PART III – COMPATIBILITY

Section Contents

Section Contents

The first section of Part III addresses general compatibility considerations for planning associated with Kirtland AFB, the Sunport and within the MRCOG region. The second section identifies four primary JLUS issues and provides analysis of their related factors. Where appropriate, discussion items are followed by a list of recommendations from Part IV intended to address the factors identified. These are listed as "Applicable Recommendation(s):" Where recommendations are considered to be of special relevance, they are in **bold font**.

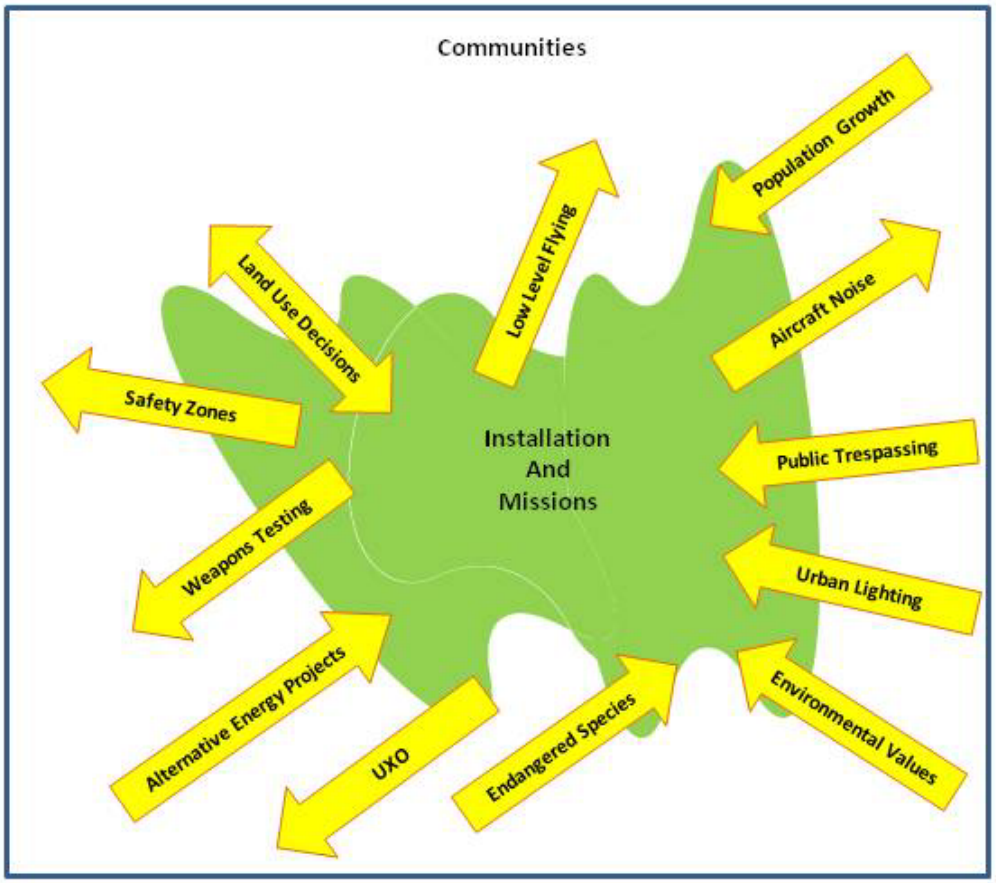
1.0 Compatibility Factors

A JLUS strives to identify ways to enable compatibility between military facilities and a community or region's ability to develop. If the objective was simply to protect an installation's ability to operate, the solution to compatibility challenges would be significantly easier– prohibit all civilian development within a set zone around the base. However, balancing the need to prevent encroachment of an installation's missions and, simultaneously, enable the economic and cultural vision of the local region is more difficult – an "exclusion zone" will not work.

Fundamental to addressing compatibility within the context of balancing needs and interests is the appreciation that encroachment is a two way street. Just as community development can encroach upon an installation, installation missions can encroach upon communities. When an installation performs its missions in other locations – low level flying, insertion or extraction of ground forces, airborne delivery of equipment, etc. – encroachment also becomes an issue for geographically separated communities. Figure III – 1 depicts how some factors can have encroachment implications for either or both an installation and its supporting communities. Since this is the case at Kirtland AFB, issues and recommendations (Part IV) focus on more than just land use authorities adjacent to the installation and Sunport.

Compatibility factors are created by both nature and people. Examples of factors created by nature include water availability and quality, wind and solar resources, threatened and endangered species and minerals or value

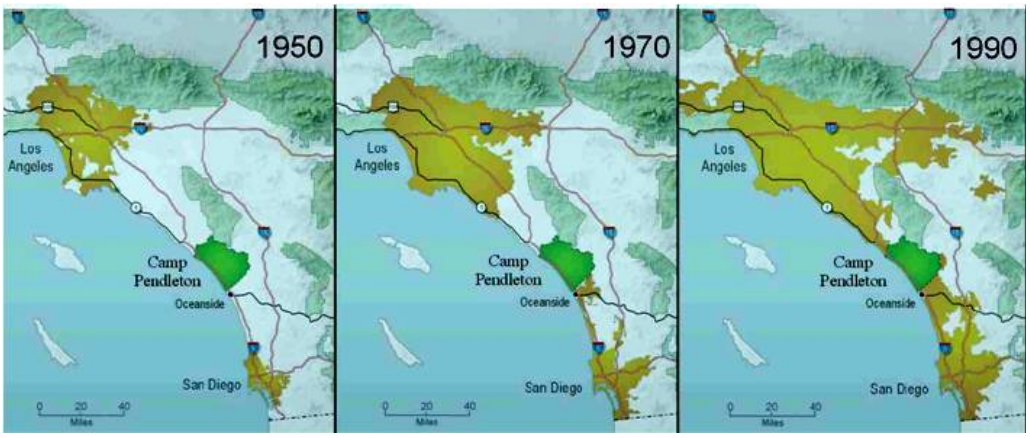
Figure III – 1: Encroachment – A Two Way Street



embedded in the ground. The majority of factors derive from peoples' activity and range from the concrete – land use, infrastructure placement, noise, buildings, air quality, safety zones – to the controlling, such as legislative and policy requirements, interagency relationships and processes and values (environmental protection, governments' vs. owners' property rights).

Another significant, encroachment characteristic is that it can occur rapidly – construction of vertical obstructions in low level flying areas such as towers to connect alternative energy projects to the electrical grid, mission changes that increase safety zone requirements – or slowly, such as population growth. Figure III – 2 is an OEA graphic depicting how Camp Pendleton, CA, (center) was slowly encroached over a period of 40 years as the Los Angeles Metropolitan Area grew to the south and the San Diego Metropolitan Area grew to the north. The last 20 years presented continuing encroachment challenges to Camp Pendleton, in large part, because Los Angeles, San Diego and the other municipalities surrounding Camp Pendleton did not act regionally in regard to the installation. Focusing on the potential unintended consequences, not just the outcomes desired, is one of the most effective ways to prevent potential encroachment from becoming reality.

Figure III – 2: Camp Pendleton, CA, Encroachment 1950 – 1990

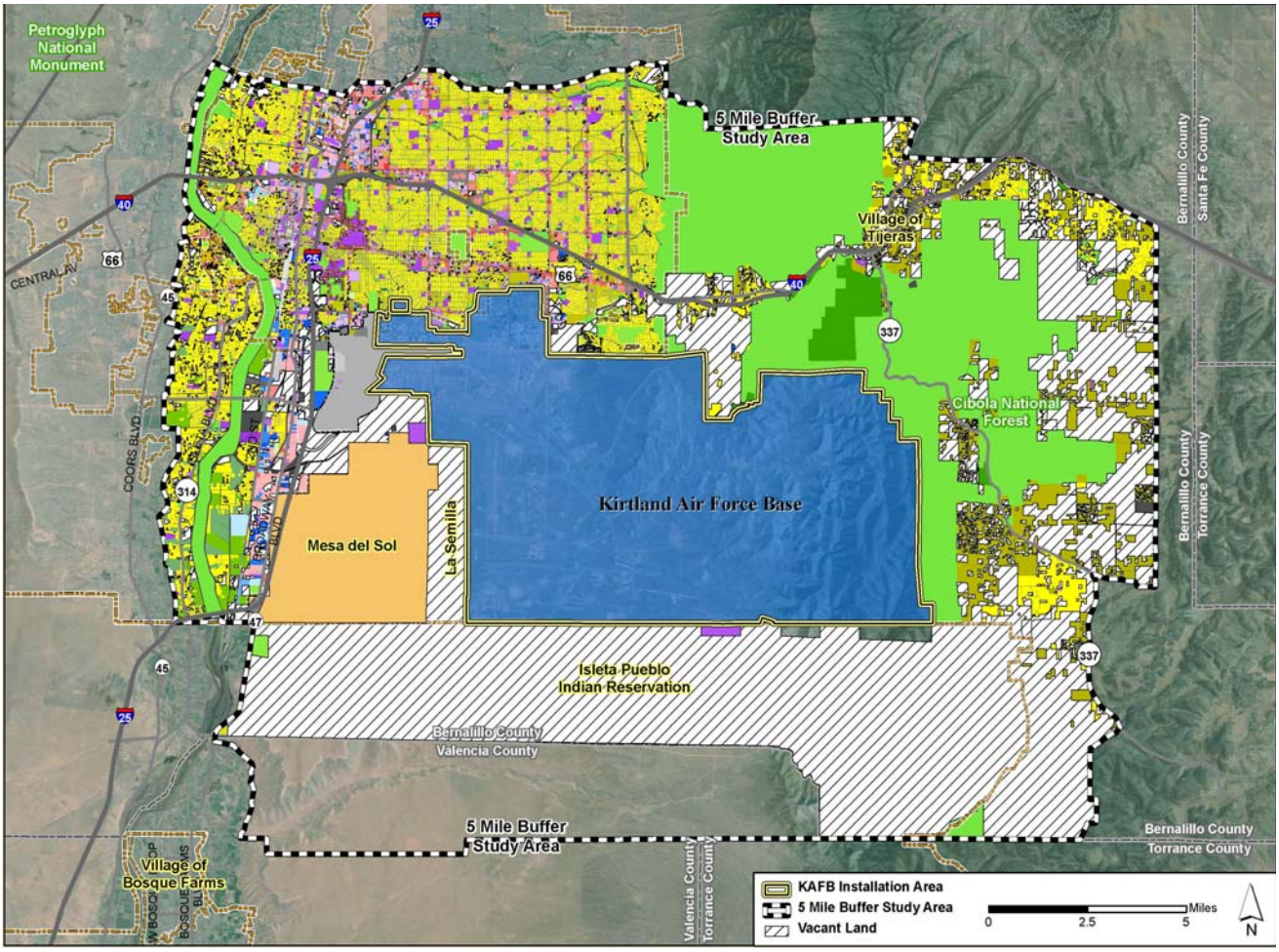


2.0 Regional Planning Considerations

As noted in the foregoing, one of the primary objectives of a JLUS is to promote compatible land use in communities that support military installations. At Kirtland AFB, Albuquerque and Bernalillo County are the immediately adjacent jurisdictions. Of the 272,840-acre study area, within the five-mile buffer, 92% of this land falls within Bernalillo County. The remainder of land is within the Pueblo of Isleta jurisdiction in Valencia County. Because the overwhelming majority of land in the study area is within Bernalillo County and the City of Albuquerque, it is particularly important that these jurisdictions adopt compatible land use development and zoning policies.

Understanding the land use development patterns within the study area helps agencies identify locations where potential land use conflicts may arise. As seen in Figure III – 3 (a larger version is in Appendix X), much of the land in the JLUS study area is already developed land; land with approved development entitlements; and land with some type of preservation status. Roughly one third of the total non-military land in the study area is developed, with a large majority dedicated to low-density, residential housing. Another third of the non-military land in the study area is part of the U.S. Forest Service's Cibola National Forest, the Rio Grande Valley State Park, and various other smaller parcels of City and County parks and open space. There is also a relatively small amount of agricultural land, which could be preserved as a compatible land use. The final third is undeveloped land. These lands should be particularly targeted to implement compatible use zoning codes and for land preservation strategies associated with Recommendations 15, 16 and 17 (Part IV). The legend for land uses shown in Figure III – 3 are shown in Figure III – 14 (p. III – 34).

Figure III – 3: Study Area – Vacant Land Parcels



The single largest tract of land that is currently undeveloped is within the Pueblo of Isleta reservation. There is a buffer approximately 2.5 miles wide in Bernalillo County, and 2.5 miles wide in Valencia County, that is currently undeveloped. The remainder of the undeveloped land primarily surrounds the Tijeras Arroyo, the East Gateway foothills, and on the east side of the Manzano Mountain Range. These tracts are generally unincorporated lands in Bernalillo County.

Mesa del Sol is the single largest undeveloped tract of land in Albuquerque. This land has been rigorously planned in conjunction with the City and Kirtland AFB and has development entitlement rights. Its planning has been a model for an appropriate coordination process with Kirtland AFB to minimize negative land use impacts on either side of the installation boundary and maximize compatible land uses.

2.1 Land Use and Growth

MRCOG projects that by 2030 the Albuquerque Metropolitan Area will grow significantly in housing, population, and jobs. The large number of new households and the economic activity that will support them will translate into demand for more neighborhoods, businesses and construction. Given existing local government policies on more efficient development, much of the new growth is likely to occur at higher intensities than past growth.

This pending community development can create land use issues and opportunities that will need to respond to the broad objective of preserving the viability of Kirtland AFB and Sunport missions and operations. Responsible land use and design policies will be extremely important to the safety and quality of life in local communities and will also contribute essential support to continuation of Kirtland AFB

as a major national defense installation and economic contributor to the region and the State.

Conflicts caused by some compatible land uses allowed in areas of low aircraft flyovers and noise potential, by excessively tall structures in flight paths, and by buildings and parking facilities with excessive lighting in areas where Base operations require dark skies can all be avoided by ongoing collaborative planning and decision making in community development.

2.1.1 Community Development

As discussed in the foregoing, population growth and community development present significant encroachment pressures that must be addressed by local development planning and decision making. General, regional growth and specific planned or potential growth in designated areas are important planning considerations for Kirtland AFB and the Sunport. These issues are discussed in this section, along with an important area set aside to provide a buffer to Base missions.

2.1.1.1 City of Albuquerque

From a population in 1890 of 3,785, the City has grown to 525,000 and become one of the country's fastest growing communities. Albuquerque is the largest city in New Mexico and the larger metropolitan area is home to approximately one-half of the State's population. When combined with other region residents, the City is part of the 59th largest metropolitan area in the United States.

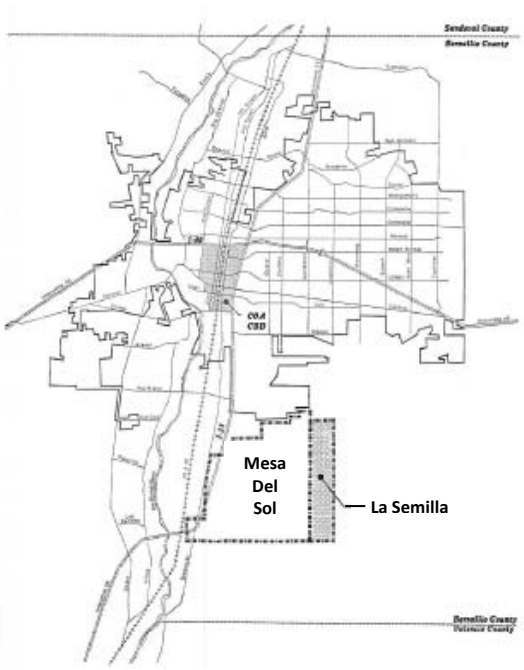
In 2008, Forbes Magazine ranked the City as the 13th best city in America for business and careers. Additionally, the City and region offer a very high quality of life and significant opportunities for educational advancement, cultural enjoyment, personal development and recreation. Albuquerque is a leader in high technology businesses and known for being on the leading edge of America's Green Revolution. These attributes will continue to attract people needing homes and business leaders needing skilled workers. As seen in Figure III – 3, Albuquerque and Bernalillo County have significant land that can help the region satisfy those demands. Additionally, both jurisdictions have a substantial amount of underutilized properties with redevelopment potential. The Southeast Heights in particular has a large proportion of these properties, many of which are within or near the Gibson Boulevard Corridor. City of Albuquerque planning initiatives aim to promote both residential and commercial redevelopment in an effort to forestall the spread of blight from closed and declining businesses and apartment complexes. Similarly, Bernalillo County has carried out planning projects designed to redevelop and diversify long-standing, but low quality, industrial areas of the South Valley between I-25 and the Rio Grande.

The possible implications for the Base and Sunport from development of raw land and redevelopment of existing properties are important planning considerations.

2.1.1.2 Mesa del Sol

Mesa del Sol (Figure III – 4[1]) is a 12,000-acre planned community, with an approved Level A Master Plan that

Figure III – 4: Mesa del Sol and La Semilla



includes long-term, mixed-use community development. Its size and proximity to the Base and Sunport may present land use compatibility challenges as it is developed. Significant effort and resources have been invested by the developer, City of Albuquerque and Kirtland AFB to ensure anticipated impacts are identified and processes designed to prevent encroachment issues. The overall approach

[1] La Semilla Master Plan

taken to consider and approve Mesa del Sol's development plans and implementation processes could be a model for future development planning.

Given Mesa del Sol's development occurring over several years, possibly decades, near a military installation hosting a large number of missions – and having the capacity to host many more – and close to a major metropolitan airport, there may be unanticipated land use challenges. These challenges could be related to transportation or light pollution encroachment, for example, on Base missions or aircraft noise from overflight of Mesa del Sol property encroaching upon its residents. Therefore, Mesa del Sol constitutes an important planning consideration and is discussed in greater detail in Section 5, *JLUS Issues and Analysis*.

2.1.1.3 La Semilla

La Semilla (Figure III - 4) is located along the eastern edge of Mesa del Sol, and designed to serve as a buffer to the military and research activities that take place on Kirtland AFB. It is composed of approximately 2,700 acres of land held in trust by the New Mexico State Land Office on a 100-year lease to DOE. The La Semilla Master Plan was developed in coordination with Kirtland AFB and DOE to ensure future, compatible land uses.

Any development within the La Semilla buffer or modification to the currently agreed-to use could present encroachment issues on the installation impacting both DoD operations and DOE missions, testing, evaluation and experimentation. Continuation of the La Semilla buffer is an important planning consideration.

2.1.1.4 Valle del Sol

Valle del Sol is a 540-acre property partially within the 65 dB noise contour and CZ and APZ 1 of Runway 03. Valle del Sol has been proposed as a planned community with a mix of residential, commercial, industrial and open space land uses. The Horne Family has tried for years to develop some portion of Valle del Sol, and both the City of Albuquerque and Mesa del Sol have attempted on several occasions to acquire the property. A development permit was denied – as recently as April 2010 – and the owner's intent to continue property development is unknown. The property's proximity to the runway and location within the 65 dB noise contour means development would encroach on Sunport operations and could threaten the long-term viability of the airdrome to support military aviation missions. Valle del Sol land use is an important planning consideration.

2.1.1.5 Land Withdrawals for DoD and DOE Use

Approximately 20,000 acres of the Cibola National Forest, on the east side of Kirtland AFB, is part of a 1943 "Military Withdrawal" of public lands for the purpose of conducting World War II (WW II) training exercises. The withdrawn land is currently used by DoD and DOE for training and research and development activities. Public use of the land is prohibited; however, unauthorized use of the trails in the withdrawal lands occurs regularly. While there is some disagreement about primary jurisdiction between DoD and the U.S. Forest Service, the JLUS planning consideration is that these 20,000 acres are currently being used to satisfy mission requirements for units on Kirtland AFB. Therefore, land use planning should consider how possible actions could adversely impact the ability of this land to support the Base and its associate units' mission requirements.

2.1.1.6 Pueblo of Isleta

The territory of the Pueblo of Isleta jurisdiction is located in Bernalillo and Valencia Counties immediately south of Kirtland AFB and is comprised of approximately 188,000 acres (Figure III – 3). The Federal government has a unique relationship with Native American tribes derived from the Constitution of the United States, treaties, Supreme Court doctrine, Federal statutes, and Executive Orders. The right of self-governance creates a special relationship between the Pueblo and Kirtland AFB that requires government-to-government consultation and coordination of actions. Land use policy and practices that can be directed to, or by, State, county or municipal entities must be negotiated and formally adopted by the Pueblo's Legislative Branch. The role of the Pueblo's Tribal Planner is essential to a successful JLUS. Close coordination between the Base and the Pueblo is essential to long-term sustainment of Base missions.

2.1.2 Community-Installation Partnering

Partnerships between Federal activities and supporting communities continue to grow. The types of partnerships also continue to increase as community and installation

leaders find new ways to balance growth and mission requirements. Kirtland AFB has two important partnering initiatives and is considering use of Enhanced Use Lease (EUL) authority to allow development of solar energy farms on the installation. Partnering in development of alternative energy sources would support the Base by potentially reducing operating costs and enhancing energy independence. The two existing private developer initiatives are both technology parks with land use implications, but sufficiently different to warrant separate discussion.

2.1.2.1 Sandia Science and Technology Park

The Sandia Science and Technology Park ("Park") is located on approximately 200 master planned acres adjacent to Kirtland AFB, just east of the Eubank Gate. It is affiliated with the Sandia National Laboratories and enjoys partnerships with a large number of States, county and city governments and organizations and private sector companies. It has grown since the first phase of development, and there is every indication that growth will continue. The Park represents both compatible land use on the perimeter of the Base and the ability to leverage that land use to support the mission needs of programs on Kirtland AFB. Land use planners and economic developers should work together to ensure the Park is integrated into their regional strategies.

2.1.2.2 Kirtland Technology Park and Other Enhanced Use Leases (EULs)

Using the Air Force's first EUL authority, a 92-acre, mixed use complex along the northern boundary of the western part of Base is envisioned as a Kirtland Technology Park (KTP) using a 50-year lease. EUL authority permits the Air Force to turn a liability – underutilized property (land currently not needed, but that might be in the future) – into an asset. Similar to the Sandia Science and Technology Park, the KTP will be master planned with the goal of supporting businesses and activities that leverage Base missions. Through June 2010, no lease has been signed.

Two additional EULs within the perimeter of the Base are currently under consideration. These two areas have been identified as potential sites for solar farms that could produce electrical power for the installation. Again, through June 2010, no lease has been signed.

2.1.3 Alternative Energy Development

The national interest and pursuit of renewable energy sources has generated significant industry attention in New Mexico and will impact the State to a much greater degree in the future. Existing energy companies, relatively new companies, entrepreneurs, ranchers and many private citizens will be attracted to the 21st Century version of oil exploration and exploitation. This business area is expected to grow significantly over the next several decades.

Renewable energy generation and operations will impact the MRCOG region and the missions of some units at Kirtland AFB, especially flying units conducting operational and training missions. In general, most non-flying units and Base missions will benefit if energy produced can partially offset current power requirements and lower the energy costs. However, in the case of flying units, the characteristics of the renewable energy hardware can present special challenges and create obstacles that represent safety of flight concerns.

New Mexico is exceptionally well suited to capture sun and wind energy. Given the size and central location of the MRCOG region, it will be involved in these initiatives, such as the current planned wind farm activity in Torrance County. The northern portion of Socorro County, within the JLUS Study Area but outside the MRCOG sphere of influence, anticipates the construction of transmission lines to tie new energy sources in the eastern part of the State, and perhaps the County, into the power grid. Energy transmission lines, wind turbines and solar arrays present the possibility of incompatible land uses based on location.

As alternative energy efforts continue throughout the region, it is essential the dangers to flight safety – life and aircraft – presented by these projects are carefully considered. Given the nature of flying training completed by the 58th SOW, the heights of transmission lines tying new power sources to the electrical grid, supporting towers and wind turbines present obstacles at the altitudes flown on many missions. The rotating blades of the wind turbines can cause a problem referred to as "doppler shift." Under night, low-level flight conditions, aircrews are totally dependent on radar, and doppler shift can cause inaccurate and unreliable information to be displayed on aircraft instrument panels. Moreover, these obstacles are difficult to see at night or in marginal weather, conditions

for many military training flights. Even during seemingly innocuous flight on cloudless days, the sun's reflection from untreated solar panels may cause a significant, momentary drop in a pilot's visual acuity during a critical flight phase.

2.1.4 Environmental Justice

According to the U.S. EPA, environmental justice is:

> "… the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies… It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work."[2]

Government projects are required to analyze if there are disproportionate impacts on particular groups. This is accomplished by analyzing potential effects on social and economic conditions, including loss of community cohesion, accessibility to community facilities or services, availability of multimodal transportation services, compatibility with planned land use, increased traffic noise, displacement of people or businesses, and other factors that affect employment and economic development.

One of the purposes of a JLUS is to reduce existing and potential land use conflicts. As such, a primary goal of the plan is to reduce potential negative impacts that may arise due to the close proximity of Kirtland AFB and adjacent communities. Reduction of negative impacts is applicable regardless of the socio-economic status of adjacent residents. The JLUS planning process included a diligent effort to reach out and involve people in a variety of neighborhoods, each with different socio-economic profiles.

The planning team determined that the issues and concerns that arose during this planning process were not disproportionately targeted at any particular group. Many of the community concerns, including noise, transportation, Base access, pollution and hazardous waste management impact the community at large. The presence of a greater number of minority and economically disadvantaged residents adjacent to the Sunport and Kirtland AFB may be indirectly attributable to the fact that these locations have a greater exposure to aviation noise. However, there is no direct correlation between these two phenomena. Regional leaders should consider implications on environmental justice as JLUS recommendations are implemented and future development is pursued.

3.0 Economic Impact

When the impacts from employment and spending at Kirtland AFB and the Sunport are summed, the total impact on the MRCOG region represents 11.2% of all regional employment, or one in every nine regional jobs. Income from Kirtland AFB and the Sunport, added together, represents 17.5% of all earned income in the MRCOG region, or one in every five to six dollars in regional wages or salaries. In total industrial output, Kirtland AFB and the Sunport together account for 12.8% of all industrial activity, or about one in every eight dollars of regional output value.

There are no known institutions or employers in the region that could replace the beneficial economic impacts if Kirtland AFB were to close or experience cutbacks. Because of this circumstance, land use planning that sustains the Base's current missions and preserves the viability for new missions in the future – both aviation and non-aviation related -- is an important regional planning consideration. The economic impact of Kirtland AFB and the Sunport is presented in more detail in Part V and Appendix B.

4.0 Transportation Considerations

With a large, installation-airport complex in the middle of the MRCOG region, the transportation system to, from and around the Base and Sunport – and its efficiency – is a critical component of compatible land use planning.

The transportation system must support up to 20,000 employees, contractors and suppliers accessing Kirtland AFB, SNL, and associated organizations every day. In addition, approximately 18,000 airline passengers arrive and depart from the Sunport daily. These passengers contribute significant vehicle traffic into the ground transportation system.

Regional planning must not only consider the practical issues of how to effectively move traffic, it must also result in responsible environmental stewardship from both quality

[2] http://www.epa.gov/environmentaljustice/

of life and mission viability perspectives. Transportation systems have a direct impact on air quality, and air quality has a direct impact on the region's attractiveness for new national security missions. Air Force testimony to the Congress includes statements that the Service actively resists efforts to increase existing mission activities or site new missions in areas of air quality non-attainment. Therefore, land use decisions and the impact those uses can have on the region's air quality should be considered an integral part of compatible land use planning.

Transportation considerations and the transportation system are discussed in more detail in Part VI and Appendix C.

5.0 JLUS Issues & Analysis

5.1 Planning Regionally

The investigation of land use planning and subsequent development adjacent to and around Kirtland AFB and the Sunport indicated few significant problems for the Base and its associates' missions or the conduct of commercial and military aviation operations. However, the lack of significant issues can be attributed more to the historic "spirit of cooperation" in the region rather than a robust, coordinated, collaborative land use planning process.

5.1.1 Lack of Formal Collaborative Planning

There is no designated, regional planning organization with land use authority. It is dispersed over a number of local land use jurisdictions. MRCOG serves as an agency to discuss regional planning issues, but has no authority over the land use planning jurisdictions.

Recognizing there was no formal land use planning input authority for military installations in New Mexico, New Mexico's Governor, Bill Richardson, issued *Executive Order Number 2004-046* in August 2004 that was intended to ensure local, compatible development with New Mexico's military installations. The Order's language clearly addressed the need for availability of unencroached military mission performance that was evaluated during the 2005 Base Realignment and Closure (BRAC) process, a near-term, completed objective. The Order states:

> "I … do hereby direct all appropriate and relevant State agencies, which are involved with land-use planning to ensure compatible development with New Mexico's military installations. Further, I recommend that all political subdivisions and municipalities that adopt land-use plans and enforce zoning regulations ensure that planned development is compatible with military installations, and that they consider the impact of new growth on "Military Value" when preparing zoning ordinances or designating land uses for land adjacent to military facilities or other parcels of land which are in proximity to military installations."

Numerous other states have enacted various statutes and Executive Orders to allow for military cooperation in land use planning and zoning in close proximity to military installations and training areas. However, most of these states enacted statutes that are still in effect and will be in existence long after departure of the administrations that implemented them. These statutes recognize the long-term nature of planning and zoning decisions and their impacts on military mission performance. While it is not clear if the August 2004 New Mexico Executive Order will have a long-term impact, the purpose and language are clear that military installation mission needs should be considered in land use planning and zoning decisions in New Mexico. The Order's intent and purpose should be continued to preserve the viability of the long-term military mission needs for Kirtland AFB organizations.

Over the years – and without benefit of Governor Richardson's Executive Order – numerous, local land use and governmental jurisdictions and concerned citizen groups considered the implications of their actions on the viability of Kirtland AFB and Sunport activities. However, the considerations of Kirtland AFB's and the Sunport's viability did not result from a regional, institutionalized process. As a result, Kirtland AFB and the Sunport benefit today from a relative lack of mission encroachment because of the collegial nature and foresight of regional government officials and concerned citizens through the years. With the exception of Sunport Runway 17/35, existing land use conditions minimize encroachment and avoid serious or insurmountable problems. After the planned decertification and closure of Runway 17/35, existing, serious encroachment issues off the ends of the runway will be mitigated with no adverse impacts on Base or Sunport operations. Environmental decision making considerations for the closure of Runway 17/35 are underway.

MRCOG's initiative to support a regionally-focused JLUS – and its activity over the last eighteen months – highlighted the fortuitous circumstances created by past, informal cooperation amongst land use jurisdictions. This insight and analysis of developmental trends made key elected and appointed officials, supervisors, individuals, organizations and agencies of the many regional jurisdictions mindful of the need to adopt a formal process. Individually and collectively, the stakeholders involved in the JLUS process appear to appreciate the imperative of close, collaborative planning to avoid future Kirtland AFB and Sunport mission encroachment issues. The JLUS contains several recommendations to institutionalize land use planning cooperation and collaboration at the regional level to ensure Kirtland AFB's and the Sunport's important national security and domestic missions and the region can continue to develop.

Applicable Recommendation(s): 1, 2, 3, 4, 6, 9, 21, 22, 23

5.1.2 Economic Impact

Discussed in more detail in Part V and Appendix B, the economic contributions of Kirtland AFB and Sunport operations to the region are significant. The significance of these employment and economic inputs into the local economy indicates the need for consideration of the consequences of policy and land use decisions affecting Kirtland AFB and the Sunport by all regional land use jurisdictions in planning and decision making processes. The potential for a land use jurisdiction to independently make a decision that adversely affects the Kirtland AFB and Sunport missions and another part of the region's economy indicates the need for these types of decisions to be discussed and deliberated in a regional forum to determine if there are feasible alternatives available within or between land use jurisdictions. While not having land use authority, such a forum is essential to help identify and enable regional planning strategies needed to sustain the Base and Sunport's existing and potential activities.

Applicable Recommendation(s): 3, 6, 21, 23, 32

5.1.3 Transportation

The transportation system discussed in Part VI and Appendix C assesses the region's ground transportation conditions associated with Kirtland AFB and the Sunport and provides a general overview of the transportation-related context of the study area. The efficiency of the ground transportation system as it affects Kirtland AFB and the Sunport is critical to assessing current and future land uses in the region.

MRCOG is designated as the regional Metropolitan Planning Organization (MPO) by the Federal and New Mexico governments. It is charged with meeting federal requirements for multi-jurisdictional planning and programming of transportation projects. These ongoing planning processes have broad-based participation, and the plans provide a methodical process for transportation investments and improvements.

Through MRCOG's role to "coordinate with Federal, State, and local transportation planning organizations to develop the Unified Planning Work Program," the agency provides a recognized, regional forum to discuss, deliberate and plan solutions when local land use planning alternatives generate transportation issues that affect Kirtland AFB and the Sunport.

Ground transportation is a major, regional concern that must support both the economic life and quality of the human environment for the region. These realities and the fact that infrastructure has a direct impact on real and expected land uses, regional transportation planning is critical to sound regional land use planning.

Applicable Recommendation(s): 3, 6, 21, 23

5.1.4 Air Quality

Local air quality is an issue that is monitored and response developed on a regional basis. The Clean Air Act of 1963 (amended in 1970 and 1990) is federal legislation developed to reduce air pollution and to protect public health and the environment. The U.S. Environmental Protection Agency (EPA) implements Clean Air Act provisions and is responsible for setting National Ambient Air Quality Standards (NAAQS) to enforce the Act. The primary strategies the EPA uses to improve air quality are reducing outdoor concentrations of air pollutants, reducing emissions of toxic air pollutants, and phasing out use of chemicals that destroy the earth's ozone layer.

The Air Force is sensitive to air quality issues and routinely evaluates the impacts of current or potential, future missions on a region's air quality. Air Force installations, since they possess regional infrastructure and their

operations contribute to regional air quality, must comply with and support regional air quality plans. This establishes a direct connection between regional compliance with Clean Air Act provisions and the ability of Kirtland AFB to perform – and possibly retain – current missions and attract new ones. As noted earlier, the Air Force resists efforts to increase existing mission activities or avoids locating new missions in non-attainment areas.

On January 19, 2010, the EPA proposed to change the national primary and secondary ambient air quality standards for ozone from the current limit of 0.075 parts per million (ppm) to a lower primary standard range of 0.060 to 0.070 ppm, and a weighted secondary standard of 7-15 ppm-hours. Adoption of these more stringent standards could result in one or more counties in the JLUS study area entering a non-attainment status. In the years 2006 to 2008, Bernalillo County is reported to have exceeded the 0.070 ppm ozone level, and Sandoval County exceeded the 0.065 ppm ozone level. EPA has projected that by 2020, Bernalillo, Sandoval, and Valencia Counties will violate a primary 8-hr ozone standard of 0.060 ppm; that Bernalillo County will violate a secondary standard of 15 ppm-hrs and Sandoval County will violate a 7 ppm-hr secondary standard.

The proposed changes by EPA provide added incentive for the region to reduce current levels of ozone emissions. The primary sources of ozone pollution are fixed infrastructure resulting from land use planning and zoning decisions and "mobile sources," primarily motorized vehicles. The best way to reduce the contribution to air pollution from vehicles is to use less carbon-derived fuels and reduce dependence on vehicles, especially the single-occupancy vehicle. Reducing vehicle miles driven can be accomplished in a number of ways by commuters through ride-sharing, trip chaining, using public transit, and telecommuting. These strategies with possible value to the MRCOG region are discussed in greater detail in Part VI.

Regional air quality is directly linked to, and an inherent byproduct of, the results of land use planning and zoning decisions, as well as transportation system planning and implementation.

Applicable Recommendation(s): 3, 4, 6, 9, 21, 22, 23, 24

5.1.5 Summary

Land use planning and zoning decisions made by the region's jurisdictions directly affect the region's economy, transportation system planning and implementation, and the region's air quality and compliance with national standards. Transportation system planning and implementation and air quality are monitored and planned on a regional basis, but land use planning is individually managed by local jurisdictions. The need for consideration of land use planning and zoning decisions that have regional impacts is clear. A regional forum is needed to enable discussion of these issues and those described in New Mexico Executive Order Number 2004-046 that potentially affect Kirtland AFB operations. To ensure long-term relevance, the intent and purpose of the Executive Order might follow the lead of numerous other states through State-wide legislation.

5.2 Sustaining Kirtland AFB

This section focuses primarily on non-aviation-related considerations associated with ensuring Kirtland AFB units retain their ability to accomplish existing activities and the installation remains attractive for new missions. As noted in the foregoing, the Base has a broad range of mission types, both aviation and non-aviation related. The sustainment of aviation-related missions is addressed in Section 5.3. Based on clearly articulated Air Force preferences and underscored by over 15 years of base infrastructure analysis and decisions, the military value of the Base is enhanced by having both aviation and non-aviation missions; activities directly supporting national security strategy; unique research and development programs; training of high-value, low-density combat forces; and a host of other characteristics that make Kirtland AFB a special installation for Federal Agencies, not just the Air Force.

Kirtland AFB is home to over 100 agencies and organizations, and it is also the sixth largest Air Force base. The Base still has excess capacity to support additional mission growth. In September 2010, 65 new manpower positions will be added and apportioned between the security forces and several of its more than 100 organizations. There could also be continued growth in organizations such as the Air Force Nuclear Weapons Center and Air Force Research Laboratory – organizations receiving increased visibility and priority by the Air Force.

Significantly, the 2005 BRAC process added hundreds of personnel and new activities to the Base in recognition of its ability to support additional missions. As encroachment issues at other installations adversely impact their capabilities, it is likely DoD will continue to move missions into the "relatively wide-open" Southwest area – Kirtland AFB is well positioned to support that growth.

5.2.1 Perimeter Boundary Development

Development along the perimeter boundary of Kirtland AFB and the Sunport is an important consideration based on the current and future potential for various types of mission encroachment. In general, the majority of Kirtland AFB's boundary is undeveloped land while the majority of the Sunport's boundary is occupied by Kirtland AFB and developed lands.

The Sunport is adjacent to and west of Kirtland AFB. It is within the City of Albuquerque and shares its northern border with the City's Southeast Heights. There is significant commercial activity to the west of the Sunport, much of it related to airport operations and other commercial users, such as general aviation, airfreight, Federal Express, United Parcel Service, car rental businesses, parking facilities, etc. The University of New Mexico (UNM) golf course and the significant change in airfield elevation immediately to the west of the primary runway present obstacles to most development types.

To the south of the Sunport is Valle del Sol's 540-acre parcel. This property is bisected east-west by Tijeras Arroyo as well as a Federally owned railroad right-of-way. University Boulevard traverses north-south through the parcel and is the primary access road for the area. Valle del Sol's location and potential development scenarios, if pursued, would pose a major land use compatibility issue for the Sunport and military aviation uses. Both the City of Albuquerque and the Mesa del Sol development have attempted on several occasions to acquire the property. In April 2010, the latest development proposal to the Bernalillo County Planning Commission was denied.

South of the Sunport and on the western boundary of Kirtland AFB, the La Semilla buffer, wildlife habitat, is composed of approximately 2,700 acres of land held in trust by the New Mexico State land Office. The land forms a buffer between Kirtland AFB and the Mesa del Sol development. The La Semilla Master plan was developed in coordination with Kirtland AFB and DOE to ensure future compatible land uses in the buffer area.

The northern border of Kirtland AFB and the Sunport is shared with the Southeast Heights of Albuquerque that is nearly fully built-out. There are portions of land along western Gibson Boulevard that are still undeveloped, as well as land in the eastern Albuquerque foothills. The Gibson Boulevard corridor has significant potential for redevelopment. Along the northern border, the SSTP is developing for commercial, institutional, and office space users. Lands east of the SSTP are developing residential and recreational uses that are addressed in the East Gateway Sector Development Plan, 2010.

The Cibola National Forest is east of Kirtland AFB. A portion, approximately 20,000 acres, of this land was withdrawn from public use in 1943 for military training purposes. Because this entire area is Federal land with mountainous land forms, development potential of the area east of Kirtland AFB is limited.

The southern border of Kirtland AFB is contiguous with the Pueblo of Isleta Reservation. There are rural roads south of Kirtland AFB on the Pueblo of Isleta across the mesa between the Manzano Mountains and the Rio Grande Valley. This portion of the Pueblo of Isleta is primarily used for livestock grazing. Currently, development on the Pueblo of Isleta is concentrated along the Rio Grande Valley. During stakeholder discussions, a representative of the Pueblo of Isleta indicated that they have a good relationship with Kirtland AFB and they understand each other's interests.

The rural nature and buffered areas along most of Kirtland AFB's perimeter boundary currently protects the Base from various forms of encroachment. A large part of the Sunport's perimeter boundary has urban development that currently has significant incompatible development, primarily at the northern end of Runway 17/35. These are noted, but of limited concern, as the environmental decision-making process for closure of Runway 17/35 has begun. When Runway 17/35 is closed, the developments will no longer present a land use compatibility issue.

Minor perimeter boundary issues for Kirtland AFB focus on the Air Force relinquishing ownership of small portions of the Base property. Examples of these issues include consideration by the Air Force to lease property immediately north of Gibson Boulevard and east of Louisiana Boulevard to the City of Albuquerque and efforts in-progress to transfer property near the southern Base boundary to the Lovelace Respiratory Research Institute. There is also a minor boundary dispute between the Hinkle family and the Air Force along the northern boundary, just

east of Albuquerque. These issues are noted in the JLUS because they were identified by stakeholders or respondents to the JLUS Public Survey; however, neither the issues, nor their potential resolutions, affect or influence JLUS recommendations.

Applicable Recommendation(s): 3, 4, 6, 9, 10, 14, 18, 21, 22, 23, 29

5.2.2 Southern Entrance to Kirtland AFB

Figure III – 5 shows a southern entrance to Kirtland AFB; however, it is not available for general use by the civilian or military workforce at the Base. The installation opens this gate ("South Gate") on a limited basis to alleviate some of the congestion on I-25 and Gibson Boulevard during morning and evening rush hour traffic. The JLUS Survey indicated significant community interest in improving access to the Base from the south. Kirtland AFB workers who live south and west of the Rio Bravo Boulevard and I-25 intersection in Albuquerque would like the South Gate opened and the necessary road improvements made to support its regular use. This sentiment is also shared by elected officials and County Commissioners representing the southern part of Bernalillo County and Valencia County, as well as Pueblo of Isleta officials who desire unencumbered southern access to the Base. The South Gate could also provide access to and from Mesa del Sol and other, future developments to the south. The five major Kirtland AFB access gates on the north and east sides of the Base are adequate to accommodate commuters; however, they do not efficiently serve a significant number of commuters – and future commuters based on development plans – south and west of the installation.

Due to operational impact, security, safety and cost issues associated with existing Kirtland AFB missions, there is no current plan, nor anticipated opportunity, to increase the capacity or change the status of the South Gate in the foreseeable future.

There could be an opportunity for enhanced southern access in the long-term, but any possibility of providing a southern entrance hinges on unforeseen mission changes for the Base that would eliminate adverse impacts on its missions and allow mitigating the existing safety and security issues. This issue is also addressed in Part VI and Appendix C. Until such significant mission changes occur, regional officials should not allow unrealistic expectations of a southern entrance to the Base to grow to the extent

Figure III - 5: South Gate and Context

that political pressure can jeopardize current and potential future missions.

Applicable Recommendation(s): 3, 4, 6, 12

5.2.3. Open Space

5.2.3.1 Tijeras Arroyo

Tijeras Arroyo is the largest drainage way in the Albuquerque area, draining water from Tijeras Canyon to the Rio Grande. The Arroyo is a broad and meandering channel that is deeply incised in places. Near the confluence of the Arroyo and the Rio Grande, the natural channel has been lined with concrete to facilitate water flows. The concrete channel also carries storm water from southeastern Albuquerque to the Rio Grande, roughly between I-25 and the river itself.

The issues identified relating to Tijeras Arroyo and the JLUS are associated with the preservation of natural habitat along the channel and its function as a wildlife corridor; Base security at the boundary between the Arroyo and Kirtland AFB; and its recreation function as public open space. In the JLUS Public Survey, numerous community members commented on their desire to maintain the existing open space along Tijeras Arroyo for recreational use, especially for off-highway vehicles (OHV) that are currently restricted to Montessa Park. There is historic use of the Arroyo for illegal dumping, as well as an authorized mixed waste landfill. There is concern about future dumping and a desire for regular monitoring of the area to manage this issue.

The City of Albuquerque's Open Space Department is currently working on its Resource Management Plan for the Tijeras Arroyo Biological Zone. The purpose of this plan is to protect existing native plants and wildlife and to restore degraded habitat. The Plan addresses the section of the Arroyo between Carnuel and 1-40 west to the eastern boundary of Kirtland AFB. The City is acquiring land in and adjacent to the Arroyo to further protect natural resources.

In 2007, a Memorandum of Understanding was signed between the City of Albuquerque, Kirtland AFB, and the DOE National Nuclear Security Administration to protect and conserve the Tijeras Arroyo as a wildlife corridor. The three parties agreed to a unified land management and wildlife conservation practice in order to: preserve natural habitat, permit free passage of wildlife, and share information and expertise about the wildlife population.

Urbanization of the land adjacent to the Arroyo is a land use concern for Kirtland AFB. In a letter to the Bernalillo County Board of Commissioners regarding an annexation of 200 acres of land east of Kirtland AFB, the 377th ABW Vice Commander identified several concerns about developing the Arroyo east of the installation. Additional stormwater runoff generated by development could cause downstream problems such as erosion and flooding at Kirtland AFB, I-25 and the South Diversion Channel. Additionally, there are security issues at the Arroyo fence line because of the difficulty of providing access for stormwater and wildlife while still prohibiting people from entering the installation. Increased stormwater flow could exacerbate the problem because a larger opening in the fence would be required for major weather events. Future development east of Kirtland AFB should address the concerns of the installation's leadership to prevent mission encroachment and follow drainage "Best Management Practices" to avoid creating downstream problems.

Applicable Recommendation(s): 3, 6, 9, 18, 21, 22, 23

5.2.3.2 Valle del Sol

As discussed in the foregoing, Valle del Sol is a 540-acre parcel with portions within the 65 dB noise contour and the approach end CZ and APZ 1 for the Sunport Runway 03. In addition to the physical encroachment its development could create, its unstable soil conditions and steep slopes extending to the floodplain could generate additional runoff and cause downstream problems such as erosion and flooding at Kirtland AFB, I-25 and the South Diversion Channel.

Keeping this property as undeveloped land would be consistent with the City and County open space plans, as well as the Draft Tijeras Arroyo Resource Management Plan prepared by the City Open Space Department. Retaining this property as open space would also contribute to sustaining the long-term viability for DoD aviation activities addressed in Section 5.3.

Applicable Recommendation(s): 3, 4, 5, 9, 14, 15, 16, 17, 21, 22, 23

5.2.4. Mesa del Sol Development

Private planners and developers conceptualized the 12,000-acre Mesa del Sol community as a live-work location for sustainable, high-tech industries. The planning for this development has been pursued in a very deliberate manner to minimize potential land use compatibility challenges, particularly those related to transportation, light pollution and noise issues.

5.2.4.1 Transportation

Mesa Del Sol's proximity to Kirtland AFB makes it a desirable location for employees who work at the Base. As discussed in Section 5.2.2, there is interest in direct access to Kirtland AFB; however there is no way to satisfy this interest in the near term. Regional officials should not allow unrealistic expectations of a southern entrance to the Base to grow that might ultimately create political pressure and actions that will encroach on existing activities and potentially threaten the Base's capability to sustain current and attract new missions.

Applicable Recommendation(s): 3, 4, 6, 12, 24

5.2.4.2 Light Pollution

The degradation of ambient light – natural night sky condition – is a major factor in the quality of NVG training essential to the mission readiness of military aircrews at Kirtland AFB. As Mesa del Sol develops, the development could result in brighter area skies. To mitigate this circumstance, Mesa del Sol has attempted to minimize light pollution in the development as much as practicable. For example, up-lighting is prohibited and street lighting has been designed to significantly reduce skyward light emissions. The more detailed plan covering the community's proposed employment center lists twenty-two specific standards and requirements developed with Kirtland AFB for preservation of dark skies. Lighting reduction is only one example of Mesa del Sol's proactive commitment to preserve Kirtland AFB's and the Sunport's mission capabilities. As development progresses, maintenance of the initial agreements will be important to sustaining the Base's missions.

Applicable Recommendation(s): 3, 4, 6, 20, 21, 26, 28

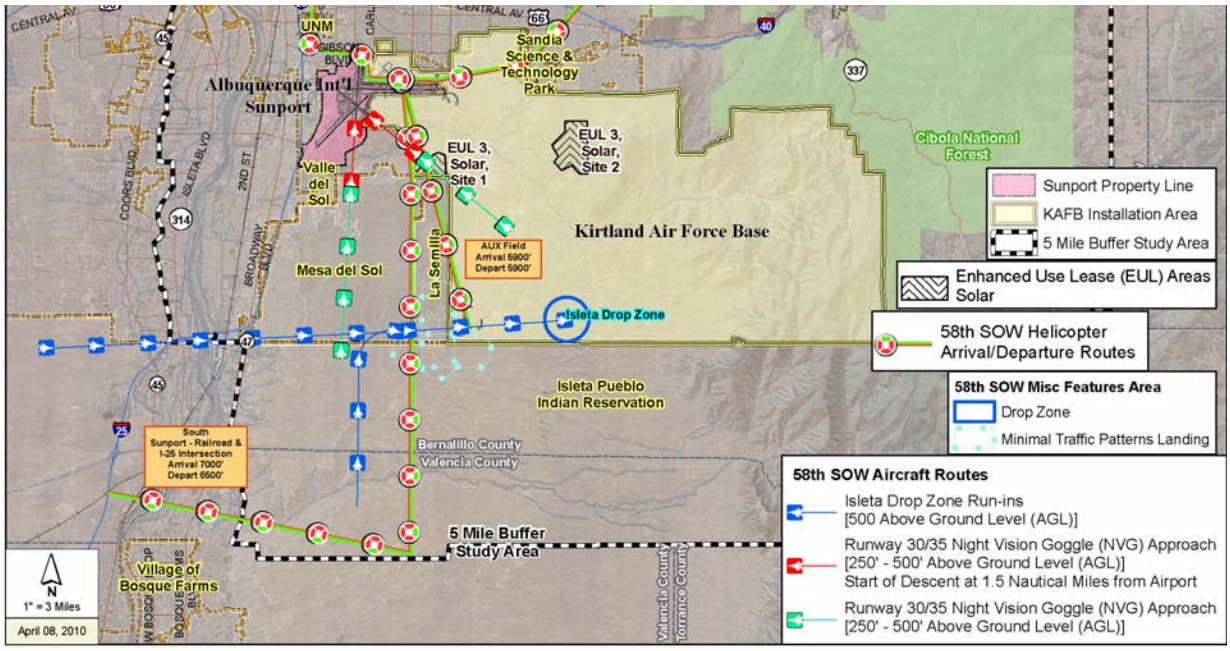
5.2.4.3 Noise Impacts

There are potential noise impacts for residential development at Mesa del Sol created by operations at the Sunport and from Kirtland AFB's Chestnut Range Explosives and Simulation Test Site. On the Mesa del Sol Master Plan, there is one future Village Center, two residential neighborhoods, and an active adult community that are within the Chestnut Noise Contour. Discussed in Section 5.4.3, development within the Chestnut Noise Contour could result in noise – and possibly structural damage – residents might use to criticize the Base if proper disclosures are not included in real estate transactions.

A portion of the Mesa del Sol development is near two Sunport runways; however, this land is designated for parks and open space – a compatible land use – and there are no incompatible structures or developments proposed within these areas.

As shown in Figure III – 6 (a larger version is included in Appendix X), there are several Kirtland AFB military training routes (MTRs) used for flight training that currently traverse Mesa del Sol.

Figure III – 6: Aircraft Routes – Mesa del Sol



- ✓ There is a MTR that crosses directly through the Mesa del Sol development area, north to south.
- ✓ The approach path to Runway 35 also crosses through the center of Mesa del Sol, going from the south to the north. The 58th SOW performs NVG Landing Training on Runway 35 with flight routes that are between 250 to 500 feet above ground level.
- ✓ The Pueblo of Isleta Drop Zone flight path crosses the southern portion of the development, land designated for future residential, commercial, and open space. Drop Zone flights are performed at an elevation of 500 feet above ground level.
- ✓ The 58th SOW Helicopter arrival and departure routes traverse the eastern portion of the development along its border with La Semilla.
- ✓ Not specifically shown, the entire development lies within the five-mile buffer along the flight path where altitudes for C-130 aircraft can be as low as 100 feet.

The Mesa del Sol developer has agreed to encumber the portions of the property with a noise easement and ensure disclosure of its proximity to the Sunport is recorded in real estate documents. This agreement is based on the mutual understanding that the development's proximity to the Base has potential adverse environmental and noise impacts for future land uses. The agreement states that:

> "Kirtland AFB generates aircraft, rocket testing and explosives maintenance and testing noise, which noise might change over time by virtue of greater numbers of aircraft, different or new types of aircraft, increased rocket and explosive testing frequency, testing of different or new types of rockets and explosives, seasonal and atmospheric variations, time-of-day or night variations, and/or changes in test equipment, and these changes could result in increased noise exposure, which may adversely impact portions of the Mesa Del Sol Property."

Kirtland AFB and Mesa del Sol agreed to hold bi-annual meetings to discuss the status of the development and issues arising from future development. There have been discussions of possibly shifting flight patterns slightly to the east to reduce the impact on future residential development and shifting the run-in to the Isleta drop zone slightly to the south.

Applicable Recommendation(s): 3, 4, 6, 20, 22, 25, 27,

5.2.5. La Semilla

As noted in Section 2.1.1.3, La Semilla (center left of Figure III - 6) is located along the eastern edge of Mesa del Sol, and designed to serve as a buffer to the military and research activities that take place on Kirtland AFB.

Protection of the agreed-to use of the buffer is essential to not encroaching on the Base's existing missions or limiting future DoD or DOE opportunities.

Applicable Recommendation(s): 3, 4, 6, 22, 29

5.2.6. Dark Skies Initiative

The Air Force's military training mission and Starfire program of research and development (R&D) at Kirtland AFB rely on night skies free from light pollution. Fortunately, New Mexico has a combination of qualities that support the Air Force's need for dark skies better than most other states. These qualities include: the high desert elevation and a regional climatology that affords cloudless or near cloudless skies, low population density across most of the State, and low average relative humidity. These characteristics also support other mission activities at Kirtland AFB, such as optical, directed energy and communications technologies that are most effective when not adversely impacted by weather-induced visibility degradation or light pollution.

5.2.6.1 Light Encroachment

Light encroachment in the context of a JLUS normally refers to adverse light or light intensity in the vicinity of a commercial airport or a military airport due to nearby population and/or commercial activities. The impacts from light pollution on general flight safety are marginal. Most experienced pilots agree that overall flight safety is only slightly degraded by nighttime flying conditions. For inexperienced pilots, night operations present a more dangerous flight condition based on degraded contrast and increased difficulty in detecting and tracking other aircraft or observing the airdrome and runway environment.

Light encroachment can be an inconvenience for commercial aviation, but a significant issue for a military installation such as Kirtland AFB which has both military aviation training and R&D missions. Light encroachment exists on much of the north and west sides of Kirtland AFB. The impact of dark skies issues on flying training is addressed in Section 5.3 as part of the discussion about sustaining flying missions.

Applicable Recommendation(s): 3, 4, 6, 18, 20, 22, 28

5.2.6.2 Starfire Optical Range

The Starfire Optical Range ("Starfire") is a division of the Directed Energy Directorate of the Air Force Research Laboratory. It is a national asset with a mission to develop and demonstrate optical control technologies. Research areas include tracking satellites. It houses a 3.5 meter telescope (one of the largest telescopes in the world equipped with adaptive optics), a 1.5 meter telescope, and a 1.0 meter beam director. In addition to its primary research charter, Starfire also supports experiments by others involved in the use of adaptive optics to remove the effects of atmospheric turbulence.

Starfire is near the center of the southern boundary of Kirtland AFB and well over six miles from significant population areas. However, it is still impacted by the loss of the region's traditionally darker night skies. Since hardware devices at Starfire transmit into and receive light from the sky, light pollution can significantly degrade device performance. Because most of the research and development activity involves extremely faint sources, Starfire light detecting equipment is extremely sensitive. Development that increases light emissions in the vicinity of the Starfire Optical Range degrades the effectiveness of this unique facility. Therefore, if light pollution of the range area continues to increase, it will become a major issue for national research and development programs conducted at Starfire.

Applicable Recommendation(s): 3, 4, 6, 18, 20, 22, 28

5.2.6.3 University of New Mexico Observatory

The University of New Mexico (UNM) is considering the desirability and feasibility to relocate its observatory from its present North Campus location to either the southern part of La Semilla, to the fairways on the South Campus golf course or near the southern perimeter of Kirtland AFB. UNM is considering the relocation to reduce the amount of light pollution currently impacting observatory capabilities. Relocated activities would include the regular Friday night public stargazing activity that would increase traffic volume to the area and possible light pollution from vehicle headlights. Kirtland AFB should be engaged in discussion about potential impacts on its missions, as well as possible impacts from its missions on observatory equipment – explosive testing, for example – if UNM decides to pursue a possible relocation.

Applicable Recommendation(s): 3, 4, 6, 18, 20, 22

5.2.6.4 Dark Sky Legislation

The State of New Mexico enacted the Night Sky Protection Act (NMSA) in 1999, for the purpose of regulating "outdoor night lighting fixtures to preserve and enhance the state's dark sky while promoting safety, conserving energy and preserving the environment for astronomy."[3] While this law has had some impact on lessening the light pollution that normally accompanies urban development, it has a fairly limited scope – it prohibited use of mercury vapor lighting systems after 2000, and required shielding of all incandescent lights after January 1, 2000, except in limited cases. However, the Act only requires extinguishing large light sources – such as athletic stadium lighting systems – after 11:00 PM.

The City of Albuquerque proposed a City-wide night sky protection ordinance in 2004. Public hearings held by the Environmental Planning Commission on the proposed legislation prompted much public input and considerable support by members of the public. Kirtland AFB representatives also provided comments and general support for the ordinance. However, City administrative support for the legislation was eventually withdrawn, and no further action on this initiative has been taken.

Applicable Recommendation(s): 3, 6, 22

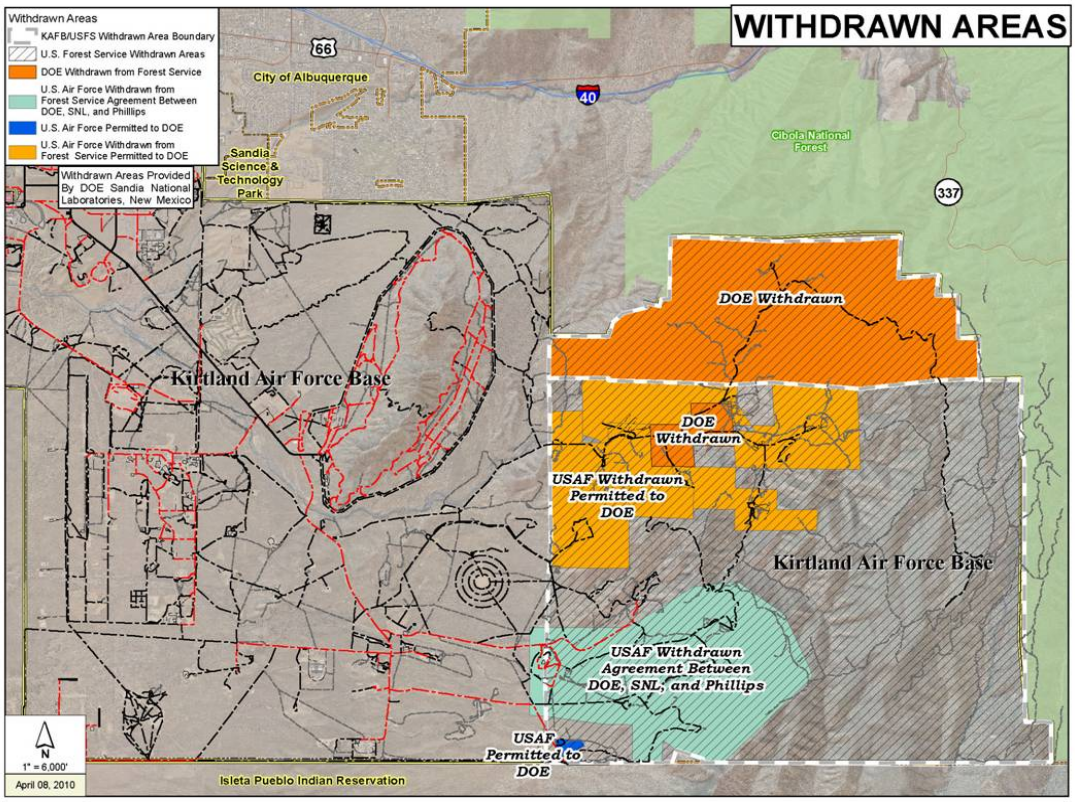
5.2.6.4 Summary

There are no current, significant lighting issues providing an opportunity to act before a problem is possibly created by continued development that could lead to mission encroachment of activities dependent upon dark skies. One example of how light pollution impacts can be prevented or mitigated is Mesa del Sol's lighting design standards that will minimize light pollution to the south of the Sunport and its airdrome complex.

5.2.7. Land Withdrawals for DoD and DOE Use

As noted in Section 2.1.1.5, Kirtland AFB and its associates use approximately 20,000 acres of withdrawn public lands (Figure III – 7 – a larger version is in Appendix X) to satisfy mission requirements. Originally withdrawn from the U.S. Forest Service in 1943, the use has been

Figure III – 7: Withdrawn Areas



[3] 74-12-1 NMSA 1978

extended until 2013, unless DoD determines it is not needed earlier. Currently, there is some disagreement between DoD and the U.S. Forest Service about which agency has primary jurisdiction over the withdrawn lands and the matter is in the hands of the U.S. Justice Department for a decision. In 1969, a Public Land Order was issued that withdrew U.S. Forest Service lands for DOE to perform research and development for the Atomic Energy Commission.

Public use of the withdrawn land is prohibited; however, unauthorized and informal use of the trails in the withdrawn lands occurs regularly. The presence of public uses in an unrestricted area so close to Kirtland AFB has raised safety and security concerns about the existing land uses. In 2002, Kirtland AFB initiated a process to evaluate the feasibility of a continuous perimeter fence through the Otero Canyon area to secure the military installation and protect the public from UXO deposited during artillery munitions tests in the 1940s and 1950s. The public, supported by several prominent elected officials, was strongly opposed to this action because it would greatly impact area recreational opportunities.

In 2007, Kirtland AFB decided to not build the Otero Canyon fence. UXO presence continues as an unresolved public safety issue, and the continued use by the public for recreation without UXO remediation could be problematic. Remediation to a limited level is included in the Base's Military Munitions Response Program (MMRP), but remediating the entire area is estimated to require "potentially in the hundreds of millions of dollars" and removal of the majority of existing vegetation to identify and recover the UXO. The issue of mission requirement, human health and safety and the public's desire for recreational opportunities makes addressing the compatibility of withdrawal lands a difficult, but essential task for the region.

Applicable Recommendation(s): 3, 4, 6, 13, 22

5.3 Sustaining Flying Missions and Long-Term Viability for DoD Aviation Activities.

As noted in the introduction to Section 5.2, the military value of the Base is enhanced by hosting both aviation and non-aviation missions. Section 5.2 focused primarily on Kirtland AFB non-aviation-related missions. This section addresses issues important to the sustainment of its flying missions and the long-term viability of the Sunport to support DoD aviation activities. These include flight safety, use of the airdrome by military aircraft, flying training and land use capability near the airfield and training areas.

5.3.1. Flight Safety and Mission Training

As the local population increases, development needed to support it may become increasingly dense and/or spread into previously rural and undeveloped lands. This phenomenon introduces additional people into areas originally suitable for high speed, low altitude flight operations and testing and training missions. Additional people also bring increased requirements for infrastructure, including outdoor lighting and communication towers, both impacting flight operations

Air Force studies of aircraft accidents have shown the majority occur either on or adjacent to airfields. A similar situation exists underneath airspace designated for low altitude military flight operations, especially where aircraft transition into airfields for approach and departure patterns. Assessing existing conditions in the vicinity of airfields and underneath airspace designated for low altitude military flight operations begins the process of establishing land use designations to protect and promote public health and safety while maintaining the ability to conduct military mission(s).

Incompatible development can threaten public safety if accidents occur in the areas surrounding an installation. Though not the dominant factor, the extent of incompatible adjacent development is considered when determining the future viability of an installation for military aviation missions. The emphasis on incompatible development is increasing as the Air Force begins to consider how to most efficiently base the declining number of aircraft in its inventory. The loss of New Mexico's Air National Guard F-16s is an example of how fewer aircraft will result in fewer flying units and, ultimately, locations with fewer – or less intense – flying missions.

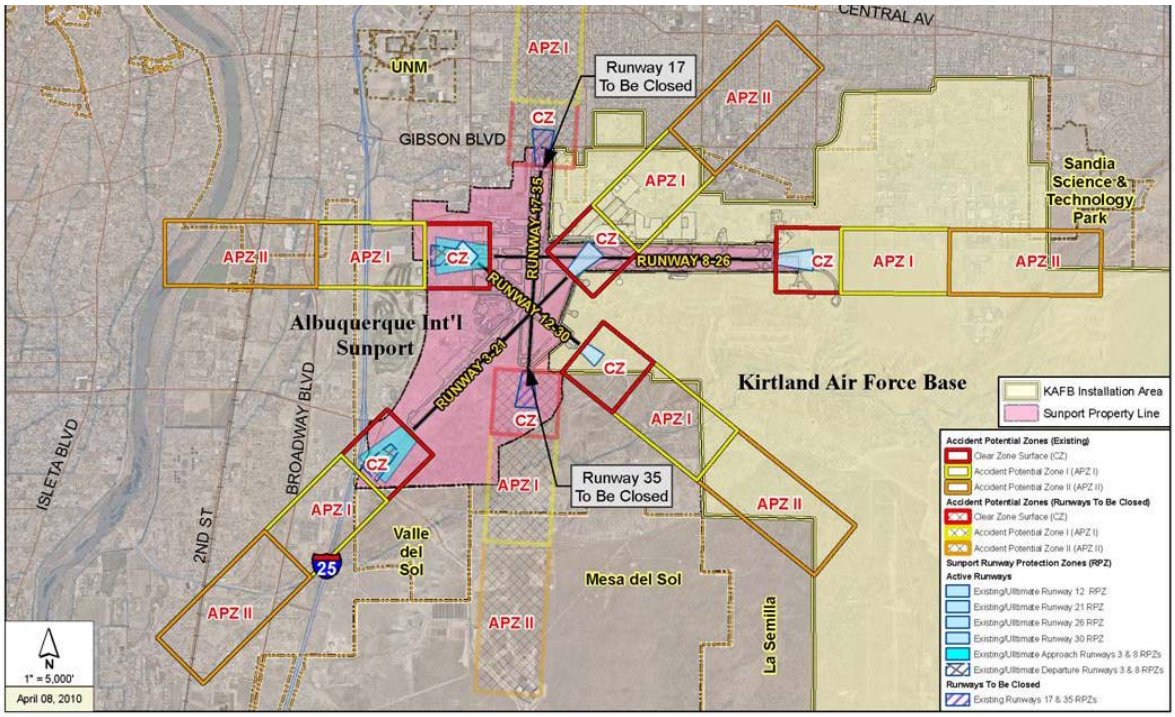
Applicable Recommendation(s): 3, 4, 5, 6, 14, 15, 16, 17, 20, 22, 25, 26, 27

5.3.1.1 Federal Aviation Administration (FAA) Civil Airport Runway Zones

Since the Sunport is owned and operated by the City of Albuquerque, it must comply with FAA safety zone requirements to protect aircraft, people, and vehicles moving across airport runways and taxiways. The safety

zones are determined in coordination with the FAA based on airfield configuration, types of aircraft being flown and number of flights. Because of the higher incidence of aircraft accidents on or adjacent to airfields, areas of high accident potential are established by the FAA at the ends of civilian runways. Civilian runways utilize Runway Protection Zones (RPZs) and Runway Object Free Areas (ROFA). Shown in Figure III – 8 as blue trapezoids, these zones exist at both ends of the runway and function to prevent incompatible land uses. (A larger version of Figure III – 8 is included in Appendix X.) The ROFA is the most restrictive and is a rectangular clearance zone that overlaps the RPZ and prohibits any above-ground objects.

Figure III – 8: Runway Safety Zones



Additional safety zones are described in the following:

- ✓ The Obstacle Free Zone (OFZ) is a defined volume of airspace centered above the runway centerline. This airspace is above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ typically extends 200 feet beyond each end of the runway and is usable for aircraft operations.
- ✓ Inner-approach Obstacle Free Zone is the airspace above a surface centered on the extended runway centerline. It applies to runways with an approach lighting system.
- ✓ Inner-transitional Obstacle Free Zone is the airspace above the surfaces located on the outer edges of the runway Obstacle Free Zone and the Inner-approach Obstacle Free Zone. It applies to precision instrument runways.

Applicable Recommendation(s): 3, 4, 6, 20, 22, 31

5.3.1.2 Military Runway Safety Zones

The Air Force also designates safety zones, but uses larger, Clear Zones (CZs) and Accident Potential Zones (APZs) I and II to identify where the risk of aircraft accidents justifies special land use restrictions. These are shown as squares and rectangles on Figure III – 8.

The zones are located at each end of the runway and are 3,000 feet wide (1,500 feet on either side of runway centerline). The zones begin with the CZ (3,000 feet long), followed by APZ I (5,000 feet long) and APZ II (7,000 feet long) for a total of 15,000 feet from the end of each runway used by military aircraft. Modifications to the zone criteria are considered based on frequency of use, prevailing wind conditions, local accident history, or other unusual existing

conditions. The potential for aircraft accidents drops dramatically from the CZ to APZ I, and then slightly from APZ I to APZ II. However, enough potential exists for aircraft accidents within both APZs that incompatible development in the APZs remains an obvious risk factor. Since accident potential is highest within the CZ, this area is preferably owned by the Air Force, resulting in military control of land use within the CZ, helping to ensure no people-intensive facilities are located within it.

Air Force Handbook 32-7084 guides preparation of the Air Installation Compatible Use Zone (AICUZ) Study and includes land use compatibility guidelines for CZ, APZ, and noise contours. Appendix G includes the relevant pages from this document. In addition, it specifically prohibits the following five land uses within a CZ:

- ✓ A use releasing any substance into the air, such as steam, dust, and smoke.
- ✓ A use producing electrical emissions that interfere with aircraft operations, communications, or navigational aid systems or equipment.
- ✓ A use that produces light emissions directly or indirectly.
- ✓ A use unnecessarily attracting birds or waterfowl.
- ✓ A use involving explosives.

While the percentages of aircraft accidents within the APZs are much lower than within the CZ, some type of land use control is recommended to reduce the density of people living, gathering, or working within an APZ. Compatible land uses within APZ I and II include industrial/ manufacturing, transportation, communication/utilities, wholesale trade, open space, recreation, and agriculture. Residential development is not recommended in APZ I. However, in APZ II, low-density residential (one dwelling/acre) and low intensity personal/business services and commercial/retail trade uses are acceptable. High-density functions such as multi-story buildings, places of assembly, and high-density office uses are not considered appropriate even for APZ II.

Figure III – 8 depicts the locations and the sizes of the CZs and APZs for Sunport runways. Based on military aircraft use and runway characteristics, only the safety zones associated with Runway 08-26 (east-west) and the approach ends to Runways 03 (southwest most zones) and 30 (southeastern most zones) are recommended for use by the Sunport.

- ✓ Clear Zones. With two exceptions, the CZs of the Sunport runways are within the perimeters of either Kirtland AFB or the Sunport. The most significant exception is associated with Runway 17/35; however, there is a current program in progress to deactivate this runway and, when completed, land use will no longer be an issue.

  The CZs associated with portions of Runways 03 and 30 are not fully owned by the Base or Sunport, but these areas are free of residential areas and encompass relatively unpopulated land.

  The Runway 03 CZ includes 11 parcels with five different existing land use designations – Aircraft Transportation, Food/Kindred Products, Motor Vehicle Transportation, Scientific Optical Products and Undeveloped Land and Water Areas.

  The CZ associated with Runway 30 includes seven parcels with three types of land use designations – Governmental, Motor Vehicle Transportation and Undeveloped Land and Water Areas.

- ✓ Accident Potential Zones. A larger issue is that the existence and purpose of recommended APZs are not generally known by residents and businesses in these areas. Of those recommended, the APZs associated with the southwestern end of Runway 03 and western end of Runway 26 extend well beyond the Kirtland AFB and Sunport boundaries.

  Only a small portion of APZ II for the eastern end of Runway 08 extends beyond the perimeter of Kirtland AFB. Runways 03 and 08/26 are heavily used for approach and landing of all types of commercial and military aircraft operating into and out of the Sunport. Runway 08/26 is used almost exclusively for departures.

  Because Runway 03 would rarely be used for departures and Runway 21 would rarely be used for landings, concern is realistically limited to APZs immediately to the west and southwest of the Sunport.

The breakdown of the existing land use designations for Runways 03, 08, 26 and 30 are provided in Appendix H

It is not clear if the people and businesses living and operating in APZs know they are within approach and departure zones for the Sunport.

For airdromes owned or operated by the Air Force, periodic AICUZ Studies are required and the safety zones are mandatory. Airdromes with Air Force operations are encouraged to complete an AICUZ, in collaboration with the Air Force, and adopt use of the safety zones; however, this is not mandatory. To sustain the long-term viability of the Sunport to support DoD aviation activities, protection of land uses within the military safety zones is recommended.

Land use within the zones is generally compatible so the result of adopting use of CZ and APZ for the recommended runways (both ends of Runway 8-26 and approach end of Runway 3 – southwest most zones – and approach end of Runway 30 – southeast most zones) will require protection of future uses rather than mitigation of current ones. If the recommendation for an AICUZ Study or adoption of CZs and APZs are not adopted, it would be prudent to disclose aviation safety issues to land owners in these areas.

Applicable Recommendation(s): 3, 4, 5, 6, 14, 25, 26, 27, 31

5.3.2. Low Altitude Tactical Navigation – Helicopters

Flight operations within helicopter low level training areas and Military Training Routes (MTRs) avoid areas that present potential flight safety hazards – such as tall objects. This method of navigation reduces the potential risk presented by tall objects, but also reduces the overall space available for training and increases the risk factor of mid-air collisions between aircraft. As the number of tall objects increase within the MTRs, already limited training airspace is further reduced. The areas in which tall objects interfere with flight training are "Military Training Routes," "Low Level Training Areas," and the "Height Restrictions Due to Air Traffic."

The portions of the low level MTRs particularly sensitive to the number and height of tall objects are those where flight operations are close to the ground and slow as the aircraft prepares to land or drop people and/or cargo. Total exclusion of tall objects within the entire, low level route is not required to continue safe training operations. Specific zones within the route can accommodate taller or shorter objects.

Applicable Recommendation(s): 3, 6, 7, 8, 10, 15, 16, 21, 22, 33

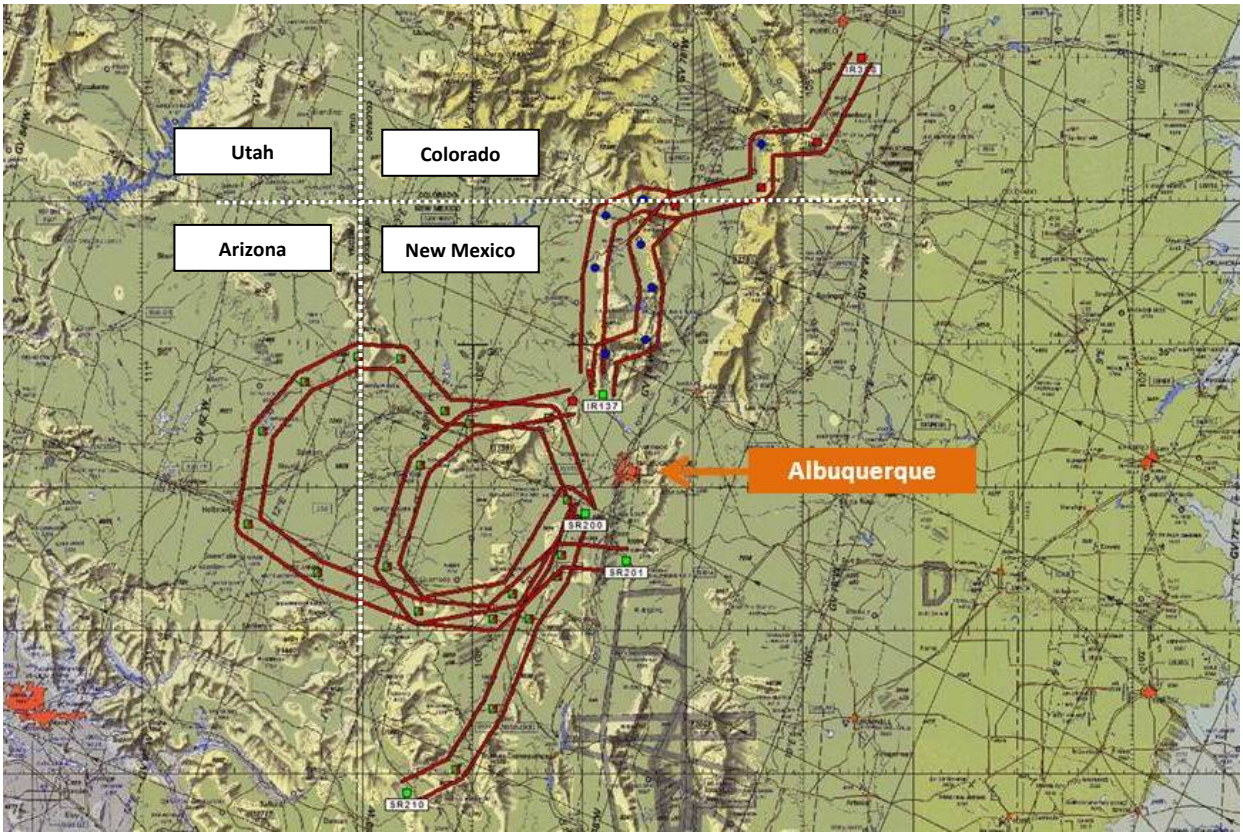
5.3.3 Military Training Routes – MC-130

The Lockheed MC-130 is the basic designation for a family of special mission aircraft operated by the Air Force Special Operations Command (AFSOC), a wing of the Air Force's Air Education and Training Command, and a soon-to-be AFSOC-associated wing of the New Mexico Air National Guard. Based on the design of the MC-130 Hercules transport aircraft, its mission is the infiltration, exfiltration, and resupply of special operations forces; psychological operations support; and the air refueling of (primarily) special operations helicopter and tilt-rotor aircraft.

Figure III – 9 was provided by the 58th SOW and depicts five of the MTRs routinely used in its training programs. The routes are identified by route designations in white labels – i.e., IR 137 just northeast of Albuquerque – and outlined in red to indicate the training corridor. As can be seen, the routes overfly a significant portion of the region, traverse a variety of terrain types and extend over much of New Mexico and into both Arizona and Colorado.

practice these necessary and demanding skills. Unlike some aircraft mission training that requires strict adherence to the "centerline" of the MTR, special operations flights can use the entire corridor. As discussed previously, simulating special operations missions requires special operations crews to train at night and in adverse weather. The combination of training profiles that encourage using the entire MTR, night flying and inclement weather makes

Figure III – 9: Example of Military Training Routes



The MTRs used by the 58th SOW are long, low-altitude corridors serving as a flight path to a particular destination. The corridors are often 10 miles wide, 70 to 100 miles long, and may range from 500 to 1,500 feet above ground level; occasionally, they are higher. MTRs are designed to provide realistic low-altitude training conditions for pilots permitting essential training in strictly defined airspace that is designed to accomplish specific objectives in an environmentally responsible way.

Tactical aircraft often fly hundreds of miles at very low altitude over varying terrain to avoid detection by enemy radar. Navigation is extremely difficult at low-altitude, making it imperative that pilots have ample opportunity to identification of obstacle placement anyplace within the MTR important to safety of flight.

Applicable Recommendation(s): 3, 6, 7, 8, 15, 16, 21, 22, 33

5.3.4 Drop Zones and Landing Zones

One of the primary missions of Air Force special operations forces is to infiltrate special operations teams; supply their operations, if needed; and exfiltrate these forces from contested areas or deep behind enemy lines. The 58th SOW must have access and the right to use a variety of drop zones (DZ) and landing zones (LZ) for its aircrews

to accomplish this required mission training. Drop zones are applicable to fixed wing aircraft, and landing zones are applicable to helicopters and tilt-wing aircraft.

There are three primary DZs and a number of LZs used by the 58th SOW; the majority of these are outside the MRCOG region. The DZ within the region is the Isleta DZ. This DZ was created in 1988, is used daily for cargo drops – no personnel drops or rescue drops are permitted - and is used by various military units. The approach is from west to east only and it traverses the southern boundary of Mesa del Sol. Requirements relating to altitude, speed, and direction must be met and neither multiple orbits nor high altitude deliveries are authorized.

Valencia and Socorro Counties offer additional opportunities in rural areas that provide differing types of terrain to add further value to mission training. In some cases, individual land owners have entered into arrangements directly with the Air Force to allow use of their land for aircrew training. Taking a regional approach to cooperation, as well as planning, could facilitate these kinds of formal and informal opportunities.

Applicable Recommendation(s): 3, 6, 7, 8, 15, 16, 21, 22, 33

5.3.5 Night Vision Goggle Training

Night vision training is dependent upon ambient lighting – very modest illumination attributed to moonlight and starlight during hours of darkness and unpolluted by artificial illumination. Any other type of illumination degrades, to some degree, the quality of night vision training.

Night vision goggles (NVG) are devices worn by users to magnify ambient light and allow operations without artificial light. The advantages of NVG have been exploited by the military for decades and by civilians for about 10 years. As the number of users-turned-instructors has grown and the technology has improved, NVG training has increased in both breadth and depth. Good night vision provides pilots the ability to distinguish objects along MTRs and at landing zones relying on ambient lighting.

Special operations forces make extensive use of NVG and the initial qualification training for Air Force special operations forces is completed by the 58th SOW. This type of initial qualification to operate mission aircraft within confined areas – such as MTRs and during aircraft approach and landing – is amongst the most complex instruction related to NVG use. Even with NVG, obstructions found at low level altitudes – such as wires, transmission lines and other vertical obstacles – can be virtually invisible to see at night or in adverse weather.

Since outdoor lights degrade night vision devices and instrumentation and can interfere with a pilot's vision acuity, they can also cause difficult and unsafe flying conditions when located near airfields. Outdoor lighting near or within the approach and landing zones of Sunport Runway 30 is especially critical to the long-term ability of the 58th SOW to meet its NVG training requirements.

Examples of ground lighting that can interfere with night vision equipment include uncontrolled lighting of residential areas, commercial facilities, recreational venues such as ball fields, golf courses and driving ranges and parking lots. Mobile lights (from sources such as motor vehicles or roaming spotlights) can also cause difficulty with night vision equipment.

Increasingly, military units – particularly aviation units – rely on the ability to train NVG uses. Sustaining the training opportunities at the airfields, DZs, and MTRs currently available to Kirtland AFB is important to sustaining both the existing flying missions and the long-term viability of the Sunport for DoD aviation activities.

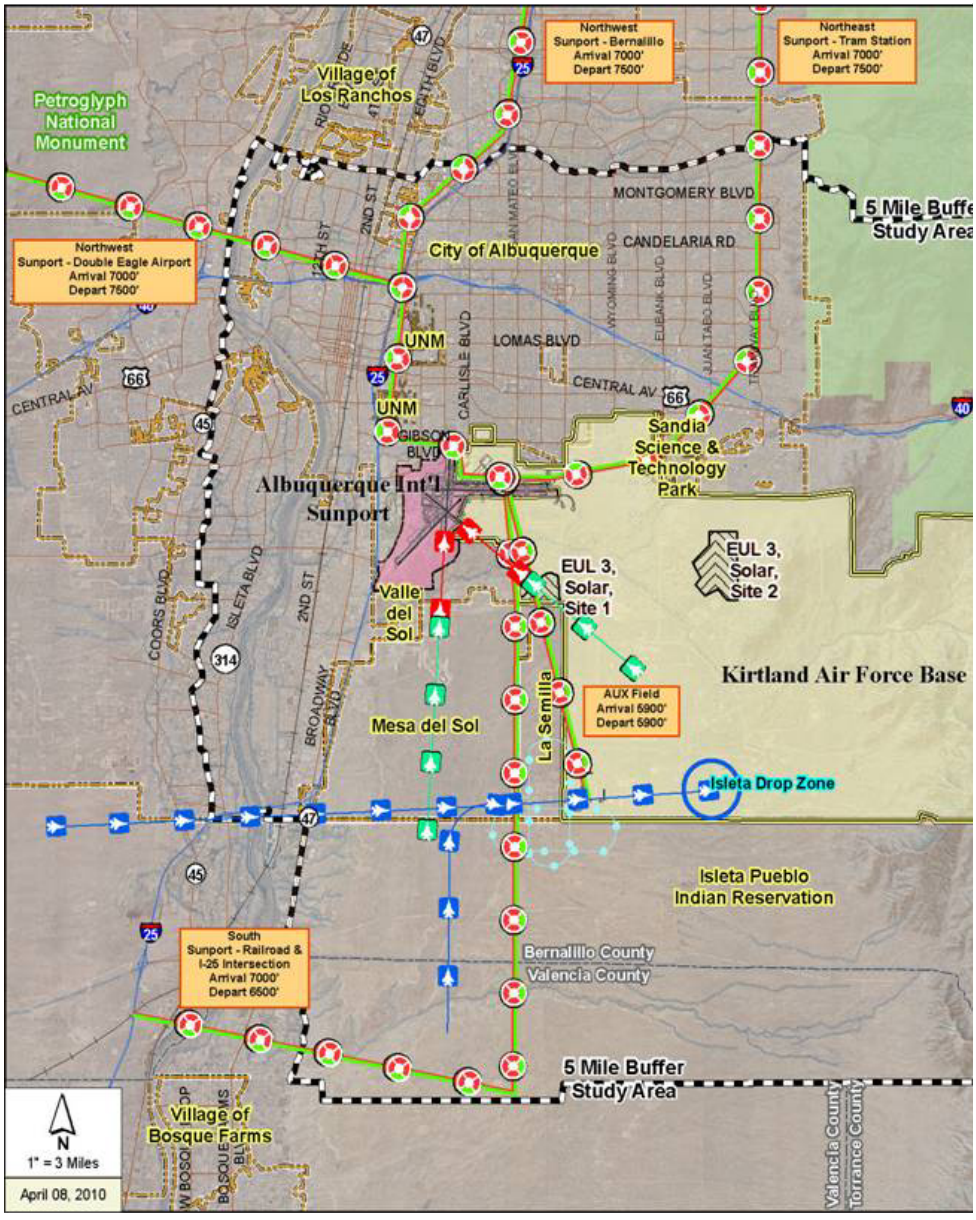
Applicable Recommendation(s): 3, 4, 6, 7, 8, 20, 21, 22, 23, 25, 26, 27, 28

5.3.6 58th SOW Arrival and Departure Routes

The 58th SOW has four arrival/departure routes to/from Kirtland AFB as depicted in Figure III – 10 ( ) and described in the following sections.[4] (A larger version of Figure III – 10 in included in Appendix X.) Regional planners should ensure the flight paths associated with these routes remain unencroached to sustain existing flying missions and the ability to possibly accept others in the future.

- ✓ Northwest
  - Arrival - From Bernalillo, proceed south along I-25 to the intersection of I-25/I-40 ("Big I"). From other areas to the northwest, proceed directly to the "Big I." From the "Big I", continue South to Gibson Boulevard, East to the end of Runway 17, South on Runway 17 to taxiway A and East on Taxiway A to the helipads. Unless otherwise approved by Terminal Radar Approach Control

Figure III – 10: Arrival and Departure Routes



[4] Source: 58th SOW

(TRACON), maintain 7,000 feet MSL until east of I-25, and then expect descent to 6,000 feet MSL or below. If directly overflying Double Eagle II airport, aircrew must maintain 8,000 feet MSL over the airport, and then can descend to 7,000 feet MSL once east of the petroglyphs, unless otherwise directed/approved by TRACON.

- Departure - From the helipads, fly west down Taxiway A (remain well clear of Runway 8/26) to Runway 35, north to Gibson Boulevard, west to I-25, then north along I-25 to the Big I. Aircrews continuing north to the Jemez LATN area should continue to follow I-25 north to Bernalillo. Aircrews continuing to the northwest LATN should turn and fly directly over Double Eagle II airport. Unless otherwise approved by TRACON, climb and maintain 8,000 feet MSL on departure.

✓ Northeast

- Arrival - From abeam the lower tram station south along Tramway Boulevard, maintain 7,000 feet MSL. Then southwest to the Kirtland AFB Eubank gate at the intersection of Gibson and Eubank Boulevards.
- Departure - From the Kirtland AFB Eubank Gate at Gibson and Eubank Boulevards northeast to the intersection of Lomas and Tramway Boulevards at 7,500 feet MSL, then north along Tramway Boulevard to a point abeam the low tram station.

✓ Auxiliary Field

- Arrival - From the Aux Field North along the boundary fence to Tijeras Arroyo, maintain 5,900 feet MSL or below. Higher altitude may be approved by Albuquerque Tower.
- Departure - Unless otherwise stated by the Tower, direct to Aux Field at 5,900 feet MSL.

✓ South

- Arrival - From the intersection of I-25 and the railroad tracks, track east bound to Hell's Canyon Wash then north bound heading 350 degrees to the airport at 6,000 feet MSL.
- Departure - From Kirtland AFB south heading 170 deg. to 1 NM south of Hell's Canyon Wash (10 NM total) then west heading 270 degrees for 6.4 miles at 6,500 feet MSL. Route ends where I-25 and the railroad tracks cross.

Applicable Recommendation(s): 3, 4, 5, 6, 9, 10, 14, 15, 16, 18, 21, 22, 23, 27

5.3.7 New Mexico Air National Guard

The Base's two major flying units – the 58th SOW and New Mexico's Air National Guard, the 150th Fighter Wing (FW) – have always helped sustain the installation within the Air Force and support its growth. The current Air Force program will result in the loss of the 150th FW's F-16s, but retention of the unit designation and merger of its personnel into 58th SOW operations. There are ongoing discussions and negotiations to determine the most effective way to consolidate the units and personnel.

Retaining the identity of these two units is important to help ensure Kirtland AFB continue its viability for aviation activities and allow the region to seek additional missions of all kinds. Completion of an AICUZ Study (Study) could also help conceptualize the types and sizes of aviation missions compatible with Base and Sunport facilities and regional training venues. The Study would then be valuable to regional planners and decision makers to help develop appropriate controls and processes to ensure land use would support desirable aviation activities if the Base is selected for additional or other aviation activities.

Applicable Recommendation(s): 5, 33

5.3.8 Development of Wind Farms

New Mexico is exceptionally well suited to convert wind energy for power generation. Wind farms and energy transmission lines in the 58th SOW training areas could present significant danger to pilot safety and training mission viability. Most of the 58th SOW's training flights are conducted at night, at low altitude and occasionally in bad weather. The aircrews flying these missions depend upon obstacle and terrain avoidance radar to identify and steer clear of all forms of obstacles that could endanger the crews and/or destroy aircraft.

In addition to the height of wind turbines, wind farms pose two distinct dangers to the safety of low flying aircraft – Doppler Shift and energy transmission lines.

5.3.8.1 Doppler Shift

The rotating blades of wind turbines create a technical hazard based on the Doppler Effect. The result is to diminish the accuracy of radar returns using aircraft Doppler radar. This "Doppler Shift" can cause display of inaccurate and unreliable information on aircraft instrument panels. When flying in night, low level, instrumented conditions, aircrews are dependent on radar for safe aircraft operations and the error tolerances are very narrow. Doppler Shift incidents could prove fatal to aircrews and/or result in destruction of specialized aircraft.

5.3.8.2 Energy Transmission Lines

The second and more dangerous safety issue associated with wind farms and other new energy projects is the danger posed by electrical transmission lines. These lines represent physical hazards to low flying aircraft that are difficult to detect, especially at night – when the majority of 58th SOW training takes place.

Grids of electrical transmission lines, built over decades, are spread across wide swaths of the United States. Until recently, wires transferring power to-and-from high voltage lines were generally near highways and rail lines, and usually no higher than 75 feet. The relatively recent expansion of renewable energy projects has introduced new concerns for the aviation community based on these smaller transmission lines. At one end of the project spectrum could be a rancher or farmer in a remote location erecting a small number of wind turbines to provide electrical power to his property and then constructing a transmission line across open land to sell excess power into the region's power grid. These lines will most likely not be annotated on aviation charts.

At the other end of the project spectrum are high voltage transmission lines and large energy projects. The lines are normally suspended from towers, typically 200 feet or more in height, and generally follow as straight a line from the source to the power grid connection as possible based on both economic and efficiency considerations. Large wind farm projects – perhaps consisting of 4,000 or more turbines – are built to sell generated power to markets in neighboring jurisdictions or states via a transmission line. These lines are beginning to crisscross open land in non-traditional ways. Eventually, new high voltage lines will be depicted on aeronautical charts and maps providing aircrews information needed for flight safety. At present, two large wind farm projects are in the planning phase in Torrance County. If approved, these projects will also require transmission lines to convey generated energy to the electrical grid.

In both the foregoing cases, electrical transmission lines can proliferate at a rate that seriously challenge State and county regulatory agencies and aviation safety, especially in areas used for low altitude military operations and training.

5.3.8.3 Significance to DoD Aviation Activities

The potential danger to 58th SOW aircraft and aircrews – and other low flying military missions – requires the process of locating and developing wind farms and transmission lines to protect flying training areas and those areas adjacent to approved helicopter and fixed-wing low level training routes.

Helicopter LATN areas exist in the MRCOG region – both inside and outside the perimeter of Kirtland AFB. The 58th SOW helicopters fly at very low altitudes in LATNs; typically between 50 and 300 feet above ground level. While there are no current plans to site wind turbines in these areas, they would present serious safety of flight concerns should they be built in the future.

MTRs for MC-130 and HC-130 aircraft also exist throughout the MRCOG region, across New Mexico and into Colorado. These MTRs are FAA approved routes and published in aviation route publications. As noted, development of wind farms – small or large – could constitute serious safety of flight concerns for fixed-wing aircraft based at Kirtland AFB.

Within the JLUS study area, land agency and regulatory agencies with approval authority over the placement of wind farms and transmission lines may not be fully aware of the seriousness of this issue. Only three of New Mexico's 33 counties have attempted to establish ordinances for locating wind farms. Both San Miguel and Union Counties have ordinances, and Lincoln County is presently going through the ordinance review process. The four counties comprising the MRCOG region plus Socorro County have not adopted similar ordinances. This issue is currently being considered at the federal level and by the State of New Mexico. Part IV includes several recommendations focused on the need for integration of

planning across the region, including formal consultation with Kirtland AFB.

Applicable Recommendation(s): 3, 6, 9, 11, 18, 21, 22, 23, 27

5.3.9 Air Quality

As discussed in Sections 4.0 and 5.1.4, the region's air quality has a direct impact on its attractiveness and viability for new military aviation missions. This is particularly true of aviation missions based on their significant addition to mobile sources of pollutants. Since the Air Force strives to not adversely impact its supporting communities' quality of life, basing decisions heavily consider the impacts of potential actions. The Air Force has testified to the Congress multiple times that the Service actively resists efforts to increase existing mission activities or site new missions in non-attainment areas or areas that could be pushed into non-attainment by additional missions. Therefore, regional planning must not only address the implications for existing Kirtland AFB and Sunport operations, it must also consider the potential impacts on future opportunities from the environmental consequences of actions – taken or deferred.

Applicable Recommendations: 3, 6, 7, 8, 9, 21, 22, 23, 24

5.4 Enabling Community Development

One of the primary purposes of the JLUS Program is to identify ways to balance sustainment of military missions and community development. The preceding sections focused on the importance of collaborative planning to achieve the desired balance and sustainment of both non-aviation-related and flying missions, along with the viability of the Sunport to support future DoD aviation activities. This section focuses on mission critical Base activities that can enable compatible development. Some sections provide examples of how this is being achieved, others highlight opportunities and a few identify issues that will help enable future development once they have been resolved.

5.4.1. Noise and Human Health

Noise is a natural by-product of military operations, testing and training, and the noise produced by these activities can affect both the health and quality of life of those exposed to it. As development occurs near military installations and population densities increase, noise effects may be experienced by more people. In the MRCOG region noises result from a wide range of sources that include aircraft takeoff, landing and overflight; weapons practice; and research, development and testing activities. Protection of human health and sustainment of mission capability are issues for land use planning; application of noise attenuation devices in existing and new structures; building code discipline; disclosures; and education to ensure citizens understand possible noise impacts.

5.4.1.1 Physical Characteristics and Measurement

Sound (used interchangeably with "noise" in this section) is a quickly varying pressure wave travelling through a medium. When sound travels through air, the atmospheric pressure varies periodically. The number of pressure variations per second is called the frequency of sound, and is measured in Hertz (Hz) which is defined as cycles per second. The higher the frequency, the more high-pitched a sound is perceived.

Another property of sound or noise is its loudness. A loud noise usually has a larger pressure variation and a weak one has smaller pressure variation. Pressure and pressure variations are expressed in Pascal (Pa) and defined as N/m^2 (Newton per square meter).

The human ear can perceive a very wide range of sound pressure. The softest sound a normal human ear can detect has a pressure variation of 20 micro Pascals (μPa) which is 20×10^{-6} Pa ("20 millionth of a Pascal") and is called the Threshold of Hearing. At the other end of the pressure continuum, the sound pressure close to some very noisy events – such as launching of the space shuttle or at some concerts – can produce a large pressure variation at a short distance of approximately 2,000 Pa or 2×10^9 μPa.

5.4.1.2 Most Common Measure

Sound levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise measurement recommended by the United States Environmental Protection Agency (EPA). The intensity of sound is measured in decibel units. For sound measurements related to human auditory limits, the decibel scale is modified into an "A-weighted" frequency scale and described as "decibels average" (dBA). A-weighting is necessary to compare the range of noise humans can hear, since the human ear is unable to hear the entire range of sounds possible and is less sensitive to low frequencies than to high frequencies. A DNL of 65 dBA is most commonly used for noise planning purposes since it falls within the sound range associated with a conversation. Areas exposed to DNL above 65 dBA are generally not considered suitable for residential use. A DNL of 55 dBA is identified by the EPA as a level below which there are effectively no adverse impacts.

Figure III – 11 is a National Institute on Deafness and Other Communication Disorders table displaying representative sounds, their approximate dBA range, and implications for human hearing.

Figure III – 11: Representative Sound Levels and Effect on Human Hearing

Sound	Noise Level (dB)	Effect
Boom Cars	145	
Jet Engines (near)	140	
Shotgun Firing	130	
Rock Concerts (varies)	110–140	Threshold of pain begins around 125 dB
Oxygen Torch	121	
Discotheque/Boom Box	120	Threshold of sensation begins around 120 dB
Stereos (over 100 watts)	110–125	
Symphony Orchestra	110	Regular exposure to sound over 100 dB of more than
Snowmobile	105	
Jet Flyover (1000 ft.)	103	
Electric Furnace Area	100	No more than 15 minutes of unprotected exposure
Farm Tractor	98	
Newspaper Press	97	
Subway, Motorcycle (25 ft.)	88	Very annoying
Lawnmower, Food Blender	85–90	85 dB is the level at which hearing damage (8 hrs.)
Diesel Truck (40 mph, 50 ft.)	84	
Average City Traffic	80	Annoying; interferes with conversation; constant
Washing Machine	78	
Dishwasher	75	
Vacuum Cleaner, Hair Dryer	70	Intrusive; interferes with telephone conversation
Normal Conversation	50–65	
Quiet Office	50–60	Comfortable hearing levels are under 60 dB.
Refrigerator Humming	40	
Whisper	30	Very quiet
Broadcasting Studio	30	
Rustling Leaves	20	Just audible
Normal Breathing	10	

5.4.1.3 Aircraft Noise and Noise Contours

As shown in Figure III – 11, aircraft operations can generate significant noise. Whether the noise is created during operation or maintenance activities, take-offs or landings, aircraft produce noise and, because of engine characteristics and performance profiles, military aircraft produce more noise than commercial aircraft. Therefore, both Kirtland AFB and the Sunport contribute to the creation of significant aircraft noise.

Kirtland AFB is home to the 58th SOW providing formal aircraft type/model/series training to AFSOC forces and Air Combat Command (ACC) Combat Search and Rescue personnel. The 58th SOW operates the MC-130H Combat Talon II and MC-130P Combat Shadow, HC-130 Hercules, UH-1N Huey, HH-60G Pave Hawk and CV-22 Osprey aircraft. Additionally, the 150th FW of the New Mexico Air National Guard currently operates the F-16 *Fighting Falcon*.

The Sunport supports daily flights in a wide array of commercial aircraft that also contribute to the overall noise environment of the airdrome. Both the FAA and the Air Force characterize the noise environment of airdromes using a "noise footprint" created by scientifically modeling the noise aircraft produce at a specific location based on the numbers and types of aircraft operating, altitudes and ground paths flown, times of flight, surrounding topography, etc. The result is a noise footprint comprised of a series of noise contours with the loudest activity at the center and lesser impacts at the periphery.

Figure III - 12 illustrates the existing aircraft noise footprint for the Sunport. The FAA and Air Force provide guidance on the kinds of development that is compatible within each noise contour. Both consider residential land use within the 75 dB and greater noise contours to be incompatible. The FAA considers residential uses within the 65-75 dB range as incompatible. The Air Force discourages residential development, but recognizes communities may consider residential use as necessary. In such cases, the Air Force guidance strongly urges Noise Level Reduction (NRL) requirements be included in building codes as a part of development agreements. Table III - 1 displays the FAA Land Use Noise Guidance for major land uses. Air Force guidance is at Appendix G.

Table III – 1: FAA Land Use Noise Matrix		55-65 DNL	65-75 DNL	75+ DNL
Residential	1-2 Family			
	Multi-Family			
	Mobile Homes			
	Dormitories, Etc.			
Institutional	Churches			
	Schools			
	Hospitals			
	Nursing Homes			
	Libraries			
Recreational	Sports/Play			
	Arts/Instructional			
	Camping			
Commercial	All Uses			
Industrial	All Uses			
Agriculture	All Uses			
	Per FAA Part 150	Compatible		
		Incompatible		

Figure III – 13 are the Figure III – 12 noise contours placed over a map of existing land uses. Figure III – 14 is the Existing Land Use Legend for use with Figure III – 13 and Figure III – 3 (p. III – 5). As can be seen, land uses associated with the current noise map are compatible. Undeveloped land is available and development for compatible uses can help the community achieve its growth vision without adversely impacting Kirtland AFB existing missions or the viability of the Sunport to support future DoD aviation activities.

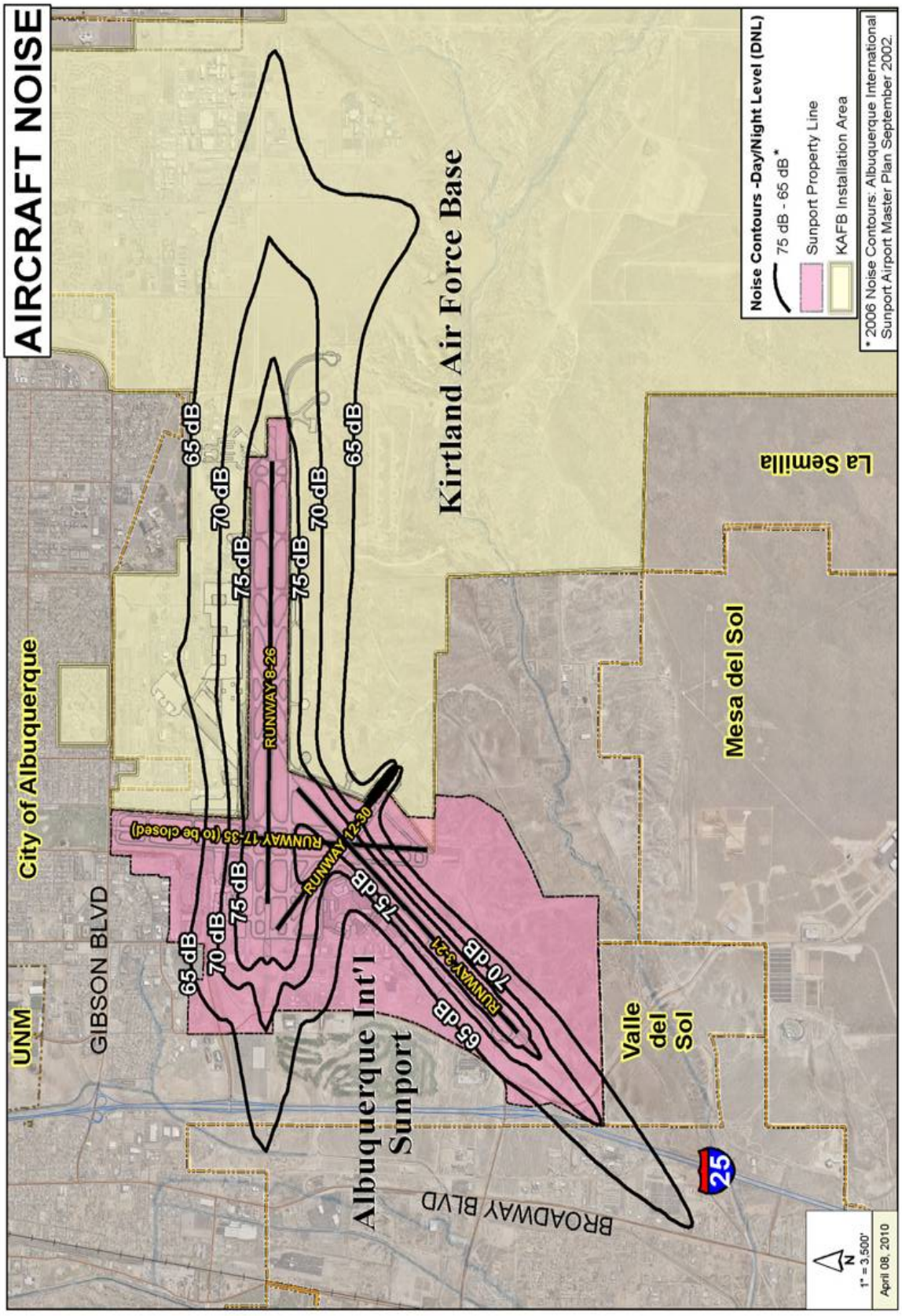


Figure III – 12: Noise Footprint

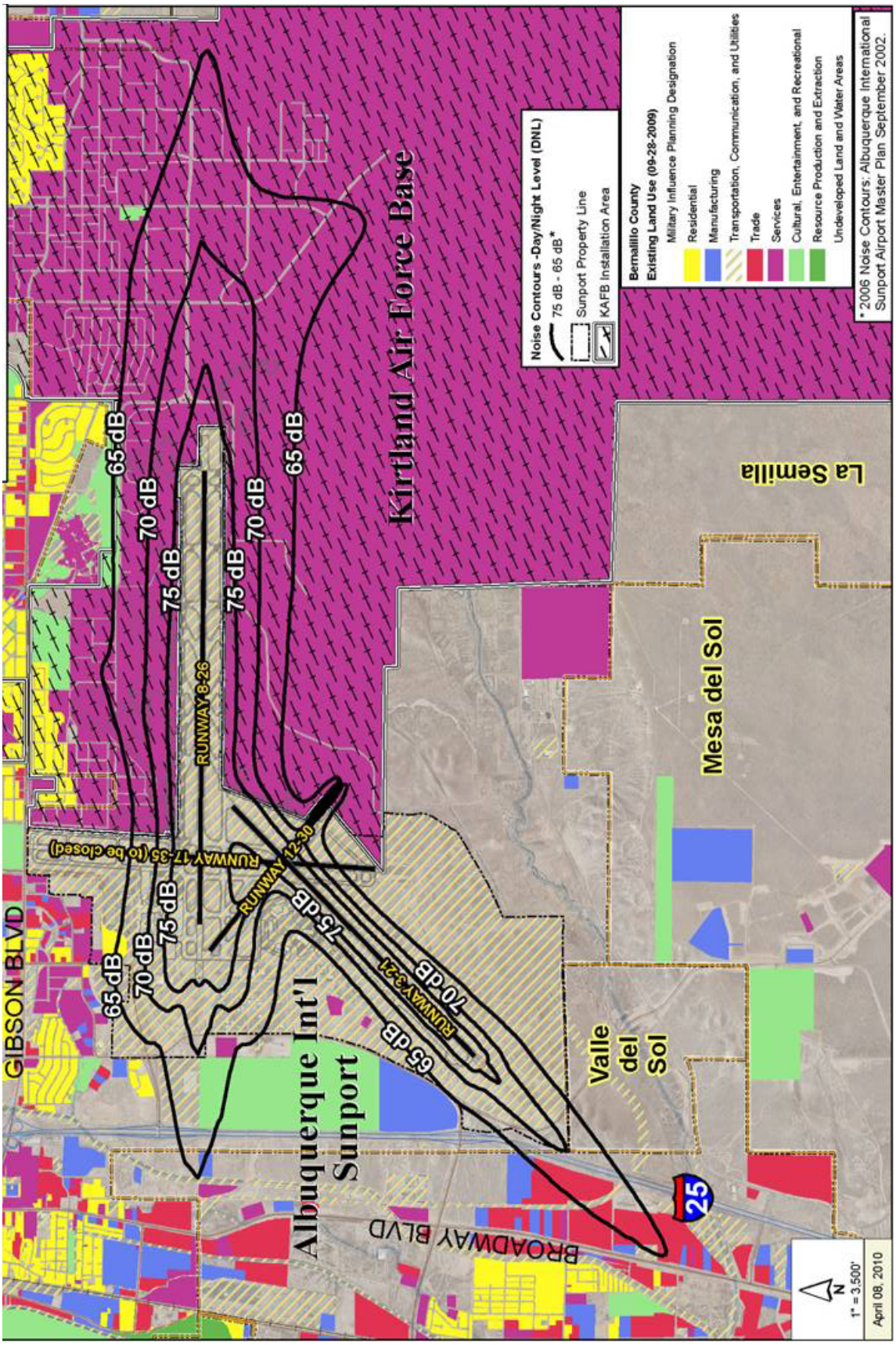


Figure III – 13: Noise Footprint and Existing Land Use

Figure III – 14: Existing Land Use Legend

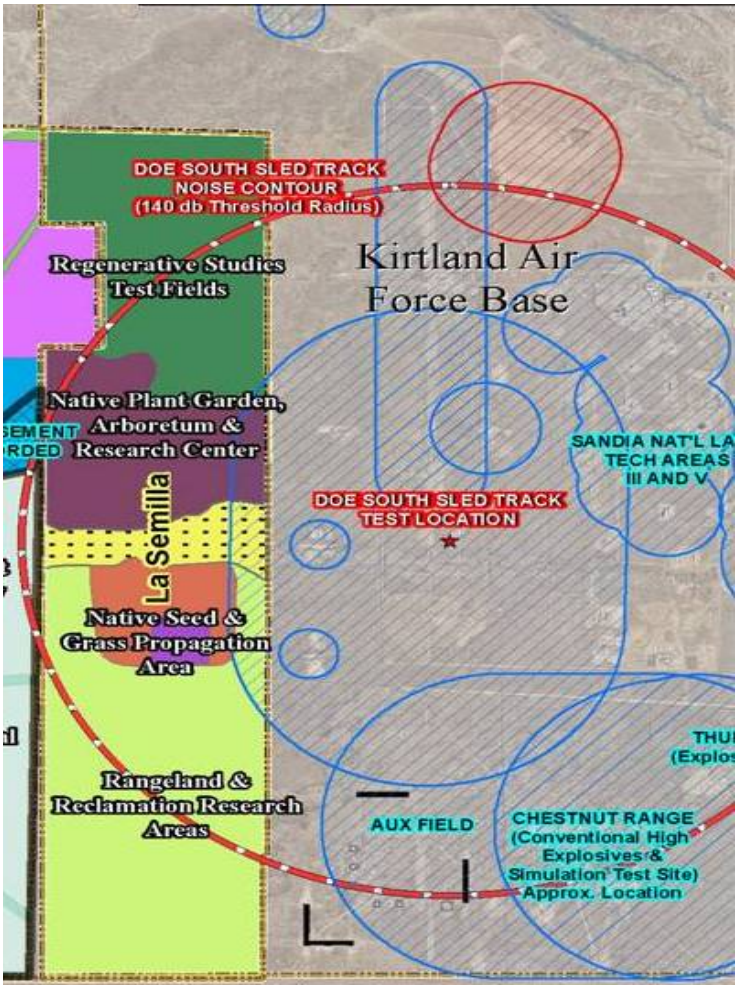
5.4.2. Munitions Firing and Explosive Safety

According to the *Air Force System Safety Handbook, July 2000*, the Air Force explosives safety program is designed to provide criteria and actions to prevent mishaps or to mitigate the damage (loss control) when mishaps do occur.

An essential element of the Air Force explosive safety program is to limit public exposure to explosives and training missions. In part, this is done by identifying specific areas where explosive operations are conducted – either intermittently or as ongoing activities. "Operations Intermittent Exposure" areas designate locations where mission or training exercises occur only periodically. "Storage Constant Exposure" areas are locations where there is a continual presence of explosives. "Test Constant/Intermittent Exposure" areas are used to regularly carry out missions and training exercises. All such areas are within the boundaries of Kirtland AFB with three exceptions. The first are "Operations Intermittent Exposure" areas (not depicted) used for explosives related to aircraft training, loading or unloading. These are located on the airdrome and exclusion areas are activated, as needed. The others are shown in Figure III – 15. One is depicted with blue hatching to show an area of "Test Constant/Intermittent Exposure" that extends past the Base border into La Semilla. The second is shown as a red-dotted line representing the noise radii of the DOE South Sled Track extending across La Semilla. As discussed in foregoing sections, La Semilla was created to provide a buffer between Base missions and the Mesa del Sol development.

Applicable Recommendations: 6, 10, 20, 22, 23

Figure III – 15: Explosive Noise Radii



5.4.3 Impulse Noise, Chestnut Explosives Range and Simulation Test Site and Small Arms Ranges

5.4.3.1 Impulse Noise

Impulse noise is a short burst of acoustic energy consisting of either a single impulse or a series of impulses. The pressure-time history of a single impulse includes a rapid rise to a peak pressure, followed by a somewhat slower decay of the pressure envelope and return to the beginning pressure, both occurring within 1 second. When the intervals between impulses are less than 500 milliseconds, the noise is considered continuous, with the exception of successive bursts of automatic weapons fire that is considered impulse noise. Simply stated, impulse noise is characterized by high-intensity noise over a short duration. Some areas surrounding Kirtland AFB are subject to increased levels of impulse (explosive) noise resulting from explosive testing at the Chestnut Range Explosives and Simulation Test Site and lower levels of explosive noise from small arms ranges.

5.4.3.2 Chestnut Explosives Range and Simulation Test Site

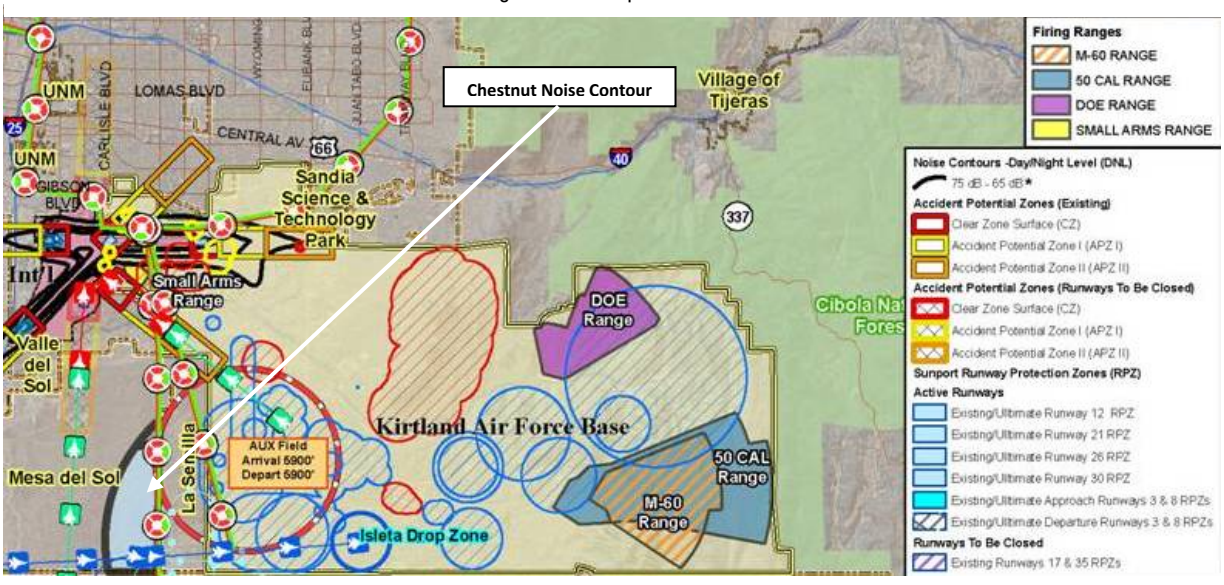
Explosive testing at the Chestnut Range Explosives Range and Simulation Test Site (Chestnut Site) can produce noise impacts for areas around the site, both on-and-off the Base. During planning for the Mesa del Sol development, an analysis was completed to characterize the extent and level of possible impacts on Mesa del Sol from Chestnut Site activities. The result was the Chestnut Noise Contour depicted in Figure III – 16. (A larger version is included in Appendix X.) This contour extends west from the Mesa del Sol and La Semilla boundary and is commonly referred to as the Chestnut Easement based on special development planning for property within the contour and agreement, by the developer, to require a noise easement from affected property owners. According to the Defense Threat Reduction Agency, it limits tests that will produce more than 100 Pa (Pascal) at the boundary between Mesa del Sol and La Semilla based on the Federal Office of Surface Mine Reclamation and Enforcement's determination that overpressures below this level are absolutely safe for avoiding damage to structures. Since 2007, DTRA reports no tests have been completed that exceeded this level at the Mesa del Sol boundary. Based on land use analysis, there is one Village Center, two residential neighborhoods, and an active adult community planned within the Chestnut Noise Contour. While it appears this development will not experience structural damage, there may be noise impacts from the explosive testing at the Chestnut Site.

The northeastern portion of Pueblo of Isleta also lies within the Chestnut Site's noise footprint, although the extent of exposure has not been characterized. Pueblo land within the noise contour is subject to loud intermittent noises as well as high pressure related to the explosions. The Pueblo government has voluntarily restricted development in this area as long as the current Chestnut Site mission is active.

Applicable Recommendations: 6, 10, 20, 22, 23

5.4.3.3 Small Arms Ranges

Figure III – 16: Explosive Noise



Small arms are weapons carried by military personnel, such as revolvers, pistols, submachine guns, carbines, assault rifles, rifles, sniper rifles, squad automatic weapons, light machine guns, and sometimes hand grenades. Shotguns, general purpose machine guns, medium machine guns, and grenade launchers may be considered small arms or as support weapons, depending on the particular armed force. The Base has several ranges for use by small arms. As seen on Figure III – 16, these ranges are in the eastern area of the installation and their impacts are contained within the Base perimeter.

Applicable Recommendations: 6, 10, 20, 22

5.4.4 Unexploded Ordnance on Perimeter of Kirtland AFB

Unexploded Ordnance (UXO) includes ordnance fired, projected, dropped, or placed in such a way that it could be unintentionally exploded and are hazards, regardless of where found. Whether in an area by design or accident, these items have not yet functioned and pose the risk of injury or death to personnel who come across them. Most UXO are found in designated impact areas, are marked on appropriate maps and identified with warning signs and fences. Being able to recognize UXO is the first and most important step in dealing with a UXO hazard. The presence of UXO adjacent to Kirtland AFB represents a significant health and human safety issue that impacts land uses. The Base recognizes the danger and uses its MMRP to address remediation needs.

One perimeter area with UXO that has presented an ongoing management problem is Otero Canyon. As discussed earlier, Otero Canyon, is part of the Military Withdrawal, and a popular outdoor hiking, bicycling and equestrian use area just outside the City of Tijeras with an extensive trail system throughout the Canyon. Public use of this area so close to Kirtland AFB has raised safety and security concerns about existing land uses. In 2002, Kirtland AFB initiated a process to evaluate the feasibility of construction of a continuous perimeter fence through the Otero Canyon area to secure the military installation and protect the public from UXO deposited during artillery munitions tests in the 1940s and 1950s. Members of the public are strongly opposed to this action because it would reduce recreation opportunities in the area. This pressure, augmented by several Federal, State and local officials, resulted in the 2007 decision by Kirtland AFB to not build the Otero Canyon fence.

The presence of UXO continues as an unresolved public safety issue. Access through this area by emergency responders has added another dimension to the issue. Construction of a fire break outside the fence line for use by emergency responders may address a portion of the issue. Public information campaigns about the risks of trespassing onto DoD/DOE lands certainly help, and facilitated discussion between public advocacy groups, possibly by DoD, DOE, and USFS, may address another element. However, the continued use of the area by the public for recreation without UXO remediation could be problematic. DoD indicated that to remediate the entire testing area would require "potentially in the hundreds of millions of dollars" and would require the removal of the majority of existing vegetation to identify and recover the UXO.

Applicable Recommendations: 3, 4, 6, 13

5.4.5. Gibson Boulevard Corridor and Gate Area Development Potential

Gibson Boulevard is the major thoroughfare north of the Sunport and most of Kirtland AFB and has significant development. There is potential for additional development and redevelopment and a requirement to consult with the Base and Sunport on structure heights over 26 feet.

The major issues identified in the JLUS Public Survey concerning the Gibson Corridor are airport and military activity noise, congestion and urban blight. In regard to blight, the feeling is that vacant storefronts and rundown housing in this area create perceptions of a lack of security and high crime rates. This sentiment was also generally expressed about the whole Southeast Heights area that borders Kirtland AFB. Congestion concerns refer to peak travel hours and were also identified in stakeholder interviews and the public participation survey.

Portions of the Gibson Boulevard Corridor are undergoing redevelopment. These new communities may be desirable for Kirtland AFB personnel and employees of associate units.

State Senator Tim Keller and City Councilor Rey Garduño suggested the possibility of using Kirtland AFB vacant land near the NM Veterans Memorial and the Gibson Gate, as park and recreation land. Kirtland AFB leaders have been approached about deeding the land back to the City. However, changing this property into a park land use may

create access issues, land compatibility concerns, and security implications for Kirtland AFB.

There are varying degrees of opportunity for development near Kirtland AFB's access gates that could benefit both the Base and the region.

- ✓ Eubank Gate. The area near the Eubank Gate has experienced substantial development of employment-related land uses in recent years due in large part to the creation of the SSTP just east of Eubank Boulevard across from the Kirtland AFB access gate. There are still a few vacant parcels of land within the SSTP, as well as vacant, commercially zoned land along the west side of Eubank Boulevard just north of the gate adjacent to the property line of the Base. Additional research and development activities and associated offices will probably be built on most of these sites in the future.
- ✓ Wyoming Gate. There is presently no vacant land near the Wyoming Gate, but existing land uses could be viewed as temporary. Current land uses are mainly low intensity and easily movable, such as mobile home parks and businesses, and do not have improvements that represent significant investment value. If Kirtland AFB and its associates evolve in a way that create new demand for near-base housing and ancillary uses, many properties near the Wyoming Gate could be redeveloped with higher and more permanent uses.
- ✓ Louisiana/Gibson Gate. The gate is recessed several hundred feet to the east of the intersection. At one time, right-of-way (ROW) was acquired by the City of Albuquerque to improve circulation and flow. This proposed project and the ROW acquired to support it has been abandoned. However, the abandoned ROW is 150 feet wide and several hundred feet long, representing opportunities for vacant land adjacent to the gate to be used for "park and shuttle" lots next to Gibson Gate and for park, open space and/or recreational uses further north near the Cesar Chavez Community Center.
- ✓ Properties along Gibson Boulevard between the Louisiana Boulevard and San Pedro intersection are a mix of failed and marginally successful commercial, restaurant and multi-unit residential uses. Several properties are vacant and some are underutilized; others are approaching a blighted condition that could create future demand for their redevelopment, depending on Kirtland AFB activity and redevelopment assistance by the City of Albuquerque.
- ✓ The vacant land between Ridgecrest Drive and Bullhead Park to the east of San Pedro Boulevard, across from and owned by the Veterans Administration, will likely be developed in time with additional Veterans Administration related uses even though it is not adjacent to a Kirtland AFB access gate.
- ✓ Truman Gate. There are no large vacant tracts near the gate, but the first block or two north of Gibson Boulevard between San Mateo and San Pedro Boulevards have several smaller, vacant parcels as well as unoccupied office buildings. Several of these buildings were used by Lovelace Hospital as "annexes" before the hospital ceased much of its operation in 2006 - 2007. Business uses that remain in this area are low intensity and generally do not have structures with significant investment value. Current zoning supports commercial and multi-unit residential land uses in the area, and redevelopment pressures could emerge when new employment activities occupy vacated buildings.
- ✓ Carlisle Gate. Existing development near the Carlisle Gate, like that near several Kirtland AFB access gates, is not intensive or high end. Much of the land along Carlisle may have higher value than the improvements on it, creating redevelopment potential as demand evolves.

When the north-south runway abutting the Gibson Boulevard south ROW is closed, the lack of commercial aircraft activity could fuel speculation about development potential associated with the Puerto del Sol Golf Course just north of Gibson Boulevard. Though prospectively appealing for commercial development, surrounding neighborhoods and user constituencies (e.g. golfers, joggers), as well as the City of Albuquerque, would be unlikely to support such speculation.

Applicable Recommendations: 3, 4, 6, 15, 17, 18, 19, 20, 21, 22, 24,

5.4.6. Lovelace Respiratory Research Institute and Land Transfers

The Lovelace Respiratory Research Institute (LRRI), established in 1947, is a private biomedical research organization dedicated to improving public health through research on the prevention, treatment, and cure of respiratory disease. Equipped with a broad range of technical expertise and a wealth of research capabilities, LRRI studies respiratory health issues of concern to scientists and health care experts in universities, government, industry, and patient advocacy groups. The Institute's focus is on curing respiratory diseases through research aimed at understanding their causes and biological mechanisms; assessing and eliminating exposures to respiratory health hazards; and developing improved therapeutics, vaccines, and diagnostics. The Institute readily opens its unique research facilities to university, government, and private sector collaborators.

LRRI is a not-for-profit corporation employing approximately 100 PhD level scientists and 540 technicians and support staff. LRRI has approximately 500,000 SF of facilities located in the southeast part of Kirtland AFB and off-Base along the Gibson Boulevard corridor. The on-Base LRRI facility originally focused on large, multi-year federal projects researching the affects of inhaled radioactive particles and studies of therapy for blast and shock injury to the lung. The decision to locate these activities on-Base was driven by project security requirements.

In the late 1980s, the DOE-funded radiation programs at the facility were largely completed, and the facility faced possible closure. At that time LRRI encompassed a unique combination of facilities and staff that could satisfy a wide-range of Federal and non-Federal research needs, but Federal ownership of the facility severely limited access to other sponsors. In 1996, the government-owned facility was privatized, granting Lovelace a long-term lease for its use for other Federal and non-Federal research. Today, the LRRI facility is the nation's largest independent, not-for-profit organization conducting basic and applied research on the causes and treatments of respiratory illness and disease.

LRRI is located on land that was withdrawn from the Bureau of Land Management for Kirtland AFB and subsequently transferred to DOE. Because the facility is now operating as an independent organization on DOE withdrawn land creates an on-going liability to DOE. As a result, DOE is in the process of transferring ownership of the land and buildings to LRRI. This is a lengthy process that will take several years. In addition to the land withdrawal process, transfer of ownership requires specific deed restrictions specifying that the facility will operate in the future as it does today and that the land will continue to be used in the same manner that it is today.

The LRRI facility conducts research requiring graded levels of security; so the location on Kirtland AFB is beneficial to their operations. The organization's research related to chemical, biological, and radiation exposure on animals presents minimal risk to the surrounding area. Hazardous material quantities are small and most of them exist in New Mexico. To date, the LRRI facility is a good example of cooperation and planning between a private organization, DOE and Kirtland AFB, and is also an example of the need for thoughtful, cooperative planning to ensure that the safety and security of the Base is not compromised. The organization's operations, compatible with installation missions and security considerations, are an excellent example of functions requiring security similar to military activities that offer opportunities not available through traditional economic development strategies.

Applicable Recommendations: 3

5.4.7 Fuel Leak Plume Remediation

During the course of the JLUS analysis, a fuel leak from storage tanks that occurred over many years on and north of Kirtland AFB emerged as a discussion point. While not currently a germane land use issue, the plume "could potentially" develop into one in the future.

The public's concern is that a mixture of aviation gas and jet fuels has reached an area above and on the aquifer providing potable water to much of Albuquerque and Bernalillo County. This fuel spill was initially self-reported by the Air Force, and Base leaders are proactive in providing information regarding the extent of the leak; fuel spill and plume characterization; ongoing extraction and remediation efforts; plans for remediation methods and timing; actions to repair the source and effort to preclude similar events in the future.

Significant remediation work has been accomplished, but there are differing opinions between Air Force, State and

local officials about the most appropriate steps and funding for quick remediation. In May 2010, an announcement was made that following a comprehensive assessment of the plume the Air Force would accelerate the cleanup of the contaminated soil and groundwater. Members of the New Mexico Congressional Delegation committed to ensuring adequate funding for an accelerated schedule.

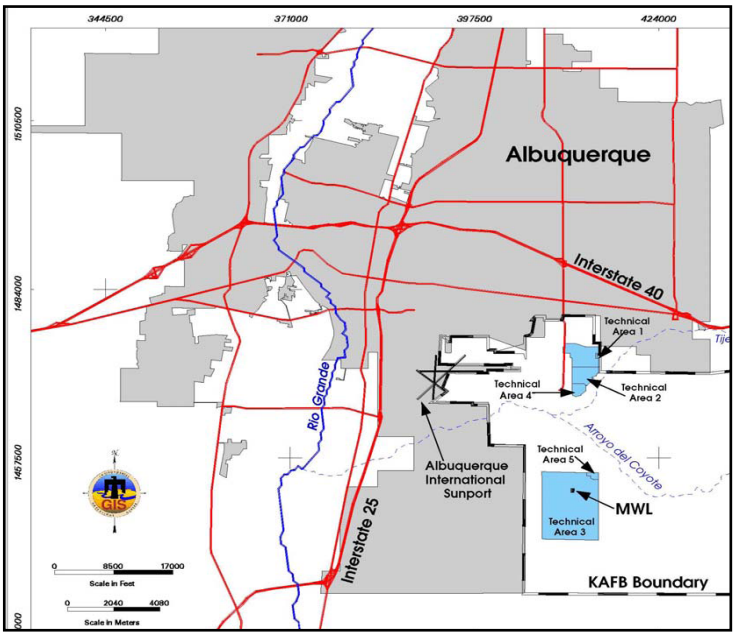
Applicable Recommendations: 30

5.4.8 Mixed Waste Landfill (MWL)

The MWL is located on Kirtland AFB, managed by DOE and located approximately five miles southeast of the Sunport and one mile east of the eastern boundary of La Semilla (Figure III - 17). Similar to the foregoing discussion of the fuel plume, the MWL is not currently a germane land use issue, but it "could potentially" develop into one.

The landfill is a 2.6 acre site used for disposal of low-level radioactive wastes and minor amounts of non-radioactive wastes from SNL from 1959 through 1988. It contains, about 100,000 cubic feet of low-level radioactive waste, approximately 6,300 curies of radioactivity in 1988. Because a significant portion of the waste is comprised of cobalt 60 (^{60}Co), with a half-life of 5.24 years, the radioactivity emanating from the ^{60}Co will decline rapidly over the next 30 years. The New Mexico Environment Department (NMED), with authorization from EPA, is the responsible agency for ensuring corrective action is completed for the site.

Figure III – 17: Mixed Waste Landfill



Members of the community and activist groups have lobbied for over a decade to force SNL to excavate the landfill and move the waste to an off-site disposal area. However, the NMED granted final approval to a Corrective Measures Implementation Plan (CMIP) that leaves the waste in place while incorporating an evapotranspirative (ET) soil cover and a bio-intrusion barrier. Construction of the ET cover was completed in September 2009, and the required Corrective Measures Implementation Report was transmitted to NMED on January 26, 2010. DOE expects to receive approval of the report in the near future.

The NMED Final Order and Class 3 Resource Conservation and Recovery Act (RCRA) permit modification that approved the corrective measure also requires development and implementation of a Long-Term Monitoring and Maintenance Plan (LTMMP) for the ET cover. The LTMMP monitoring, maintenance, and implementation of physical and institutional controls must ensure that the measures put into place protect human health and the environment. The Plan also requires a review of the corrective measures performance every five years, with the stipulation there will be additional controls or actions required if the cover fails to perform as designed.

According to DOE, some members of the public have concerns about potential leakage of chemical and radioactive contaminants from the soil into the groundwater, thus they anticipate future requests for public hearings related to required permit amendments. The continuing community interest in the effectiveness of the MWL corrective action was demonstrated in an April 21, 2010, joint DoD/DOE community public meeting to specifically address the status of the MWL and the ongoing groundwater monitoring program. While resolution of this issue may not enable community development directly, it could make property on-Base available for other uses.

Applicable Recommendations: 30

5.4.9 University of New Mexico (UNM) South Campus Student Housing

UNM plans to expand its student housing stock by constructing new housing and renovating existing housing units on its three Albuquerque campuses – main, north and south. Plans call for developing new upperclassman housing between "The Pit" and I-25. Currently, the goal is to provide 600 townhouse units south of Avenida de Caesar Chavez, as well as retail and mixed uses along Avenida de Cesar Chavez. The new, high-density student housing at this location will have traffic impacts primarily on Avenida de Cesar Chavez and University Boulevard, which connect the residences to I-25 and UNM. The new housing should have a minimal impact on Kirtland AFB, and vice versa.

The University also owns a large tract of land west of University Boulevard and North of Gibson Boulevard. The long range plans are to develop this property for mixed use.

Applicable Recommendations: 3, 4, 6, 18, 21, 22, 25, 26, 28

5.4.10 UNM Property in Mesa del Sol Development Area

Mesa del Sol includes 400 acres of UNM property within the development area and another 40 acres in the area of the proposed Mesa del Sol/I-25 interchange. In 2009, the University's Film School expanded to include a Digital Film and Media Building at Mesa del Sol's community center. UNM has a long range vision to open a branch campus at the Mesa del Sol location; however, at this time, there are no specific plans.

14.1.4 Relocation of UNM Observatory to La Semilla Property

As discussed in Section 5.2.6.3, UNM is considering the desirability and feasibility of relocating its observatory from its present location to the southern part of La Semilla. The University is seeking a location with less light pollution that is increasingly becoming an adverse impact on observatory capabilities. Relocated activities would include the Friday night public stargazing activity that would increase traffic volume to the observatory. A higher intensity land use, such as public stargazing, is likely to be considered incompatible with the La Semilla Master Plan. As noted in the earlier discussion, the need to balance the potential adverse impacts from Base missions and UNM desires for the highest quality observatory performance requires close coordination. Relocation into La Semilla would also require a determination that observatory activities and related human impacts will be compatible with the La Semilla purposes.

Applicable Recommendations: 3, 4, 6, 18, 21, 22, 25, 26, 28