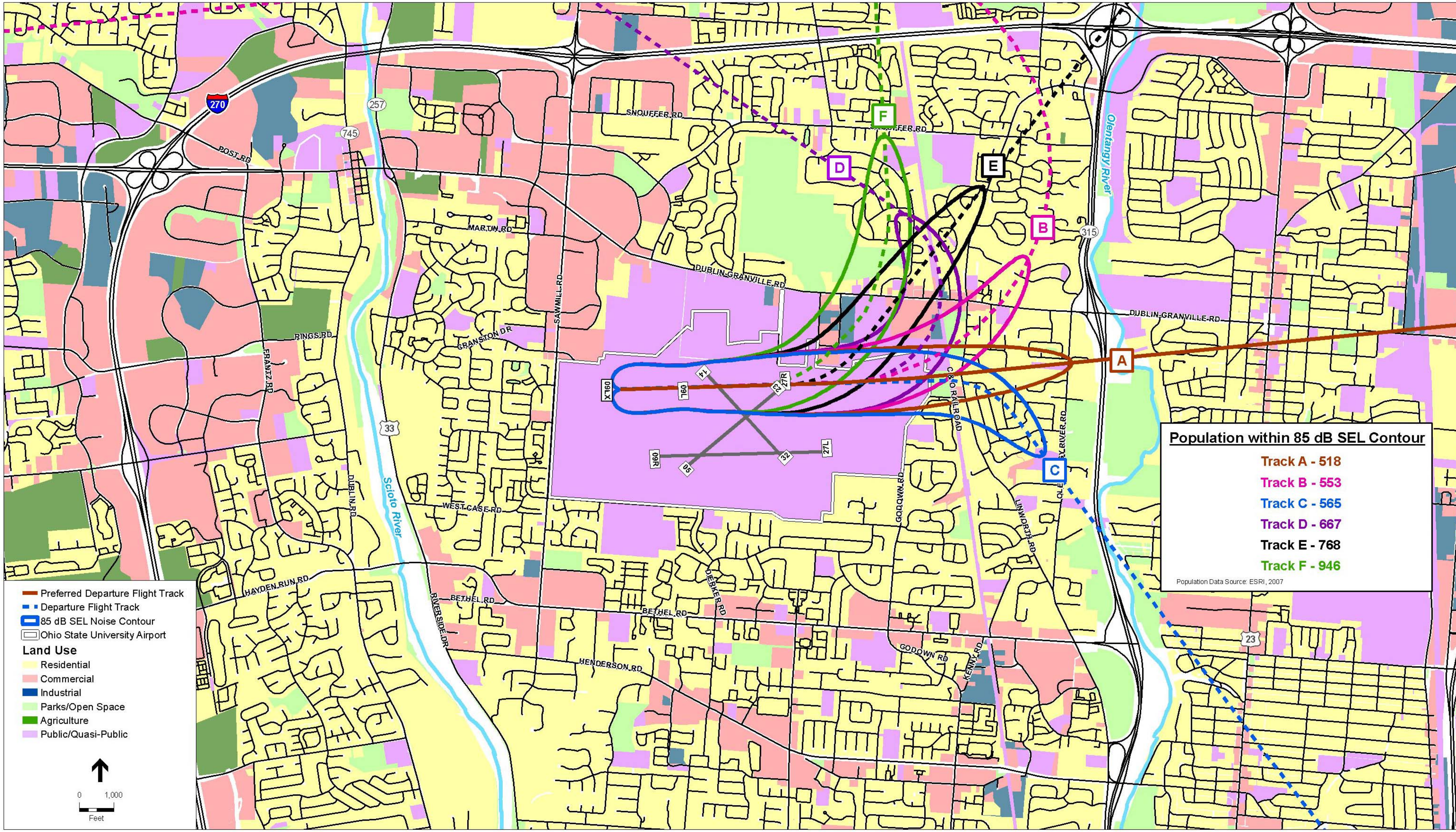
FIGURE 9-14
FUTURE PROPELLER AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 9L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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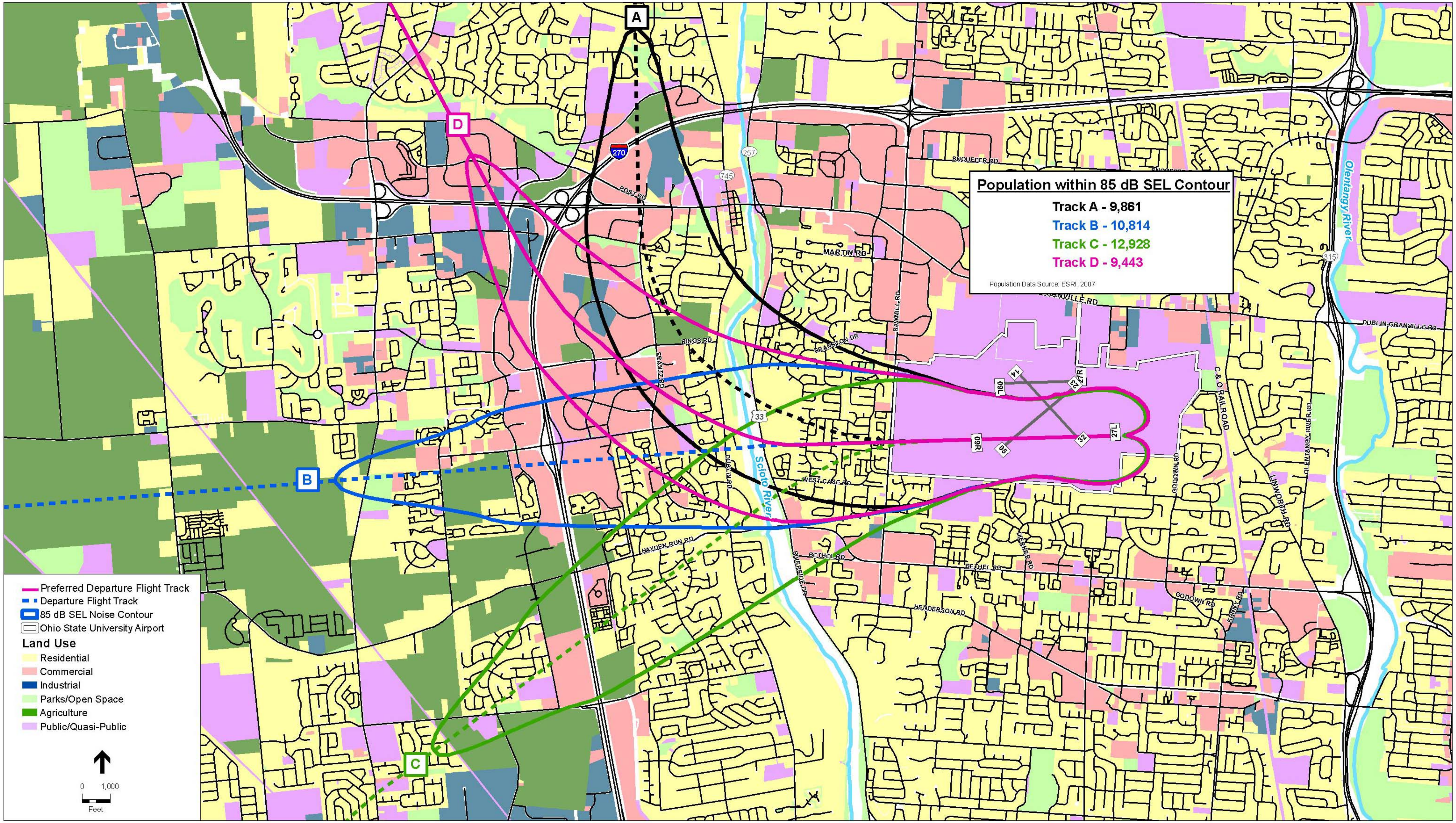
FIGURE 9-15
EXISTING JET AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 27L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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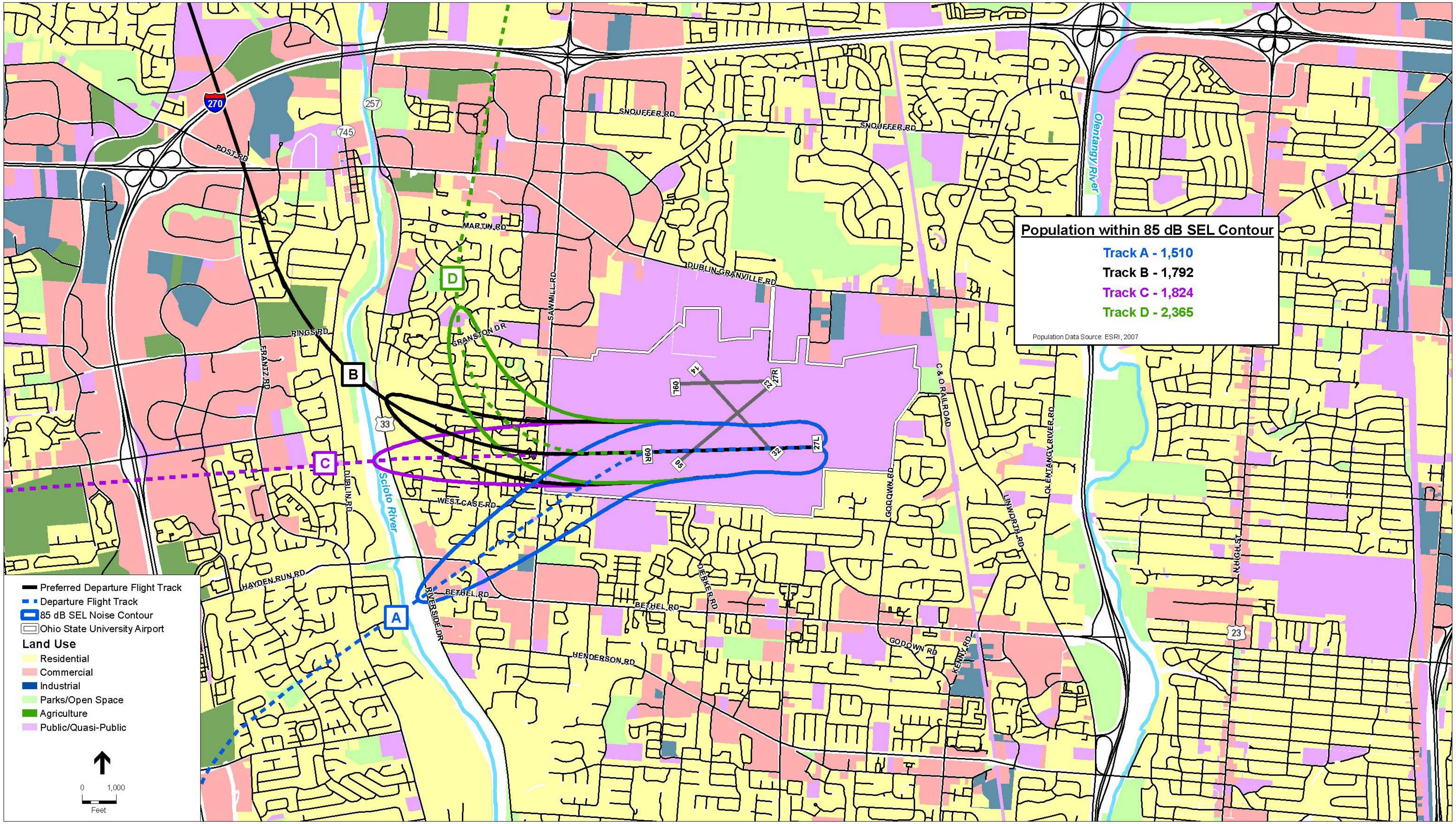
FIGURE 9-16
EXISTING PROPELLER AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 27L



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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Figure 9-17 presents the future jet departure analysis to the west on Runway 27R. Based on the analysis, departure path D on Runway 27R should be used when conditions permit. The population estimate contained within the SEL contour for departure path D is less than the other departure paths analyzed and the departure path continues over a commercial/industrial corridor. This departure path also has the aircraft reaching the Scioto River before commencing any turns. **Figure 9-18** presents the future propeller aircraft departure analysis to the west on Runway 27R. While departure path A has the least amount of population within the contour, it crosses the extended centerline of Runway 27L and is only used sparingly. Because of this potential airspace conflict, departure path B presents the best option for a preferred departure path to be used as conditions permit.

The preferred departure paths identified in this section should be used when conditions permit and during the nighttime hours when the ATCT is closed for OSU Airport. OSU Airport staff should identify these departure paths as the preferred departure paths during the nighttime hours as part of their noise abatement guidelines. This information should also be shared with pilots and operators at OSU Airport through all channels of communication available.

Recommendation: This Study recommends OSU Airport work with ATC to have departing aircraft use departure paths with the fewest people exposed to aircraft noise, when operating conditions permit. These departure paths will also be identified as the preferred paths for use during the nighttime hours when the ATCT at OSU Airport is closed, subject to conditions permitting, and educate the pilots on these procedures through all channels of communication available.

9.4.3 Establish Area Navigation (RNAV) Procedures

RNAV procedures can be beneficial if a compatible land use corridor is identified and a desire to concentrate operations over that corridor can be achieved. RNAV has traditionally been used in the enroute environment to provide precise navigation at high altitudes. However, RNAV has seen greater low altitude application in recent years. RNAV uses waypoint coordinates to direct aircraft departures and replaces, to a great extent, vector directed headings used in the past. The key benefit of using RNAV is the continual adjustment of the aircraft's departure track to its next waypoint. This adjustment minimizes the impact of wind drift and other factors that cause an aircraft to vary from an assigned flight path.

Because noise sensitive land uses surround OSU Airport on all four sides; very little opportunity exists to establish an RNAV procedure. However, a corridor of commercial/industrial land use is located west of OSU Airport. The commercial/industrial corridor is identified by Tuttle Crossing Boulevard to the south, Frantz Road to the east, and Emerald Parkway to the west. The corridor continues to the north to Post Road and then west from there following State Highway 161. Residential land uses exist between OSU Airport and this corridor, however population density drops significantly beyond this corridor and would lend itself to RNAV procedures.

RNAV arrival and departure procedures for Runways 9R, 9L (when extended), 27R (when extended), and 27L respectively would utilize the compatible land uses in this corridor potentially reducing noise exposure on area residents by having aircraft use these procedures more than the other arrival and departure procedures that do not fly over this corridor.

Recommendation: This Study recommends the establishment of RNAV procedures for aircraft arrivals to 9R and 9L, and aircraft departures from 27L and 27R. The RNAV procedure would utilize a commercial/industrial corridor located west of OSU Airport to concentrate aircraft noise over compatible land uses.

9.4.4 Establish a Scatter Departure Pattern

Communities that receive departure overflights often request the airport operator to implement a scatter departure pattern. The scatter departure pattern rotates which departure path is used by aircraft so that no single neighborhood receives all departures, which reduces the noise exposure they experience. This request was received through this Study process by people in communities located to the east of OSU Airport. Approximately 30 percent of the time in a given year, the communities east of OSU Airport have departing aircraft overflights. Most people in communities east of OSU Airport have concerns they receive all the departures to the east.

A review of the current flight tracks for departures to the east reveals that a scatter/fan pattern already exists, especially to the north and east. There are virtually no departures to the south and southeast of OSU Airport due to potential air traffic conflicts with Port Columbus International Airport aircraft operations. Port Columbus International Airport ATC personnel indicated that the prohibition of departures from Runways 9R/L from turning to the southeast of OSU Airport must remain in place to maintain air traffic separation.

Recommendation: This Study does not recommend the establishment of a scatter departure pattern due to a natural fanning of the air traffic that already occurs and so that OSU Airport aircraft do not interfere with air traffic from Port Columbus International Airport.

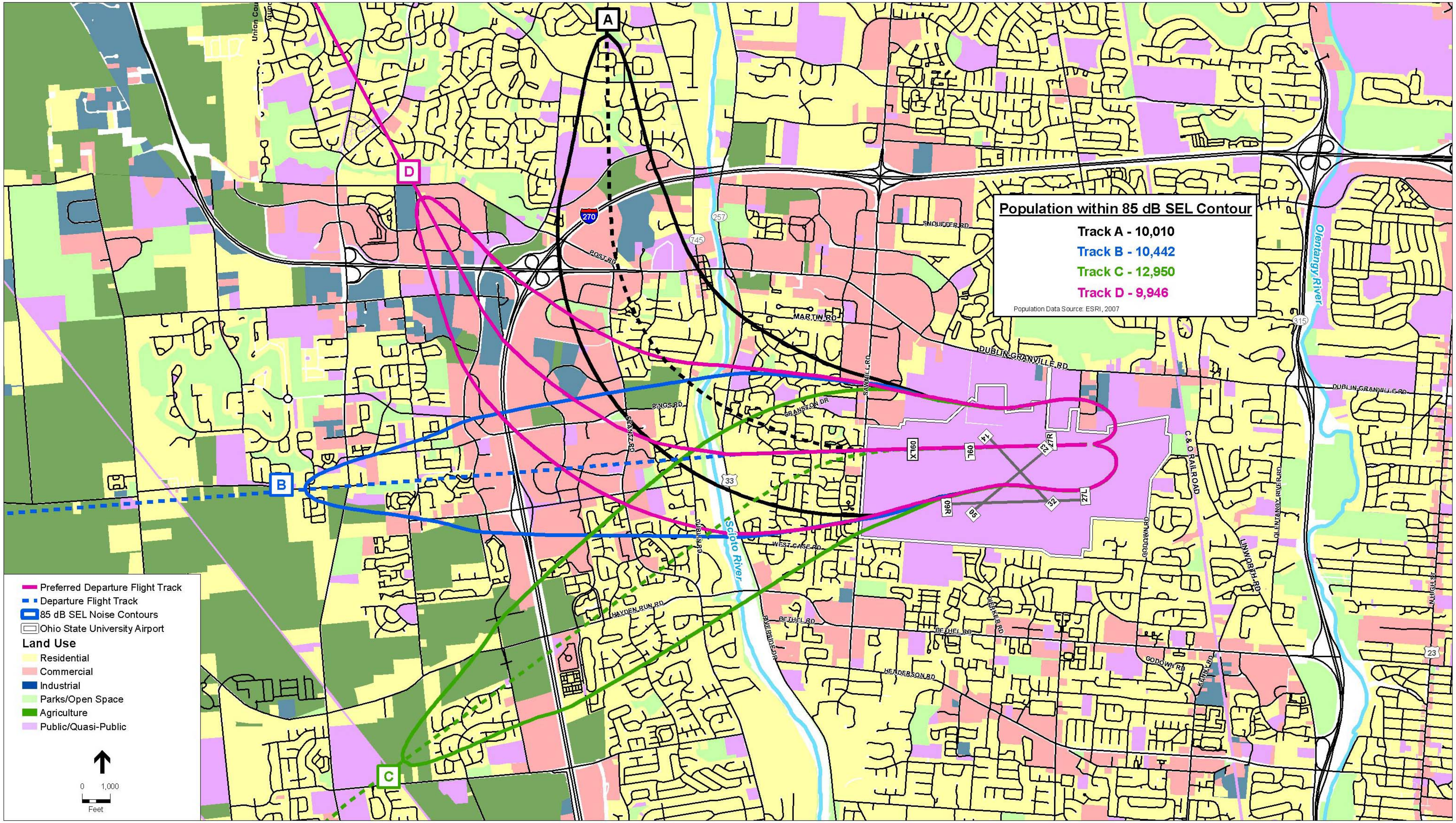
9.4.5 Remove All Altitude Restrictions

To the east of OSU Airport is Port Columbus International Airport, a commercial service airport. Because it is a commercial service airport, certain airspace classifications exist that requires all traffic above a certain altitude to be in contact with the Port Columbus International Airport ATC. In addition, there are arrival and departure corridors for Port Columbus International Airport located east of OSU Airport as well. When aircraft depart OSU Airport to the east, they are sometimes asked to climb and hold at 3,000 feet MSL to maintain aircraft separation with Port Columbus traffic. When aircraft are held down to 3,000 feet MSL, residents east of OSU Airport have concerns about the noise exposure from these operations. Because of this, several residents suggested that all altitude restrictions be removed for aircraft departing to the east from OSU Airport.

The discussions with OSU Airport and Port Columbus International Airport ATC personnel indicated that altitude restrictions are rarely used for aircraft departing OSU Airport. The current procedure calls for aircraft to depart and climb to 3,000 feet MSL and hold until given further clearance by Port Columbus Terminal Radar Approach Control (TRACON). The hold occurs less than five percent of the time according to ATC personnel from both OSU Airport and Port Columbus International Airport, and only occurs if needed for conflicting air traffic to or from Port Columbus International Airport. Most aircraft departures are not held at 3,000 MSL, but rather given clearance to continue climbing prior to reaching 3,000 foot MSL. ATC personnel indicated the limit of 3,000 feet MSL must remain as it is today to allow for flexibility in separating aircraft operations.

Recommendation: This Study does not recommend the removal of all altitude restrictions due to the need to separate conflicting traffic when conditions warrant.

FIGURE 9-17
FUTURE JET AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 27R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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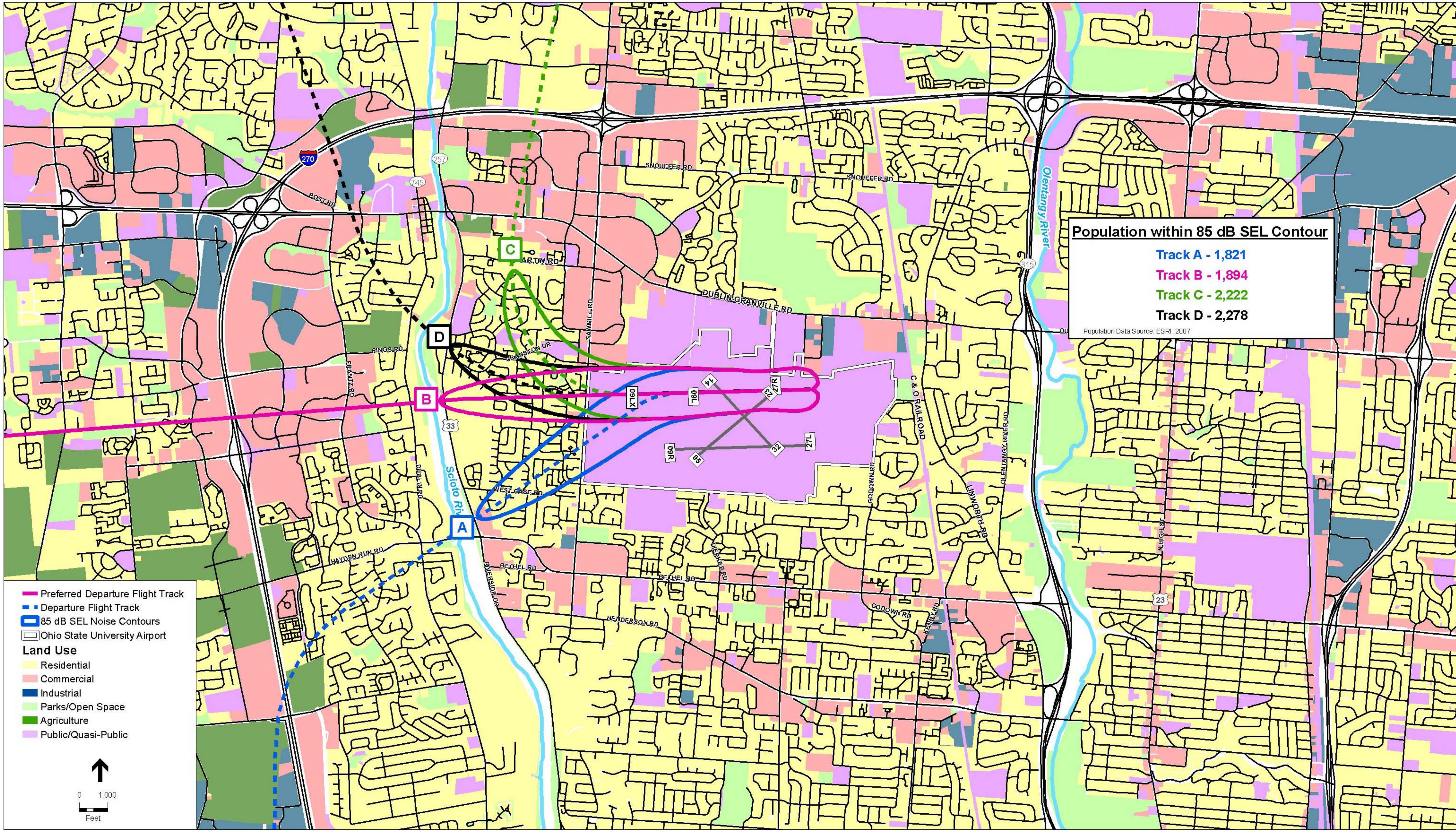
FIGURE 9-18
FUTURE PROPELLER AIRCRAFT DEPARTURE ANALYSIS – RUNWAY 27R



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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9.4.6 Establish a Side-Step Approach for Runway 27R

A side-step approach is often considered at airports to use a compatible land use corridor that may not line up exactly with a runway. Aircraft will follow the approach over a compatible land use corridor to the side of the extended centerline of the runway and then "side step" to line up with the runway two to three miles from the landing threshold. This was suggested as a potential noise abatement alternative for OSU Airport for arrivals to an extended Runway 27R by making use of SR 161/W Dublin Granville Road. ATC personnel discussed this and concluded that this type of procedure would create safety concerns because the side-step portion of the approach would be almost directly facing an aircraft if it were to be in the training pattern on the north runway and the need to turn from the side-step approach to the runway would occur during a critical phase of aircraft flight subjecting the aircraft to additional safety risk. Safety would be compromised with this suggested measure.

Recommendation: This Study does not recommend the establishment of a side-step approach at OSU Airport due to safety concerns.

9.4.7 Publish Visual Approach Procedures

Prior to flying to an airport, pilots review the published arrival procedures for that airport. Instrument arrival procedures are published for use by pilots during inclement weather conditions, or when an Instrument Flight Rules (IFR) flight plan has been filed. IFR arrival procedures provide specifics to the pilot on location of their aircraft, where turns should occur, and what altitude the aircraft should be flying at a particular point along the arrival flight path. When visual approach procedures are used, the pilot primarily uses references seen out the window of the aircraft to guide them into the airport.

Airports primarily publish instrument approaches. However, there are airports that publish visual approaches as well. The primary reason for publishing visual procedures is for the efficient movement of aircraft. There are instances where a visual procedure was published for noise abatement purposes. When a visual procedure is published, noise sensitive land uses can be identified so the pilot is aware of where those areas are located. Procedures, both visual and instrument, are developed by the FAA. Airports can work with the FAA to request procedures be established and published, but the ultimate decision to do so this is with the FAA. It is reasonable that published visual approach procedures could be implemented at OSU Airport. A process would need to be established where OSU Airport staff worked with the OSU ATCT and Port Columbus ATCT to determine which existing visual approaches are most used for each runway. Once each visual approach was identified, the FAA would need to work to develop the procedure for publication and have it published and available for pilots to use. Once a visual approach procedure is published, it does not guarantee the procedure will be used. It is merely a tool ATC can use to guide an aircraft to the Airport.

Recommendation: This Study recommends OSU Airport work with the FAA to identify and publish the most commonly used existing visual procedures for the Airport, with a goal of identifying noise sensitive land uses on the published visual procedures.

9.4.8 Review 050 Departure Heading

Many comments were received throughout this Study regarding the 050 degree departure heading when OSU Airport is in east flow. As mentioned previously, the Class C airspace of Port Columbus International Airport dictates the current departure procedures for the safe separation of OSU

Airport and Port Columbus International Airport aircraft operations. The current 050 degree departure heading turn has been a focus of community concern for several years. ATC personnel for Port Columbus International Airport confirmed that a turn to the north of the runway heading must remain in place as a departure procedure to avoid conflicts with aircraft operating to and from Port Columbus International Airport. While the Class C airspace prevents aircraft from departing on a heading greater than 050 degrees, departure headings less than 050 degrees may be possible.

An analysis was completed for Runway 9R and 9L (once extended) to determine if use of a departure heading less than 050 degrees, conditions permitting, would be more beneficial from a noise standpoint. SEL contours were used for the analysis because they represent a single departing aircraft. It is not appropriate to show SEL contours on both runways on the same map because the contours depict a single aircraft operation and the runways would not be used for simultaneous departures. Both runways will be used in the future, and the use of both runways is depicted in the future DNL contours included in the NEM document.

Figures 9-19 and **9-20** present this analysis. Alternate headings, already in use today but used less extensively, for departures on 9R, and expected departure headings for 9L (when extended) were reviewed to determine the estimated population within the 85 dB SEL contour.

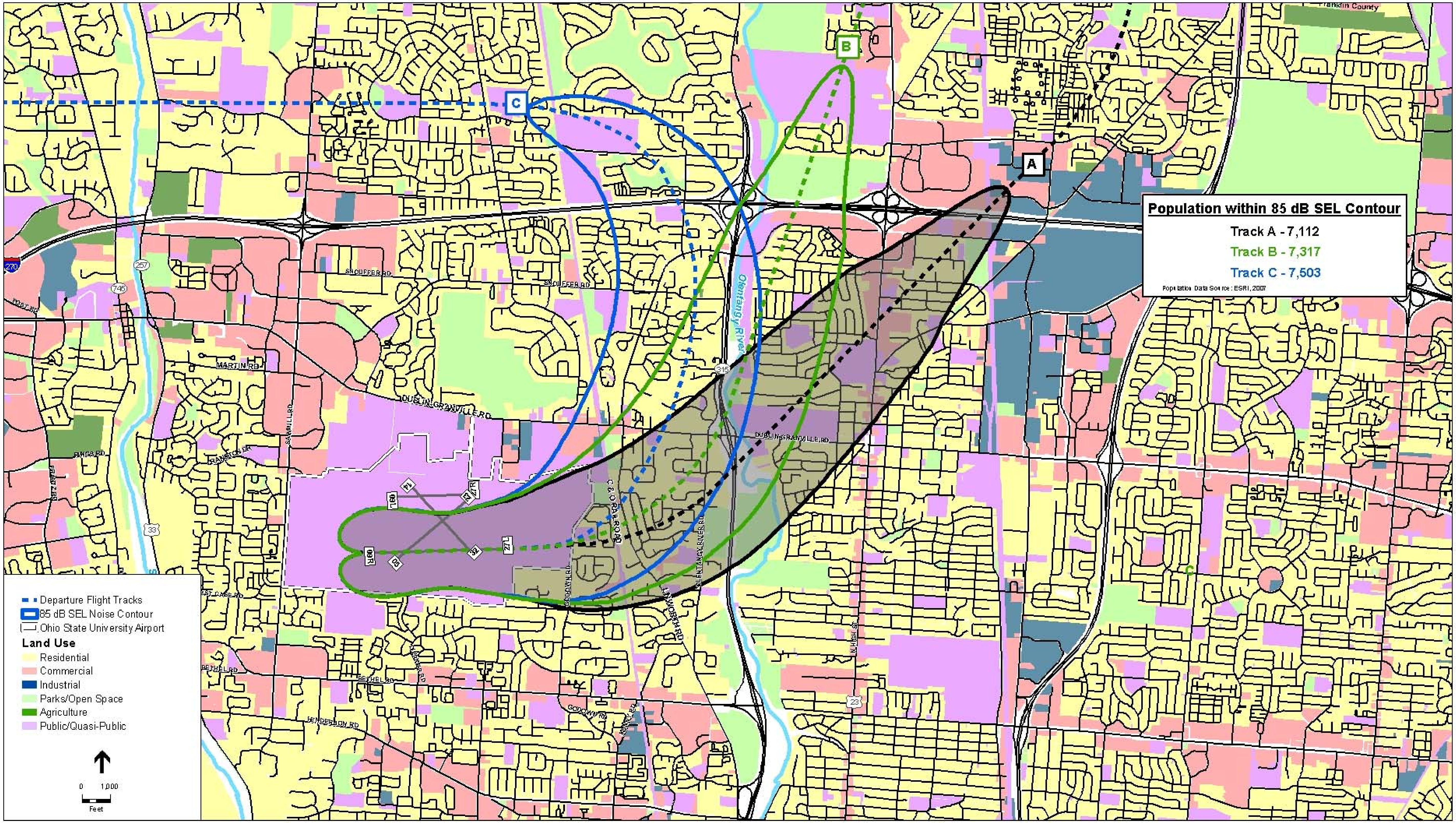
The population count within each SEL contour provides an indication of which corridor would be best to use by having the fewest people within the SEL contour. As mentioned previously, when preparing population counts for contours in a Part 150 study, only residential dwellings are considered. Schools and churches are not counted separately because the population using those facilities is transient. Also, counting school and church enrollments would result in a double-count of the residents who live in the surrounding neighborhoods. Still, these structures are specifically identified as sensitive land uses in the Part 150 Study. Phase 1 of the Part 150 Study included a map displaying such noise sensitive land uses. Also, FAA guidelines state that all land uses outside the 65 DNL contour are considered to be compatible with airport operations. As shown in Phase 1 of the Part 150 Study, the 65 DNL contour remains on Airport property. As a result, no noise-sensitive land uses, such as residential units, schools, or churches, are within the 65 DNL contour. A discussion of any effects of aircraft noise on noise-sensitive land uses as a result of an extension to the Airport’s north runway would be included in environmental review documentation prepared in compliance with the National Environmental Policy Act (NEPA). In accordance with FAA guidelines on the implementation of NEPA, this environmental review documentation is required before the Airport could proceed with an extension to the north runway.

The analysis shows that no alternate departure heading offers a noise benefit when compared to the current 050 degree heading. The 050 degree departure heading has the lowest population exposure when compared to departure headings greater than 050 degrees. It is important to note that departures to the east are dispersed and no single neighborhood receives all departures.

Recommendation: This Study does not recommend any alternate departure headings to the east of OSU Airport due to a natural fanning of the departure tracks that already occurs.

In addition, the current 050 heading has a lower number of population contained within the 85 dB SEL contour when compared to alternative east flow departures such as Track C in **Figure 9-20**.

FIGURE 9-19
RUNWAY 9R JET ANALYSIS FOR 050 DEPARTURE HEADING



SOURCE: Franklin County, 2005; ESRI, 2007; and ESA, 2009.

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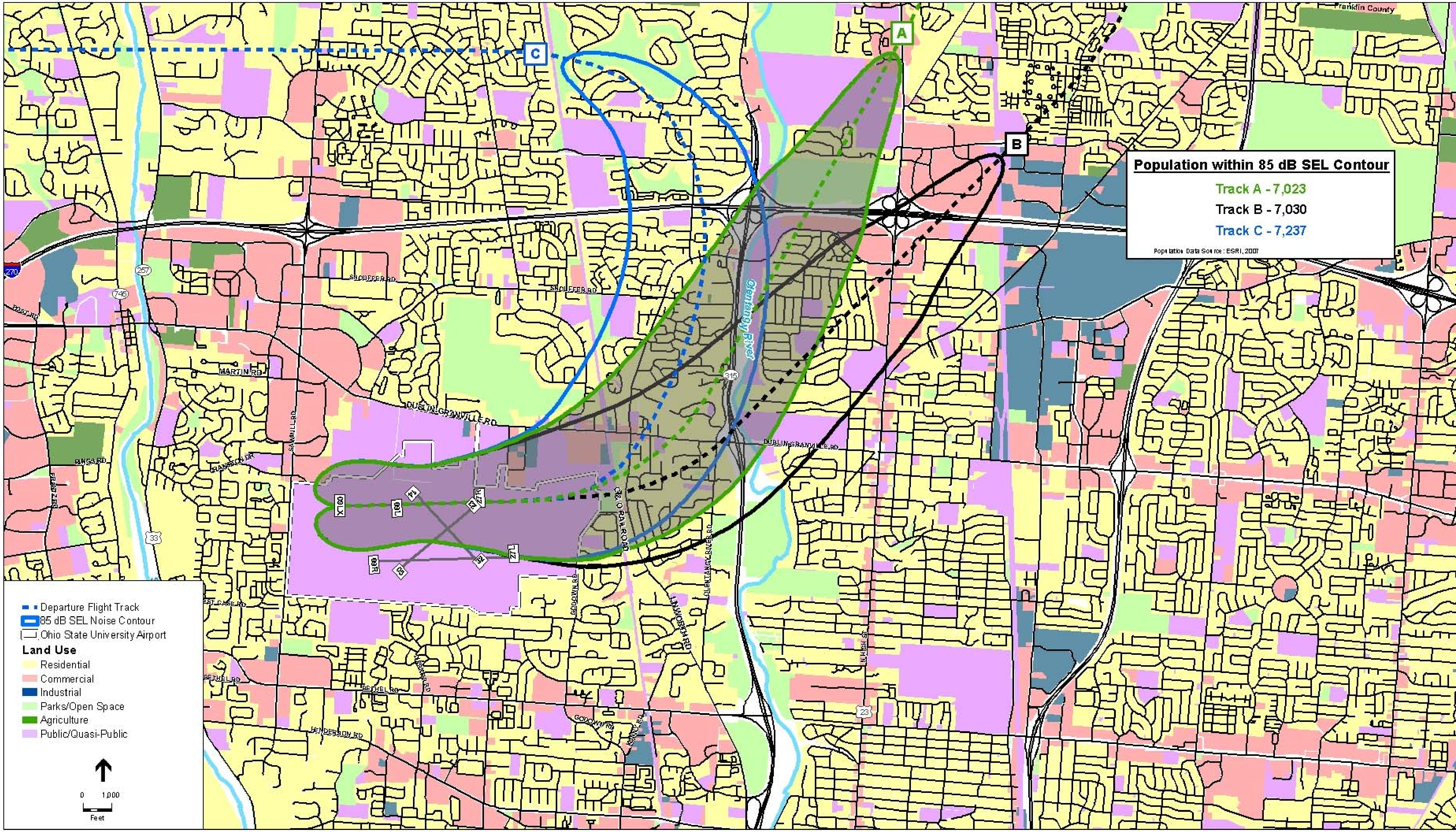
FIGURE 9-20
RUNWAY 9L JET ANALYSIS FOR 050 DEPARTURE HEADING



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9.5 OPTIONS REQUIRED FOR REVIEW UNDER FAR PART 150

The Federal Aviation Regulation Part 150 lists several options that must be reviewed in every FAR Part 150 Study. The options presented in this section represent those options required by the FAA not covered in other sections of this chapter.

9.5.1 Implement Curfews

The purpose of this action would be to reduce aircraft noise levels associated with aircraft operations during the nighttime hours. Noise from nighttime flights can be disruptive to airport neighbors. If these flights can be reduced or eliminated, nighttime disruptions can be minimized.

Some airports have instituted curfews in the past; however, no new curfews (or other use restrictions) have been approved at any airport within the United States since the passage of the Airport Noise and Capacity Act in 1990. That Act prohibited use restrictions at airports until a Federal Aviation Regulation Part 161 (FAR Part 161) Study has been developed and reviewed to determine the cost/benefit analysis of implementing the use restriction.

A mandatory restriction on nighttime operations at OSU Airport would be considered an access restriction and would require compliance with FAR Part 161. A FAR Part 161 Study includes a rigorous cost/benefit and noise/land use study. The ability of an airport operator to implement any form of use restrictions is very limited. In addition, such restrictions are subject to vigorous constitutional analysis to ensure compliance with interstate commerce interests and discrimination concerns.

Recommendation: This Study does not recommend the establishment of a mandatory curfew because it would be considered a noise and access restriction under FAR Part 161 and is not consistent with the goals established for the OSU Airport Part 150 Study.

9.5.2 Implement Noise Related Landing Fees

Aircraft weight is typically used to determine the fee for landing at an individual airport. As a means of encouraging or discouraging noisier operations, differential-landing fees might be levied based on the noise levels of particular aircraft types. That is, the noisiest aircraft would pay more than the quietest; either always, or during particularly noise-sensitive periods, such as nighttime.

A noise-based landing fee would involve an extensive justification, evaluation, and review process. At a minimum, this could include an FAR Part 161 Study of noise benefits versus economic costs; and most likely, a separate review under the Federal Aviation rates and charges regulations.

Recommendation: This Study does not recommend the establishment of a noise related landing fee because it may be considered a noise and access restriction under FAR Part 161 and is not consistent with the goals established for the OSU Airport Part 150 Study.

9.5.3 Limit the Number or Type of Operations or Type of Aircraft

This action would set limits on the number of aircraft operations, aircraft types, total cumulative noise level, or other similar measures intended to reduce overall noise at the Airport. For example, maximum cumulative impact could be defined as the total area within the existing DNL 65, 70, or 75 noise contours and this would be established as the baseline. The Airport's operations would be adjusted or limited so as not to exceed that maximum noise level in the future. This concept also can be formulated to set a threshold noise level, which cannot be exceeded by individual aircraft, or different thresholds could be established for day and night.

An operations-limit noise rule would be subject to an FAR Part 161 Study, which includes a rigorous cost/benefit and noise/land use study. The ability of an airport operator to implement such restrictions is limited. In addition, such restrictions are subject to vigorous constitutional analysis to ensure compliance with interstate commerce interests and discrimination concerns.

Recommendation: This Study does not recommend limits on numbers or types of operations or types of aircraft because it would be considered a noise and access restriction under FAR Part 161 and is not consistent with the goals established for the OSU Airport Part 150 Study.

9.6 OTHER OPTIONS

Throughout the Study process, comments were received from local residents regarding noise concerns and suggested alternatives to address those concerns. Most of the concerns and/or alternatives suggested by the public have been addressed in the other sections of the chapter. There were several items suggested that did not fall under one of the other headings in this chapter, so those items are discussed here.

9.6.1 Review Ground Run-up and Taxi Restrictions

Many airports establish procedures for aircraft ground operations to reduce noise exposure for surrounding areas. OSU Airport has an established noise abatement program that also addresses these noise concerns. The program includes:

- Prohibition on engine maintenance run-ups during the nighttime hours of 10:00 p.m. to 7:00 a.m.
- Limits on use of auxiliary power units between 10:00 p.m. and 7:00 a.m. and more than one hour before flight
- Request to use minimum reverse thrust on landing when conditions permit

These three items represent a fairly comprehensive approach to ground-based noise. The one area of ground-based noise not addressed is that related to taxiing aircraft. A review of the locations of the taxiways at OSU Airport was conducted to determine the proximity of the taxiways to residential areas and the general use of the taxiways.

As mentioned previously, OSU Airport operations are concentrated primarily on the parallel runways that run east-west. Each of these parallel runways has a single parallel taxiway in addition to the taxiways to access aircraft parking areas. Most of the taxiways on the airfield are not in close proximity to residential uses. The one exception is Taxiway A near the approach end to Runway 27L. This section of taxiway is approximately 800 feet from a single residential structure, and 1,200 feet from additional residential structures. It should be noted the residential structures are not within the existing or future 65 DNL contour. Because Runway 9R/27L has a single taxiway, it is not possible to limit or restrict the use of that taxiway and still allow the airfield to operate safely and efficiently.

Recommendation: This Study does not recommend changes to the existing ground noise programs at OSU Airport. In addition, this Study also does not recommend establishing taxi restrictions at OSU Airport due to potential constraints on the safe and efficient operation of the airfield.

9.6.2 Establish a Maximum Aircraft Noise Level Restriction

Comments were received from the public requesting OSU Airport set a maximum noise level an aircraft was allowed to make when operating to or from OSU Airport. This concept can be formulated to set a threshold noise level, which cannot be exceeded by individual aircraft, or different thresholds could be established for day and night.

A maximum aircraft noise restriction rule would be subject to an FAR Part 161 Study, which includes a rigorous cost/benefit and noise/land use study. The ability of an airport operator to implement such restrictions is limited. In addition, such restrictions are subject to vigorous constitutional analysis to ensure compliance with interstate commerce interests and discrimination concerns.

Recommendation: This Study does not recommend a maximum aircraft noise restriction because it would be considered a noise and access restriction under FAR Part 161 and is not consistent with the goals established for the OSU Airport Part 150 Study.

9.6.3 Establish FAR Part 36 Noise Limits

When new aircraft are developed, they must get certain certifications before they can be flown. One of those certifications is for noise standards under Federal Aviation Regulation (FAR) Part 36. This certification established the noise levels each particular aircraft will make on arrival and departure to any given airport.

Comments were received from the public requesting limits be placed at OSU Airport based on FAR Part 36. This restriction is very similar to the maximum aircraft noise level restriction request because it would set a threshold of noise that could not be surpassed. A noise limit based on FAR Part 36 certifications would be subject to an FAR Part 161 Study, which includes a rigorous cost/benefit and noise/land use study. The ability of an airport operator to implement such restrictions is limited. In addition, such restrictions are subject to vigorous constitutional analysis to ensure compliance with interstate commerce interests and discrimination concerns.

Recommendation: This Study does not recommend setting noise limits based on FAR Part 36 certification because it would be considered a noise and access restriction under FAR Part 161 and is not consistent with the goals established for the OSU Airport Part 150 Study.

9.6.4 Review Noise Abatement Guidelines

As discussed in Chapter 1 of this document, OSU Airport has established a noise abatement program based on quiet flying techniques, voluntary limitations on aircraft operations, and a prohibition of certain operations during the late night hours to address the noise concerns of nearby residents. The program includes a “Please Fly Neighborly” program for pilots, traffic pattern altitudes, engine maintenance run-up procedures, and voluntary curfews on Stage 2 jets, auxiliary power unit usage, touch and go operations, and low practice approaches. In addition to these programs, OSU Airport uses all possible opportunities to communicate with pilots the parameters of the Noise Abatement Guidelines.

The existing Noise Abatement Guidelines were reviewed to determine if additional programs should be established that would provide for additional noise reduction for the local communities. Part of this review incorporated a review of the comments received from the public related to the programs. Some comments were provided that suggested OSU Airport establish a voluntary quiet time requesting pilots and aircraft owners to avoid flying between the hours of 11:00 p.m. and 6:00

a.m. Many of the operations that occur during the late night hours are a medical necessity or related to an emergency situation. These operations should continue as needed. However, language should be added to the Noise Abatement Guidelines informing the operators that OSU Airport is surrounded by noise sensitive land uses, which are more sensitive to noise during the late nighttime hours of 11:00 p.m. to 6:00 a.m., and this sensitivity should be considered when planning flights to and from OSU Airport. While this language would not restrict operations from occurring, it would have the potential to raise the awareness of the noise-sensitive nature of the surrounding communities without restricting access to OSU Airport. The addition of this language would be a positive addition to the existing Noise Abatement Guidelines.

There were also comments received from the public requesting penalties be established for abatement non-compliance by pilots and aircraft owners. The penalties suggested included public listing of non-compliant pilots/aircraft owners, fines, and terminations of hangar leases for continued non-compliance. Because the Noise Abatement Guidelines at OSU Airport are voluntary programs, pilots and aircraft owners are not required to follow them. With the passage of the Airport Noise and Capacity Act (ANCA) of 1990, the ability for an airport to restrict operations and punish those who did not follow noise abatement guidelines was limited in return for the airlines promise to phase out the older noisier jet aircraft. The passage of this act restricts OSU Airport from establishing penalties for any operator that may not be following the Noise Abatement Guidelines. The best way to achieve success with a noise abatement program is to establish voluntary procedures and work with the pilots and operators to agree to abide by those voluntary procedures as much as possible, which is the approach that has been taken by OSU Airport.

As has been discussed previously in this chapter, disseminating information on the Nois Abatement Guidelines to the pilots, aircraft owners, and local residents is a very important aspect to successful noise abatement program. Information regarding the Noise Abatement Guidelines is available on the OSU Airport website as well as in hard copy form at the Fixed Based Operator (FBO) located on the airfield. In addition, OSU Airport staff discusses the Noise Abatement Guidelines with pilots and aircraft owners when the opportunity presents itself. In the past, OSU Airport has discussed noise abatement guidelines with stakeholders, including the public, as a subset of Airport Committees that were formed to address all operating aspects of OSU Airport. It is anticipated this umbrella Airport Committee will be developed again in the future and OSU Airport staff should continue to discuss noise abatement programs with stakeholders, including the public, through these committees as they evolve. Until such a committee is established, OSU Airport should continue to distribute information on the Noise Abatement Guidelines on the Airport's website as well as through hard copies where aircraft operators would have the chance to receive them, such as the FBOs on the airfield.

Recommendations: **(A)** This Study recommends the addition of language to the OSU Airport Noise Abatement Guidelines informing the operators that OSU Airport is surrounded by noise sensitive land uses, which are more sensitive to noise during the late nighttime hours of 11:00 p.m. to 6:00 a.m., and this sensitivity should be considered when planning flights to and from OSU Airport. **(B)** This Study recommends discussing aspects of the noise abatement program with stakeholders through Airport Committee's as they are developed in the future.