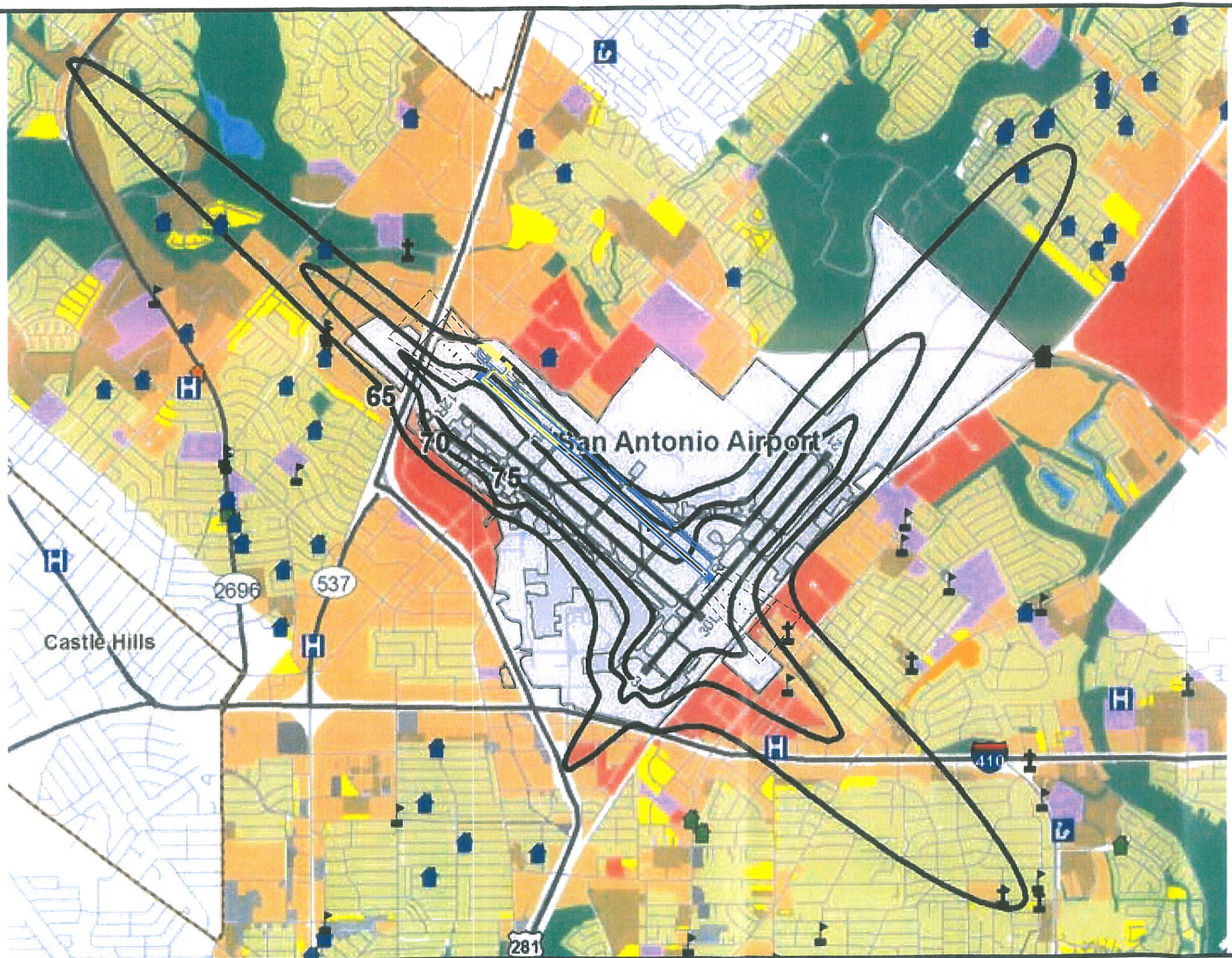

NOTES:

1. Source: US Census TIGER/Line 2000, San Antonio Government, Wyle 2008.
2. Wyle Report "Noise Exposure Map Report and Noise Compatability Program Update for San Antonio International Airport, May 2009.

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SAN ANTONIO AIRPORT SYSTEM

San Antonio International Airport
Terminal Area Forecast and
Runway Capacity Feasibility Study

N

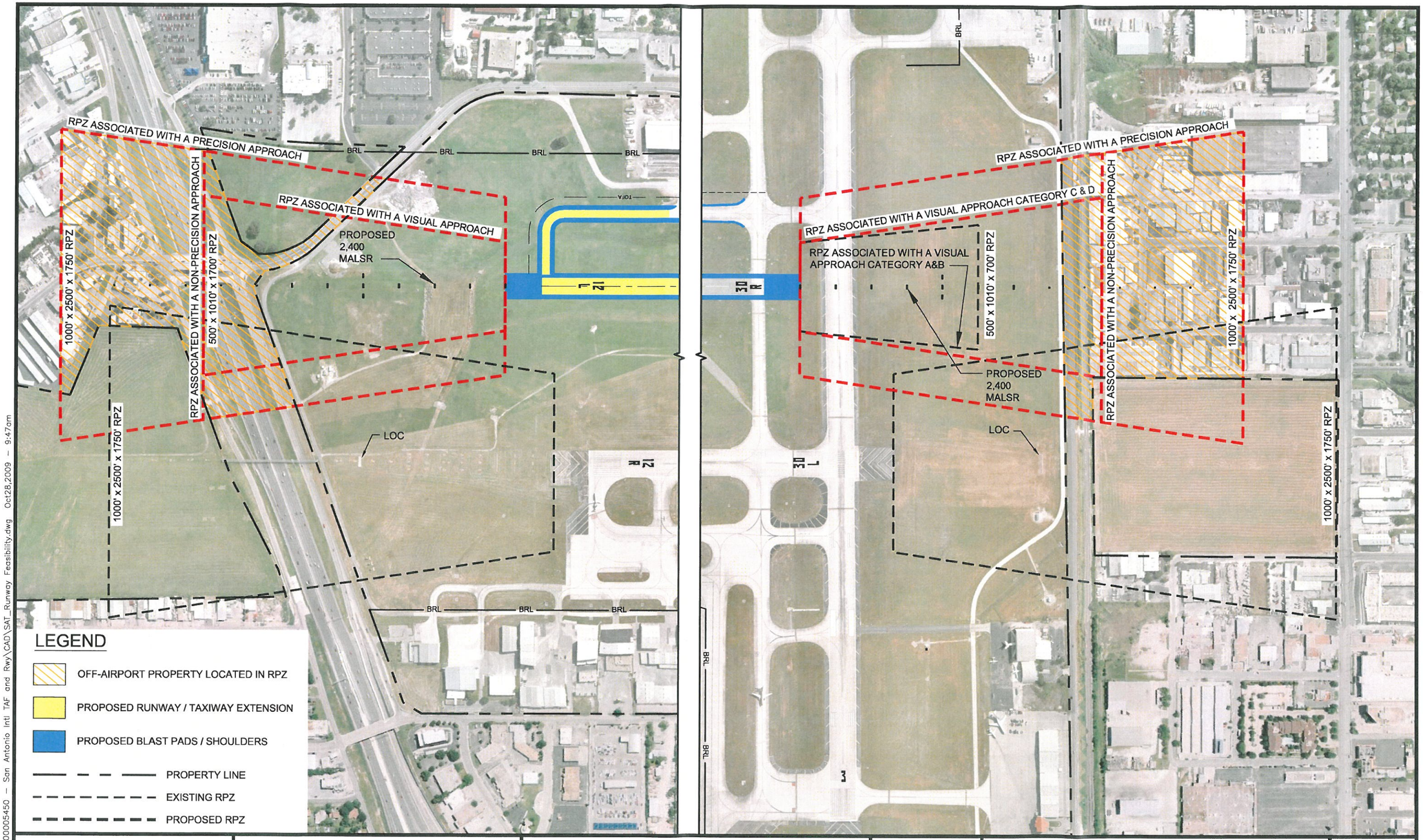
0 1,400' 2,800'

GRAPHIC SCALE IN FEET

Runway 12L-30R ARC D-IV
Extension Land Use Map

Figure 7-6

Plotted By: 11328
J:\AVServ\SAT – 100005450 – San Antonio Intl TAF and Rwy\CAD\SAT_Runway Feasibility_Landuse.dwg Mar25,2010 – 11:32am



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San Antonio International Airport
Terminal Area Forecast and
Runway Capacity Feasibility Study

N

0 250' 500'
GRAPHIC SCALE IN FEET

Runway 12L-30R ARC C-III
Runway Protection Zones

Figure
7-7

Plotted By: 23027
J:\AVServ\SAT - 100005450 - San Antonio Intl TAF and Rwy\CAD\SAT_Runway Feasibility.dwg Oct28,2009 - 9:47am

RPZ ASSOCIATED WITH A PRECISION APPROACH

RPZ ASSOCIATED WITH A NON-PRECISION APPROACH

1000' x 2500' x 1750' RPZ

RPZ ASSOCIATED WITH A VISUAL APPROACH

PROPOSED
2,400
MALSR

LOC

BRL

TWY A

12 L

12 R

30 L

30 R

RPZ ASSOCIATED WITH A VISUAL APPROACH CATEGORY C & D

500' x 1010' x 700' RPZ

1000' x 2500' x 1750' RPZ

RPZ ASSOCIATED WITH A NON-PRECISION APPROACH

RPZ ASSOCIATED WITH A PRECISION APPROACH

1000' x 2500' x 1750' RPZ

LEGEND

- OFF-AIRPORT PROPERTY LOCATED IN RPZ
- PROPOSED RUNWAY / TAXIWAY EXTENSION
- PROPOSED BLAST PADS / SHOULDERS
- PROPERTY LINE
- EXISTING RPZ
- PROPOSED RPZ

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SAN ANTONIO AIRPORT SYSTEM

San Antonio International Airport Terminal Area Forecast and Runway Capacity Feasibility Study

N

0 200' 400'

GRAPHIC SCALE IN FEET

Runway 12L-30R ARC D-IV Runway Protection Zones

Figure 7-8

Plotted By: 23027
J:\AVSer\SAT - 100005450 - San Antonio Intl TAF and Rwy\CAD\SAT_Runway Feasibility.dwg Oct28,2009 - 9:48am

7.2.5 Construction Impacts

During periods of development, extensive construction activities occur. Construction activities may include, but are not limited to, earthmoving activities, delivery of equipment and materials, and removal of debris. The potential for impacts to off-Airport communities near the Airport is greatest during the initial phases of development. These impacts may consist of increased traffic on local roads, noise, mud, dust, and other effects associated with the activity of heavy construction vehicles. All potential impacts related to the proposed development projects are expected to be minor and temporary. Nevertheless, Airport management should exercise best practices at SAT to contain and minimize the impacts of construction during building phases of projects proposed in the development plan.

7.2.6 Section (4f) Lands

The United States Code (USC) Title 49 – Transportation, Subtitle I - Department of Transportation (DOT), Chapter 3 – General Duties and Powers, Subchapter I – Duties of the Secretary of Transportation, Section 303 – Policy on lands, wildlife and waterfowl refuges, and historic sites was formerly known as the DOT Act, Section 4(f). According to that law, it is the policy of the US Government that special effort is made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.

It is the responsibility of the Secretary of Transportation to cooperate and consult with the Secretaries of the Interior, Housing and Urban Development, and Agriculture, and with the States, in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of lands crossed by transportation activities or facilities.

The law provides that no approval be given by the Secretary to a program or project which requires the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance unless there is no prudent and feasible alternative to using that land, and the project includes all possible planning to minimize harm to such lands. Enforcement of this legislation is the primary responsibility of the Department of the Interior, though the U.S. Fish and Wildlife Service and Army Corps of Engineers may provide assistance.

A Section 4(f) property includes publicly owned public parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places (NRHP). There are no Section 4(f) historic places listed in the NRHP within the vicinity of the Airport.

Before approval of a project that uses Section 4(f) property is granted by the Secretary, it must be determined that any impacts are *de minimis* or a Section 4(f) Evaluation must take place. *De minimis* is a Latin expression that means, "about minimal things." A *de minimis* impact is one that will not adversely affect the activities, features, or attributes of the property. A *de minimis* impact determination does not require analysis to determine if avoidance alternatives are feasible and prudent, but consideration of avoidance, minimization, mitigation or enhancement measures should occur.

Considering the proposed development at SAT take place within the Airport's existing property limits, no impacts to Section 4(f) lands are anticipated.

7.2.7 Prime and Unique Farm Land

The FAA requires an EA for an airport project that would convert land protected under the Farmland Protection Policy Act (FPPA) to non-agricultural use, when the total score on the USDA's Farmland Conversion Impact Rating Form (Form AD-1006) exceeds 200 points. Prime farmland is defined as land best suited for producing food, feed, forage, fiber, and oilseed crops. Such land has the quality, growing season, and moisture supply necessary to produce sustained crop yields with minimal energy and economic input.

According to FAA Order 1050.1E – *Environmental Impacts: Policies and Procedures*, if farmland is to be converted to a nonagricultural use by a federally funded project, consultation with the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) should occur to determine if the FPPA classifies the land as "prime" or "unique." If it is found to be prime or unique, the FPPA requires rating the farmland conversion impacts based on length of time farmed, amounts of farmland remaining in the area, level of local farm support services, and the level of urban land in the area.

No known prime or unique farmlands have been identified within the immediate vicinity of the Airport. Therefore, the proposed Airport development described in this document is not expected to affect any such lands.

7.2.8 Fish, Wildlife and Plants

The Fish and Wildlife Coordination Act (FWCA) (48 Statute 401 as amended; 16 USC 661-667e.) provides the basic authority for the Fish and Wildlife Service's involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features, and requires Federal agencies that construct, license or permit water resource development projects to first consult with the Service (and the National Marine Fisheries Service in some instances) and State fish and wildlife agency, the Texas Parks and Wildlife Department (TPWD), regarding the impacts on fish and wildlife resources and measures to mitigate these impacts.

The FWCA takes into consideration the possible impacts that airport development projects may have on surrounding habitat and wildlife. Section 2 of that act requires consultation with the U.S. Fish and Wildlife Service, the U.S. Department of the Interior, and the state agencies that regulate wildlife and water resources (TPWD). In the case of water resources, this would particularly apply to such instances where proposed development by any public or private agency would result in modification of the flow and/or shape or watershed of any stream or body of water. Under this act the U.S. Fish and Wildlife Service along with the EPA have authority to provide comments and recommendations concerning vegetation and wildlife resources.

San Antonio International Airport is located in an area which is mostly developed with minimal undisturbed areas remaining. The surrounding properties are characterized by retail shops, service industries, transportation facilities, parking lots, and grassed fields. The proposed project is located on airport property though in near proximity to Highway 281 and some commercial use areas. Based on the size and location of development initiatives proposed for SAT, no impacts to biotic communities are expected as a result of the planned growth of the Airport. However, some development plans may require a detailed analysis in the form of a formal EA.

7.2.9 Floodplains

Floodplains are defined in The US Environmental Protection Agency (EPA) Executive Order (EO) 11988, *Floodplain Management, 1977*. They include lowland areas adjoining inland and coastal waters, especially those areas subject to a one percent or greater chance of flooding in any given year. Under the EO,

The Federal Emergency Management Agency (FEMA) has produced flood insurance rate maps (FIRMs) for communities participating in the National Flood Insurance Program. Detailed maps illustrate the 100-year and 500-year base flood elevations. Descriptions of zones delineated on these maps include, Zone VE – coastal flood with velocity hazard, Zone A and AE – areas of 100-year flood, Zone X500 – areas in the 500-year floodplain, and Zone X – areas outside of the 500-year floodplain.

FEMA maintains a computer database that contains the flood hazard map information from FEMA's Flood Map Modernization program. Through that program FEMA has developed the National Flood Hazard Layer (NFHL), which is mapped data from the Digital FIRM databases and Letters of Map Revisions (LOMRs).

7.2.10 Hazardous Materials

Four primary laws have been passed governing the handling and disposal of hazardous materials, chemicals, substances, and wastes. The two statutes of most importance to the FAA in proposing actions to construct and operate facilities and navigational aids are the Resource Conservation and Recovery Act (RCRA) (as amended by the Federal Facilities Compliance Act of 1992) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA or Superfund) and the Community Environmental Response Facilitation Act of 1992. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of any release of a hazardous substance (excluding petroleum) into the environment.

FAA Order 1050.1E defines *hazardous material* as any substance or material that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce. *Hazardous waste* is defined by that Order as a waste that is listed in or meets the characteristics described in 40 CFR Part 261, including ignitability, corrosivity, reactivity, or toxicity. A *hazardous substance* is defined as any element, compound, mixture, solution, or substance defined as a hazardous substance under CERCLA and listed in 40 CFR Part 302. If released into the environment, hazardous substances may pose substantial harm to human health or the environment.

The potential for handling hazardous waste must be evaluated when determining the impacts associated with Airport development. The Assistant Administrator for Security and Hazardous Materials (ASH) is responsible for considering the environmental impacts for all actions arising out of ASH initiatives that require NEPA compliance and other Federal and Departmental environmental laws, regulations, and orders.

The proposed improvements at SAT are not anticipated to require the removal or relocation of any hazardous materials.

7.2.11 Historical, Architectural, Archeological and Cultural Resources

The Archeological and Historic Preservation Act of 1974 provides for the preservation of historic American sites, buildings, objects, and antiquities of national significance by providing for the survey, recovery, and preservation of historical and archeological data which might otherwise be destroyed or irreparably lost due to a Federal, Federally licensed, or Federally funded action.

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons. They include archaeological resources (both prehistoric and historic), historic architectural resources, and American Indian sacred sites and traditional cultural properties. Historic properties (as defined in 36 CFR 60.4) are significant archaeological, architectural, or traditional resources that are either eligible for listing or listed in the National Register.
The National Historic Preservation Act (NHPA) of 1966 and the Archeological and Historic Preservation Act of 1974 provide protection against development impacts that would cause change in the historical, architectural, archeological, or cultural qualities of the property.

Under the NHPA the Airport Sponsor is required to consider the effects of its undertakings on historic properties listed, or eligible for listing, in the National Register. NHPA obligations for a federal agency are independent from NEPA and must be complied with even when an environmental document is not required.
Other applicable guidance and directives associated with cultural resource management include EO 11593, *Protection and Enhancement of the Cultural Environment*; EO 13006, *Locating Federal Facilities on Historic Properties in Our Nations Central Cities*; EO 13287, *Preserve America*.

The previous master plan document developed for SAT identified the potential for future the future extension of Runway 12L-30R and considered such action when analyzing potential impacts to historic, architectural, archaeological, and cultural resources. It was realized that while archeological sites exist in the general area, none are listed on the National Registry of Historic Places (NRHP). However, archeological sites which may be eligible for inclusion on the NRHP or warrant designation as a State Archeological Landmark (SAL) could potentially be found. Should such sites be discovered all work would halt and the Texas Historical Commission would be notified.

7.2.12 Light Emissions and Visual Impacts

There are no special purpose laws or standards for light emission impacts and visual impacts. Because of the relatively low levels of light intensity compared to background levels associated with most air navigation facilities (NAVAIDS) and other airport development actions, light emissions impacts are unlikely to have an adverse impact on human activity or the use or characteristics of protected properties. Whenever the potential for an annoyance exists, such as site location of lights or light systems, pertinent characteristics of the particular system and its use, and measures to reduce any annoyance, such as shielding or angular adjustments information should be included in the appropriate environmental document.

Visual, or aesthetic, impacts are inherently more difficult to define because of the subjectivity involved. Aesthetic impacts deal more broadly with the extent that the

development contrasts with the existing environment and whether the jurisdictional agency considers this contrast objectionable. Public involvement and consultation with appropriate Federal, State, and local agencies and tribes may help determine the extent of these impacts. The visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed to constitute an adverse impact. The art and science of analyzing visual impacts is continuously improving and the responsible FAA official should consider, based on scoping or other public involvement, the degree to which available tools should be used to more objectively analyze subjective responses to proposed visual changes.
None of the proposed Airport development items described in this document are expected to have significant light or visual related impacts.

7.2.13 Natural Resources and Energy Supply

Executive Order 13123, Greening the Government through Efficient Energy Management (64 FR 30851, June 8, 1999), encourages each Federal agency to expand the use of renewable energy within its facilities and in its activities. E.O. 13123 also requires each Federal agency to reduce petroleum use, total energy use and associated air emissions, and water consumption in its facilities.

The FAA's policy is consistent with NEPA and the Council of Environmental Quality (CEQ) regulations, which is to encourage the development of facilities that exemplify the highest standards of design including principles of sustainability. As such, all elements of the transportation system are encouraged to be designed with a view to their aesthetic impact, conservation of resources such as energy, pollution prevention, harmonization with the community environment, and sensitivity to the concerns of the traveling public.
The proposed development at the Airport is not anticipated to significantly affect the energy supply or natural resources. The largest demand requirements are expected to result from increased electrical requirements from airfield lighting, navigational equipment, and tenant facilities. In order to limit and or eliminate any possible negative impacts associated with increased energy demands from the proposed development, proper planning and coordination with City of San Antonio and Bexar County and other necessary agencies should be conducted.

7.2.14 Airport Noise

Noise is the most apparent impact that an airport has on the environment, with the majority of complaints received from nearby residents; therefore, necessitating the majority of mitigation efforts. The FAA recommended the average day-night sound level (Ldn) in decibel values as the national standard for measuring airport noise. The FAA has determined that a sound level of 65 Ldn or less is compatible with most residential land uses. Therefore, noise levels greater than this measurement should be contained within Airport property lines to the greatest extent possible. In areas around the Airport where noise levels exceed 65 Ldn, other methods of mitigation such as land acquisition, zoning requirements, and the purchase of easements may be used as possible remedies for incompatible land uses.

The noise impact SAT has on its surrounding community was most recently analyzed by Wyle Aviation Services in May 2009. This analysis developed Noise Exposure Maps (NEMs) for existing year 2009 and future year 2014 based on forecast level of operations. Approximately 1,924 homes, a church, three day-care facilities, one hospital and three schools are located within the 65 Ldn of the 2014 NEM. These properties are likely eligible for participation in the Residential Acoustical Treatment Program (RATP) assuming they have not previously been treated for noise exposure.

However, increased noise pollution or changes in noise exposure could be realized as a result of the proposed development at SAT. The extension of Runway 12L-30R for use as a commercial service runway will likely affect the runway utilization rates at the Airport and could have an effect on aircraft approach and departure patterns at the field. Such changes are likely to affect the location of noise contours on the NEM. Airport noise should be further analyzed in a formal environmental assessment.

7.2.15 Socioeconomic Environmental Justice, and Children's Health and Safety Risks

Analyses of socioeconomics include addressing the following: economic activity (employment and earnings), population, housing, and public schools. The principal social impacts that must be considered are the relocation of businesses and/or residences, alteration of surface transportation patterns, division or disruption of established communities, disruption of orderly planned development, and the creation of an appreciable change in employment. Subsequently, if any relocation of residential or commercial properties is required, compensation shall be made under the Uniform Relocations Assistance and Real Property Acquisition Policies Act of 1970, as amended by the Surface Transportation and Uniform Relocation Act of 1987 and its implementing regulations (49 CFR Part 24).

If any potentially impacted properties cannot be acquired through a land acquisition program prior to the start of each specific project, the guidelines set forth in the documents described previously must be followed to mitigate impacts on the affected residences. Additionally, any areas with concentrated populations of people belonging to a single race, national origin, or low income bracket must be identified and evaluated under the requirements of Environmental Justice to ensure that they are not receiving a disproportionate share of adverse environmental impacts (e.g., high levels of noise exposure) in relation to other areas in the vicinity of the Airport.

The only significant social impact expected to occur as a result of the implementation of the proposed development of the Airport is the potential land acquisition of some retail and commercial properties located under the limits of the Runway's RPZ and/or an area required for the implementation of a NAVAID.

The following sections describe legal requirements for evaluating impacts to Environmental Justice and Special Risks to Children.

7.2.15.1 Environmental Justice

Concern that that minority populations and/or low-income populations bear a disproportionate amount of adverse health and environmental effects led to the issuance of EO 12898 in 1994. 32 CFR 989, *The Environmental Impact Analysis Process,* addresses the need for consideration of environmental justice issues in the impact analysis process. The purpose of an Environmental Justice analysis is to identify disproportionately high and adverse human health and safety and environmental impacts on minorities and low-income communities and to identify appropriate alternatives. That EO also requires the application of equal consideration for American Indian populations.

None of the development initiatives outlined in this report should have any social impacts related to relocation, community disruption, surface transportation patterns or planned development. However, projects that require an Environmental Assessment would need to address such impacts.

7.2.15.2 Special Risk to Children

President Clinton signed EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* in 1997. That EO mandated that all Federal agencies assign a high priority to addressing health and safety risks to children, coordinating research priorities on children's health, and ensuring that their standards take into account special risks to children. The EO states that *"environmental health and safety risks" mean risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink or use for recreation, the soil we live on, and the products we use or are exposed to).*

Children are more sensitive to some environmental effects than the adult population, such as airborne asbestos and lead paint exposures from demolition, safety with regard to equipment, trips/falls/traps within structures under demolition, and noise. Activities occurring near areas that tend to have a higher concentration of children than the typical residential area during any given time, such as schools, churches, and community childcare facilities may further intensify potential impacts to children.
The proposed development at SAT is not likely to have adverse impacts upon the health or safety risks of children. However, development projects requiring an EA would require further analysis to verify that probability.

7.2.16 Solid Waste

The Resource Conservation and Recovery Act (RCRA) accompanied by FAA Order 5200.5A regulate solid waste impact. The RCRA grants authority to the EPA to control hazardous waste from the "cradle-to-grave," including its generation, transportation, treatment, storage, and disposal. The RCRA also provides for safe disposal of discarded materials, regulates hazardous waste, promotes recycling, and establishes criteria for sanitary landfills. An amendment was made to the RCRA in 1986 that enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

FAA Order 5200.5A provides guidance concerning establishment, elimination, or monitoring of landfills, open dumps, or waste disposal facilities on or near airports. Under this order, waste disposal sites within 10,000 feet of any runway end used by turbine-powered aircraft, are considered incompatible with airport operations. However, the EPA has primary responsibility for regulating landfills and overseeing programs associated with solid wastes.

Increases in solid waste will likely be seen during periods of construction and development, though such increases are expected to be relatively minor and temporary. Landfills do exist on and around Airport property though all are covered with dirt fill or by other means. The potential for and increased risk of bird strike is not likely to be realized by the proposed development.

7.2.17 Water Quality

The Clean Water Act (CWA) (33 U.S.C. 1151 et seq., 1251 et seq.), formally known as the Federal Water Pollution Control Act, is the basic federal legislation governing wastewater discharges. The implementing federal regulations include the National Pollutant Discharge Elimination System (NPDES) permitting process (40 CFR 122), general pretreatment programs (40 CFR 403), and categorical effluent limitations, including limitations for pretreatment of direct discharges (40 CFR 405, *et seq.*).

To the extent possible, FAA Order 5050.4B requires consideration be given to the following: storm and sanitary sewer design, requirements for additional water supply or water treatment capacity, erosion controls to prevent siltation, provisions for containing oil spills and wastewater from aircraft washings, designs to preserve existing drainage or minimize dredge and fill, and locations with regard to surface and subsurface aquifers or sensitive ecological areas such as wetlands.

The proposed development at SAT will likely relocate some existing storm drainage features on the airfield but not likely to affect the drainage feature's capacity or greatly affect the areas storm water runoff patterns. The proposed development is not anticipated to greatly affect waste water generation although the potential does exist as additional aviation development occurs at the airfield. Erosion and Siltation characteristics of the area will not be affected by the proposed development.

7.2.18 Wetlands

Under EO 11990, *Protection of Wetlands* (1977), federal agencies are prohibited from undertaking or providing assistance for activities, including new construction, located in wetlands unless there are no practicable alternatives and all practicable measures to minimize harm to wetlands have been implemented.

Two important Federal laws which regulate wetlands are the River and Harbors Act (RHA) of 1899 (the earliest environmental law in the US) and the Clean Water Act (CWA). The focus of the RHA is protection of water navigation, while the focus of the CWA is prevention of water pollution. Additionally, the North American Wetlands Conservation Act of 1989 assigns preservation responsibilities to all Federal agencies whose jurisdiction may involve the management or disposal of lands and waters under their control.

The U.S. Army Corps of Engineers (CoE) and EPA share responsibility for wetland protection and permitting under the CWA. Both define a wetland as, "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Such areas typically include swamps, marshes, and bogs.

Other agencies with non-regulatory responsibilities to create or protect wetlands include the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Soil Conservation Service.

7.2.19 Wild and Scenic Rivers

The National Wild and Scenic Rivers Act (NWSRA) of 1968 describe those river segments designated or eligible to be included in the Wild and Scenic Rivers System. The Department of the Interior (DOI) National Park Service (NPS) River and Trail Conservation Assistance Program (RTCA) within NPS's National Center for Recreation and Conservation (NCRC) maintains a Nationwide Rivers Inventory (NRI) of river segments that appear to qualify for inclusion in the National Wild and Scenic River System.

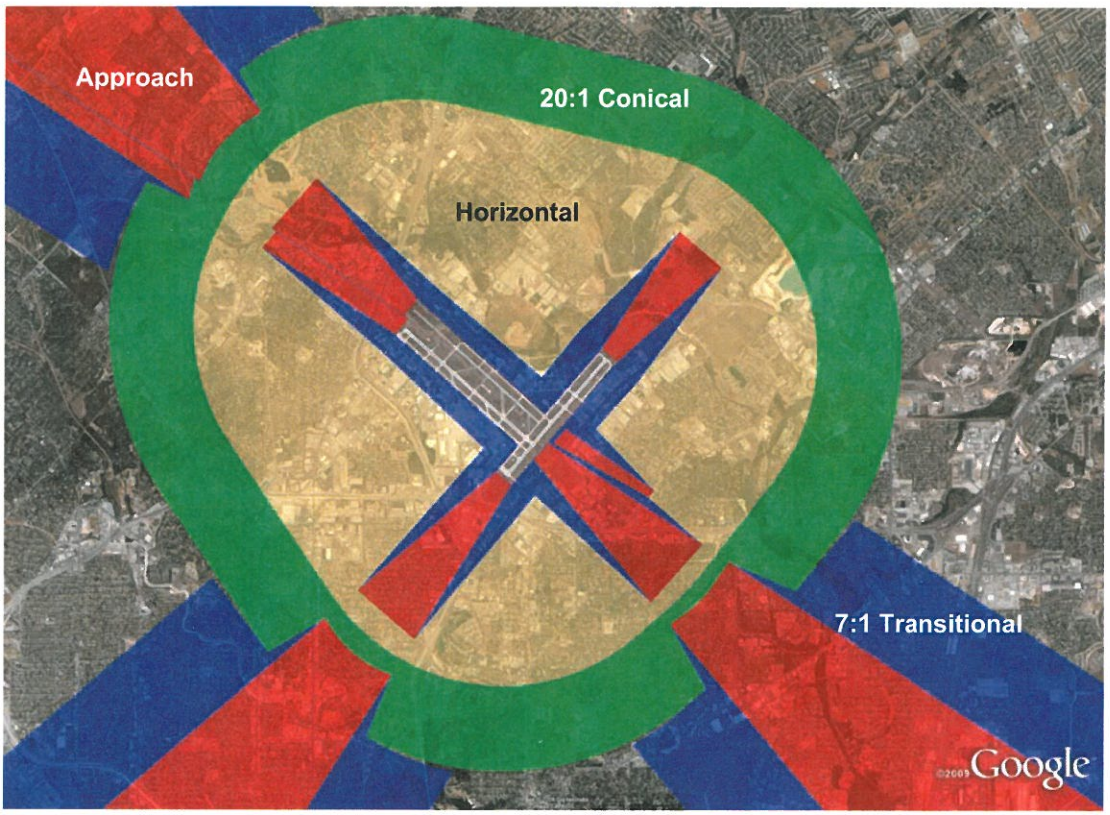
No wild or scenic rivers are identified near the project area.

7.3 AIRSPACE ANALYSES

The "Imaginary Surfaces" described in Title 14 Code of Federal Regulations (CFR) Federal Aviation Regulation (FAR) Part 77 *Objects Affecting Navigable Airspace* (Part 77) was reviewed for this analysis. The Airport's Primary, Approach, and Transitional

Surfaces are graphically depicted on the following figure. The following sections describe the dimensions of the Part 77 surfaces associated with the Airport. Several penetrations to the Airport's Part 77 surfaces have been identified as part of the 1998 Airport Master Plan Study, and more recent ALP Update. As such, this analysis focuses on whether or not the proposed Runway 12L extension and associated precision instrument approach procedures would cause more structures to be captured by the Part 77 surfaces. It must be noted that the verification of penetrations of off-airport structures was not completed as part of the analyses because of missing building elevation data.

Figure 7-9. Part 77 Surfaces for SAT



Source: PBS&J, 2009.

7.3.1 Primary Surface

The *Primary Surface* is utilized to restrict the heights of objects in the periphery of a runway. It is defined by Part 77 as a rectangular *"surface longitudinally centered on a runway. When the runway has a specially prepared hard surface the Primary Surface extends 200-ft beyond each end of that runway; the elevation of any point on the Primary Surface is the same as the elevation of the nearest point on the runway centerline."*

The primary surface extends 200 feet beyond each end of the Airport's runway ends. Runways 12R, 30L, and 3 are equipped with precision instrument landing systems (ILS) which support Precision Instrument Approach Procedures (IAP). Therefore, the width of their *Primary Surface* is 1,000-ft centered on each runway. Runway 21 is equipped with a non-precision IAP; however it shares the 1,000-foot wide primary surface precision

approach to Runway 3. No IAPs are available for landing on either end of Runway 12L-30R, making it strictly a visual use runway. However, as previously discussed, precision IAPs are being analyzed for their potential feasibility. Therefore, the Runway 12L-30R *Primary Surface* width is also 1,000 feet wide.

7.3.2 Approach Surface

Approach Surfaces are utilized to restrict the heights of objects in an aircraft's approach path arriving to a runway end. A Part 77 *Approach Surface* extends outward and upward from the *Primary Surface* and varies in size and slope based upon the runway category and the instrument approach procedures provided. As previously mentioned, Runways 12R, 30L, and 3 are equipped with Precision IAPs, as are the ultimate 12L and 30R for analysis purposes. Therefore, the *Approach Surfaces* to those runways begin 200-ft beyond each runway end, and extend outward 10,000-ft along the extended runway centerlines from the 1,000-ft wide *Primary Surface* to an outer width of 4,000-ft at an upward slope of 50:1 (2 percent), and continuing their outward extension by an additional 40,000-ft at upward slopes of 40:1 (2.5 percent) to outer widths of 16,000-ft. **No adverse impacts to the precision *Approach Surfaces* would be caused by the proposed Runway 12L-30R extension.**

7.3.3 Transitional Surface

The *Transitional Surface* is placed to restrict object heights in the areas adjacent to the *Approach* and *Primary Surfaces*. The Part 77 *Transitional Surface* extends at a slope of 7:1 (14.29%) perpendicular to the runway centerlines, outward and upward from the *Primary Surfaces* and the edges of the *Approach Surfaces*. **No adverse impacts to the *Transitional Surfaces* would be caused by the proposed Runway 12L-30R extension.**

7.4 ATCT LINE OF SITE (LOS) ANALYSIS

This section presents the line-of-sight (LOS) analysis which was performed to determine any controller visibility constraints associated with the proposed Runway 12L extension. The analysis considers certain guidance set forth in FAA Order 6480.4A, *Airport Traffic Control Tower Siting Process*. However, since there is an existing tower, the analysis was limited to identifying obstructions to controllers' visibility. As such, ATCT siting requirements considered in this analysis include the following:

- Provide maximum visibility of the airport's traffic patterns.
- Provide a clear unobstructed and direct line-of-sight to all runway approaches, all runway and taxiway surfaces, and other areas used for aircraft movement which would be under the control of the ATC.
- Provide visibility for all ground operations of aircraft and to airport ground vehicles on ramps, apron, and tie-down areas, and test areas.

7.4.1 Existing Tower

The Airport's traffic control tower is located west of the terminal and public parking area. The tower is 240 feet tall with a base elevation of 799.0 feet above mean sea level (AMSL), and a maximum elevation of 1,039 feet AMSL. The tower cab has a floor elevation of 195.0 feet above ground level (AGL) (994.0 feet AMSL), with corresponding controller eye height of 200.0 feet AGL (999.0 feet AMSL), and a cab roof elevation of 214.19 feet AGL (1,013.19 feet AMSL).

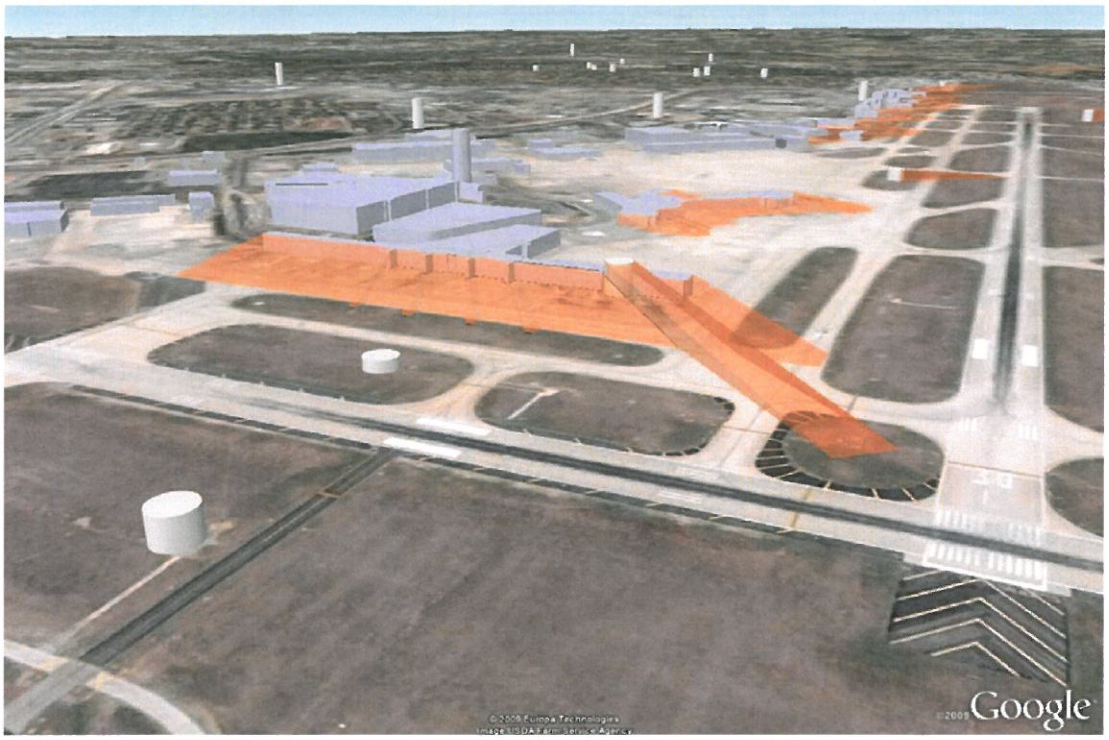
7.4.2 LOS Analysis Results

The analysis revealed that there are multiple "shadows" (areas that are not visible to controllers) cast on portions of Terminals One and Two's aircraft parking aprons, Signature Flight Support's parking apron, and Taxiways "Golf" (G), "November" (N), "Wisky" (W), "Siera" (S), "Juliet" (J), "Yankee" (Y), "Kilo" (K), and "Zulu" (Z). No shadows were cast on Runway 12R-30L, however the glideslope facilities at the southern end of Runway 12R-30L cast minor shadows on southern portions of Runway 30R's approach end. Similarly, the glideslope facilities at the northern end of 12R-30L would cast minor shadows on northern portions of the proposed Runway 12L-30R extension. Graphical representations of the LOS shadows are displayed in the following figures.

Figure 7-10. LOS Analysis for SAT

Source: PBS&J, 2009.

Figure 7-11. LOS Analysis for SAT

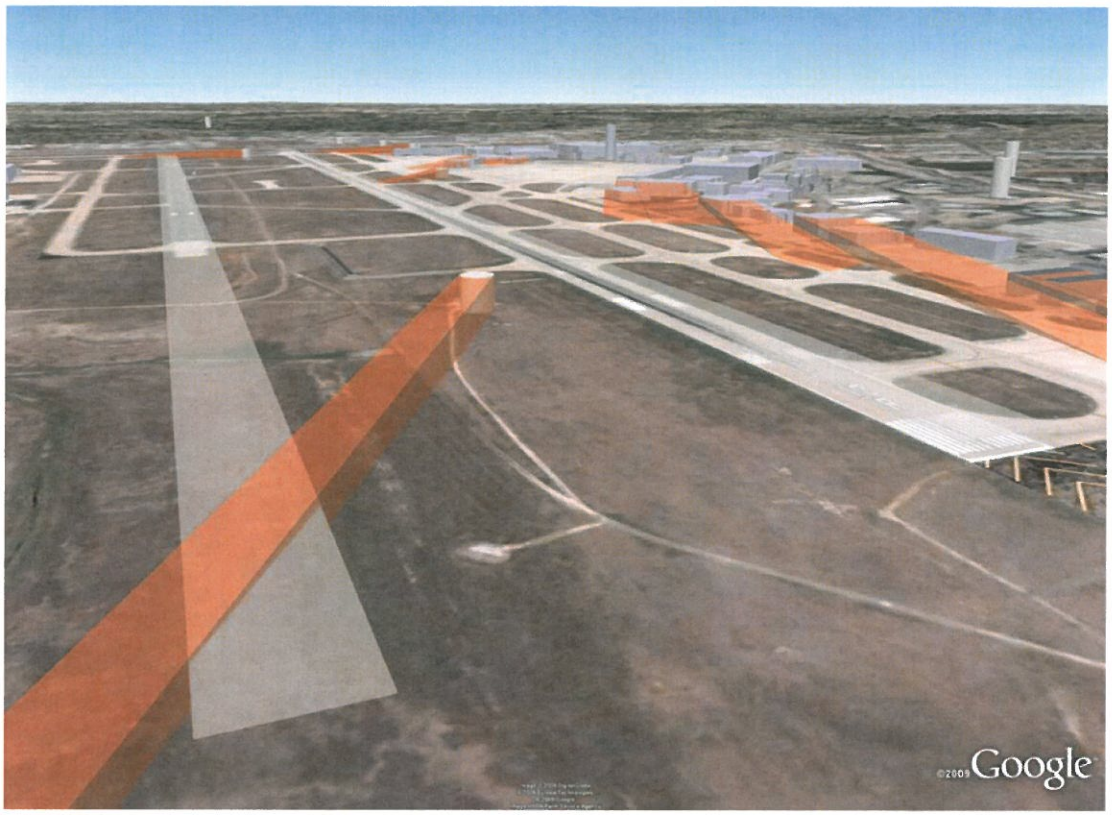


Source: PBS&J, 2009.

Figure 7-12. LOS Analysis for SAT

Source: PBS&J, 2009.

Figure 7-13. LOS Analysis for SAT



Source: PBS&J, 2009.

7.5 CONSTRUCTABILITY REVIEW AND IMPACTS

The extension of Runway 12L-30R and Taxiway R will have an impact on operations using the runway and portions of Taxiway R, Taxiway N and connector Taxiways A and D. The construction impact will be greater if the existing runway is widened to 150 feet and if paved shoulders are constructed on the Runway 12L-30R and Taxiway R. Under that scenario, Runway 12L-30R will have to be closed to traffic.

Construction of the runway extension can be accomplished in a phase that allows the existing runway to operate with a temporary displaced or relocated threshold. The widening of the existing runway and constructing paved shoulders could be done in a following phase with the runway closed to traffic. The runway closure phase would be phased so Taxiway N or Taxiway D would be open and available to route traffic to and from Runway 21.

In addition the extension of Taxiway R would have to be phased to provide to a private tenant hangar south of the Runway 12L end. The southern portion of Taxiway R extension and the runway extension could be utilized for access while the remaining portion of Taxiway R extension is completed.

The construction of paved shoulders on the existing Taxiway R would have to be phased to provide access for the adjacent general aviation. Access to the ARFF station would have to be maintained at all times during construction.

The construction of a paved blast pad at the Runway 30R end and the potential installation of a MALSR system for the Runway 30R approach will both impact the operation of Runway 3-21. This construction will have to be accomplished during nighttime closures of Runway 3-21 or scheduled at times that Runway 3-21 could be closed during the day. Since all construction will be outside of the safety area of Runway 12R-30L, there will no operational impact on that runway.

CONCLUSION

San Antonio International Airport

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Based on the analyses contained herein, the following conclusions can be made:

Runway Capacity - Based on the simulation analyses conducted for the San Antonio International Airport (SAT or Airport) in visual conditions with the existing and forecasted FY 2025 fleet mix, the resulting hourly throughputs are summarized below. The airspace restrictions due to close proximity of other airfields, specifically Randolph Air Force Base (RND), limit the ability of SAT to achieve higher throughputs. The table also provides a comparison of the manual capacity calculations applied above using the FAA AC 150-5060-5, *Airport Capacity and Delay*. In both cases, the analyses indicate that the existing SAT airfield will need to improve in order to handle current and future operational demands. The upgrade of Runway 12L-30R to handle larger aircraft would allow for increased utilization and subsequently increased capacity.

Table 8-1. Sustainable Hourly Capacity in VMC

Airfield Layout and Flow	SIMMOD Hourly Capacity	Manual Hourly Capacity – 30% IFR
Runway 12L, 12R, and 03	60	77
Runway 30L and 30R	50	56
Runway 03	45	54

Sources: TransSolutions and PBS&J, 2009.

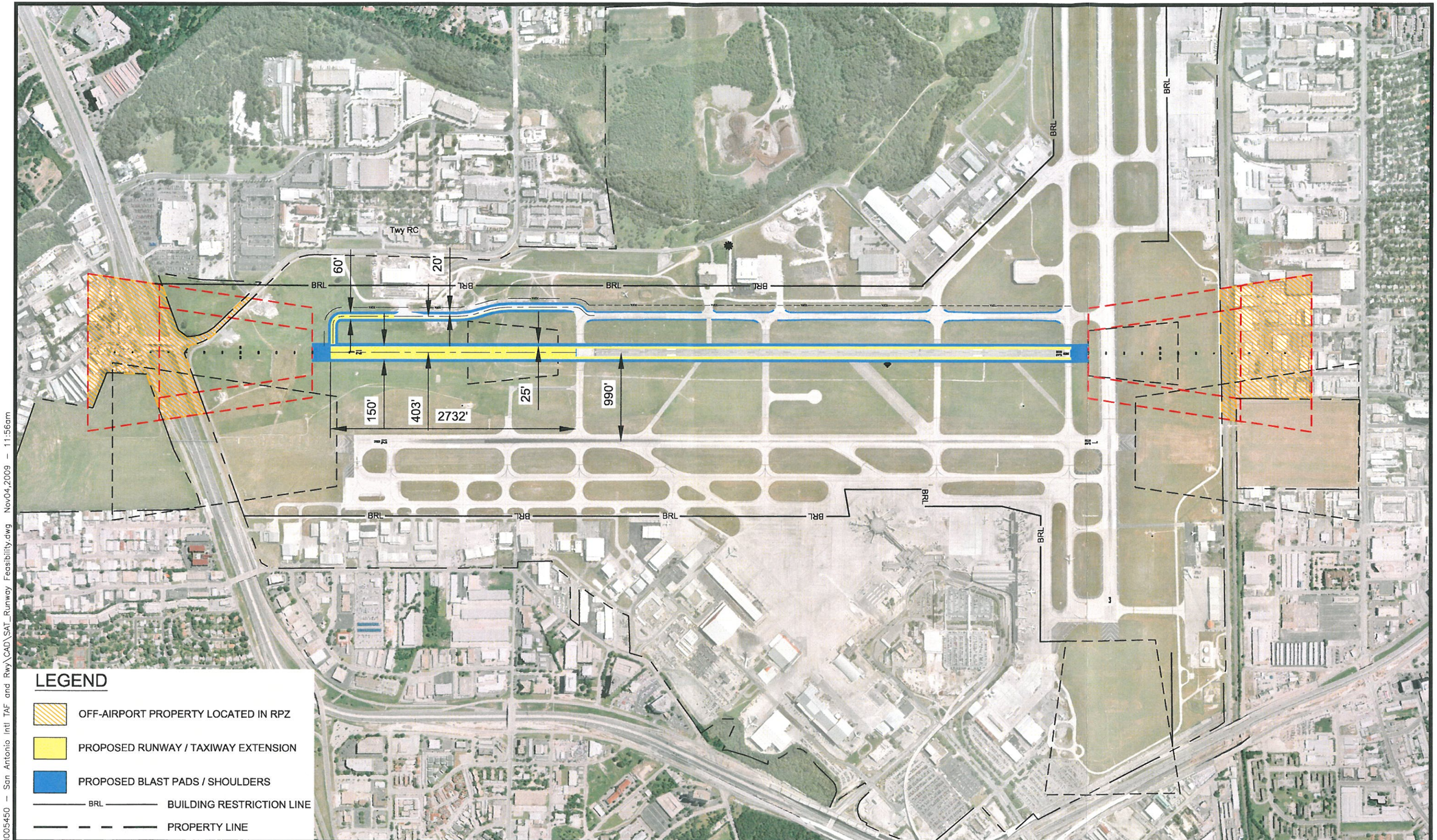
Critical Aircraft - Runway 12L-30R currently handles only general aviation aircraft and has an ARC of B-III. A review of the type of aircraft currently using and expected to use SAT was performed in order to verify the critical aircraft and associated ARC. Based upon operational data obtained from the SAT ATCT, the critical aircraft for Runway 12L-30R was determined to be C-III (Boeing 737-700).

Runway 12L-30R Extension – The extension of 12L-30R is determined to be feasible. Two alternatives for the enhancement of Runway 12L–30R were analyzed and include the following:

- Runway extension to provide a length of 8,250 feet, and upgrade the design category from B-III to C-III.
- Recommended development alternative from the *San Antonio International Airport Master Plan Study, January 1998* - upgrade facilities to accommodate increasing the FAA design criteria from B-III to D-IV, and extend the runway to provide a length of 8,250 feet.

Both of the alternatives involve extending Runway 12L–30R by 2,732 feet to achieve the recommended runway length of 8,250 feet, determined in the 1998 Master Plan Study. Both expansion alternatives also consider the addition of a precision instrument landing system (ILS) to each runway end, thereby providing precision instrument approaches to Runways 12L and 30R. These alternatives do not include an analysis of taxiway exits or improvements as well as taxiways and taxilanes controlled by tenants.

As mentioned above the ARC for runway 12L-30R was determined to be C-III for a Boeing 737-700. However, if the runway were to be upgraded to C-III and allow commercial service aircraft, the Boeing 737-800 and 900 would be excluded from utilizing the runway as these aircraft are D-III and require a runway width of 150 feet. The recommendation basically blends the above two alternatives. As shown in **Figure 8-1**, the runway would be extended to 8,250 with a width of 150 feet with a designation of D-III. Although Figure 8-1 reflects the visual, non-precision, and precision approach RPZs, it is also recommended that Runway 12L-30R be non-precision.



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San Antonio International Airport
Terminal Area Forecast and
Runway Capacity Feasibility Study

N

0 500' 1,000'
GRAPHIC SCALE IN FEET

Runway 12L-30R ARC D-III
Extension (Recommended Option)

Figure
8-1

Plotted By: 11328
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