7. Recommended Airport Plan

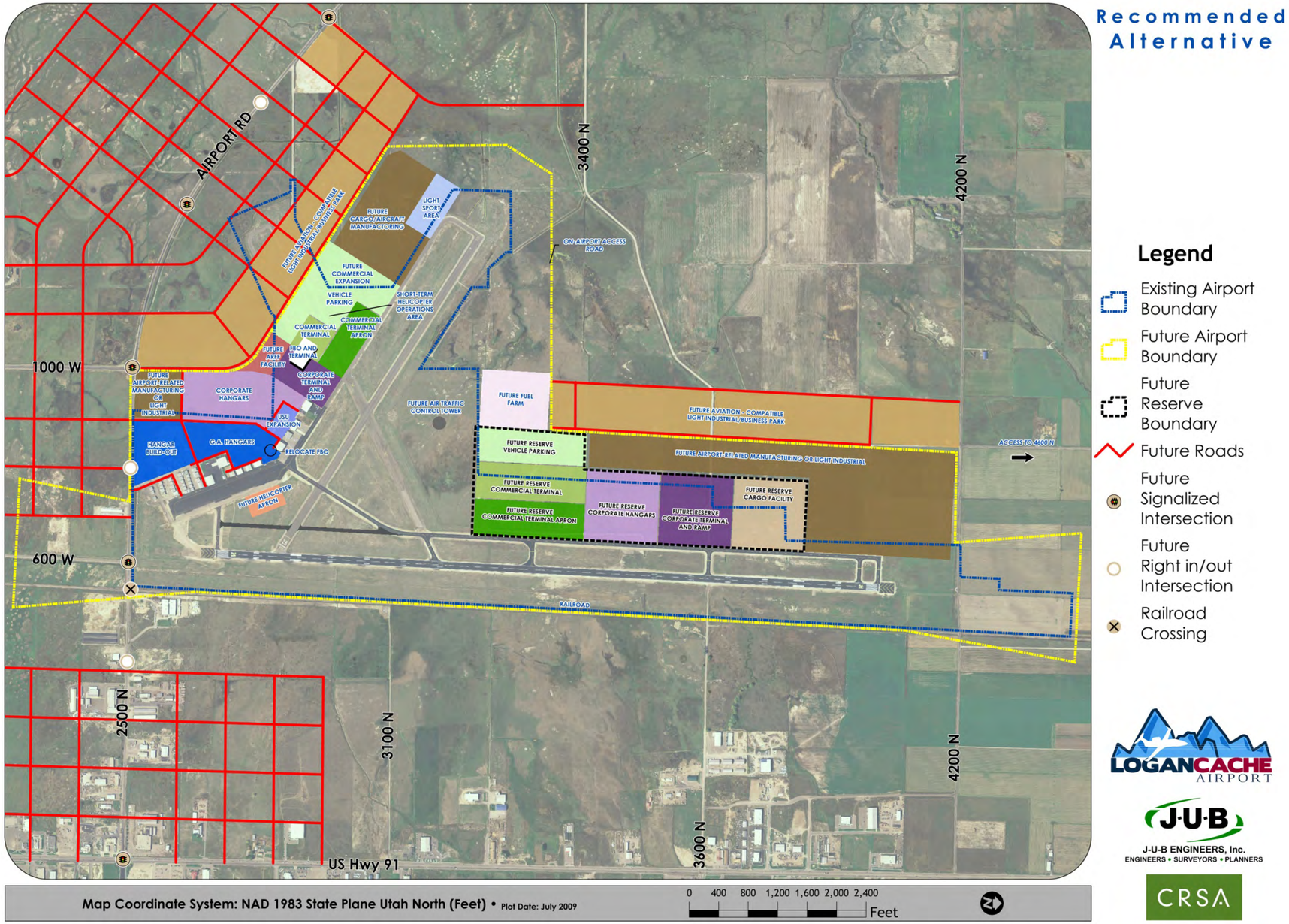
The planning process for the Logan-Cache Airport Master Plan Update has included several technical efforts, as outlined in the previous Chapters. Those efforts established the role for the airport, projected potential aviation demand, established airfield and landside facility needs, and evaluated options for improving the airport to meet airfield and landside facility needs. The planning process, thus far, included the presentation of draft working papers to the Technical Advisory Committee (TAC) in four technical meetings; and presentation of the information and proposed alternatives to the public in an Open House. A plan for the use of the Logan-Cache Airport has evolved, which considers the input of the TAC and the public. The purpose of this section is to describe, in narrative and graphic form, the recommended plan for the future use and development of Logan-Cache Airport.

7.1 Recommended Alternative Development Concept

The Recommended Alternative Development Concept represents the development direction for the Logan-Cache Airport through the twenty year planning period of this Master Plan Update and beyond. The Recommended Alternative Development Concept is the consolidation and refinement of the five airside and three landside alternatives (presented in Section 6) into a single recommended alternative collectively representing input received from the TAC, public open house meeting, the Airport Board, UDOT Division of Aeronautics, and Federal Aviation Administration (FAA) staff.

Following the review of alternatives as discussed in Section 6, development considerations were refined into a comprehensive list of airport improvements addressed by the Recommended Alternative Development Concept. Figure 14 depicts the collective representation of recommendations for the long term development of the Logan-Cache Airport.

Figure 14. Recommended Alternative



Recommended Alternative

Legend

- Existing Airport Boundary
- Future Airport Boundary
- Future Reserve Boundary
- Future Roads
- Future Signalized Intersection
- Future Right in/out Intersection
- Railroad Crossing

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Public Open House Comments

A public Open House meeting to discuss the Logan-Cache Airport Master Plan Update was held in North Logan at Greenville Elementary School on March 10, 2009. More than 110 interested stakeholders attended the public meeting and more than 45 comment cards were received from them. Most of the comments were focused on the landside alternatives, with an overall desire to see the area remain rural as much as possible. General comments regarding the airport master plan included the following subjects:

1. Wetland impacts
2. Drainage
3. Noise impacts
4. Safety
5. Traffic flow around the airport
6. Accommodating the ARFF needs of both the airport and the City
7. Accommodating helicopter operations as the airport grows
8. Whether the expansion of the airport was economically feasible
9. Some opposition for any development in the area
10. Preference for open and green space

Of 46 comment cards received, eight (8) preferred Alternative 1, fifteen (15) preferred Alternative 2, and eleven (11) preferred Alternative 3. Twelve (12) did not select any of the alternatives.

A detailed representation of the public comments is located in Appendix B. Additional stakeholder comments are discussed in the Area Land Use Study, under separate cover.

Recommendation

The Recommended Alternative Development Concept focuses on a long term vision for the future of the airport and surrounding area that maintains the economic viability of the airport. This plan accomplishes four very important goals for the future of the airport:

1. Identifying and protecting the area needed for airport operations beyond the twenty year plan. This includes additional property adjacent to the airport that should be in airport ownership and control. To allow these areas to be developed outside of airport ownership could compromise its ability to remain in operation long term.
2. Working with the adjacent city planning departments to specifically define compatible land use surrounding the airport. This is needed to protect the airport from development under incompatible land uses, such as residential, which could endanger the long term operation of the airport.
3. Create a plan that gives the cities, county and airport an economic vision for potential development and uses in the area. Though flexible, the plan envisions the types and locations of viable compatible uses in and around the airport. The plan also meshes closely with the area land use plan.
4. Define the best development plan for future commercial operations. Even though significant commercial operations within the next twenty years are not justified at this time, the area needed for commercial operations is identified and defined for future development so that it will not impact other operations.

The Logan-Cache Airport currently operates under an Airport Reference Code of C-II and will continue to do so into the future.

Airside Plan

Airfield components include the runways, parallel and connecting taxiways, lighting aids, navigational aids, and imaginary surfaces which help to provide a safe operating environment. The specific development plans for the airfield are depicted in detail on the Airport Layout Plan Sheet 2 in Appendix A, Airport Layout Plan Drawing Set.

As a federally-obligated airport (the result of accepting federal grant funding), Logan-Cache Airport must comply with FAA design and safety standards. The FAA has established these design criteria to define the physical dimensions of runways and taxiways, and the imaginary surfaces surrounding them that ensure the safe operation of aircraft at the airport. FAA design standards also define the separation criteria for the placement of landside facilities.

As discussed previously in Section Five, FAA design criteria is a function of the critical design aircraft's wingspan and approach speed, and in some cases, the runway approach visibility minimums. The critical design aircraft is defined as the most demanding aircraft or "family" of aircraft that will conduct 500 or more operations (take-offs and landings) per year at the airport. The FAA has established the Airport Reference Code (ARC) to relate the physical and operational factors of the critical design aircraft to airfield design standards (refer to Chapter Five). According to FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certified weight.

Runways

Logan-Cache Airport is used by a wide range of general aviation aircraft and helicopters. General aviation aircraft include single and multi-engine piston aircraft within ARCs A-I and B-I, turboprop aircraft within ARCs B-I and B-II, and business jet aircraft within ARCs C-I, C-II, and C-III. As detailed in Section Five, each runway at Logan-Cache Airport is expected to serve different types of aircraft; therefore, an ARC has been assigned separately for each runway at the airport and used in the development of the ultimate airfield plan.

As the longest runway at the airport with the greatest pavement strength and best instrument approach capability, Runway 17-35 is expected to serve the needs of all aircraft expected to use the airport. For this reason, Runway 17-35 is planned for the most demanding ARC C-II standards, with separation standards for long term ARC C-III.

As shown in the analysis in Section Five, Runway 10-28 is needed for smaller aircraft and when the wind is from the east or west. Therefore, consistent with FAA design standards, Runway 10-28 is planned for aircraft falling into the ARC B-I classification. The Logan-Cache Airport recently hosted a regional glider contest, sanctioned by the National Soaring Society of America. This contest took place primarily on Runway 10-28, which was closed for the duration. The airport could not close the primary runway and allow this contest to occur. As commercial operations increase on Runway 17-35, Runway 10-28 will be critical for other airport operations.

Runway 10-28 is in poor condition, and requires reconstruction soon to remain in operation. Many local pilots are beginning to avoid Runway 10-28 because of its present condition. Soon the runway will be in such poor condition that it will not be available for use. Runway 10-28 must be reconditioned to remain a viable long-term alternative for the Logan-Cache Airport.

Recommended runway related improvements include the following:

1. Construct Aircraft Run-ups on Runway 17-35
2. Reconstruct Runway 10-28

3. Acquire full ownership of the Runway 17 and 35 Runway Protection Zones (RPZs)
4. Construct Perimeter Access Road
5. Adjustment of Runway 17-35 MALSR
6. Construct Runway 17-35 Safety Area Improvements
7. Grading Improvements to Runway 17-35 Safety Areas and Shoulders
8. Replace Runway 17-35 PAPIs
9. Upgrade Runway 17-35 Edge Lighting to High-Intensity Runway Lighting (HIRL) System
10. Periodic Crack Sealing and Surface Seal Coating to Maintain Pavement Condition
11. Periodic Airfield Pavement Marking Replacement

Taxiways and Aprons

The design of taxiway and apron areas considers the wingspan requirements of the most demanding aircraft to operate within the specific area. The Runway 17-35 parallel taxiway, and connecting Taxiways A and C, are planned to accommodate aircraft within airplane design group (ADG) III for future commercial operations.

Growing helicopter operations and training is occurring at the airport. As aircraft operations increase at the airport, helicopter operations will conflict if they are not coordinated. Short-term, helicopter operations should be relocated along the abandoned runway. Separate helicopter parking aprons should be designated away from the fixed wing tie-down areas. A set of Standard Operations Procedures has been developed by the helicopter operators and airport staff to promote safe operations. These procedures should be continually updated to adjust to the changing needs of all airport users.

Recommended taxiway - and apron-related improvements include the following:

1. Rehabilitate Taxiway C
2. Construct Helicopter Parking Pads (4)
3. Periodic Pavement Maintenance (Crack Seal, Seal Cot, Markings, etc.)

Hangar and Tie-down Areas

There are approximately 110 aircraft stored in 73 hangar buildings of various sizes, with an occupancy rate of 95% to 100%. Current forecasts indicate an additional 70 aircraft will require storage in the next twenty years. The Logan-Cache Airport will continue to see increased pressure for aircraft hangar space. An additional 55 hangar spaces are anticipated within the next twenty years. As aircraft operators become more sophisticated, they will require larger hangar space with opportunities for related business operations.

The plan envisions long term development of General Aviation hangar storage, both T-hangars and box hangars, in the existing airport property to the southwest. The existing FBO building will need to be relocated to provide for access to the hangar development area behind the existing facilities.

Corporate hangar space will be separated and developed to the west of the existing facilities. This area will ultimately provide for corporate FBO operations and individual corporate hangars/business lots. These business hangars will provide leased lots to operators for access to the airport. The business side of the hangar would be accessible directly from the local streets. Each facility will require full utilities.

The existing tie-down area is in good condition and provides adequate storage for future plans, provided the helicopter parking is separated as discussed above.

Recommended hangar and taxilane related improvements include the following:

1. Construct Taxilane D, H, and I Extensions
2. Construct New Corporate Hangar Area Taxilane
3. Periodic Pavement Maintenance (Crack Seal, Seal Cot, Markings, etc.)
4. Relocate FBO, Construct New FBO Apron

Sport Recreation

As operations grow, a designated area for sport recreation should be created at the northwest end of Runway 28. This area would provide for temporary parking and storage of sport recreation aircraft operations such as gliders and parasails.

Noise Impacts Analysis

A detailed Noise Analysis was conducted on the recommended plan to verify that all improvements over the next ten years will not unduly impact the surrounding properties. Results of the analysis indicate that the 65 dBA day-night average sound level (DNL) contour will remain within the airport property and no noise impacts are predicted. Because there are no noise impacts projected, no noise mitigation is recommended. There are no noise sensitive receivers within the existing or future 65 dBA DNL, and therefore existing and planned airport operations are within the FAA regulations. The detailed Noise Analysis is provided in Appendix C.

Future Commercial Operations

While not justified within this Master Plan Update at this time, substantial effort was put into anticipating future development of commercial operations. Planning for future commercial operations will alleviate any short term improvements that could preclude commercial development in the future.

A commercial airline market analysis, conducted by Sabre in 2007, identified a potential for key flights from Logan-Cache Airport to six regional cities, and a projected total annual enplanements of 580,000. Table 24 summarizes Sabre's projections.

Table 24. Projected Commercial Flights to Key Airports

Hub Airport	Annual OnBoard Passengers	CRJ-700 Load Factor	Weekly Flights	Total Daily Flights	Initial Daily Flights
Denver	68,542	67%	14	7	3
Los Angeles	49,170	68%	10	5	2
Phoenix	62,836	72%	12	6	2
Las Vegas	57,600	79%	10	5	1
San Francisco	32,946	65%	7	4	0
Seattle	25,624	50%	7	4	0
Totals	296,718		60	30	8
Visiting	290,000		60	30	8

Source: MIDT Study, 2007, Sabre

Realistic initial projections are for up to eight (8) total daily flights and 580 passengers. This would translate into two (2) aircraft spaces for 155 passengers outbound at one time. Future

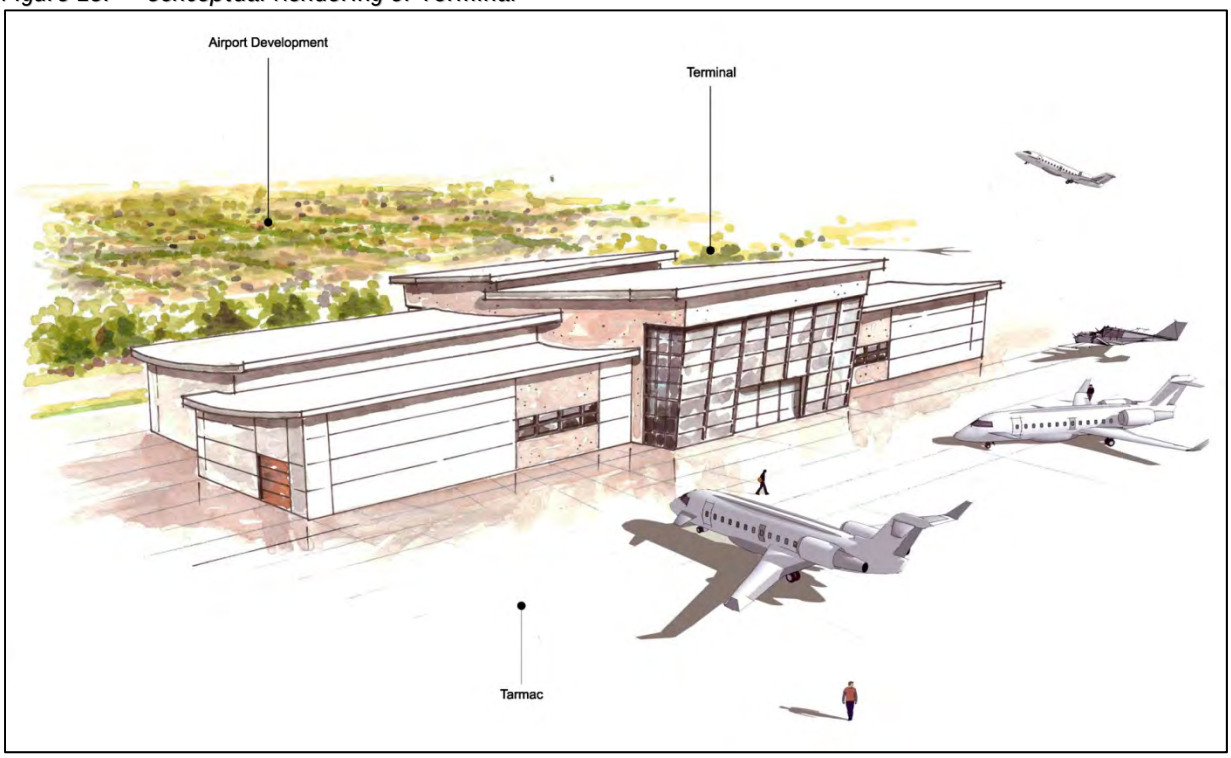
facility needs would see up to 30 flights per day, translating into four (4) aircraft spaces and 300 passengers outbound at one time.

Space has been provided on the south side for up to four (4) aircraft parking spaces, a terminal building, and parking. Long term, commercial operations could transfer to the north side, for more convenient access to the runway.

Terminal Building

The Proposed Logan Airport Terminal is approximately 28,000 square feet. Figure 15 shows a conceptual rendering.

Figure 15. Conceptual Rendering of Terminal



The Terminal includes the following spaces:

Main Floor

Unsecured Entry Lobby	2,500 sf
Unsecured Restrooms	700 sf
Mechanical	1,250 sf
Ticketing & Cueing	2,600 sf
Passenger Security Screening	2,000 sf
TSA Office	400 sf
Storage	750 sf
Secured Departing Baggage Screening	2,600 sf
Secure Lobby / Waiting	3,500 sf

	Secure Concessions / Gift Shop	375 sf
	Secure Smoking Lounge	300 sf
	Secure Restrooms	700 sf
	Secured Arriving Baggage Handling	1,925 sf
	Unsecured Baggage Claim	1,925 sf
	Ground Transportation & Cueing	1,800 sf
	Secured Mechanical Room	1,400 sf
Upper Floor		
	Office	1,600 sf
	Break Room / Training	1,000 sf
	Restrooms / Storage.	425 sf

Main Floor. Departing passengers arrive in a large entry vestibule and move to the left (clockwise) through the ticketing counter queuing area, and into the passenger screening / baggage drop-off. TSA offices are located adjacent to both the passenger and baggage screening areas for easy access to both secure areas. After moving through screening, passengers are directed into the Secure Lobby to await boarding. The Secure Lobby has direct access to restrooms, a smoker's lounge and a concessions/gift shop/snack bar area.

Arriving passengers enter the Secure Lobby and are directed to the left (clockwise) through a circulation area to the unsecured landside and baggage claim. Following the baggage claim is a queuing area for ground transportation counters, and then passengers are directed to the Entry Lobby and out of the terminal.

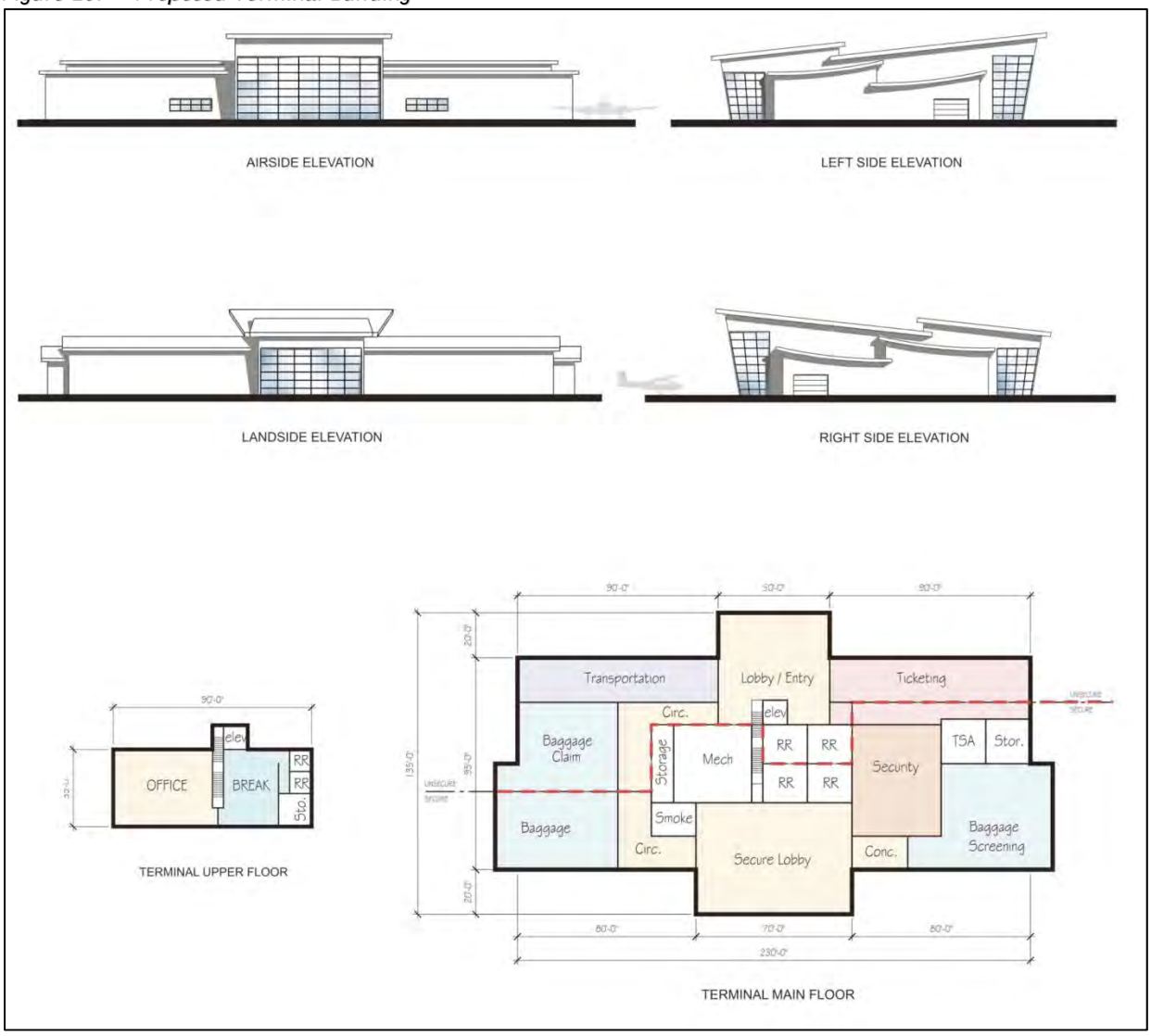
Upper Floor. Access to the Upper Floor is controlled through secured access through the Entry Lobby elevator and stair. This area is intended for access by Airport employees only, and includes a large open office which could have windows to provide visual observation of the unsecure and secure lobbies. A large break room adjacent to the office can be used for employee training. Two single occupant restrooms and a storage closet are also provided.

Design Strategy. The massing and form of the building are referential of the classic Beech Staggerwing of the 1930's & 40's. The staggered biplane arrangement of the Staggerwing is evident in the cascading and overlapping roof planes. The large Secured Lobby is prominently located at the center of the symmetrical building and alludes to the large radial engine common in aircraft of the period. The terminal's exterior materials and finishes are to evoke a "technological edginess" representative of not only the fabrication and manufacture of aerospace components, but also of the scientific research and advanced technologies associated with the University and industry in Cache Valley.

The interior of the building utilizes volume to differentiate spaces. High volume rooms are dedicated to public areas that incorporate waiting or lingering such as the lobbies. Lower volume rooms are intended to help maximize passenger movement through queuing and security areas.

Figure 16 shows the proposed terminal building.

Figure 16. Proposed Terminal Building



Landside Plan

During the planning process, substantial effort was focused on the area around the airport, to provide for adequate long-term development (beyond the next twenty years). Of particular concern was how a future commercial operation could be woven into the facilities, including a commercial terminal, parking, Aircraft Rescue Fire Fighting facility (ARFF), tower, and fuel farm.

Airport Related Development

The area to the southwest of the existing airport property is identified for future development of airport-related businesses and operations. This would include aircraft manufacturing, cargo and parcel operations, corporate businesses and the ARFF. Cargo and manufacturing is designated to the northwest end of this area. A joint City-Airport ARFF facility is envisioned in a location central to the airport. A new city street system would be developed to access the business side of these airport operations, including full utilities.

Additional property acquisition will be required for long term development of this plan. The property is vacant at this time and should be pursued before costs increase substantially.

Future Utilities

As the airport expands to provide additional landside and airside services, water and sewer systems will need to be improved to provide adequate service for new development. Currently, the water and sewer systems provide service to all of the buildings at the airport; however, there are deficiencies in fire flow within the airport due to insufficient pipe size.

Water

Currently, the airport water system consists of a 6-inch pipe connected to an existing 14-inch mainline along 2500 North. Fire hydrants are located along the pipeline; however, the length of the 6 inch pipe restricts the flow that can be carried, due to friction losses. This results in fire flows that are not sufficient to meet current building code requirements. According to the 2007 Water Master Plan, "ideally, the airport would maintain local pressurized storage for emergencies" (see pg 4-28). This would imply that on site storage and booster pumps would provide fire flow to the airport area. Since the 2007 plan was developed, the city has upgraded the water line in 2500 North to 14 inches. At this time, it is unknown if this improvement alone is sufficient to provide adequate fire flows into the airport, or if pressurized storage should be planned for the airport.

Currently, and in the future, it will be necessary to provide adequate fire flow to protect buildings on and near the airport. In order to define adequate flow, we assumed a flow of 3,000 gallons per minute (gpm) would be required, with a minimum pressure of 20 psi at each fire hydrant. This is based upon fire fighting flows for typical buildings that may be constructed on site and pressure requirements required by the State. It is also assumed for our report that there was adequate flow and pressure at 2500 North from Logan City to provide 3,000 gpm at a pressure of 100 psi.

With those assumptions, to provide the necessary fire flows to the north planned development area of the airport, our model indicated that a 14-inch pipeline would be needed from 2500 North into the airport. As the line extends northward, the line size could be reduced to 8 inches near the north airport limits and still provide adequate fire flow. At this time, it does not appear likely that a loop for the water system in the north end of the airport will be constructed. A single line has been planned, due to the longitudinal nature of the development planned along the northern end of the airport.

Installing this pipeline to the north planned development area will require directional drilling or installing a casing beneath the existing runway. This would allow the runway to remain in service while construction is underway. Settlement concerns will also be reduced. If the runway were abandoned, or if approved by the FAA, this segment could be open cut and pipe installed in a trench through this area. For budget planning purposes, we have assumed that a casing or directional drilling will be used for construction.

The west planned development area of the airport would also be served from the Logan City waterline along 2500 North. The distribution system in this area would consist of a series of 8-inch waterlines looped to provide adequate fire flow and water service. Please note that the same assumptions of water flow and pressure at 2500 North are also assumed for this area. Total estimated cost for future water service is $1,593,450.

Sewer

At this time, the sewer system within the airport provides adequate service to the existing buildings. The current system consists of a gravity flow line from the north end of the current developed area toward a manhole in 2500 North. From that manhole the flow moves west to 1200 West, then south, where it is lifted via the Smithfield Lift Station to the (2) 48" trunk lines that connect the collection system to the treatment lagoons.

Unfortunately the existing sewer in the airport property is at its limit due to depth. The northernmost manhole within the airport has a depth of 3 feet. This is a minimum depth to provide frost protection for the collection system, and possibly serve any buildings.

In order to expand the improvements within the north planned development area, a lift station would need to be installed. This should be located toward the southern third of the planned developed area, to take advantage of existing ground slopes from the north. It would also be placed on the west border of the existing airport limits. (See Sheet 12 in the Airport Layout Plan for an approximate location).

The lift station would be designed to collect flow from 8-inch gravity pipes in the north planned development area, with a minimum depth of 5 feet and a maximum depth of 15 feet. The depth of the wet well would be approximately 20 feet. Groundwater will likely be a concern during construction of the deep sewer lines and wet well. Emergency power will be necessary to provide service in the event of a power outage to prevent spillage of sewage onto the ground surface.

A pressure sewer line would be installed from the north lift station to the existing north manhole in the airport. As with the waterline, this pressure line could be installed using underground methods (directional drilling or boring) or using and open trench. Again, coordination with the FAA would be required in order to open cut the runway area.

The west planned development area of the airport would also be serviced by a lift station due to lack of ground slope. This lift station would be located in the western extents of this area due to gradual slopes from east to west. The pressure outlet from this lift station could be routed to the existing manhole in the airport, or to an existing manhole along 2500 North. As with the northern lift station, minimum collection depths are assumed to be 5 feet with a maximum depth of 15 feet. Emergency power will also be a requirement for this lift station.

A grid system of 8-inch collection lines would be installed along planned roads in the area to provide reasonable sewer connection for businesses.

It is possible that a large portion of the west planned development area may be able to flow into the existing sewer system along 2500 North if existing system depths are adequate. Review of this alternative should be completed prior to design of the collection system. Furthermore, a temporary lift station may also be considered to allow development to be served, while future collection systems and regional lift stations are installed per the Logan City Wastewater Collection System Master Plan. We have assumed that a lift station will be installed for budgetary purposes. Total estimated costs for future sewer service is $3,293,000.

Maintenance of a lift station is important in order to prevent malfunction and possible sewage spills. For this reason, it is recommended that Logan City operate and maintain any lift stations located on the airport, due to their experience and availability of equipment and maintenance personnel.

Storm Drainage

The existing development of the Logan Cache Airport has incorporated a simplified storm water system consisting of surface runoff and infiltration. Runoff sheet-flows across the runways and taxiways toward infiltration areas between paved surfaces consisting of native soils and grasses. In these locations, the storm water seeps into the soil and is stored, providing an effective disposal system. This system allows for filtering of potential storm water contaminants from the soil column filtration. Utilizing this type of system keeps maintenance costs low by eliminating maintenance of a collection and disposal system. This method of disposal will experience increased depth of sheet-flow across impervious surfaces the further runoff has to travel to a disposal area. Also, extremely wet times of the year may limit the ability for maintenance crews to mow grassed areas because of saturated soils. To our knowledge, these conditions have not been a concern up to this point.

As the airport grows, consideration should be given to controlling storm water with each project. As impervious area increases with expansion of facilities, the runoff quantity will grow. This may result in existing infiltration areas not being able to absorb all of the storm water runoff. Therefore as new areas are developed, areas for infiltration should be planned. These may include grassy swales, infiltration beds, or open spaces consisting of native grasses where runoff can collect and absorb into the soil. Underground infiltration beds may be considered, but geotechnical reports should be performed to ensure ground water and soil types are conducive to their use.

Alternatively, a collection system for roof drains and impervious surfaces could be installed in hangar/building areas to allow for drainage. This type of system allows for more taxiways and development structures to exist. However, with the land being flat, a collection system may have to be installed at depths below the ground water surface, and may require lift stations to route peak runoff flows to detention/retention basins. If a design were to require installation of pipe beneath the ground water surface or the use of lift stations, it is not recommended.

A hybrid of a collection system and infiltration beds may be an acceptable option for storm water disposal, if collection systems can be installed above ground water and maintain pipe slopes over 0.50%. This option would allow for buildings to be clustered with taxiways and other impervious surfaces between them, but still provide for runoff to infiltrate as it has done previously.

Routing storm water runoff to existing irrigation canals is discouraged due to present overloading of canals from upstream storm water inlets. Currently, the City of Logan and the irrigation companies are pursuing agreements to work together to allow storm water to be conveyed in canals, but these have not been signed at this time. It is anticipated that agreements may be in place within the next year. Once in place, storm water may be allowed into irrigation canals at a historical runoff rate. This would be equivalent to the amount of runoff that has reached the canals traditionally under non-developed conditions. With the flat topography of the area, this historic amount is likely very low, therefore discharging into irrigation channels would have little benefit for controlling storm water.

As infiltration areas are developed in and around the airport to control storm water, use of these areas should include landscaping. With proper planning, infiltration areas can be created to be low maintenance and an attractive amenity at the airport. This planning requires more up front effort and cost with regard to design, but long term benefits in the form of decreased maintenance will pay off over time.

Irrigation

Irrigation canals and ditches are very common within communities and the county in Cache Valley and the airport is no exception. Currently, the airport has a large canal that borders the airport on the south along 2500 North, an irrigation ditch that is piped under Runway 35, and another under the taxiway crossing Runway 28. As noted previously, the topography in the area is extremely flat. Consequently, pipes conveying irrigation water are extremely flat or use siphons under existing runways/taxiways. This results in sedimentation in the pipes and reductions in flow capacity. The existing pipe beneath the taxiway crossing Runway 28 has traditionally had problems with sedimentation, and requires Logan City crews to jet the pipe periodically and remove debris from the inlet, so flooding does not occur near the ditch/inlet.

If possible, when development occurs, options to improve irrigation flows through the airport should be considered. Where able, these ditches should be routed around runways and taxiways to eliminate future flooding concerns and settlement problems around culverts.

Canal companies associated with these ditches crossing in and around the airport include: Logan Northwest Field Canal, Benson Canal, Logan Northfield Canal, and Hyde Park Canal. When considering improvements in and around irrigation infrastructure, communication with these companies is recommended to reduce future concerns.

Irrigation of landscaped areas in the airport is very minimal at this time. With future development, it is likely that landscaping will be included. Irrigation of these areas can be completed by two methods: culinary water and irrigation water. Utilizing culinary water for irrigating landscape areas is simple and requires little maintenance, but does come with increased costs from water usage. Irrigation water from the nearby ditches and canals may be used for maintaining landscape areas, but would likely require a pressurization system consisting of pumps, pipes and a distribution network. This may be beneficial since water rates for irrigation water are much less than for culinary water.

When acquiring land around the airport, it is important to acquire any water shares associated with the land, to allow for future use for irrigation, for sale on the open market or for Logan City.

7.2 Area Land Use Planning

While the airport property itself lies within the boundaries of Logan City, several surrounding communities share the airport's boundaries. North Logan, Hyde Park, and Smithfield lie to the east and north of the airport, with Cache County on the other sides, including the unincorporated community of Benson which lies to the west of the airport. In concert with the Airport Master Plan, an Area Land Use Study was conducted to identify a long term plan for the area surrounding the airport.

Currently the airport is bounded primarily by undeveloped land, much of it falling under the county's jurisdiction and being used as productive agricultural land. The zoning by the county is for agricultural use. The primary access to the airport is from the south, with some industrial use along Airport Road. Fifty acres near the airport were recently annexed into Logan City, with future land use plans indicating detached residential as the primary use. The residential is proposed for a density ranging between 4 to 6 dwelling units per acre. Other future uses in addition to the residential would be those currently allowed in single-family residential zones, such as parks, community services, schools, and religious institutions, as well as other conditional uses, such as golf courses, nursing homes, and utility-related uses.

East of the airport along Highway 91 is a corridor of some industrial and commercial uses in North Logan and Hyde Park, along with some agricultural uses. Future uses in this region are likely to be compatible with the Main Street (Hwy 91) corridor. To the north of the airport is mainly actively farmed agricultural land with little pressure for a change in use currently.

Land Use Goals & Objectives

The development of goals and objectives is an important first step in creating a land use strategy. Overall the goal is to promote land uses that will be harmonious with the airport's operations, now and in the future. A coordinated land use strategy with Logan, Cache County, and the surrounding communities has been developed to work toward this overall goal. Four specific goals were outlined in regard to land use in the airport vicinity.

Goal One: Protect the Airport from encroachment

- Objective One: Create buffer zones around the airport.
- Objective Two: Develop land uses that are appropriate within the various types of buffers.

Goal Two: Develop land use patterns that complement the airport and support Logan's projected growth

- Objective One: Develop infrastructure improvements that will support recommended land use patterns.
- Objective Two: Develop land use patterns that complement planned infrastructure and support airport buffer zones.

Goal Three: Promote economic development

- Objective One: Develop land use patterns and infrastructure that will promote economic development for the community.

Goal Four: Collaborate with neighboring communities

- Objective One: Develop land use patterns and infrastructure improvements that will be complementary to all local communities.

Goal Five: Build upon existing planning documents

- Objective One: Consult existing planning documents from the surrounding communities for guidance on future development patterns.
- Objective Two: Resolve any conflicts that may subsist between existing planning documents and the airport master plan.

Land Use Decision-Making Criteria

With the land use goals and objectives established, decision-making criteria are set to guide the implementation of these goals and objectives. These include policy statements, analysis tools, and maps. Using these criteria, a process is developed for making land-use decisions and resolving any conflicting goals and objectives. The following four policies have been established to guide land use decisions, beginning with the first policy and working through to the fourth. If the first policy indicates that the land in question is suitable for development, then the second policy will be applied, and so on through the fourth policy. All four policies will need to be favorable for development to occur.

Policy One: Sensitive Lands

Using a sensitive lands map, lands will be assessed a sensitivity score to indicate whether it is considered to be developable.

Policy Two: Future Land Use Planning

The proposed development is compatible with the future land use plans and/or maps for the relevant communities or jurisdictions.

Policy Three: Wetlands

Using a wetlands map, lands falling in a sensitive wetlands category are automatically unavailable for development unless mitigation measures approved by the Army Corps of Engineers are implemented.

Policy Four: Airport Buffer Zone

Lands that are within the airport buffer zones must meet the requirements of the buffer zone even if they meet other development potential requirements.

Policy Five: Roadway Layout

Roads may stray from the Logan City grid if physical land conditions exist that would prescribe a better route. Airport buffer requirements, wetlands existence, or land sensitivity may fall under these conditions.

Land Use Analysis

The FAA has developed aviation-related restrictions in regard to land use in the vicinity of airports. These have been taken into consideration during the development of the land use strategy concept and will need to be evaluated during the review and approval process of development projects in the future. Three FAA zones are described below and presented in Figure 17.

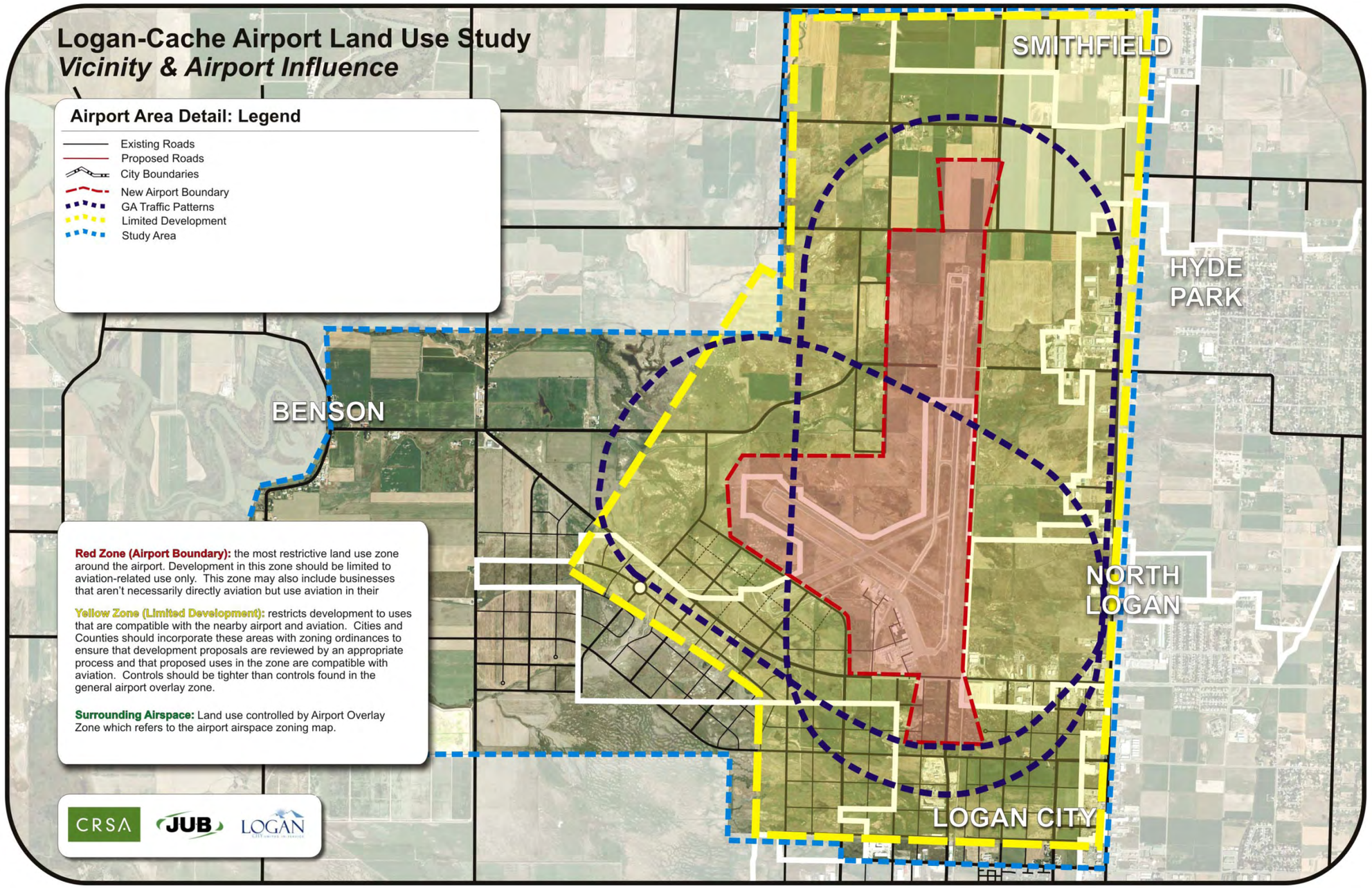
Aviation Use Only (Red Zone)

The red zone is the most restrictive land use zone around an airport. This zone includes everything inside the airport boundary and the Runway Protection Zones (RPZs) at each runway end. Development in this zone should be limited to aviation-related use only. This includes aviation, hangars, aviation businesses (FBOs, repair, manufacturing of airplanes and aviation equipment, sales, etc.). This zone may also include businesses that aren't necessarily directly aviation but use aviation in their business. For example, air freight is a common land use where the business involves the shipping of products.

Aviation-Compatible Development Zone (Yellow Zone)

The yellow zone restricts development to uses that are compatible with the nearby airport and aviation. Property in this zone is usually not directly controlled by the airport. Thus, the ultimate goal is to incorporate these areas into City or County zoning ordinances to ensure that development proposals are reviewed by an appropriate process and that proposed uses in this zone are compatible with aviation. Special care should be taken for land uses that fall within the runway approaches.

Figure 17. Future Airport Influence Zones



Restricted Height Development Zone (Green Zone)

The green zone is much less restrictive than the yellow zone, but does suggest for planning review by the City or County to protect the airport primarily from vertical intrusion into airspace. Items such as antennas, towers, and bright lights could create obstructions or distractions to the airspace around the airport and should not be allowed

Airport-Compatible Land Uses

Within the airport influence area, land use restrictions are recommended to protect the airport from encroachment of non-compatible development. The 20-year airport master plan has been developed and outlines the land necessary for the planned use of the airport. Some land will be set aside for future growth. Adjacent lands within the airport buffer zones described above may develop, although certain land use restrictions may apply. The following land use categories and specific use types are generally considered to be compatible in the vicinity of an airport.

Industrial – Warehouses, Manufacturing

Commercial – Office/Manufacturing combination, Office/Business Park, Services, Hospitality and Entertainment

Residential – Medium to High Density

Open Space – Public Parks, Trails, Golf Courses

Agricultural

Non-compatible Land Uses

Residential – Low Density

Commercial – Businesses or Entertainment venues that utilize heavy outdoor lighting

Land Use Concept Development

A design charrette was held in January 2009 to elicit input from stakeholders and landowners in the study area surrounding the airport. The charrette process took place over three days and provided the opportunity for different stakeholder groups to receive information from the consultant team and to participate in the design process. The first session held was for landowners within the study area, and was attended by approximately 70 people. A second session was held for Logan City, Cache County, and Logan-Cache Airport staff. A third session was held for the TAC committee and a fourth was held for leaders/key officials in the adjacent communities of Benson, Hyde Park, North Logan, and Smithfield. The four land use goals and their related objectives were the foundation for discussion during the design charrette. A survey was handed out at the first session with the landowners in order to elicit additional information on the use and ownership characteristics of the land surrounding the airport.

Three general land use concepts were developed as a result of the charrette. The concepts reflect comments made by landowners, the TAC, community leaders and city officials. Each plan addresses development density, open space conservation, potential annexation areas, and FAA land use restrictions. The three concept scenarios were named according to a development style or place of influence, and are as follows:

Conservation Scenario

The focus of this scenario is the conservation of as much open space as possible in the study area, which would then require little mitigation of sensitive lands. This focus was a response to concerns by land owners regarding agricultural uses converted to residential. In the scenario all commercial, industrial and hospitality uses were centralized along Airport Road and Main Street with high density growth clustered around key locations west of 1600 West. These strategies then allow much of the land surrounding the airport to remain in a natural state or as an agricultural use.

Benson Town Center Scenario

The focus of this scenario is for larger-scale development centered around a Benson Town Center at 2600 West and Airport Road. Smaller neighborhood centers would also be created to support other areas of the new development. The land immediately surrounding the airport remains agricultural or as a business park zone, both considered to be compatible with the airport. Included in the scenario are recreation trail systems, hospitality and service uses at the airport gateway on Airport Road, and light industrial and service uses to the north of the airport.

Greenways Scenario

The focus of this scenario is to be a balance of the other two scenarios, allowing for limited mitigation of sensitive lands while allowing some clustered development to occur. Multiple small town centers are created and the circulation system reinforces the grid layout. These work to support a balance between developed land and open space conservation, including active agricultural use. Airport support services are located to the northwest of the main runway and the circulation pattern is designed to allow for access from both the north and south ends of the airport property. Hospitality services are located to the south and east along with commercial and light industrial.

Preferred Scenario Selection Process

The Conservation Scenario was selected as the preferred scenario as a future land use strategy for the area surrounding the airport. The following factors contributed to the selection of this option as the preferred scenario:

Public Preference

A majority of landowners in the area favored this scenario because it allowed for a balance between agricultural preservation and moderate development opportunities south of the airport. This balance would continue the rural character that defines the area while taking advantage of the economic opportunities offered by proximity to the airport.

TAC/Airport Operations

The Technical Advisory Committee favored the layout of this scenario for its protection of open space directly around the airport, which in turn facilitates airport operations by protecting critical airspace.

Market Analysis

The proximity to the airport provides future economic opportunities and an economic analysis report completed by Real Estate Economics contributes to the decision-making process for the

land use scenario. The results of the market analysis provide a recommendation of the highest and best mix and magnitude of land uses from an economic viewpoint. The conservation scenario is the one that most closely matches acreage of land use to the mix and magnitude of land uses in the market analysis. Thus, the land use concept is inline with current market absorbency rate predictions for the Logan-Cache County Airport region.

Preferred Scenario Design

The layout of the preferred land use scenario took into consideration several design-related decisions. The first design application is the use of the rotated grid. The rotated grid orients with Airport Road and a second arterial to the south. It meets the general plan requirements of Logan City and is also beneficial for its avoidance of area wetlands.

The land use distribution is designed in order to promote a development pattern that will be compatible for an area in the vicinity of the airport. By locating residential uses to the south, the flight paths for lower flying general aviation planes have been avoided. Additionally, this has clustered the density of the development away from the airport while allowing for more industrial uses to develop closer to the airport property. Open space around the water ways has been protected through the use of clustering residential development and maintaining common open spaces throughout the area.

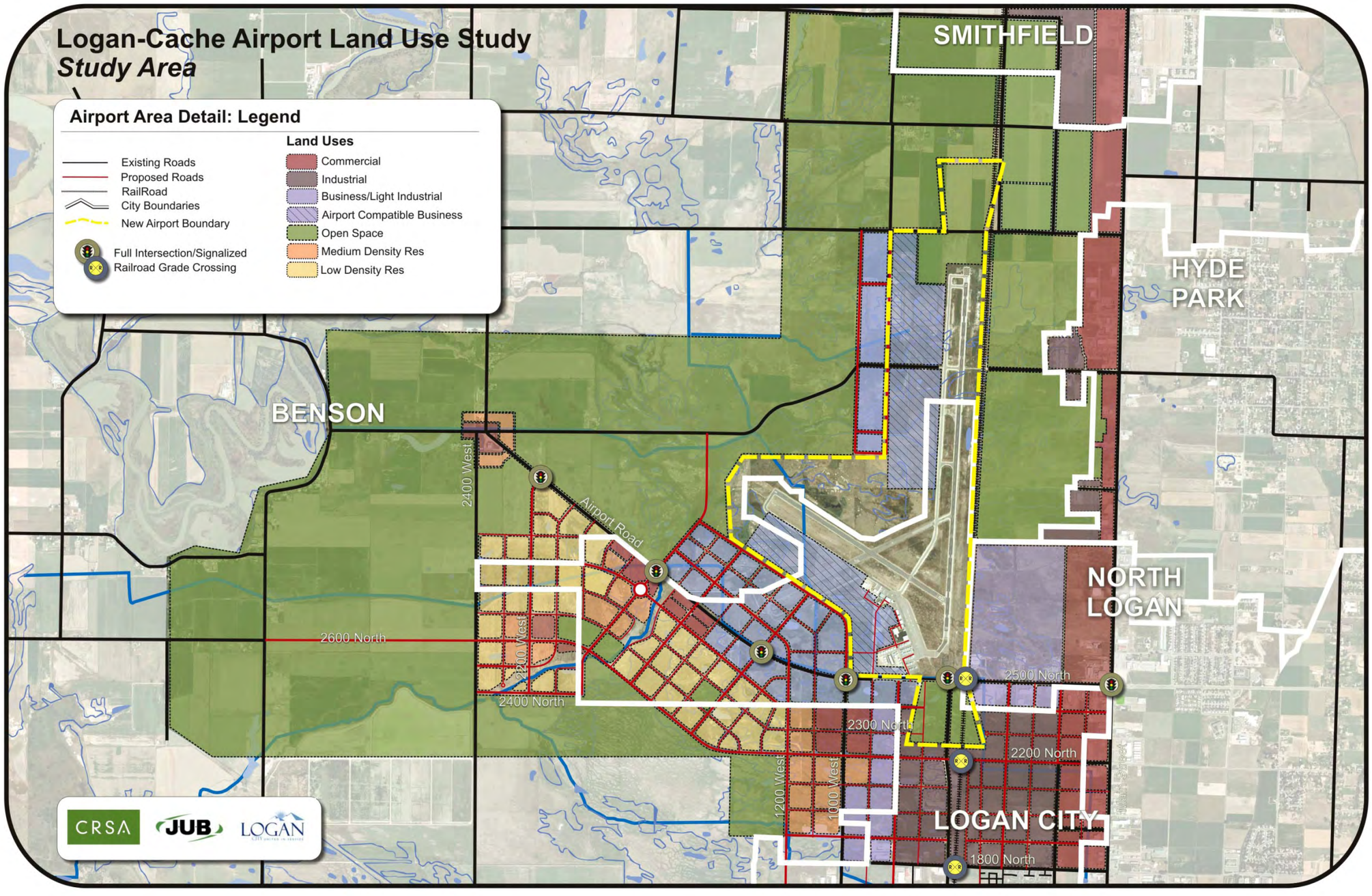
Land Use Study Map

In addition to the land uses that were developed as part of the preferred scenarios, the future land uses for each of the communities surrounding the airport were incorporated into the land use study area map (see Figure 18). These were determined from existing future land use maps and general plans. In the case of Hyde Park, which does not presently have a future land use map, the current zoning map was used. A general plan update is underway for Hyde Park and discussions with city officials indicate that future land uses will likely follow current zoning for the area adjacent to the airport property.

Vicinity & Airport Influence Map

Figure 18 illustrates the boundaries of various zones and traffic pattern areas. These indicate the issues associated with the vicinity and the influence of the airport location on surrounding land uses. The two most restrictive of the FAA land use zones are indicated, the red zone, where development should be limited to aviation-related use only, and the yellow zone, where uses should be limited to those that are compatible with the airport. Additionally, the general aviation traffic pattern boundaries are indicated for both sets of runways. The low-flying nature of the general aviation aircraft will have a significant impact on surrounding land uses and are thus used to develop the boundary of the yellow zone.

Figure 18. Preferred Area Land Use Plan



Existing Land Use Regulations/Tools

Airport Zoning

Logan City has an established Airport Limitation Combining Zoning District and Cache County and North Logan have both adopted the same Airport Overlay Zone. These zones, along with the base zoning of properties surrounding the airport, comprise the current land use controls for the airport area. The language for the overlay zones was developed as an implementation tool from the previous airport master plan process. Language and zones in the ordinance coordinates with the Airport Zoning map developed by Armstrong Consultants in 2001. The ordinance and corresponding map indicate land use compatibility guidelines for each of the five airport area zones. Four broad use categories are defined and a total of nine use subcategories have been assigned compatibility criteria of permitted, conditional, or not allowed. The conditions associated with the conditional use criteria address airport-related concerns and issues, such as location of structures, disclosure of airport proximity as a condition of development, and aviation easements.

Land Use Recommendations

Overlay Zone

In general, the existing overlay zone appears to sufficiently address land use compatibility for the current airport master plan. The following are minor recommendations for enhancing the existing ordinance to achieve a more predictive result in regard to land use compatibility:

- Residential subcategories – some residential uses, types and densities will be more compatible in proximity to an airport than others. By breaking down the residential category into more descriptive subcategories, less ambiguity regarding compatibility will be achieved.
- Clarify if there is any difference in the disclosure of airport proximity for commercial vs. residential development
- Allow small non-lighted amphitheatres (such as associated with a park) to be located in the Approach Zone
- Include an additional condition regarding bodies of water or other wildlife attractors that may be incompatible with an airport

Yellow Zone (Aviation-Compatible Development Zone)

The yellow zone, developed from the general aviation traffic pattern areas, is the area that will be most affected by airport operations, although the land is generally not directly controlled by the airport. As such, to promote the viability of the airport it is critical that the land uses within this zone are well-planned to be compatible with the airport. Rather than just utilizing the airport overlay zone, land within the yellow zone should be controlled by base zoning.

Using the uses as proposed on the Preferred Area Plan Land Use (Figure 17), Future base zoning should coordinate with the uses proposed on the Land Use Study Map that fall within the yellow zone boundaries. In addition to agricultural/open space uses, included within the yellow zone are commercial, business, industrial, light industrial, and medium density residential.

As a land use category, medium density can cover a wide range of housing types and densities. For the purposes of compatibility with the airport, it is recommended that residential uses within the yellow zone not be detached, single-family residential, as these neighborhoods tend to be incompatible with the noise associated with an airport. Residential uses should be attached or multi-family, or assisted living centers. Opportunities for

detached, single-family residential exist in the study area, but are located outside of the yellow zone to promote better long-term compatibility for the airport area.