Appendix C

Landside Master Plan Study

LANDSIDE MASTER PLAN STUDY

Missoula International Airport

Missoula County Airport Authority
Missoula, Montana

June 2008

CH2MHILL

In Association With

ALBERSMAN & ARMSTRONG, LTD.
PROGRAMMING PLANNING AND DESIGN

Landside Master Plan Study
for

Missoula County Airport Authority
Missoula International Airport
5225 Highway 10 West
Missoula, MT 59808

Prepared
June, 2008

by

In Association with

ALBERSMAN & ARMSTRONG, LTD.
PROGRAMMING PLANNING AND DESIGN
UNION PLAZA SUITE 411 333 WASHINGTON AVENUE NORTH
MINNEAPOLIS MINNESOTA 55401
PHONE: 612-349-2778
FAX: 612-349-2779

Table of Contents:

Table of Contents Continued:

List of Tables

List of Exhibits

Executive Summary

I. Existing Conditions

Currently, there are a total of 756 public parking spaces of which 157 are designated as short term spaces and 599 are designated as long term spaces. In 2006, 187,887 parkers generated $1,212,028 in gross parking revenue. The maximum daily parking rate in the short term lot is $8.25 and $7.00 in the long term lot. Eighty percent of all parkers are short term parkers with an average length of stay of four hours or less. On busy days in the peak month, the long term lot is 87% occupied while the short term lot is only 25% occupied. On peak days around the holidays or spring break, the existing public parking supply cannot satisfy parking demand.

II. Future Parking Supply and Demand

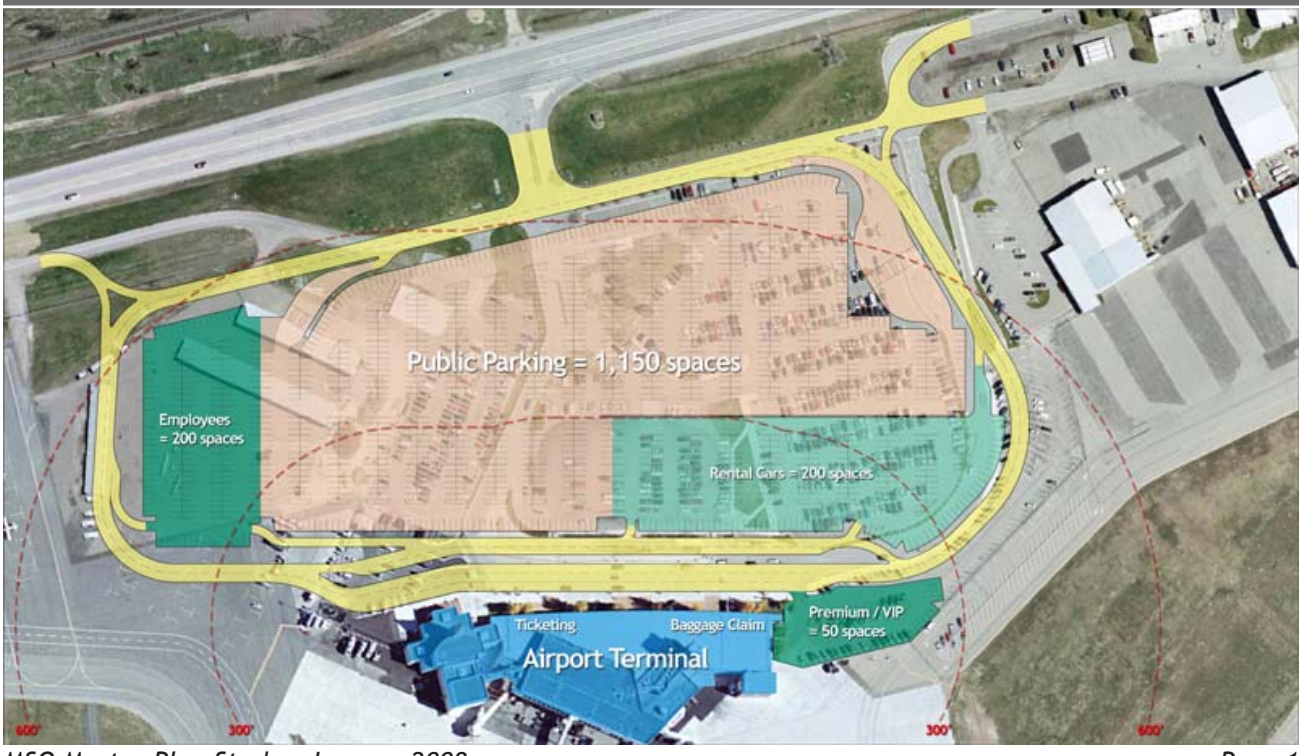
a. The long term parking supply is operating at or near capacity while the short term lot is approximately 25% to 30% utilized. It is recommended that the two lots be combined to achieve greater efficiency. Convenient parking spaces near the terminal would be signed for short term parking only.

b. If the two lots are combined there would be a surplus of 138 spaces. If passenger activity grows as projected to 457,000 enplanements in the year 2026 the public parking deficit would be 273 spaces.

III. Landside Master Plan - Preferred Alternative

It is our opinion that Alternative 5 is the preferred because it satisfies all of the landside goals in a plan that provides the greatest amount of flexibility. Public parking, rental cars and employee parking is contiguous, the size and shape of those areas can increase or decrease as circumstances and needs change. It also provides an opportunity to provide premium parking in the space previously

Exhibit 1 - Master Plan Alternative 5 - Recommended
MSO Master Plan Study
January, 2008



occupied by the rental car ready and return cars. This could be an unmanned card access or credit card in/out lot. The estimated order of magnitude costs (2008 dollars) including design to implement Alternative 5 is approximately $6 million.

IV. Other Related Landside Considerations

a. Reconfiguring the existing parking layout with minor changes to the roadway system would increase the public parking supply by approximately 137 spaces.

b. The parking system is currently operated under a concession agreement. Since the current agreement is due to expire in the near future, the airport should consider changing to a management agreement. A management agreement would provide for more airport control and accountability on the part of the parking operator.

c. It is recommended that the parking rate schedule for long term and short term parkers be the same in the combined parking lot scenario.

V. Traffic Operations and Access Review

a. The current single access and frontage road (Aviation Way) configuration has been reported to suffer significant congestion during peak travel demand. Formal analysis of traffic operations during peak holiday travel conditions indicates some undue delay is experienced for left turning vehicles exiting the airport at Johnson Bell Drive and W. Broadway Street, however, overall both intersections (at Johnson Bell Drive and W. Broadway Street and Johnson Bell Drive and Aviation Way) operate reasonably well.

b. A traffic operations review performed for forecast 2030 traffic conditions indicates that the current access configuration will provide adequate capacity to meet future needs however intersection level-of-service at Johnson Bell Drive and W. Broadway Street will deteriorate. Ultimately, traffic signal control may be appropriate if MUTCD warrants are met. The calculated queue length for exiting right turning vehicles will approach the currently available storage length between W. Broadway Street and Aviation Way.

c. Reconfiguration of the circulation road to a one-way system will facilitate improved traffic operations. Potential queue impacts would be avoided under this scenario as the current frontage road configuration would be eliminated. Exiting traffic would be permitted to move freely from the ring road to the intersection of Johnson Bell Drive and W. Broadway Street thereby eliminating the two-way stop controlled intersection at Aviation Way .

d. A review of recent crash statistics at Johnson Bell Drive and W. Broadway Street indicates that this intersection is relatively safe and that acceleration and deceleration of vehicles on W. Broadway Street accessing the airport does not appear to be problematic.

e. Based upon the review conducted herein it is determined that a single access at W. Broadway Street would adequately serve 2030 forecast traffic volumes at MSO. The scenario is consistent with the Preferred Alternative 5 configuration recommended by this Landside Master Plan Study. Intersection traffic control at W. Broadway Street and Johnson Bell Drive could initially be accommodated by a stop-controlled configuration as currently exists. Ultimately, traffic signal control may be appropriate if MUTCD warrants are met.

- End of Executive Summary -

1. Introduction

Goals and Objectives

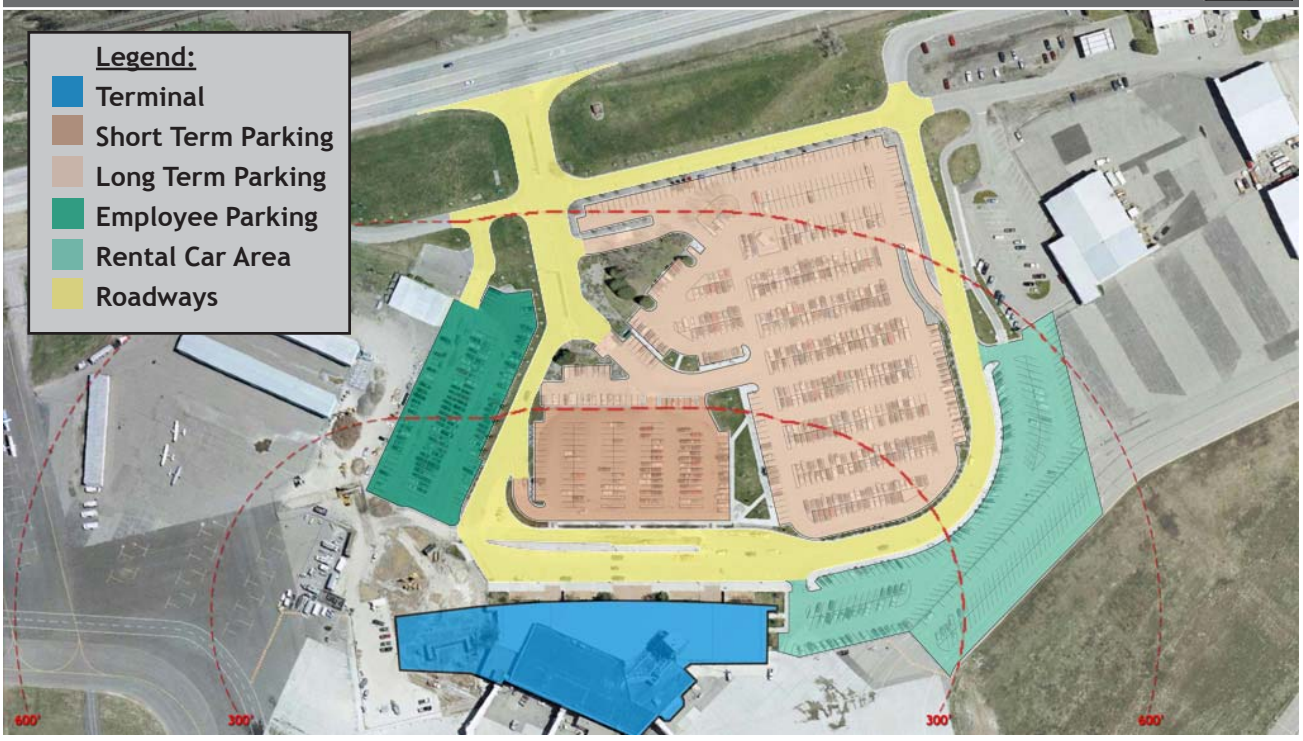
MSO is currently in the process of completing an overall airport master plan. The purpose of this study is to develop a landside master plan that will satisfy the existing and future landside needs in a manner that is consistent and complementary to the overall master plan. This study addresses the layout, capacity and circulation issues associated with public parking, rental cars and employee parking.

2. Existing Conditions

Missoula International Airport (MSO) was ranked 154 among US Airports with 276,170 enplanements in calendar year 2006.

The two level terminal building at MSO provides airline ticketing functions at the north end and baggage claim at the south end. The landside area includes space for public parking, rental cars and employee parking. Access to the landside area is provided by a single access point off of West Broadway Street to a ring road (Exhibit 2).

Exhibit 2 - Existing Conditions
Missoula International Airport
Missoula, Montana



a. Public Parking

There are 756 public parking spaces contained within the ring road. Approximately 170 rental cars spaces and 135 employee parking spaces are located adjacent to but, outside of the ring road. The public parking system contains a separate parking area for long and short term parking. A single cashier plaza is provided for exiting short term and long term parkers. During peak periods the employee lot is used for public parking because the existing public parking supply is inadequate.

Table 1 - Parking Supply[1]
Missoula International Airport
Missoula, Montana

Short Term	157
Long Term	599
Total:	756
Overflow from Employee Lot	135
Grand Total:	891

[1] Republic Parking, Robert Linehart

There were 187,887 public parkers in 2006 generating $1,212,028 in revenue. The number of parkers has remained fairly constant since 2002 while the parking revenue has grown by approximately 20 percent. The increased parking revenue is primarily the result of a recent rate increase. The peak parking months are July and August with approximately 10 to 11% percent of total parkers (Table 3).

Table 2 - Annual Parking Activity and Revenue[1]
Missoula International Airport
Missoula, Montana

Year	No. of Parkers	Enplanements	Parkers Per Enplanement	Gross Revenue	Revenue Per Parker
2002	192,864	240,199	0.80	$932,260	$4.84
2003	186,578	253,761	0.74	$961,876	$5.16
2004	193,642	260,039	0.74	$1,029,723	$5.32
2005	191,117	268,745	0.71	$1,080,814	$5.66
2006	187,887	275,125	0.68	$1,212,028	$6.45

The number of parkers per enplanement has decreased since the year 2002. This is largely due to the fact that since 9/11, only ticketed passengers are allowed past security into the terminal gate area. This has steadily reduced the number of short term parkers because the number of passengers dropped-off at terminal curbside has increased. Also, there are occasions throughout the year that the short term parking lot is full and the overflow lot is utilized. However, this occurrence is minimal and has no significant impact on the parking demand.

Table 3 - Monthly Activity 2006[1]

Missoula International Airport
Missoula, Montana

Month	No. of Parkers	Percent of Total
Jan	13,306	7%
Feb	10,796	6%
Mar	14,207	8%
Apr	13,499	7%
May	14,648	8%
Jun	16,966	9%
Jul	19,252	10%
Aug	19,763	11%
Sep	15,377	8%
Oct	16,118	9%
Nov	15,546	8%
Dec	18,409	10%
Total:	187,887	100%

[1] Republic Parking, Robert Linehart

The public parking lot is divided into short term and long term parking spaces. Of the total public parking demand, 20 percent are required for short term parkers and 80 percent are required for long term parkers. Typically, short term parkers are those who have a length of stay of four hours or less which is about 80% of the parkers at MSO (Table 5). The maximum daily rate for short term parking is $8.25 and $7.00 for long term (or $35.00 per week).

Table 4 - Parking Rates[1]

Missoula International Airport
Missoula, Montana

	Short Term	Long Term
0 to 15 Minutes	Free	Free
15 to 30 Minutes	$1.00	$2.00
1/2 to 1 Hour	$2.00	$3.00
1 to 1-1/2 Hours	$3.00	$4.00
1-1/2 to 2 Hours	$4.00	$5.00
2 to 2-1/2 Hours	$5.00	$6.00
2-1/2 to 3 Hours	$6.00	$7.00
3 to 3-1/2 Hours	$7.00	$7.00
3-1/2 to 4 Hours	$8.00	$7.00
4 to 4-1/2 Hours	$8.25	$7.00
4-1/2 to 5 Hours	$8.25	$7.00
5 to 24 Hours	$8.25	$7.00

[1] Missoula International Airport Website

b. Length of Stay and Occupancy

The following length of stay and occupancy statistics show that MSO's parking pattern is typical for a US Airport. As mentioned above, 80 % of all parkers are short term and stay for less than 4 hours. This is because the high turnover for short term parkers require a smaller percentage of the available space, often only 15 to 20% of the total space at a typical airport.

Table 5 - Length of Stay - Occupancy[1]
Missoula International Airport
Missoula, Montana

Duration	No. of Parkers	Percent
0 to 4 Hours	3,211	80%
4 to 24 Hours	124	3%
1 to 6 Days	579	14%
Over 6 Days	126	3%
Total	4,040	100%

[1] Republic Parking, Robert Linehart

Table 6 - Mid Day Occupancy - Peak Month / Typical Week[1]
Missoula International Airport
Missoula, Montana

Day	Short Term	% Occupied	Long Term	% Occupied
Sunday	48	31%	434	72%
Monday	46	29%	458	76%
Tuesday	43	27%	463	77%
Wednesday	41	26%	454	76%
Thursday	43	27%	480	80%
Friday	40	25%	519	87%
Saturday	40	25%	522	87%

[1] Republic Parking, Robert Linehart

3. Analysis of Existing Landside System

Public Parking Supply and Demand

The following tables describe the surplus / deficit of the public parking system at MSO. Occupancy is based on midday occupancy in a typical week in the peak month. Parking demand is calculated based on 110% of occupancy in order to take into account the difficulty of finding the last few open spaces. Projected future parking demand is directly related to projected growth in enplanements.

Table 7 - Long Term Parking Adequacy
Missoula International Airport
Missoula, Montana

Year	Enplanements	Occupancy	Parking Demand[1]	Surplus/Deficit
2006	275,125	522	574	25
2016	362,352	687	756	-157
2026	457,730	868	955	-356

1 Based on a 10% effective supply factor

Table 8 - Short Term Parking Adequacy
Missoula International Airport
Missoula, Montana

Year	Enplanements	Occupancy	Parking Demand[1]	Surplus/Deficit
2006	275,125	48	53	104
2016	362,352	63	70	87
2026	457,730	80	88	69

1 Based on a 10% effective supply factor

Currently, there is a short term parking lot and a separate long term parking lot at MSO. Existing and future parking adequacy was calculated for both lots. Based on this analysis, the long term lot is running near or at capacity with a surplus of 25 spaces during a typical week in the peak month. However, the airport reports that during the peak parking periods occurring during the holidays and spring break, overflow parking is required.

Based on Table 8, it appears as though the short term parking lot has a surplus of parking spaces that will exceed parking demand through the year 2026.

When total parking demand and supply are combined, the picture improves somewhat with a current surplus of 138 spaces. However, it should be noted that a parking deficit is projected prior to the year 2016.

Table 9 - Total Parking Adequacy
Missoula International Airport
Missoula, Montana

Year	Enplanements	Occupancy	Parking Demand[1]	Surplus/Deficit
2006	275,125	562	618	138
2016	362,352	740	814	-58
2026	457,730	935	1,029	-273

1 Based on a 10% effective supply factor

Based on this analysis, it is recommended that the parking supply be increased to satisfy the public parking needs through 2016 with a provision for future expansion that would satisfy the public parking needs through the year 2026. In addition, steps should be taken to rectify the current imbalance between the short term parking supply and the long term parking supply.

4. Best Practices

The following is a summary of common landside characteristics and features found at airports of similar size and/or region.

Landside Components:

a. Ring Road

A common roadway feature is a one-way ring road. The ring road enables motorists to drop-off patrons at the terminal building then recirculate back to parking without leaving the terminal area. A one-way traffic flow provides for simplified way finding and is also safer for pedestrians crossing traffic between parking and the terminal building.

b. Rental Cars

For the convenience of the rental car patrons the rental car ready and return car parking should be located either adjacent to baggage claim (as it is at MSO) or directly across from baggage claim within the ring road. Having the ready return adjacent to baggage claim is slightly more convenient however, locating the ready/ return inside the ring road will provide the greatest flexibility for future growth and changes in the parking configuration.

c. Public Parking

The best planned airports have a single vehicle entrance to the parking system in order to reduce the number of signs required and simplify way finding for the motorist. Parkers are then directed to short term or long term parking. In some cases, a single parking facility is provided for short term and long term parkers. In those cases, individual spaces are signed for short term parking. The latter method provides the greatest efficiency and flexibility.

Example of "Short Term Parking" signage.

d. Employee Parking

Employee parking usually consists of Airport staff, concession employees, flight crews, and VIP's. Usually, employee parking is located within walking distance of the terminal building to avoid the high cost of shuttle busing. In terms of priority, the most convenient location should be reserved for public parkers and rental cars in order to achieve maximum customer service. One exception is VIP parking for senior staff/commissioners, etc. Often a few spaces close to the terminal, say 10 to 15 are set aside for this purpose.

Often times airports will locate employee parking separate but contiguous with public parking. This approach allows for maximum flexibility. During some peak periods such as the holidays or spring break, the employees can be temporarily relocated to make room for the additional public parking demand. Also, as the overall airport parking demand grows, employee parking can be easily converted to public parking.

e. Parking Access (ingress and egress)

The parking access system should be as simple as possible, with a minimum of decision points and to reduce the amount of required way-finding signage. Initially, motorists should be directed to a single Airport entry point. Once on the parking entrance roadway (ring road), the motorist can be directed to short term, long term or other categories of parking. A minimum of two entry lanes with ticket dispensers and gate arms should be provide at each entry to each parking category. To the extent possible, exiting parkers should be directed to the back of the parking facility to reduce pedestrian/vehicular conflicts (and depending upon parking layout, this could also apply to entering parkers). The exiting cashier plaza should be designed to allow a minimum of four vehicles to queue behind each exit lane. All exit lanes should funnel to a single egress lane to access the airport ring road.

f. Curb side (terminal building)

At the terminal curb side there should be two roadways separated by a 10' to 12' minimum wide island. Each roadway should have two driving lanes and one parking lane nearest the terminal for passenger loading and unloading.

5. Landside Master Plan Alternatives

One common feature on all of the following alternatives is the expanded Airport roadway system. The purpose of this new roadway is to create a two-lane, one-way flow "Ring Road" around the landside parking areas. This will expand the areas needed for the parking functions, and better orient or "center" these functions on the Airport Terminal building in terms of layout.

Landside Goals and Objectives

The following are goals and objectives that should be used to guide the selection of the most appropriate alternative;

- Minimize the number of vehicle entry and exit points.
- Minimize vehicle / pedestrian conflicts
- Minimize Vehicle / Vehicle conflicts
- Designate the most desirable parking for short term parkers (four hours or less)
- Provide a flexible and easily expandable plan
- Plan for a typical parking demand that occurs during peak periods such as holidays and spring break
- Minimize capital and operating expenses
- Maximize revenue

Master Plan Alternative 1

Alternative 1 incorporates all of the short and long term public parking as well as the rental car ready and return spaces inside of the ring road. Employee parking is located outside of the ring road on the northwest side. The existing access to/from West Broadway Street is maintained and connections to the service road (Aviation Way) are provided at the east and west corners.

Exhibit 3 - Master Plan Alternative 1
MSO Master Plan Study
January, 2008

Access to public parking (short and long term) is provided via a single entry point along the north-west side of the ring road at the entry plaza. Patrons who need to drop-off someone at the terminal building before entering the parking lot will recirculate around the ring road to enter parking. An exit plaza for public parking is located at the east side of the parking lot. The plaza is oriented so that exiting patrons can merge into the two lane, one-way ring road then access West Broadway Street via the existing exit lanes.

Short and long term parking are located in a single 1,100 space parking lot. Parking bays are oriented 90 degrees to the airport terminal building to allow for better access for patrons on foot. This bay orientation also allows for maximum flexibility for resizing the parking and rental car parking areas as demand requires.

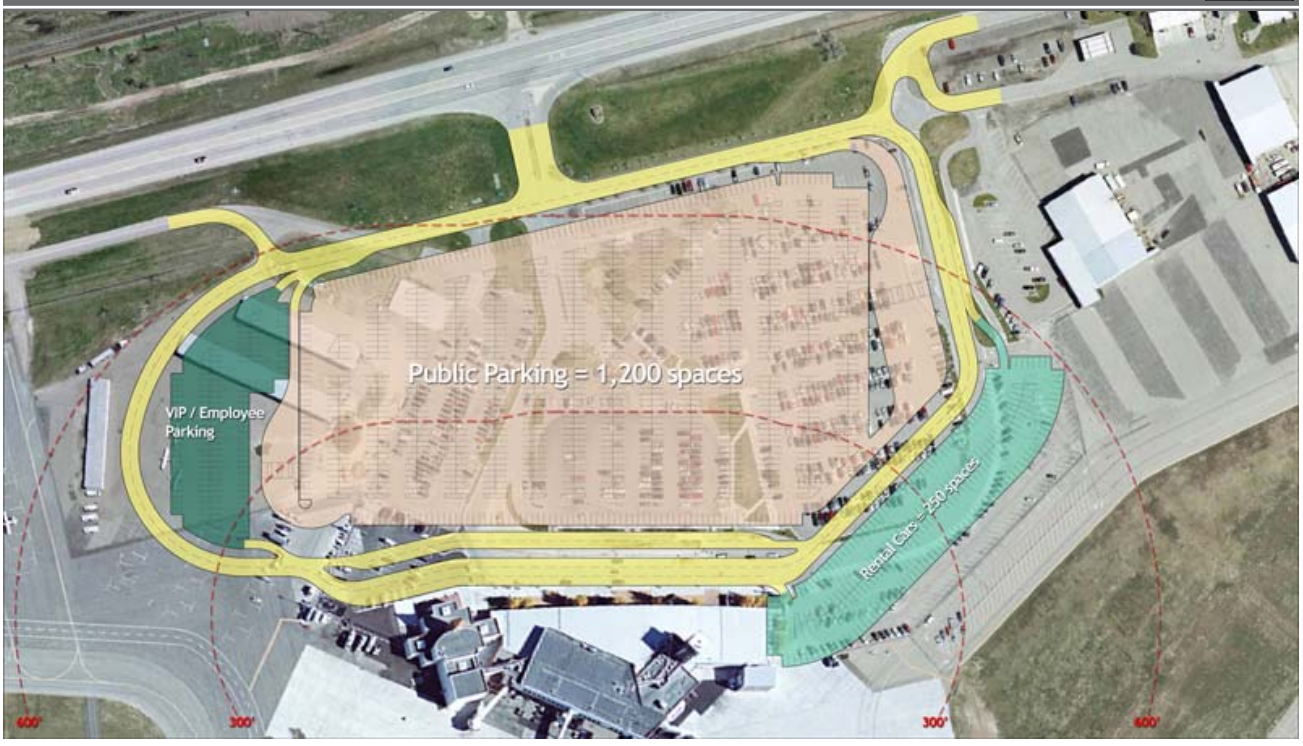
Access to the rental car area is via the inner two lane roadway of the ring road along the terminal building frontage. This location will move all of the rental return vehicle traffic away from the terminal building pick-up and drop-off area directly in front the building. Rental car exiting is provided at the south side of the ring road just before the public parking exit. This area will yield approximately 300 ready and return spaces for the rental car agencies and is conveniently located directly across the road from the baggage claim area in the terminal building.

Employee parking is wrapped around the outside of the north ring road. However, walking distance for the northeasterly portion of the lot will approach 600'.

Master Plan Alternative 2

Alternative 2 incorporates all of the short and long term public parking as well as the employee parking inside of the ring road. Rental car ready and return spaces are located outside of the ring road on the south side. The existing access to/from West Broadway Street and connections to the service road (Aviation Way) are similar to Alternative 1.

Exhibit 4 - Master Plan Alternative 2
MSO Master Plan Study
January, 2008



Access to public parking (short and long term) is provided via a single entry point along the north-west side of the ring road. This single point entry also provides access to the employee parking described below. Patrons who need to drop-off someone at the terminal building before entering the parking lot will recirculate around the ring road to enter parking. An exit plaza for public parking is located at the east side of the parking lot. The plaza is oriented so that exiting patrons can merge into the two lane, one-way ring road then access West Broadway Street via the existing exit lanes.

Short and long term parking are located in a single 1,200 space parking lot. All Parking bays are oriented the same as Alternative 1.

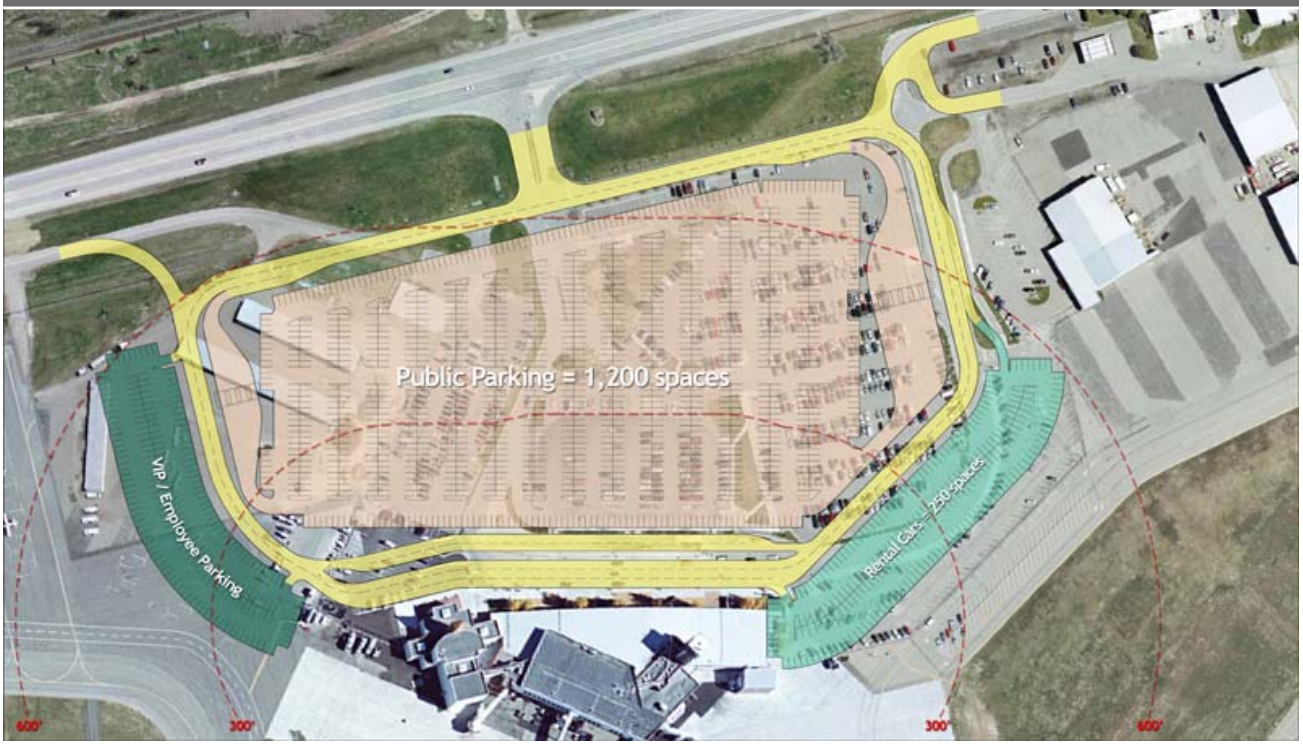
Employee parking in this alternative is inside the ring road on the north end and yields approximately 140 spaces. Note that because entry for public parking is located between the employee and public parking areas, this alternative provides the least flexibility for reallocating parking areas for future demand fluctuations.

Access to the rental car area is via the existing curb cut along the terminal building frontage road. This location will require all of the rental return vehicle traffic to drive through the terminal building pick-up and drop-off area directly in front the building. Exiting is provided at the south side of the ring road. This area will yield approximately 250 ready and return spaces for the rental car agencies.

Master Plan Alternative 3

Alternative 3 incorporates only the short and long term public parking inside of the ring road. The rental car ready and return spaces and employee parking are located outside of the ring road on the north and south sides. The existing access to/from West Broadway Street and connections to the service road (Aviation Way) are similar to Alternative 1.

Exhibit 5 - Master Plan Alternative 3
MSO Master Plan Study
January, 2008



Access to public parking (short and long term) is provided via a single entry point along the northwest side of the ring road. Patrons who need to drop-off someone at the terminal building before entering the parking lot will recirculate around the ring road to enter parking. However, with this alternative, it may be possible to provide a secondary entrance for public parking near the southwest corner of the ring road. An exit plaza for public parking is located at the southeast corner. The plaza is oriented so that exiting patrons can merge into the two lane, one-way ring road then access West Broadway Street via the existing exit lanes.

Short and Long term parking are located in a single 1,200 space parking lot and all Parking bays are oriented the same as Alternative 1.

Employee parking is wrapped around the outside of the north ring road similar to Alternative 1

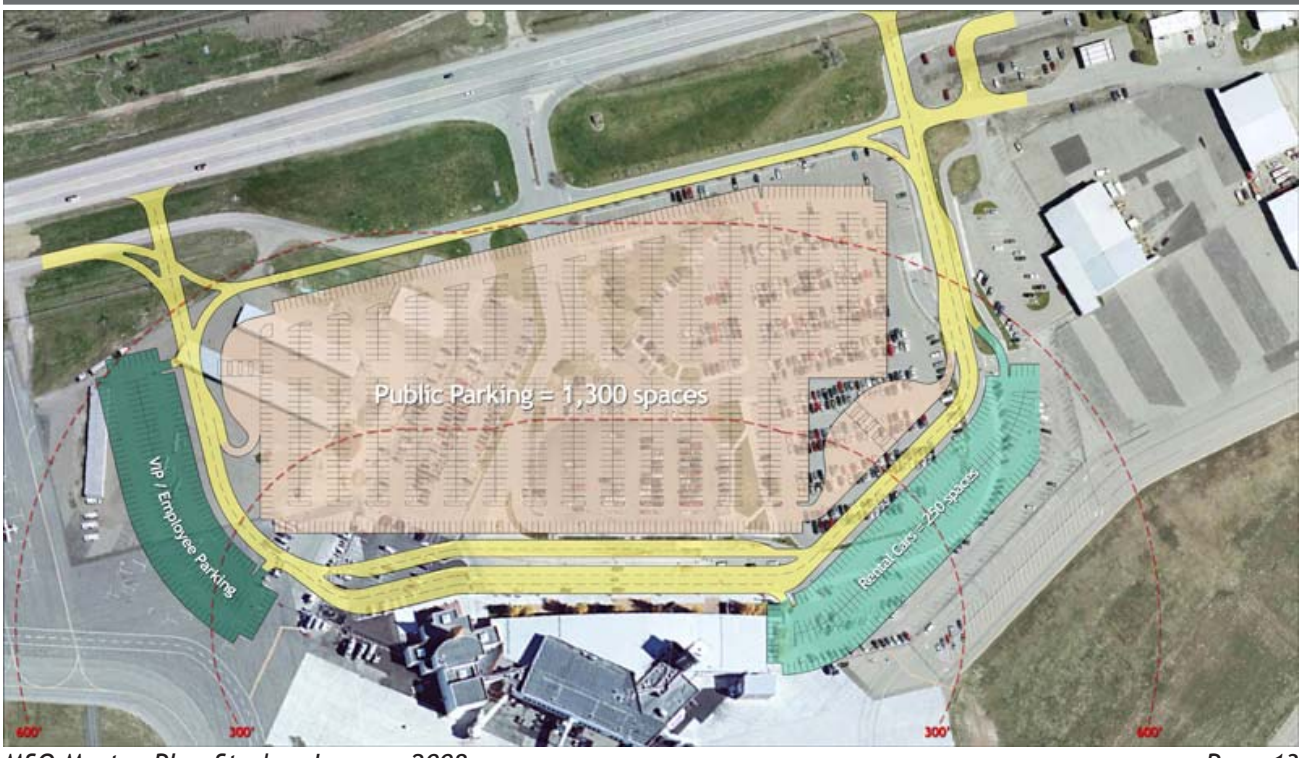
Rental car ready and return parking is similar to Alternative 2.

Master Plan Alternative 4

Alternative 4 is nearly identical to Alternative 3 in terms of parking area locations and sizes. The difference with this alternative is the access points. The existing center access point to/from West Broadway Street has been eliminated. A two-lane entry point from West Broadway has been provided at the north end and a two-lane exit point is located at the south end. This function technically eliminates the “ring-road” concept with the exception of a single-lane connection for recirculation and to maintain access between the service roads (Aviation Way).

Traffic flow ramifications on West Broadway would need to be studied in more detail with this layout, however, it is shown here as a possible way to improve vehicle stacking at both the entry and exit locations.

Exhibit 6 - Master Plan Alternative 4
MSO Master Plan Study
January, 2008



Master Plan Alternative 5

Alternative 5 incorporates all functions inside of the ring road. The existing access to/from West Broadway Street and connections to the service road (Aviation Way) are similar to Alternative 1.

Access to public parking (short and long term) is provided via a single entry point along the north-west side of the ring road. Patrons who need to drop-off someone at the terminal building before entering the parking lot will recirculate around the ring road to enter parking. An exit plaza for public parking is located at the northeast corner. The plaza is oriented so that exiting patrons can merge into the two lane, one-way ring road then access West Broadway Street via the existing exit lanes.

Short and Long term parking are located in a single 1,150 space parking lot. Parking bays are oriented 90 degrees to the airport terminal building to allow for better access for patrons on foot. This bay orientation also allows for maximum flexibility for resizing the parking, employee and rental car parking areas as future demand requires.

Exhibit 7 - Master Plan Alternative 5
MSO Master Plan Study
January, 2008

Recommended Plan

The total future parking demand has been estimated in this study to be 814 spaces in 2016 and 1,029 spaces in the year 2026. All of the alternatives presented in this study satisfy public parking demand through the year 2026. It is our opinion that Alternative 5 is the preferred alternative because it satisfies all of the landside goals in a plan that provides the greatest amount of flexibility. Because public parking, rental cars and employee parking is contiguous, the size and shape of those areas can increase or decrease as circumstances and needs change. It also provides an opportunity to provide premium parking in the space previously occupied by the rental car ready and return cars. This could be an unmanned card access or credit card in/out lot.

6. Cost Estimate

The following is a preliminary order of magnitude cost estimate for construction of the Master Plan Alternate 5. Note that this estimate does not include any underground utility costs since at the time of this study, this information was unknown. See Exhibits 27 and 28 in the appendix for the proposed removal areas and new construction areas.

Table 10 - Preliminary Cost Estimate (Order of Magnitude) - January 22, 2008

Missoula International Airport
Missoula, Montana

ITEM NO.	DESCRIPTION	UNIT	ESTIM. QTY.	UNIT PRICE	AMNT. ($)
1	CLEARING AND GRUBBING	LS	1	$10,000.00	$10,000
2	BITUMINOUS REMOVAL	SF	580,000	$0.75	$435,000
3	CONCRETE REMOVAL (apron/parking/sdwk.)	SF	160,000	$1.50	$240,000
4	BUILDING REMOVAL (incl. foundation & util.)	LS	1	$100,000.00	$100,000
5	NEW BUILDING CONSTRUCTION	SF	30,000	$50.00	$1,500,000
	TOTAL SITE PREPARATION				**$2,285,000**
5	SITE GRADING	LS	1	$125,000.00	$125,000
6	SUBGRADE PREP.	SF	750,000	$1.00	$750,000
7	CONCRETE CURB	LF	18,000	$12.00	$216,000
8	BITUMINOUS PAVING (incl. gravel base)	SF	750,000	$2.50	$1,875,000
9	CONCRETE SIDEWALKS (incl. sand base)	SF	24,000	$4.00	$96,000
10	CONCRETE ISLANDS (incl. sand base)	SF	5,000	$5.50	$27,500
11	PARKING STRIPING	LS	1	$25,000.00	$25,000
12	CASHIER LANES	Lane	6	$30,000.00	$180,000
13	ENTRY LANES	Lane	4	$15,000.00	$60,000
14	TOPSOIL & SODDING	SF	161,000	$0.50	$80,500
15	LANDSCAPING	LS	1	$200,000.00	$200,000
16	MONUMENT SIGN	ALLOWANCE	1	$200,000.00	$200,000
17	SECURITY FENCING	ALLOWANCE			$15,000
18	LIGHTING	ALLOWANCE			$200,000
19	TRAFFIC SIGNAGE	ALLOWANCE			$20,000
	TOTAL SITE CONSTRUCTION				**$4,070,000**
	TOTAL				$6,355,000
	+ 20% CONTINGENCY				$1,271,000
	TOTAL ESTIMATED CONST. COST				**$7,626,000**
	Design (10%)				$762,600
	GRAND TOTAL				**$8,388,600**
	TOTAL NUMBER OF PARKING STALLS				1,600
	CONST. COST/PARKING STALL				**$5,243**
	CONSTRUCTION LIMITS	SF	902,100	20.7 AC.	
	BITUM. REMOVAL	SF	548,900		
	CONC. REMOVAL	SF	154,800		
	NEW BITUM. PAVEMENT	SF	741,400		
	NEW CONC. CURB	LF	16,200		
	NEW SOD	SF	160,700		
	NEW CONC. SIDEWALK	SF	19,200		

ASSUMPTIONS:

Assume all bitum. and conc. areas within construction limits is removed.
Assume existing bit. and conc. is recycled on-site.
No underground utility construction is included.
No hazardous waste removal, cleanup is included.
No storm water ponding areas are included.
No entrance monument sign is included.

7. Other Related Landside Considerations

a. Interim Parking Layout Plan

The proposed interim public parking layout plan is a single, contiguous surface lot inside of the existing ring road. The main public entrance is two lanes wide and is located on the west corner. A single-lane supplemental entry for those patrons who drop off people at the terminal building is located on the south side of the parking area. A four-lane exit plaza is located at the west. The layout of the exit plaza is such that it allows patrons to "merge" onto the existing ring road.

The parking bays are all oriented 90 degrees to the terminal building. This will allow easier pedestrian movements between the terminal building and parking and yields approximately 890 spaces total. Separation between short and long term parkers will be accomplished via signage. Twenty percent (or 180) of the short term spaces will be signed "Short Term Parking Only - 4 Hours Max". These spaces should be the closest and most convenient to the airport terminal building.

Virtually no changes will be required for the ring road, rental car area or employee parking. However, all internal curbs, islands, landscaping, lighting, structures, etc. inside of the ring road will have to be removed so the short and long term lots can be demolished, recontoured and replaced with a single contiguous surface lot.

Exhibit 8 - Interim Parking Layout Plan
MSO Master Plan Study
January, 2008

b. Parking Management

The current parking system is operated by Republic Parking on a concession agreement. This agreement is due to expire in the near future. There are two basic types of parking management agreements; a concession agreement and a management agreement.

Concession Agreement

Under a concession agreement the airport essentially leases the parking system to the parking operator and the parking operator pays a fee to the airport for the right to operate the facility. That fee is typically a percentage of gross. The operator retains all parking revenue and pays all parking expenses.

The primary advantage of this type of operation is that the airport has very little administrative involvement (and cost) in the parking system. The disadvantage is that there is limited control on the type of service being offered. The operator collects all of the revenue and pays all of the expenses. The operator is highly motivated to reduce operating expenses and increase revenue which can have a negative impact on customer service. The airport is not a party to the profit / loss of the parking system. This type of management agreement is often found at smaller airports.

Management Agreement

Under a management agreement the airport pays a fee to the parking operator to operate the parking system. The airport reimburses the operator for all operating expenses. Each year the parking manager submits a budget for operating the parking system and the operator is required to work within that budget or come to the airport for adjustment if substantial changes are needed. Parking revenue collected by the parking operator is remitted to the airport.

The primary advantage of this method of operation is the airport has more control and flexibility over customer service, revenue and expenses. If the airport wants to add staff or make improvements to the parking system they simply direct the operator to do it. A management agreement requires that the airport be more actively involved in the management of the parking system. Most medium to large airports operate their parking system under management agreement.

c. Parking and Parking Rate Alternatives

Parking Rate Alternative 1

High Daily Rate for Short Term Parking

Typically, public parking at airports is designated for both short and long term parkers. Often, the maximum daily rate for short term parkers is set high enough to discourage most, if not all, of the long term parkers from using the short term parking lot. Parking that functions in this manner has a higher maximum daily rate differential between short and long term rates. Airport parking systems with this type of operation are represented by Medford, OR and Eugene, OR with a differential in the maximum daily long term rate of $7.00 and $4.00 respectively. This approach makes it most likely that short term parking will always be available for short term parkers.

Parking Rate Alternative 2

Short Term Parking Rates Designed to Attract Short and Long Term Parkers

Some airports choose a lower differential between short and long term rates. This approach will encourage those long term parkers, willing to pay the additional cost for the added convenience, to park in the short term lot. Airport parking systems with this type of operation are represented by Missoula, MT and Billings, MT with a differential in the maximum daily long term rate of $1.25 and $2.50 respectively. The advantage of this approach is the increased revenue from long term parkers in the short term lot. The disadvantage is the unpredictable space availability. If too many long term parkers are in the short term lot then there may be times when space is not available for short term parkers.

Parking Rate Alternative 3

Single Maximum Daily Rate For Short and Long Term Parkers

This approach applies one rate structure for all available parking spaces. In order to insure that short term parkers are provide with the most convenient spaces, the appropriate number of parking stalls are reserved via signage (i.e. “Short Term Parking Only”). An example of an airport that uses a single parking rate is Tulsa OK. The advantage of this approach is the flexibility to vary the number of designated short term spaces based on need. The disadvantage is the enforcement required to keep long term parkers from occupying short term parking space. The Tulsa Airport has reported minimal violations with their system.

Recommendation

Since the current operating agreement is due to expire in the near future it may be prudent to undertake a comparative analysis of a management agreement versus a concession agreement for the MSO parking system. Such a study should focus on:

1. An economic analysis of the two management approaches.
2. The type of agreement used by other airports of similar size and /or regional characteristics.

8. Traffic Operations and Access Review

Introduction

As part of the Missoula International Airport Master Plan process it has been determined that consideration and review be provided for certain landside facilities including Airport parking, circulation and access.

The Airport terminal is currently configured with a single primary access at Johnson Bell Drive and W. Broadway Street. Johnson Bell Drive is stop-controlled at the south approach to W. Broadway Street. Johnson Bell Drive forms an internal ring (circulation) road around existing parking facilities and facilitates pick-up and drop-off of passenger arrivals and departures. Aviation Way intersects Johnson Bell Drive approximately 150 feet southwest of W. Broadway Street and functions as a frontage road along Airport property.

This scope of work is intended to address elements related to primary access and circulation for the Missoula International Airport. Additionally, the existing and future public and rental car parking requirements will be analyzed to develop the future parking plans and recommendations. The first stage of this process involves collection of pertinent traffic data, development of design year traffic forecasts, and evaluation of both existing and forecast scenarios. Subsequent review includes development of alternatives and analysis of the recommended improvements.

Data Collection

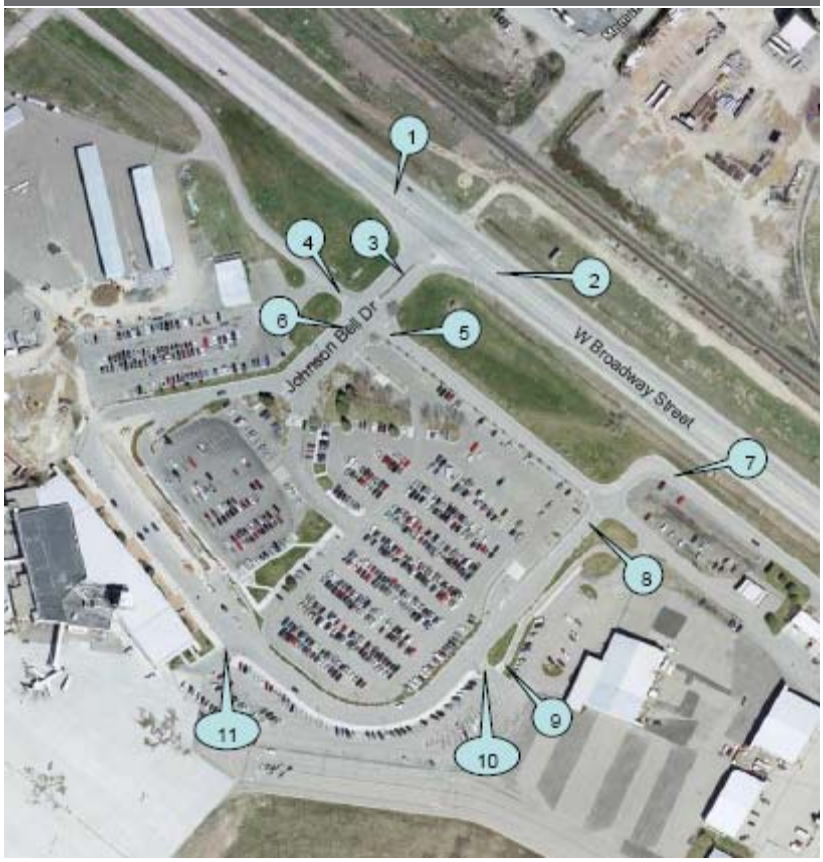
Normally, traffic counts are recorded on an average day however it is desirable to determine likely impacts during a peak travel period at the Missoula International Airport. In this regard, traffic counts were collected during the pre-Thanksgiving period from November 20, 2007 to November 21, 2007 and recorded at 15- minute intervals during this 48-hour period. Eleven count locations were established at the airport access, the frontage road, internal ring road, and at parking areas. These locations are illustrated in Exhibit 9. Review of this data indicates that the predominate peak hour for Airport traffic occurred between 12:00 PM and 1:00 PM on Wednesday November 21, 2007 (the day before Thanksgiving). Peak hour and daily approach volumes are depicted in Exhibit 10. This peak hour approach data was further post-processed to estimate turn movements at each of the intersections analyzed. This process involved applying a factor to entering traffic volumes based on the corresponding exit ratio of each leg of the intersection. This method does not, however, create balanced entering and exiting traffic volume totals. To account for imbalances, estimated turn volumes were further refined to create a balanced system.

Traffic Operations Analysis

In order to assess peak hour traffic conditions a traffic operations analysis was performed in accordance with the Highway Capacity Manual, Transportation Research Board, 2000 (HCM) procedures for unsignalized intersections. Traffic operations results are quantified within a range of Level-of-Service (LOS), where LOS A represents the most favorable conditions with the least delay and LOS E/F represents conditions at or over capacity and significant delay. Generally, improvements should be designed to meet LOS C conditions or better under average day conditions.

Two primary intersection locations were analyzed including: 1) the main access at Johnson Bell Drive and W. Broadway Street and 2) the frontage road at Johnson Bell Drive and Aviation Way. The main access at Johnson Bell Drive is stop-controlled at the south approach to W. Broadway Street while Aviation Way is two-way stop-controlled at the east and west approaches to Johnson Bell Drive.

Exhibit 9 - Traffic Count Locations
MSO Master Plan Study
January, 2008



A forecast 2030 No Build traffic scenario was also developed assuming existing peak hour traffic growth at 3 percent per annum and the current circulation and access configuration. This growth rate generally aligns with enplanement forecasts being developed for the Airport Master Plan. A summary of operational results for existing peak hour and 2030 No Build is presented in Exhibit 11. This figure includes associated peak hour turn movements, intersection delay, and intersection LOS. Additionally, vehicle queue lengths were calculated for both traffic scenarios and are illustrated in Exhibit 12. Results indicate that existing LOS conditions are very favorable at both of the primary intersections associated with the Missoula International Airport. A composite LOS B was computed at both locations under existing peak hour conditions though the northbound left turn movement operates at LOS D at Johnson Bell Drive and W. Broadway Street. 2030 No Build forecasts also indicated favorable LOS B results at the intersection of Johnson Bell Drive and Aviation Way while conditions are expected to worsen to LOS D at Johnson Bell Drive and W. Broadway Street with the northbound left turn movement operating at LOS F. The longest vehicle queue computed was 125 feet for the northbound right turn lane under 2030 No Build Conditions. The available storage length between intersections is approximately 150 feet.

It should be reiterated that theses results reflect worst case conditions, and traffic operations under normal operations can be expected to be substantially better.

Exhibit 10 - Existing Traffic Volumes

MSO Master Plan Study
January, 2008

Exhibit 11 - Traffic Operations Results

MSO Master Plan Study
January, 2008

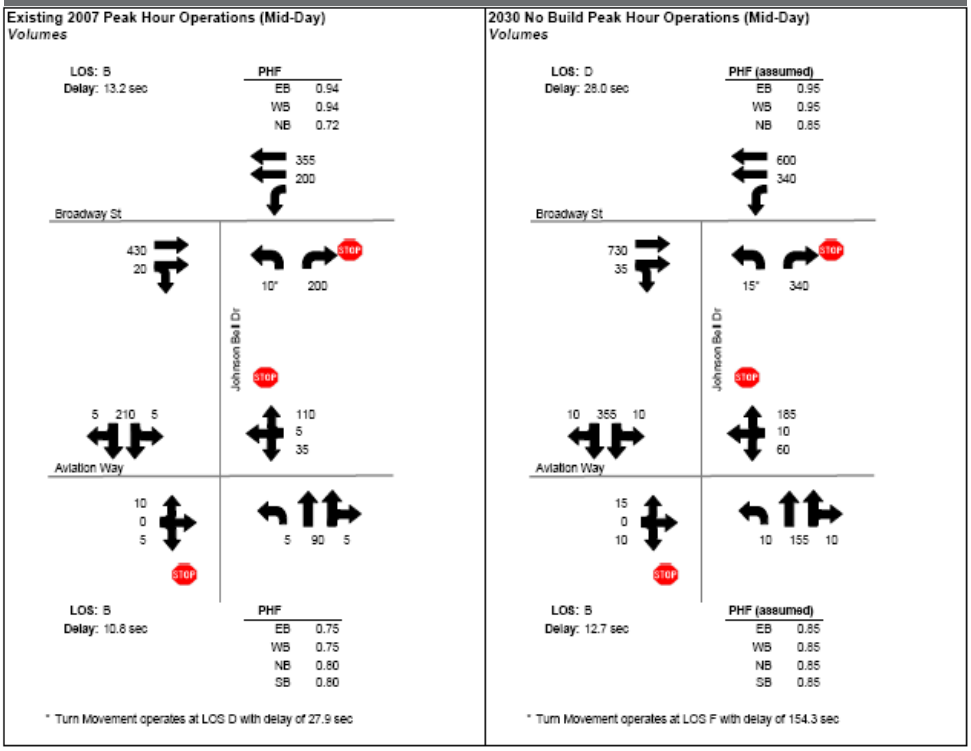
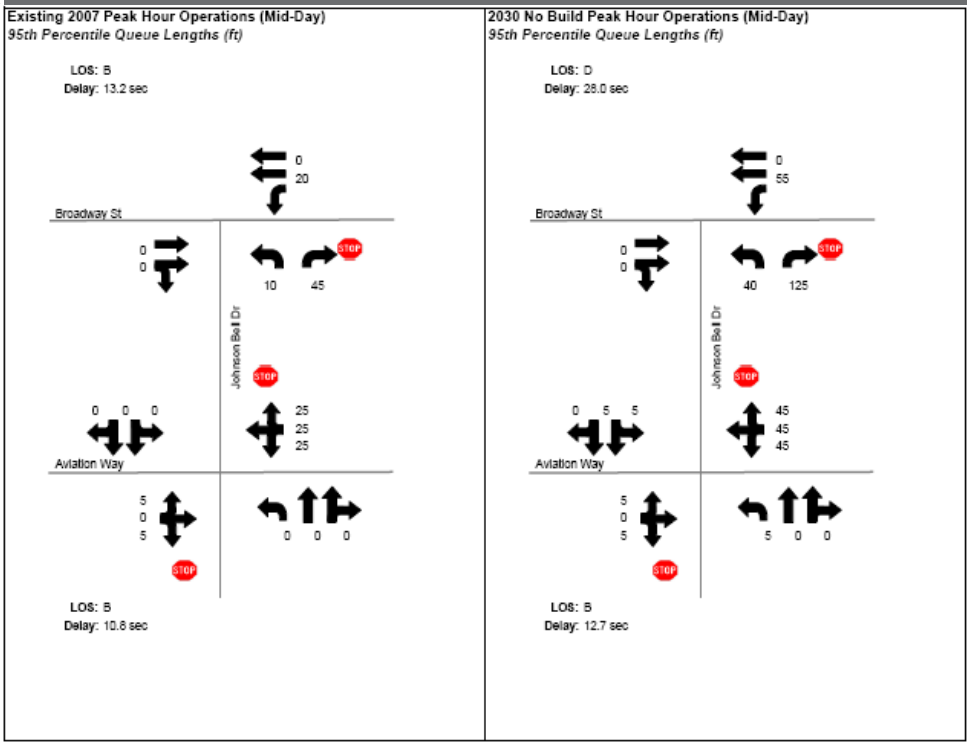


Exhibit 12 - Vehicle Queue Length

MSO Master Plan Study
January, 2008



Traffic Signal Warrant Review

A typical investigation of the need for a traffic control signal involves review of average day traffic conditions against a series of eight warrants as identified by the Manual on Uniform Traffic Control Devices (MUTCD). As the data collected for purposes of this review was recorded during peak holiday travel it is not appropriate for this type of evaluation. However, the current stop-controlled configuration reasonably accommodates existing peak holiday traffic conditions suggesting that traffic signal control may be premature. Traffic volumes and operations should be monitored as growth occurs to determine if traffic signal control is warranted in the future.

The Montana Department of Transportation (MDT) anticipates that a traffic signal will be installed at Airway Boulevard and W. Broadway Street in the near future as warrants are met at this intersection. A traffic signal at this location may enhance available gaps and associated operations for left turning traffic exiting the Airport.

Accident Review

MDT furnished crash data for W. Broadway Street from east of Airway Boulevard to west of Johnson Bell Drive for the period from July 1, 2002 to June 30, 2007. Airway Boulevard intersects W. Broadway Street approximately 2000 feet east of Johnson Bell Drive. During this period, 25 crashes occurred within this segment. Three of these crashes occurred in the vicinity of Johnson Bell Drive while the remainder occurred at or near Airway Boulevard. Of the three crashes occurring in the vicinity of Johnson Bell Drive, two involved property damage only while the third resulted in injuries. These crashes were either rear end or sideswipe type involvements. Based upon this data, an accident rate of 0.11 crashes per million entering vehicles (MEV) was computed for the intersection of W. Broadway Street and Johnson Bell Drive. Although MDT does not compute statewide average rates for comparison purposes, this rate is considered low. As such, the intersection of W. Broadway Street and Johnson Bell Drive is relatively safe and likely does not require corrective measures to mitigate apparent safety concerns.

Alternate Modes

Service to/from the Airport is available via alternate transportation modes including bus, taxi, and bicycle. Mountain Line provides bus service from the downtown transfer center to the terminal accommodating am, mid-day and pm departures and arrivals. Bicycle access is available via N. Reserve Street and Expressway Boulevard on designated bike routes. On-street usage is required on Airway Boulevard, W. Broadway Street, and Johnson Bell Drive where designated bike routes have not been established.

Development of Alternatives

Parking and circulation alternatives were examined and included in this study, *(by Albersman & Armstrong, Ltd.*). Five alternatives were developed that incorporate various parking configurations and a two-lane, one-way circulation road ("Ring Road"). This evaluation concluded that Alternative 5 best accomplished the landside goals and objectives. This Alternative incorporates all parking functions inside of the ring road. The existing access configuration to/from W. Broadway Street would generally remain intact, while the frontage road (Aviation Way) would be re-configured to intersect the ring road.

As W. Broadway Street (Old Highway 10 W.) is a minor arterial on the State System it is under the jurisdiction of the MDT. Possible safety and operational improvements could be realized through development of an eastbound acceleration lane to accommodate the high volume of exiting right turn traffic from the Airport. The *MDT Traffic Engineering Manual* indicates that acceleration lanes

may be considered “where the turning traffic at an unsignalized intersection must merge with high-speed, high-volume facility” as is the case at W. Broadway Street. Design of an acceleration lane should accommodate sufficient distance for a turning vehicle to accelerate to a speed near that of the intersecting roadway prior to merging into the through lane. Assuming an initial right turn speed of 15 mph and a highway design speed of 60 mph on W. Broadway Street (55 mph posted speed) yields a required acceleration length of 1,140 feet. At this point a 300 feet merge taper is recommended (Source: *A Policy on Geometric Design of Highways and Streets, AASHTO, 2004*). Therefore, the total length to develop this acceleration lane would be 1,440 feet. A potential problem may exist however for right turning drivers (from the Airport) who wish to turn left at Airway Boulevard to access Interstate 90. The left turn lane to Airway Boulevard begins near the end of the proposed merge on W. Broadway Street. As such, a limited weave distance would result in order to enter the left turn lane at Airway Boulevard.

Recommendations

Based upon the review conducted herein it is determined that a single access at W. Broadway Street would adequately serve 2030 forecast traffic volumes at the Missoula International Airport. The scenario is consistent with the Alternative 5 configuration recommended by the Landside Master Plan Study. Intersection traffic control at W. Broadway Street and Johnson Bell Drive could initially be accommodated by a stop-controlled configuration as currently exists. Ultimately, traffic signal control may be appropriate if MUTCD warrants are met.

Improvements to facilitate acceleration of vehicles turning right from Johnson Bell Drive to W. Broadway Street present constraints due to the proximity of Airway Boulevard. The required acceleration length plus the merge taper leaves minimal length for vehicles to weave across through traffic lanes and enter the left turn lane at Airway Boulevard. Under these conditions an acceleration lane is not recommended. A possible solution would be to accept a lesser acceleration length than that desired. However, the lack of historic crash data suggests that the current condition is not problematic. Additionally, if a traffic signal becomes warranted in the future an acceleration lane would not be needed.

Internal traffic operations would be enhanced through development of a one-way internal circulation road (ring road). Traffic would permitted to move freely from the ring road to the intersection of Johnson Bell Drive and W. Broadway Street thereby eliminating the current two-way stop controlled configuration at Aviation Way. Under this scenario potential queue impacts from the W. Broadway intersection could be avoided as additional vehicle stacking could occur along the circulation road, as needed. Exhibit 13 illustrates this proposed channelization.

Multi-modal elements such as bus, shuttle and taxi pick-up and drop-off facilities should be incorporated. Additionally, Airport staff has indicated a desire to incorporate bicycle facilities in development of circulation road improvements. These elements are generally unique to Airport terminal facilities and associated driver expectancy. As such development of off-street paths are encouraged to service this mode. Coordination with the City of Missoula’s Bicycle/Pedestrian Office would facilitate integration of improvements with current and planned bicycle routes.

The Montana Department of Transportation (MDT) anticipates that a traffic signal will be installed at Airway Boulevard and W. Broadway Street in the near future. A traffic signal at this location may enhance available gaps for exiting Airport traffic at Johnson Bell Drive. Other system improvements have also been identified in the Wye Mullan West Comprehensive Area Plan. This plan proposes improvements for the collector roadway system between W. Broadway Street and Mullan Road to alleviate congestion on Reserve Street. Possible north-south alignments are located east and west of the Airport. If completed, the proximity of these additional facilities may further enhance operations on W. Broadway Street in the vicinity of the Airport.

Exhibit 23 - Proposed Intersection Channelization

MSO Master Plan Study
January, 2008

9. Appendix

Review of Land Use Areas at Other Airports

Contained in the appendix is a review of land use areas at other Airports (see the following tables 11 & 12 and exhibits 14 & 15) of similar size or similar region as compared to MSO. Included are graphics that are intended to describe the size (in terms of massing) and function, the following basic components:

a. Airport Terminal Building Location
b. Short Term Parking
c. Long Term Parking
d. Rental Car Area(s)
e. Roadway Configuration

This information helped guide the planning process by selecting the best planning elements from these existing examples and then reinterpreting them for MSO.

Table 11 - Airports of Similar Size
Missoula International Airport
Missoula, Montana

Rank	Code	Airports - Similar Size
146	SHV	Shreveport Regional
147	MOB	Mobile Regional
153	CRW	Yeager Airport
154	**MSO**	**Missoula International**
156	FWA	Fort Wayne International
157	DAB	Daytona Beach International
158	BMI	Central Illinois Regional

Table 12 - Airports of Similar Region
Missoula International Airport
Missoula, Montana

Rank	Code	Airports - Similar Region
133	BIL	Billings Logan
143	BZM	Gallitin Field
150	MFR	Rogue Valley
154	**MSO**	**Missoula International**
163	PSC	Tri-Cities
172	RDM	Roberts Field
185	GPI	Glacier Park

Exhibit 14 - Airports of Similar Size
Mobile Regional Airport
Mobile, Alabama

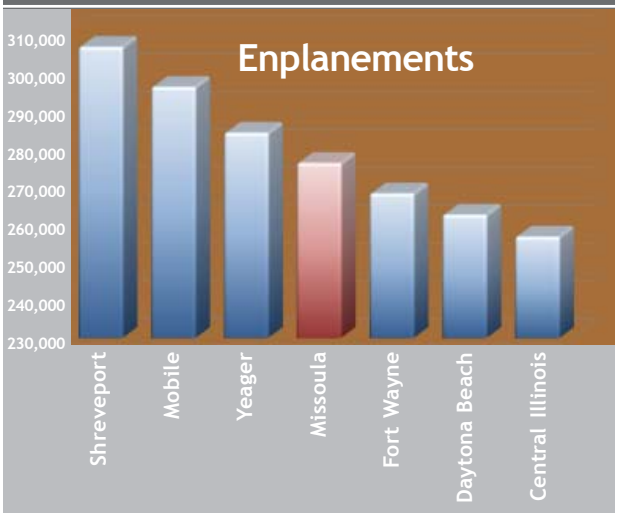
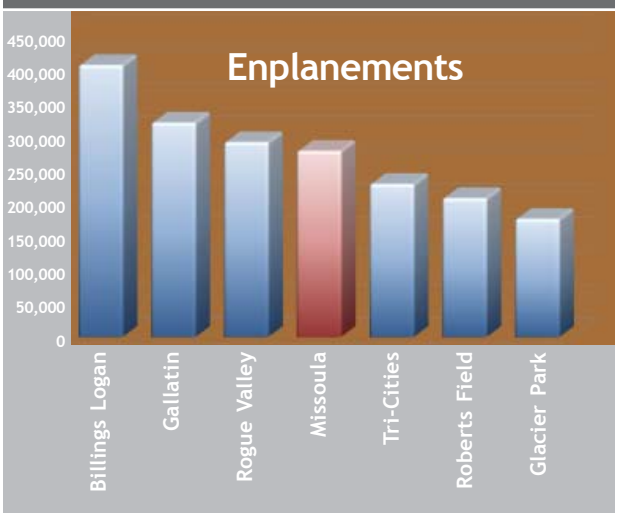


Exhibit 15 - Airports of Similar Region
Mobile Regional Airport
Mobile, Alabama

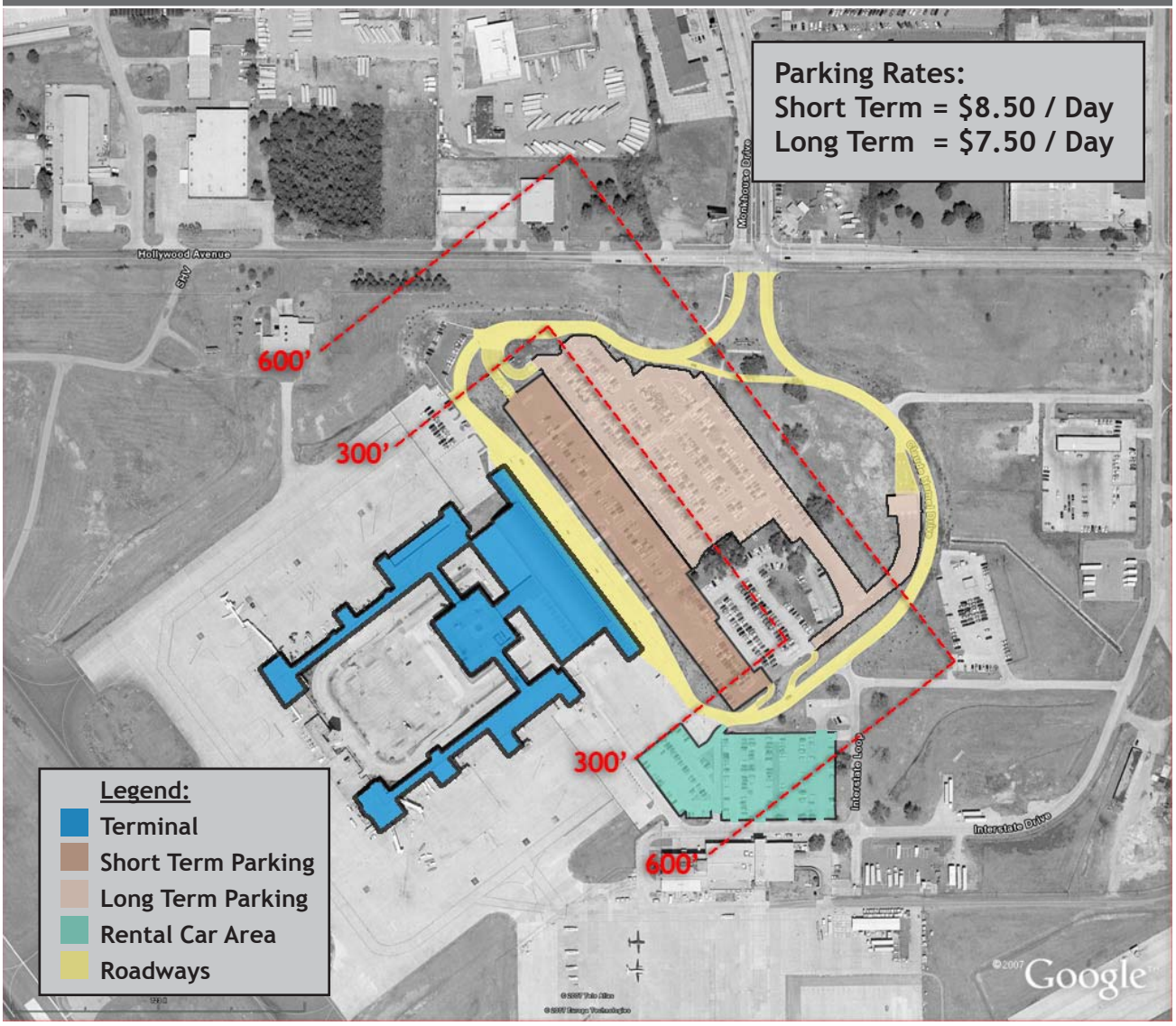


Airports of Similar Size;

Shreveport Regional Airport
Shreveport, Louisiana

Conceptually, the Shreveport Regional Airport has the best designed land use layout of all the similar sized airports we have studied. One possible criticism is the short que at the parking entry and the abrupt entry to the ring road following the parking exit plaza.

Exhibit 16 - Land Use Areas
Shreveport Regional Airport
Shreveport, Louisiana

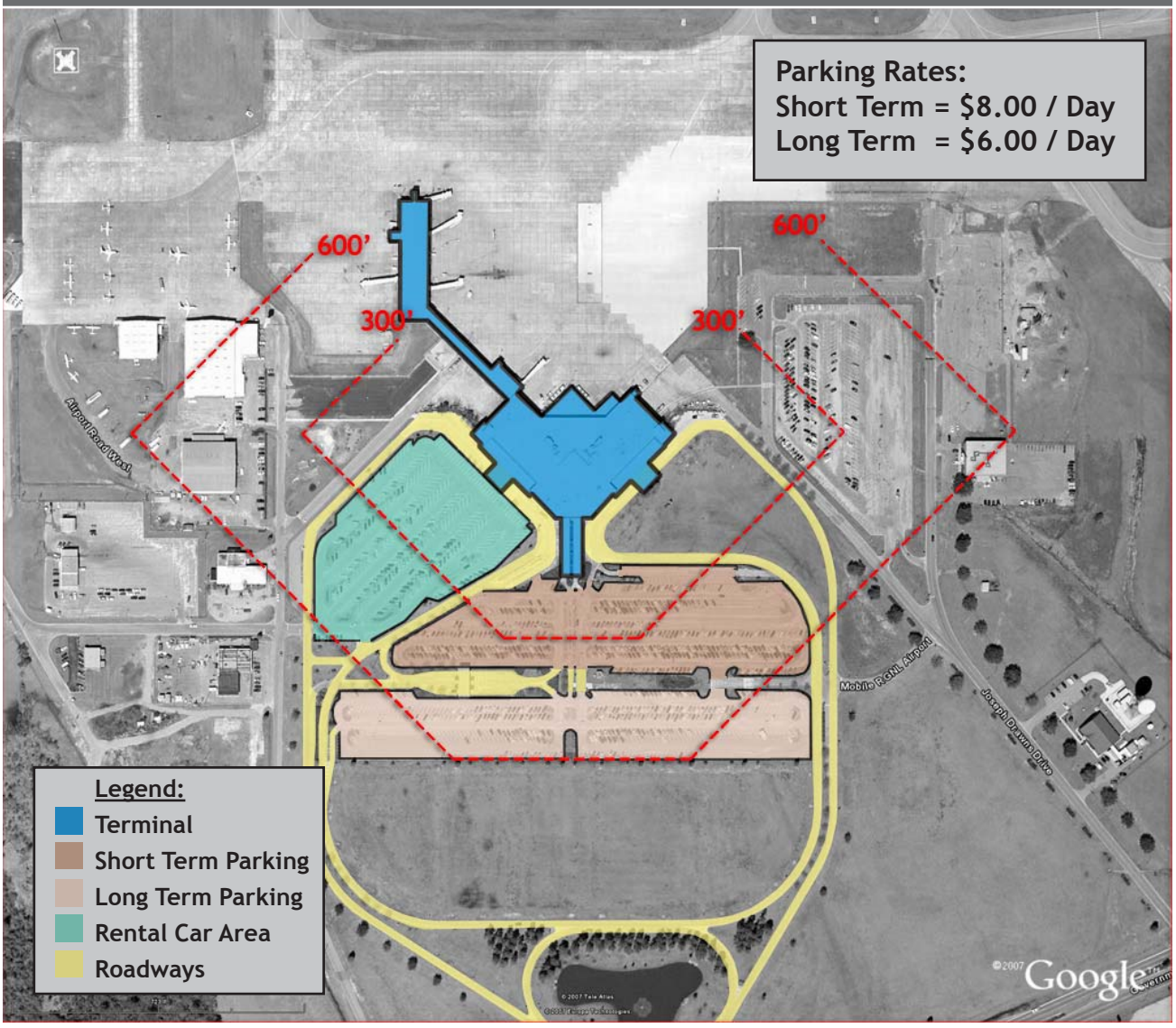


Airports of Similar Size;

Mobile Regional Airport
Mobile, Alabama

This is an interesting and most unusual landside roadway system. It appears that the roadway system was designed to allow parking patrons to enter the terminal building without crossing the curb side area (roadway) in front to the terminal building. While the intention is laudable, it undoubtedly results in a confusing and circuitous route for the motorist. The motorist must make a decision to go to baggage claim or ticketing before entering the modified ring road. Furthermore, if the motorist wants to go from ticketing to baggage claim he/she must exit the terminal area to re-enter the roadway system. The land use does not make good use of the property close to the terminal resulting in long walking for distances for pedestrians. Note the short term parking area is larger than the long term area because many long term parkers are using the short term area.

Exhibit 17 - Land Use Areas
Mobile Regional Airport
Mobile, Alabama

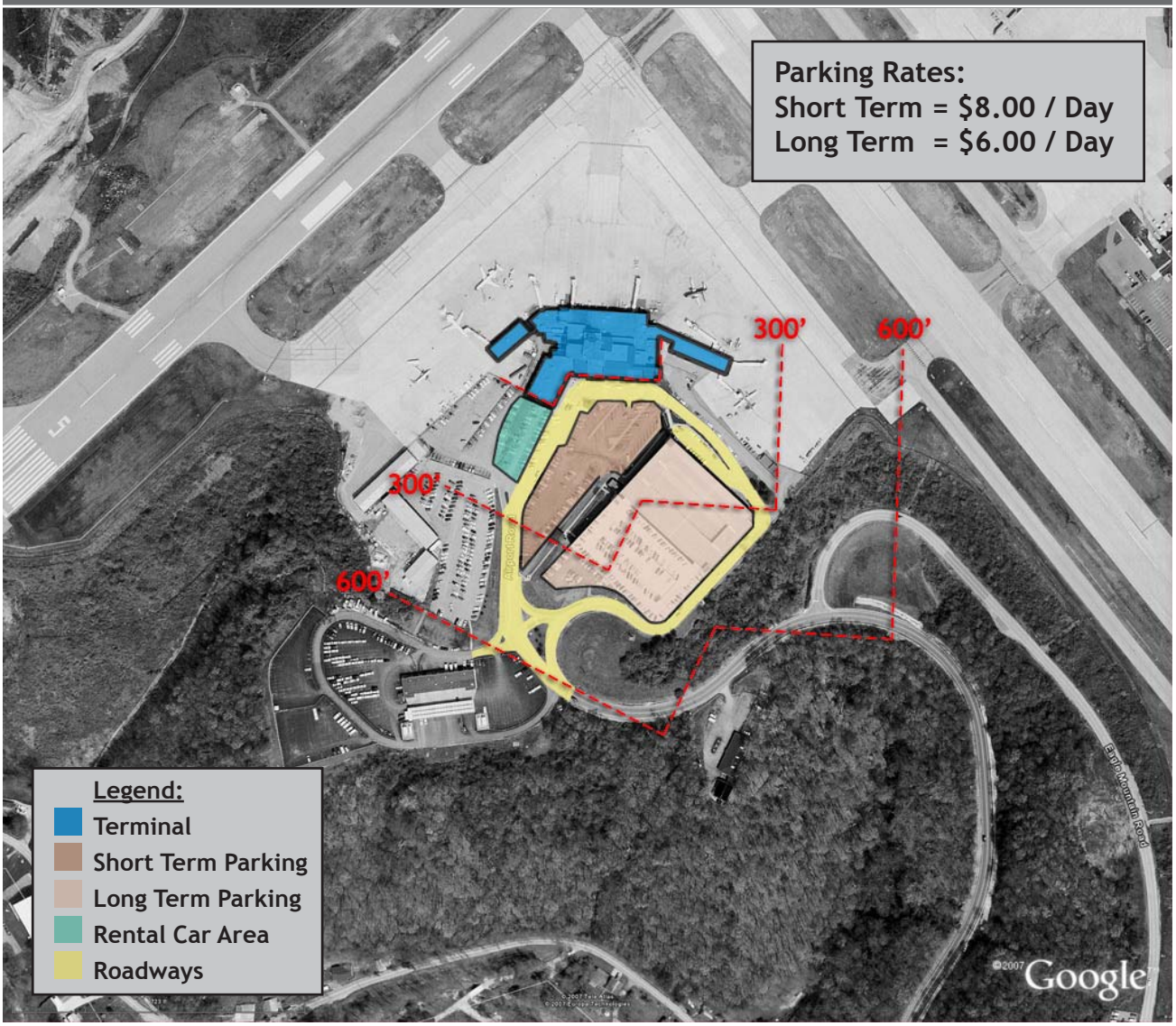


Airports of Similar Size;

Yeager Airport
Charleston, West Virginia

This Airport is the closest in size to MSO in terms of enplanements and shows a typical land use layout. It has a one-way ring road with a separate entry for long term parking and short term parking. There is a single parking exit for long term and short term parking. The portion of the ring road that has two way traffic serves the rental car facility and employee parking. Because the parking is at an awkward angle from the terminal building, a portion of the short term lot is outside of the 300' walking distance. There is also a structured parking facility at the northeast end of the long term area which may contain parking spaces that are more convenient than some of the short term spaces. There are few airports of this size that include "structured" parking facilities.

Exhibit 18 - Land Use Areas
Yeager Airport
Charleston, West Virgina

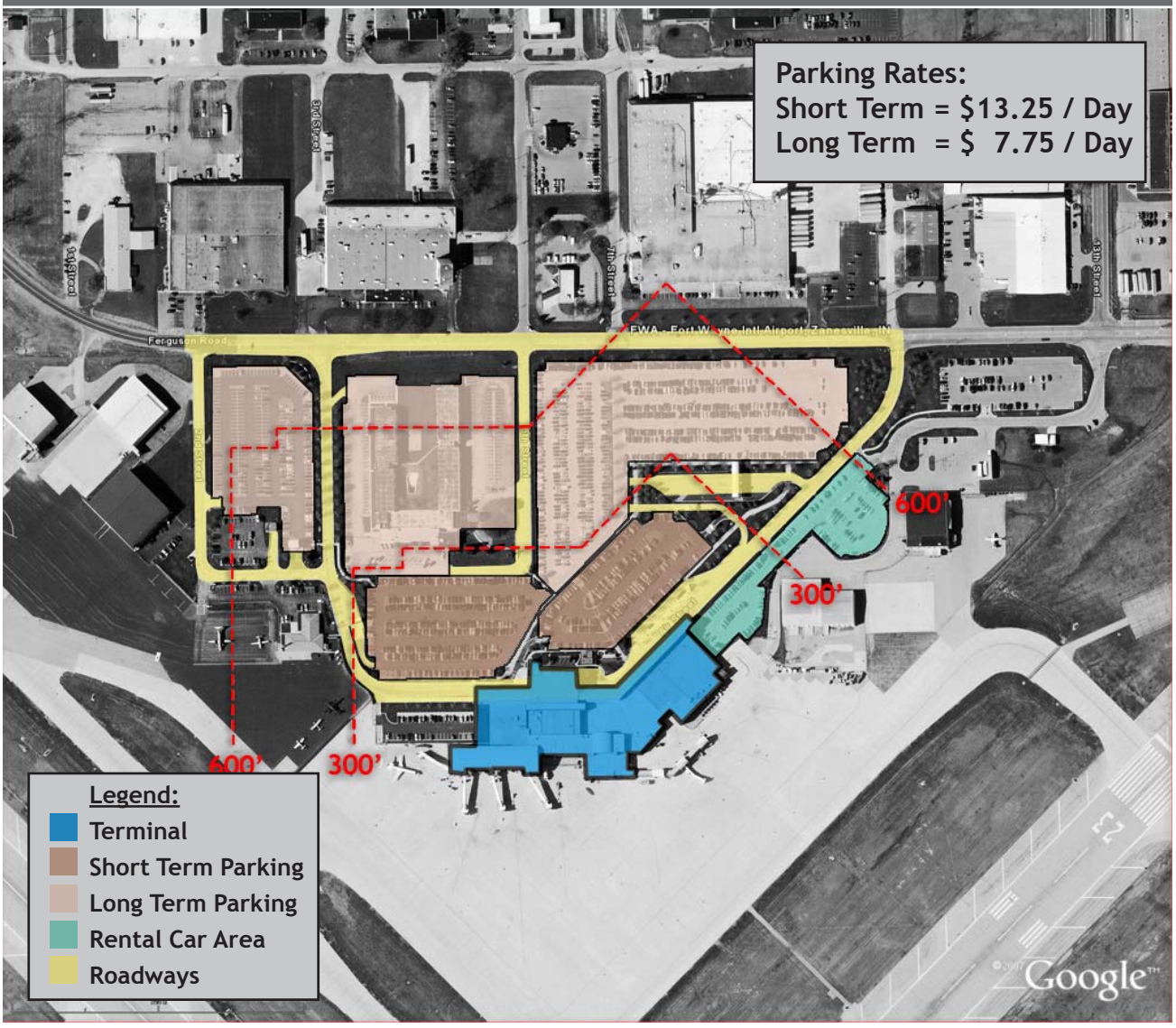


Airports of Similar Size;

Fort Wayne International Airport
Fort Wayne, Indiana

The parking layout appears haphazard with parking bays going in different directions and too many different parking areas. This leads to confusion and inefficiency. Also, the cashier plaza orientation blocks pedestrian flow to the airport terminal building. No recirculation road is provided. Patrons must use the highway to re-enter the airport roadway system. Walking distance for some rental cars is beyond 300' and is excessive.

Exhibit 19 - Land Use Areas
Fort Wayne International Airport
Fort Wayne, Indiana

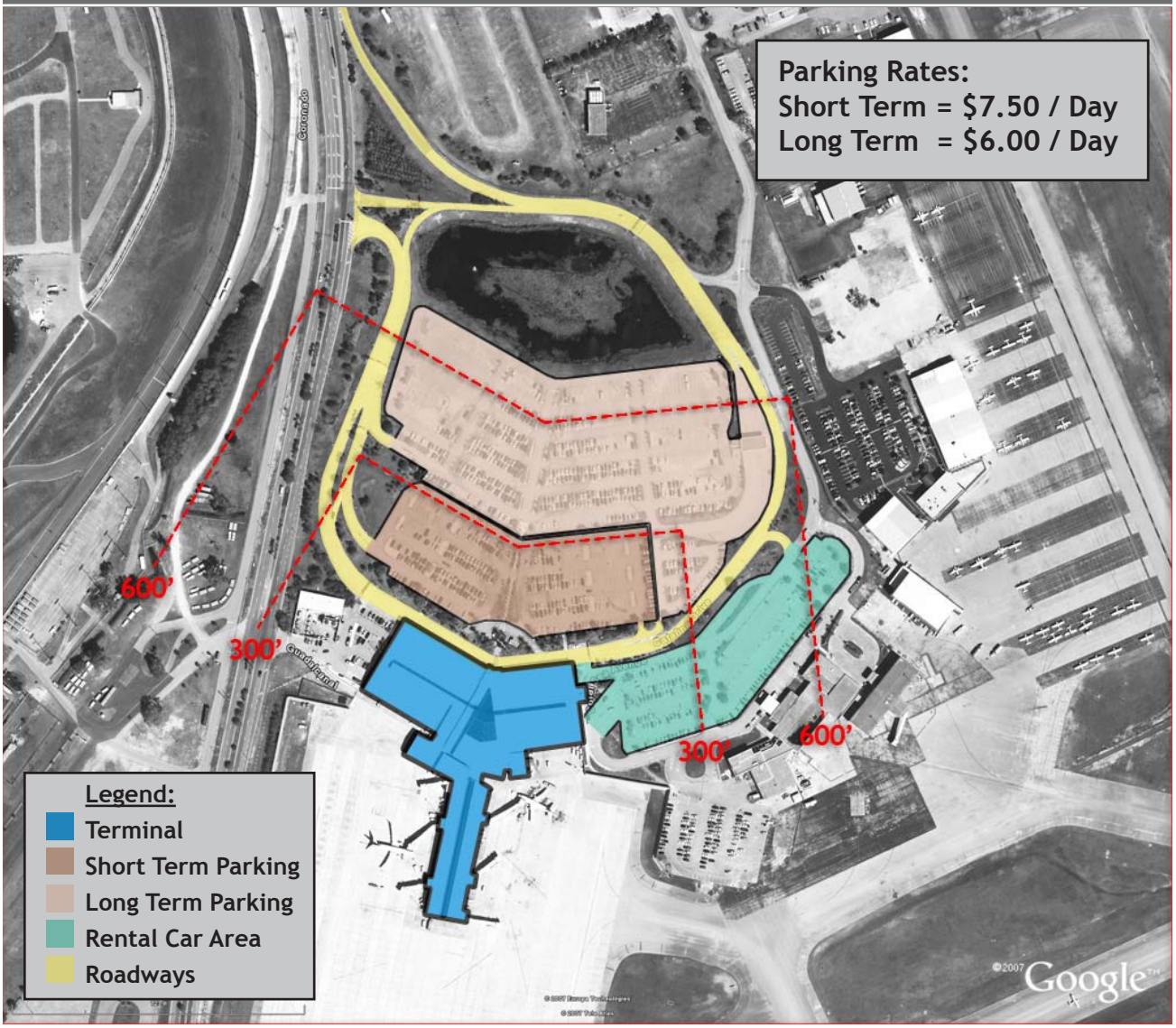


Airports of Similar Size;

Daytona Beach International Airport
Daytona Beach, Florida

Well defined ring road with simple way finding both from the highway and internally. Includes a recirculation roadway and a single entry road to parking that later splits to long term and short term parking. The size of short term area in proportion to the long term area seems a little excessive. However, because the short term maximum daily rate is only slightly higher, we assume that long term parkers are paying for the convenience of using the short term lot thereby increasing the demand for that space.

Exhibit 20 - Land Use Areas
Daytona Beach International Airport
Daytona Beach, Florida

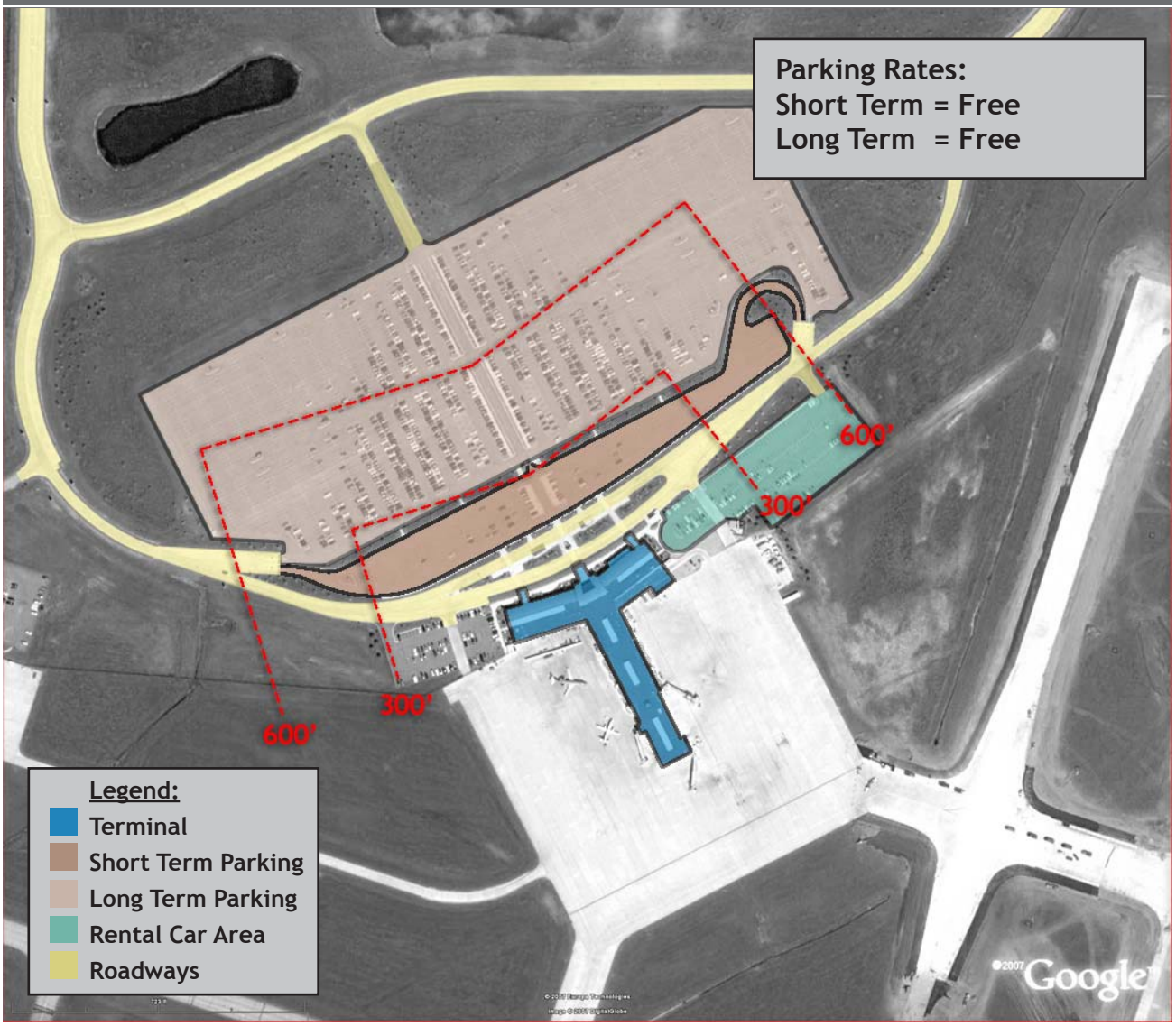


Airports of Similar Size;

Central Illinois Regional Airport
Bloomington, Illinois

Landside use at Central Illinois has a lot of desirable characteristics including a one-way ring road with a re-entry road, a single parking entry that splits into long term and short term parking, and a single parking exit plaza. The most curious aspect of the parking system is that all public parking is "free". Airport staff indicated that they provide free parking in order to be competitive with nearby airports. They are able to control use of the short term parking area with signage ("Short Term Parking Only"). They reported no problems with long term "cheaters" in the short term parking area.

Exhibit 21 - Land Use Areas
Central Illinois Regional Airport
Bloomington, Illinois

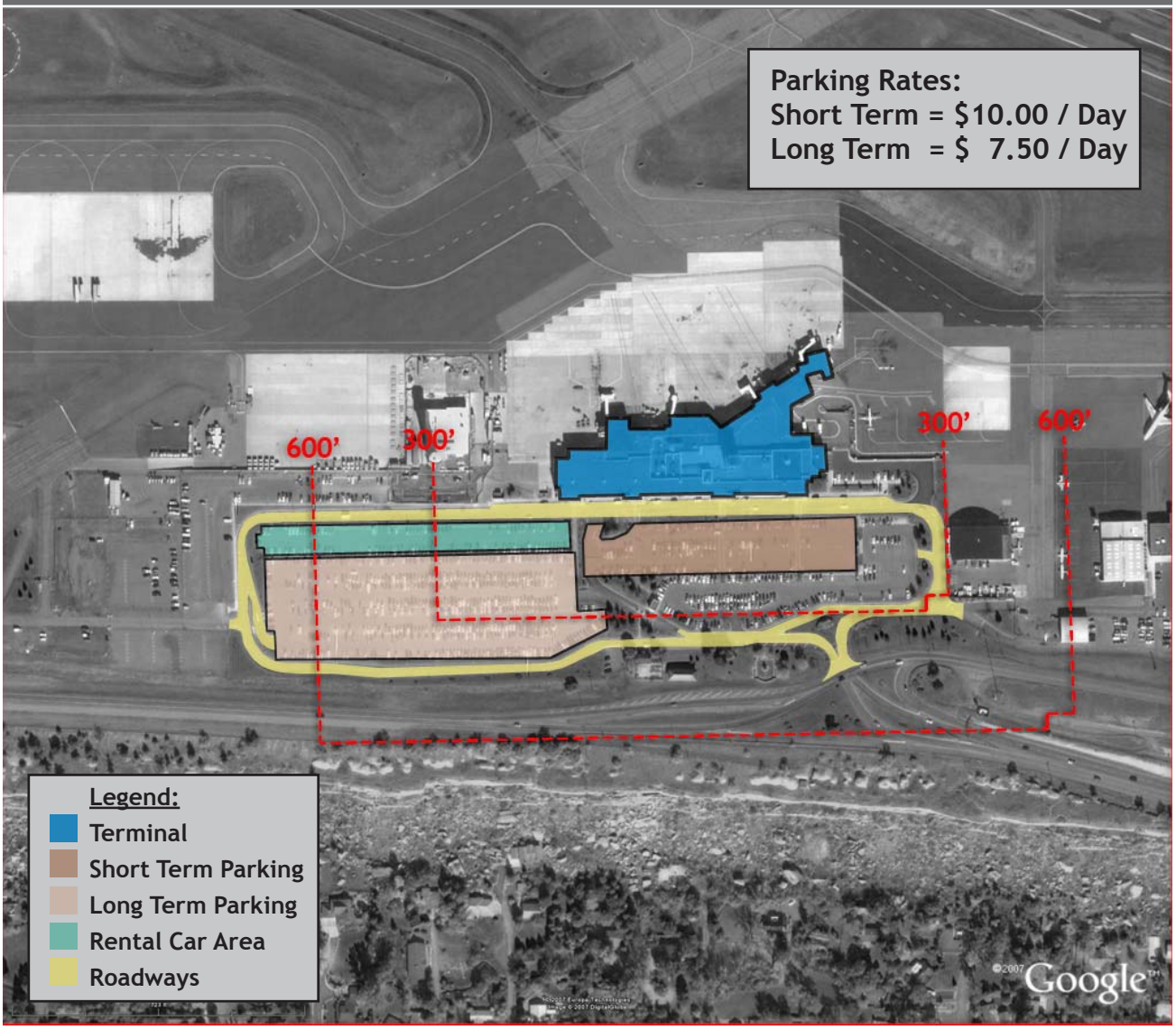


Airport of Similar Region;

Billings Logan International Airport
Billings, Montana

Because of the unusually long and narrow site available for parking, this airport is not a good land use example for the purposes of this study. Walking distance for a large portion of both long term and rental cars is excessive.

Exhibit 22 - Land Use Areas
Billings Logan International Airport
Billings, Montana

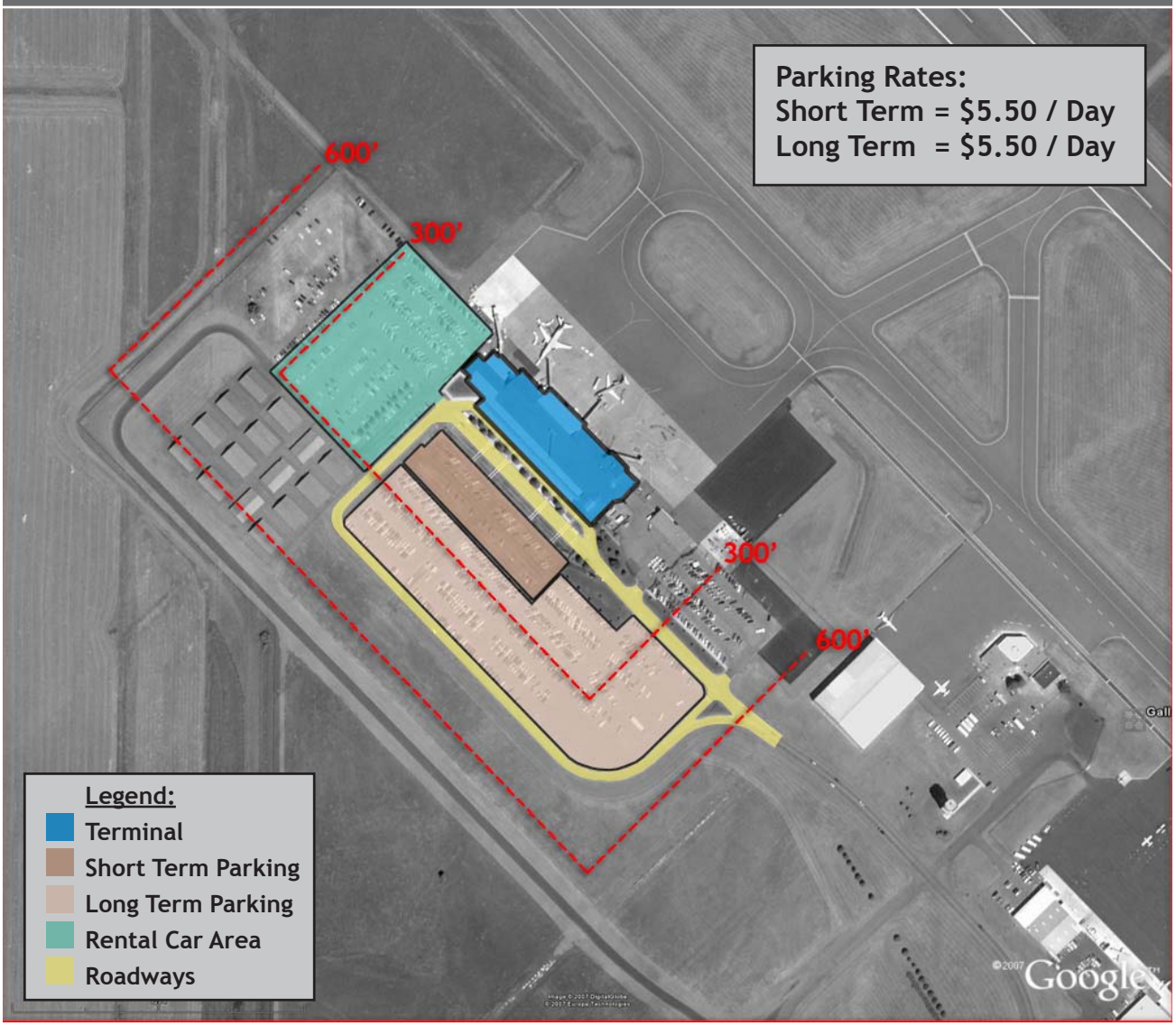


Airport of Similar Region;

Gallatin Field Airport
Bozeman, Montana

This is a typical small to midsize airport land use layout. All short term parking and rental car spaces are located with 300' of the terminal building. Although the same parking rate is charged for both the short and long term parking, it is interesting to note that the long term lot is almost full while the more convenient short term lot has plenty of available parking. Also, too much space may be allocated to rental cars.

Exhibit 23 - Land Use Areas
Gallatin Field Airport
Bozeman, Montana

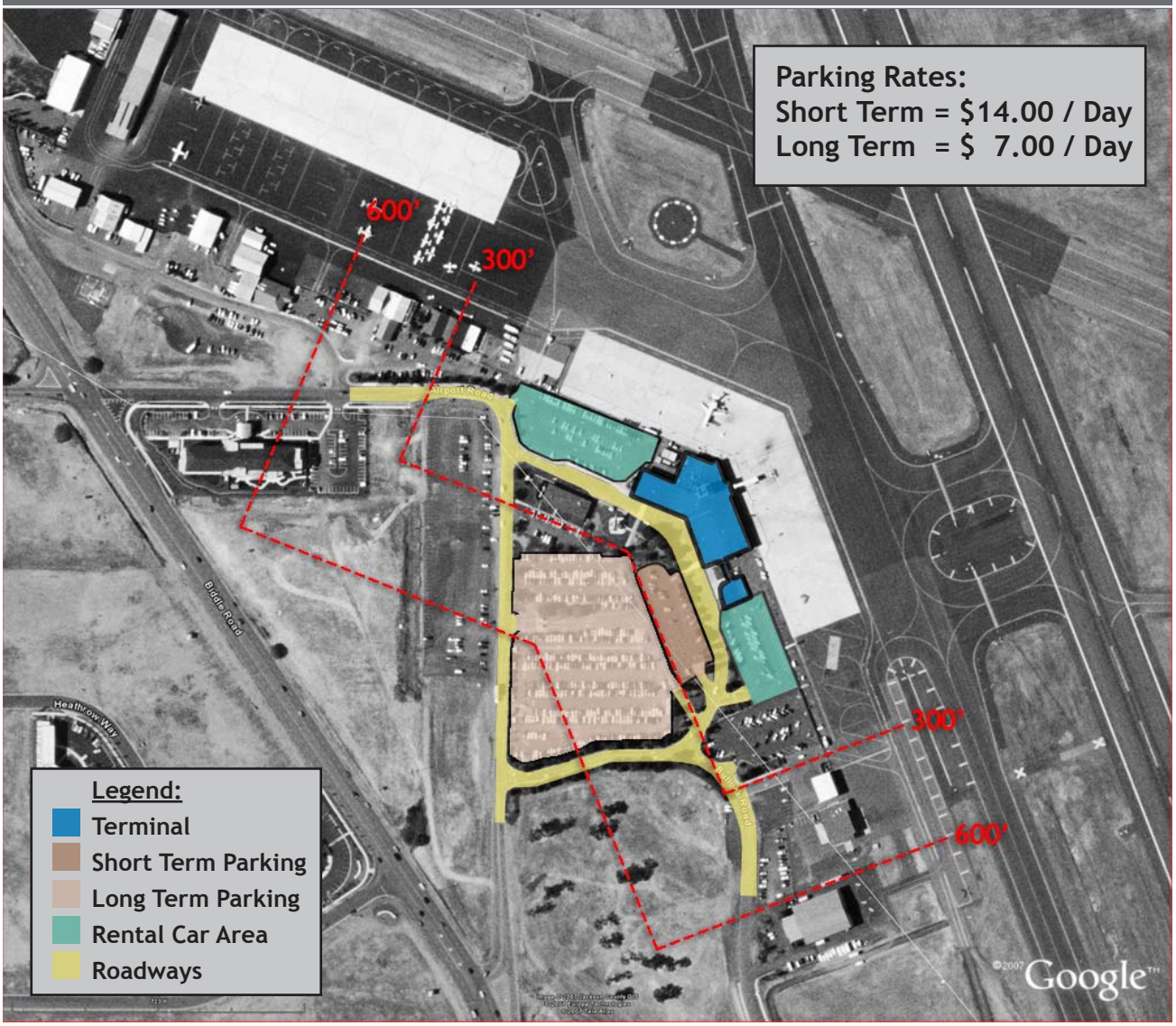


Airport of Similar Region;

Rogue Valley International Airport
Medford, Oregon

Note that the long term lot is full and the short term lot has available space. This is because it is likely there are no long term parkers in the short term lot due to the high maximum daily rate; $14.00/day in the short term lot compared to $7.00/day in the long term lot. Also, the rental car "return" area is separate from the "rental" area. This split operation is undesirable because of additional staffing required.

Exhibit 24 - Land Use Areas
Rogue Valley International Airport
Medford, Oregon

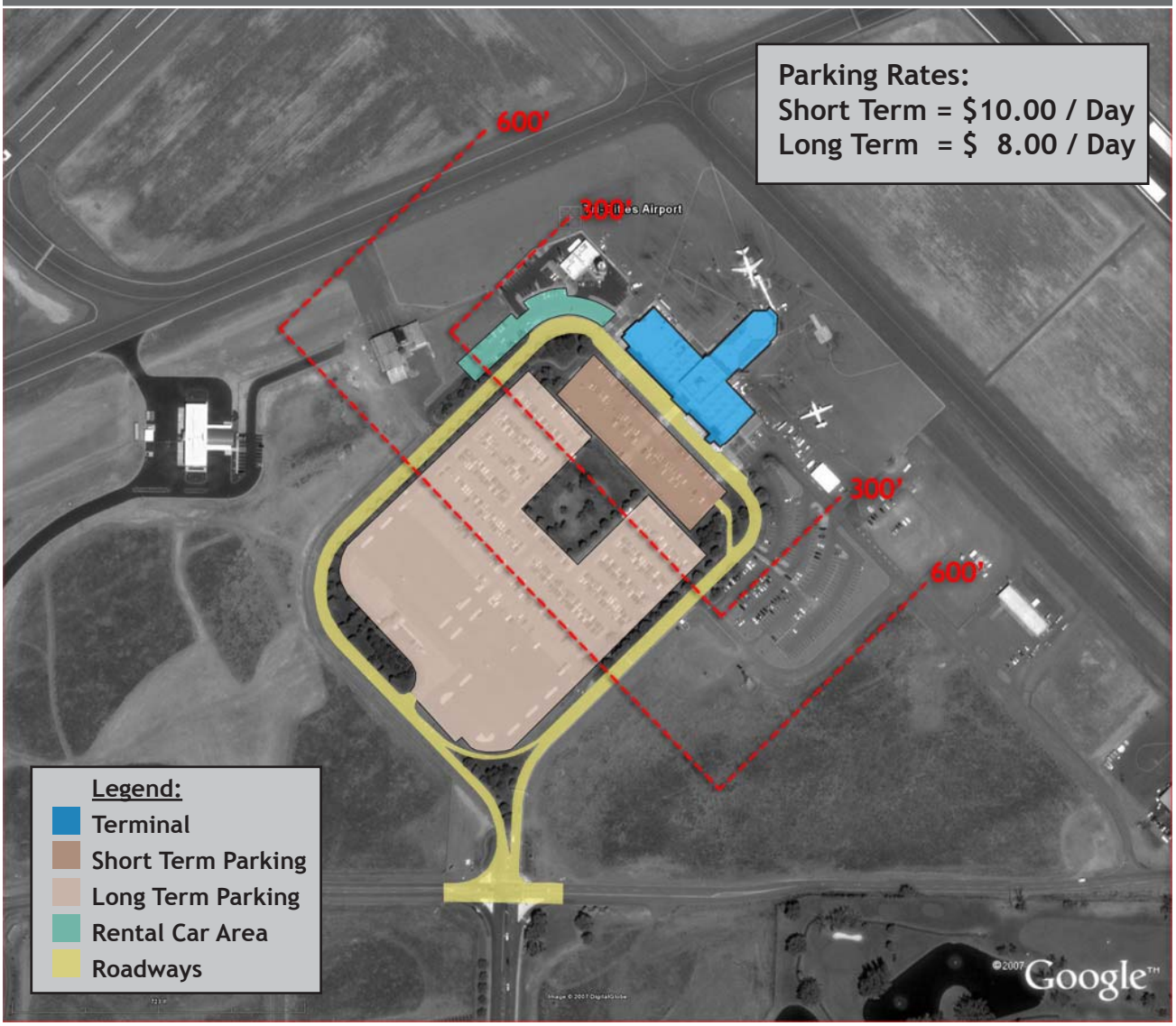


Airport of Similar Region;

Tri-Cities Airport
Pasco, Washington

This is an excellent landside layout with an easy to follow roadway system. However, the walking distance for long term parkers near the back of the lot appears to be excessive.

Exhibit 25 - Land Use Areas
Tri-Cities Airport
Pasco, Washington



Airport of Similar Region;

Roberts Field Airport
Redmond, Oregon

This is typical small to midsize airport land use layout with the exception of the dislocated rental car area that is separated from the terminal building. This location may require shuttling customers to/from the RAC area.

Exhibit 26 - Land Use Areas
Roberts Field Airport
Redmond, Oregon

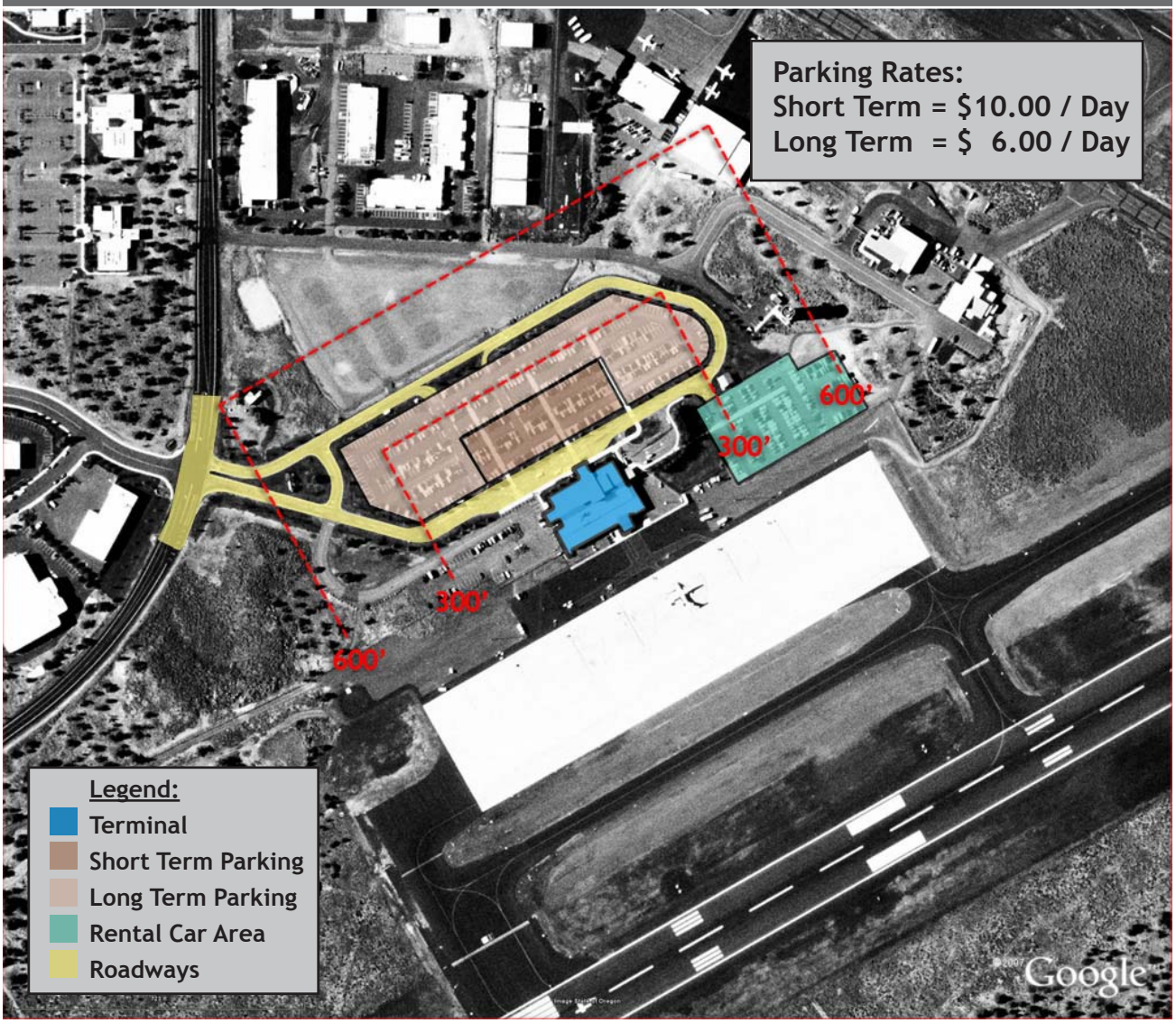


Exhibit 27 - Proposed Removal Areas

Missoula International Airport
Missoula, Montana

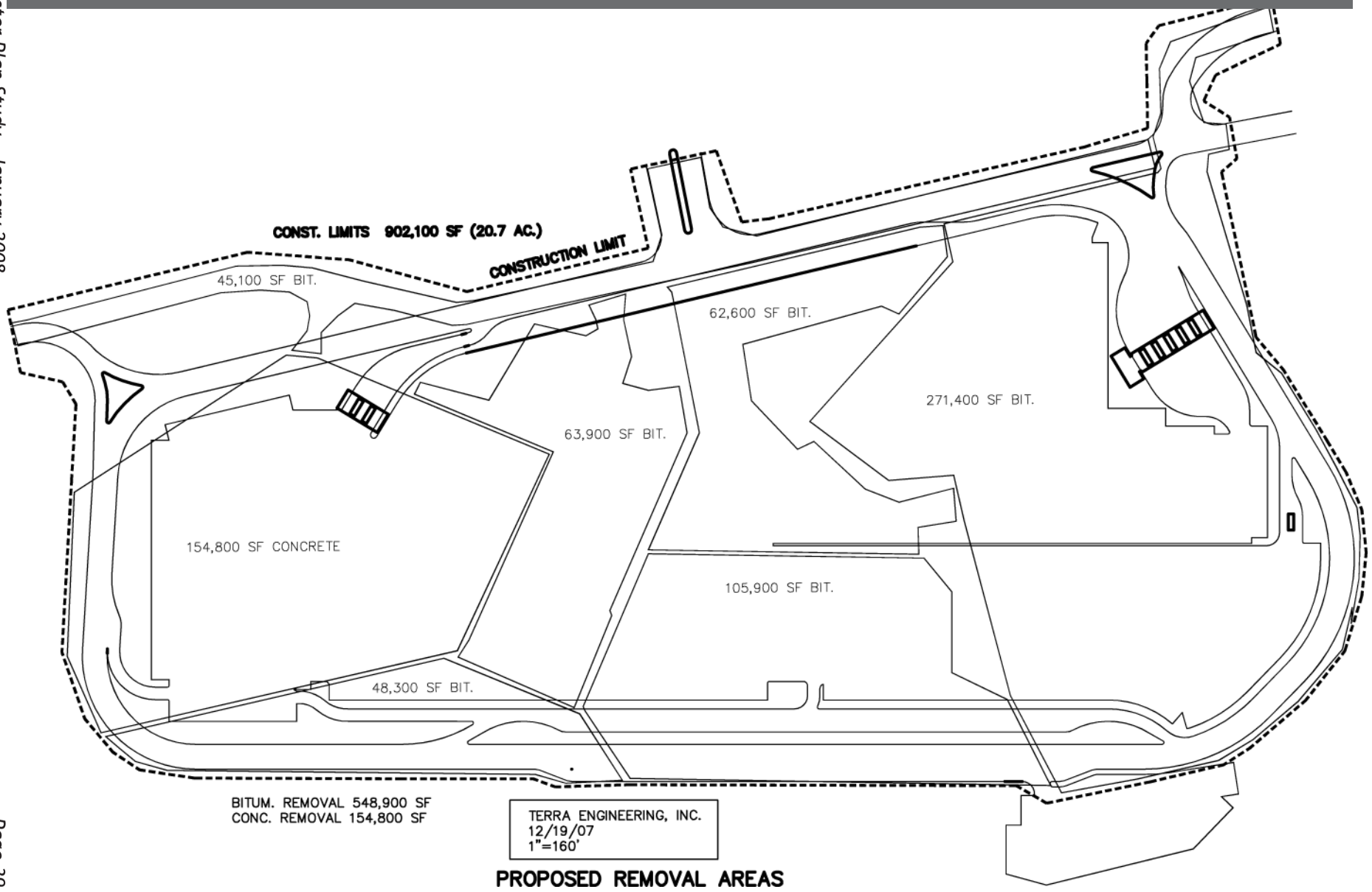


Exhibit 28 - Proposed New Construction

Missoula International Airport
Missoula, Montana