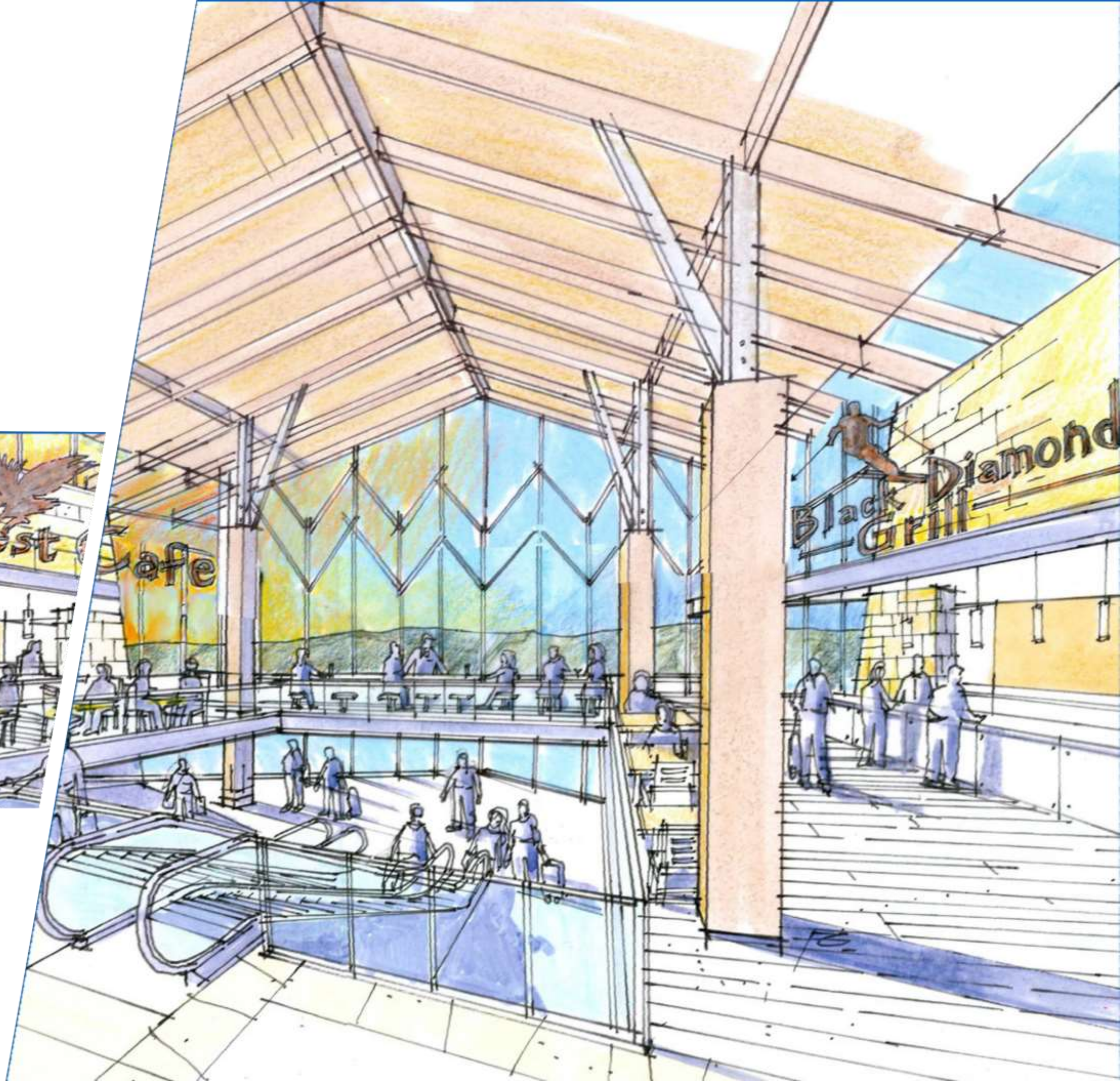


EAGLE COUNTY REGIONAL AIRPORT

ADVANCED TERMINAL AREA PLANNING
PROGRAM CRITERIA

JANUARY 2016



RS&H



Prepared by RS&H, Inc. at the direction of Eagle County Air Terminal Corporation in conjunction with Curtis Transportation Consulting, Hensel Phelps, and Unison Consulting

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*SECTION 1
PLANNING
REQUIREMENTS*

1.1 INTRODUCTION

The Eagle County Regional Airport (EGE) is conducting advanced terminal planning based on recommendations from the recently completed 2014 Airport Master Plan Update (2014 Master Plan). The purpose for conducting this additional analysis is to create and refine landside and terminal facility concepts and assist Eagle County Air Terminal Corporation in preparing to begin terminal construction by 2017. The purpose of this report is to establish the quantitative basis for defining issues and opportunities, and for the development and evaluation of concepts to address them. The project kicked-off in March 2015 and culminated in November 2015. The project timeline with the approximate key stakeholder engagement dates can be seen in **Figure 1.1**.

1.1.1 STAKEHOLDER ENGAGEMENT AND PUBLIC INVOLVEMENT

This study required high levels of public/stakeholder involvement in order to achieve planning and design outcomes which reflect the vision and values of the served community. Input from a variety of stakeholders and stakeholder groups was programmed into the terminal planning process and was critical to developing and refining the final planning requirements and concept alternatives. Participation included key stakeholder interviews and surveys, regular Eagle County Board meeting updates, a Technical Review Committee (TRC), and Airport Staff Technical Development Workshops to help shape the direction of future concept development and design theming. Participants included members from the following areas: Airport management and staff; Airlines and ground handlers; Rental car agencies; Concessionaires; On-airport major tenants; Local Transportation Security Administration (TSA); Local area historians and knowledgeable key officials.

1.1.2 DATA/FIELD COLLECTION

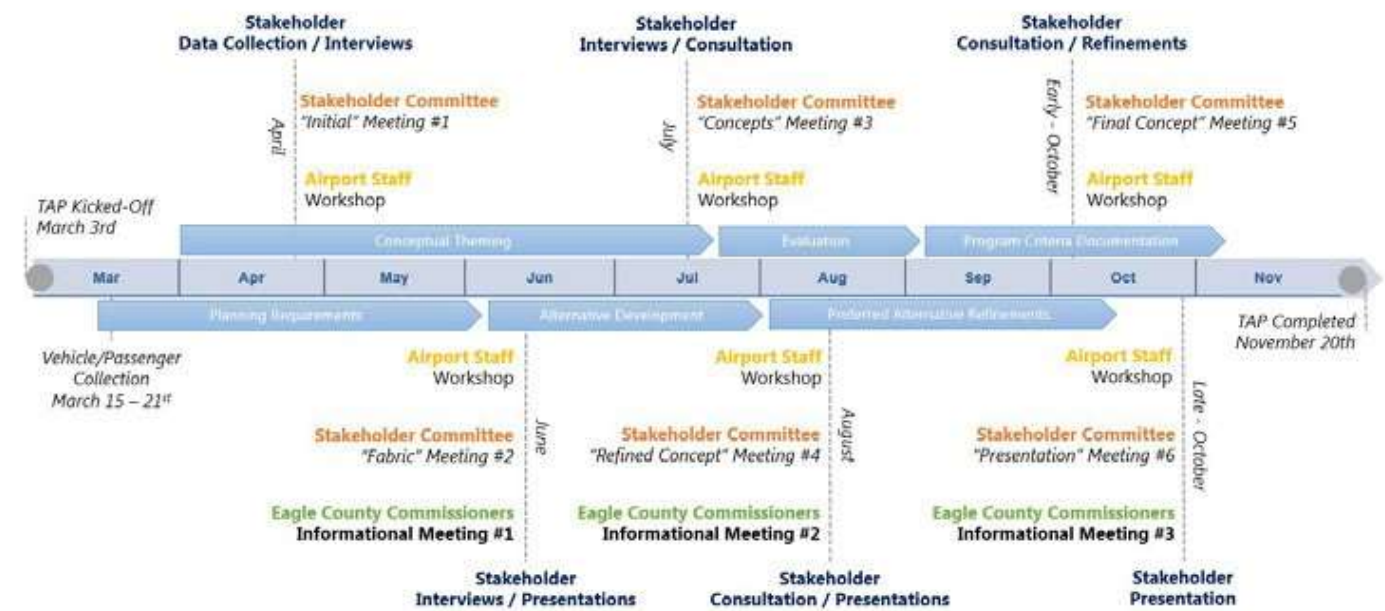
Data collection was a key element to identifying, understanding, and addressing critical issues facing Eagle County Regional Airport. On-site landside and terminal passenger/vehicle count data was collected during the peak event (ie, the busiest terminal period) on March 21, 2015 to validate and refine the 2014 Master Plan assessments. Knowledge was gained by reviewing existing airport documents and media including, but not limited to, the following:

- Existing terminal building as-built documentation
- Existing terminal area site plans
- As-built plans for the terminal curbside roadway, Eldon Wilson Drive, and other terminal-area circulation roadways
- Digital terrain map of the terminal area, including all landside facilities that serve the terminal
- Airport Property Plan/Existing Exhibit
- Current Airport Layout Plans
- Airport activity records
- Five year Capital Improvements Program
- Current Airport Master Plan
- Geotechnical Information
- Survey Information

1.1.3 INFRASTRUCTURE ASSESSMENT

In order to proceed with building modification and design recommendations, existing infrastructure systems underwent thorough review based on available information. As-built conditions were evaluated by a team of certified professionals during an on-site assessment. Existing available construction drawings of past projects including electrical, mechanical, structural, security, fire protection, baggage, sanitary, stormwater, electrical high-mast lighting, and pavement markings, were all reviewed and validated. A review of basic building code requirements was also performed to evaluate any potential issues with expansion or modification to existing structures.

FIGURE 1.1
PROJECT TIMELINE SCHEDULE



Source: RS&H, 2015

1.1.4 VALIDATION OF PEAK HOUR/PEAK EVENT AND BASELINE PASSENGER/VEHICLES

Validating the peak hour and baseline passenger/vehicle assessments made in the 2014 Master Plan facility requirements was an important element in determining appropriate terminal program space requirements. “Bottom up” and “Top-down” analyses of terminal and landside performance were done to develop a baseline for air carrier traffic demands and inform future planning concepts. “Bottom up” methodology used a consolidated list of arrivals and departures by aircraft type and estimated passenger loads for the observed event day of Saturday, March 21st, 2015. “Top-down” methodology generated peak hour/event passenger enplanement/deplanements calculations from the established future airline flight schedule for Saturday, December 26th, 2015.

Landside (roadway/parking) data was collected over multiple days using traffic recording “tube counters” and manual counts at strategic locations along roadway and parking areas. Collected data included vehicle counts and classifications, pedestrian crosswalk counts, commercial vehicle traffic, curbside dwell times, intersection movement, parking occupancy, and rental car traffic.

The combination of landside (roadway/parking) and terminal information was analyzed and used to validate and refine future planning assumptions and program landside and terminal spaces accordingly. Additional assumptions were modeled into future planning considerations based on industry trends and expert opinion.

1.1.5 TERMINAL BUILDING PROGRAM

Data and feedback gathered established the foundation for the terminal building program. Although the 2014 Master Plan identified areas of deficiency to be addressed, all landside and terminal program areas were considered throughout this assessment in order to properly account for structural and operational impacts that would also affect adjacent and ancillary uses. Level of service determinations were made based on International Air Transport Association (IATA) planning guidelines along with stakeholder feedback in regard to the nature of the Airport’s role in the National Plan of Integrated Airport Systems (NPIAS).

1.1.6 ENVIRONMENTAL CONSIDERATIONS

Environmental considerations are important when planning for and developing airport land uses. Development can have impacts on wildlife, air quality, water quality, drainage, and other aspects of our natural world. In performing this assessment, review and validation of the 2014 Master Plan conclusions were performed. Data was compared to U.S. environmental law and FAA orders to create a summary of any potential impact to legally specified resource categories, identifying those which are unlikely to be affected and those which would require further review.

1.1.7 TERMINAL BUILDING DESIGN THEMING

It is important in any building design to capture the essence and values of its community. The Eagle County Regional Airport terminal project is no exception. Books and articles discussing local flavor were reviewed along with research and interviews that engaged local historians, community leaders, tourism industry officials, and the local public to gain an understanding of how the community envisions its regional gateway. Once community input was gathered, charrettes were held to help focus design efforts and these efforts guided the architectural design process.

1.2.1 TERMINAL FACILITY DEMAND PLANNING

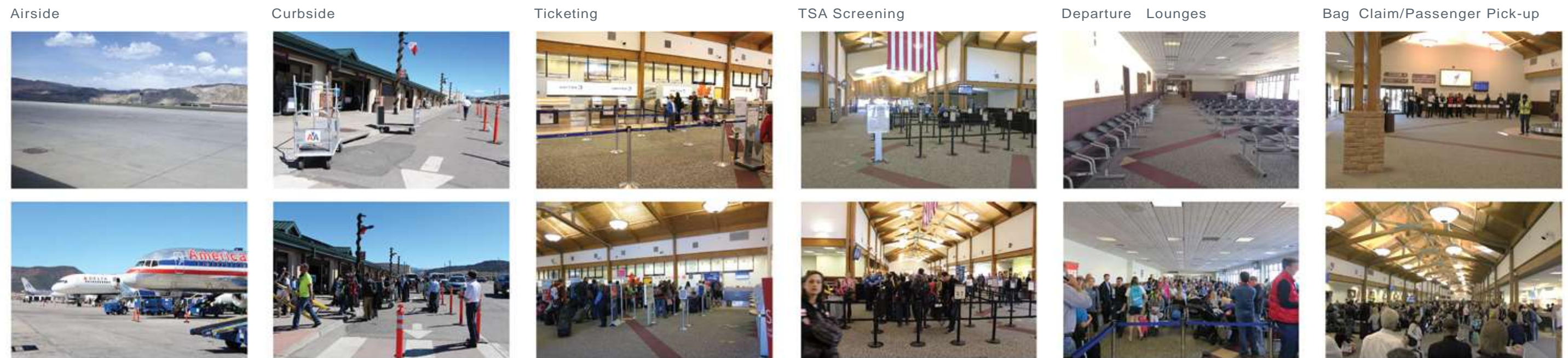
Determining peak hour passenger (PHP) demand is the traditional method for comparing commercial service airport facility capacity against current and forecast demand. This is done by calculating the amount of enplaning and deplaning passengers processed through the terminal during the busiest hour on busiest day of the busiest month annually. Airline gate schedules are used to identify the types of aircraft serving different routes and calculate passenger load factors. In this instance, both the observed and potential aircraft load factors were then analyzed to determine peak passenger time periods and determine when the airport facilities were most stressed, demonstrating what can be thought of as the present-day “worst case” scenario. Slight alterations in the traditional PHP methodology, similar to slight adjustments made in the 2014 Master Plan, take into account the unique nature of the Airport’s varying seasonal demand. For this study, in addition to recognizing the peak hour demand, emphasis was placed on recognizing the Airport’s “Peak Event”. Analyses of the observed and future events are detailed in following sections. The peak event for both periods was found to occur on Saturdays in December and March between the hours of 10:00am and 2:00pm. **Figure 1.2** below shows the contrast of how the different program areas operated before and during the peak event on March 21, 2015. Considering the entire peak event for EGE along with the peak hour was important for capturing the true pressures put on programmed areas throughout the terminal.

Ultimately, the peak hour/event methodology informs the level of service (LOS) which is provided at specific programmed areas throughout the terminal and landside facilities. The 2014 Master Plan identified multiple terminal areas in which the LOS degraded beyond acceptable standards during peak hour demand. These areas included rental car facilities, curbside/check-in, departure lounges, public circulation, and baggage claim. Each of these areas will eventually, if not already, begin to create negative LOS impacts on neighboring uses. For this reason, all terminal components were considered throughout the course of this study. One additional consideration addressed over the course of this study is the potential impact of peak event terminal passenger counts on the TSA Screening Checkpoint. This area is essentially the filter from landside to airside and a potential bottleneck in which all passengers must pass through. For this reason, TSA lane accommodations were also considered for the Design Activity Level planning period.

1.2 PEAK HOUR/PEAK EVENT PASSENGERS AND DESIGN ACTIVITY LEVEL

Eagle County Regional Airport (EGE) is an exceptional Rocky Mountain airport that credits much of its busiest operational periods to passengers destined for Vail and Beaver Creek resorts. The highest activity times occur on Saturdays during the months of December and March. On these days, the airport transforms from a quiet and relatively relaxed place to a bustling epicenter of activity as travelers make their way through the airport terminal environment. This setting can only fittingly be described as “organized chaos”. As a non-hub airport primarily serving origin-destination commercial passenger traffic, EGE is subject to limited flexibility in airline service hours and this results in the peaking event experienced March 21, 2015; Spring Break weekend. During this event, passenger, airline, and vehicle traffic was observed with the purpose of understanding, planning, and designing for the levels of demand placed on the EGE landside and terminal facilities.

FIGURE 1.2
PROGRAM AREAS BEFORE AND DURING PEAK EVENTS ON MARCH 21, 2015



Source: RS&H, 2015

1.2.2 2015 OBSERVED PEAK EVENT

The gate schedule and airline load factors were analyzed for the observed peak event day (March 21, 2015) in order to determine the current load placed on terminal facilities. **Figure 1.3** and **Figure 1.4** represent the Eagle County Regional Airport Terminal peak event passenger movements and aircraft parking positions. **Figure 1.4** also displays all relevant gate information including arrival/departure times, aircraft type, airline gate positions, potential passenger loads, destination city, and flight frequencies.

The terminal building position relative to airside movement surfaces, paired with past airport development, has limited potential apron expansion areas for accommodating commercial aircraft parking. Consequently, the Airport has a total of 10 possible positions to park aircraft, 2 of which are currently co-utilized for de-icing and would be unavailable during winter operations when EGE is experiencing its highest traffic. The Airport presently has 5 available gates but peak event operations on the observed day experienced 6 occupied positions. Load factors reached an average of 88% during the peak event with an 87% average on the day. American Airlines flights from Dallas reached a remarkable 99% average throughout the entire day. This factor reveals high demand for EGE during peak event times, especially from Dallas, with limited additional space to park aircraft. As commercial aircraft parking stretches further east into positions 7 and 8, general aviation operations occurring at the Vail Valley Jet Center are also negatively impacted.

For this study, the peak hour/event data has been broken down into three functional areas: Curbside/check-in, departure lounges, and baggage claim. The 2015 observed peak event enplaning and deplaning passengers can be seen for these areas in **Figure 1.3**. The charts shows passenger arrival distributions into each area which are calculated based off actual passenger distributions as captured in video recorded data on the observed day. A total of 2,261 passengers were processed through the terminal during the hours of 10:00am to 2:00pm (peak event period). Peak hour enplaning passengers at curbside/check-in reached 542. Passenger movements prior to boarding flights caused this number to grow to 566 per hour in the departure hold rooms. Deplaning passengers entering the building from the airside gates and moving through the terminal into the baggage claim/passenger pick up area caused the landside baggage claim space to reach a peak of 623 people during the baggage claim peak hour of the peak event. This level of enplaning passengers, with the assumption of optimal TSA processing ability of 200 passengers per hour, creates a peak of 118 passengers/bags processed within the 10 minute period of 11:30am to 11:40am. This level of passenger activity equates to the need for 4 TSA lanes during peak times. TSA processing will be further analyzed in later sections.

FIGURE 1.3
2015 OBSERVED PEAK EVENT BY PROGRAMMED AREA

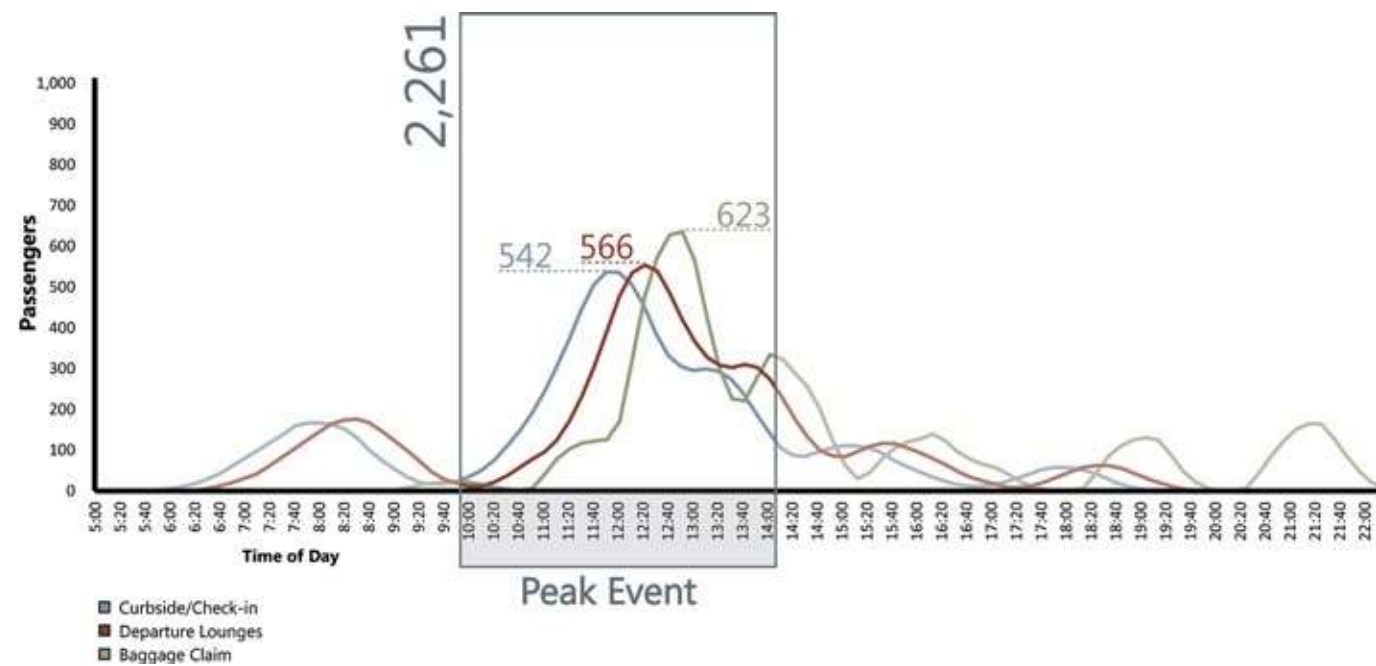
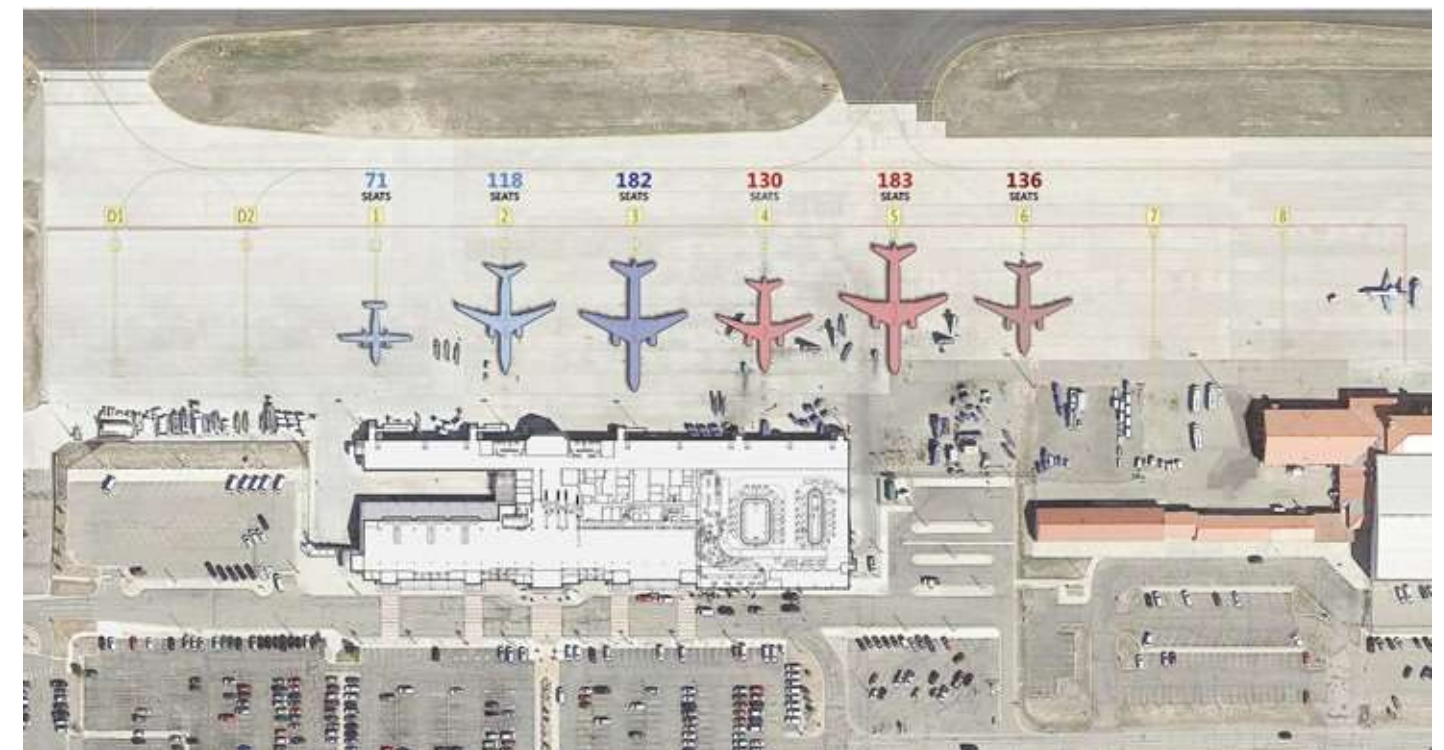
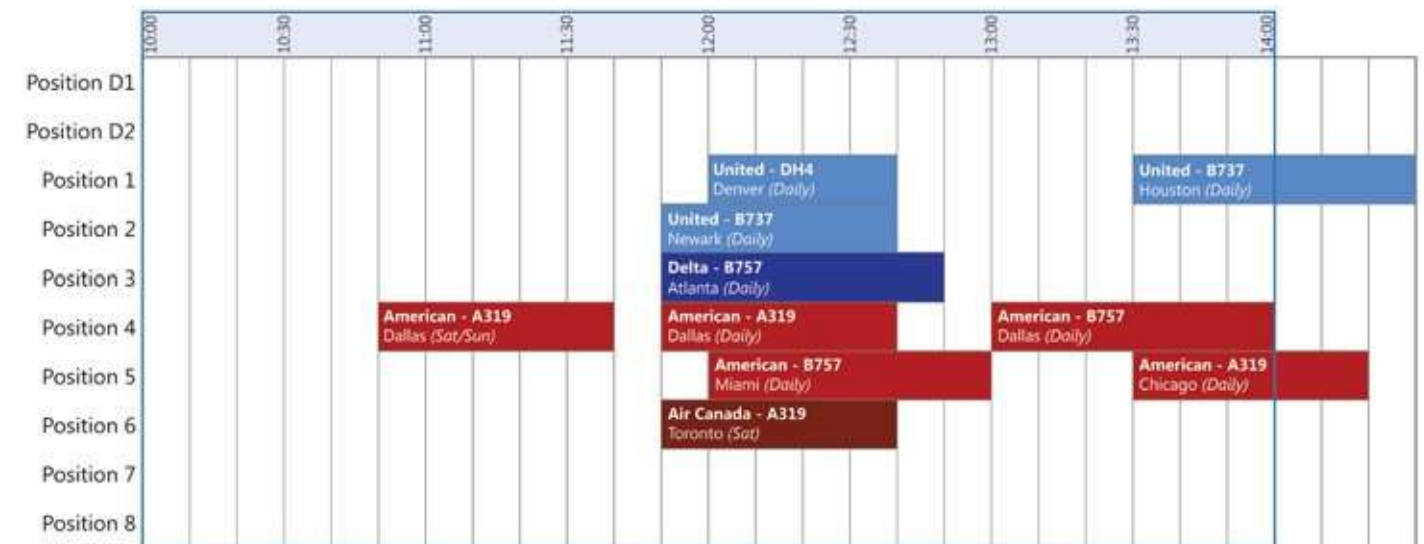


FIGURE 1.4
2015 PEAK EVENT GATE SCHEDULE FOR MARCH 21, 2015



Source: RS&H, 2015

1.2.3 DESIGN ACTIVITY LEVEL PEAK EVENT

The 2015-16 Winter Gate Schedule was analyzed and used as the basis for determining the future airport facility requirements. After considering the Airport's geographic, physical, and potential service area limitations, assumptions were made to define the "ultimate" required design level, hereby referred to as the 'Design Activity Level'. Recognizing the Airport's facility limitations, planning load factors were assumed at 100%, a reasonable future assumption when considering flight schedule limitations during the future peak event and the fact that American Airlines flights have already reached this load factor during peak event days. The design activity level gate schedule shows future expected arrival/departure times, aircraft type, airline gate positions, potential passenger loads, destination city, flight frequencies, and passenger movements (see **Figure 1.5** and **Figure 1.6**). The assumptions made for this planning period were based on the 2014 Master Plan forecast, industry research and trends, airport management and tenant input, and aviation expert analysis. These assumptions include:

- Increase in air service demand with load factors reaching 100% during peak hour times.
- Lack of airline ability/interest in planning flights outside of peak event/peak hour windows.
- Upgrading of United Express aircraft from DH4 to EMB175.
- Additional Air Canada flights scheduled during seasonal peaks.

The design activity level peak event enplaning and deplaning passengers can be seen for each programmed area in **Figure 1.5**. The charts show passenger arrival distributions into each area based off the assumptions listed above. A total of 2,928 passengers will be processed through the terminal during the hours of 10:00am to 2:00pm (peak event period). Peak hour enplaning passengers at curbside/check-in will have reached 805 people. Both airline scheduling and passenger arrival/departure behaviors are anticipated to cause departure hold rooms to reach 842 peak hour enplaning passengers. Deplaning passengers exiting aircraft and moving through the terminal to the landside baggage claim will have swelled to 908 peak hour passengers. With the TSA processing an optimum of 200 passengers per hour, there will be a need for processing 172 passengers within the 10 minute period of 11:20am to 11:30am. This level of passenger activity equates to the need for slightly over 5 TSA lanes during the peak hour. Future TSA processing will be further analyzed in later sections.

FIGURE 1.5
DESIGN ACTIVITY LEVEL PEAK EVENT

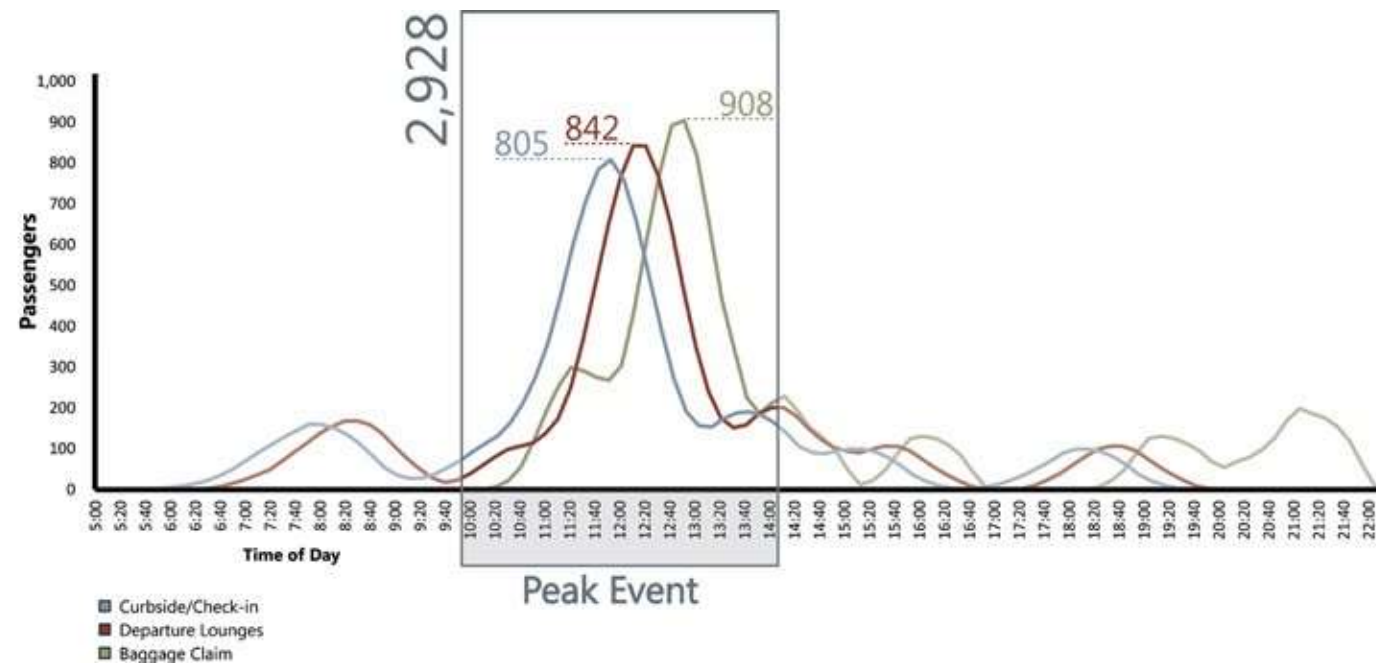
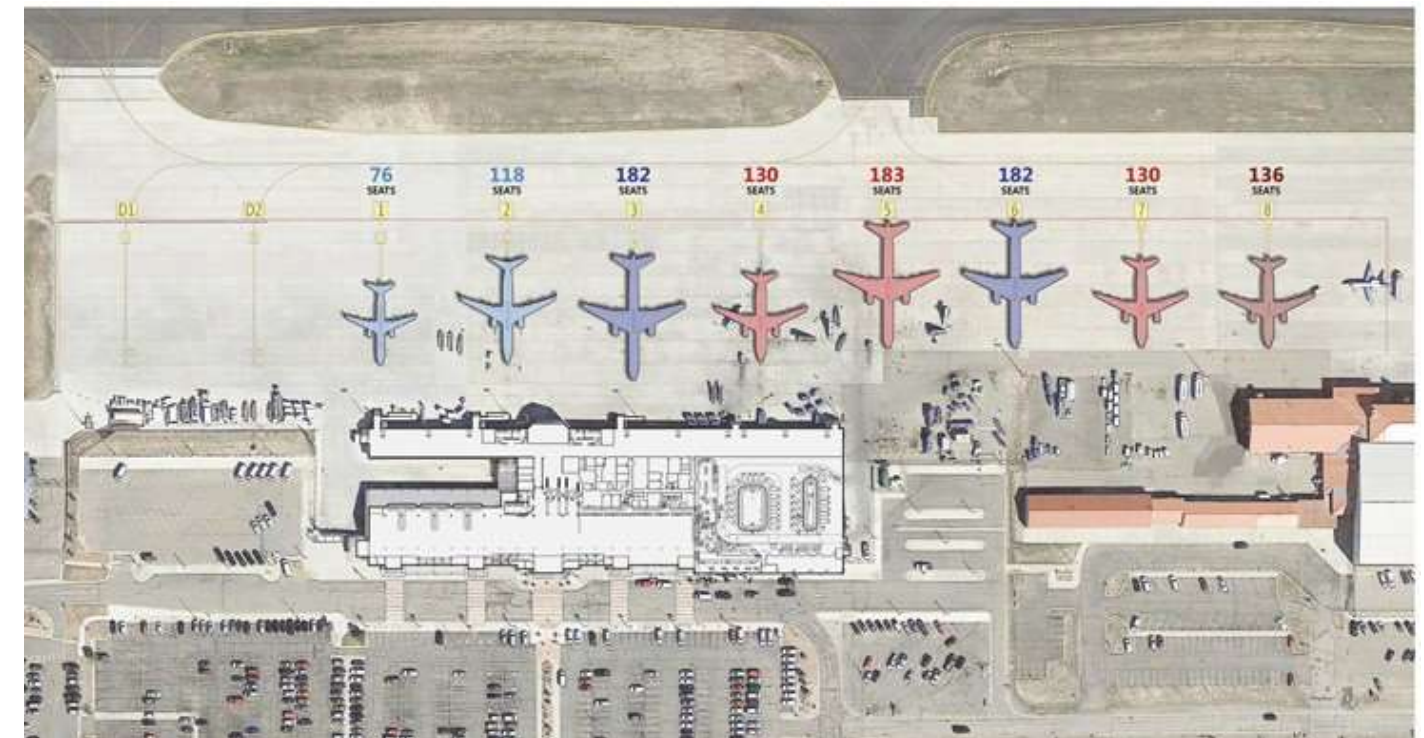
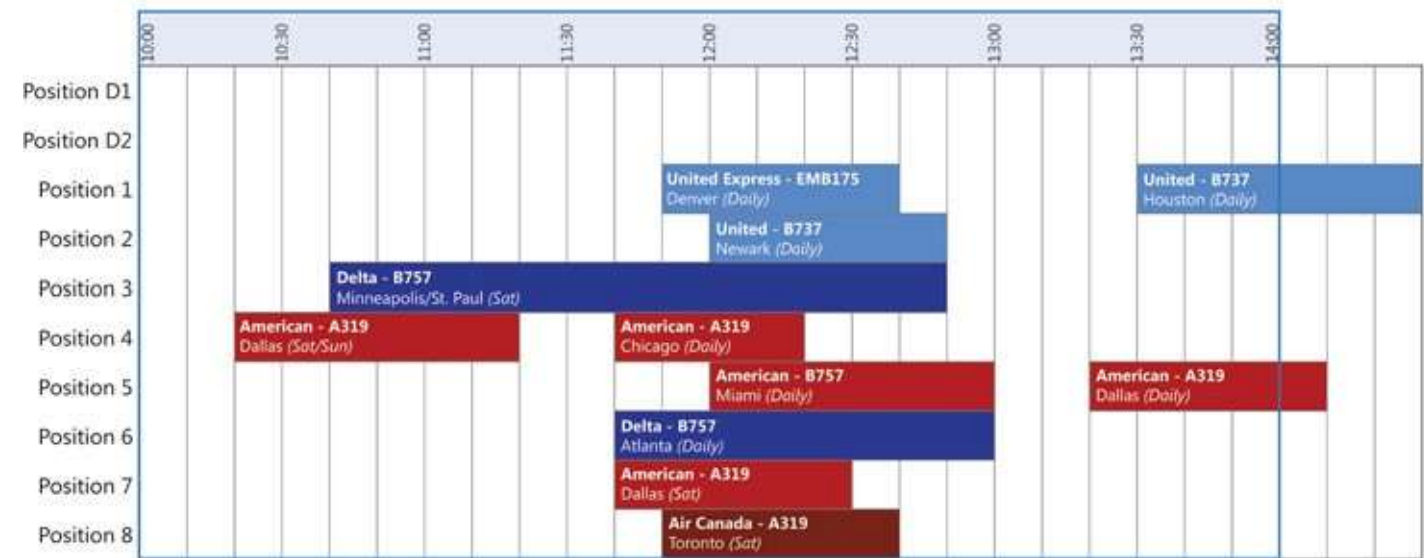


FIGURE 1.6
DESIGN ACTIVITY LEVEL PEAK EVENT GATESCHEDULE



Source: RS&H, 2015

1.3 TERMINAL BUILDING ASSESSMENT

Prior to proceeding with any building modifications, it is necessary to understand the existing terminal building conditions. This section will cover architectural, structural, mechanical, plumbing, electrical, and fire protection considerations and assess conditions as they exist, prior to any potential building modifications.

1.3.1 ARCHITECTURAL

The Eagle County Regional Airport is a one story, approximately 90,000 square foot complex comprised of three distinct areas. The areas can be divided by their primary function. The landside terminal area serves ticketing, baggage claim, security screening and car rental. The departure lounge area serves as a waiting area for departing passengers and a location to receive arriving passengers. The baggage area provides required back-of-house space for outbound baggage screening equipment.

As typical with the dynamic lifespan of a growing airport, Eagle County Regional Airport is the result of an original terminal and several expansions/additions. The terminal was originally constructed in 1996 and has had two large expansions. The first expansion occurred in 2001 to provide additional space at the concourse, baggage claim and ticket lobby. The “Outbound Baggage Expansion” was constructed in 2007.

1.3.1.1 ORIGINAL TERMINAL

The original terminal, constructed in 1996, was approximately 29,590 sf. It was designed and constructed under the 1991 edition of the Uniform Building Code (UBC). The occupancy classification was designated as A2.1 – Any building or portion of a building having an assembly room with an occupant load of 300 or more without a legitimate stage, including such buildings used for educational purposes and not classified as Group E or Group B, Division 2 Occupancy. The associated construction types were Type V-1 hour (for the majority of the building) and Type IV – Heavy Timber (in the public lobby area). The more restrictive of the two was the Type V-1 hour, thus it was used for the determination of the allowable area. The base allowable area of 10,500 sf was increased due to appropriate building separation on three sides, and the inclusion of an automatic sprinkler system. The building could accommodate up to 63,000 sf of space under this type of construction. See **Figure 1.7**.

It is apparent that the original structure was designed with future expansion in mind, specifically for an additional concourse to the west. As the original structure was intended as a single occupancy there were not any rated partitions or fire separations within the interior of the building. One hour walls were provided on the exterior at the bag make-up area (to the east) as the spacing between East-West oriented walls prompted a rated condition per the code. In preparation for future concourse expansion to the west, the East-West wall bordering the bag claim and the North-South throat from terminal to concourse were also constructed with a one-hour fire rating.

1.3.1.2 TERMINAL BUILDING EXPANSION

In 2001, the terminal was expanded by 32,340 sf. The expansion was made up of four separate components: baggage claim expansion; ticket lobby expansion; west concourse expansion; east concourse expansion. These expansions were designed and constructed under the 1997 UBC, although the basic allowable areas and requirements did not differ from the 1991 UBC. Thus, the total allowable area of 63,000 sf determined during the original building construction still applied. The total building area at the completion of these expansions was 61,930 sf. See **Figure 1.7**.

The expansions all continued the same types of construction utilized in the original construction (Type V-1 hour and Type IV-Heavy Timber). The structural grids were replicated at the same spacing in the new areas, and new construction was tied directly into the existing. No special provisions were indicated on the drawings to assume anything other than the continuation of existing materials and methods.

1.3.1.3 OUTBOUND BAGGAGE EXPANSION

The 2007 expansion increased the footprint of the building by 21,800 sf (and a 5,000 sf mezzanine). The baggage make-up area was infilled and covered in the southwest corner of the facility. The available construction documents indicate that the expansion was designed and constructed under the 2003 edition of the International Building Code (IBC). The building was clearly separated into three specific zones (see **Figure 1.7**):

Zone	Area (sf)	Construction Type
Terminal Area	39,200 sf	Type II Construction
Departure Lounge Area	26,400 sf	Type V Construction
Baggage Area	21,800 sf (+5,000 sf mezzanine)	Type II Construction

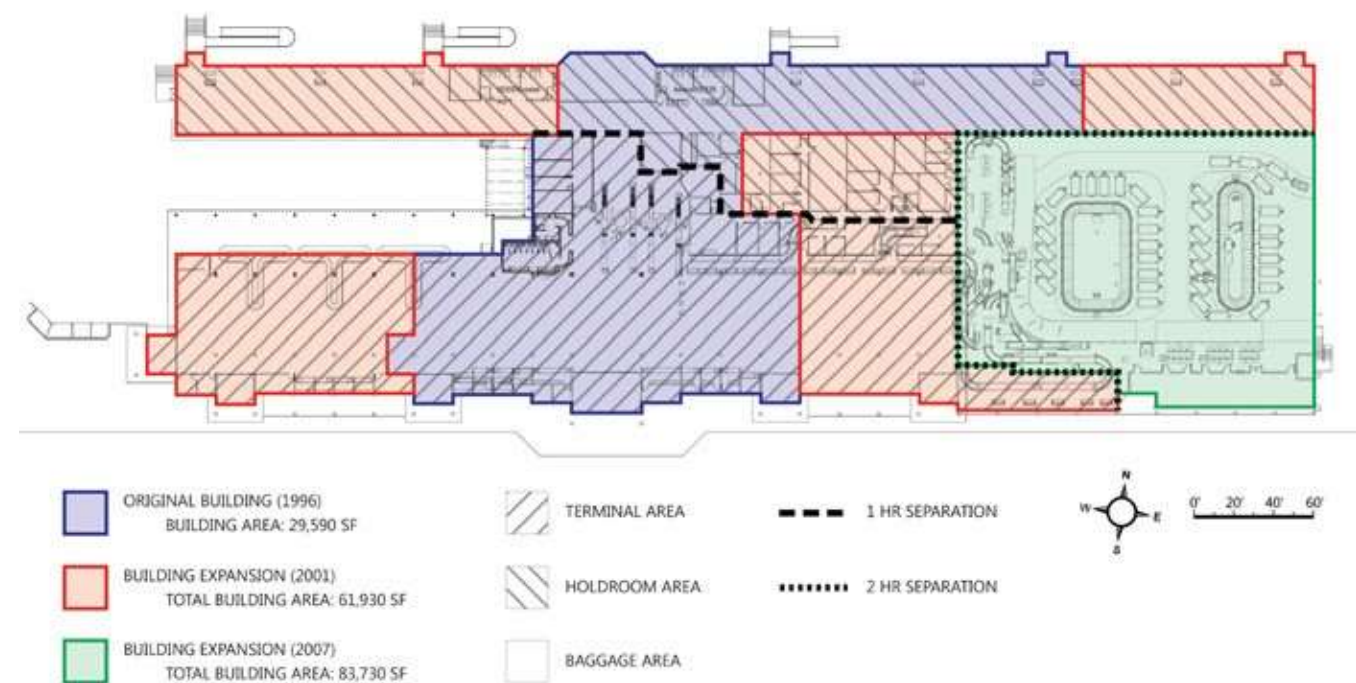
As depicted on the drawings there is a 1-hour separation wall between the Terminal Area and the Holdroom Area, and there is a 2-hour separation wall between the Baggage Area and the other two areas. Neither of these separation walls appear to conform to the IBC definition of Fire Wall as they are not of the required rating, nor do they extend up through the roof to at least 30 inches above adjoining roofs (IBC section 705). They seem to delineate construction types.

1.3.1.4 FUTURE EXPANSION CONSIDERATIONS

Future expansions to the terminal will require a comprehensive assessment of the existing layout, the types of construction (existing and proposed), and the decision to either continue down the path of maintaining a mixed-use building classification or graduate to the covered mall provisions of the IBC section 402.

Under the current 2006 IBC adopted by Eagle County Building Department, the Section 402.2 definition of covered mall building includes passenger transportation terminals. Waiting areas in transportation terminals are also classified as A-3 occupancies. Section 402.1, Exception 2, states that buildings need not comply with the covered mall provisions when they totally comply with other applicable provisions of the IBC.

FIGURE 1.7
TERMINAL BUILDING ZONES AND FIRE WALLS



Source: RS&H, 2015

1.3.1.4.1 MIXED USE

The IBC does not specifically address passenger transportation terminals in any other sections. Therefore, to comply with the “other applicable provisions” the building would have to be classified as a mixed-use building. The primary uses would be assembly, mercantile, and business. The nearest classification for the general public areas would be assembly.

Per Section 506 of the IBC for a fully sprinklered building, with a 100% accessible perimeter building, and A-2/A-3 occupancies (most restrictive occupancy), the allowable building areas (building footprint per floor) are as follows:

Per 2006 IBC Table 503:

Type II B footprint area, A_t : 9,500 sq. ft.
 Type V B footprint area, A_t : 11,500 sq. ft.
 All permit 2 stories.

Allowable Area (Section 506):

$$A_a = A_t + (A_t \times I_f) + (A_t \times I_s)$$

A_t = Table 503 area

$$I_f = \text{frontage increase} = (F/P - 0.25)W/30$$

F = accessible perimeter

P = total perimeter

F/P = 1 with the complete perimeter accessible

W = width of the accessible perimeter (30 ft maximum) = 30

$$I_f = (1 - 0.25)30/30 = 0.75$$

I_s = sprinkler increase = 2 for more than one story and 3 for one story

Existing Building - Single Story Allowable Area:

$$\text{Type II B; } A_a = 9,500 + (9,500 \times 0.75) + (9,500 \times 3) = 45,125 \text{ sq. ft.}$$

$$\text{Type V B; } A_a = 11,500 + (11,500 \times 0.75) + (11,500 \times 3) = 54,625 \text{ sq. ft.}$$

Existing Building – Actual Areas:

Building Area	Existing Area (sf) ¹	Allowable Area (sf)	Expansion Area (sf)
Terminal Area	39,200 sf	45,125 sf	5,925 sf
Holdroom Area	26,400 sf	54,625 sf ²	28,225 sf
Baggage Area	21,800 sf	45,125 sf	23,325 sf

The primary concerns with utilizing the mixed-use classification would be:

- Area Limitations: As seen above the allowable areas could be limiting depending on extent of projected growth, as well as the openness of spaces to accommodate passenger flow
- Fire Proofing: The requirement for fire-rated construction for existing structural members
- Existing Building Fire Separations: Imposing of fire rated walls to create separate buildings in the existing areas
- New Construction Separations: The potential application of additional fire separation walls between the existing and new additions while still allowing the operational characteristics necessary for a terminal facility.

¹ It is important to note that in order for these areas to be accurate, fire separation walls would have to be clearly defined and installed if they do not currently exist.

² The existing building area is indicated for a Type V one-story structure. It is likely that any concourse (departure lounge) addition would be a two story endeavor thus resulting in an allowable area of 43,125 sf, offering an expansion of 16,725 sf. This is for information only, as the construction of a new concourse component would likely result in the demolition of the existing and construction of new Type II B building (allowable area of 45,125 sf).

1.3.1.4.2 COVERED MALL

Most, if not all, terminal buildings today are designed under the Covered Mall provisions of the IBC. The reasoning is that the provision allows for unlimited building area when the structure is surrounded on all sides by open space of not less than 60 ft (of which Eagle County Regional Airport complies). This is highly beneficial for airport terminals as it allows for:

- Large open spaces that are conducive to terminal activities
- Ease of expansion (as related to code requirements) that comes with ever growing traffic and passenger demands
- Ease of interior renovation (as related to code requirements) that comes with changing TSA requirements, always evolving concessions, insertion of new air carriers, and airline equipment updates

Imposing the covered mall provision into an existing facility can have some ramifications that need to be assessed further before committing to this direction. Code compliance requires, among others, the following:

- **Distance to Exits:** The travel distances are limited to 200 feet within each tenant space and 200 feet from any point in the mall to an exit. Additionally, the waiting areas in a transportation terminal are classified as A-3 occupancies, which have a total travel distance limitation of 250 feet.
- **Mall Width:** A minimum width of the mall public circulation area shall be 20 feet.
- **Fire Resistance Rated Separation:** Requires 1-hour fire resistance rated separations between tenants (not between tenant and mall). Separation only needs to extend to the underside of a ceiling that is not part of the fire-resistance rated assembly.
- **Automatic Sprinkler System:** Requires an automatic sprinkler system throughout, and the system for the mall is to be either independent to that of the tenants, or independently controlled.
- **Standpipes:** The covered mall shall be equipped with a standpipe system as per IBC section 905.3.3.
- **Standby Power:** Covered mall buildings exceeding 50,000 sf shall be provided with standby power systems that are capable of operating the emergency voice/alarm communications system.
- **Emergency Voice/Alarm Communications System:** Covered mall buildings exceeding 50,000 sf shall be provided with an emergency voice/alarm communications system.
- **Fire Department Access to Equipment:** Rooms containing controls for air-conditioning systems. Automatic fire-extinguishing systems or detection, suppression or control elements shall be identified for use by the fire department.

Further investigation during design will help identify the appropriate approach.

1.3.2 STRUCTURAL

The structural assessment of the terminal building follows the same chronology as that of the architectural with a focus on foundations, vertical load carrying systems, and lateral load resisting systems.

1.3.2.1 ORIGINAL TERMINAL

The ticketing, baggage claim and lobby spaces in landside area have exposed glulam trusses supporting glulam joists and beams. The large exposed trusses have a clear span of 40'-0" and are supported by wood posts with isolated concrete spread footings. In “non-public” spaces of the landside area and the concourse, roof framing is comprised of pre-engineered wood trusses spaced at 2'-0" on center.

Exterior walls of the entire original terminal are comprised of plywood sheathed, six inch wood stud framing supported by a concrete stem wall and a continuous concrete footing founded at 4 feet below grade. The exterior walls and some interior walls serve as shear walls for the lateral force resisting system. A four inch thick slab on grade reinforced with welded wire fabric is typical throughout the terminal.

1.3.2.2 TERMINAL BUILDING EXPANSION

The 2001 expansion added approximately 30,000 square feet by enlarging the ticket lobby, baggage claim and concourse. Structural drawings of the expansion were not available, but review of the architectural documents indicates that the expansion construction was similar to the original terminal's construction. See the section above(1.3.2.1 Original Terminal) for specific information.

1.3.2.3 OUTBOUND BAGGAGE EXPANSION

The 2007 expansion consisted of a 22,000 square foot addition east of the ticket lobby to serve as outbound baggage screening area. This addition is comprised of a steel framed superstructure. A sloping metal roof deck is supported by steel beams and joists. The secondary framing members span to steel girders that frame into steel tube columns supported on isolated concrete spread footings. The addition includes a 5,600 square foot mechanical mezzanine framed with steel beams and steel columns supporting a five inch thick concrete slab over metal deck. Lateral forces for this addition are resisted by steel braced frames.

1.3.2.4 FUTURE EXPANSIONS / ADDITIONS

Future expansions of the terminal will face challenges as it pertains to the existing concourse structure. Because the existing concourse consists of wood framed walls and pre-engineered wood trusses, any expansion that widens the existing concourse or has a second story will likely require complete demolition of the concourse elements.

1.3.3 MECHANICAL, PLUMBING, FIRE PROTECTION

The mechanical, plumbing and fire protection assessment of the terminal follows the same chronology as that of the architectural with a focus on the individual systems.

1.3.3.1 ORIGINAL TERMINAL

The mechanical systems serving the original terminal consisted of chilled water cooling and hot water heating systems with a mixture of large volume air handling units and four pipe fan coil units. The chilled water system was fed by an air cooled chiller with nominal 70 tons of cooling capacity. The original main heating plant consisted of four natural gas fired boilers with primary and secondary circulating pumps. This system also served the snowmelt systems for the terminal. The capacity of the system for the 1996 original terminal was approximately 1.8 million btu/h.

The plumbing systems for the original terminal were fed by a 6" water main to feed both domestic water and fire protection supply systems from the west side of the building. Sanitary sewer for the 1996 terminal construction connected to a 6" gravity main on the west side of the building.

The original 1996 terminal building was provided with a fire sprinkler system throughout the building.

1.3.3.2 TERMINAL BUILDING EXPANSION

In 2001, the terminal added approximately 30,000 square feet by expanding the ticket lobby, baggage claim and concourse.

The chilled water plant for the building was not expanded in 2001, maintaining its original 70 ton nominal cooling capacity. The chilled water system was also noted in 2001 to have 30% propylene glycol solution in the chilled water loop. The approximate Square Foot/Ton ratio for the building after the 2001 expansion was 928 sf/ton, assuming the chiller was providing its full 70 ton nominal rating. The presence of propylene glycol in the system would de-rate the chiller capacity from its 70 ton nominal rating, so the ratio is even higher. A typical sf/ton ratio for cooling is approximately 350-400 sf/ton. Thus the existing chiller system was undersized to provide proper cooling after the 2001 expansion.

The heating plant for the building was modified and provided with four new boilers rated to provide 1.6 Million Btu/h each, for a total heating capacity for the building, including snowmelt, of 6.4 million Btu/h. The heating capacity for the building after the 2001 expansion appears to be adequate.

The plumbing systems were expanded in the 2001 building expansion to serve new restrooms located in the expansion areas, but these were fed from sources internal to the existing building. Thus, the main system connections remained in the same location and size as the 1996 construction. There was some site utility construction to relocate the existing underground utilities to avoid the new building expansion, but the plumbing and fire protection system connections were not affected.

1.3.3.3 OUTBOUND BAGGAGE EXPANSION

The 2007 expansion consisted of a 22,000 square foot addition east of the ticket lobby to serve as outbound baggage screening area.

The mechanical systems for this outbound baggage area consisted of roof mounted gas-fired make-up air units to provide ventilation air and heating to these areas. These new units were not connected to the existing chilled water cooling and hot water heating systems.

In the 2007 baggage expansion, the domestic water supply system and the fire protection supply systems were modified to provide a separate and independent fire sprinkler supply line to the building. This line was located at the east end of the new expansion and routed across the roof to connect to the existing fire protection system.

1.3.3.4 FUTURE EXPANSION CONSIDERATIONS

Future expansions of the terminal will require replacement and upgrade of the existing cooling and heating systems to meet the new capacity requirements of the expanded building. The existing chilled water cooling system is already undersized to adequately serve the building's cooling requirements.

The age of the chiller and air handling equipment is also a concern as these units are approaching 20 years old. The normal life expectancy for air cooled chillers and air handling units is approximately 20 years according to the ASHRAE 2007 HVAC Applications handbook.

The existing boilers still have approximately 10 years of useful life, and thus any increase in heating capacity for the plant would likely be accomplished through the installation of additional boilers to provide additional capacity. These additional boilers could be located in the same area as the existing boiler plant, or in a remote stand-alone configuration to support the building expansion only.

The need to replace the chiller to provide additional cooling capacity, allows some flexibility in the consideration of building expansion options. The new chiller system location can be somewhat flexible to accommodate building expansion.

Air distribution systems to the building expansions would consist of independent air handling units sized and located to serve the building expansion areas independently with only hydronic piping connections back to the existing chilled water and heating water plants.

Plumbing and Fire Protection systems appear to be easily adaptable to any expansion options for the building. The site utility lines for sanitary, domestic water and fire protection supply systems appear to be adequately sized to accommodate significant growth in the terminal building size. The covered mall code concept will require standpipes at entrances and other critical areas. There may need to be some site utility reconfiguration to accommodate expanded building footprint, but as has been proven in the past at Eagle County Regional Airport, this is generally not a roadblock to expansion.

1.3.4 ELECTRICAL

The electrical assessment of the terminal follows the same chronology as that of the architectural with a focus on the individual systems.

1.3.4.1 ORIGINAL TERMINAL

The Electrical systems serving the original terminal consisted of one 1600 amp 208/120v 3 phase service feeding a fused main Switchboard MDP which fed the chiller, conveyors, lighting and power distribution panels. The airfield lighting was tapped at the utility transformer and was provided with a separate service feeder from the main terminal. Lighting consisted of Metal Halide fixtures in the ticketing, baggage claim and TSA Inspection area. The holding areas contained an assortment of incandescent and T8 parabolic fluorescent fixtures.

1.3.4.2 TERMINAL BUILDING EXPANSION

In 2001, the terminal added approximately 30,000 square feet by expanding the ticket lobby, baggage claim and concourse. The electrical distribution was expanded in 2001 to a 1200 amp power panel SDP2 and an 800 amp power panel SDP1 were added. The same fixtures were used in the new holding areas, new ticketing, and the new baggage claim areas. The outbound baggage area used a combination of wall and ceiling mounted 250 watt metal halide fixtures. The new curbside check-in uses incandescent down lights.

1.3.4.3 OUTBOUND BAGGAGE EXPANSION

The 2007 expansion consisted of a 22,000 square foot addition east of the ticket lobby to serve as outbound baggage screening area. The electrical distribution was only slightly modified for the conveyor system, screening, and new outbound baggage area. Additional lighting in the screening area consisted of more 250 watt metal halide fixtures.

1.3.4.4 FUTURE EXPANSION CONSIDERATIONS

Future expansions of the terminal will possibly require new or a second electrical service for the new HVAC systems in the building expansion. The existing distribution system has indicated a fault duty of 100,000 amps for the equipment, thus requiring fused disconnect switches. This fault level should be validated and consideration for using circuit breaker switchboards in the future expansion if below 65,000 amps. This would eliminate some single phasing issues of three phase motors and the need for a large store of fuses. Generally there appears to be limited number of areas for charging phones and laptops throughout. Consideration should be given to providing charging stations in any existing and expanded holding areas.

The existing system's lighting control should be incorporated in future design in order to meet the current energy code. Consideration should be given to expanding the required new system into the existing spaces. Consider providing occupancy sensors in rest room and office areas. The areas with natural light such as the holding areas should use dimming fixtures with continuous photocell control daylight harvesting. Common areas should be controlled with a time clock to reduce energy usage during hours the airport is closed. Night lighting could be provided for security as required.

The existing incandescent down light fixtures should be replaced with LED equivalent and the LED down lights used in the new holding areas to match. Accent lighting should use LED wherever possible. The lumen efficiency of the existing fluorescent fixtures in the holding area is low (68.4%) compared to newer fixture available (86%). Consider upgrading to LED volumetric fixtures in the holding areas. Replacing the large pendant fixture 1000 watt lamps and ballast with electronic dimmable 875 watt pulse start metal halide lamps should be considered especially where there is daylight harvesting opportunities near the clearstory windows and the cupola. The existing emergency exit signs are fluorescent, consider replacing with LED exit signs for energy savings. As the design process begins for terminal update projects, sustainability initiatives should be closely examined and implemented throughout.

1.4 TERMINAL BUILDING PROGRAM REQUIREMENTS

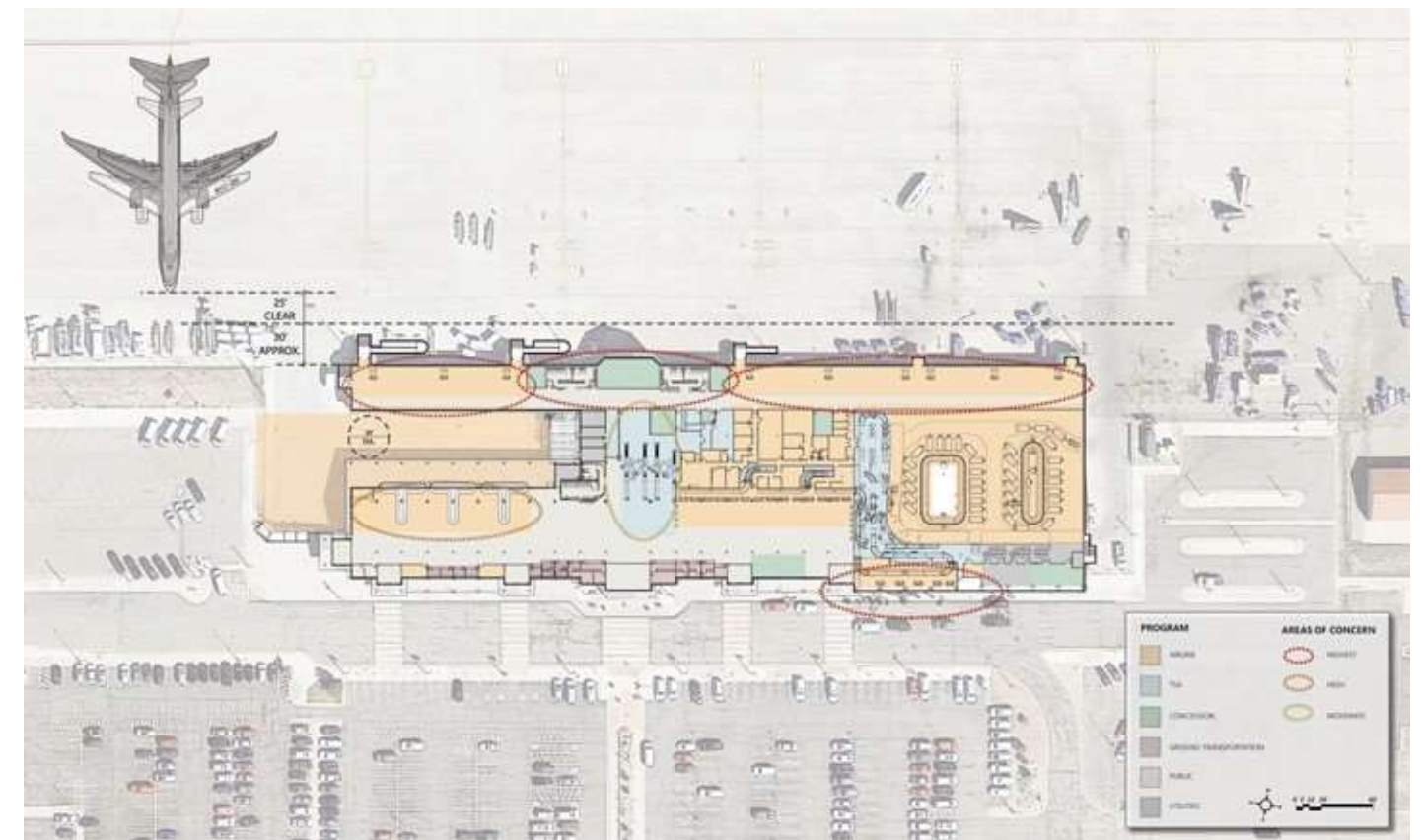
The Eagle County Regional Airport terminal building is specifically designed to serve commercial airline passengers. This section focuses on the terminal environment and how passengers are processed to and from their enplaning/deplaning aircraft. Enplaning passengers flow through the building beginning at the curbside, working their way into airline ticketing spaces (as needed), through the central TSA screening checkpoint, and on into the secure airside facilities which primarily consist of circulation space, departure lounges, and a central concessions area. Deplaning passengers proceed through the airside departure lounges into the airside circulation space, through the central corridor, and into the landside baggage claim area, which also serves as the meeting and greeting point for commercial vehicle operators and others. The landside area of the terminal also houses rental car agencies for arriving and departing passengers. Non-customer fronting space consisting of airport, airline, and other tenant leased space was also considered in this assessment, but is not the primary focus of further analysis.

The four deficient terminal areas identified in this study are highlighted in **Figure 1.8** and include:

- Curbside/Check-in
- TSA Screening Checkpoint
- Departure Lounges
- Baggage Claim

These deficiencies were evaluated as a means to develop conceptual alternatives for needed terminal projects. These concepts will aim to provide drastic and much needed improvements to the Airport's current level of service during the peak events discussed in **Section 1.2**. As discussed prior, changes to these primary areas paired with future design activity level increases will impact adjacent areas. The area impacted most by this is the TSA screening checkpoint, therefore it will also be addressed as an element of these program requirements.

FIGURE 1.8
TERMINAL PROGRAM AREA HOTSPOTS



Source: RS&H, 2015

Terminal building programmatic requirements were determined based on the design activity passenger demand level. An analysis was conducted to determine if a delta existed between the amount of existing space and the space required to maintain an adequate level of service (LOS). LOS is a measure of passenger flows, level of delay, and level of passenger comfort. Two reputable industry resources have performed research and developed rating systems that discuss methodologies and recommendations for determining the LOS. These organizations are the International Air Transportation Association (IATA) and the Airport Cooperative Research Program (ACRP). **Table 1.1** shows the LOS ratings and attributes used in this study.

TABLE 1.1
TERMINAL LEVEL OF SERVICE

GRADE	LEVEL OF SERVICE	FLOW	DELAY	COMFORT LEVEL	
A	Over-design	Excellent	Free	None	Excellent
B		High	Stable	Few	High
C	Optimum	Good	Stable	Acceptably brief	Good
D	Sub-optimum	Adequate	Unstable	Acceptable for short periods	Adequate
E		Inadequate	Unstable	Unacceptable	Inadequate
F		Unacceptable	Cross flows	System breakdown	Unacceptable

Sources: ACRP Airport Passenger Terminal Planning and Design (2010) and IATA Airport Development Reference Manual: 10th Edition (2014)

IATA and ACRP guidance is an excellent place to begin evaluating an airport’s required level of service, but this guidance is generalized and primarily targeted toward hub airports serving higher traffic than EGE. EGE does not necessarily “fit the mold” of these models and therefore, while the guidance was used as starting metric, formulas for calculating programmed spatial requirements were tailored to the unique nature of Eagle County Regional Airport. These assumptions will be discussed in further detail in each program area section.

1.4.1 CURBSIDE/CHECK-IN

As departing passengers arrive at the Airport terminal they need to be able to perform ticketing and baggage check functions. The curbside/check-in program area was found to operate at LOS “E” in the 2014 Master Plan due to its high level of usage, high demand, and limited number of stations. The Master Plan estimated 35% of passengers use this service, but during the observed peak event this area accommodated roughly 50 percent of departure bound passenger traffic. The lack of curbside width creates congestion for pedestrian movement as people are dropped off by vehicles and queue up for the curbside check-in facilities. Curbside roadway lane space is then designated for passenger movements, reducing the available roadway for arriving vehicles.

FIGURE 1.9
CURBSIDE/CHECK-IN DURING MARCH 21, 2015 PEAK EVENT



Source: RS&H, 2015

Curbside/Check-in facilities are already in place to accommodate current and future passenger levels, but they are being used as storage and are not set up for check-in operations. Addressing the storage space issues during the terminal expansion is an important component to opening up these units for proper curbside/check-in configuration. The addition of a baggage belt to meet up with existing baggage screening belts would be necessary to make this space functional and doing so would be relatively simple and cost-effective.

TABLE 1.2
CURBSIDE AREA PROGRAM REQUIREMENTS

DESCRIPTION	2015 OBSERVED	DESIGN ACTIVITY LEVEL
Annual Enplaned Passengers	217,829	278,811
Total Peak Hour	1,189	1,750
TPH Enplaned	566	842
TPH Deplaned	623	908
Curbfront		
Enplaning	300 If	391 If
Deplaning	400 If	514 If
Total Curb Front	700 If	905 If

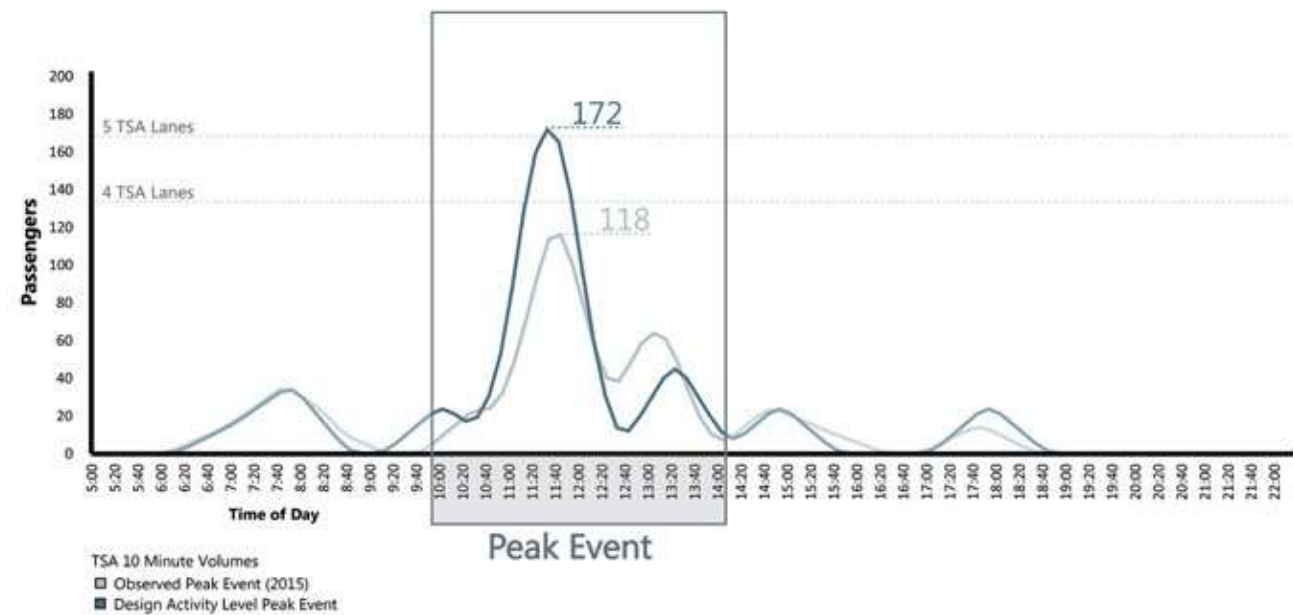
Source: RS&H Analysis, 2015

The length of the curbside available for passenger pick-up and drop-off is important when considering passenger safety and overall experience when entering/exiting the airport terminal. Landside/roadway mode choice data recorded the highest use as commercial vehicle (CV) traffic (shuttle, taxi, limousine) pickup/drop-offs. This is likely the result of the high percentage of tourist travelers going to/from the region. Rental usage was the second highest ground transportation mode used but there was also a significant amount of passengers using privately owned vehicles (POV). Looking at future enplaning and deplaning passenger loads and vehicular choice behaviors result in the eventual need for slightly longer curb space. There is a need for approximately 100 feet of additional departure side curb length with another 100 feet of curb required for arriving passengers.

1.4.2 TSA SCREENING CHECKPOINT

All passengers and baggage boarding a commercial aircraft require security screening prior to boarding. The TSA screening checkpoint at EGE is positioned in a central corridor and acts as a filter between landside and airside terminal areas. The checkpoint currently houses four lanes, each having a screening device, and TSA staffing numbers that are required to increase during peak events in order to accommodate the high levels of anticipated passenger traffic. As noted in **Section 1.2 Peak Hour/Peak Event Passengers and Design Activity Level**, research has shown TSA screening can handle up to 200 passengers per hour in optimal conditions. Under this assumption, 10 minute checkpoint volumes will reach a future maximum of 172 people between 11:20am and 11:30am of the design activity level peak event. **Figure 1.10** shows a comparison between the observed and design activity level TSA passenger throughput and demonstrates the eventual need for a fifth lane at the screening checkpoint. Security screening is an important function that will likely be impacted by any terminal expansions and must be configured appropriately to handle future passenger levels while allowing room for future lane expansions.

FIGURE 1.10
TSA 10 MINUTE SCREENING VOLUMES FOR OBSERVED DAY AND DESIGN ACTIVITY LEVEL



Source: RS&H Analysis, 2015

1.4.3 DEPARTURE LOUNGES

Departure lounges are dedicated secure-side areas adjacent to departure gates where passengers are able to wait to board aircraft. A total of 11,850 square feet is currently designated as departure lounge area but this space is difficult to delineate because of the way it blends into the airside corridor circulation space. The 2014 Master Plan identified the existing departure lounges as operating under the “worst case scenario” level of service due to their dire need for expansion and reconfiguration (see **Figure 1.11**). This study confirms and reinforces that analysis. Design activity levels show a need for roughly 27,100 square feet, far more than the existing 11,850 square feet.

FIGURE 1.11
DEPARTURE LOUNGES DURING MARCH 21, 2015 PEAK EVENT



Source: RS&H, 2015

According to IATA ADRM 10th Edition, which is the industry standard, terminal departure lounges should function at level of service “B/C”. To provide this LOS they require 18.3 square feet for each sitting passenger and 12.5 square feet for each standing passenger. At this LOS, 70% of people should be able to sit and 30% are expected to stand. The Airport currently has 672 total seats in the departure lounges. A small percentage of these are lined along the internal airside wall and intrude on public circulation space. This adds to the dysfunction of both the circulation corridors and the departure lounges. EGE currently meets requirements in terms of the required number of seats needed during the observed activity level events but operates at a LOS “E” due to the lack of circulation space. Design activity levels show the need for a total of 796 seats to accommodate level of service B/C. This means that as the terminal is expanded

to meet design activity level traffic, 124 more seats will need to be added. The redistribution and addition of necessary seating will need to be considered during the terminal expansion.

TABLE 1.3
DEPARTURE LOUNGE PROGRAM AREA REQUIREMENTS

DESCRIPTION	2015 OBSERVED	DESIGN ACTIVITY LEVEL
Peak Hour Enplaned	566	842
No. of Aircraft at Peak Hour	6	8
No. of Aircraft Seats at Peak Hour	820	1,137
No. Passengers Sitting (70%)	574	796
Departure Lounge Seating Area (18.3 sf per passenger)	-	14,570 sf
No. Passengers Standing (30%)	246	341
Departure Lounge Standing Area (12.5 sf per passenger)	-	4,450 sf
No. Check-In Counter Positions	8	16
Gate Check-In Counter Length (4 ft)	-	64 sf
Gate Check-In Counter Area (10 ft)	-	640 sf
Gate Check-In Counter Area (20 ft)	-	1,280 sf
Deplaning/Enplaning Hall (300 sf per gate)	-	2,400 sf
Circulation (20%)	-	4,420 sf
Structure (2%)	-	470 sf
Reduction Factor for Combined Lounges (5%)	-	(1,190) sf
Total Passenger Departure Lounge	11,850 sf	27,100 sf

Note: Assumptions in italics adopted from IATA Airport Development Reference Manual: 10th Edition (2014), ACRP Airport Passenger Terminal Planning and Design (2010), and March 21, 2015 peak event observations.

Source: RS&H Analysis, 2015

1.4.4 BAGGAGE CLAIM

The 2014 Master Plan noted that baggage counts at EGE are high due to the resort market served by the Airport and a recent increase in international travelers staying for longer periods of time. The level of service in the baggage claim area is unacceptable at LOS “E”. This determination was confirmed during the observed peak event day (see **Figure 1.12**). It is estimated that 90% of passengers check bags on flights arriving to EGE. Additionally, much of this baggage is oversized as passengers bring in their own recreational equipment such as skis and golf clubs which creates a need for more oversized baggage drops.

FIGURE 1.12
BAGGAGE CLAIM AREA DURING MARCH 21, 2015 PEAK EVENT



Source: RS&H, 2015

The busiest 20 minutes of the peak hour for arriving passengers results in 545 people moving through the baggage claim area. The recommended 1.25 feet per passenger baggage claim frontage was adopted from the 2010 *Airport Passenger Terminal Planning and Design* guidance to achieve level of service “C” for the claim belts by the design activity level. **Table 1.4** shows the 2015 observed conditions and facility needs for the planning design activity level.

The baggage claim belt currently has 252 linear feet available to passengers collecting checked bags and 120 feet available for airline bag delivery for a total of 372 linear feet. Forecasted demand levels show a need for 2.5 times that length. Similarly, the passenger active and access spaces in the baggage claim lobby are inadequate for current and future needs with almost double the space of 9,200 square feet required for the design activity level.

The airport currently allots designated space to commercial vehicle operators who efficiently service waiting passengers by quickly recovering baggage as it is delivered. Expanding not only the claim area, but the allocated space for commercial vehicle operators, would assist in providing target levels of service for departing passengers. Additionally, any expansion of this area provides an opportunity to create a better interface between arriving passengers and commercial vehicle operators. The majority of passengers arriving to the Airport make use of commercial vehicle services to reach their final destinations and these operators are squeezed into a small area adjacent to bag claim, encroaching an already cramped space. Fortunately due to the nature of the airport, meeters and greeters are less frequent and commercial operators are efficient and highly organized which alleviates the lack of space issues to at least a small degree. The level of service provided to arriving passengers would benefit greatly from improved baggage claim and more formalized commercial vehicle operator facilities.

TABLE 1.4
BAGGAGE CLAIM AREA

DESCRIPTION	2015 OBSERVED	DESIGN ACTIVITY LEVEL
Peak Hour Deplaning Passenger	623	908
Peak 20 min. Deplaned Passengers (60%)	374	545
Common Baggage Claim		
Passenger claiming bags (90%)	-	491
Meeter/Greeter (50% of claiming passengers)	-	245
Flat Bed Public Frontage (1.25 ft per passenger)	252 lf	613 lf
Off-Loading (0.5 ft exposed frontage)	120 lf	307 sf
Total Claim Device Length	372 lf	920 lf
Claim Lobby		
Baggage Claim Device Area (5 ft)	1,330 sf	3,070 sf
Active Area & Passenger Access (10 ft)	3,750 sf	6,140 sf
Lost Bag Services	690sf	930 sf
Total Baggage Claim Lobby	5,100sf	9,200sf

Note: Assumptions in italics adopted from IATA Airport Development Reference Manual: 10th Edition (2014), ACRP Airport Passenger Terminal Planning and Design (2010), and March 21, 2015 peak event observations.

Source: RS&H Analysis, 2015

1.4.5 SUMMARY

The four terminal program areas that need to be addressed in terminal expansion projects are as follows:

- Curbside/Check-in
- TSA Screening Checkpoint
- Departure Lounges
- Baggage Claim

Table 1.5 shows the breakdown of the observed peak hour/event data, the design activity level data, and the deficiencies between the two planning levels. Airline functional spaces are in the most need of attention with passenger departure lounges demonstrating the highest priority need for expansion. This is followed by the baggage claim area. Curbside/check in facilities can be activated and improved as storage is strategically relocated, however, expansion of actual curb space would still need to be addressed in terminal/landside projects. Future projects need to incorporate and account for impacts to TSA screening checkpoint space when being considered.

TABLE 1.5
TERMINAL PROGRAM REQUIREMENTS SUMMARY TABLE

DESCRIPTION	OBSERVED 2015	DESIGN ACTIVITY LEVEL	DIFFERENCE FROM EXISTING
Total Annual Passengers	217,829	278,811	60,982
Peak Period Passengers (1000-1400)	2,261	2,928	667
Total Peak Hour Enplaned	566	842	276
Total Peak Hour Deplaned	623	908	285
Number of Aircraft Seats at Hour	820	1,137	317
Total Peak Hour Deplaned	623	908	285
Avg. Seats Per Departure	104	114	10
Avg. Load Factor Per Departure	87%	100%	13%
Peak Hour Air Carrier Departures	6	8	2
Number of Gates	5	8	(3)
Terminal Program Area Spaces			
Passenger Departure Lounges	11,850 sf	27,100 sf	(15,250) sf
Baggage Claim Length	372 lf	920 lf	(548) lf
Baggage Claim Area	5,100 sf	9,200 sf	(4,100) sf
Curb frontage Total	700 lf	905 lf	(205) lf

Source: RS&H Analysis, 2015

1.5 LANDSIDE/ROADWAY ASSESSMENT

The landside transportation system at Eagle County Regional Airport consists of access and circulation roadways, including a terminal curb roadway; parking for the public, for employees, and the Vail Valley Jet Center (VVJC); ground transportation services provided by High Mountain Taxi (HMT), Colorado Mountain Express (CME), and other providers; and rental cars. Most of these facilities and services relate to the Terminal Area, and were assessed as part of this study. The exceptions are the parking affiliated with the VVJC and employee parking. The facilities included in this study are shown in **Figure 1.13**, which also presents a color code for the degree to which the various facilities were a concern for this study.

1.5.1 SYSTEM DESCRIPTION

The Terminal Area is served by a one-way terminal loop roadway, typically two lanes wide, which passes in front of the terminal and presents approximately 700 feet of terminal curb roadway. Direct access to the terminal loop roadway is provided by an intersection with Cooley Mesa Road, opposite Spring Creek Road. A secondary access to the terminal loop is provided by Eldon Wilson Road, an on-airport, two-lane, two-way road that runs from Cooley Mesa Road (opposite the intersection with Buckhorn Valley Boulevard) to the terminal loop road. This eastern portal to the airport actually serves a larger total share (57 percent of traffic to/from the airport) than the direct access to the terminal loop. The reason for this is that more traffic accesses the airport from up the Valley, via the interchange with I-70 at Eagle, than from the interchange at Gypsum.

The terminal curb portion of the loop roadway varies from three to four lanes in width. There are five zebra-striped crosswalks along the curb, which decrease by some 125 feet the effective length that can legally be used by vehicles stopping to drop off or pick up passengers. The curb east of the main entrance to the terminal used for departures, is adjacent the ticketing hall and the curbside bag check facilities of the terminal, and has 305 feet of useful curb frontage. Commercial vehicles are assigned to drop off on the eastern "half" of the departures curb, with privately owned vehicles (POVs) permitted to drop off on the western "half". The curb west of the main entrance is in front of the bag claim hall, and is for the exclusive use of POVs picking up passengers. All ground transportation providers have transponder-controlled access to a pick-up lot located immediately west of the bag claim hall, adjacent to the outside pick-up for oversize bags.

One taxi service provider, High Mountain Taxi, has had an exclusive franchise to provide service at EGE for approximately eight years. The contract will be recompeted in a few years. During peak season, HMT has approximately 35 taxis active in the Vail Valley, and roughly 30 percent of their trips are to/from EGE. Approximately half of these arriving passengers have pre-arranged for pick-up. There is a counter in the bag claim hall for walk-up customers. HMT has stalls in the center aisle of the commercial vehicle pick-up lot.

Colorado Mountain Express provides three types of services:

- Reserved express service (in essence, charter service), which is a rarity at EGE
- Shared-ride van service using Ford F350 or Mercedes Sprinter vans
- Private-car service, chiefly using SUVs.

All private car service is pre-arranged, while 80 percent of the shared-ride passengers pre-book their trips. CME has a counter in the bag claim hall for walk-up customers. They pick up their customers in the first and third aisles of the commercial vehicle lot.

There are nearly 40 other ground transportation providers that serve EGE with limousine service, private-car ("black car") service, shared-ride service, or charter bus service. As well, the County transit system, EcoTransit, provides services to the airport at a stop located on the terminal loop roadway some 260 feet from the western door from the bag claim hall.

FIGURE 1.13
LANDSIDE/ROADWAY SYSTEM OVERVIEW AND AREAS OF CONCERN



Source: RS&H Analysis with Curtis Transportation Consulting, 2015

Parking is provided to the public in three areas:

- Short-term Lot: Immediately across the curb roadway from the bag claim hall, this lot is intended for parking durations of 7 days or less. This lot includes handicapped spaces and true hourly spaces (for durations of two hours or less). There are three entry points to this lot, and three exit points, all from/to the loop roadway. Until June 1, 2015, this lot was free; now the fee is \$8/day, and payment is made at one of three kiosks in the vestibules of terminal doorways 3, 4, or 5.
- Long-term Lot: Located a minimum walk west from the main terminal door of 970 feet, this lot has its entry and exit from Cooley Mesa Road, not from the on-airport roads. It is unpaved, and serves parking durations of less than 30 days. As with the Short-term Lot, this lot was free until June 1, 2015. Now there is a fee of \$6/day, also payable at the kiosks.
- Free long-term parking (30 days) is located east of the terminal and south of Eldon Wilson Road, across from the VVJC, in two unpaved lots, which are more than 1,500 feet from the main terminal door. Additional long term parking (30 day) is available further east along Eldon Wilson Rd.

Seven brands of rental cars serve EGE: Alamo, Avis, Budget, Dollar, Hertz, National, and Thrifty. Rental ready cars are picked up by customers in the lot across from the ticketing hall, where signs direct them to the stalls assigned to each company. Most cars are returned to designated spaces in the lot in front of the old terminal building which now forms the west wing of the VVJC. Customers of Dollar and Thrifty return their cars to two lanes in the rental car service area, which is under common ownership by the licensee for Dollar and Thrifty. This service area provides "quick turn-around" service of vacuum, fuel, and wash for most companies. Alamo and National vacuum and wash their cars in a building on Buckhorn Valley Boulevard, but buy fueling services from Cooley Mesa Leasing, which has a long-term contract for the rental car service area. Hertz also does minor repair, oil changes, etc., in a building it leases from the airport east of the VVJC.

1.5.2 PEAK HOUR ACTIVITY AND CURRENT LEVELS OF SERVICE

Landside activity (traffic volumes, demand for parking and ground transportation, etc) all follow the peak of passenger activity. The peak season runs from the weekend before Christmas through Easter Monday. The exact peak day varies year-to-year based on the calendar, with the Christmas holidays, President's Day weekend, and several weeks in March around Spring Break typically creating the activity peaks at EGE. During this past season, the peak day of passenger activity was at Christmas.

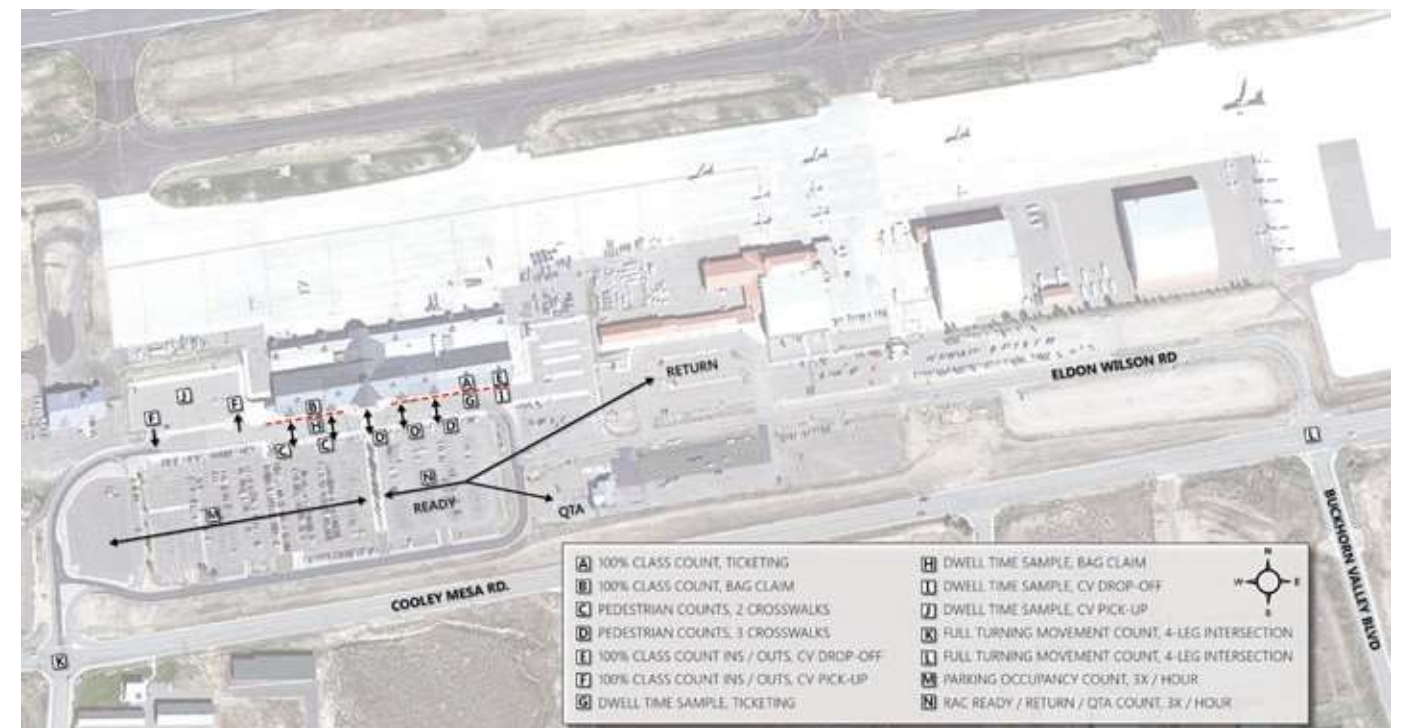
Data to drive this study's landside analyses were collected in March 2015, with automated traffic recorder counts taken at eight locations from March 14 through March 21 (**Figure 1.14**). Manual counts of traffic and pedestrians, of parking and rental car lot occupancy, of vehicle dwell time on the terminal curb, and of passengers alighting from commercial vehicles were made on Saturday March 21, 2015. **Figure 1.15** shows the locations of these varied counts. Using the passenger activity information (originations and terminations) from the busy days in March 2015 and December 2014, the collected data were adjusted to reflect the landside activity of the peak hours and days of the 2014 -2015 ski season. The March data were factored upward by 17 percent to account for the busier passenger activity in December.

FIGURE 1.14
LOCATIONS OF 8 DAYS OF AUTOMATED TRAFFIC COUNTS



Source: RS&H Analysis with Curtis Transportation Consulting, 2015

FIGURE 1.15
LOCATIONS OF MANUAL COUNTS (MARCH 21, 2015)



Source: RS&H Analysis with Curtis Transportation Consulting, 2015

1.5.3 ROADWAY TRAFFIC

Figure 1.16 shows the estimated traffic volumes for the peak day and in the peak hour of the peak day in December 2014. There are approximately 2,700 daily vehicles into and out of the airport on the peak day. The east entrance/exit is busier than the western portal over the course of the day. The actual peak hour of the day starts as early as 10:30 AM for certain roadway segments that carry more traffic related to departing flights, and as late as 12:00 noon for segments carrying more traffic related to arriving flights.

There are several distinct characteristics to traffic at Eagle County Regional Airport:

- The ratio of the peak hour volume to the daily volume varies between 15 – 18 percent. At many airports where the air service is spread more throughout the day, this ratio is typically in the 10 – 12 percent range. The EGE ratios reflect the intensity of the current air service schedules in the very busy midday peak.
- Some 62 percent of the total traffic entering the airport drives past the terminal on its curb roadway. This is rather unusual, as at most airports, less than 40 percent of traffic passes across the terminal curb. The high volume at EGE stems from the layout of the on-airport roadway network. There is one destination that can only be reached by driving past the terminal – the commercial vehicle pick-up lot. The employee parking lot and the administration building are also located such that one must pass the terminal to access them unless one knows to cut through the Short-Term parking lot's western end.
- As well, Short-Term Parking is only accessible from the primary eastern entrance by driving across the terminal curb roadway, and the western exit is only accessible from the Rental Car Ready Lot (and from two of the three Short-Term Parking Lot exits) by driving past the terminal on its curb roadway. The result of the network's layout is that there is too much traffic congesting the terminal curb, traffic which otherwise would not need to be on that roadway.
- With the dual entrances and exits served by both a one-way roadway (the western portal) and a two-way roadway (the eastern portal), there are a number of roadway segments that carry both inbound and outbound traffic. This becomes confusing to some drivers, as the signing on such segments needs to provide two sets of information – information for traffic coming to terminal-area destinations, and information on where and how to exit the airport. In general, it is a rule of thumb that such overlapping traffic movements should be avoided.

With the exception of the terminal curb roadway (see below), all the roadway segments on the airport operate well, at Levels of Service A or B³, as indicated by the green shading of the volumes in **Figure 1.16**.

1.5.4 INTERSECTIONS

The traffic volumes for the two intersections on Cooley Mesa Road that serve as portals to Eagle County Regional Airport are shown in **Figure 1.17**. The volumes are estimated for the peak hour of the peak day of the 2014–2015 ski season, based on the March 2015 counts⁴. The intersections are stopped controlled on the side streets, meaning that through and right-turning traffic on Cooley Mesa Road flows uninterrupted, the highest level of service. Left-turn lanes are provided in both directions on Cooley Mesa Road so that left turn traffic does not interrupt through traffic. These left turn movements must yield to opposing traffic. All other movements must stop before proceeding. With the one exception of the traffic turning left while exiting the east end of the airport, all movements operate at Levels of Service A or B. The exiting left turns from Eldon Wilson Road operate at a LOS C from a left-turn lane. While this is not an issue today, this movement could become problematic with growth in airport activity.

³ Transportation engineers use a scale of A through F to designate the quality of operations, or level of service (LOS), of many landside elements, including roads and intersections. For an airport such as EGE, the targeted value during the peak hours of the peak days should be a LOS of C or better. Below C, traffic flow begins to experience enough delay and congestion that poor traffic operations can hinder the user experience at the airport.

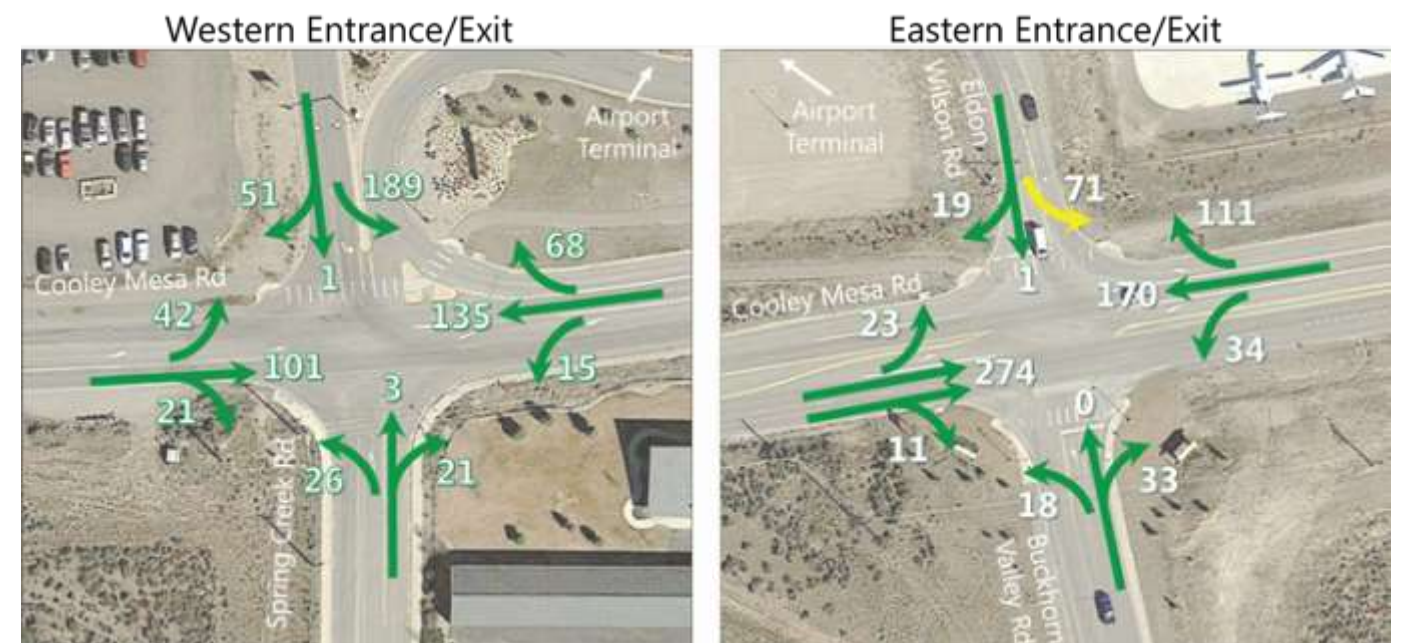
⁴ The reader may note a difference in the estimated peak-hour volumes shown in **Figure 1.16** and **Figure 1.17**, for movements into and out of the airport at Cooley Mesa Road. Both estimates derive from data collected in March 2015. The automated traffic recorder volumes for the northbound volumes into the airport, and the southbound volumes out of the airport at Cooley Mesa Road generally were higher than the manual counts taken at these locations during the same hours of Saturday, March 21, 2015. The differences may stem from a variety of error sources. Overall, the planning team has greater faith in the manual counts, and has used its professional judgment in the analysis of current and future conditions. All the conclusions on the adequacy of the roadways and intersections in question remain the same regardless of which data were used, and all operate now and in the future at a sound level of service.

FIGURE 1.16
PEAK HOUR AND PEAK DAILY TRAFFIC VOLUMES



Source: RS&H Analysis with Curtis Transportation Consulting, 2015

FIGURE 1.17
PEAK HOUR AT THE TWO AIRPORT PORTAL INTERSECTIONS ON COOLEY MESA ROAD



Source: RS&H Analysis with Curtis Transportation Consulting, 2015

1.5.5 TERMINAL CURB ROADWAY

As shown in **Figure 1.18**, there are three zones with defined roles along the terminal curb, i.e., the commercial vehicle (CV) departures zone, the privately owned vehicle (POV) departures zone, and the POV arrivals zone. In addition, between the two departure zones is a segment of the curb lane which is coned off for use by baggage carts during busy period. During the peak hours, a crew of airport operations staff actively manages the curb to help both commercial and private drivers get to a safe place to unload (or load), and to help others exit from having served a passenger. The staff is very efficient with a positive attitude of helping others through the congestion, with the result being that the curb operates quite effectively despite the intense peaking.

The estimated volumes for the peak hour of the peak day are shown in **Figure 1.18**, both for the number of vehicles stopping in each zone, and the number of vehicles bypassing (driving through without stopping) each zone. For the POV curb zones, the bypass volume is considerably higher, while in the CV zone, which is accessed exclusively by ground transportation providers, the volume of vehicles not stopping is small.

Table 1.6 presents pertinent data regarding these three curb zones. Key observations regarding these data include:

- Limousines, shared-ride vans, and taxis are the dominant modes, bringing the largest share of passengers to the airport.
- While stopping volumes are low, non-stopping traffic is very high for the two POV zones.
- The bypass traffic reduces the quality of service on the terminal curb by providing the friction of traffic looking to move quickly past the stopped vehicles, and those seeking to find a place to stop, or to move out of a stopped position.

While the interpretation of level of service as a function of the volume/capacity ratio (with bypass traffic included in the volume) tends to overstate the severity of the condition, nonetheless it serves as a reflection of the abnormally high bypass traffic's impact on the curb roadway where such traffic really does not belong.

TABLE 1.6
CURB TRAFFIC PEAK HOUR DATA

CURB	ATTRIBUTE	VEHICLE CLASSIFICATION					STOPPING VOLUME	BYPASS VOLUME	BALANCED CAPACITY	VOLUME/CAPACITY		LEVEL OF SERVICE	
		POV	TAXI	VAN	LIMO	OTHER				W/O BYPASS	WITH BYPASS	W/O BYPASS	WITH BYPASS
CV Departures	Percent Stopping	2	25	32	41	0							
	Stopping Volume	1	13	16	21	0	51	29	183	0.28	0.44	A	A
	Mean Dwell Time (min)	3.66	2.50	3.20	2.25	-							
POV Departures	Percent Stopping	95	0	4	1	0							
	Stopping Volume	79	0	3	1	0	83	159	162	0.51	1.49	A	F
	Mean Dwell Time (min)	3.66	2.50	3.20	2.25	-							
POV Arrivals	Percent Stopping	92	0	2	2	4							
	Stopping Volume	51	0	1	1	2	55	154	210	0.26	1.00	A	F
	Mean Dwell Time (min)	7.90	2.50	2.40	0.70	8.00							

Source: RS&H Analysis with Curtis Transportation Consulting, 2015

FIGURE 1.18
TERMINAL CURB ROADWAY CONFIGURATION AND PEAK HOUR VOLUMES



Source: RS&H Analysis with Curtis Transportation Consulting, 2015

The terminal curb sidewalk is nominally 18 feet wide. In a number of locations, there is a modest overhang of the roof, but it provides little shelter during inclement weather. The curb sidewalk widens by approximately 12 feet, the width of the curb lane, in front of Terminal Doorway 3, the main entrance/exit for the terminal. At the curb check-in locations on the eastern end of the terminal, the same sidewalk width is present. The counters inside the check-in areas are placed a few feet towards the interior of the building, but nonetheless, during peak hours, there is not enough queuing space for these counters. The queues block the sidewalk, essentially eliminating longitudinal movement. As a consequence, pedestrians step into the curb lane. Most of this is coned off in front of the curb check-in counters as a space in which sky cabs can maneuver baggage carts, which are essential for many departing travelers with their large number of bags and significant number of oversize bags (e.g., skis). By taking a portion of the curb lane away from vehicles wishing to stop at the departures curbside check-in, the capacity of the departures curb is reduced, as it is elsewhere when pedestrians spill out into the roadway to get around the sidewalk congestion. This exacerbates the impact of traffic bypassing the POV departures curb that otherwise would not need to be on the curb roadway if not for how the roadway network was laid out.

The impact of pedestrian traffic on the curbs was also examined. With five crosswalks within the 700 feet of terminal curb, there are many opportunities for pedestrians to cross conveniently. While most pedestrians do cross within the crosswalks, the pedestrian counts show that 13 percent of people crossing the curb roadway in the peak hour do so outside the crosswalks. The total peak hour pedestrian count is 385 people, with 70 percent walking from the terminal to the short-term parking and rental car lots. This validates the location of Short-Term Parking across from the arrivals area, since there is more of the high-turnover (true hourly, i.e., less than two hour duration) parking related to meeting an arriving passenger than there is associated with dropping off a departing passenger. Conversely, curb volumes for drop-offs are approximately 50 percent higher than they are for arrivals. All in all, the impacts of pedestrians on current curb levels of service is negligible.

1.5.6 PUBLIC AND RENTAL CAR PARKING

Public parking and rental car parking (for ready cars, return cars, and cars being serviced) are the largest uses in terms of the available landside area. Some 27 acres of land are dedicated to these uses. While much of this area is for parking away from the terminal area (and thus not the focus of this study), the closest lots to the terminal contain almost 1,000 delineated spaces, plus the approximately 300 cars that can be accommodated in the rental car service area (assuming that most are parking nose-to-tail). **Table 1.7** presents the space and occupancy counts of the terminal-area parking facilities.

TABLE 1.7
TERMINAL AREA PUBLIC PARKING AND RENTAL CAR LOTS: CAPACITY AND OCCUPANCY

FUNCTION	LOT	TOTAL SPACES	PEAK OCCUPANCY (MARCH 21, 2015)	PERCENT OCCUPIED	ESTIMATED OCCUPANCY, PK HR., PK DAY SKI SEASON	PERCENT OCCUPIED
Public Parking	West, 7 Day	112	57	50.9%	66	59.4%
	East, 7 Day	449	260	57.9%	303	67.5%
	All 7 Day	561	317	56.5%	370	65.9%
Rental Cars	Ready Lot	251	143	57.0%	167	66.5%
	Main Return Lot	112	35	31.3%	41	36.5%
	Dollar/Thrifty Returns	36	8	22.2%	9	25.9%
	All Return Lots	148	43	29.1%	50	33.9%

Source: RS&H Analysis with Curtis Transportation Consulting, 2015

Parking is used by residents of the region who fly out of EGE, who represent some 15 percent of total passengers. The other 85 percent are visitors, who choose a ground transportation mode from those available, including rental car. A parked vehicle belongs to a given person, and only enters and leaves parking with that traveling party. Rental cars are “shared” in the sense that there are multiple users over the course of a season. As well, each rental car has multiple movements related to a given user:

- The car exits the ready lot with the new renter.
- It enters the return lot when that renter completes his stay in the Valley.
- It leaves the return lot to be shuttled to the service area.
- It leaves the service area and enters the ready lot after it has been serviced.

For these reasons, the volume in/out of rental car lots are higher than the volumes in/out of parking facilities.

There are no national or international standards for the level of service of parking facilities at airports (or other land use types, for that matter). Quality of service is generally related to the walking distance and ease of walking between lot and terminal, the availability of parking during peak times, and the ease of finding empty spaces when a lot is nearly full. Judgmentally, the public parking facilities at EGE reasonably provide a good level of service to its customers. The lots are full only rarely, chiefly for a few days during the Christmas holiday period when Valley residents travel to be with family and friends. The walking distances for short-term are a mean of 550 feet and maximum of 1,000 feet from the main terminal door. The 1,000 foot mark is generally considered the upper limit for reasonably maximum parking lot walking distances. Lastly, the layout of the lots is efficient, with good visibility, aisles that run perpendicular to the terminal (for ease of walking within the lots with good wayfinding), and short aisles (21 stalls long, or 210 feet), all of which are favorable to ease of use. The layout of the lots could be more user friendly. As they exist, the lots are divided and contain few if any east-west aisles. They also have multiple entrances, multiple exits, and poor signing to those exits.

The lots historically had been free at EGE. That changed on June 1, 2015, when Republic Parking began operating the lots for the airport. There has been a modest downturn in parking demand in the opening month, as there nearly universally is when parking prices increase. There is also a high reported incidence of public parking in the rental car ready lot, where such violators can be towed. Improved signing is forthcoming, along with a gradual increase in enforcement. The history at other airports where prices have been raised is that within six months, the demand returns to where it had been prior to the parking price increase. Eagle County should be no exception to that experience, as demand for airport parking is, ultimately, relatively inelastic.

The rental car lots are not quite as well located relative to the terminal as is the Short-Term parking lots. The ready spaces are in front of the ticketing hall, yet it is arriving passengers coming from bag claim that wish to pick up their car from the ready lot. This however, is a modest impact, in that it adds at most 200 feet to the average walking distance from the bag claim hall to ready spaces. The return lots are more of a walk from the ticketing hall and curbside check-in. The mean walking distance to curb check-in is 650 feet, while the maximum is nearly 1,000 feet. Moreover, the pedestrian facilities from the return lots are not well located or easy to follow. One consequence of the return lot location is that many users first drop off members of their party at the curb for check-in, while the driver returns the car and walks back to the terminal.

The rental car companies did not report any significant lack of space with either the ready, return, or service areas. They all expressed concern that the three areas (ready, return, and service) are all separated by public roads. This increases the risk of crashes and incidents during shuttling of cars by rental car agents, which in turn increases insurance costs. The time and distance inefficiency of the arrangement is disproportionate to the small size of the airport. This, plus the highly peaked air service, drives up operating costs, and thus prices.

The severe peaking also can drive a reduction in customer service, as it means that on a busy Saturday in ski season (the peak day of the week for both returns and rentals), some companies can have a hard time getting returned cars serviced fast enough to keep up with the customers brought by several flights arriving at nearly the same time.

As with parking, there are no national or international standards for levels of service for rental car facilities. Judgmentally, the area dedicated to rental cars is appropriate to provide good customer service at current demand levels. In regard to efficiency and safety, the rental car issues are more associated with how the facilities are laid out and located than how much area is dedicated to them.

1.5.7 GROUND TRANSPORTATION FACILITIES

The various ground transportation service providers use the following facilities:

- The far eastern end of the departures curb for dropping off passengers. This curb is approximately 200 feet in length upstream of the bag cart zone in front of the American, Delta, and United curb check-in facilities. Further to the east is a pedestrian island that provides an additional 80 feet of curb frontage. This area is used during the peaks when the base area is too congested. Neither drivers nor passengers like this, due to its perceived remote location.
- The commercial vehicle pick-up lot is just west of the terminal. The lot is accessed via the airport’s automatic vehicle identification (AVI) system, which uses RF transponders (similar to toll tags) to provide access to vehicles permitted to do business at the airport. The lot has 68 stalls, which are either reserved for the two franchised providers (CME and HMT), or shared by all other providers. This lot is quite full during the peaks, as it is used both as a waiting area as well as a loading area. Some of the waiting is a natural function of the process by which a driver can leave his vehicle to go into the terminal and wait for, and provide high quality service to, his customer. Much of the waiting, however, is apparently just dead time between trips, as there is not enough time for the driver and vehicle to be dispatched elsewhere and complete a trip before the driver needs to service his next inbound passenger(s).
- The commercial vehicle hold lot. This lot is unpaved, and located adjacent the VVJC where the inbound Eldon Wilson Road turns 90 degrees to the west. It is used by drivers who cannot find a space to wait in the commercial vehicle lot. Other than during the hectic peaks on the busiest days, this lot is underutilized. If there was a restriction on how long vehicles could wait in the pick-up lot, then this lot would see much more activity, and become a true waiting and staging area for the ground transportation providers.
- Counter space inside the bag claim hall. The two franchise providers, CME and HMT, both acquired counter space for customer service inside the bag claim hall, due to winning the bids for such privileges. These counters are staffed principally during peak hours. Half of HMT’s customers use the counter as walk-ups, and 20 percent of CME’s shared ride users book at the counter as walk-ups.
- Ground transportation service drivers can meet their incoming passengers at a small area cordoned off at the far end of the bag claim hall, adjacent the door out to the CV pick-up lot. While there is a sign above the area, when the bag claim hall is full, as it is steadily during the midday peak on busy days, it is very hard for arriving passengers to see and know that is where they are to meet their drivers. Having pre-arranged a ride, and knowing the higher cost of such services, the passengers can get annoyed due to the perceived lack of service they are getting. Both drivers and passengers have expressed concern that this area does not permit the level of service for which the customer has arranged and paid.

The ground transportation providers are the most important modes to the smooth operation of this airport’s landside. They carry relatively high vehicle loads, and the greatest number of passengers. Helping them to provide a high level of service will be an important dimension of the landside improvements in the terminal area.

1.6 LANDSIDE FACILITY REQUIREMENTS

This section presents the forecast of future landside activity, and estimates the scale of each landside facility in order for it to provide the desired level of service under those future demand conditions.

1.6.1 FUTURE DEMAND FOR LANDSIDE FACILITIES

The basis for the forecasts of landside demand is that landside demand follows the overall level of passenger activity. A ten percent increase in peak hour passengers at EGE would create a ten percent increase in peak hour traffic volumes, parking, etc. An underlying assumption is that passenger behavior relative to landside choices (which mode to choose to get to/ from the airport, where to park, etc.) is rational, and based on actual or perceived cost, availability, reliability, travel time,

flexibility, etc. Furthermore, it is assumed that the relative attractiveness, price, and utility of the various choices will not change significantly over time.

Table 1.8 shows the basis for the derivation of the factors used to grow landside demand from current peak to future peak conditions. For both current and the future, the case of interest is the peak hour of the peak day of the ski season, when the airlines greatly increase their flights to/from EGE. The table shows three factors – one each for growth in enplanements, deplanements, and total passengers. Each factor was applied to the demand for those landside services which are oriented towards one type of passenger (arriving or departing), or to both. For example, the demand for the terminal departures curb relates to growth in enplanements, while the demand for the arrivals curb and the commercial vehicle pickup lot relates to the growth in deplanements. Most demands relate to both types of passengers, so the common factor was used.

TABLE 1.8
GROWTH FACTORS FOR PEAK HOUR DEMAND

CASE	DATE	ENPLANE	DEPLANE	TOTAL
Base Data	Mar 21, 2015	535	636	1,171
PHPDSS	Dec 27, 2014	624	742	1,366
Future	PHPDSS	805	908	1,713
Ratio used for growth		1.290	1.224	1.254

Note: PHPDSS = peak hour, peak day of ski season

Source: RS&H Analysis with Curtis Transportation Consulting, 2015

1.6.2 ROADWAY TRAFFIC

Between now and the future planning condition (which assumes all eight gates serving flights within the peak period of the peak day of ski season), general roadway traffic will grow approximately 25 percent. Given that all roadway segments, except the terminal curb roadway (see below) currently operate with a considerable excess of capacity in the peak hour, this growth can readily be accommodated. **Table 1.9** presents the current and future peak hour volumes and levels of service.

TABLE 1.9
PEAK HOUR ROADWAY VOLUMES AND LEVELS OF SERVICE

STATION NO.	LOCATION	PHPD DEC 2014			PHPD FUTURE	
		PEAK HOUR	PK HR VOL	LOS	PK HR VOL	LOS
1	Airport western exit	11:45 AM	210	see note	260	see note
2	Airport western entrance	10:30 AM	180	A	230	A
3	Return to terminal ramp	10:30 AM	70	A	90	A
4	Terminal loop road	10:30 AM	190	A	240	A
5	Terminal approach POVs	11:15 AM	250	A	310	B
6a	Eldon Wilson Road EB	12:00 PM	220	A	280	B
6b	Eldon Wilson Road WB	10:30 AM	240	A	300	B
7	Terminal approach CVs	10:45 AM	80	A	100	A
8a	Airport eastern exit	12:00 PM	190	see note	240	see note
8b	Airport eastern entrance	10:45 AM	230	A	290	B

Note: The levels of service for the roadway segments leaving the airport are controlled by stop signs, and thus the level of service varies by whether the vehicle is turning left or right, or are crossing Cooley Mesa as a "through" movement. See the next table for the intersection levels of service.

Source: RS&H Analysis with Curtis Transportation Consulting, 2015

Under the future planning scenario, with no changes to the roadway network, none of the roadway segments will operate below a LOS C, which is the standard to be attained for good quality traffic flow during the busiest hours of the year.

1.6.3 INTERSECTIONS

The two intersections of interest are the two portals to the airport. Both of these are four-legged intersections, with the side streets (including the airport exits) controlled by stop signs. Both intersections operate well today, with levels of service for all movements but one at LOS A or B (see **Table 1.10**). Note that while levels of service are not calculated for the through movements on and right turns from Cooley Mesa Road, as they have the right-of-way, and thus do not yield to any other movements, these movements essentially are at LOS A, because they would experience no delay related to the stop-controlled nature of the intersections.

Table 1.10 also presents the estimates of future peak hour volumes and levels of service for all movements. As with the on-airport roadways, traffic is estimated to grow by approximately 25 percent to the future planning conditions (peak hour, peak day of ski season). This increase in traffic would be felt mostly by left and through movements from the side streets, including the airport exits. Thus, four additional movements in the future are estimated to operate at LOS C. While this is not as good as the current higher levels of service, it is still within the acceptable range for the planning condition, and should not significantly adversely affect the passenger experience. No additional improvements are therefore necessary for either of these intersections as long as no other changes are made to the airport roadway network.

TABLE 1.10
CURRENT AND FUTURE INTERSECTION LEVELS OF SERVICE

INTERSECTION	ROAD AND DIRECTION	MOVEMENT	LANES	PHPD DEC 2014			PHPD FUTURE SKI SEASON		
				PK HR VOL	CONTROL DELAY (SEC.)	LOS	PK HR VOL	CONTROL DELAY (SEC.)	LOS
Airport West Portal	Cooley Mesa EB	Left	1	42	7.7	A	52	7.9	A
		Through	1	101	-	-	127	-	-
		Right	1	21	-	-	26	-	-
	Cooley Mesa WB	Left	1	15	7.5	A	19	7.5	A
		Through	1	135	-	-	169	-	-
	Spring Creek NB	Right	1	68	-	-	85	-	-
		Left	1	26	12.3	B	33	13.9	B
	Airport Exit SB	Through	shared	3	11.7	B	3	12.7	B
		Right	shared	21	8.9	A	26	9.1	A
	Airport East Portal	Cooley Mesa EB	Left	1	189	15.0	B	237	20.5
Through			shared	1	11.8	B	2	12.8	B
Cooley Mesa WB		Right	shared	51	9.2	A	64	9.5	A
		Left	1	23	7.8	A	29	8	A
Cooley Mesa WB		Through	2	274	-	-	344	-	-
		Right	1	11	-	-	14	-	-
Buckhorn Valley NB		Left	1	34	7.9	A	43	8.1	A
		Through	1	170	-	-	214	-	-
Airport Exit SB		Right	1	111	-	-	139	-	-
		Left	1	18	14.2	B	22	17.1	-
Airport Exit SB	Through	shared	0	13.6	B	0	15.5	-	
	Right	shared	33	10	A	41	10.5	-	
Airport Exit SB	Left	1	71	16.1	C	89	21.6	-	
	Through	shared	1	13.7	B	2	15.7	-	
	Right	shared	19	9.2	A	24	9.5	-	

Source: RS&H Analysis with Curtis Transportation Consulting, 2015

1.6.4 TERMINAL CURB ROADWAY

Terminal curb roadways are the most complicated part of the airport’s roadway network. They feature aspects of roads (as places for vehicles to move) and aspects of parking facilities (as places where vehicles stop to serve passengers). Consequently, their capacity and level of service is a function not just of the physical facilities (the number of lanes and the length of the curb). While these dimensions play a role in analyses, it is how the curb roadway is used and managed that are the dominant factors in assessing its operation. Some of the salient aspects of current curb management and use are as follows:

- The curb is separated into three zones for exclusive use of certain vehicle types – CV departures curb, POV departures curb, and POV arrivals curb.
- There is a loss of a portion of the curb lane between CV and POV departures that creates coned-off area for movement of baggage carts and people, who spill over from the sidewalk. This decreases capacity and LOS.
- Dwell times by CVs are well within the norms of the industry, as these professional drivers know how to serve passengers well but quickly, as for them, time is money.
- Dwell times by POVs are somewhat higher than the national norm for the departures curb due to larger parties carrying above average luggage counts. At the arrivals curb, dwell times are more than twice the national average due primarily to the congestion and level of service experienced in the baggage claim area. High dwell times are related to lower capacity and LOS.
- The five crosswalks take away curb capacity, as vehicles are not supposed to stop within a crosswalk. But the pedestrian volumes are light enough that they were not observed to have a harmful impact on capacity or LOS.
- The critical portion of the departures curb which experiences the greatest demand is well managed by the staff of the airport.

The analysis of future capacity and level of service for the terminal curbs assumed no changes to physical plant or operation and management. It also assumed no changes in the on-airport roadway network. The results are presented in **Table 1.11**.

TABLE 1.11
FUTURE CURB TRAFFIC, CAPACITY, AND LEVEL OF SERVICE

CURB	ATTRIBUTE	VEHICLE CLASSIFICATION					STOPPING VOLUME	BYPASS VOLUME	BALANCED CAPACITY	VOLUME/CAPACITY		LEVEL OF SERVICE	
		POV	TAXI	VAN	LIMO	OTHER				W/O BYPASS	WITH BYPASS	W/O BYPASS	WITH BYPASS
CV Departures	Percent Stopping	2	25	32	41	0							
	Stopping Volume	2	27	34	43	0	106	11	183	0.58	0.64	B	B
	Mean Dwell Time (min)	3.66	2.50	3.20	2.25	-							
POV Departures	Percent Stopping	92	0	2	2	4							
	Stopping Volume	62	0	1	1	3	107	241	148	0.72	2.35	C	F
	Mean Dwell Time (min)	3.66	2.50	3.20	2.25	-							
POV Arrivals	Percent Stopping	92	0	2	2	4							
	Stopping Volume	62	0	1	1	3	67	269	183	0.37	1.84	A	F
	Mean Dwell Time (min)	7.90	2.50	2.40	0.70	8.00							

Source: RS&H Analysis with Curtis Transportation Consulting, 2015

As **Table 1.11** shows, the same POV curb locations that experience adverse impact of bypass traffic today will continue to experience it in the future unless changes are made to reduce such traffic. Bypass traffic is a natural phenomenon at a single-level terminal, as all departures traffic exit the curb by bypassing the downstream POV arrivals curb. Similarly, all POV arrivals traffic and CV departures traffic must bypass the POV departures curb resulting in a LOS F for both POV curbs. However, if bypass traffic was eliminated, all curb zones would operate very well. This offers some guidance on how to revise curb facilities and management in the future to provide for more capacity, less traffic, less congestion and better levels of service.

1.6.5 PUBLIC AND RENTAL CAR PARKING

The future demand for public parking at EGE can be estimated with less confidence than other landside activities due to two interrelated factors:

- The airport had no data other than anecdotal data regarding how full parking becomes, and when, due to the fact that until June 2015, parking was free, and no data on parking utilization was gathered.
- The change to paid public parking in the Short-Term and Long-Term lots possibly could change demand moving forward, though industry experience strongly suggests that airport parking demand is inelastic. Inelastic demand implies a lack of sensitivity to price, such that at virtually all airports, when parking rates are increased, after a matter of few weeks to several months (60 – 90 days, chiefly), demand returns to its previous level.

The approach taken in this plan was to estimate future demand based on the estimated parking activity on the peak day of the ski season, which coincides with the Christmas holiday. Christmas holidays are the peak time for Vail Valley residential use of the airport, and since parking correlates to residential and not visitor travel at an airport, the late December timeframe is the likely peak for parking. Anecdotal evidence from staff indicates that the holidays are when lots are most likely to be full.

Table 1.12 presents the estimate of the short-term parking lot occupancy for the future condition during the holiday season. Given that the short-term lot contains all the ADA required spaces (which typically are not full, and the true hourly spaces (previously limited to 30 minutes, and now to 2 hours), the factor that all short-term parking is expected to be 83 percent occupied in essence a forecast that it will be effectively full for those who wish to park in a non-handicapped space for more than 2 hours. While the planning team did not collect data on the 30-day (now, Long-term) lot, anecdotal data suggest that during the holiday season, it too, is at or nearly fully occupied, and thus with a 25 percent overall growth in peak passenger activity, additional long-term parking is likely to be needed.

The last remaining aspects of public parking are what had been the overflow lots, and what are now the free lots. Again, data were not collected by either the airport or the planning team for these lots. Given their size (total of 2.7 acres, enough to park 400 cars), and their rather remote location from the terminal, it is not anticipated that additional free parking spaces would be needed within the planning horizon.

TABLE 1.12
SHORT-TERM AND RENTAL CAR PARKING FUTURE OCCUPANCY

FUNCTION	LOT	TOTAL SPACES	ESTIMATED OCCUPANCY	PERCENT OCCUPIED
Public Parking	West, Short-term	112	83	74.4%
	East, Short-term	449	380	84.7%
	All Short-term	561	464	82.6%
Rental Cars	Ready Lot	251	204	81.3%
	Main Return Lot	112	53	47.0%
	Dollar/Thrifty Returns	36	12	33.4%
	All Return Lots	148	65	43.7%

Source: RS&H Analysis with Curtis Transportation Consulting, 2015

Rental car facilities are used by visitors to the Vail Valley. They peak during the peak day of the ski season. The data in **Table 1.12** suggest that while the current return lots offer an adequate number of spaces, the ready lot is nearing its capacity. Anecdotal evidence and field observations confirm that at times, cars are not ready for passengers when they arrive. While this is more likely related to the intense peaking and the challenge of turning the returned cars back to ready status through the service area, it could also be the result of an inadequate number of ready spaces and/or the fleet to keep them full in the peaks. Overall, a larger ready lot would provide the rental car companies greater operational flexibility, and thus improve customer service levels.

1.6.6 COMMERCIAL VEHICLE FACILITIES

This section addresses the external commercial vehicles facilities, with the exception of the commercial vehicle departures curb, which was addressed previously in the discussion of the terminal curb roadway. The CV facilities located in the terminal (counter space, and driver waiting areas) are discussed in earlier sections of this document.

The primary CV facility that is anticipated to require attention in this plan is the pickup lot just west of the terminal. In 2015, by observation, it was operating at more than 85 percent full in the peak hours of a busy Saturday in ski season. In the future, the potential need for terminal expansion to the west would impact this lot, further exacerbating the situation. If the lot is assumed to be 90 percent full during the peak hour of the ski season under current (2015) passenger activity levels, then the future condition would bring the demand to approximately 10 percent greater than capacity.

This estimate does, however, assume that no changes are made in how the pickup lot is used. Currently, drivers use the lot to park their vehicle, and go inside the terminal to wait for their passengers, to interact with their counter staff (for CME and HMT, the only operators with counters in the terminal), or for breaks. The vehicle is moved out of the lot once the passengers arrive, their bags are claimed, and passengers and bags are loaded. The mean time for vehicles in this lot is estimate to be more than 40 minutes, which is longer than truly necessary to provide the essential role of meeting and assisting passengers. Thus, the pickup lot is used for waiting, or as a hold lot, despite there being a holding area on Eldon Wilson Road near the VVJC. Changes to management of the lot likely could greatly reduce the mean time that vehicles wait in the pickup lot, and thus, the high occupancy levels could be adjusted downward. This planning study will consider both physical plant and management actions to ensure adequate capacity under future higher levels of demand.

The commercial vehicle holding lot is approximately 1.1 acres in size, and could be arranged to hold at least 80 commercial vehicles. With its estimated current peak occupancy being less than 25 percent, it is likely that this facility can accommodate future demand levels even if more commercial vehicles do their waiting in this lot and not in the pickup lot. During concept evaluation, this preliminary finding will be confirmed.

1.7 ENVIRONMENTAL CONSIDERATIONS

FAA Order 1050.1E, *Policies and Procedures for Considering Environmental Impacts*, and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airports*, require the evaluation of airport development projects as they relate to specific environmental impact categories. The Orders outline the types of impacts and the significance thresholds used to determine if a project would cause significant environmental effects. For some impact categories, the determinations can be made through calculations, measurements, or observations. However, other impact categories require that the determination be established through correspondence with appropriate federal, state, and/or local agencies. A complete evaluation of the impact categories identified in FAA Orders 1050.1E and 5050.4B is required during an environmental assessment (EA) or environmental impact statement (EIS). Categorical Exclusions require evaluations of extraordinary circumstances to ensure that projects, typically causing minimal environmental effects, would not cause effects requiring more analyses in an EA, or possibly, an EIS.

Analyses of future development plans at the Airport should address those environmental issues that are known to exist in the vicinity of the Airport. Early identification of these environmental factors may help to avoid impeding future development plans.

1.7.1 ENVIRONMENTAL RESOURCE CATEGORIES UNLIKELY TO BE AFFECTED

This section provides an overview of resource categories defined in FAA Orders 1050.1E and 5050.4B, as it applies to the environs surrounding the Airport. Based on the planning information available to us, we have preliminarily determined the environmental resource categories listed in **Table 1.13** are those the proposed terminal project is unlikely to affect. The environmental categories the proposed project would likely affect are discussed in the text following the table.

1.7.2 ENVIRONMENTAL RESOURCE CATEGORIES REQUIRING FURTHER REVIEW

The following resource categories will need to be evaluated further prior to construction to complete the necessary NEPA documentation.

1.7.2.1 CONSTRUCTION IMPACTS

1.7.2.1.1 WATER QUALITY

The National Pollutant Discharge Eliminations System (NPDES) permitting program contained in 40 Code of Federal Regulations (CFR) Part 122 requires that the Airport Sponsor obtain an NPDES storm water discharge permit. CFR Part 122.26(a)(9) requires an NPDES storm water discharge permit for “small construction activity” which is described as one “disturbing one acre, but less than five acres.” CFR Part 122.23(a)(1)(ii) requires an NPDES storm water discharge permit for construction activities “disturbing at least five acres of land.”

FAA Advisory Circular (AC) 150/5370-10G, *Standards for Specifying Construction of Airports*, must be adhered to during development, along with Best Management Practices (BMPs).

Water quality standards will need to be monitored during construction activities, which can deteriorate when erosion and pollutant runoff occur.

1.7.2.1.2 AIR QUALITY

For NEPA purposes, construction-related air quality will need to be evaluated to provide information about dust and exhaust from construction equipment, and burning debris. However, there should not be any significant impacts to air quality during construction.

1.7.2.1.3 NOISE

Ambient noise levels will need to be evaluated due to equipment operation. However, there should not be any significant impacts to noise during construction.

TABLE 1.13

ENVIRONMENTAL RESOURCE CATEGORIES UNLIKELY TO BE AFFECTED

CATEGORY	JUSTIFICATION
Air Quality	The Airport is located in an attainment area.
Coastal Resources	The Airport is not located in coastal zones. The proposed project is not likely to affect coastal zone resources.
Compatible Land Use	The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport’s noise impacts. The Airport currently does not have noise impacts necessitating additional analyses. The proposed project is not likely to alter those impacts.
Cumulative Impacts	Based on past, present, and reasonable foreseeable projects, and the proposed project’s anticipated effects, we do not expect significant cumulative effects on any of the project-affected resources.
Section 4(f)	The closest Section 4(f) property to the Airport is Quail Run Park located 0.3 miles from the Airport. The proposed project would not eliminate and is not likely to severely degrade the intended use of this Section 4(f) property.
Farmlands	No prime or unique farmland exists in the vicinity of the Airport.
Floodplains	According to the Flood Insurance Rate Maps (FIRM) for Eagle County, no floodplains exist at the Airport. The nearest flood zone is approximately 0.5 mile north of the Airport.
Hazardous Materials	Eagle Mine, located 26 miles east of the Airport, is the only National Priority Listed (NPL) listed site. The proposed project is not likely to affect this property.
Historical, Architectural, Archaeological, and Cultural Resources	The closest resource on or eligible for listing on the National Register of Historic Places to the Airport is the First Evangelical Lutheran Church located approximately one mile west of the Airport. The proposed project is not likely to affect this property.
Light Emissions and Visual Impacts	The Airport has five light emission sources, all of which are lighting aids associated with the safety of airport operations. The proposed project will not add new airfield lighting, but would alter the terminal’s existing nighttime light emissions. However those emissions are not likely to affect light-sensitive, off-Airport land uses.
Secondary (Induced)	The proposed project is not likely to change business and economic activity in the community, significantly impact public service demands, or induce shifts in population movement and growth.
Socioeconomic Impacts/ Environmental Justice/Children’s Health and Safety Risks	The proposed project would not relocate residences or business, and is not likely to affect low-income or minority populations or impact children.
Solid Waste	The proposed project is not likely to put significant demands on the local solid waste management facilities. Incorporation of recycling efforts in the proposed terminal expansion would reduce waste going to the waste facilities. FAA is encouraging recycling.
Water Quality	Operation of the proposed terminal is not likely to put significant demands or adversely affect current or future water supplies, nor would it adversely affect water quality.
Wild and Scenic Rivers	The Cache La Poudre River is the only designated Wild and Scenic River in CO. The river is approximately 100 miles northeast of the Airport. Since the proposed project is within Airport property, the project would not affect this river.

Source: RS&H Analysis, 2015

1.7.2.1.4 LEVEL OF SERVICE (LOS) ON ROADWAYS

The level of service on local roadways will need to be evaluated. We do not expect that the level of construction-related traffic would adversely affect local roadway LOS.

1.7.2.1.5 HAZARDOUS WASTE

Construction activities can increase amounts of hazardous waste. However, the use of construction-related BMPs would minimize effects due to storing and using hazardous materials needed to operate and maintain construction equipment or used to build the proposed terminal.

1.7.2.1.6 SOLID WASTE

Construction activities can increase amounts of solid waste. Local disposal facilities will need to be coordinated with to ensure they can handle the increased level of construction waste.

1.7.2.1.7 NATURAL RESOURCES AND ENERGY SUPPLIES

FAA's Order 1050.1E, states that the threshold is "when an action's construction, operation, or maintenance would cause demands that would exceed available or future (project year) natural resource or energy supplies."

Coordination with natural resource and energy supply companies and utilities prior to the construction of new facilities requiring these services is recommended.

1.7.22 PROJECT IMPACTS

1.7.2.2.1 FISH, WILDLIFE AND PLANTS

The Endangered Species Act of 1973 (ESA) is administered by the U.S. Fish and Wildlife Service (FWS) where terrestrial and freshwater organisms are found. Under the Act, species may be listed as either "endangered" or "threatened". The FWS defines "endangered" species as those plants and animals that have been designated as being rare enough that they are in danger of becoming extinct. "Threatened" species are those plants and animals that are likely to become endangered within the foreseeable future. According to the FWS, the following species are listed as threatened, endangered, and candidates for threatened and endangered status (candidate species) in Eagle County:

The following species are listed as endangered or threatened:

- Mexican spotted owl (*Strix occidentalis lucida*)
 - Bonytail chub (*Gila elegans*)
 - Colorado pikeminnow (*Ptychocheilus Lucius*)
 - Greenback Cutthroat trout (*Oncorhynchus clarki stomias*)
 - Humpback chub (*Gila cypha*)
 - Razorback sucker (*Xyrauchen texanus*)
 - Penland Alpine Fen mustard (*Eutrema penlandii*)
 - Ute ladies'-tresses (*Spiranthes diluvialis*)
 - Uncompahgre fritillary butterfly (*Boloria acrocneuma*)
 - Canada Lynx (*Lynx canadensis*)

The following species are listed as a candidate species:

- Greater Sage-grouse (*Centrocercus urophasianus*)
- Yellow-billed Cuckoo (*Coccyzus americanus*)
- North American Wolverine (*Gulo gulo luscus*)

Essential Fish Habitats (EFHs) are those waters and substrates necessary for fish spawning, breeding, feeding, and growth to maturity as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA requires the National Marine Fisheries Service (NMFS) and regional fishery management councils to minimize, to the extent practicable, adverse effects to EFH caused by fishing activities. The MSA also requires Federal agencies to consult with NMFS about actions that could damage EFH. There are no fish species currently protected under the MSA in Eagle County.

The Migratory Bird Treaty Act (MBTA), enacted in 1918, prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations, and does not require intent to be proven. Section 703 of the MBTA states, "Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means or in any manner, to ... take, capture, kill, attempt to take, capture, or kill, or possess ... any migratory bird, any part, nest, or eggs of any such bird...." The Yellow-billed Cuckoo is protected under the MBTA.

Unrelated to this project, a wildlife inventory could be conducted to determine if any of the species mentioned above are found within Airport property.

1.7.2.2.2 WETLANDS

Executive Order 11990, Protection of Wetlands, defines wetlands as those areas "inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds." Federal agencies have an obligation to "minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities."

There is the potential for wetlands within Airport property. Any development potentially affecting wetlands would require further detailed investigation; and possible coordination with and approval from the U.S. Army Corps of Engineers.

1.7.2.2.3 SUMMARY

It is anticipated that the terminal expansions, loop road, parking lot, and curb front modifications that are being considered as part of this advanced terminal planning study can be categorically excluded per Order 1050.1F.

As for those environmental resource categories associated with construction (e.g., water quality, air quality, noise, LOS on roadways, hazardous waste, solid waste, and natural resources and energy supplies) they will need to be evaluated further during the design process to complete the necessary NEPA documentation. Additionally, any permits associated with the proposed project will need to be obtained prior to construction.

1.8 ARCHITECTURAL THEMING

The Airport terminal is the first and last impression left on a visitor to the Eagle-Vail region. Designing a terminal expansion requires community input in order to properly capture and reflect the community values to each visitor. Community input was gathered throughout the planning process from a comprehensive list of resources and stakeholder interviews. This contained, but was not limited to, books and articles, local historians, curators, community leaders, tourism industry officials, tenant stakeholders, airport management and staff, and the local general public. This process revealed the following seven applicable architectural themes.

1.8.1 VISION COMMUNITY DESIGN

Arriving at a “sense of place” involves a collaborative process that searches for the uniqueness and spirit of that place. Understanding of the area’s history, culture, environment, industry, recreation, and people all serve to inform the design team in that search. A comprehensive tour of the valley resulted in a photographic survey of towns and significant landmarks that are part of the community fabric. Many of these photographs along with the data collected were later used to create image boards that depict distinct architectural themes. Integral to the research are interviews with airport stakeholders and community leaders across the valley. This resulted in a consensus of ideas and visions that together start to paint a picture of the special qualities and culture that make for a memorable place. The responses from the interviews were additionally put through a simple internet program to create a “Wordle.” The result is a collage of descriptive words that the stakeholders and leaders used to convey their impressions and vision of the community. The “Wordle” gives greater prominence to words that appear more frequently in the source text. Through different sizes of words, the “Wordle” graphically represents the importance of ideas and themes based on how often the words were used in the interview responses. Thoughtful community research is the first step in the process of concept theme development.



1.8.2 CONTEMPORARY

This theme resonates with a new and growing generation of visitor that evokes ideas of a modern lifestyle through innovation, connectivity, convenience, efficiency and simple elegance. A "Contemporary" terminal is a state of the art facility that seamlessly incorporates the latest technology and conveniences for the modern traveler. Warm, natural materials are combined with metal and glass in a clean, intuitive layout, that acknowledges the past, however looks to the future for its primary inspiration. The result is a contemporary terminal that is an iconic symbol for the community, yet one that is comfortable in its Colorado setting.

Ready Connected to the World Efficient
 Smart Communication Technology Intuitive
 Clean Innovation Future
 Making Place Clean
 Integrated Systems
 Digital
 Fresh
 Technology
 Modern Art
 State of the Art
 Millennial Generation
 Future
 State of the Art
 Elegant Convenience
 Digital
 State of the Art
 Clean
 Modern Art
 Ski Resort
 Smart
 Fresh
 Clean
 Digital
 Ready
 Iconic
 State of the Art
 CONTEMPORARY
 CONTEMPORARY

HISTORICAL ROOTS



Mining Traditional Details Determination
Adapting to Nature 10th Mountain Division
Community Mountains
Historical Journey Perseverance
Pioneer Spirit Community
Railroad Sense of Place
Historical Roots Mining
Ranching
Vision
Adapting to Nature
10th Mountain Division
Vision

1.8.3 HISTORICAL ROOTS

Eagle Valley has a rich past filled with cultural icons, industrial pioneers and visionaries. The Historical Roots Theme draws influence from this past. A “Historical Roots” inspired terminal is a facility that makes reference to the history of the Valley’s railroads, ranching, mining, military (10th Mountain Division), and ski industry, while still incorporating the latest technology. Traditional details and natural materials reminiscent of those seen in local, historic, and cultural structures are incorporated and featured in a terminal that is straightforward and passenger friendly.

Valley Native Place Making Sense of Place
NATURAL ENVIRONMENT

Sustainability Sky
 Aspen Lakes
 Color
 Creek
NATURAL ENVIRONMENT
 Flora Trail Indigenous Wildlife



Seasons
 Trail River
 Castle Peak
NATURAL ENVIRONMENT
 Flora Green
 Mountains

Fauna Trail Mountain Of The Holy Cross Color
 River Connected to Nature wildlife Creek

1.8.4 NATURAL ENVIRONMENT

The local, natural environment is what draws most to the Eagle Valley. The Natural Environment Theme uses this natural beauty as its inspiration. A "Natural Environment" influenced terminal is an efficient facility that incorporates materials, forms and imagery found in nature. Natural light, locally sourced materials, and details inspired by local landmarks help form a connection between the passengers and nature. The result is a terminal that not only creates an enjoyable passenger experience, but serves as the introduction to Eagle Valley's abundant natural beauty.

1.8.5 RECREATION

Clearly, one of the main reasons people visit the Eagle Valley is its abundance of year-round recreation. The Recreation Theme embraces these various sports, activities and events as a source of inspiration. A "Recreation" focused terminal serves as the passengers' gateway to adventure, whether it be the excitement of the trip's beginning, or the satisfaction of a trip fulfilled. An increased collaboration and integration with local resorts and resort culture will reinforce this theme. Natural materials and locally inspired details are incorporated into a terminal facility utilizing the latest technology to connect the passenger to their recreation of choice.

Vail Mountain Biking Family Ski Excitement
 Fishing Friends Zipline
RECREATION Snowboard
 Rodeo Live Music
 Fishing Friends Rafting
 Hunting
RECREATION Seasons
 Ski
 Rafting Horseback Riding Mountain Biking
 Vacation **RECREATION** Restaurants Golf Family Live Music

1.8.6 RESORT

Eagle Valley is known for its many world class resort destinations, which offer relaxing mountain retreats for those who visit. The Resort theme incorporates certain characteristics of these resorts to connect the passengers to this vacation experience. A "Resort" terminal combines wood beams, stone accents, comfortable furnishings and fireplaces to create a feeling of warmth and comfort. While the terminal may draw inspiration from the essence of a "mountain lodge", it is very much a contemporary facility with these materials and accents integrated in a thoughtful and clean expression.

Hearth Connected to Nature Comfort
Vacation Mountain Lodge **RESORT** Heart



Sustainability
Relaxation
Comfort
Ski
RESORT
Heart
Rustic
Getaway
Home
Relaxation
ski
Retreat
Mountain
Lodge
Connected to Place
RESORT
Heart
Fire

Seasons
RESORT
Lakes
Retreat
Warmth
RESORT
Sustainability
Ski
Fire
Home
Rustic
Getaway

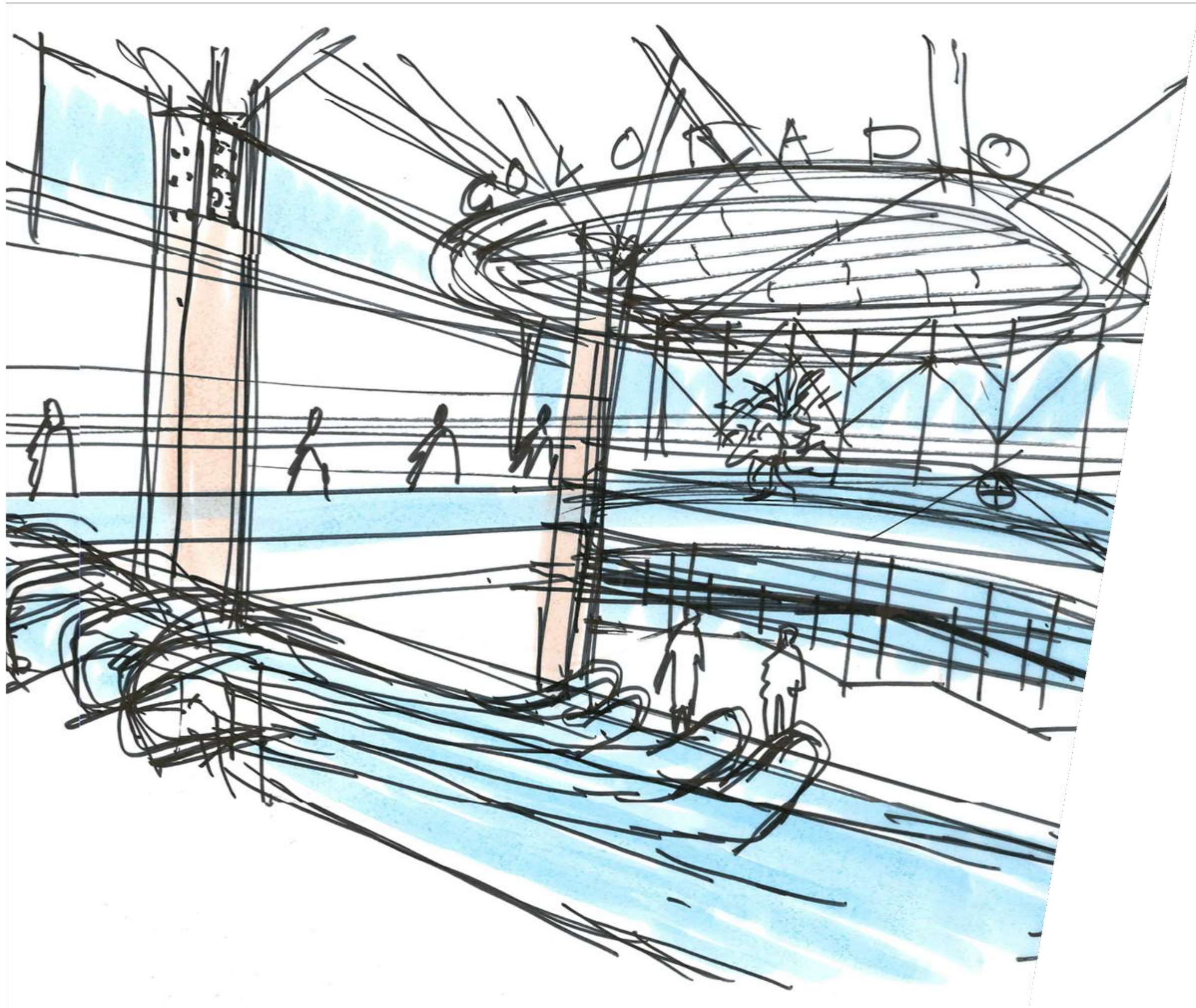
1.8.7 COLORADO

Colorado is unlike any other part of the country, and Eagle Valley is a true representation of this Colorado experience. The Colorado Theme embraces the local cultures, environment and pastimes allowing this Colorado experience to begin once you step off the plane. Understanding the Colorado experience and fulfilling the expectations of the first time visitor are key to the success of this theme. A "Colorado" terminal is a facility that echoes the architecture of the local resorts and lodges, while drawing references to the Valley's mountain environment and outdoor culture through natural materials, local art & photography, details and furnishings. These elements combine to form a unique sense of place, providing passengers an introduction to authentic Colorado.

West Destination True Expectations Water Authentic
 Earth Roots Ski Native Mountains Timber Local Unique Sense of Place
COLORADO Natural
 Sunshine
 Rugged Stone
 Environmental
 Fresh Air
 Historical
 Ski
 American Individualism
Resort
 Rivers **COLORADO** Resort Natural West Timber
 Outdoors Experience Native Historical True Sense of Place
 Authentic
 Genuine Timber
 Fresh Air
 Ski
 Destination
 Climbing
 Mountains
 American

1.8.8 ZEN

Modern air travel can be stressful, and although many travel to Eagle Valley for relaxation, the journey can often be filled with complications. The Zen Theme is a sensory experience that offers a respite from these complications, drawing inspiration from spa-like retreats and meditation spaces. A “Zen” terminal utilizes a simple, intuitive layout with a calm, open sense of space that allows passengers to easily travel through the airport, enjoy airport amenities or relax at their gate. Natural materials of stone and wood provide warmth and texture in a modern structure emphasizing clean lines, with amenities such as water features, natural lighting, and natural vegetation that evoke tranquility.



SECTION 2
CONCEPTUAL
PLANNING

2.1 INTRODUCTION

The conceptual planning process evaluates the information gathered during the planning requirements stage and uses it to inform the creation of development alternatives which can be refined into a final concept. The terminal building and landside/roadway alternatives presented in this section are the direct result of the collaborative effort between Airport staff, the Technical Review Committee (TRC), and community leaders. The following outlines the process by which the team (consultants, TRC, and Eagle Board of County Commissioners) distilled the information into the creation of eight landside/roadway projects and four terminal building conceptual alternatives. These were then refined further in conjunction with stakeholder feedback, culminating in the selection of a preferred landside/roadway concept and a preferred terminal concept.

2.2 LANDSIDE/ROADWAY CONCEPTUAL PLANNING

The landside system consists of the terminal's roadways, parking lots, rental car facilities, and facilities for ground transportation service providers. The roadway system is used by arriving and departing passengers as they transition between the airport terminal and the Eagle/Vail Valley. The following section looks at the process of identifying landside/roadway areas of concern, potential alternative projects targeting program deficiencies as related to future projected growth, and a preferred solution.

FIGURE 2.1
LANDSIDE/ROADWAY EXISTING CONDITIONS



Source: RS&H, 2015

2.2.1 AREAS OF CONCERN

The landside concepts were developed to respond primarily to three major issues documented and explained in the Planning Requirements section:

- Curbside congestion occurs at departures during the busy midday hours of the winter peak season.
- 36 percent of the traffic on the terminal curb roadway does not need to be there as they are neither dropping off nor picking up passengers, however, due to the current roadway configuration, they have no choice but to drive past the terminal and add to its peak period congestion.
- The rental car facilities are too spread out for an airport this size, which results in adverse impacts on customer service and operating efficiency.

The following additional concerns emerged from the development of concepts and interaction with the stakeholders:

- Any widening to the south of the terminal curb sidewalk and/or roadway would impact the rental car ready lot and the short-term parking lot with a potential loss of spaces. Given that these two lots are full during peak hours and/or peak times of the ski season, a loss of spaces would have a significant impact on customer levels of service.
- Widening of the terminal sidewalk in front of Arrivals was not a priority because the observed congestion was not as great.
- The commercial vehicle (CV) pick-up lot west of the terminal would be impacted by the proposed expansion of the terminal's bag claim hall. This lot also operates at capacity during peak hours of the ski season.
- Any expansion of the terminal loop roadway should be examined relative to the feasibility of it being phased over time, as funding becomes available.

2.2.2 IDENTIFICATION OF ALTERNATIVES

The team developed, evaluated, and refined a variety of landside concepts. They were developed to be compatible with each other, and able to be phased in as warranted when funding became available. Seven concepts were created (Projects A – G), with an eighth (Project H) added during the evaluation process. The concepts were intended to address three primary challenges as follows:

- Challenge: Lack of curbside capacity
 - Project A – Four-lane terminal curb roadway with curb sidewalk expansion
 - Project B – Five-lane terminal curb roadway with curb sidewalk expansion
 - Project C – Dual curb roadway, with the inner lanes serving CVs, and the outer lanes serving privately owned vehicles (POVs), with curb sidewalk expansion
 - Project H – Reduction of curb roadway crosswalks from five to three
- Challenge: Unnecessary bypass traffic in front of terminal
 - Project D – Single point of access/egress to airport, and to short-term parking
 - Project E – Direct CV access lane to the pick-up lot through existing short-term parking
- Challenge: Inconvenient rental car facility layout
 - Project F – Relocation of the permit parking facilities to existing Commercial Vehicle drop off location which allows the reprogramming of existing permit parking lot to rental return facilities
 - Project G – Expansion of the terminal loop road around all rental car facilities, including the Cooley Mesa Leasing service area

LANDSIDE PROJECT A

Landside Project A widens the terminal sidewalk and constructs a four-lane roadway along the terminal curb. This project consists of several distinct improvements which, together, add significant capacity to the terminal curb roadway. Expanding the sidewalk over the existing departures drop-off lane accommodates both queuing at curbside check-in and passenger circulation. The sidewalk is also lengthened parallel to the terminal building face extending east, adding more capacity for CV departures. Instead of a traditional raised curb, the expanded sidewalk would slope gently to the roadway and be delineated with pavement color, texture, and one or more of a variety of architectural treatments such as planters or bollards (hereby referred to as the "curbless" concept). The curb roadway would be widened to four lanes along the entire length of the terminal, providing more capacity for both private and commercial vehicles. The new roadway would drain water away from the curbless curb to prevent puddles and ice along the curbfront.

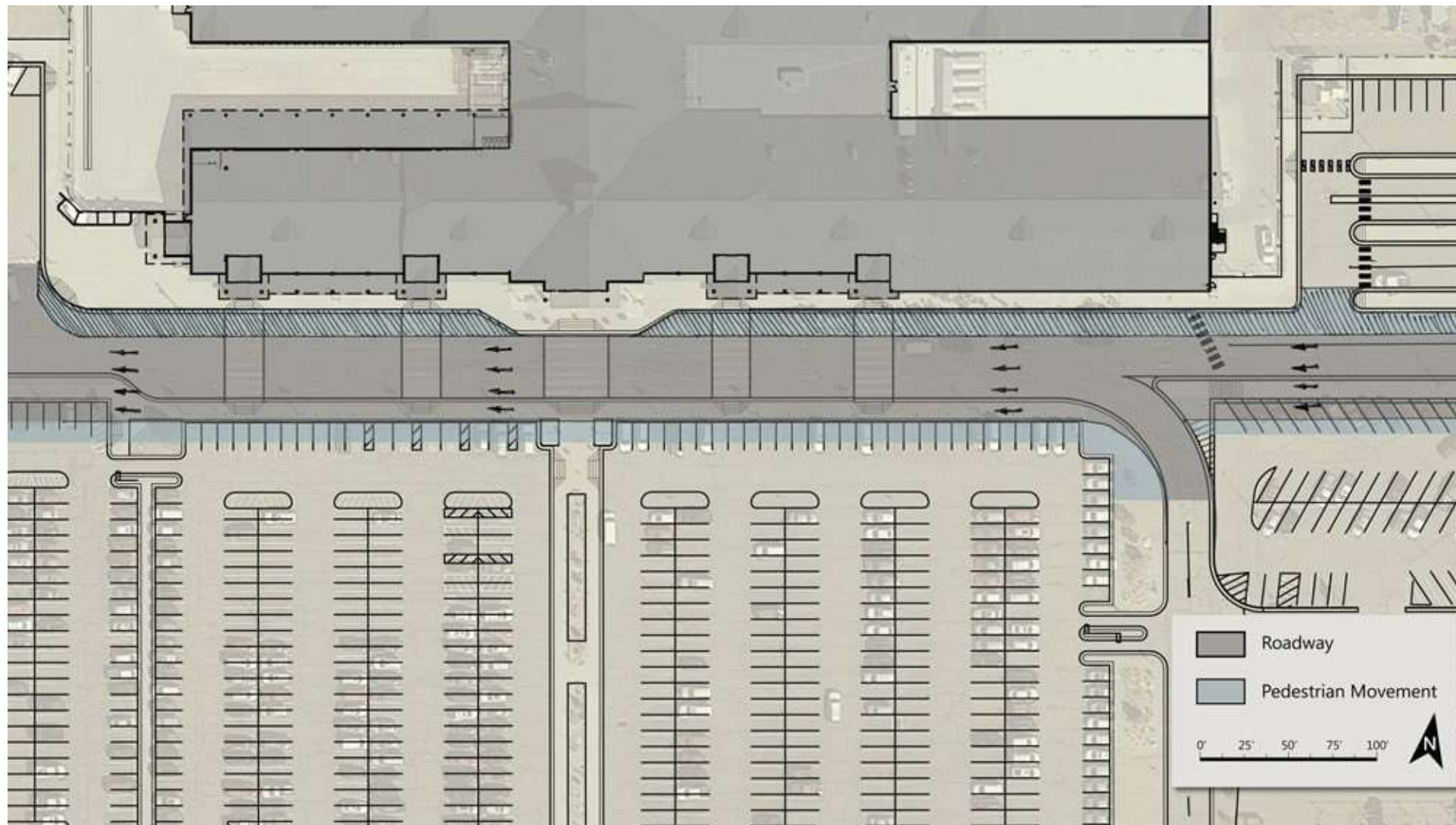
FEATURES

- With this project, curb capacity would increase significantly for CVs at Departures, moderately for POVs at Departures, and modestly for POVs at Arrivals.
- Passenger safety and curb operations would be improved with the widened sidewalk and its curbless interface with the roadway.
- Roadway expansion will have impacts on existing parking configurations for adjacent parking areas.

SUMMARY

This project helps the landside roadway resolve current issues and meet long-term demands. It also improves safety and passenger/vehicular level of service while having an overall positive impact on tenant operations. This project is not fully sufficient to relieve terminal curb roadway congestion, but would act as one element of a larger plan to completely address landside/roadway issues.

FIGURE 2.2
PROJECT A – FOUR LANE TERMINAL CURBSIDE ROADWAY WITH CURB SIDEWALK EXPANSION



Source: RS&H with Curtis Transportation Consulting, 2015

LANDSIDE PROJECT B

Landside Project B widens the terminal sidewalk and constructs a five-lane roadway along the terminal curb. Aside from the amount of roadway lanes, this project repeats all other aspects of Landside Project A.

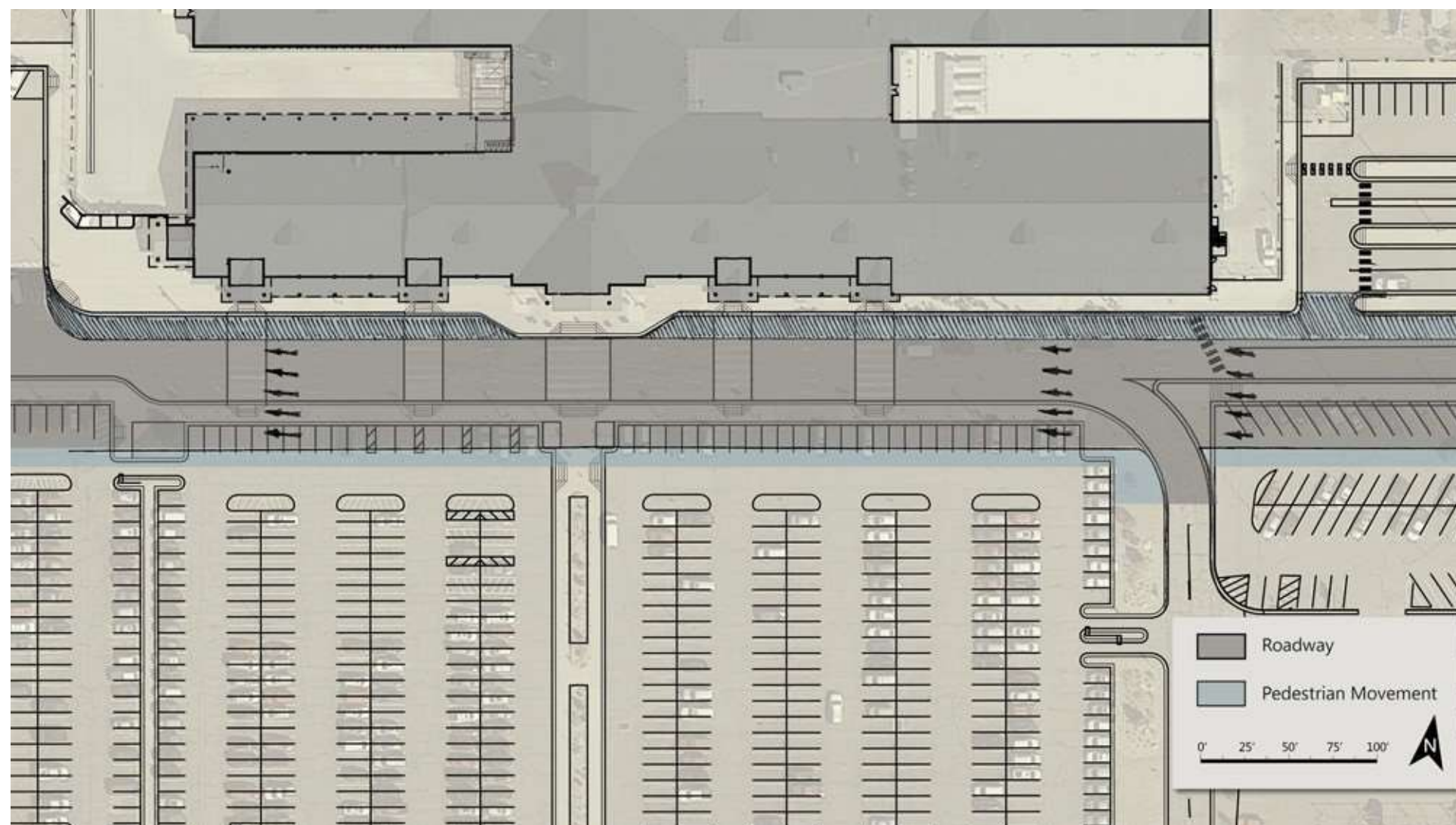
FEATURES

- Increases curb capacity significantly for CV's and POV's at Departures, and moderately for POV's at Arrivals.
- Creates high capacity for stopping and bypass traffic.
- Removes some short-term parking and rental ready parking spaces.
- Additional traffic lanes means wider span of roadway for pedestrians to cross from parking areas to terminal curb.
- Requires a terminal loop road realignment as existing lanes to enter five lane roadway would not be efficient or safe.
- Passenger safety would be improved with the widened sidewalk and its curbless interface with the curb roadway.

SUMMARY

Feedback and analysis determined this roadway configuration to be excessive in meeting current and expected future demand which does not necessitate a terminal curb roadway of this magnitude. This project was therefore dropped from future project considerations.

FIGURE 2.3
PROJECT B – FIVE LANE TERMINAL CURBSIDE ROADWAY WITH CURB SIDEWALK EXPANSION



Source: RS&H with Curtis Transportation Consulting, 2015

LANDSIDE PROJECT C

Landside Project C widens the terminal sidewalk and reconstructs the departure curb with an inner-road for CV traffic and an outer-road for POV traffic. This project includes the same distinct improvements as Projects A and B. The significant difference in Project C is a division of traffic into two separate roadways. The inner three-lane roadway (closest to terminal building) would serve CVs, as they carry the majority of departing passengers. The outer roadway, also three lanes, would serve POVs. Departing passengers in the inner and outer roadways would merge into a four lane curb roadway west of Departures. Departing passengers in private vehicles would be dropped off on a raised island between the inner and outer roadways. For safety reasons, this would not be curbside.

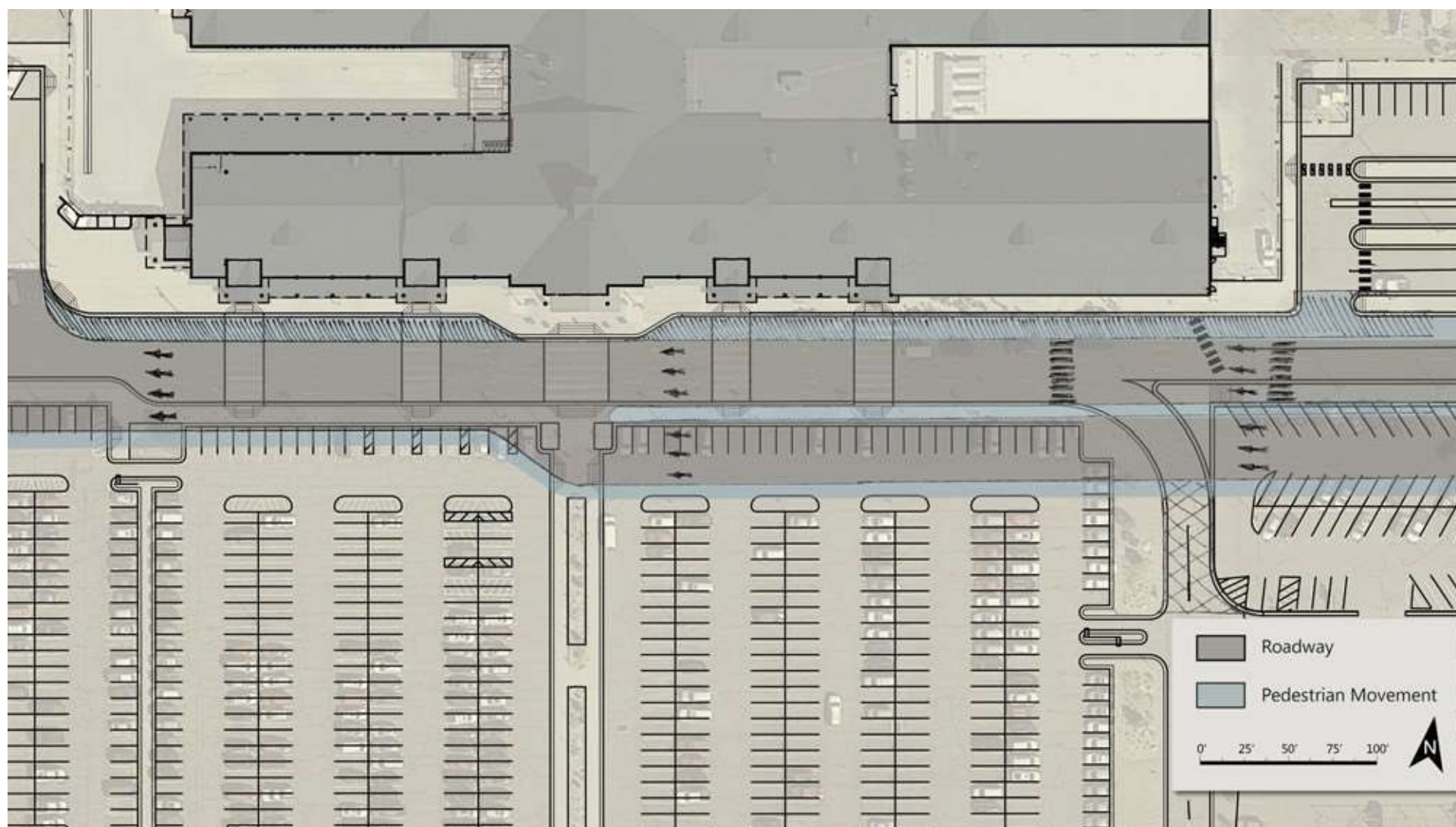
FEATURES

- Increases curb capacity for CVs and POVs at Departures, and moderately increases curb capacity for POVs at Arrivals.
- Greatest reduction in parking spaces (when compared to Projects A and B.)
- CV and POV traffic flows become inflexible.
- Widened sidewalks improve passenger safety.
- Separated roadways increase pedestrian/vehicle conflicts as passengers cross the inner curb roadway.
- Requires terminal loop road realignment for lanes entering separated curbside roadways.

SUMMARY

Feedback and analysis determined this roadway configuration to be excessive in meeting current and future demand which does not necessitate a terminal curb roadway of this magnitude. This project was therefore dropped from future project considerations.

FIGURE 2.4
PROJECT C – INNER CV BYPASS AND OUTER POV TERMINAL CURBSIDE ROADWAY WITH CURB SIDEWALK EXPANSION



Source: RS&H with Curtis Transportation Consulting, 2015

LANDSIDE PROJECT D

Landside Project D creates a single entry and exit point for the terminal area and is intended to simplify wayfinding, orientation, and signing, especially for departing passengers coming into the airport. The current west portal (Cooley Mesa Rd. and Spring Creek Rd.) was selected because it provides the most direct access to short-term parking and rental car areas. The eastern portal (Eldon Wilson Rd. and Buckhorn Valley Rd.) would remain open to provide access to the Vail Valley Jet Center (VVJC) and serve as an entry/exit for commercial service and emergency vehicles. Entrance to the terminal area from Eldon Wilson Road westbound would be limited to only authorized vehicles via an access control gate. The exit from the terminal area eastbound on Eldon Wilson Road would be usable by all traffic, but would be secured with an automatic gate to prevent backflow around the inbound gate.

In addition, this project includes revisions to the short-term parking, creating a single public entrance off the loop road before arriving at the terminal curb and an exit after the terminal curb, thus reducing the bypass traffic in front of the terminal. With the reconfiguration of the entry and exit, it was necessary to improve internal lot circulation by creating a continuous two-way aisle around periphery of the lot.

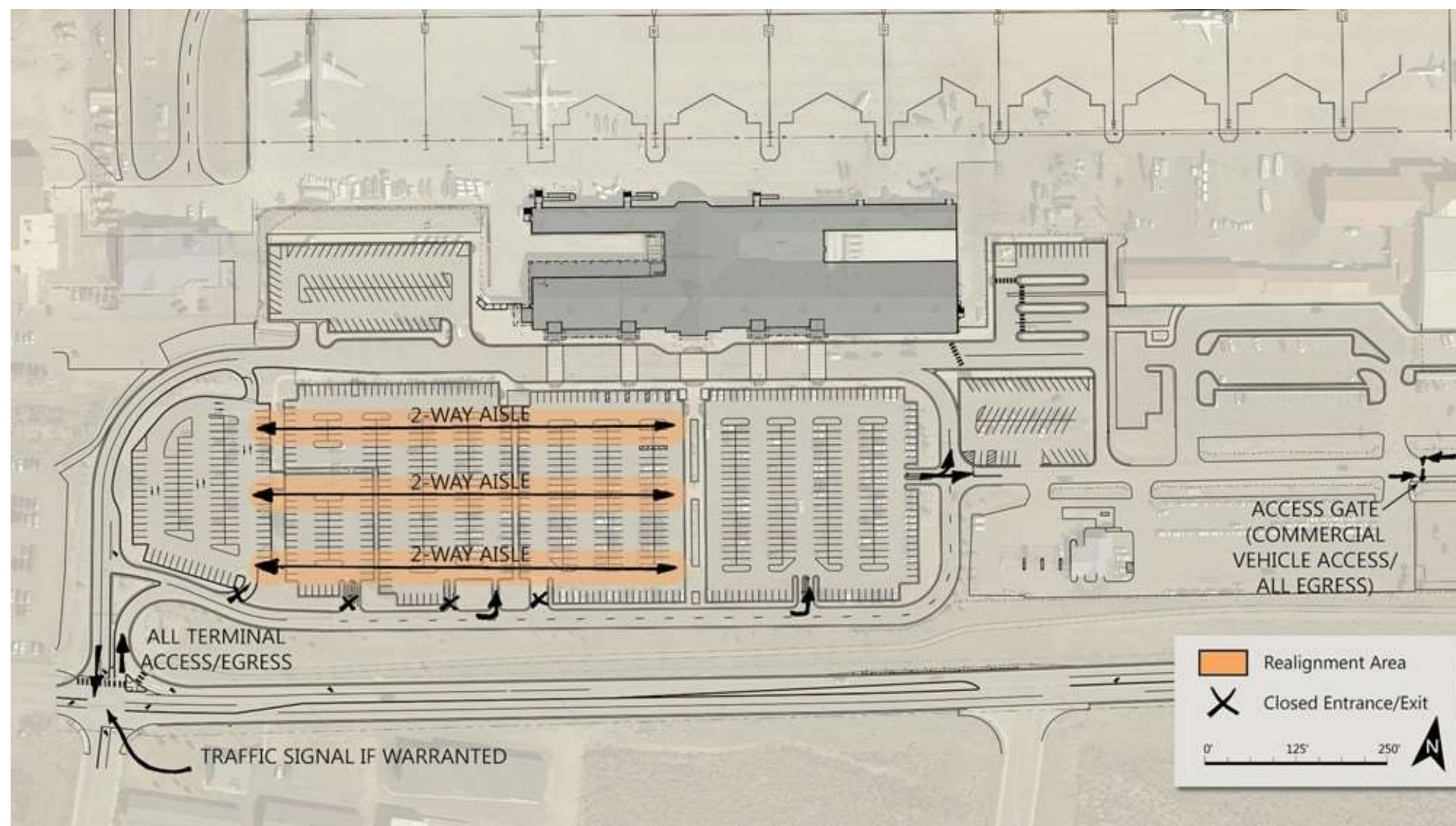
FEATURES

- Reduction in faster moving curb bypass traffic reduces curbside traffic volume, improving curb capacity and pedestrian safety.
- Signing is simplified by providing a single, common terminal approach experience for all drivers and minimizing the traffic that seeks to exit at Eldon Wilson Road via the east portal.
- Reducing the entry and exit points and reconfiguring the parking circulation results in a net gain of 12 spaces in short-term parking.

SUMMARY

This option helps resolve current deficiencies and meet long-term needs. It improves wayfinding and makes best use of existing short-term parking infrastructure to minimize impacts and costs. Alone, this project is not sufficient to relieve terminal curb congestion. It would work in conjunction with a larger plan to address landside/roadway issues.

FIGURE 2.5
PROJECT D - SINGLE ACCESS/EGRESS TO AIRPORT AND SHORT-TERM PARKING AREA



Source: RS&H with Curtis Transportation Consulting, 2015

LANDSIDE PROJECT E

Given the one-way flow on the loop road, the only access to the pick-up lot requires commercial vehicles to pass in front of the terminal. Landside Project E creates a direct CV access lane through the short-term parking lot, allowing commercial vehicles to bypass the terminal curb roadway and access the west pickup lot more directly. While many CVs drop off a passenger first, and then go to the pick-up lot, this project provides a lane through the short-term parking lot directly to the west pick-up lot for the significant number of commercial vehicles that do not need to drop off passengers. The location of the lane was chosen to minimize the impact on short-term parking spaces, and to eliminate the potential for parked vehicles to back out into the CV lane. Access to the lane would be gate-controlled using the transponders that all ground transportation vehicles are issued when they sign up to provide service at the airport.

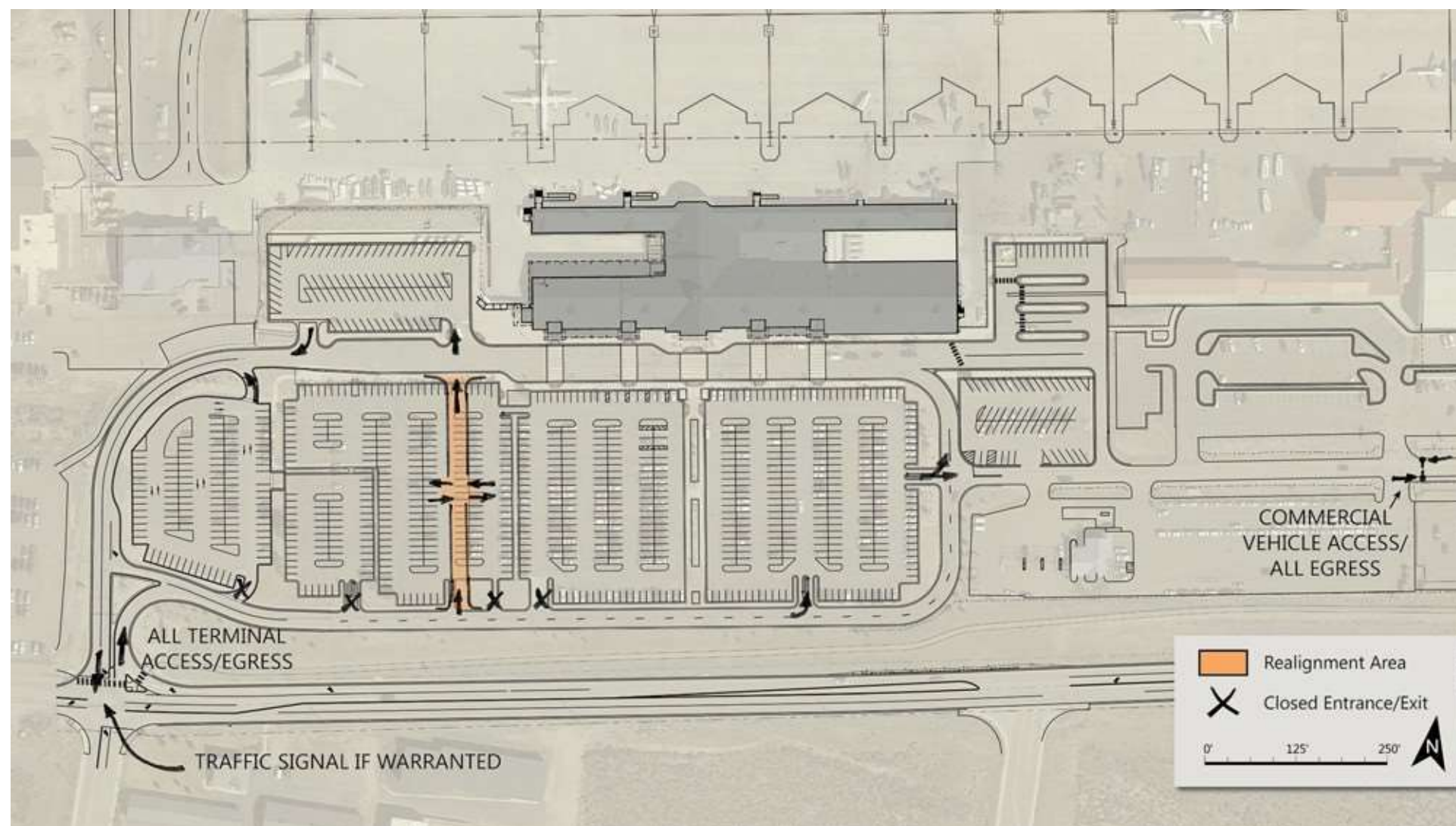
FEATURES

- Reduction in faster moving curb bypass traffic reduces curbside traffic volume, improving curb capacity and pedestrian safety.
- The intersection of the bypass road and the exiting loop road is a safe CV crossing point because it provides excellent sight distance and relatively low speeds.
- The lane through short-term parking would not result in losses of any parking spaces if this project were implemented in conjunction with Project D.

SUMMARY

This project helps resolve current deficiencies and meets long-term needs. It is determined to be necessary but not sufficient for relief of terminal curb roadway congestion. It would best act as one element in a larger plan to address landside/roadway issues.

FIGURE 2.6
PROJECT E - DIRECT CV ACCESS LANE



Source: RS&H with Curtis Transportation Consulting, 2015

LANDSIDE PROJECT F

Landside Project F relocates the Permit Parking Lot into the currently underutilized CV lot east of the terminal building. The permit parking would then be reallocated for rental car returns, shifting it closer to the terminal. The existing Permit Lot is used by employees and passengers who wish to reserve a space for six months or more. The new Permit Lot would also remain open for service access to the several locations for product deliveries and pick-up of solid waste that can only be accessed through this location.

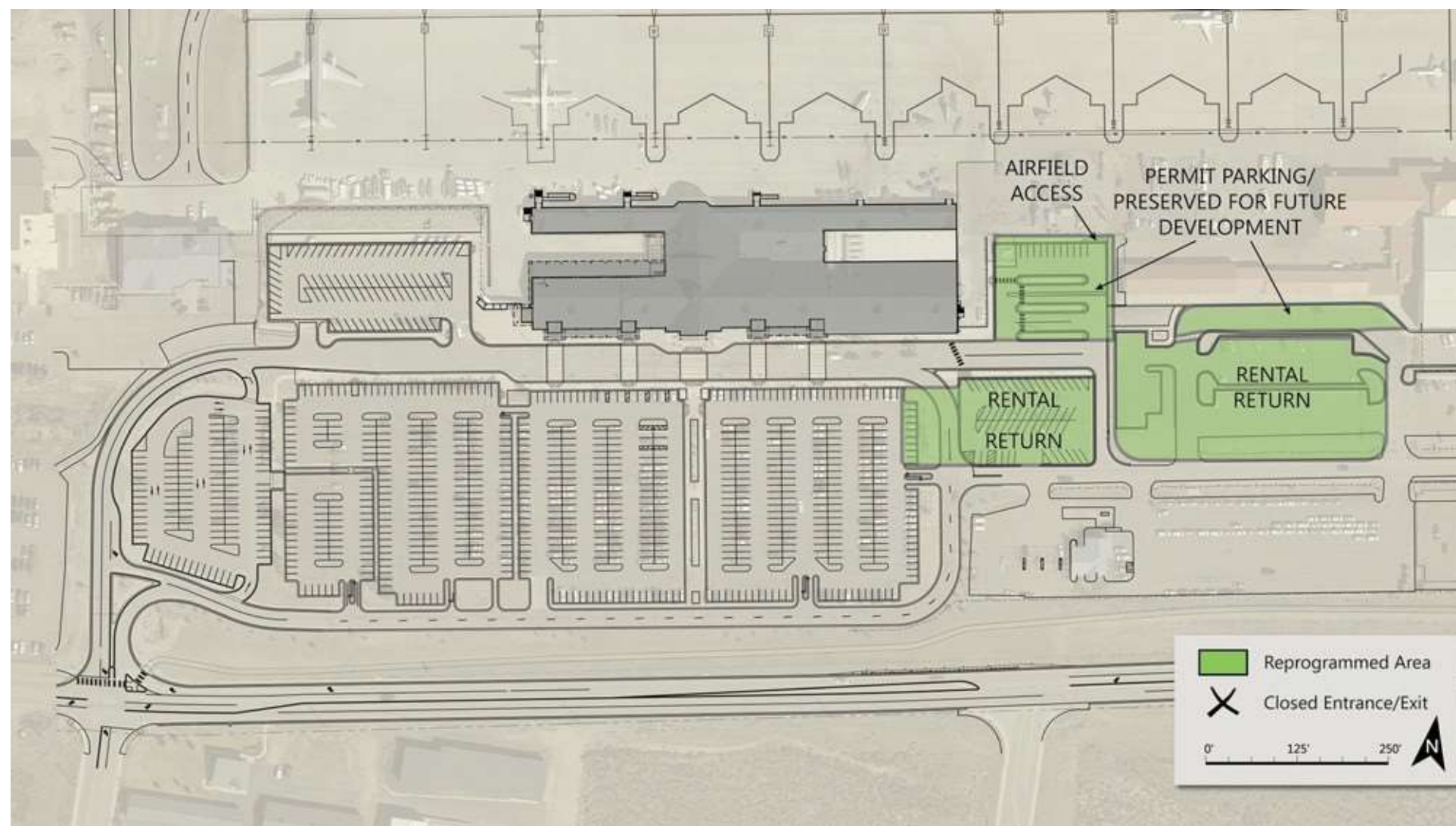
FEATURES

- Redefining the use of these spaces would bring rental car passengers closer to the terminal therefore reducing rental car drop-off traffic along the terminal curb, as this new location for returns would be directly across the curb roadway from curbside check-in.
- The new permit parking lot location allows preservation of valuable land until a higher purpose is determined.
- Costs are likely minimal including only signage and pavement markings.
- Using the existing Permit Lot for rental car returns would further separate the rental car return function from other rental car facilities, potentially leading to some passenger confusion.
- Relocating the existing Permit Lot would result in a loss of associated parking spaces. Addressing this issue would require eliminating existing raised islands.
- The small area of the Permit Lot presents a challenge to rental car companies determining how best to make use of it for returns.

SUMMARY

Reallocating the permit parking lot for rental car returns modestly helps resolve current deficiencies and meets a small portion of short-term needs, but does not meet long-term needs when enacted alone. The project does provide some improvement to the level of service for rental car users in a feasible low-cost manner. Additionally, the new permit parking area preserves the possibility for future expansion opportunities while still making use of the existing infrastructure in a better way than is currently done.

FIGURE 2.7
PROJECT F-- PERMIT PARKING RELOCATION



Source: RS&H with Curtis Transportation Consulting, 2015

LANDSIDE PROJECT G

Landside Project G expands the terminal loop road and has the potential to be phased by using existing roadway infrastructure. This project concept is the full terminal loop road. The new terminal loop road would enable all rental car facilities (rental ready, return lot, and service area) to function within the loop road.

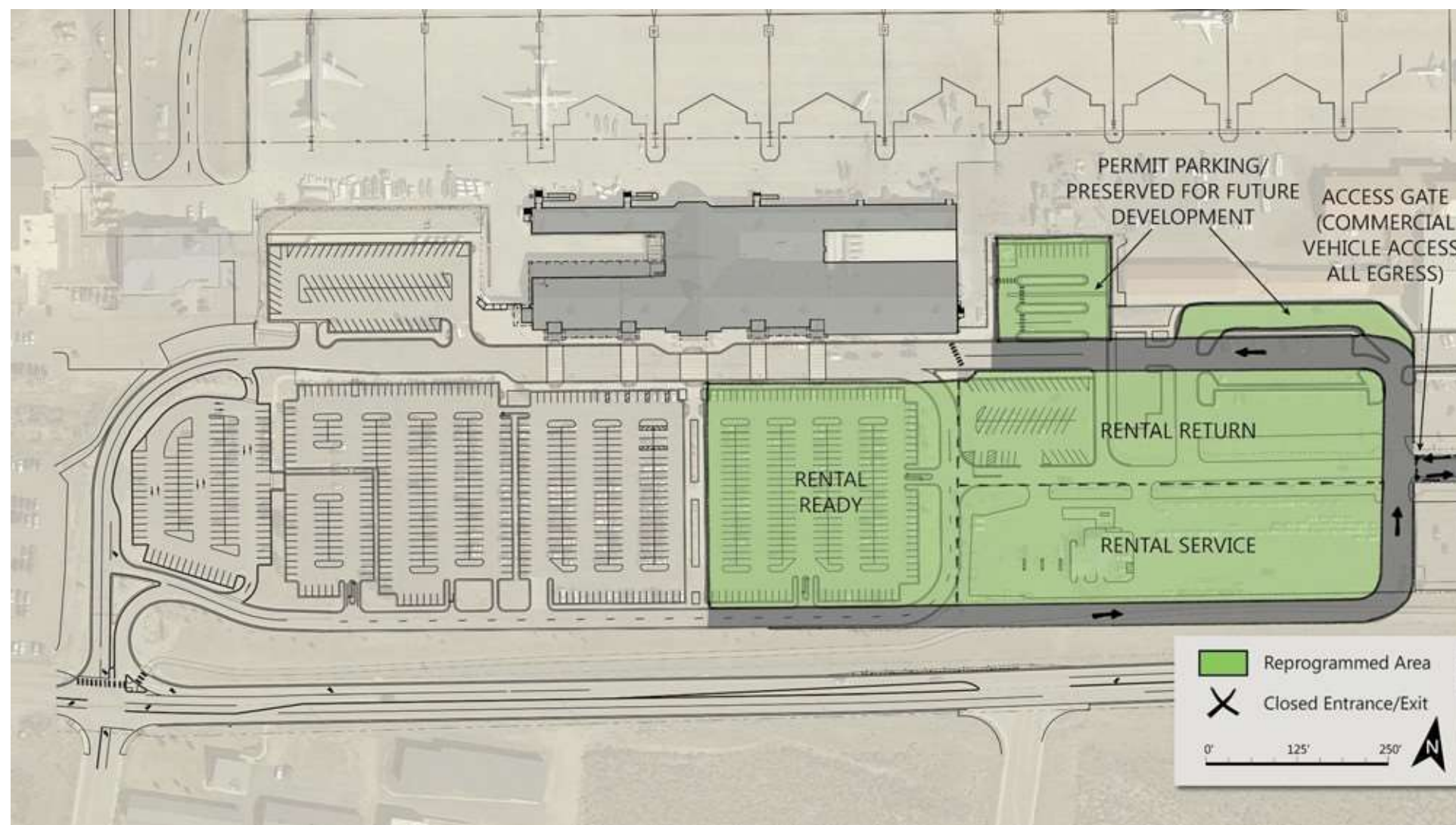
FEATURES

- Increases net available rental car space.
- Flexible rental car areas are created within the new expanded loop road improving operational efficiency, lowering costs, improving employee safety, and reducing operational risks associated with moving cars along public roads. It also affords the Airport the flexibility to reallocate space among the several companies as market shares and/or bids change.
- Reduces walking times and distances for those returning rental cars. This would also lead to a reduced presence of rental cars on the terminal curb roadway.
- The loop expansion has the potential to be done in phases with a relatively inexpensive interim phase using existing roadway infrastructure.
- This project assumes gates are installed at the intersection of the loop road and Eldon Wilson Road.
- Full project buildout preserves the Cooley Mesa Leasing service area, but requires realignment of the bike path and construction of a retaining wall to deal with the slope down into the new road from Cooley Mesa Road.
- Long-term parking, employee parking, and visitor parking organization would need to be considered when pursuing this project.

SUMMARY

The full terminal loop road expansion helps resolve current deficiencies and meets long-term needs with the benefit of creating the best rental car operational efficiencies and customer level of service. It has the potential to be phased over time and greatly increases the loop road capacity and functionality.

FIGURE 2.8
PROJECT G – EXPANSION OF TERMINAL LOOP ROAD



Source: RS&H with Curtis Transportation Consulting, 2015

LANDSIDE PROJECT H

Landside Project H reduces the crosswalks along the terminal curb to three crossings: one at the west end of arrivals, one at the main entrance, and one at the east end of curbside check-in. While the five crosswalks at EGE are not a principal source of curb congestion, they are closely spaced and are not located to facilitate the common paths of pedestrian traffic between the terminal, short-term parking, and rental ready spaces. This project was devised to help improve curb operations in the future while simplifying and enhancing pedestrian movement by locating fewer crosswalks where they can best accommodate pedestrian movement. The main crosswalk at the center of the terminal is the most heavily used, and would remain. It serves movements into the ticketing area from short-term parking, and movements to short-term parking and rental ready cars from bag claim. The western-most crosswalk would remain as well, as it provides the most direct path between bag claim and short-term parking. The eastern-most crosswalk would be relocated further east to serve the movement from the future relocated rental return area to ticketing and check-in. Eliminated crosswalks are depicted by a red 'X'.

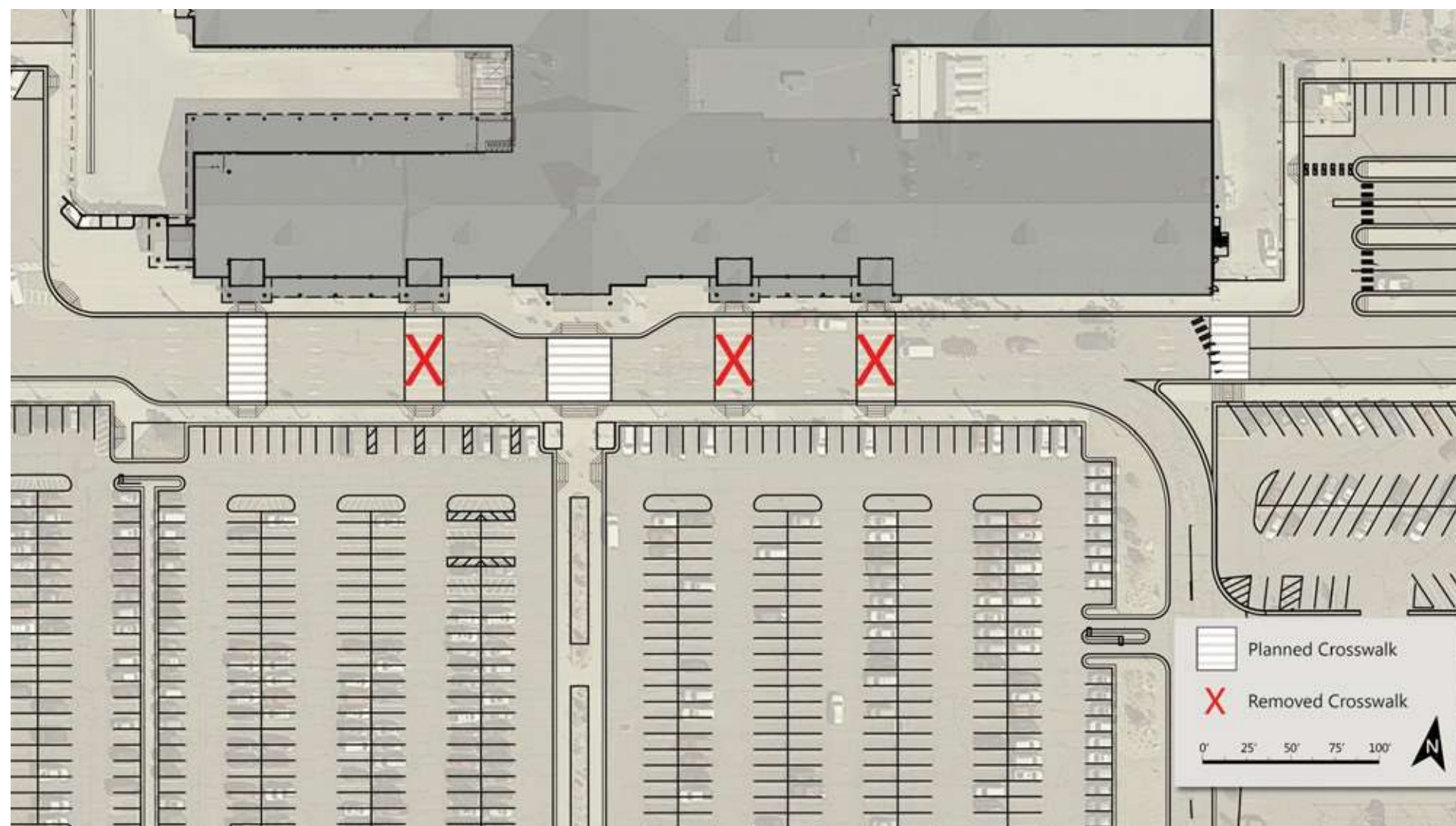
FEATURES

- Increases curb capacity by providing nearly 50 feet of additional curb length currently devoted for crosswalks to stopping vehicles.
- This project would not reduce the number of pedestrian/vehicle conflicts on the curb roadway but it would channel pedestrians to simpler, more direct paths resulting in higher crosswalk use and the associated safety benefits.
- Modest reductions in the number of stops made by vehicles on the terminal curb roadway, providing some reductions in delay, idling emissions, and fuel consumption.

SUMMARY

This project was judged to help resolve current deficiencies and meet long-term needs. It is a necessary project but not sufficient on its own to provide relief for terminal curb roadway congestion. This project comes at a very minimal cost and is best incorporated as part of a larger plan to address landside/roadway issues.

FIGURE 2.9
PROJECT H – REDUCTION OF CURB ROADWAY CROSSWALKS FROM FIVE TO THREE



Source: RS&H with Curtis Transportation Consulting, 2015

2.2.3 EVALUATION PROCESS

The eight projects were assessed quantitatively and qualitatively relative to nine criteria. The results are shown in **Figure 2.10** in matrix format. The chief findings of the evaluation process were:

- To provide the necessary additional curb capacity that resolves current deficiencies and meets long-range needs, Project A (sidewalk expansion and a four-lane curb roadway) was the best option. It would be the least expensive curb expansion project, with the smallest impacts, and would provide a higher level of customer service through the planning period's anticipated passenger activity levels and beyond. This finding was based on the assumption that Projects D, E, and H would also be implemented.
- Projects D and E each were helpful and necessary, but not sufficient, to resolve curb capacity issues by reducing unnecessary traffic on the curb. Together, though, they would eliminate 36 percent of the traffic on the curb, which is the portion of vehicles that unnecessarily bypass the terminal. Implemented along with Project A to gain physical space for curb capacity improvements, these projects would result in more efficient curb operations well beyond the planning activity levels in this study.
- Project F's relocation of Permit Parking was a valuable step towards providing flexibility to make rental car operations more efficient, yet it did not add enough contiguous space to stand alone as a useful project.
- Project G, the complete expansion of the loop road, would provide the full unification of rental car areas with no public roads in between, and thus offer the potential, with the relocation of Permit Parking in Project F, to revise the rental car facility layout for greatest efficiency and highest customer service.
- Project H added enough curb capacity, and simplified pedestrian crossings enough, that it would be a valuable addition to Projects A, D, and E in creating the highest future level of service for the terminal curb roadway.

In conducting the evaluation, the RS&H Team presented and discussed the projects and evaluation with airport staff and the TRC. Their input was vital to the results of the evaluation, and to the refinement of the project's definition. Specific inputs included:

- Consider how the CV pick-up lot would work following the terminal's bag claim hall expansion and the entry/exit relocation. The concern was raised that any loss of space might impact operations, as the lot is nearly full on busy ski season days just prior to the peak midday arrivals period⁵. The ground transportation industry representatives noted that they do not make much use of the current staging area at the east end of the airport as it is far from the terminal, and does not provide the opportunity for driver relief. They further noted that the row of spaces along the south side of the pick-up lot do not work well for rear loading of baggage due to curb heights and narrow sidewalk width at the rear of the spaces. As a result of this feedback, the Team revised certain aspects of the plan, including moving the bus stop, and identifying several ways in which to reduce CV idle time in the pick-up lot.
- Reconsider how an interim phase of Project G would be defined. The rental car companies noted that the modest gain of the Permit Lot would not provide a very useful addition of space for their purposes. Airport staff raised concerns that the terminal approach path around the Permit Lot might be confusing, and certainly would not offer improved orientation to the terminal. Both suggested that the interim phase be routed to include virtually all of the current return lots (as well as the current Permit Lot) within the revised loop roadway, leaving only the service area separated by public roads. This refinement was evaluated and costed along with the initial interim phase, and the complete project.

This feedback assisted the Team in the refinements to the preferred landside concept described in the next section.

FIGURE 2.10
LANDSIDE PROJECT EVALUATION MATRIX

Landside Roadway Project	D Single Airport Access and Short-Term Parking	E Direct Commercial Vehicle Access Lane	H Reduce Five Crosswalks To Three	D+E+H Divert Bypass Traffic From Curb	A Four Lanes and Curb Extension	F Permit Parking Relocation	G Expand Terminal Loop Road
Evaluation Criteria							
Meets Facility Requirements	○	○	○	◐	●	◐	●
Ability to Resolve Current Issues	◐	◐	◐	◐	●	◐	●
Ease of Implementation	●	●	●	●	○	●	◐
Operating and Capital Costs	●	●	●	●	◐	◐	○
Flexibility and Future Expansion Potential	+	+	+	+	●	+	○
Safety	◐	○	●	◐	●	●	●
Public and Tenant Operational Impacts	●	●	●	+	●	●	●
Passenger and Vehicular LOS Impacts	○	●	●	●	◐	◐	●
Potential Environmental Issues	◐	●	◐	◐	◐	◐	○

Legend | ○ Less than Desirable | ◐ Moderate | ● Good | + Best

Source: RS&H with Curtis Transportation Consulting, 2015

⁵ The high occupancy of the pick-up lot chiefly relates to the long times the CVs are parked therein. Times in the lot averaged 48 minutes during March 2015. This is well longer than is necessary for high quality customer service. Stated differently, the lot is used not just for pick-up, but as a waiting area.

2.2.4 PREFERRED CONCEPT

FIGURE 2.11
PREFERRED LANDSIDE/ROADWAY CONCEPT



Source: RS&H with Curtis Transportation Consulting, 2015

PREFERRED LANDSIDE/ROADWAY CONCEPT

The preferred landside concept was presented to the stakeholders as the culmination of the collaborative input process and functioned as the final opportunity to provide input to the preferred concept as it relates to curb and roadway. This concept incorporated revised versions of many of the landside projects put forward.

FEATURES

- A single access/egress point leads to the terminal loop road, thereby reducing curbside traffic.
- A direct CV access lane is provided to reduce terminal curbside traffic.
- Short-term parking is reconfigured to improve wayfinding and traffic flow. Exit on outbound loop road reduces the recirculation in front of terminal.
- Rental car facility land uses are incorporated into the center of the loop road with opportunities for a collaborative reconfiguration.
- Permit parking is relocated to the existing area to just east of the terminal, formerly the CV drop-off location. This makes use of the space while preserving it for future uses.
- Terminal curbside roadway is widened to 4 lanes and crosswalks are reduced from five to three.
- A new automated vehicle identification (AVI) gate located just east of the intersection of Eldon Wilson Road and the new loop road allows westbound CV access and eastbound egress by all traffic.
- The transitional terminal curb is widened to provide more space for passenger movement in front of the terminal building.

SUMMARY

The major components of the new landside roadway system are an expansion of the terminal loop road, simplified access points to roads and parking, a direct CV bypass lane, an AVI gate system for CV's, lot reconfigurations to optimize short-term, rental, and permit parking, and a four lane terminal curbside roadway.

2.3 TERMINAL BUILDING CONCEPTUAL PLANNING

The Planning Requirements assessment demonstrated the Eagle terminal building is lacking necessary space to perform up to established level of service standards in certain programmed areas. This section will focus on addressing the facility needs through strategic and appropriate levels of investment. Four terminal building options addressing the existing and future facility needs were identified, developed, and evaluated using Airport and stakeholder feedback. This resulted in a preferred concept which is being put forward as the recommended option for managing EGE passenger activity and future development needs.

2.3.1 AREAS OF CONCERN

As shown in the Planning Requirements portion of this study, multiple areas of concern were identified throughout the development of the terminal building alternatives. These areas included curb/check-in, TSA screening checkpoint, departure lounges, and baggage claim. Stakeholder feedback gathered throughout the planning process provided additional operational considerations. The interface between the baggage claim and the commercial vehicle pick-up lot became an area of concern while developing baggage claim expansion. Additionally, providing suitable space for tug circulation and other ground service equipment (GSE) operating on the apron as well as providing for future expanded curbside check-in was considered throughout the development of the terminal concepts. Impacts to deicing and rental car operations also came forward as important areas of consideration. All of these concerns were deliberated through the planning process and are addressed in further detail in future landside and terminal sections of this document.

2.3.2 IDENTIFICATION OF ALTERNATIVES

The four terminal building alternatives were created primarily in response to the deficient areas identified in the Planning Requirements section. These areas included the curbside check-in facilities, TSA screening checkpoints, departure lounges, and baggage claim area.

The four initial terminal building alternative options were:

- Option 1 – Expand terminal on ground level.
- Option 2 – Split the concourse maintaining some airside on ground level and some on a new 2nd floor.
- Option 3 – Move the entire airside concourse to a new and expanded 2nd floor and reconfigure TSA screening checkpoint on ground level.
- Option 4 – Move the entire airside concourse and TSA screening checkpoint up to a new and expanded 2nd floor.

Each option was reviewed during a collaborative process involving the Technical Review Committee where significant input was offered into the impacts each alternative would have on specific airport operations. These areas included: airline operations, ground service equipment, rental car functions, commercial vehicle services, TSA operations, concessions, and passenger level of service. After consideration and input was received, the group selected a final concept for revision and finalization. The following sections present and assess the four initial alternatives.

TERMINAL OPTION 1

This option expands the existing airside concourse, keeping all airline gate operations at ground level. The expanded concourse is re-centered on the existing aircraft positions, maintaining western de-ice positions 1 and 2. The TSA screening checkpoint rotates 90 degrees and is enlarged to accommodate additional screening lanes and dedicated queue space. The baggage claim expands west into the existing CV pickup lot allowing for an additional bag claim belt and oversized bag slides within the bag claim hall.

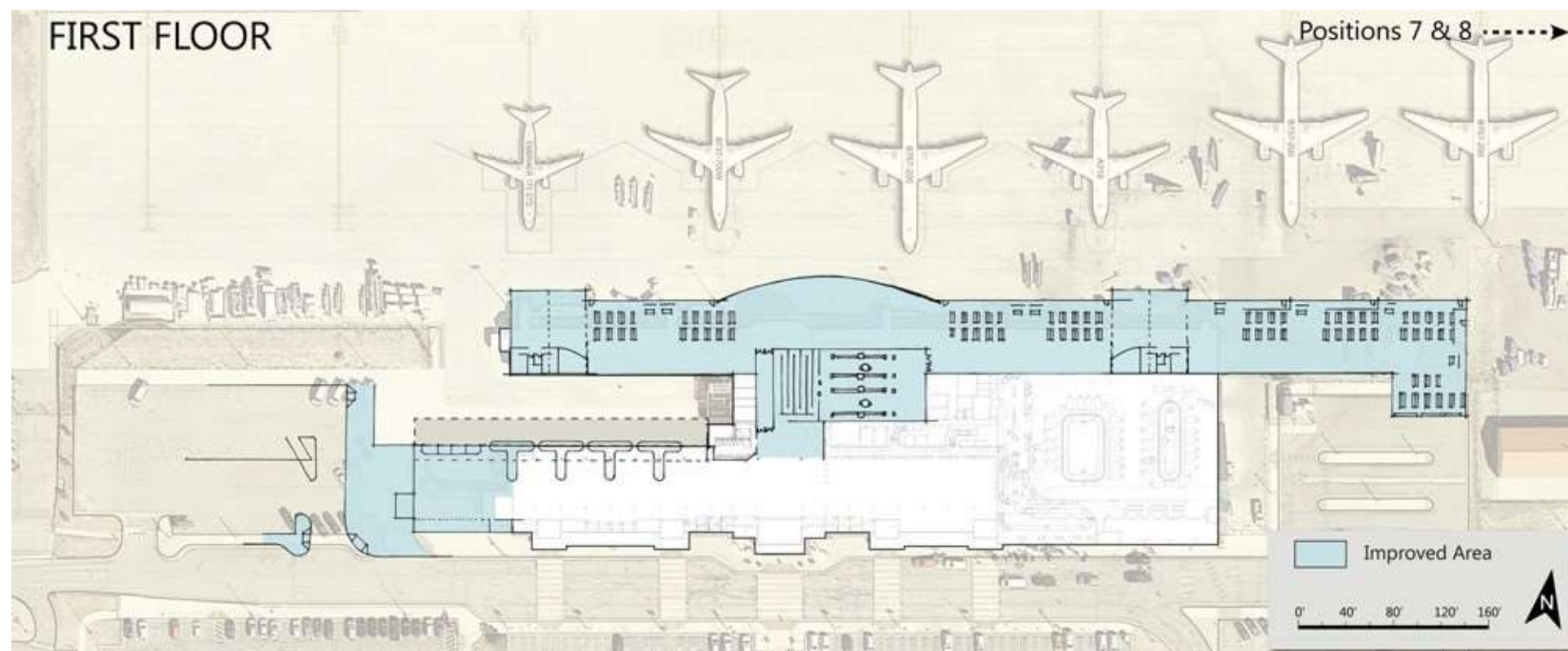
FEATURES

- Departure lounge level of service improves.
- Baggage claim area level of service improves with additional bag claim belt.
- Provides reasonable walking distances to gates.
- Brings oversized bag retrieval inside building.
- Provides dedicated CV driver meeting area.
- Provides additional room for concessions.
- Allows the ability to close down or “shutter” unused portion of terminal during summer season.
- Limits SSCP expansion beyond four lanes.
- Restricts future concourse expansion.
- Minimizes GSE storage and staging.
- Extends outbound tug routes (around concourse).
- All gates remain ground boarded.

SUMMARY

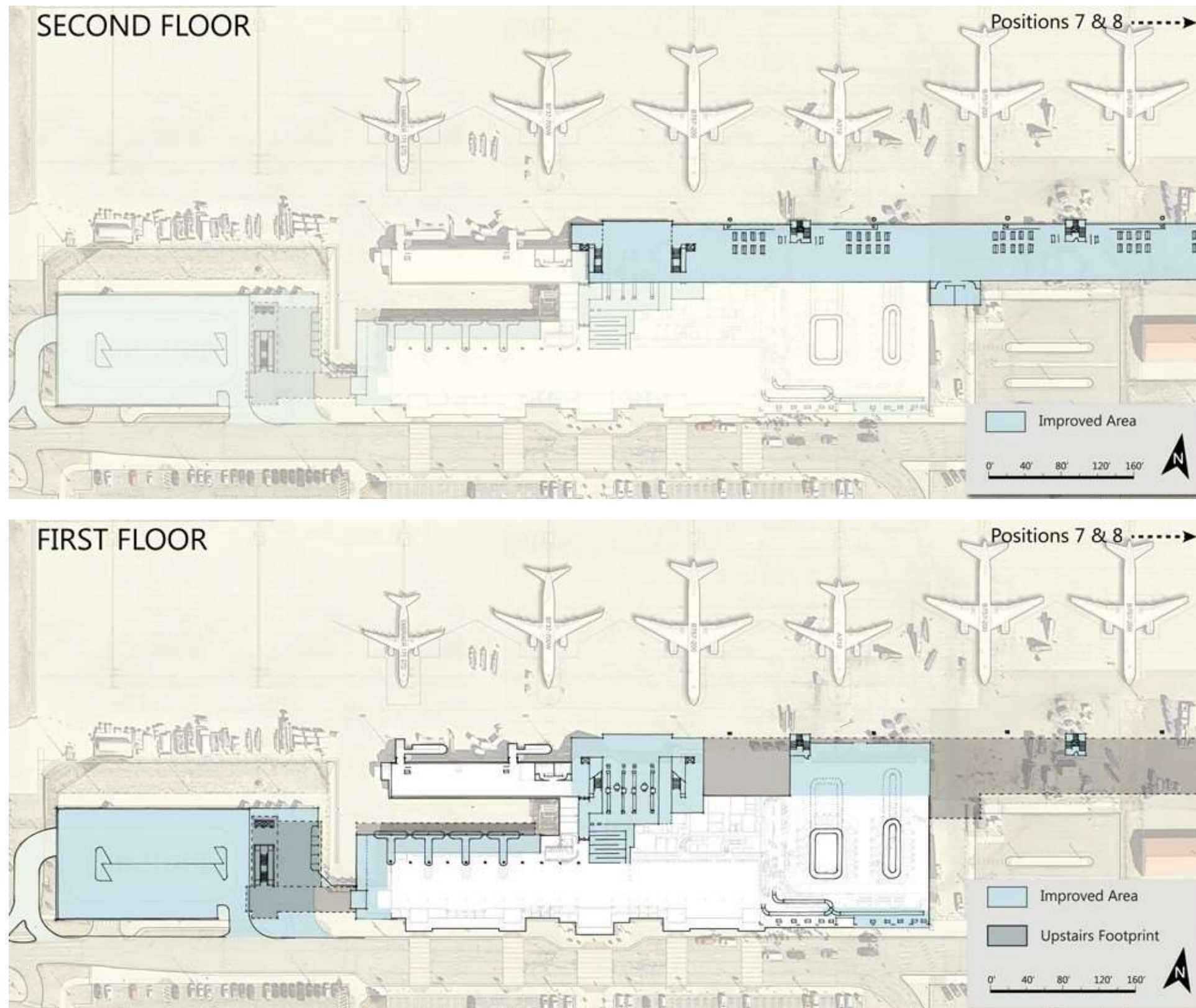
While this option offers the lowest cost and easiest implementation it falls short of meeting expectations for improving passenger level of service, restricts airport operations, and provides limited expandability.

FIGURE 2.12
TERMINAL OPTION 1 – KEEP CONCOURSE ON FIRST FLOOR



Source: RS&H, 2015

FIGURE 2.13
TERMINAL OPTION 2 – SPLIT CONCOURSE



Source: RS&H, 2015

TERMINAL OPTION 2

This option splits the airside concourse into two levels. The expanded concourse is re-centered on the existing aircraft positions, maintaining western de-ice positions 1 and 2. New, enlarged departure lounge/gate space is built above the current eastern holdrooms with the option to demolish or renovate the existing spaces below. Demolishing the old spaces would allow for expansion of the outbound baggage area and provide covered space for the storage and staging of ground service equipment. However, retaining the space creates flexibility for future operational needs such as international flight facilities. The TSA screening checkpoint expands north on the first floor, with space to accommodate a fifth lane to the east. The bag claim area expands west toward the CV pick-up lot with the option of investing in a covered and formalized two-tiered CV pickup facility. The existing lot would be replaced with a parking deck and a new excavated pickup lot below at apron level (potential for all terminal alternative options). Curbside check-in is expanded east within the existing terminal to provide greater check-in capacity.

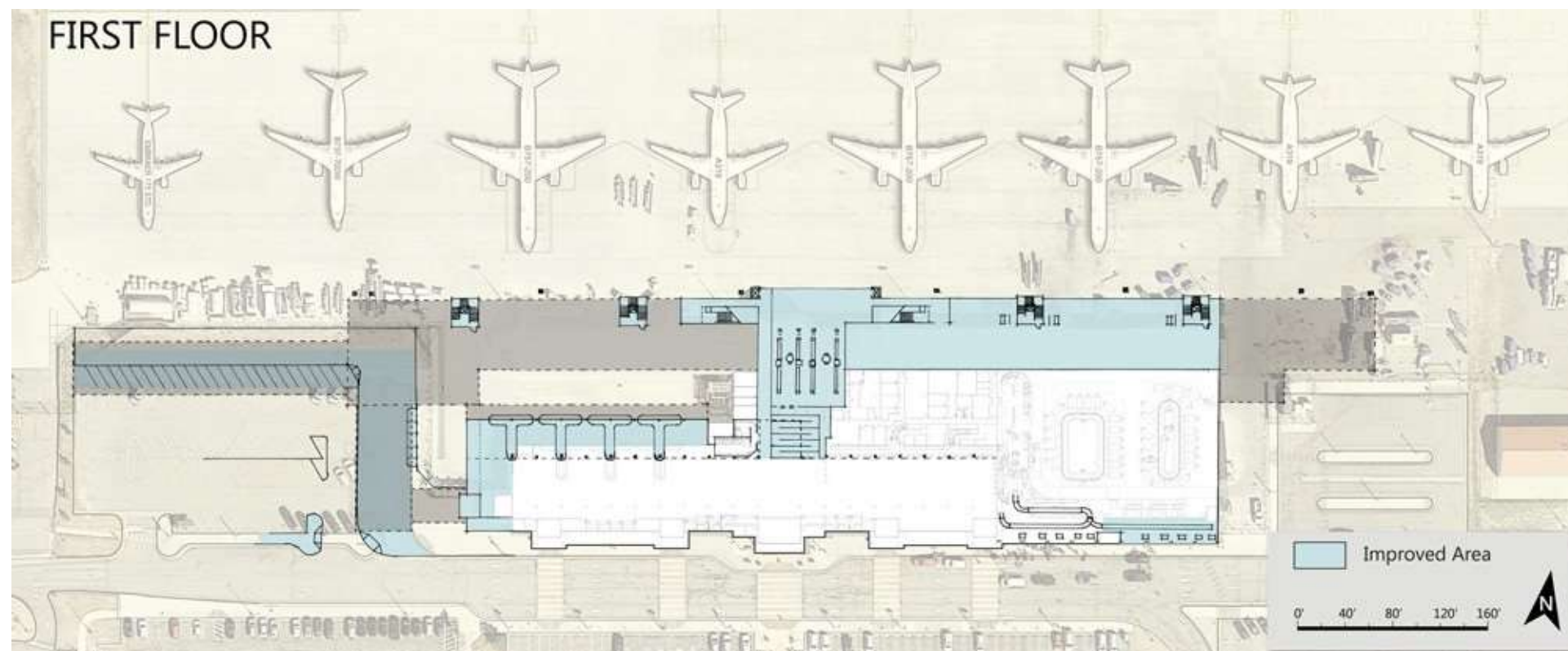
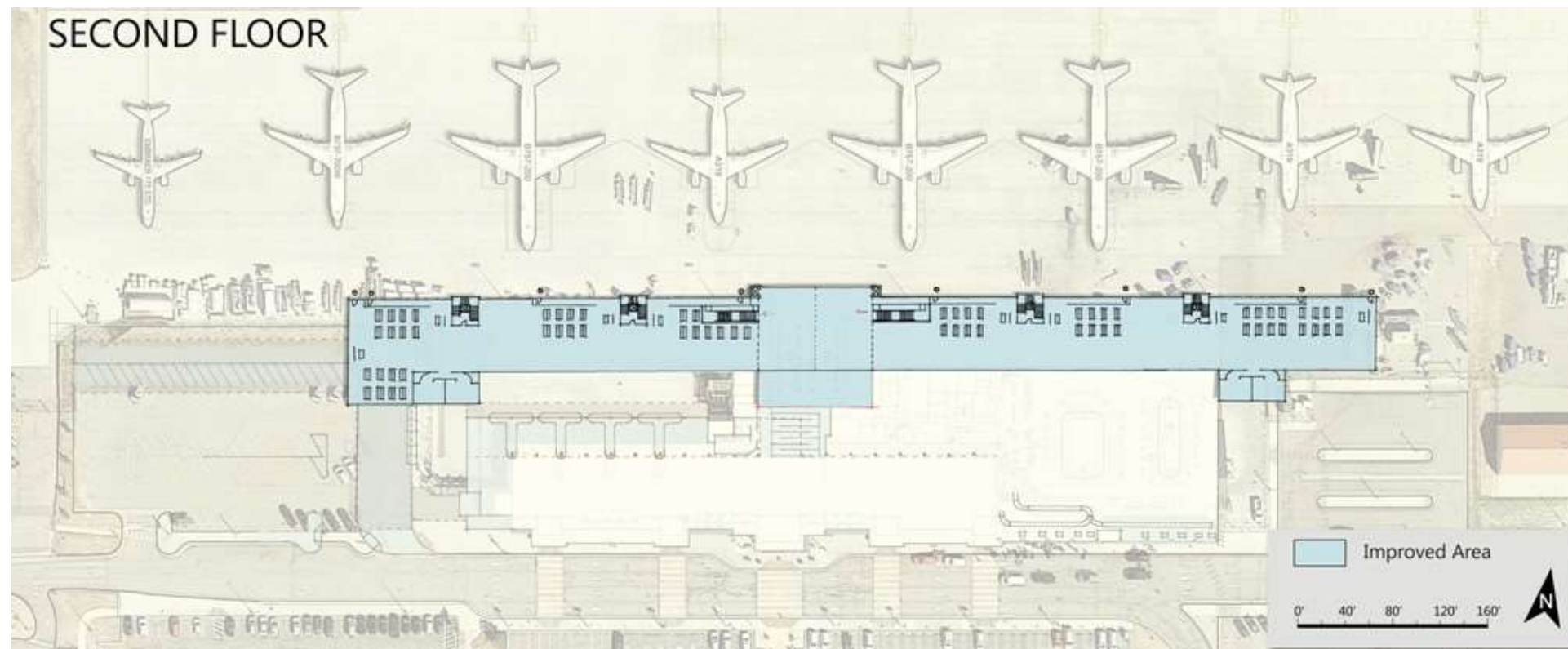
FEATURES

- Demolishing east ground level departure lounges and building 2nd floor allows for outbound baggage expansion and more direct tug access.
- Central GSE storage and staging is displaced but replaced with covered open space.
- Preserves space for SSCP expansion.
- Baggage claim area level of service improves with additional bag claim belt.
- Allows the ability to close down or “shutter” unused portion of terminal during summer season.
- Existing west ground departure lounges/gates remain confined with poor level of service.
- Concessions are split between two levels.
- Creates long walking distances to far gates.

SUMMARY

This option addresses many areas of concern such as departure lounge and bag claim level of service, but splits operations between two levels and creates difficulties in maintaining efficient passenger flows.

FIGURE 2.14
 TERMINAL OPTION 3 – MOVE CONCOURSE UPSTAIRS



Source: RS&H, 2015

TERMINAL OPTION 3

This option moves the entire airside concourse to a second floor, while keeping the SSCP on the first floor. Additionally, the aircraft are re-centered on the terminal, utilizing the western de-ice positions 1 and 2. This shift allows for a more equal east and west airside concourse extending from a central core. The expansion “right-sizes” the departure lounges and optimizes the airside concessions organization. The TSA screening checkpoint expands north to provide more screening space and a dedicated queue area, while preserving space for future lane expansions. Curbside check-in is expanded to provide greater capacity. The baggage claim expands west into the existing CV pickup lot allowing for an additional bag claim carousel.

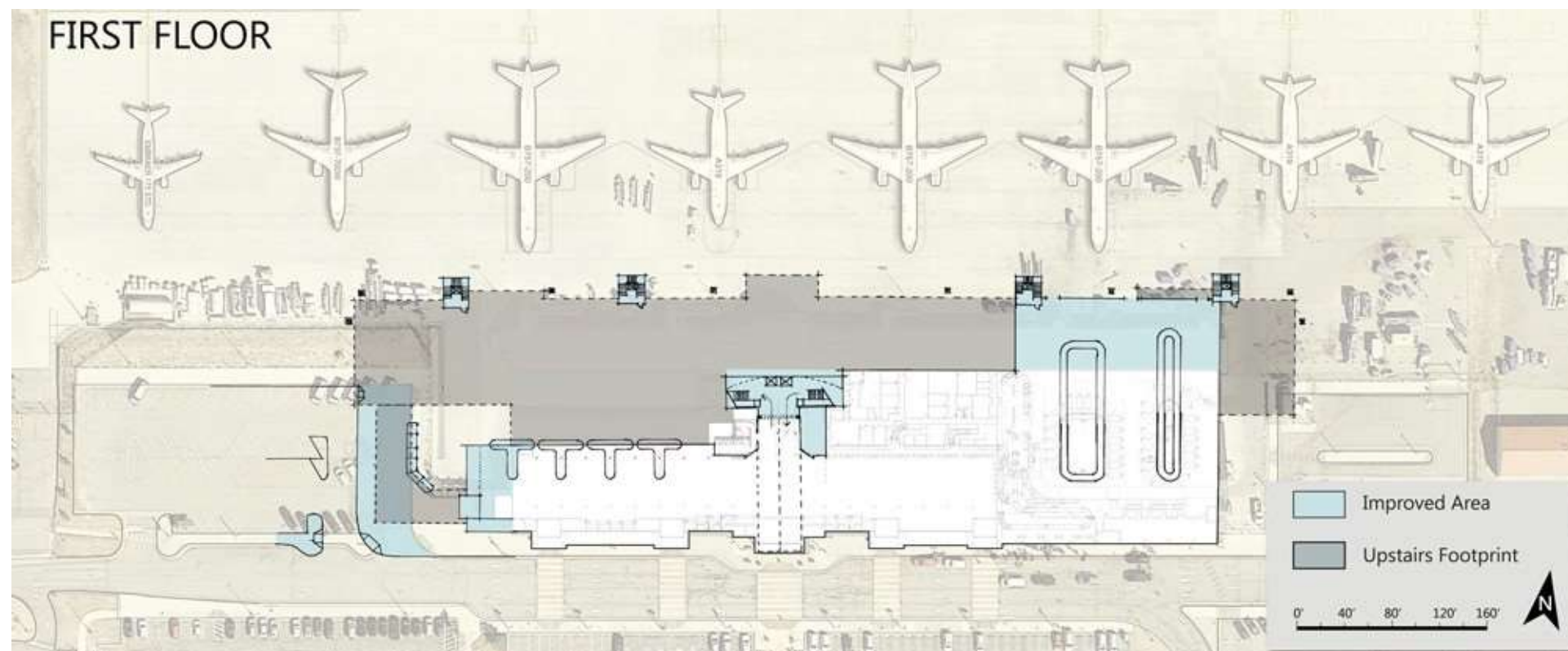
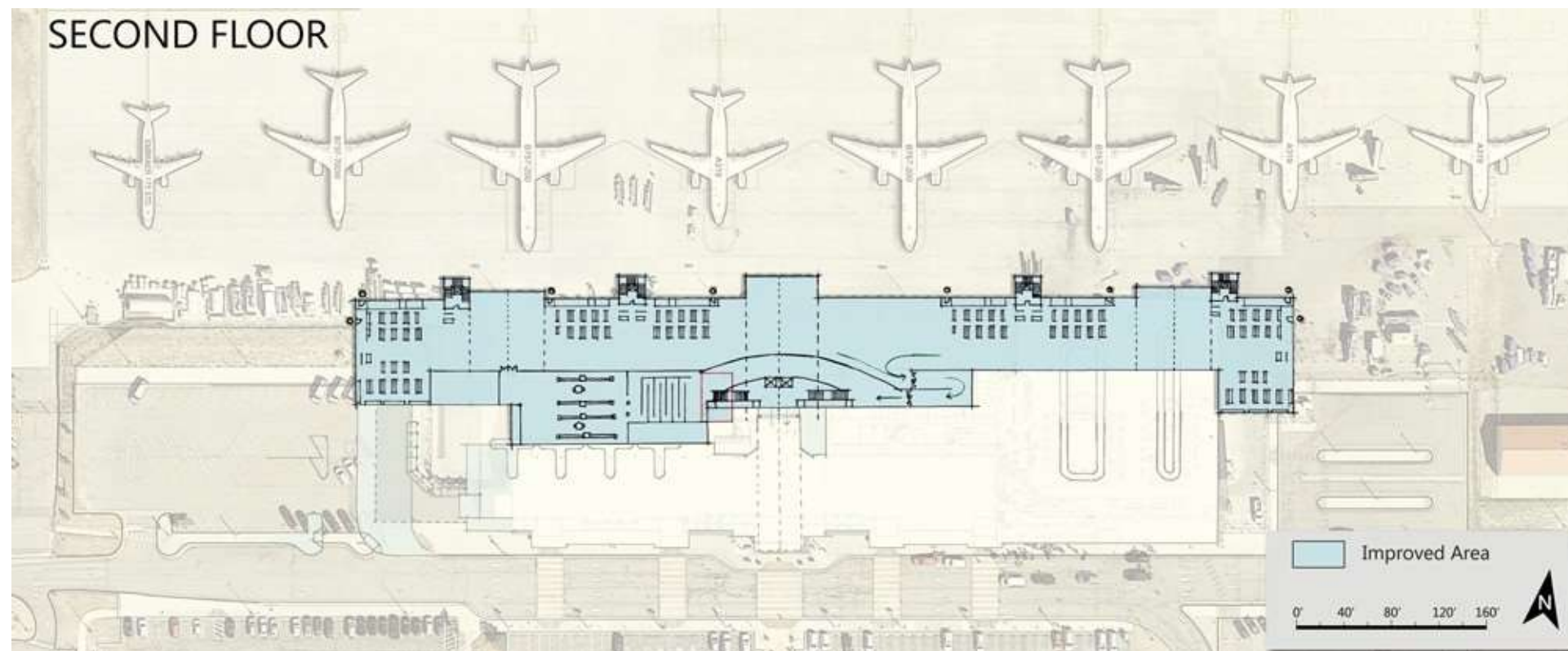
FEATURES

- All gates have passenger boarding bridge (PBB) capability.
- Creates comfortable walking distances to gates from central core.
- Baggage claim area level of service improves with additional bag claim carousel.
- Provides opportunity for ground level summer holdrooms allowing entire second level to be shuttered in summer season.
- Provides covered GSE storage and staging.
- Enlarges TSA screening with space preserved for future expansions.
- Allows opportunities for future growth at all levels.
- Potential for phased implementation approach.
- Requires further analysis of deicing operational impacts.

SUMMARY

This solution most effectively resolves current issues and meets future facility needs. Great efficiencies and improvements can be achieved in airport operations and passenger level of service with this alternative.

FIGURE 2.15
 TERMINAL OPTION 4 – MOVE CONCOURSE AND SECURITY SCREENING CHECKPOINT UPSTAIRS



Source: RS&H, 2015

TERMINAL OPTION 4

This option moves both the airside concourse and TSA screening checkpoint to a new second floor. Similar to Option 3, the aircraft are re-centered on the terminal utilizing the western de-ice positions. Curbside check-in is expanded to provide greater capacity. The baggage claim expands west into the existing CV pickup lot allowing for an additional bag claim carousel.

FEATURES

- Departure lounge level of service improves dramatically.
- Creates comfortable walking distances to gates.
- All gates have PBB capability.
- Baggage claim area level of service improves with additional bag claim carousel.
- Allows for outbound baggage expansion and provides more direct tug route.
- Provides abundant, covered GSE storage and staging space.
- Eliminates ground floor departure lounge capability.
- Preserves space for potential departure lounge expansions.
- Potential for phased implementation approach.
- Limits future TSA screening expansion.
- Requires relocation of HVAC and IT core.
- Requires further analysis of deicing operational impacts.

SUMMARY

This option is the most expensive option but fails to provide as many benefits as Option 3. While it would be the most difficult to implement, it does significantly improve overall level of service and meets long-term facility needs.

2.3.3 EVALUATION PROCESS

The four terminal options were evaluated against nine criteria to help identify their strengths and weaknesses in regard to meeting Airport needs. This evaluation is shown in **Figure 2.16**.

Option 1 is rated “less than desirable” in its ability to resolve current issues and only moderately addresses long-term facility needs. There is little flexibility for future expansion and impact to airport operations and level of service falls below desired outcomes. However, concession opportunities work well, project costs are relatively low, and implementation is easier with all construction occurring at ground level.

Option 2 performs moderately to good in nearly all areas with the exception of concessions opportunities, which is the result of splitting concessions between two levels.

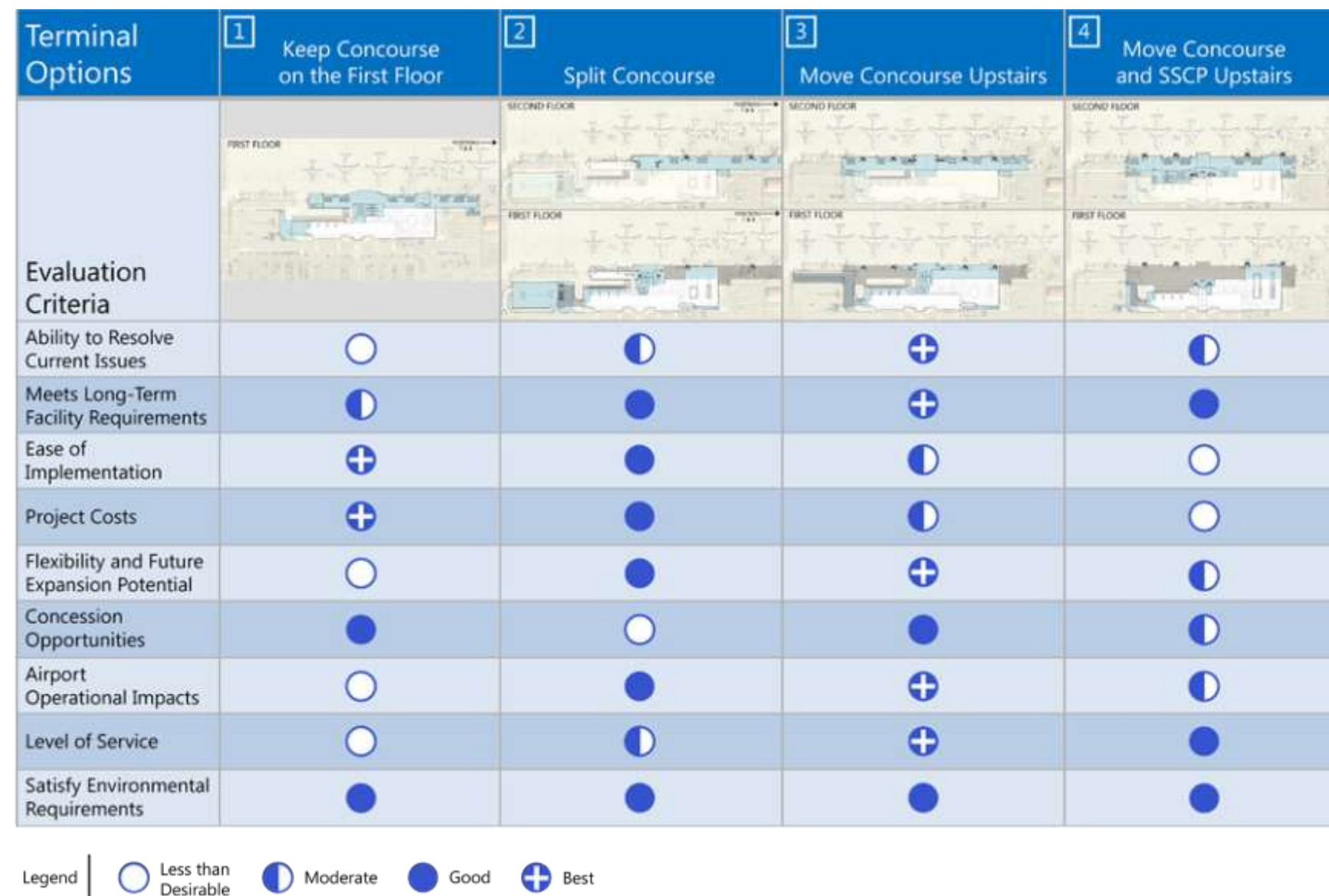
Option 3 stands out as highly beneficial in key areas such as resolving existing and future facility concerns, flexibility for future expansion, and minimizing impacts to airport operations, while greatly improving passenger level of service. It is not the most expensive nor the most difficult option presented, but costs and ease of implementation are the main two challenges to be addressed.

Option 4 performs moderately well in its ability to resolve current issues, provide flexibility for future expansions, create concession opportunities, and positively impact airport operations. However, it presents issues in the areas of project cost and ease of implementation. The solution does well to meet future facility needs and improve the overall level of service.

All of the options presented have a relatively low environmental impact as the proposed terminal work will occur on the Airport’s previously developed property. In each option, a majority of the new construction proposed would occur on the terminal’s airside. As a result, significant consideration was given to aircraft and airline operations on the apron.

At the conclusion of the evaluation process, Option 3 proved to be the most desirable alternative. This option was determined to provide the most beneficial outcomes in terms of its ability to resolve current issues and meet long-term facility needs. It also scored highly in its ability to allow flexibility for future expansion, improve airport operations, and provide passengers with a high level of service. Concessions opportunities integrate well into this option, however implementation challenges would need to be addressed and costs are higher relative to other alternatives.

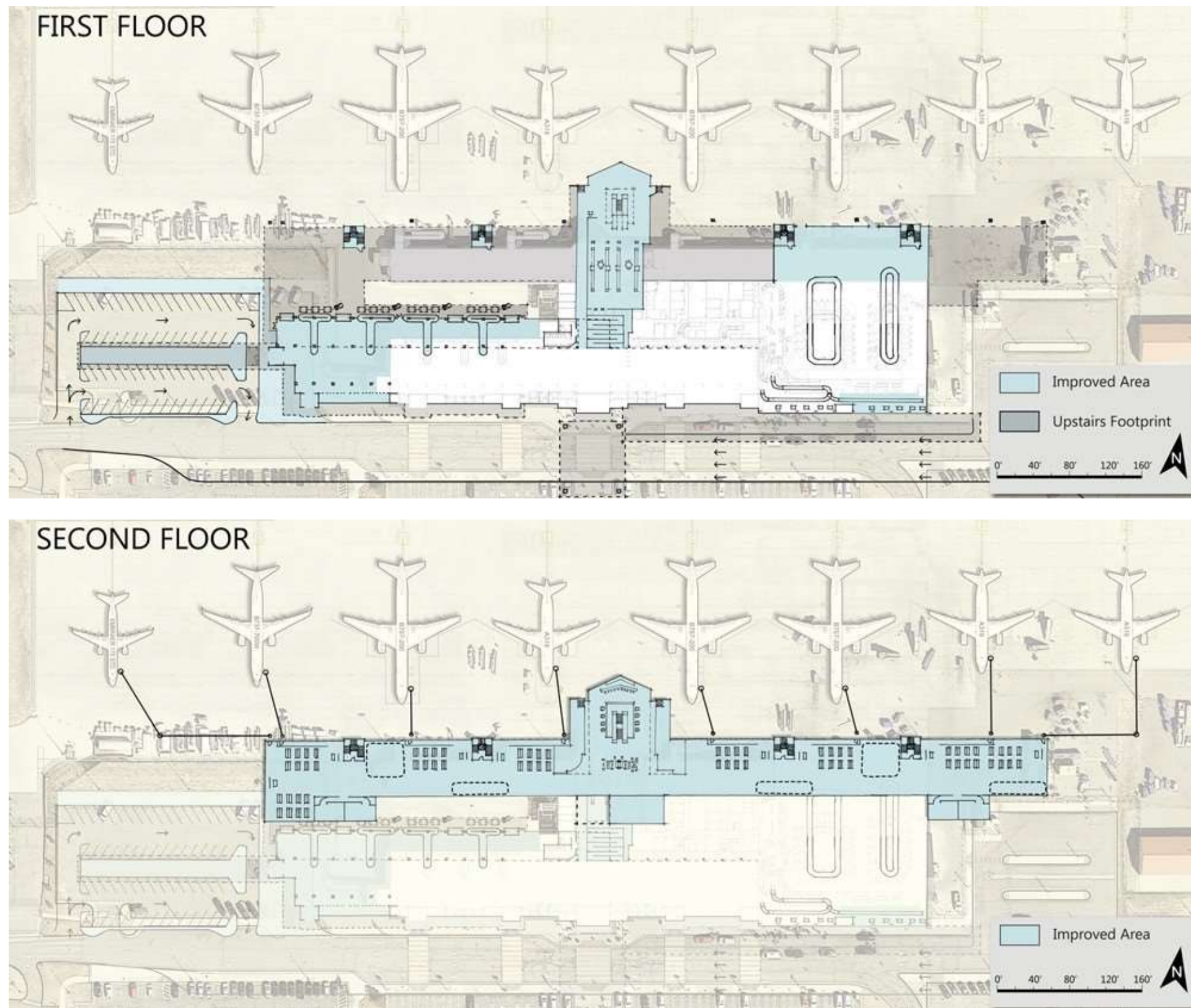
FIGURE 2.16
TERMINAL OPTION EVALUATION MATRIX



Source: RS&H Analysis, 2015

2.3.4 PREFERRED CONCEPT

FIGURE 2.17
PREFERRED TERMINAL BUILDING CONCEPT



Source: RS&H, 2015

PREFERRED TERMINAL BUILDING CONCEPT

As a result of the evaluation, Option 3 was chosen as the preferred direction. This option was further developed into the Preferred Terminal Building Concept shown in **Figure 2.17**. Starting on the landside, curbside check-in is extended east to provide greater check-in capacity at the curb. A new curbside canopy along the length of the departures curb provides cover to both the sidewalk and the curbside drop-off lane. Additionally, a new porte cochère over the terminal’s central entrance extends over the roadway to the parking lot, providing additional cover to passengers entering and exiting the terminal.

Moving into the terminal, the TSA screening checkpoint is expanded and shifted north into the first floor of a new two story airside concourse hall. This new space allows for four (4) screening lanes, preserving the area to the east for future expansion. The space currently occupied by the checkpoint is remodeled and converted to dedicated checkpoint queue space, allowing the landside lobby to reclaim the area currently used for queuing. At the north end of this expansion is a large re-composure area with a view of the apron. This re-composure area is flanked by two elevators, and includes an open stair and pair of escalators at its center, which lead to the second floor central hall.

The second floor hall is the center core of the new airside concourse with elevated ceilings, a large fireplace, and expansive views of both the apron and mountains beyond. This space also contains the main concessions for the airside. Extending east and west of the hall are the departure lounge concourses, which provide space for passenger circulation, holdrooms, and smaller concessions opportunities. At each end of the concourse is a large set of restrooms. The concourse accommodates eight (8) gates with passenger boarding bridge capability. Moving back down to the first level, the baggage claim hall is expanded west and north, providing space for four (4) baggage carousels. When compared to the existing baggage claim hall, these carousels are pushed north and spaced further apart. This allows more area for passengers to circulate in and around these units, and provides space for an oversized bag shelf at each unit. Finally, a dedicated CV driver staging area is added along the south wall.