Chapter 4 – Terminal Facility Requirements and Alternatives

I. Terminal Facility Requirements

Introduction

This chapter of the master plan converts the forecasted passenger demand levels that were identified in Chapter 2 into quantities of terminal facilities that will meet targeted levels of demand at peak periods through the planning period. Once those facilities were identified, a systematic development and analysis of alternatives to provide those facilities identified the best approach to providing those facilities, weighed against specific quantifiable and/or qualitative criteria. These criteria were established through the identification of specific goals and objectives. These goals, objectives, criteria, and the preferred terminal alternatives will be identified in subsequent sections of this chapter.

Existing Terminal Building

The role of the airport passenger terminal is to provide a facility which balances present and future needs for passenger convenience, baggage handling, airport operations, ground access, business commerce and operational control. The primary objective is to facilitate the movement of passengers and baggage between surface and air transportation modes with a minimum amount of time, confusion, and inconvenience.

The terminal building at Gallatin Field is a centralized facility in which processing of passenger ticketing, baggage check-in, baggage claim, security screening, and airport boarding are achieved in one building. A primary advantage of a centralized facility is the ability of the airport and air carriers to focus efforts in a concentrated area, thereby minimizing duplication of personnel costs and allowing for the consolidation of facility and operational equipment. Additionally, a centralized terminal provides an airport the ability to consolidate passenger transfer, simplify vehicle and passenger information systems and provide a common area for passenger services and amenities. As a result, centralized terminals are typically less expensive to operate than other types of terminals.

The existing terminal building, as was identified in Chapter 1, provides 74,422 square feet of space. This space is allocated among various functional needs including space for airlines, security, concessions, common areas, mechanical systems, and administration. The building itself is remarkable in its character and appeal and captures the spirit of the region's heritage. However, after having been enlarged several times, creating additional area through a simple addition would be a challenge that may not be cost-effective to undertake. This conclusion is fully explained in this chapter. To the extent feasible, it is the goal of the Airport to keep and integrate as much of the existing building as possible.

Terminal Capacity and Facility Requirements

The terminal capacity and facility requirements analysis for Gallatin Field was conducted using forecast information presented in Chapter 2. Depending on the type of facility being examined the terminal analysis utilized the forecast number of annual enplanements, annual passengers or annual aircraft operations to obtain the Airport's projected space requirements. To determine future space requirements for the terminal, peak hour demand values were also applied to determine the level of accommodations necessary to facilitate passenger traffic during the most critical hour of the year. After determining the terminal space values, Planning Activity Level (PAL) values were calculated to serve as numerical thresholds for Gallatin Field staff to use in planning additional facilities.

An airport terminal consists of a complex network of individual elements with different demand levels and capacity requirements. Facility expansion adds incremental growth to various elements as needed. As a result, the need for additional facilities does not occur simultaneously with all airport elements. Therefore, space deficiencies identified with terminal elements in the future may be resolved through space reallocation rather than through constructing additional space.

Terminal Requirements

Overall Footprint (SF)

Existing	2015	2020	2025
74,422	182,500	209,900	238,800

The overall size of the terminal is referred to as the terminal footprint. The size of an airport's terminal and amenities provided should correspond to the travel characteristics of the community in which it serves. Through the experience of planning and designing dozens of terminal buildings, including several since September 2001 when the focus on aviation security became a pre-eminent constraint, aviation architects on the consulting team for this study have developed a sophisticated program for determining the overall space requirements for specific peak hour passenger levels. **Table 4-1** provides the existing breakdown of terminal areas, along with the preliminary recommended areas (for planning purposes rather than final design) that will meet the forecasted passenger demand through 2025.

As a general rule of thumb in the post-9/11 era, terminal design has been providing approximately 300 square feet per Peak Hour Passenger. This is a variable target number and terminal design will adjust that number to meet the specific needs of Gallatin Field. By comparison, the Airport is accommodating the estimated peak hour level of 691 passengers with the existing terminal area of 74,422 square feet, or 108 square feet per passenger. In order to handle twice the number of passengers and increase the area per Peak Hour Passenger, the building will need to increase significantly beyond double, as indicated by **Table 4-1**.

Specific areas for each functional area of the terminal building and surrounding infrastructure are presented and discussed below. The existing facility is quantified along with the recommended total quantity for each planning activity level. Where appropriate, a percentage of the overall footprint for the building is provided as a comparison to what is provided in the current building. It is important to note that some of the existing space allocations fall below recommended allowances, which is what causes congestion at peak periods, while others such as the administration spaces are appropriately sized.

Airline Gates

Existing	2015	2020	2025
6	10	11	14

An important attribute of an airport passenger terminal is the number of aircraft parking positions or gates. Consequently an emphasis should be placed on understanding actual gate demand prior to construction and creation of a terminal development strategy which provides for easy gate expansion when demand requires.

Forecasted demand for Gallatin Field indicates that there will be a doubling of passenger enplanements during the planning period. At the same time, the average seats per departure will remain fairly steady, indicating that the size of aircraft will not increase beyond the fleet mix operating currently. Therefore, the number of aircraft that use the terminal gates should also double during the forecast period.

With regard to peaking characteristics, while it might be expected that the peak demand could be spread out to capture capacity at off-peak times, the reality is that the proximity of the hub airports is such that the first arriving flights of the day arrive at the noon-time busy hour. The current demand is not sufficient to warrant originating early flights from hub airports. The characteristics of the airline schedules is expected to continue the pattern of early morning departures for the aircraft that remain overnight, followed by their return at or near the noon peak. This pattern will require the doubling of gates within the forecast period to meet that peak demand.

Airline Space (SF)

Existing	2015	2020	2025
33,811	59,933	69,487	78,266
45%	35%		

Airline space includes ticket counter area, airline ticket offices (ATO), outbound baggage make-up areas, inbound baggage stripping and claim areas, and passenger boarding lounges. The current percentage of total area leased by the airlines is impressive and provides Gallatin Field with a higher return on the available space. However, it also is a trade off as it indicates that areas such as public circulation and passenger security screening are likely undersized, with resulting congestion.

FAA guidance and averages for terminal buildings indicate that approximately one third of the terminal space is dedicated as airline space. This percentage is a reduction of the current utilization by airlines, but considering the increase in the total footprint this will result in a significant increase in airline space.

Table 4-1 Overall Program

MASTER PLAN TERMINAL FACILITIES REQUIREMENTS					
Description	**Existing**	**Planning Activity Levels**			**Recommended MP Addition**
Year	**2006**	**2015**	**2020**	**2025**	**2020**
Annual Enplaned Passengers	335,700	503,500	587,500	671,500	587,500
Total Peak Hour Passengers	691	815	951	1,087	951
Number of Gates	6	10	11	14	**5**
Total Terminal Area (Rounded)	74,422 sf	182,500 sf	209,900 sf	238,800 sf	**174,300 sf**
AIRLINE SPACE					
Ticket Counter Length	120 lf	184 lf	212 lf	240 lf	212 lf
Ticketing & Outbound Baggage	12,065 sf	20,900 sf	24,100 sf	26,800 sf	24,100 sf
Baggage Claim Length	285 lf	356 lf	416 lf	476 lf	**131 lf**
Inbound Baggage and Claim	11,774 sf	20,310 sf	23,659 sf	27,119 sf	**11,885 sf**
Passenger Departure Lounges	10,002 sf	18,723 sf	21,728 sf	24,347 sf	**11,726 sf**
TRANSPORTATION SECURITY ADMINISTRATION					
Security Screening Checkpoint	1,900 sf	15,299 sf	18,194 sf	21,079 sf	18,194 sf
Baggage Screening	2,392 sf	9,330 sf	10,200 sf	11,080 sf	10,200 sf
CONCESSIONS	7,086 sf	9,500 sf	11,000 sf	12,600 sf	11,000 sf
GROUND TRANSPORTATION	2,691 sf	2,700 sf	3,200 sf	3,600 sf	3,200 sf
PUBLIC SPACE					
Public Circulation	18,851 sf	63,000 sf	73,600 sf	84,100 sf	**64,175 sf**
Washrooms	2,327 sf	8,450 sf	9,350 sf	11,140 sf	9,350 sf
AIRPORT ADMINISTRATION	4,424 sf	4,758 sf	4,935 sf	5,641 sf	**511 sf**
UTILITIES	*See Note 1* sf	9,516 sf	9,870 sf	11,281 sf	9,870 sf
CURB FRONT					
Enplaning Curb	250 lf	379 lf	443 lf	506 lf	443 lf
Denplaning Curb	250 lf	379 lf	442 lf	505 lf	**192 lf**
PARKING	1,407 sp	1,842 sp	2,123 sp	2,426 sp	2,123 sp
Short Term Parking	*See Note 1* sp	202 sp	210 sp	240 sp	210 sp
Long Term Parking	776 sp	968 sp	1,130 sp	1,291 sp	1,130 sp
Employee Parking	220 sp	252 sp	294 sp	336 sp	294 sp
Rent-A-Car Ready/Return	411 sp	420 sp	490 sp	560 sp	490 sp
Car Condominiums	180 sp	270 sp	315 sp	360 sp	315 sp

Bold Values *are adjusted to account for existing area to be reused.*

Note 1: Area not separately accounted in Inventory

The increases would be mainly focused in enlarged operations areas to increase efficiency, enlarged passenger departure lounges, ticket queuing, and baggage claim areas, and expansion areas for entrant carriers.

TSA Security Space (SF)

Existing	2015	2020	2025
4,292	24,629	28,394	32,159
6%	14%		

The passenger screening checkpoint is the most visible evidence of the constraints placed upon terminal facilities since September 11th. Centralized passenger and baggage screening is a virtual requirement at airports the size of Gallatin Field. Space for additional equipment and personnel has been extracted from areas previously dedicated to most other terminal functions and many retrofit actions had to be swiftly undertaken on the fly. The result is congestion at peak periods, passenger and employee inconvenience, and constraints on growth within the terminal building.

As can be seen by the table above, applying the industry average of 14 percent of the terminal space, meeting the demand for 2015 will require approximately 20,000 square feet of additional TSA space. This space is a combination of passenger screening checkpoint, baggage screening within the baggage make-up area, and TSA offices. The design of the building addition may be able to reduce the amount of space required for TSA to meet their mission. However, being a centralized function, the provision for ample room for growth will allow for the expansion of concourses without the need to construct additional space in the central portion of the terminal.

Concessions (SF)

Existing	2015	2020	2025
7,086	9,500	11,000	12,600
10%	6%		

Space designated as concessions includes areas leased by the Airport for food and beverage facilities, gift shops, and other general concessions and advertising space that produce revenue for the airport. This is an important feature of the terminal building and sufficient space for concessions, both within the secure areas and also outside of the secured areas that are available for the meeters and greeters will be required.

Ground Transportation Space (SF)

Existing	2015	2020	2025
2,691	2,700	3,200	3,600
3%	3%		

Ground transportation includes space for car rental agencies and other ground transportation vendors who provide services to the visiting passengers. The space required and/or desired by these concessions is not tied to the size of the building but rather to the number of operators leasing space in the terminal. The growth indicated captures the off-airport operators who may wish to have facilities within the terminal building and new entrant ground transportation providers.

Public Space (SF)

Existing	2015	2020	2025
22,088	71,450	82,950	95,240
30%	40%		

Public space includes waiting areas, general circulation areas, and restrooms. Terminal planning criteria typically calls for approximately 40 percent of the terminal building to be public space. Generally speaking, the public spaces provide the passenger the user-friendly impression since there is plenty of room to separate arriving and departing flows, wide corridors, and open, friendly spaces to meet arriving passengers. The trade-off is that the public spaces are not revenue-producing and the proper balance of passenger comfort and convenience to revenue must be achieved.

The space required at the 40 percent level is indicated in **Table 4-1**. Much of this space would be provided in the central core of the building, allowing for expansion of adjacent facilities to cost-effectively meet demand levels at the end of the planning period and beyond.

Airport Administration (SF)

Existing	2015	2020	2025
4,424	4,758	4,935	5,641
6%	2%		

The space for airport administration is considered adequate and not tied to the size of the building. Due to the administration's location in the center of the building, any addition to the terminal would not likely impact this space and this function can remain intact. A small increase is indicated for additional space that may be captured during the remodeling process.

Enplaning and Deplaning Curb (LF)

Existing	2015	2020	2025
250	379	443	506
250	379	443	506

Terminal frontage is a critical element in the performance of the Airport's terminal ground access system. Congestion at the terminal interface is common at many airports as a result of curb design deficiencies. This is because curb design is tied to airport activity characteristics such as peak passenger volume, annual enplanement levels, modes of transportation accessing the terminal, and curb dwell time.

The current frontage is approximately 500 feet and is shown to be evenly split between enplaning and deplaning curb. The growth in curb length is shown in Table 4-1 and the increases are tied to the increase in peak hour passengers. The reality, however, is that the curb will be a function of the type of building constructed, the amount of existing curb that can be captured, and the use of additional dedicated lanes for commercial vehicles and buses.

Auto Parking (Spaces)

Existing	2015	2020	2025
1,407	1,842	2,123	2,426

Auto parking includes short term, long term, employee, car rental ready/return, and car condominiums. Being an airport with a high number of visiting passengers, adequate and conveniently located car rental spaces are a vital factor in the expansion of the terminal building. Premium short term spaces can also provide additional revenue as higher rates can be charged to account for added convenience and encourage turnover.

Additionally, "car condos" are a desirable feature for the high value customer, but are not necessarily required to be located within the terminal area as arrangements can be made to retrieve vehicles and have them brought to the passenger when needed.

II. Terminal Alternatives

With the Terminal Facility Requirements established, the gross quantities of terminal facilities need to be developed into alternative concepts. These concepts will be evaluated systematically to determine the extent to which the scheme meets the Terminal Facility Requirements. Furthermore, the evaluation will consider the extent to which the alternative concepts meet stated goals and objectives which were developed by Gallatin Field. These goals and objectives fall into three main categories: Programmatic Elements, Terminal Site Specific Issues, and User Friendly Elements. These were further subdivided into specific evaluation criteria and developed into a matrix that was used to evaluate each initial design concept. The evaluation criteria are:

Programmatic Elements:

- Ability to meet the set Planning Activity Level – 1.4 Million Total Passengers – 12 Gates
- Centralize passenger and carry-on baggage screening and exit lane
- Consolidate baggage screening in-line "straight-forward" systems (TSA)
- Streamline check-in/checked luggage process (Kiosks, Curbside, Express Freight)
- Improve pedestrian and vehicular interface (exterior)
- Accommodate future expansion easily and economically

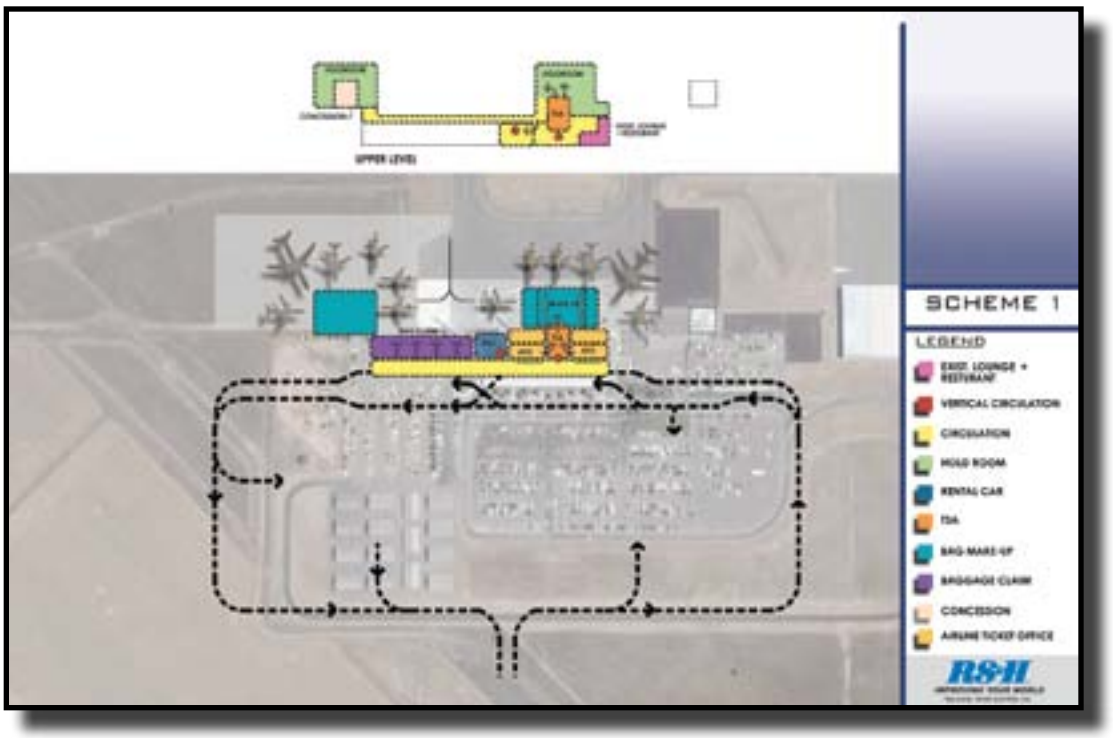
Terminal Site Specific Issues

- Minimize building construction phasing
- Maintain significant portion of existing investment
    - Apron
    - Terminal
    - Roadway and parking
    - Utilities – infrastructure
- Optimize reuse of existing terminal spaces
- Scalable development
- Operational efficiency (ticket counter to gate)

User Friendly Elements

- Minimize walking distances for passengers (interior)
- Minimize the pain during construction
- Intuitive wayfinding
- Concessions conveniently located for maximum revenue collection
- Efficient tug operations
- Minimize vertical movement of passengers
- Minimize vertical movement of baggage

Figure 4-1 – Scheme 1 - Master Plan Dual Pier



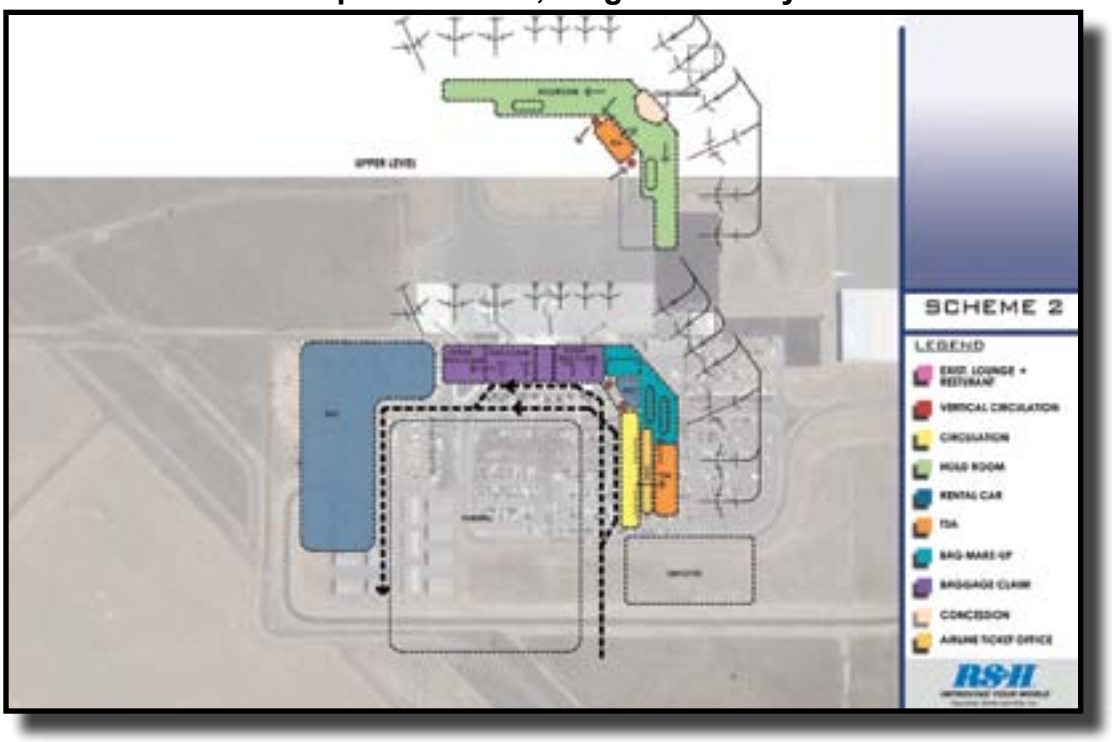
Features

Scheme 1 is carried forward from the existing Master Plan. The principal features of this scheme include reutilization of the existing terminal building for ticketing and constructing new ground level space for baggage claim and two new “piers” accessed through a second level concourse connecting the two together. These piers would each contain the departure lounges and gates along with separate concession areas. The security screening function would occur on the second level in Concourse A and the passengers who are departing from Concourse B would walk down the second-level corridor that connects the two together.

On the landside, the access roadway system would feature a single loop road with all parking within the loop. Vehicles approaching the terminal building would first encounter the departures (ticketing) curb, with the arrivals (baggage claim) curb constructed in front of the extended portion of the building. The rental car concessions would have their offices and counters approximately where they are today.

The general circulation of passengers would have the departing passengers starting at the ticket counters, then proceeding to the second level for passenger and carry-on screening, then on to one of the two boarding lounges prior to loading on aircraft via passenger loading bridges or down to ground level gates. Arriving passengers would exit the concourses down to the first level at the central area near the rental car counters and then to the baggage claim units or out to parking/ground transportation.

Figure 4-2 – Scheme 2 - Lineal Expansion East, Single Roadway



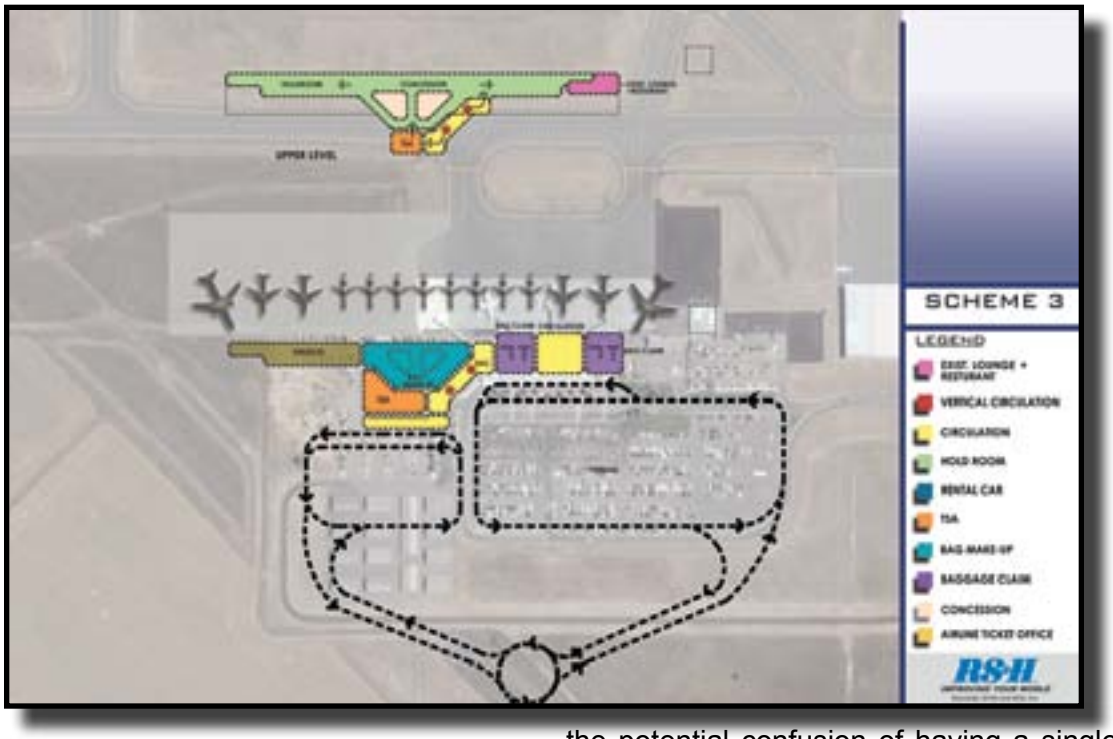
Features

Scheme 2 is a new concept that features a reutilization of the existing terminal building for baggage claim and constructing new ground level ticketing (departures) and second level concourse and boarding lounges in a “linear” fashion that wraps around the entrance road to the east and south. This linear concept would centralize the security screening in the corner that is created between the ticketing and baggage claim curbs. The concourse, boarding lounges, and concessions on the second level would be on either side of the security checkpoint with equal walking distances to either end of the concourse.

On the landside, the access roadway system would feature a single loop road with all parking within the loop. Vehicles approaching the terminal building would first encounter the newly constructed departures (ticketing) curb, with the arrivals (baggage claim) curb in front of the existing portion of the building. The parking would be reconfigured from the existing arrangement as the new portion of the building would be constructed on top of the existing entrance road. New rental car offices and counters would be constructed in the center (corner) portion of the new building, easily accessible by arriving passengers as they transition from the concourse to the baggage claim area.

The general circulation of passengers would have the departing passengers starting at the ticket counters, then proceeding to the center of the building’s second level for passenger and carry-on screening, then on to boarding lounges prior to loading on aircraft via passenger loading bridges or down to ground level gates. Arriving passengers would exit the concourses down to the first level at the central area near the rental car counters and then to the baggage claim units or out to parking/ground transportation. The rental car ready/return lot would be essentially where it is today, accessed through the west exit of the existing building.

Figure 4-3 – Scheme 3 - Lineal Expansion West, Dual Loop Roadway, Central Ticketing



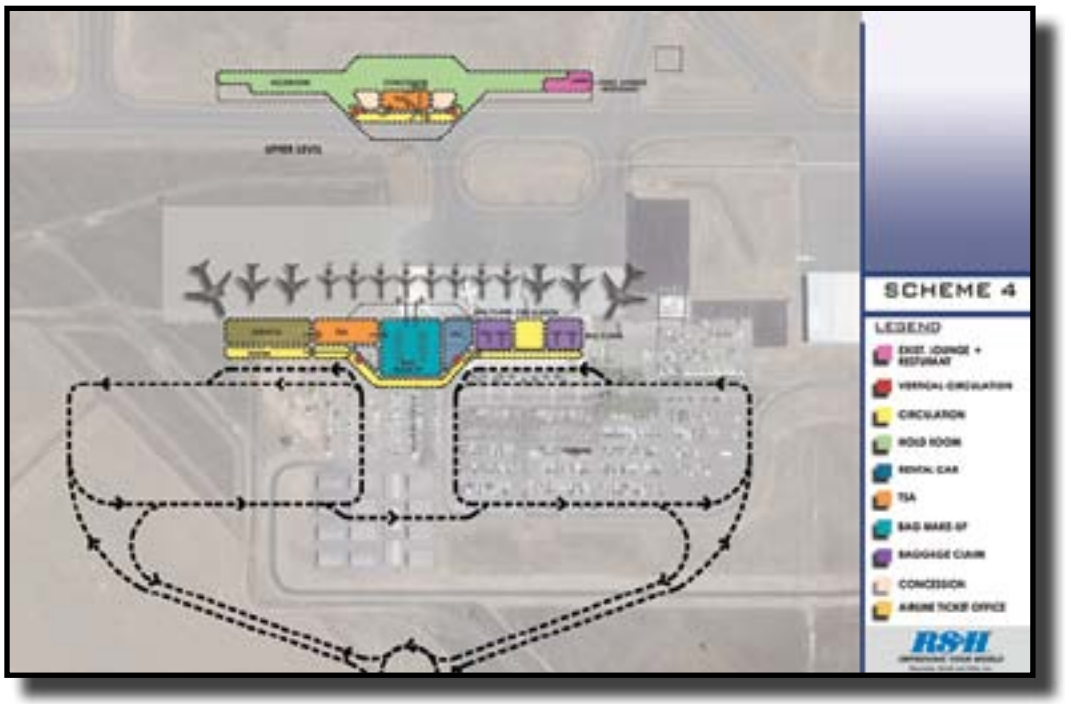
Features

Scheme 3 is a new concept that features a reutilization of the existing terminal building for baggage claim and the construction of new ground level ticketing (departures) and second level concourse and boarding lounges in a linear fashion to the west. This linear concept would centralize the security screening in an enlarged “node” that is created between the ticketing and baggage claim curbs. The concourse, boarding lounges, and concessions on the second level would be on either side of the security checkpoint with equal walking distances to either end of the concourse.

On the landside, the access roadway system would feature dual loop roads with separate parking areas within each loop. The separation of vehicles that are accessing either curb frontage is accomplished at a roundabout traffic circle well away from the building. Signage would direct vehicles to the appropriate loop road. This arrangement is intended to eliminate the potential confusion of having a single loop road where the arrival curb appears before the departure curb and reduce the amount of traffic at pedestrian crossings. New rental car offices and counters would be constructed in the center (corner) portion of the new building, easily accessible by arriving passengers as they transition from the concourse to the baggage claim area.

The general circulation of passengers would have the departing passengers starting at the ticket counters, then proceeding directly to the building’s second level for passenger and carry-on screening, then on to boarding lounges prior to loading on aircraft via passenger loading bridges or down to ground level gates. Arriving passengers would exit the concourses down to the first level at the central area near the rental car counters and then to the baggage claim units or out to parking/ground transportation. The rental car ready/return lot would likely be within the smaller loop road.

Figure 4-4 – Scheme 4 - Lineal Expansion West, Dual Loop Roadway, West Ticketing



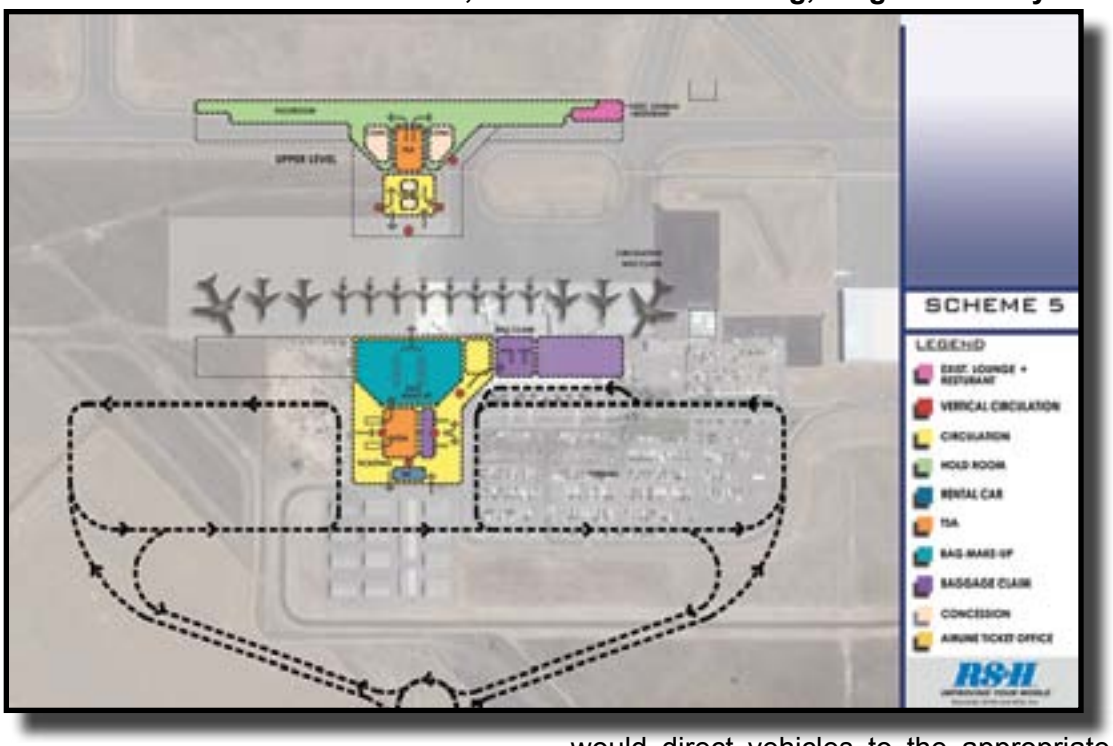
Features

Scheme 4 is a new concept that is closely related to Scheme 3, except for a rearrangement of airline/TSA spaces and the location of the ticketing (departure) curb from the center of the building to the west end of the new construction. Scheme 4 features a reutilization of the existing terminal building for baggage claim and the construction of new ground level ticketing (departures) and second level concourse and boarding lounges in a linear fashion to the west. This linear concept would centralize the security screening in an enlarged “node” that is created between the ticketing and baggage claim curbs. The concourse, boarding lounges, and concessions on the second level would be on either side of the security checkpoint with equal walking distances to either end of the concourse. Abundant concession space would be provided both on the screened passenger side and the public side of the security checkpoint within the central node.

On the landside, the access roadway system would feature dual loop roads with separate parking areas within each loop. The separation of vehicles that are accessing either curb frontage is accomplished at a roundabout well away from the building. Signage would direct vehicles to the appropriate loop road. This arrangement is intended to eliminate the potential confusion of having a single loop road where the arrival curb appears before the departure curb and reduce the amount of traffic at pedestrian crossings. The difference between Scheme 4 and Scheme 3 is the departure loop is further to the west to front the departure curb, rather than in front of the smaller central node. New rental car offices and counters would be constructed in the center (corner) portion of the new building, easily accessible by arriving passengers as they transition from the concourse to the baggage claim area.

The general circulation of passengers would have the departing passengers starting at the ticket counters, then proceeding first to the center node and then to the building’s second level for passenger and carry-on screening, then on to boarding lounges prior to loading on aircraft via passenger loading bridges or down to ground level gates. Arriving passengers would exit the concourses down to the first level at the central area near the rental car counters and then to the baggage claim units or out to parking/ground transportation. The rental car ready/return lot would likely be within one of the two loop roads.

Figure 4-5 – Scheme 5 - Three Sided Terminal, Ground Level Ticketing, Single Roadway



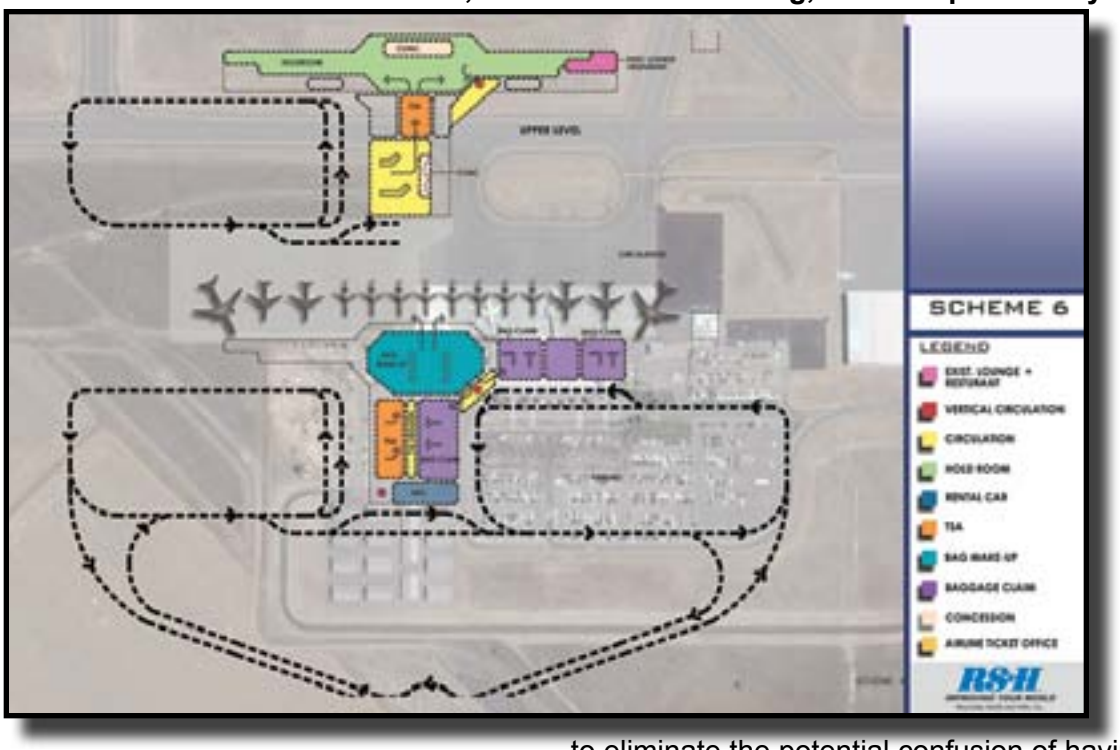
Features

Scheme 5 is a new concept that explores the idea of a "three-sided" terminal – or simply one that has a "T" arrangement that can be expanded any of three ways. Scheme 5 features a reutilization of the existing terminal building for baggage claim and the construction of new ground level ticketing (departures) and second level concourse and boarding lounges in a "T" fashion to the west and south. This concept would centralize the security screening in a much enlarged "node" that is created between the ticketing and baggage claim curbs. The key feature is that the stub portion of the "T" would have the ability to have ticketing curb on one side and baggage claim on the other. Curb frontage would be available on both sides of the stub as it wraps around each loop road. The concourse, boarding lounges, and concessions on the second level would be on either side of the security checkpoint with equal walking distances to either end of the concourse. Abundant concession space would be provided both on the screened passenger side and the public side of the security checkpoint within the central node.

On the landside, the access roadway system would feature dual loop roads with separate parking areas within each loop. The separation of vehicles that are accessing either curb frontage is accomplished at a roundabout well away from the building. Signage would direct vehicles to the appropriate loop road. This arrangement is intended to eliminate the potential confusion of having a single loop road where the arrival curb appears before the departure curb and reduce the amount of traffic at pedestrian crossings. The difference between Scheme 5 and Schemes 3 and 4 is the addition of extended curb frontage provided by the "T" portion of the node. New rental car offices and counters would be constructed in the arrivals (corner) portion of the new building or at the far end of the "T", easily accessible by arriving passengers as they transition from the concourse to the baggage claim area.

The general circulation of passengers would have the departing passengers starting at the ticket counters located within the "T" portion of the building on the ground level, then proceeding up to the second level to passenger and carry-on screening in the central node, then on to boarding lounges prior to loading on aircraft via passenger loading bridges or down to ground level gates. Arriving passengers would exit the concourses down to the first level at the central area near the rental car counters and then to the baggage claim units or out to parking/ground transportation. The rental car ready/return lot would likely be between the two loop roads accessed from the end of the "T" portion of the building.

Figure 4-6 – Scheme 6 - Three Sided Terminal, Second Level Ticketing, Dual Loop Roadway



Features

Scheme 6 is a variant to Scheme 5, a concept that explores the idea of a “three-sided” terminal – or simply one that has a “T” arrangement that can be expanded any of three ways. Scheme 6 features a reutilization of the existing terminal building for baggage claim and the construction of new second level ticketing (departures) and second level concourse and boarding lounges in a “T” fashion to the west and south. This concept would centralize the security screening in a much enlarged “node” that is created between the ticketing and baggage claim curbs. One main difference between Scheme 6 and Scheme 5 is that the stub portion of the “T” would have the ticket counters on the second level and the baggage claim units on the ground level.

On the landside, the access roadway system would feature dual loop roads with separate parking areas within each loop. Another difference between Scheme 6 and Scheme 5 is that the roadway would be elevated to a departure curb on the second level. The separation of vehicles that are accessing either curb frontage is accomplished at a roundabout well away from the building. Signage would direct vehicles to the appropriate loop road. This arrangement is intended to eliminate the potential confusion of having a single loop road where the arrival curb appears before the departure curb. The difference between Scheme 6 and Schemes 3 and 4 is the addition of extended curb frontage provided by the “T” portion of the node. New rental car offices and counters would be constructed in the arrivals (corner) portion of the new building or at the far end of the “T”, easily accessible by arriving passengers as they transition from the concourse to the baggage claim area.

The general circulation of passengers would have the departing passengers starting at the ticket counters located within the “T” portion of the building on the second level, then passing directly through the ticket counters that are in an “island” arrangement and then proceeding directly to passenger and carry-on screening in the central node, and finally on to boarding lounges prior to loading on aircraft via passenger loading bridges or down to ground level gates. Arriving passengers would exit the concourses down to the first level at the central area near the rental car counters and then to the baggage claim units or out to parking/ground transportation. The rental car ready/return lot would likely be between the two loop roads accessed from the end of the “T” portion of the building.

Initial Evaluation of the Schemes

The first six schemes were evaluated against the criteria and summarized in a matrix, as shown in Table 4-2. Each concept was graded against the criteria with one of three symbols: A dark circle if the scheme meets the criteria, a half circle if the scheme partially meets the criteria, and an open circle if the scheme does not meet the criteria. The score indicated in the far right column is the tally of the grades. The top ranked schemes were slated for further development and refinement.

The following discussion provides the evaluation of each concept against the criteria and the rationale behind each of the scores given to each concept.

Programmatic Elements

Ability to meet the set Planning Activity Level - Each of the schemes, almost by definition, can be designed to meet the designated PAL. Full credit was given to each scheme.

Centralize passenger and carry-on baggage screening and exit lane – Each scheme features centralized TSA functions for passenger and carry-on screening. This is a by-product of September 11th screening requirements. Scheme 1 suffers a bit since the centralized function is not necessarily central to the two piers, but given full credit since the function takes place in one area.

Consolidate baggage screening – straight forward systems for TSA – The intent for this criterion is to have a system that is as efficient for TSA baggage screening as possible and provides a dedicated and consolidated area out of view of the passengers to meet their baggage screening mission. Room for growth is also a key factor. Schemes 1 and 5 had difficulty with this item; Scheme 1 did not feature a system where the bags went straight behind the ticket counter, but rather made a turn to reach the TSA area. Since this is the only scheme that reutilized the existing ticketing area, options for addressing this issue are limited. Both Schemes 1 and 5 also are boxing in the TSA area and that limits growth potential. For that reason Scheme 1 was given an open circle and Scheme 5 received a half circle.

Streamline check-in/checked luggage process (kiosks, curbside, express freight) – Certain technological advances in recent years, such as kiosks for check-in, have reduced the time spent in the queuing area. This reduction in dwell time has a corresponding reduction in the amount of area required for this function as the throughput is increased. However, the layout of the building as well as the underlying infrastructure needs to be conducive to this type of space-reducing implementation. Since Scheme 1 reutilizes the existing ticketing area, this will essentially be a remodeling and it is more problematic to implement the required technological upgrades within that existing space. As such it was determined that Scheme 1 fails to meet the program. Scheme 4 was determined to only partially meet the program requirements due to the lack of overall depth of the ticketing area.

Improve pedestrian and vehicular interface (exterior) – The arriving and departing passengers should be able to efficiently transition to and from the terminal building and the various ground transportation modes. The goal is to ensure that there is adequate curb length and curbside services, limited pedestrian crossing of traffic and general pedestrian convenience, and an efficient traffic pattern in the lanes fronting the building. Scheme 1 was considered to not improve this interface since the pedestrian is required to cross all lanes of traffic, which includes all vehicles, arriving and departing. Scheme 2, although featuring shorter walking distances to a centralized parking area, has limited curb length along with a single loop road. The other schemes feature dual loop roads that separate traffic so that the pedestrian only crosses either arriving or departing traffic. Additionally, the space between the traffic loops would offer access to lots without having to cross any lanes of traffic. Schemes 1 and 2 were graded with open circles.

Accommodate future expansion easily and economically – Each scheme has the ability to be expanded in the future, however Schemes 1 and 2 cause constraint on the aircraft parking apron with any future additions. For Scheme 1, this constraint is caused by the pier arrangement that would require expansion to move parking positions closer to the runway, or alternatively require the construction of a third pier. For Scheme 2, the constraint is the limitation to expansion on the east side of the building. Considering the abundant land available on the west

side of the building, to constrain the scheme on the east would not meet the intent of this item. Scheme 1 was not considered to meet this criterion and Scheme 2 was given half credit.

Terminal Site Specific Issues

Minimize building construction phasing – This criterion addresses the ability for each scheme to be phased without a great deal of temporary facilities or disruption to passenger or airline convenience. Scheme 1, which is the only scheme to retain the existing terminal building for the ticketing function, fails to meet this objective since temporary ticket counters and airline space would be required during the renovation of the building. The construction of the other schemes would entail the completion of replacement ticket counters and airline office space, which could then be opened and used during the conversion of existing ticketing to baggage claim area or other uses.

On the apron, Scheme 1 would require the second pier to be completed and the entire concourse extended back to the terminal building prior to any expansion of the existing building. TSA functions would also need to be temporarily relocated and concession areas would also be significantly disrupted. For these reasons, Scheme 1 was found to not meet the program objectives.

Maintain significant portion of existing investment – This criterion was given a significant amount of weight and is reflective of the fact that the existing building and the attendant infrastructure has a great deal of value and should be preserved to the extent feasible. The weighting is accomplished by having five separate subcategories that were given equal weight in the tally. The following five criteria directly relate to maintaining the existing investment:

Apron – Unlike Schemes 2 through 6, Scheme 1 requires the construction of new terminal spaces on a significant amount of existing parking apron. This apron would be lost as complete demolition would be required to prepare for the building and concourse construction and would need to be replaced. Scheme 1 was considered to not meet the program criteria.

Terminal – All schemes were given full credit for keeping the terminal building. A follow-on criterion judges the optimization of such re-use.

Roadway and Parking – Scheme 1 was the only scheme to receive full credit for this criterion as the existing roadway and parking infrastructure remain virtually unchanged. Scheme 2 received no credit as the new construction would be built across the existing roadway and even infringes on the existing parking lot, especially during construction. All other schemes received half credit as some impacts are unavoidable to accomplish the dual loop roadway concept.

Utilities (underground infrastructure) – For very similar reasons to the roadway impacts, the existing utilities are disrupted due to their location under the roadway that fronts the existing terminal building. The scores were therefore identical to those for the previous criterion.

Optimize reuse of existing terminal spaces – This criterion attempts to judge how well the various schemes reutilize the existing building in the future condition. Scheme 1 was marked down since the existing spaces would need to be heavily re-worked to provide the required depth for all of the necessary functions, plus the addition of the pier on the apron side would impact the existing structure visually, especially during construction. Schemes 2 through 4 were given full credit as the existing building would remain pretty much unchanged, except for the relocation of ticketing to the newly constructed addition. Schemes 5 and 6 were marked down due to the fact that the highly efficient Three Sided Terminal concept includes baggage claim units, which would call into question the relevance of having baggage claim in the existing terminal at all, although the existing building would be available for future expansion. Schemes 1, 5, and 6 were each found to only partially meet the program criteria.

Scalable development – The notion of scalable development calls upon a number of issues and attempts to answer the question “How much needs to be built right away?” This is a very important criterion since it offers options to the Airport should interim steps toward full build out of the recommended scheme be desired or even necessary to meet funding requirements. The success of the scheme depends a great deal on the location within the building of the various functions. The more that required functions are able to be clustered or centralized, the less total footprint is required in the initial development. Scheme

1 suffers because so much construction needs to occur before the concept functions at all. The second pier needs to be fully operational prior to commencing any work on the existing terminal building. There is no 8-gate option to this scheme.

In a different way, Scheme 4 is also not scalable since the required functions are spread throughout the footprint. The full west extension to the building is required to achieve the minimum ticket counter, airline offices, and TSA baggage screening area. The second level – the boarding lounges, gates, and concession areas – would be either built out and not leased or would not be built at all and a later costly project to add the second story and gates would be required.

Scheme 3 is a good example of scalable design as the required functions for the ticketing, airline offices, baggage screening, baggage make-up, passenger screening, and concessions are centralized, and yet expandable. The new construction can occur independently of the operation of the existing terminal and then simply connected. If needed to meet funding constraints, the west extension with additional gate capacity can be added at a later time without impacting the essential function of the terminal. Even the dual loop roadway can initially be a single loop connecting to the existing access road without needing to build the interchange and roundabout. For these reasons, Scheme 3 was the only scheme to receive full credit.

Operational efficiency – The intent of this criterion was to gauge the efficiency, primarily for the airline personnel, in moving from the ticket counter to the aircraft. The key indicators are walking distances and the general movement of baggage. The basic test was the maximum distance between the farthest ticket counter and the farthest gate position. The best schemes will focus the ticketing activity equidistant from the end gates, strong features of Schemes 5 and 6. Schemes 1 and 4 fail since the ticketing occurs on the end of a linear building, well away from the most distant gate.

User Friendly Elements

Minimize walking distances for passengers (interior) – Minimizing walking distances is one of the most basic ways to make a terminal building user friendly. The key metric is to measure the distance from the departure curb and ticket counter, through security, and on to the farthest gate. The best way to accomplish this is to have the ticketing area, baggage claim, and passenger screening centralized relative to the gates. Scheme 1, with the long corridor between the checkpoint and the second pier creates long walking distances. Similarly, Scheme 4 has the ticket counters on the west end of the building, which creates longer walking distances to get to the central checkpoint. These schemes were considered not to meet this program objective, while the other four schemes achieved the objective.

Minimize the pain during construction by carefully considering phasing – The best schemes under this criterion allow for the construction of the addition to occur independently from the operation of the existing building and then simply connect the two together. Schemes 1 and 2 do not allow for this. Scheme 1 would require the complete construction of the distant pier prior to moving all aircraft operations to that pier while the existing building is significantly enlarged. There would be multiple disruptions to the normal operations of the terminal as the construction proceeds. Scheme 2 would require the rerouting of the entrance road prior to breaking ground on the addition to the east. These two schemes were given no credit under this criterion while the other four were considered to not cause significant phasing “pain”.

Intuitive wayfinding – The ability to “follow one’s nose” rather than constantly having to refer to signage is a good test of a user friendly terminal. A very common arrangement for terminal buildings with single-level roadways is to encounter the departure curb first and the arrival curb second. Arranging the building opposite to that is counterintuitive. Schemes 1 and 2 were given full credit based in part on maintaining this relationship. The dual loop road arrangement was conceived to counter this wayfinding issue. Vehicles are separated into arrival and departure traffic well away from the building via a roundabout. Once on the correct loop road, the correct curb will always be the first (and only) one. A neutralizing factor is that signage is required to assist the driver in deciding which loop road to select – that decision cannot be made by “following one’s nose”.

Another measure of intuitive wayfinding on the ground level is being able to see the baggage claim area from the ticketing lobby and vice versa. This allows the

passenger to orient themselves within the building. Schemes 5 and 6 provide excellent wayfinding characteristics as each element of the building appears exactly where one expects to find it and one flows nicely into the next. Scheme 4 fails to meet this objective, while Scheme 3 was deemed to partially meet this objective. All other schemes received full credit.

Concessions conveniently located – Concessions, including restaurants, gift shops, and snack shops are not only a convenience to the passenger, they are a significant source of revenue for the airport. With the changes in security regulations that prevent non-ticketed passengers from entering the secured areas, concession opportunities for the passengers who are expected clear security earlier, as well as for the meeters and greeters are a vital element. Having a centralized area for concessions is also preferred so that a single operator is not attempting to operate multiple concessions.

Scheme 1 is not a concept with a centralized area. With multiple departure lounges, the concession spaces are divided. A mitigating factor is that it may be possible to retain the existing restaurant/lounge on the second floor, however, given the split concessions, this scheme was not given credit.

Scheme 6 was also marked down since the central node on the upper level is used for ticketing and space is less available for concessions on that level. For that reason, Scheme 6 only partially meets this program objective.

Efficient tug operations – This user friendly criterion is geared toward the airline employee that operates the tugs to move baggage to and from the aircraft. Efficiency is maximized by centralizing the baggage makeup area in relationship to the aircraft parking positions. Scheme 1 features the baggage makeup area within the east pier, which necessitates longer tug distances for those airlines that operate out of the other pier. For this reason, Scheme 1 received no credit for this criterion. The other concepts, while having centralized baggage makeup areas, were marked down based on the offset baggage stripping area locations.

Minimizes vertical movement of passengers – The vertical movement of passengers is a requirement when the ticketing and baggage claim functions are on the ground floor and the passenger screening and departure gates are on the second floor. To a certain extent, this is unavoidable unless the departure curb is elevated. Scheme 6 features the elevated roadway, which allows for full credit for this criterion. Each of the other schemes received half credit.

Minimizes vertical movement of baggage – The vertical movement of baggage was identified as a selection criterion since baggage systems must be capable of transporting baggage to another level. Considering the fact that many travelers have odd-sized luggage such as skis, guns, and golf clubs that are more difficult to transport via conveyors, it is a much simpler system to keep the luggage on the same level. Scheme 6, which benefits the passenger by initiating travel on the same level as the checkpoint and gates, also requires the baggage to change levels via conveyors. As a result, Scheme 6 was marked down for partially meeting the program criterion while each of the other five schemes received full credit.

Summary of Evaluation Criteria

Table 4-2 provides the summary of each scheme's evaluation against the criteria as discussed above. The three top scoring schemes were identified as Scheme 3, Scheme 5 and Scheme 6 and this evaluation was presented to the Gallatin Airport Authority. Based on the information presented, these top ranked schemes were to be carried forward for further development. The following section details the resulting two schemes that evolved from this evaluation.

Table 4-2 Evaluation Matrix

Description	Scheme 1 - Master Plan Dual Pier	Scheme 2 - Lineal Expansion East, Single Roadway	Scheme 3 - Lineal Expansion West, Dual Loop Roadway, Central Ticketing	Scheme 4 - Lineal Expansion West, Dual Loop Roadway, West Ticketing	Scheme 5 - Three Sided Terminal, Ground Level Ticketing, Single Roadway	Scheme 6 - Three Sided Terminal, Second Level Ticketing, Dual Loop Roadway
	See Figure 4-1	See Figure 4-2	See Figure 4-3	See Figure 4-4	See Figure 4-5	See Figure 4-6
Programmatic Elements:						
Ability to meet the set Planning Activity Level – 1.4 Million Total Passengers – 12 Gates	●	●	●	●	●	●
Centralize passenger and carry-on baggage screening and exit lane	●	●	●	●	●	●
Consolidate baggage screening in-line “straight-forward” systems (TSA)	○	●	●	●	◖	●
Streamline check-in/checked luggage process (Kiosks, Curbside, Express Freight)	○	●	●	◖	●	●
Improve pedestrian and vehicular interface (exterior)	○	○	●	●	●	●
Accommodate future expansion easily and economically	○	◖	●	●	●	●
Terminal Site Specific Issues						
Minimize building construction phasing	○	●	●	●	●	●
Maintain significant portion of existing investment:						
-Apron	○	●	●	●	●	●
-Terminal	●	●	●	●	●	●
-Roadway and parking	●	○	◖	◖	◖	◖
-Utilities – infrastructure	●	○	◖	◖	◖	◖
-Optimize reuse of existing terminal spaces	◖	●	●	●	◖	◖
Scalable development	○	◖	●	○	◖	◖
Operational efficiency (ticket counter to gate)	○	◖	◖	○	●	●
User Friendly Elements						
Minimize walking distances for passengers (interior)	○	●	●	○	●	●
Minimize the pain during construction	○	○	●	●	●	●
Intuitive wayfinding	●	●	◖	○	●	●
Concessions conveniently located for maximum revenue collection	○	●	●	●	●	◖
Efficient tug operations	○	◖	◖	◖	◖	◖
Minimize vertical movement of passengers	◖	◖	◖	◖	◖	●
Minimize vertical movement of baggage	●	●	●	●	●	◖
Total Score:	**8.0**	**14.5**	**18.0**	**14.5**	**17.5**	**17.5**

Concept Refinement

The initial evaluation of the Programmatic, Terminal Site Specific, and User Friendly elements of the original concepts yielded a limited number of differentiators. These alternative approaches were refined and reflected into two new competing schemes that were developed from the three top ranked finalists. The two basic approaches were the Linear Concept based on Scheme 3 and the "T" or Three-Sided Concept based on Schemes 5 and 6.

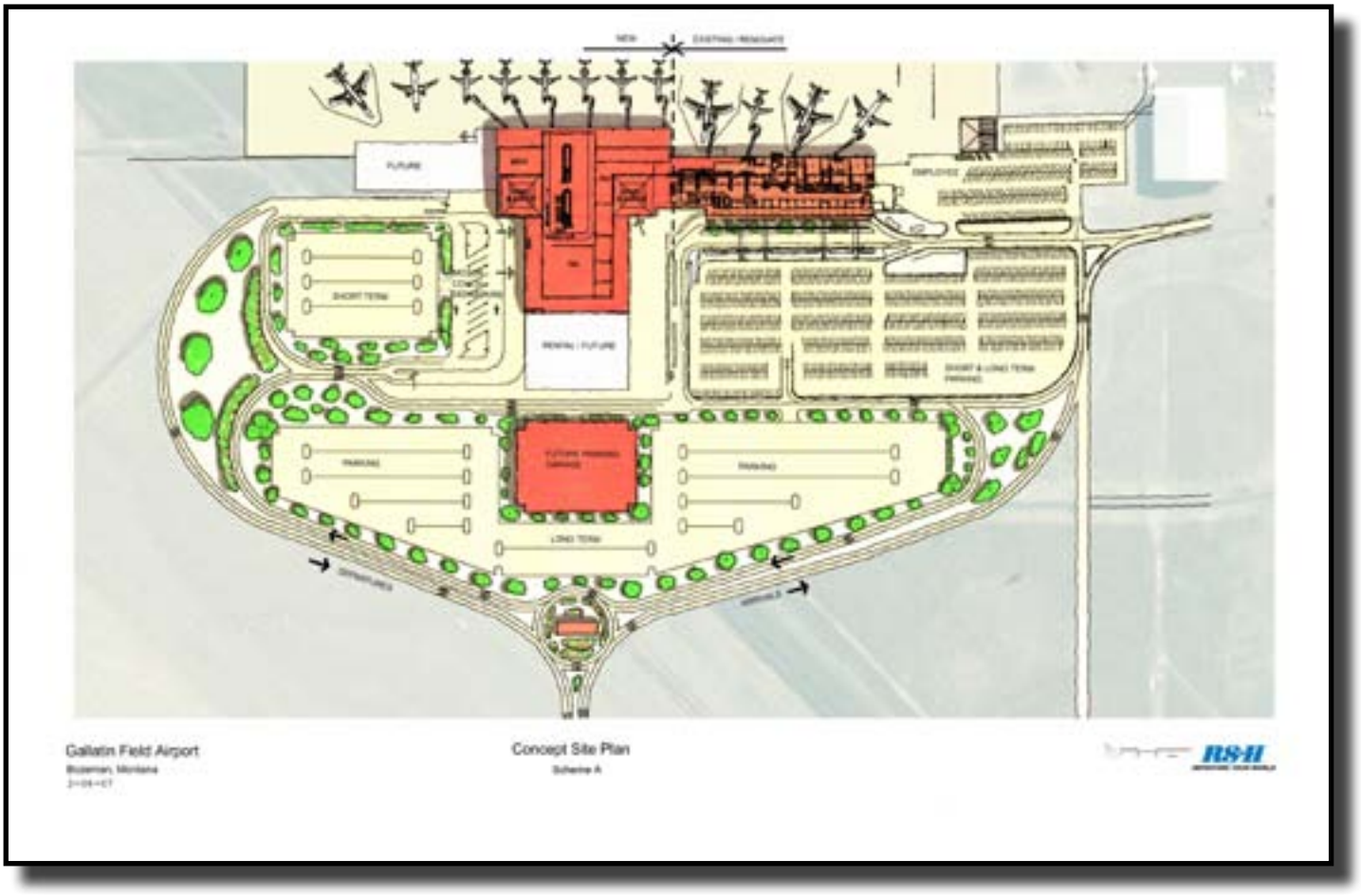
The "T" concept was redesignated as Scheme A (Figure 4-7) and the Linear concept was redesignated as Scheme B (Figure 4-8). The key features that differentiate the two schemes are:

- Ability to meet the program
- Elevated roadway vs. single curb
- Single vs. dual loop access roadway
- Single vs. multiple parking lots
- Future expandability
- Intuitive wayfinding

Scheme A – The "T" Concept

The "T" concept carries forward the theme from the original Schemes 5 and 6, which is a three-sided terminal that can be expanded on each of the three sides. Also featured is the dual loop roadway with an elevated portion at the departure curb and multiple parking lots. For long range planning purposes, a suggested location for a parking structure is also shown. Summarizing the evaluation criteria for this terminal concept, the marks were high for the Programmatic Elements and the User Friendly Elements, but did not make the highest marks for the Terminal Site Specific Issues, most notably the Optimal Reuse of the Existing Terminal and Infrastructure Investment, and Scalability.

Figure 4-7: Scheme A

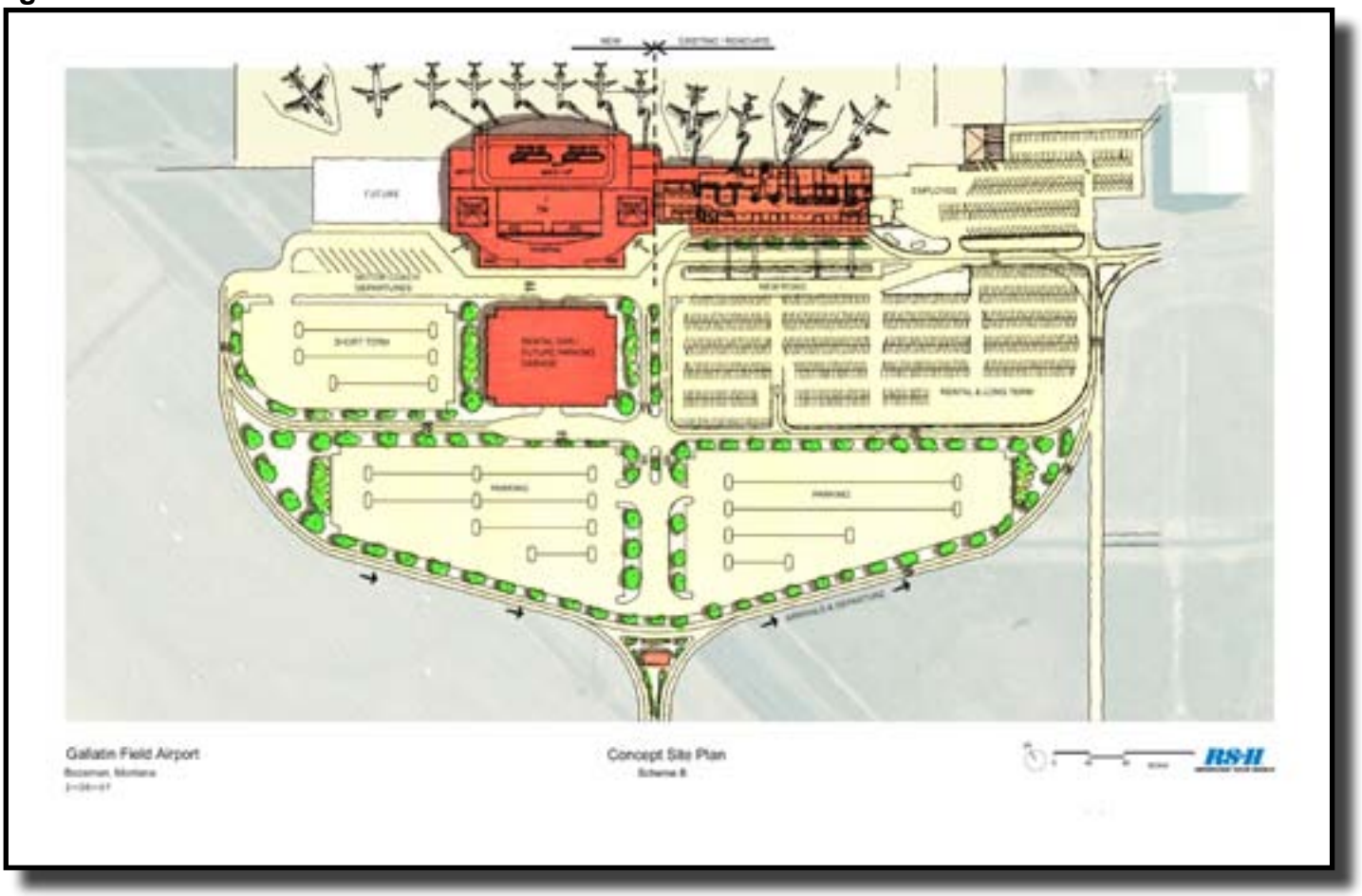


Scheme B – The Linear Concept

The Linear concept carries forward the theme from the original Scheme 3, which features the construction of a large addition to the west. This large addition will become the new center of the terminal building as it expands to the west, either initially or in a subsequent construction project. Also featured is a single curb with a single loop roadway and a single parking lot within the roadway system.

Summarizing the evaluation criteria for this terminal concept, which was the top overall ranked scheme, the marks were high across the board. The benefits are especially clear for scalable development, which assessed the ability for the design to be modified to fit the funding requirements. And in fact, the scalable element was further enhanced during concept refinement by featuring the single loop roadway in the initial development, which recognizes that the construction of a planned freeway interchange and roundabout may not be completed at the time the terminal is expanded. The design does offer the ability to evolve into separate loop roadways as the other elements fall into place.

Figure 4-8: Scheme B



Conceptual Floor Plans

The refinement of the schemes included development of initial floor plans, that will give a sense of scale, adjacency of space and passenger flow, and be used to prepare the preliminary planning cost estimates. The allocation of space meets all program requirements identified and discussed earlier in this chapter.

Figure 4-9 depicts the Scheme A First Floor Plan. Within the main node on the first floor are:

- Operational spaces for TSA offices and to perform checked baggage screening
- Airline bag make up area
- Car rental counters
- Meeter/Greeter lobby
- Circulation

There is a transitional area denoted by dashed “cut” lines that depict the limits of the new construction, where remodeling of the existing car rental counters would occur, and where the renovation of the existing building begins. Within the existing building on the first floor there would be an expanded baggage claim area and the existing airport administration spaces, including the Bridger Room. The balance of the first floor would remain available for reuse.

Outside of the building on the ground level there is parking for buses and one of the parking lots on the west side and the existing ground level arrival curb and parking lot on the east side.

Figure 4-9: Scheme A First Floor Plan

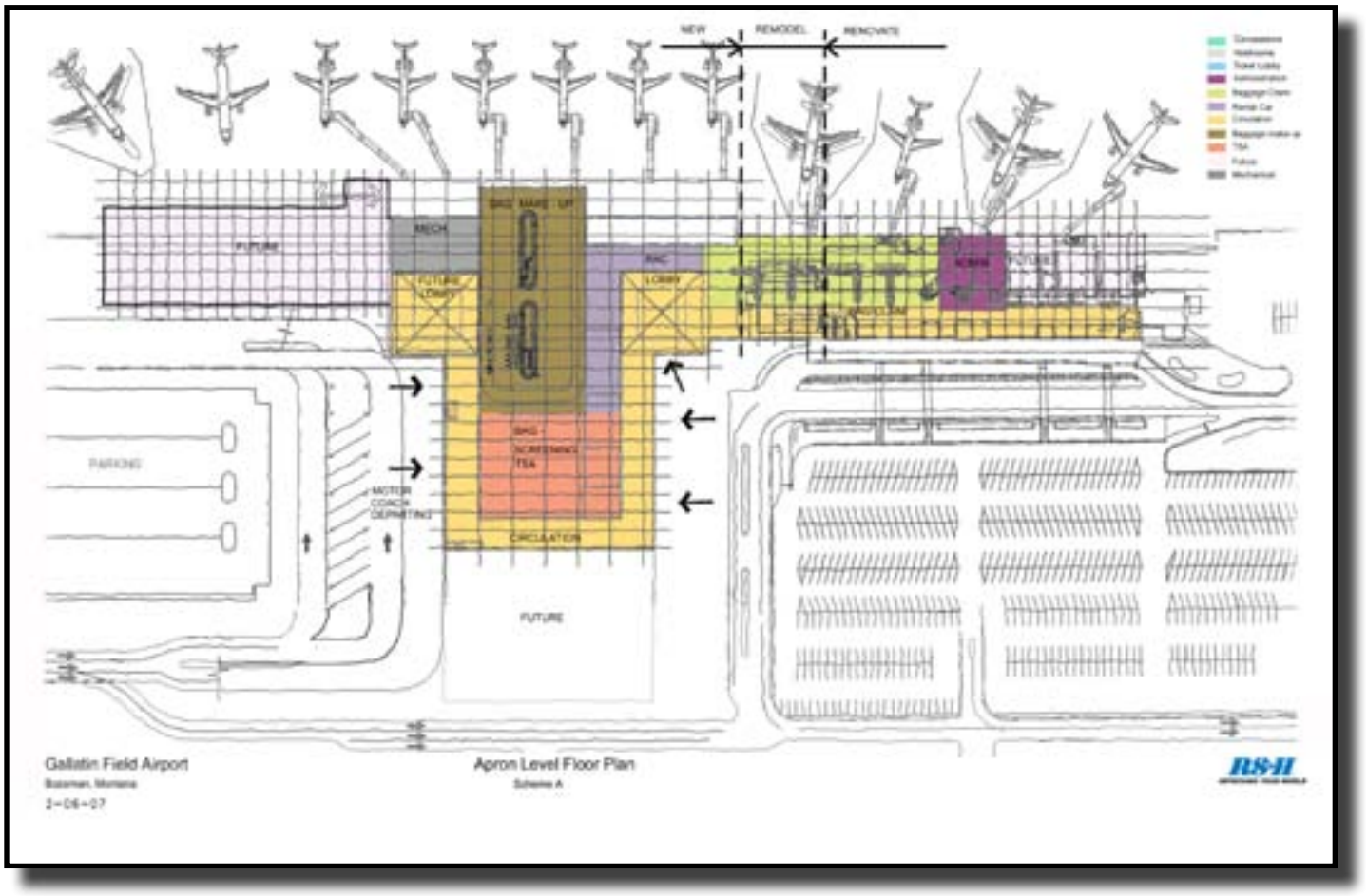


Figure 4-10 depicts the Scheme A Second Floor Plan. Within the main node on the second floor are:

- Island ticket counters that the passenger would pass through after processing
- Centralized TSA checkpoint
- Concession areas both public and within the secured area
- Airline Ticket Offices
- Departure lounges and gates
- Circulation

The transition area between the dashed cut lines denotes the area that will require remodeling to connect the new building to the existing terminal. Within the existing terminal building, there would be renovation to expand the gate and departure lounges, essentially recapturing the space now dedicated to the security screening checkpoint and the hallway to the restaurant and lounge.

Outside of the building, the elevated roadway and departure curb is depicted on the west side and the multiple parking lots are depicted on either side as they appear on the ground level.

Figure 4-10: Scheme A Second Floor Plan

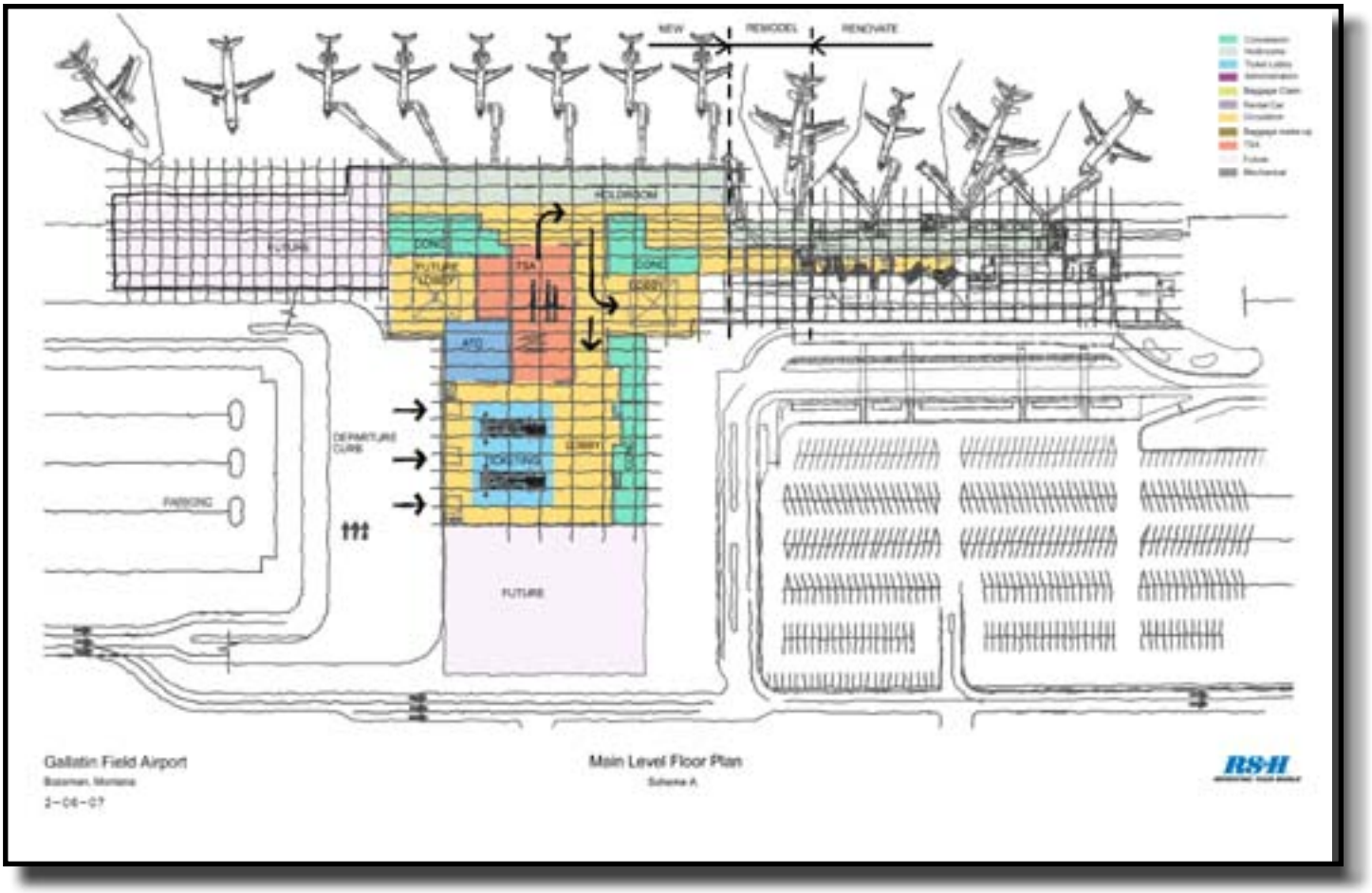


Figure 4-11 depicts the Scheme B First Floor Plan. Within the main node on the first floor are:

- Airline ticketing and airline offices
- TSA operational space for baggage screening and offices
- Baggage makeup
- Rental car & ground transportation counters
- Meeter/Greeter lobby
- Circulation

The transition area between the dashed cut lines denotes the area that buffers the new construction and the existing terminal. A third baggage claim unit could be installed in this area. Within the existing building on the first floor there would be an expanded baggage claim area and the existing airport administration spaces, including the Bridger Room. The balance of the first floor would remain available for reuse.

Outside of the building, the single loop roadway divides to separate the arrival traffic (to the right of the trees) from the departure traffic (remains in through-lanes left of the trees). The existing parking lot can be seen along with future parking expansion via additional ground level lots within the single loop road as well as a long range location for a parking garage.

Figure 4-11: Scheme B First Floor Plan

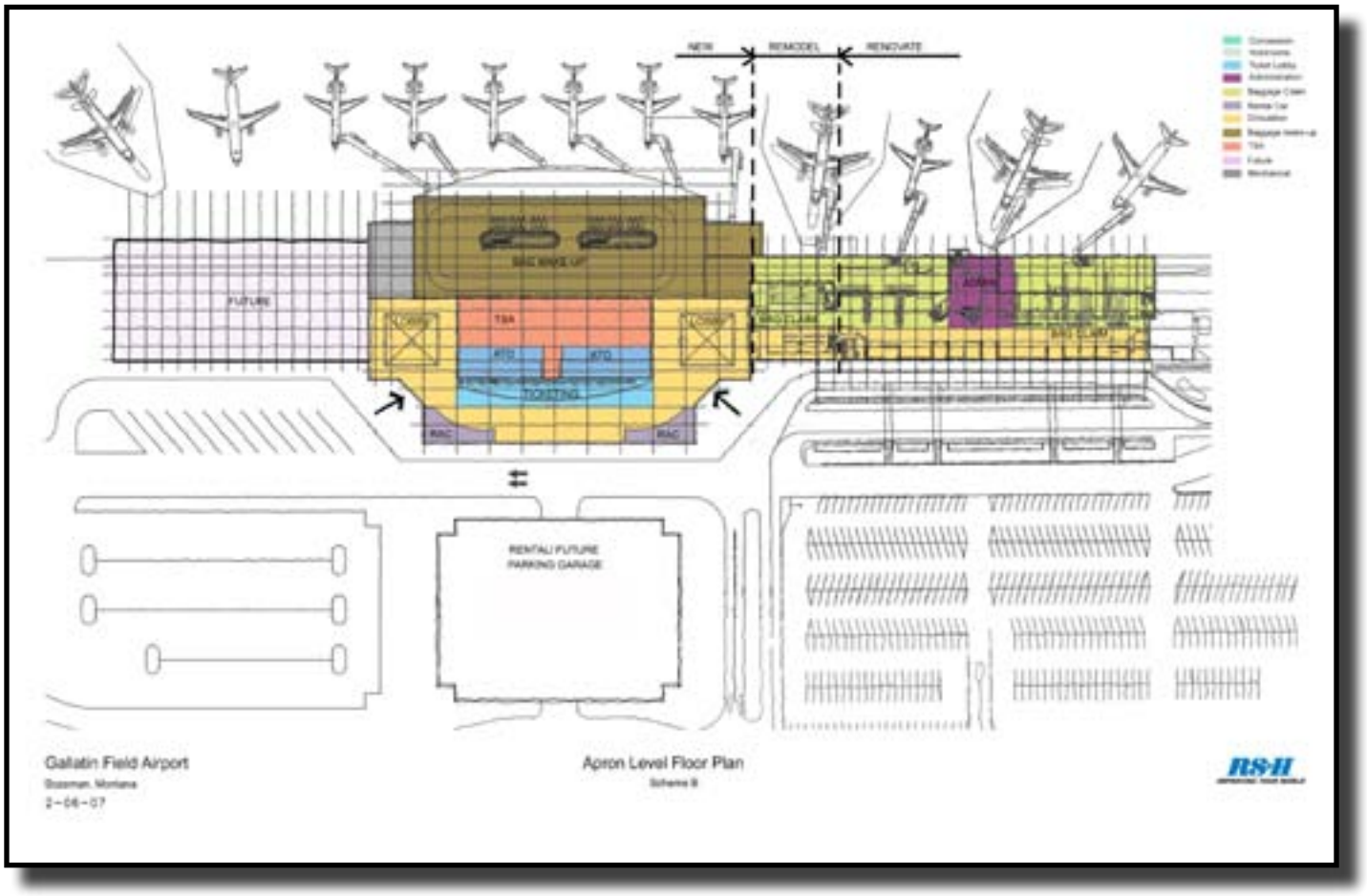
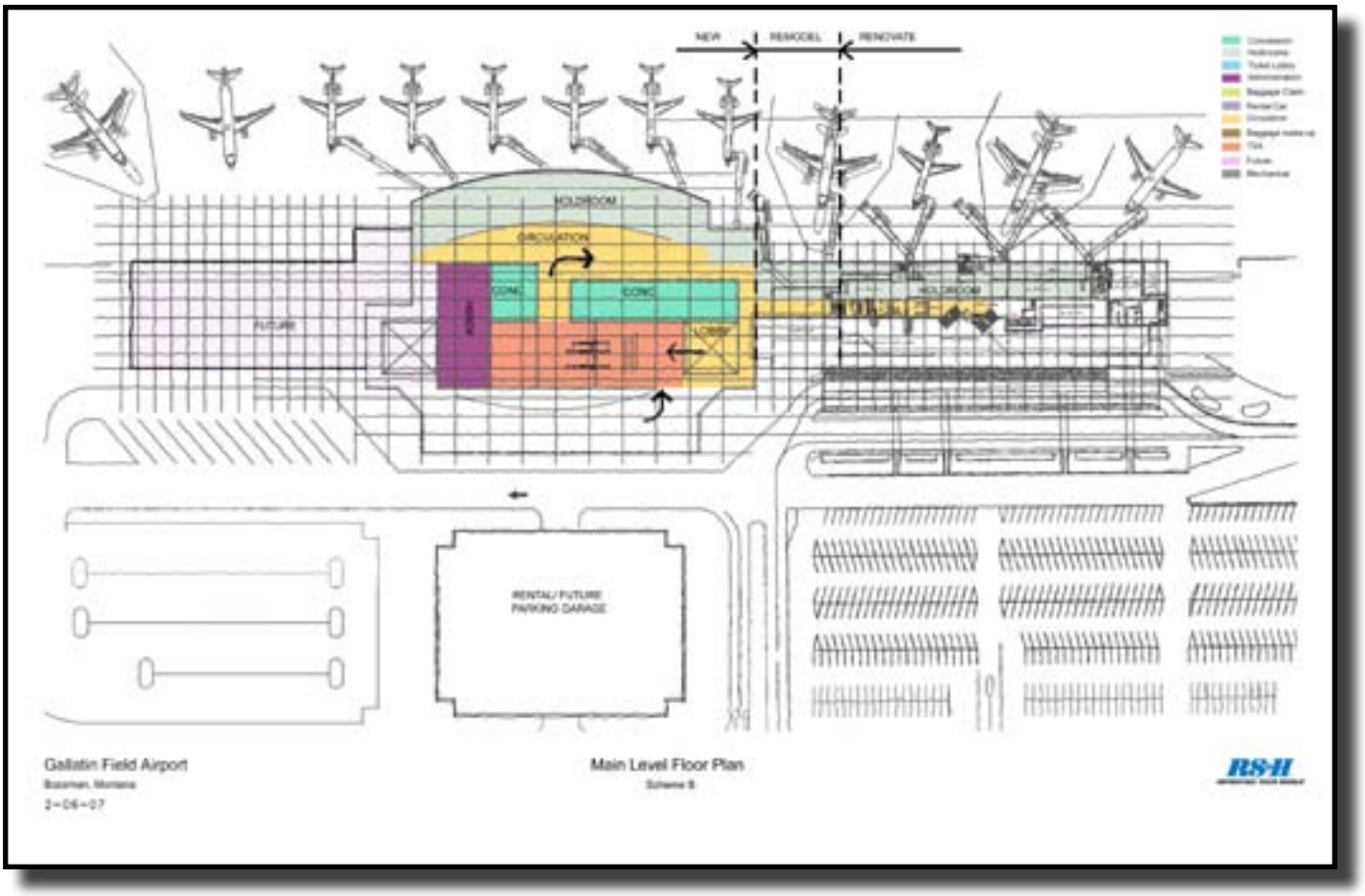


Figure 4-12 depicts the Scheme B Second Floor Plan. Within the main node on the second floor are:

- Centralized TSA Checkpoint
- Concession areas both public and within the secured area
- Departure lounges and gates
- Meeter/Greeter lobby
- Circulation

Within the existing terminal building, there would be renovation to expand the gate and departure lounges, essentially recapturing the space now dedicated to the security screening checkpoint and the hallway to the restaurant and lounge.

Figure 4-12: Scheme B Second Floor Plan



Comparative Costs

The costs for the development fall into three main categories:

- Building Costs – including the architectural design and construction
- Airside Costs – including the construction of new aircraft parking apron
- Landside Costs – including the new site construction costs as well as the reconfiguration of existing infrastructure

Building Costs

For the purposes of this master plan study, the preparation of estimates for the building employed a methodology that computes unit costs per square foot of space. The estimating has taken into account the various types of space proposed for the building according to the unit costs in **Table 4-3**:

Table 4-3 Square Footage Cost

Type of Space	Cost per Square Foot
New Public Space	$ 360
Remodeled Space	$ 390
Renovated Space	$ 175
Mechanical System Spaces	$ 190
New Back of House Space	$ 100
New Open / Covered Space	$ 50

The proportions of the schemes, which were derived from the Terminal Facility Requirements, by definition are equal and therefore have equal estimated costs. Certainly once the full terminal concept development conducted under terminal design is completed, very detailed differentiators will be identified that will yield differences between competing concepts. However, at the master planning level, this is considered precise enough to conduct the financial planning that is detailed in a later chapter of this study.

The costs for the other categories, however, do vary widely based on the site development, new roadway construction, apron construction, etc. These categories will be described, including estimates of their cost in the following sections.

The preliminary cost estimate for the building, including design, contingencies, new passenger boarding bridges, and an inflation escalator is approximately $62 Million. This proposed building will meet the forecasted peak hour demand through the planning period.

Airside Developments

Chapter 3, “Airside Facility Requirements,” addressed the need for the expansion of the commercial apron to be coordinated with the expansion of the terminal. Concrete and asphalt aprons for the competing terminal schemes will be discussed in the following paragraphs. A comparison of their uses and costs are also presented. The size of the apron expansion for each alternative varies with the length of building construction as well as the boarding bridge position and size of aircraft docking at the gate. The depth of the apron is dependant on the length of aircraft that can dock at the gate and the length of boarding bridge provided.

Differences in types of construction materials (for instance, concrete versus asphalt) will vary costs considerably. The total pavement thickness required to support the aircraft that are expected to utilize the airport will also affect construction costs. Chapter 3, “Airside Facility Requirements,” addressed the pavement strength of the existing Commercial Apron. No deficiencies in pavement strength were determined. As a result, the planned pavement sections match that of the existing commercial apron. The planned concrete portion of the apron includes a 14” depth of concrete. The asphalt section of the apron includes 4” of asphalt surface course on 8” of crushed aggregate base course. Both pavement sections provide pavement strength in excess of the expected pavement loading.

Scheme A (T- Concept)

The parking configuration of Scheme A is displayed in **Figure 4-7**. The ultimate layout of Scheme A provides 5 boarding positions for Design Group III aircraft similar to the 737 and the A320. The two end positions can be used for large design group IV aircraft such as the 757. In addition to the five (5) boarding positions for the larger aircraft, 7 positions for regional jets are provided. The first phase of the terminal under Scheme A will provide 10 boarding positions, 4 for larger aircraft and 6 for regional jets.

The terminal expansion and modifications require the relocation of the existing furthest west boarding bridge. The existing bridge is served by a tunnel from the terminal building. The tunnel, bridge, and rotunda could be relocated to the west to provide an additional gate prior to ultimate construction of the terminal.

The terminal length and aircraft parking configuration for Scheme A will require the Commercial Apron to be expanded 850' feet to the west. The first phase will require a concrete apron 450' x 150' and 14,035 square yards of asphalt apron. The existing concrete portion of the Commercial Apron is 150 feet in width. This width is sufficient for the expected commercial fleet to utilize and have their landing gear on the concrete portion of the apron. Apron edge lighting and down lighting will also be necessary. Storm drain improvements would also be included in Phase I of the apron construction. Phase II of the apron expansion consists of an additional 400' x 150' of concrete apron and 8,850 square yards of asphalt apron. Phase II will also require lighting and storm drain improvements.

Scheme B (Linear- Concept)

The parking configuration of Scheme B (is displayed in **Figure 4-8**. The ultimate layout of Scheme B provides 5 boarding positions for Design Group III aircraft similar to the 737 and the A320. The two end positions can be used for large design group IV aircraft such as the 757. In addition to the five (5) boarding positions for the larger aircraft, 7 positions for regional jets are provided. The first phase of the terminal under Scheme B will provide 10 boarding positions, 4 for larger aircraft and 6 for regional jets.

The parking configuration in Scheme B is very similar to Scheme A as a result of the overall length of terminal to be constructed under each scheme is the same. Therefore the apron required to be constructed and the associated costs are the same for each option.

The layout of the airside improvements are displayed in **Figures 4-7 and 4-8** with their corresponding estimates being included in **Table 4-4**.

Table 4-4: Airside Improvements

TERMINAL SCHEMES A & B - AIRSIDE IMPROVEMENTS	
TOTAL COST PHASE I APRON	$1,900,000.00
TOTAL COST PHASE II APRON	$1,445,000.00
TOTAL AIRSIDE IMPROVEMENTS	$3,345,000.00

Landside Developments

The access roads, parking and other landside developments required for each of the competing schemes will be discussed in the following paragraphs. A discussion of their operating conditions and associated costs of construction are also included.

Scheme A (Dual Road)

The dual road system that accompanies Scheme A's major advantaged is reducing the number of vehicles passing in front of the terminal by splitting them into two loops of traffic. This improves the road system for pedestrians greatly. The road system is dependant on the construction of the Belgrade bypass road that is currently being planned. If the bypass road is not constructed by the time the terminal expansion is completed, additional road improvements for the main access to the Airport will be required. To enter the appropriate loop for arrivals or departures, traffic will pass through a roundabout located south of the airport. As discussed previously, this terminal option has the airline ticketing located on the second floor. To accommodate departing passengers the road system on the west side of the terminal is elevated to the second level. Costs associated with the road system are displayed in **Table 4-5**.

From the concept shown in **Figure 4-7**, the option provides 850 additional parking spaces. The total spaces provided under this option would be 1,846, including existing pay parking lot and employee lot. The required number of parking stalls as identified in **Table 4-1** is 1,842 spaces in 2015 and 2,426 parking spaces at the end of the planning period. Additional parking could easily be provided by expanding the parking lot to the south. Estimated costs associated with the road system and parking lots are displayed in **Table 4-5**. The estimate includes paving and lighting of the road system and parking lots.

Scheme B Through Road

The road system that accompanies Scheme B's major advantage is that it can be constructed to use the existing access road. The construction of the connector road from the Belgrade bypass road to the Airport could come at anytime after the Bypass road is constructed. This option does have all vehicle traffic passing in front of the terminal. The through road system is less efficient from the pedestrian standpoint due to the additional traffic the pedestrian is required to cross. The costs associated with this option are considerably less than Scheme A. A great reduction in cost is associated with not constructing an elevated road system. This option also results in less total length of roads to construct because all the traffic being carried by one road system, rather than split into two systems.

The total construction costs for Scheme B can be reduced by $431,000 if the existing access road is used and a new entrance from the bypass road is not constructed.

This concept also provides an additional 850 parking spaces similar to Scheme A which could easily be expanded to the south to increase parking. Estimated costs associated with the road system and parking lots are displayed in **Table 4-5**. The estimate includes paving, stormdrain, and lighting of the road system and parking lots.

Table 4-5: Landside Development Costs

Landside Development Costs	
Total Construction Scheme A	$22,595,000.00
Total Construction Scheme B	$5,516,000.00

Parking Garage

Both Terminal Schemes depict a parking structure south of the terminal building. Additional at-grade parking can be created by providing parking in the location of the garage until it is constructed and expanding the parking to the south. The parking structure was addressed to plan for a future location for its construction.

As displayed in each scheme the structure covers 63,000 square feet. Planning of parking structures generally suggests to use 325 square feet per stall but can vary up to 400 square feet. Assuming 350 square feet per stall, each floor of the garage would provide 180 spaces. Recent local construction costs associated with parking garages indicate the cost per stall to range from $16,000 to $18,200. Based on $17,000 per stall, each floor of the structure would cost $3,060,000 to construct.

Selection of Preferred Terminal Alternative

The two final schemes were presented to the Gallatin Airport Authority for their consideration. At that meeting all objectives, selection criteria, and evaluations were discussed as well as the conclusions reached through the methodical analysis described in this chapter.

The preferred alternative selected by this process is Scheme B – The Linear Concept. This scheme is the preferred alternative due to the following factors:

- Scalable Development – The preferred scheme is much easier to match to the available funding stream and offers more flexibility for future expansion
- Elevated Roadway Costs – The construction of the elevated roadway is a significant escalator to the overall estimate of cost.
- Initial Landside Costs – The single loop roadway is not only less costly, it can connect to the existing access roadway system and serve the airport indefinitely. The dual loop roadway system requires significant initial expenditure in the second loop road to function.

Subsequent chapters in this study will prepare the financial plans that will establish the implementation strategy for the proposed terminal expansion.