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ADDENDUM TO:
Terminal Area Concept Plan Technical Report
November 2016

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Preliminaries

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Table of Contents

Table of Contents

Chapter 1

Executive Summary

- Background
- Process
- Master Plan
- Campus Zoning - East
- East Concept Overview
- Campus Zoning - South
- South Concept Overview
- Next Steps

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Chapter 1 | TERMINAL DEMAND

1.1 Background

A Terminal Area Concept Plan was completed for the Des Moines Airport Authority in September 2014 by LeighFisher. For that plan, potential new terminal sites were investigated at the existing terminal area (east quadrant) and the south quadrant of the airport. The concept plan recommended development of a future terminal site at the south quadrant.
In March 2016, the Authority hired HNTB to restudy components of the concept plan, in part due to differing site conditions. This report, which was prepared as an addendum to LeighFisher's Terminal Area Concept Plan Technical Report, describes the changes in conditions, the study process and the recommended future direction.

1.2 Process

The study was performed through a series of charrette-style workshops with the Authority. An open dialogue was utilized to determine all concepts that could achieve the goals of the program. A "pros-cons" analysis was used to guide the Authority through the decision-making process that kept the following criteria in mind:

- Functional and Efficient circulation
- Creates a zoned Master Plan for the entire airport campus
- Concepts that connect the airport to the community and create a "sense of place"
- Flexible Phasing/Construction – initial and ultimate
- Minimizing relocation of existing buildings/tenants and infrastructure
- Avoid the Iowa Air National Guard (IANG) site on the north quadrant
- Meets all requirements (terminal, airside and landside)
- Cost Effective

1.3 Master Plan

One of the largest changes over the two year duration was utilization of the overall site. The previous study concluded that a portion of the existing Iowa Air National Guard (IANG) site in the north quadrant could be utilized for relocation of tenants to clear the south quadrant site for the new terminal. For this new report, the IANG site was deemed "off-limits". A comprehensive review of the entire airport campus was developed and planning concepts were developed for both the south and east quadrants.

Figure 1.1 East Concept Campus Phasing

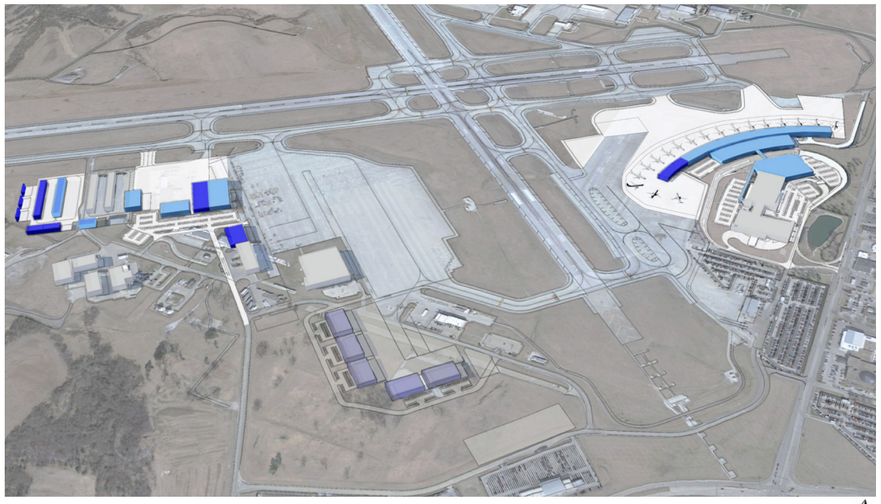


Figure 1.2 South Concept Campus Phasing

KEY POINTS

This report is an addendum to the 2014 Leigh Fisher Report. An update was required to accommodate several master plan variables that have changed, namely, the "off-limits" restrictions of the IANG site.

The addendum was developed through charrette workshops with the Authority and includes:

- Re-zoned airport campus options
- East and South Terminal Concepts

Figure 1.3 East Concept Zoning

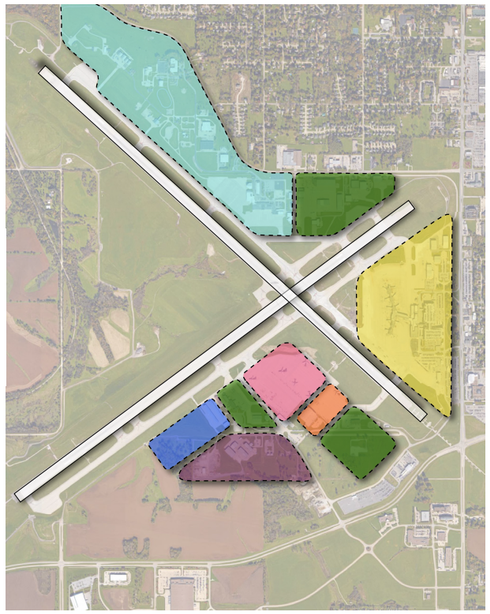
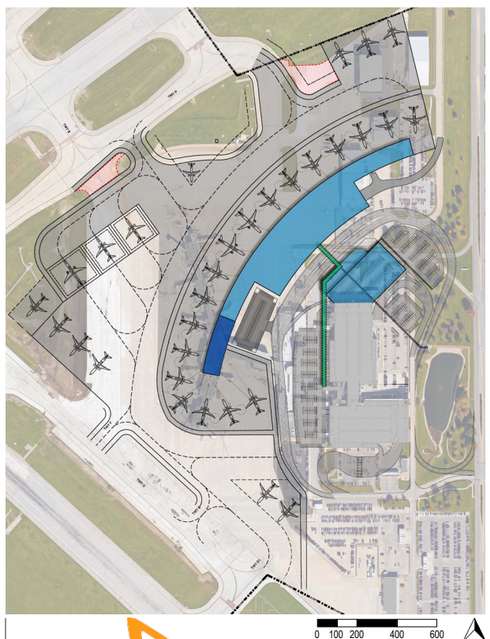


Figure 1.4 East Concept Overview



1.4 Campus Zoning - East

The East Option requires the least amount of changes to the overall zoning plan. The new terminal will utilize the existing terminal campus, therefore, many of the current utilities can remain in place. The new zoning plan will primarily enlarge certain tenant sites, including the GA / T-Hangars, the GA / Corporate and the Airline Maintenance Spaces in the South Quadrant. The GA / T-Hangar and GA / Corporate sites are placed so that they can expand as needed in the future. Specific advantages to the east site include:

- Ability to keep the passenger terminal in a completely separate quadrant
- Less relocation of the current tenants
- Maintains the connection to downtown by keeping the Fleur Drive address.

1.5 East Concept Overview

Terminal – Major adjustments to the East concept from the previous study include the overall site orientation/rotation to be nearer to the existing terminal so that walking distances to and from the parking garages could be minimized. This slight rotation maximizes the landside area for future growth without intercepting any of the new roadways. It also places the southern end of the new concourse as close as possible to the existing concourses, while still maintaining proper construction clearances. This will assist with the phasing of the concept.

Airside - This design integrates 14 gate positions at the completion of Phase 1 and 10 Remain Over Night (RON) hardstands. It corrects an Airfield Runway Incursion Mitigation (RIM) problem while taking advantage of the added room for the three new deice pads and four RON positions on the east side of the site while avoiding the containment site.

Landside - Phase 1 also includes the construction of a new parking garage adjacent to the existing garage, which will hold approximately 870 spaces for rental and short term parking. A new pedestrian bridge will safely connect passengers flowing to and from the new terminal, and a route will be provided for passengers to get to the bus stop located on Fleur Drive. Additionally, Phase 1 incorporates a new entry from Fleur Drive, a new entry plaza to segregate parking, a new roadway loop and curb in front of the landside terminal, a new long term lot, short term hourly lot, an exit plaza and a new loading dock off of the northeast service road.

Phase 2 – Phase 2 expansion would be an extension of the uniform curve set in place by Phase 1. Phase 2 will include new concourse space, hold rooms, restrooms, concessions and apron space. Four more aircraft gates will be added with the new extension. A new parking lot south of the landside terminal can be utilized for employees or as a VIP lot before the ultimate buildout is completed. The ultimate buildout will accommodate 23 aircraft.

KEY POINTS

EAST CONCEPT:

Zoning:
- Re-uses and expands the existing facilities
- Keeps passenger terminal in a separate quadrant, keeping the Fluer Drive address

New Terminal:
- Minimizes walking distances
- Orientation & building form maximizes airside and landside expansion capabilities
- Phasing will retain full operation during construction

Airside:
- 14 gate positions (Phase 1)
- 10 RON hardstands
- 3 new deice pads
- Corrected RIM issues

Landside:
- New parking garage & surface lots
- New pedestrian bridge
- New Fleur Drive entry
- Roadway improvements

Phase 2:
- 18 gate positions
- Ultimate buildout: 23 positions

1.6 Campus Zoning - South

The South Option, which was the previously selected preferred location, provides more flexibility for future expansion and ultimately can accommodate at least ten more aircraft than the East Option. However, the additional 10 contact gates would not be needed within the life cycle of the terminal building and therefore makes both sites similar for ultimate buildout potential.

The new south site will require many of the current tenants to be relocated, generating a much higher project cost than the East Option. The South Option will also require a new taxiway, which adds significantly to the project cost. Other disadvantages include:

- Disconnection of the terminal site from Fleur Drive
- Separation of the terminal site from the existing passenger garages in the East Quadrant
- Proximity of the passenger terminal to airline maintenance, GA/T-Hangars and air support sites creates un-needed congestion for vehicular and aircraft movement.

1.7 South Concept Overview

Terminal – The south quadrant option is located directly to the southeast of the previous 2012 preferred alternative site. Primary factors for this adjustment were to lower costs by reducing the amount of landside infrastructure and existing tenant/building relocation. The terminal diagram would be primarily a single loaded concourse except at the ends of the concourse. A linear terminal diagram could be utilized and easy for passenger wayfinding and airline/airport operations. All required contact gates are included. The southern site has significant grade changes, which poses additional constraints to the overall site and ultimately will increase the cost of the project. The South Option's new terminal is offset from Fleur Drive, one of the main arterial streets from downtown. This may benefit the traffic flow on Fleur, but the new site becomes disconnected from the community with its new address on Army Post Road. Views to downtown and the approach to the airport are obstructed by the other necessary facilities that will be relocated to the East Quadrant. This greatly contrasts the direct visual connection of the airside terminal in the East Option to Fleur Drive and downtown Des Moines, potentially reducing the connection to the community that the current site possesses.

Landside - This new concept is located as close to the Army Post Road as possible, which will help to minimize infrastructure costs and shorten the overall drive to the terminal. A new intersection would be required at Army Post Road with a new entry road to the terminal site. Existing parking facilities in the east quadrant can still be maintained in this concept, but this will require a shuttle to the new terminal. Additional parking (structured and surface) would also be required directly at the new terminal site in the south as well. A tunnel would connect the new terminal to the new parking structure due to the parking being located at a lower elevation on the site.

Airside – The FAA would require a new parallel taxiway along the NW/SE runway for safety purposes to eliminate aircraft taxi across the active runway. A new deice pad accommodating 3 aircraft is included on the southern quadrant. The previous preferred alternative assumed reuse of the majority of the existing cargo apron currently located at the site. In order to maintain proper slope away from the new terminal building, much of the apron from the new terminal out to the Ground Service Vehicle road would need to be replaced, thus, not saving as much of the existing pavement as once determined.

Figure 1.5 South Campus Zoning

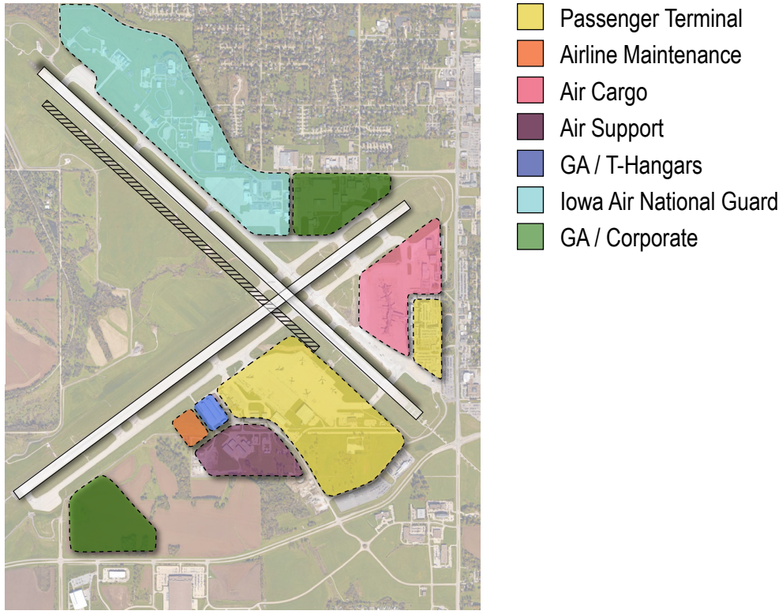
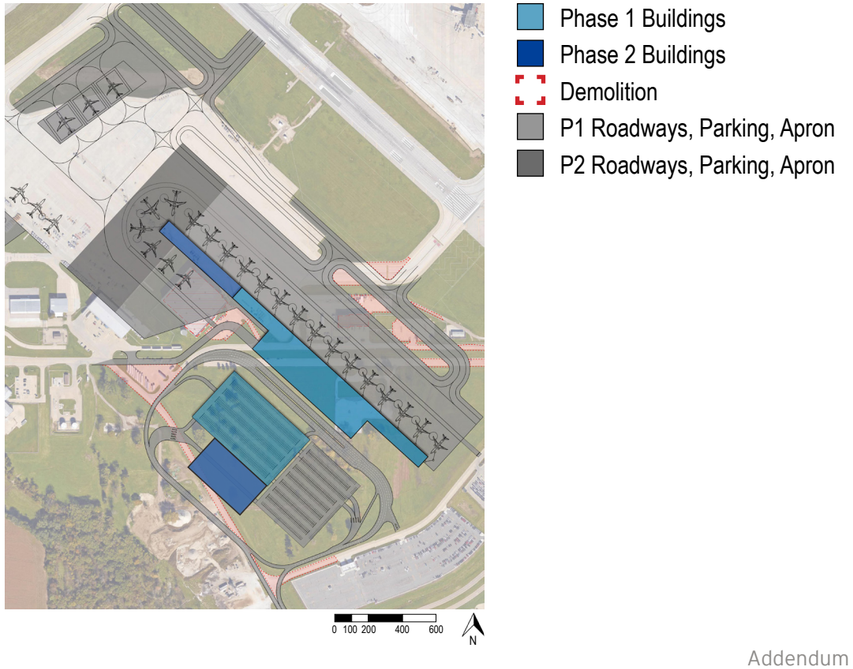


Figure 1.6 South Concept Overview



KEY POINTS

SOUTH CONCEPT:

Zoning:
- Most flexibility for future expansion
- Requires relocation of many current tenants
- More expensive option

New Terminal:
- Linear building form
- Easy way-finding for passengers
- Significant grade changes

Landside:
- Located close to the Army Post Road to minimize infrastructure costs
- Existing parking facilities can be maintained in the East Quadrant
- Additional parking directly southwest of new terminal

Airside:
- FAA requires new taxiway along Runway 13/31
- New pavement required
- 14 gate positions
- 3 deice pads

1.8 Conclusion & Next Steps

On October 11, 2016, the Board approved the East quadrant as the preferred site terminal site location. The costs for these alternatives are shown in Figure 1.8. These are program costs, which include hard construction costs and soft costs including contingency, project management and design fees, etc.

Over the next year, the Authority and HNTB Team will conduct a terminal programming study that will provide detailed requirements for the entire east quadrant program (terminal, airside and landside) that includes input from all major stakeholders. The deliverable will include a Program Definition Document (PDD) that will be a guiding document to be used by the future Design Team and Contractors.

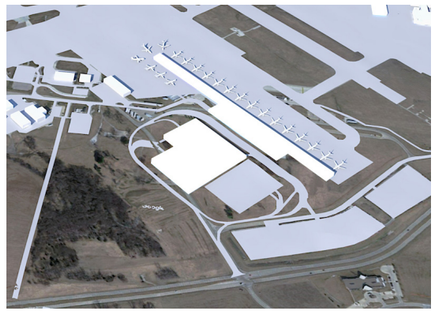
Figure 1.7 Comparison Matrix Chart

Goals	East	South
Functional / Efficient	✓	✓
Pride / Community (Connection to Fleur + Downtown)	✓	–
Future Expansion Capability (Ultimate Buildout)	– (23 Gates)	✓ (33 Gates)
Zoning (Connection to Fleur + Downtown)	✓	–
NEW Parking Required (3,346 total req'd - Phase 1)	✓ (1,269)	– (3,346)
NEW Taxiway Required	✓ (NO)	– (YES)
Avoids IANG site	✓	✓
Cost	✓	–

Figure 1.8 Total Project Cost Comparison

East Concept
$ 491,000,000

South Concept
$ 618,000,000



KEY POINTS

The East Concept has been selected for further development.

The Authority and HNTB will conduct a terminal programming study and produce a PDD over the next year.

Chapter 2

Existing Conditions

- Airport Overview
- General Findings and Approach
- Existing Iowa Air National Guard (IANG) Facilities

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2.1 Airport Overview

For 2015, Des Moines International Airport was ranked as the 84th largest passenger airport in the United States. In August 2016, the Airport was served by three mainline passenger airlines and three low-cost carrier airlines, which together provided nonstop service to 19 destinations, an increase of four destinations over August 2013. The Airport continues to be served by two national all-cargo airlines – FedEX and UPS – plus regional feeder cargo airlines.

2.2 General Findings and Approach

Existing Buildings identified in the Leigh Fisher Technical Report remain in place, with one exception. Building 36, the 12,150 square foot South Executive "T" Hangar, has been removed from the South Quadrant of the Airport (Figure 2.1.) There have been no significant changes to the functions housed in the remaining buildings.

2.3 Existing Iowa Air National Guard (IANG) Facilities

The Iowa Air National Guard continues to lease approximately 170 acres of airport property on the north side of the Airport. The current expectation is for the IANG to remain in that location. If part of that area becomes available to the Airport, future corporate aviation facilities could be located there, immediately west of the current General Aviation/Corporate area.

Figure 2.1 South Quadrant - Existing Conditions Update

KEY POINTS

- Building 36 removed

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Chapter 3

Aviation Demand Forecast

- Forecast Approach
- Forecast Summary
- Historical Aviation Activity
- Review of Annual Passenger Enplanement Forecast
- Review of Annual Passenger Departure and Fleet Mix Forecast
- Peak Activity Forecasts
- Gate and Remain Overnight Parking Requirements
- Total Aircraft Operations
- Forecast Review - Summary

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3.1. Forecast Approach

The purpose of the analysis described in this section was to perform a general review of the methodologies, assumptions and resulting forecasts in the Des Moines International Airport (DSM) Terminal Area Concept Plan (LFA Forecast) for appropriateness. The intent of the review was to identify any inconsistencies or departures in current trends from the forecasts and to provide a recommendation on whether the forecasts should be redone.

The focus of the review was on the forecast elements most relevant to the terminal plan, specifically passenger forecasts, passenger aircraft and fleet forecasts, peak activity forecasts, and contact gate and remain overnight hardstand requirements.

3.2. Forecast Summary

The economic assumptions used in the LFA Forecast published in 2014 are still applicable. Essentially, the world and U.S. economies are still growing at a moderate rate, employment is increasing and unemployment levels are steady, and inflation is under control. The airline industry is financially healthy and still practicing capacity management. Fuel prices have fallen more than expected but are expected to increase again by both the FAA and the U.S. Department of Energy.

Since the original forecast assumptions are generally sound and still applicable and the annual passenger enplanement forecast is tracking well a complete revision of the forecast is not recommended. However, some industry trends, such as changes in fleet mix resulting in increases in average aircraft size, have occurred faster than anticipated. In these instances, adjustments reflecting new base year levels are recommended.

Understanding that fluctuations in airport activity above and below long term trends have occurred in the past and are expected to continue to occur in the future, a 5 percent deviation threshold was used when evaluating the forecasts. Forecast elements for which actual (2015) activity levels were within 5 percent of the forecast were assumed to be on track and were therefore not adjusted. Conversely, forecast elements for which actual (2015) activity levels differed from the forecast by more than 5 percent were adjusted by applying the LFA forecast growth rate to the most recent actual activity level.

3.3 Historical Aviation Activity

Figures 3.1 and 3.2 provide historical passenger enplanements and aircraft operations at DSM over the past twenty-five years. Since the most recent downturn in 2008-2009, enplanements have grown rapidly. The 2016 estimate is extrapolated from data through August and currently shows a year over year growth rate of 5.1 percent. However, the rate of growth has been declining in recent months (2.1 percent in July and 2.8 percent in August) so it is likely that when 2016 is complete, the growth rate will be slightly below 5 percent.

Historical aircraft operations at DSM have been declining over the past twenty-five years. Most of the decline has been in the air taxi/commuter, general aviation, and military categories. Commuter operations have gone down as air carriers have increasingly transitioned from small turboprop aircraft to larger 50, 70 and 76-seat jets. The decline in general aviation has mirrored a national decline in general aviation activity, especially recreational and personal flying.

Figure 3.1 Historical Passenger Enplanements

Year	Passenger Enplanements (a)		Percent Change
1990	717,460		
1991	744,088		3.7%
1992	747,757		0.5%
1993	703,127		-6.0%
1994	707,204		0.6%
1995	797,797		12.8%
1996	905,405		13.5%
1997	860,230		-5.0%
1998	861,523		0.2%
1999	885,175		2.7%
2000	876,018		-1.0%
2001	820,741		-6.3%
2002	883,190		7.6%
2003	911,063		3.2%
2004	997,655		9.5%
2005	951,604		-4.6%
2006	978,907		2.9%
2007	992,059		1.3%
2008	952,152		-4.0%
2009	875,625		-8.0%
2010	914,587		4.4%
2011	959,997		5.0%
2012	1,038,484		8.2%
2013	1,104,749		6.4%
2014	1,157,235		4.8%
2015	1,180,764		2.0%
2016	1,240,983	(b)	5.1%
Compounded Annual Growth Rate			
1990-2015	2.0%		
2009-2015	5.1%		

(a) LFA, Terminal Area Concept Plan, Appenidix A, Table 3-2, and Des Moines Airport Authority Traffic Statistics.
(b) Extrapolated from January through August data.

Sources: As noted and HNTB analysis.

KEY POINTS

- Purpose: to perform general review of previous DSM Terminal Area Concept Plan
- Original forecast assumptions are generally sound and still applicable
- Adjustments made to fleet mix

Figure 3.2 Historical Aircraft Operations

Year	Commercial Air Carrier	Commercial Air Taxi/ Commuter	Commercial Subtotal	General Aviation	Military	Total	Percent Change
1990	27,426	21,575	49,001	87,908	9,229	146,138	
1991	28,228	21,728	49,956	83,429	8,619	142,004	-2.8%
1992	26,310	22,489	48,799	80,009	8,949	137,757	-3.0%
1993	27,436	23,898	51,334	71,668	7,650	130,652	-5.2%
1994	28,954	27,090	56,044	71,034	6,925	134,003	2.6%
1995	33,091	27,252	60,343	71,906	6,613	138,862	3.6%
1996	33,038	28,803	61,841	68,512	4,488	134,841	-2.9%
1997	29,333	32,872	62,205	60,752	4,174	127,131	-5.7%
1998	30,039	36,375	66,414	65,179	5,010	136,603	7.5%
1999	36,388	33,788	70,176	59,847	4,742	134,765	-1.3%
2000	34,580	33,626	68,206	54,889	4,573	127,668	-5.3%
2001	31,854	33,112	64,966	48,408	4,694	118,068	-7.5%
2002	31,759	36,239	67,998	47,316	5,201	120,515	2.1%
2003	27,961	37,685	65,646	45,360	5,357	116,363	-3.4%
2004	27,271	37,768	65,039	42,792	5,180	113,011	-2.9%
2005	23,717	37,611	61,328	41,538	3,966	106,832	-5.5%
2006	20,793	43,454	64,247	42,245	4,490	110,982	3.9%
2007	15,784	44,262	60,046	37,301	3,568	100,915	-9.1%
2008	17,761	38,161	55,922	36,981	2,955	95,858	-5.0%
2009	15,978	34,891	50,869	32,308	3,787	86,964	-9.3%
2010	15,707	31,442	47,149	32,795	3,992	83,936	-3.5%
2011	16,022	30,634	46,656	33,045	4,202	83,903	0.0%
2012	19,626	24,574	44,200	31,962	3,874	80,036	-4.6%
2013	20,514	22,617	43,131	30,432	2,882	76,445	-4.5%
2014	23,353	18,286	41,639	27,077	811	69,527	-9.0%
2015	28,354	11,402	39,756	28,075	1,556	69,387	-0.2%
2016 (b)	27,996	12,610	40,606	27,563	1,620	69,789	0.6%
Compounded Annual Growth Rate							
1990-2015	0.1%	-2.5%	-0.8%	-4.5%	-6.9%	-2.9%	
2009-2015	10.0%	-17.0%	-4.0%	-2.3%	-13.8%	-3.7%	

(a) LFA, Terminal Area Concept Plan, Appendix A, Table 5-1, and FAA OPSNET database.
(b) Extrapolated from January through August data.

Sources: As noted and HNTB analysis.

KEY POINTS

- Passengers at DSM have increased over the past five years
- Because of higher load factors and larger aircraft, operations have declined

3.4. Review of Annual Passenger Enplanement Forecast

Figures 3.3 and 3.4 provide a comparison of actual enplanement levels with interpolated levels from the LFA forecast. As shown, actual enplanements are tracking slightly higher than forecast enplanements, through August 2016. The difference is less than 5 percent however; therefore, no adjustment to the forecast is recommended. Another consideration is that oil prices are projected to recover over the next several years. This will drive air fares higher, and thereby reduce the growth in passenger demand.

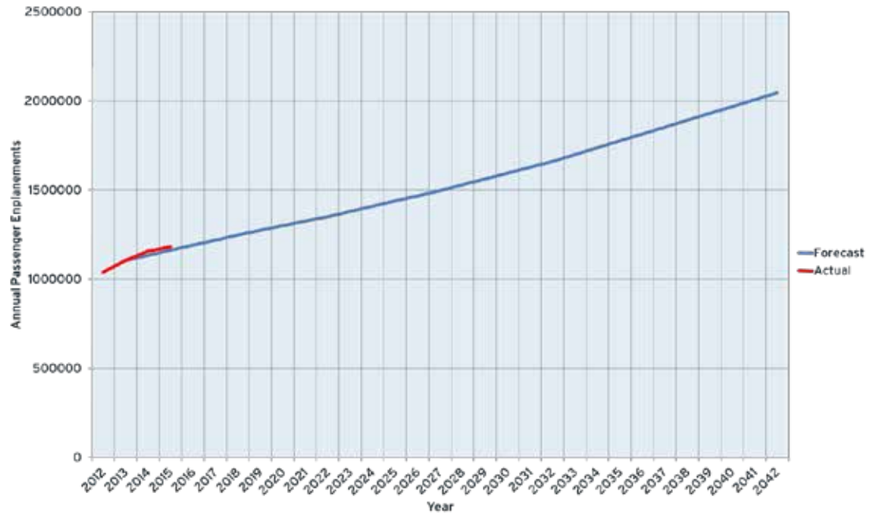
Figure 3.3 Annual Passenger Enplanement Forecast

Year	LFA Forecast (a)	Actual (b)	Variance	Recommended (c)
2015	1,162,448	1,180,764	1.6%	1,180,764
2016	1,191,298	1,240,983	4.2%	
2017	1,218,600			1,218,600
2018	1,248,997			1,248,997
2022	1,350,700			1,350,700
2027	1,497,064			1,497,064
2032	1,660,300			1,660,300
2042	2,045,117			2,045,117
Compounded Annual Growth Rate				
2015-2042	2.1%			2.1%

(a) LFA, Terminal Area Concept Plan. 2015 and 2016 interpolated.
(b) Table X.1.
(c) Since variance is less than 5 percent, LFA forecast recommended without adjustment.

Sources: As noted and HNTB analysis.

Figure 3.4 Annual Passenger Enplanement Forecast



KEY POINTS

- Annual passenger enplanements are within five percent of original forecast

3.5 Review of Passenger Aircraft Departure and Fleet Mix Forecasts

Figures 3.5 and 3.6 provide a comparison of actual passenger aircraft departures and the associated LFA forecast. In contrast to passenger enplanements, aircraft departures are tracking 9.0 percent below the forecast. Since the difference is greater than 5.0 percent, the forecast was adjusted to reflect a lower base year level as shown in the table and exhibit. The reason that aircraft departures are tracking behind LFA forecast levels is that the transition to larger aircraft, specifically the transition from 50-seat to 70- and 76-seat regional jets, is occurring faster than originally anticipated.

Figures 3.7 and 3.8 compare the actual 2015 and 2016 passenger aircraft fleet with the LFA forecast. As shown, the narrow-body aircraft projection is tracking well. However, actual large (more than 60 seats) regional jet aircraft departures are tracking significantly above the forecast whereas small (less than 60 seats) regional jet aircraft departures are tracking well below the forecast.

Figure 3.5 Annual Passenger Aircraft Departure Forecast

Year	LFA Forecast (a)	Actual (b)	Variance	Recommended (c)
2015	17,509	15,930	-9.0%	15,930
2016	17,827			16,220
2017	18,146			16,510
2018	18,465			16,800
2022	19,538			17,776
2027	20,879			18,997
2032	23,125			21,040
2042	27,616			25,126
Compounded Annual Growth Rate				
2015-2042	1.7%			1.7%

(a) LFA, Terminal Area Concept Plan. 2015 and 2016 interpolated.
(b) US DOT T100 database as compiled by DataBase Products, Inc.
(c) Since variance is greater than 5 percent, recommended forecast is LFA forecast adjusted by 2015 variance.

Sources: As noted and HNTB analysis.

Figure 3.6 Annual Passenger Aircraft Departure Forecast

Figure 3.7 Passenger Aircraft Fleet Mix Comparison

	2013	2015	2016	2017	2018	2022	2027	2032
Narrow-Body aircraft								
Forecast (a)	21.5%	*26.6%*	*29.1%*	31.6%	32.1%	34.1%	36.6%	39.4%
Actual (b)		29.3%	*33.2%*					
Difference (%)		10.4%	14.1%					
RJ More than 60 seats								
Forecast (a)	26.0%	30.4%	32.5%	34.7%	35.8%	40.1%	47.9%	55.0%
Actual (b)		47.7%	41.3%					
Difference (%)		57.0%	27.1%					
RJ less than 60 seats								
Forecast (a)	52.5%	43.1%	38.4%	33.7%	32.1%	25.7%	15.5%	5.5%
Actual (b)		23.0%	25.5%					
Difference (%)		-46.6%	-33.6%					
Total								
Forecast (a)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Actual (b)		100.0%	100.0%					

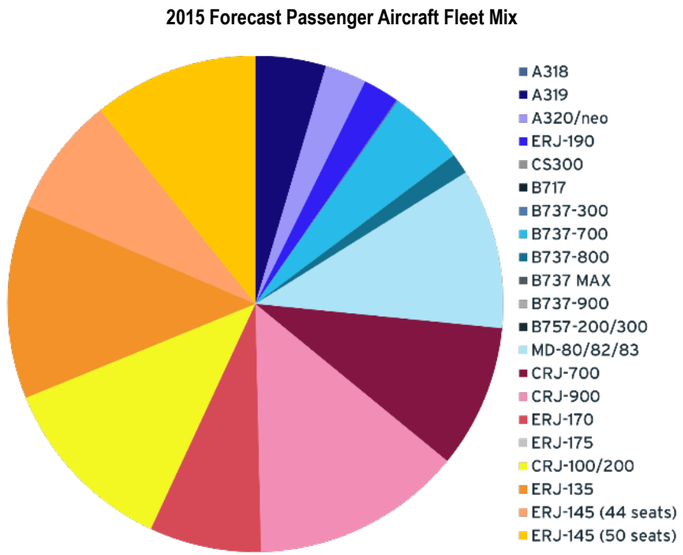
(a) Leigh/Fisher, Terminal Area Concept Plan, Appendix A, Table 6-7. Intermediate years interpolated and percentages adjusted to reflect only passenger carrier fleet.
(b) USDOT T100 annual data as compiled by Database Products for 2015 and Official Airline Guide for June 2016.

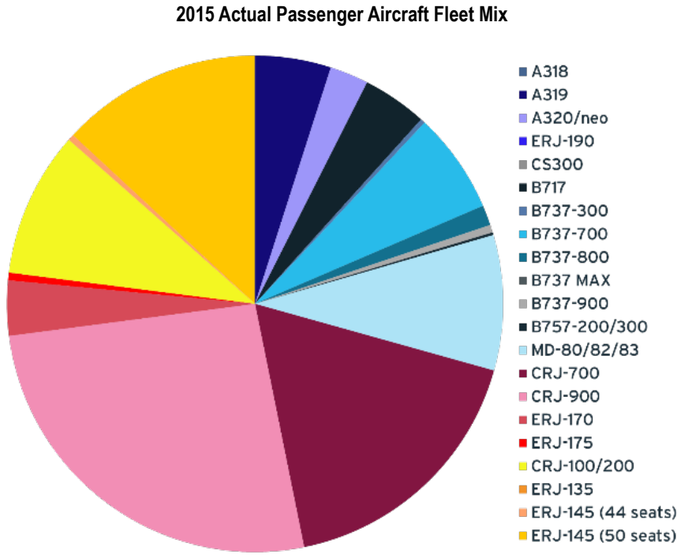
Sources: As noted and HNTB analysis.

KEY POINTS

- Accelerated change from small RJs to large RJs have resulted in reduced passenger aircraft operations
- The reduced level of operations was carried forward into an adjusted lower aircraft operations forecast

Figure 3.8 Passenger Aircraft Fleet Mix Comparison





3.5 (continued) Review of Passenger Aircraft Departure and Fleet Mix Forecasts

Figure 3.9 provides a summary comparison of the existing fleet mix along with the LFA forecast through 2032. As shown, the current mix of large and small regional jets is very similar to the mix originally projected for 2022.

Figure 3.9 Summary of Passenger Fleet Projections

	2015 Fleet		2016 Fleet	
	Projected (a)	Actual (b)	Projected (a)	Actual (c)
Narrowbody				
A318	0.0%	0.0%	0.0%	0.0%
A319	4.6%	4.9%	4.8%	9.9%
A320/neo	2.7%	2.5%	2.9%	3.2%
ERJ-190 (d)	2.3%	0.0%	3.5%	0.0%
CS300 (d)	0.0%	0.0%	0.0%	0.0%
B717	0.0%	4.2%	0.0%	5.0%
B737-300	0.1%	0.3%	0.1%	1.8%
B737-700	5.0%	6.6%	5.3%	4.4%
B737-800	1.3%	1.3%	1.7%	1.7%
B737 MAX	0.0%	0.0%	0.0%	0.0%
B737-900	0.0%	0.5%	0.0%	0.3%
B757-200/300	0.0%	0.2%	0.0%	0.0%
MD-80/82/83	10.5%	8.8%	10.8%	6.9%
Subtotal	26.6%	29.3%	29.1%	33.2%
RJ More than 60 seats				
CRJ-700	9.3%	17.5%	10.9%	12.1%
CRJ-900	13.7%	26.1%	13.6%	15.8%
ERJ-170	7.3%	3.6%	8.0%	2.4%
ERJ-175	0.0%	0.5%	0.0%	11.0%
Subtotal	30.4%	47.7%	32.5%	41.3%
RJ less than 60 seats				
CRJ-100/200	11.9%	9.5%	8.8%	12.1%
ERJ-135	12.6%	0.0%	11.2%	0.0%
ERJ-145 (44 seats)	7.8%	0.4%	7.0%	0.0%
ERJ-145 (50 seats)	10.8%	13.1%	11.4%	13.4%
Subtotal	43.1%	23.0%	38.4%	25.5%
Total	100.0%	100.0%	100.0%	100.0%

(a) Leigh/Fisher, Terminal Area Concept Plan, Appendix A, Table 6-7. Intermediate years interpolated and percentages adjusted to reflect only passenger carrier fleet.
(b) USDOT T100 annual data as compiled by Database Products.
(c) June 2016 data from Official Airline Guide.
(d) Included with RJs in Terminal Area Concept Plan.
Sources: As noted and HNTB analysis.

KEY POINTS

- Regional jets with more than 60 seats accounted for almost half of total passenger aircraft operations at DSM in 2015

3.6. Peak Activity Forecasts

The appropriate sizing of most terminal building facilities is dependent on peak period passenger forecasts. Figures 3.10 through 3.13 compare current (June 2016) peak hour enplanement, deplanements, and enplanement plus deplanements forecasts with the original projections prepared by LFA. As shown, current peak hour deplanements vary from the forecasts by less than 5 percent, and therefore the forecasts were not adjusted. Peak hour enplanements and total passengers (enplanements plus deplanements) vary from the forecast by more than 5 percent, and they were therefore adjusted to reflect the lower base year numbers.

Figure 3.10 Peak Hour Enplanement Forecasts

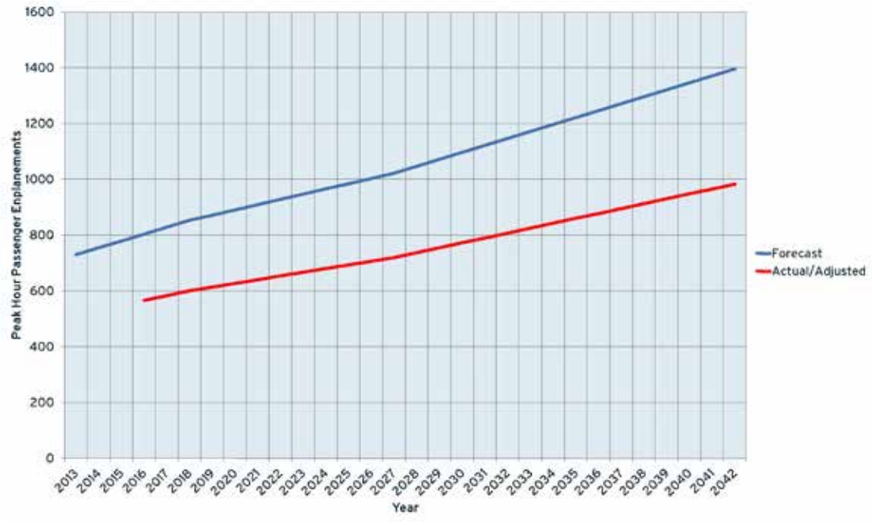


Figure 3.11 Peak Hour Deplanement Forecasts

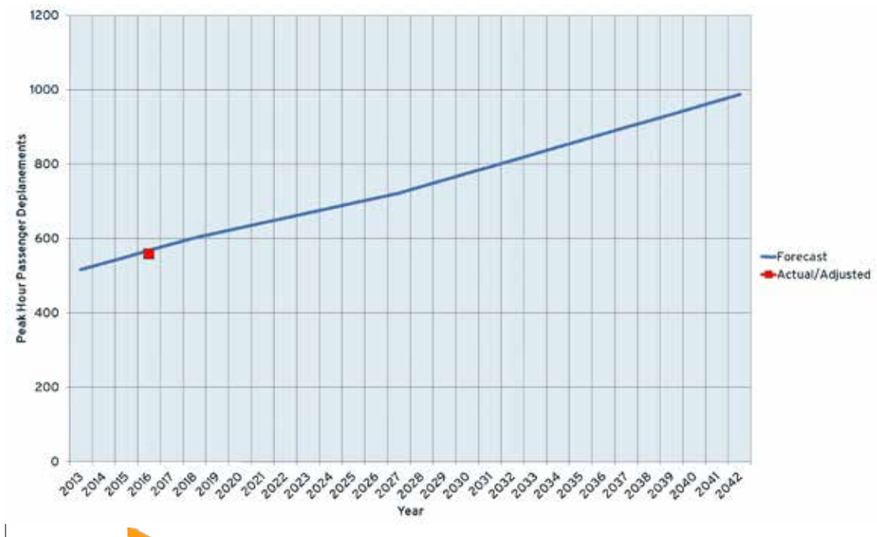


Figure 3.12 Peak Hour Passenger Movement Forecasts

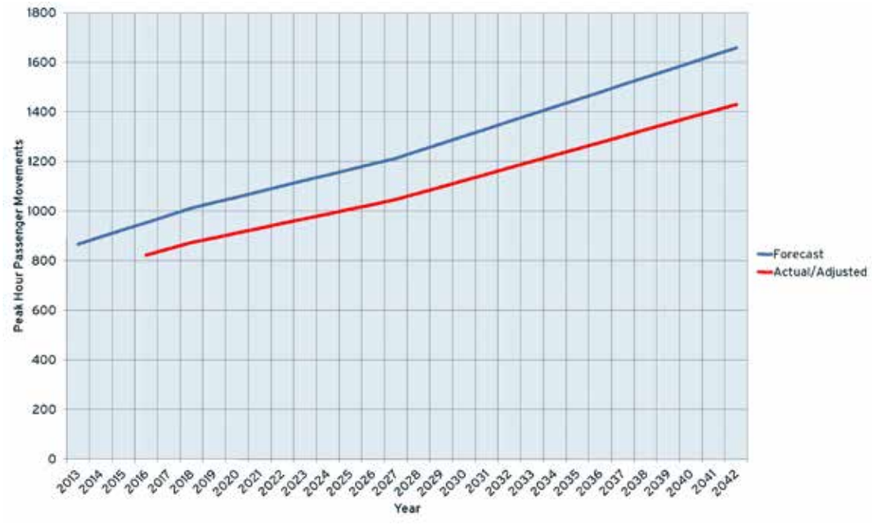


Figure 3.13 Peak Hour Passenger Forecasts

Year	Peak Hour Enplanements LFA Forecast (a)	Actual (b)	Variance	Recom-mended (c)	Peak Hour Deplanements LFA Forecast (a)	Actual (b)	Variance	Recom-mended (d)	Peak Hour Enplanements + Deplanements LFA Forecast (a)	Actual (b)	Variance	Recom-mended (c)
2015	779				550				925			
2016	804	566	-29.6%	566	568	558	-1.7%	568	954	823	-13.7%	823
2017	828			583	585			585	983			848
2018	853			601	602			602	1,012			873
2022	928			654	655			655	1,101			950
2027	1,022			720	722			722	1,213			1,046
2032	1,147			807	810			810	1,361			1,174
2042	1,396			983	987			987	1,658			1,430
Compounded Annual Growth Rate												
2016-2042	2.1%			2.1%								

(a) LFA, Terminal Area Concept Plan
(b) Estimated using Official Airline Guide schedules & peak month load factors from US DOT T100 database as compiled by DataBase Products, Inc.
(c) Since variance is greater than 5 percent, recommended forecast is LFA forecast adjusted by 2015 variance.
(d) Since variance is less than 5 percent, LFA forecast recommended without adjustment.

Sources: As noted and HNTB analysis.

KEY POINTS

- Peak hour deplanement forecasts are tracking closely
- Peak hour enplanement and total passenger forecasts were adjusted downward to reflect lower base year levels.

3.7. Gate and Remain Overnight Parking Requirements

This subsection contains a review of the LFA projected gate and remain overnight (RON) parking requirements and provides adjustments to the forecast where necessary. Gate and RON requirements depend, in large part, on the passenger aircraft departure forecast. Since actual passenger aircraft departures have varied significantly from the LFA forecast, an updated gate and RON requirement forecast was prepared based on the new aircraft departure projections. Updated base year gate and RON requirements were based on an analysis of the June 2016 airline schedules. The updated gate and RON requirement projections incorporated the following assumptions:

- Current gate use patterns would continue:
- Preferential for United, Delta, American, and Southwest
- Common use for smaller carriers
- Turns per gate will continue at 2015 levels
- Ratio of RON requirements to passenger aircraft departures will continue at 2015 levels.
- No extra allowance for charter flights or irregular operations

Figure 3.14 provides the updated gate and RON forecasts and Figures 3.15 and 3.16 compare the updated forecasts with the original estimates in the LFA forecast. As shown, the updated gate requirements are slightly lower than the original forecast. The RON requirements, however, are higher by 2042.

Figure 3.15 Contact Gate Requirements

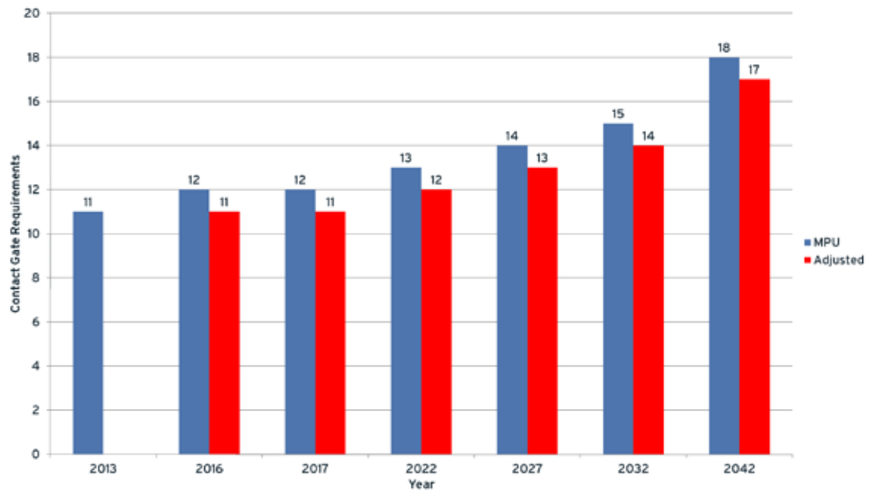
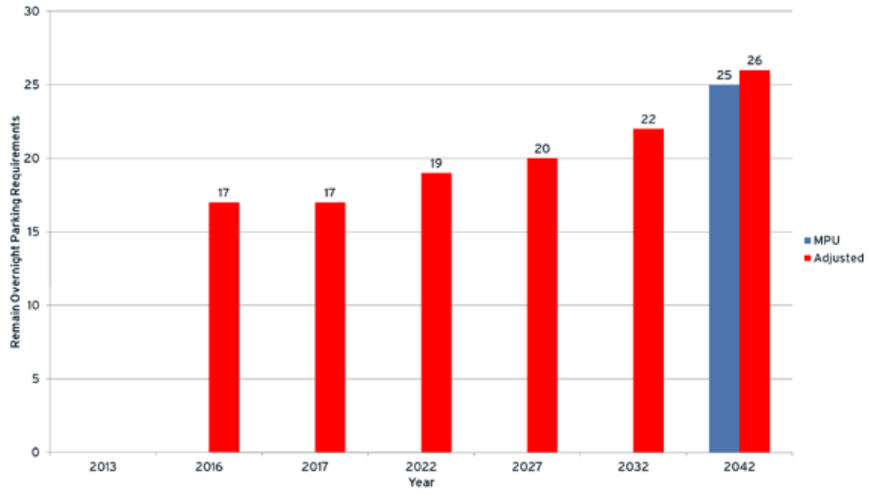


Figure 3.14 Estimated Gate and RON Requirements

	2013	2015	2016	2017	2018	2022	2027	2032	2042
Terminal Concept Plan - Original Forecast and Gate Requirements									
Passenger Aircraft Departures									
Forecast (a)	16,871	*17,509*	*17,827*	*18,146*	18,465	19,538	20,879	23,125	27,616
Contact Gates									
Forecast (a)	11	*11.4*	*11.6*	*12*	12	*13*	14	*15*	18
Daily departures per Gate (a)	4.20	4.21	4.21	4.21	4.22	4.15	4.09	4.13	4.20
RON Positions (b)	-	-	-	-	-	-	-	-	7
Contact Gates + RON Positions	-	-	-	-	-	-	-	-	25
Adjusted Forecast and Gate Requirements									
Passenger Aircraft Departures									
Adjusted Forecast (c)		15,930	*16,220*	*16,510*	*16,800*	*17,776*	*18,997*	*21,040*	*25,126*
Adjusted Forecast - Current Gate Use Pattern (d)									
Contact Gates			11	11	11	12	13	14	17
RON Positions			6	6	7	7	7	8	9
Contact Gates + RON Positions			17	17	18	19	20	22	26
Daily departures per Gate			4.04	4.04	4.04	4.04	4.04	4.04	4.04
Daily Departures per Total Parking Positions (Gates)			2.61	2.61	2.61	2.61	2.61	2.61	2.61

(a) Leigh/Fisher, Terminal Area Concept Plan, Appendix B, page 1. Intermediate years interpolated.
(b) Leigh/Fisher, Terminal Area Concept Plan Technical Report, Figure 61. RON requirements for intermediate years not available.
(c) Table X.4.
(d) Assumes airline contact gate and RON parking utilization per daily aircraft departure remain at existing levels.
Sources: As noted and HNTB analysis.

Figure 3.16 RON Requirements (Contact Gates + Handstands)



KEY POINTS

- Because of the reduced number of projected aircraft operations, the forecast of required gates has also been reduced.
- A total of 14 gates will be needed in 2032 and 17 in 2042.
- Total remain overnight (RON) parking requirements will be 22 in 2032 and 26 in 2042

3.8 Total Aircraft Operations

Figures 3.17 and 3.18 compare actual operations with the LFA forecast of operations for the major activity categories, including commercial (air carrier plus air taxi), general aviation and military. In instances where the variance was greater than 5 percent, the forecasts were adjusted by applying the original LFA growth rates to the updated base year numbers. All of the major categories were revised downwards. As a result, the updated forecast for 2032 is 80,243 operations, approximately 9 percent lower than the original LFA forecast.

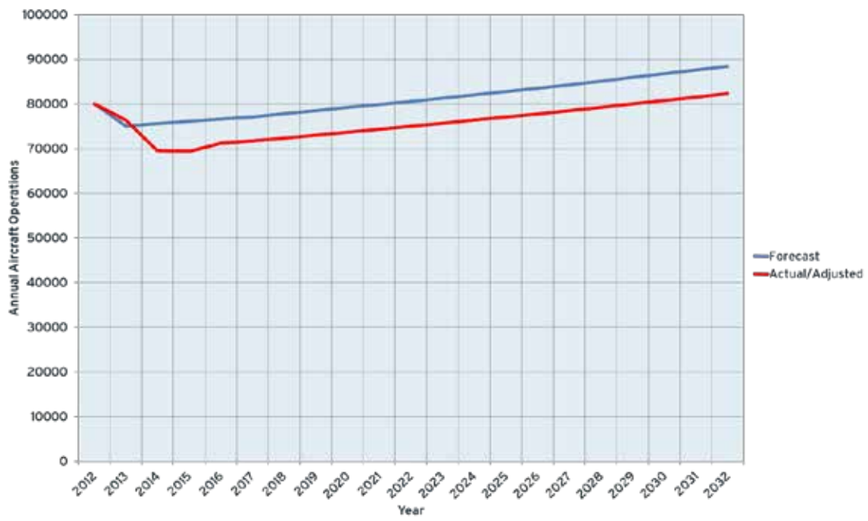
Figure 3.17 Total Aircraft Operations Forecasts

	2012	2013	2015	2016	2017	2018	2022	2027	2032
LFA Forecast (a)									
Air Carrier	19,626	21,200	*25,000*	*26,900*	28,800	*29,820*	33,900	40,400	47,800
Air Taxi	24,574	20,900	*17,850*	*16,325*	14,800	*14,360*	12,600	9,200	5,200
Subtotal Commercial	44,200	42,100	*42,850*	*43,225*	43,600	*44,180*	46,500	49,600	53,000
General Aviation	31,962	29,200	*29,450*	*29,575*	29,700	*29,820*	30,300	30,900	31,600
Military	3,874	3,800	*3,800*	*3,800*	3,800	*3,800*	3,800	3,800	3,800
Total Operations	80,036	75,100	*76,100*	*76,600*	77,100	*77,800*	80,600	84,300	88,400
Actual/Adjusted									
Air Carrier	19,626	20,514	28,354	27,996					
Air Taxi	24,574	22,617	11,402	12,610					
Subtotal Commercial (b)	44,200	43,131	39,756	40,606	40,452	40,990	43,142	46,019	49,173
General Aviation (b)	31,962	30,432	28,075	27,563	27,679	27,791	28,239	28,798	29,450
Military (b)	3,874	2,882	1,556	1,620	1,620	1,620	1,620	1,620	1,620
Total Operations	80,036	76,445	69,387	69,789	69,751	70,401	73,001	76,436	80,243
Variance									
Air Carrier	0.0%	-3.2%	13.4%						
Air Taxi	0.0%	8.2%	-36.1%						
Subtotal Commercial	0.0%	2.4%	-7.2%	-6.1%	-7.2%	-7.2%	-7.2%	-7.2%	-7.2%
General Aviation	0.0%	4.2%	-4.7%	-6.8%	-6.8%	-6.8%	-6.8%	-6.8%	-6.8%
Military	0.0%	-24.2%	-59.1%	-57.4%	-57.4%	-57.4%	-57.4%	-57.4%	-57.4%
Total Operations	0.0%	1.8%	-8.8%	-8.9%	-9.5%	-9.5%	-9.4%	-9.3%	-9.2%

(a) Leigh/Fisher, Terminal Area Concept Plan, Appendix A, Table 6-5. Intermediate years interpolated.
(b) Data for 2012 through 2016 from Table X.2. Forecasts were adjusted when 2016 variance exceeded 5 percent. Adjusted forecasts assume aircraft operations increase from 2016 estimated levels at same rate as in Terminal Concept Study.

Sources: As noted and HNTB analysis.

Figure 3.18 Total Aircraft Operations Forecast



3.9 Forecast Review - Summary

The review and analyses above indicate that the LFA forecast methodologies and assumptions are generally sound and the annual passenger enplanement forecasts are on track. Some industry trends such as average aircraft size and fleet mix have occurred faster than originally anticipated and has resulted in a lower operations and gate requirements forecast. As a result of the analysis, no adjustment is recommended for the annual passenger or peak hour deplanement forecasts. However, because there have been material variances from actual and forecast levels, adjustments are recommended for passenger aircraft operations, peak hour enplanement, peak hour passenger, and gate and RON requirements forecasts

KEY POINTS

- Total aircraft operations at DSM are expected to grow slowly and not exceed 2011 levels until after 2032.

Chapter 4

Facilities Requirements Analysis

- Ground Transportation and Parking Requirements
- Roadways and Curbside
- Rental Car Facilities and Hold Lot
- Existing and Future Critical Aircraft
- Runway Design Code
- Taxiways
- Runway Incursion Mitigation
- Airspace Considerations/ NAVAID Critical Areas
- Deicing Pad
- Design Criteria - Width of Deicing Positions
- Design Criteria - Length of Deicing Positions

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Chapter 4 | GROUND TRANSPORTATION REQUIREMENTS

4.1 Ground Transportation and Parking Requirements

Parking requirements are based on existing utilization by the parking facility, grown at the rate of expected passenger traffic growth. Overall assumptions and requirements for future 3.0 MAP and 4.0 MAP are the same as presented in the LeighFisher report including the application of a 10% circulation factor to estimate requirements from the base demand. An updated detailed breakdown of existing demand by parking facility is provided in Table 4.1. Demand is based on the average occupancies in the peak parking month of June 2015. Future public parking requirements broken out by parking type are summarized in Table 4.2. Employee parking is also estimated to increase relative to overall passenger growth. Future employee parking requirements are summarized in Table. 4.3.

Table 4.1 Existing Public Parking Utilization

	Existing Spaces	Average Percent Occupied	Occupied Spaces
Short-Term	341	62.8%	214
Long-Term	1,732	84.2%	1,459
Economy 1	848	51.9%	440
Economy 2	658	83.1%	547
Economy 3	379	68.6%	260
Economy 4 (public overflow)	300	0.0%	0
Total	4,258		2,920

Table 4.2 Public Parking Requirement

	Requirement (Spaces)	
	3 MAP (2027)	4 MAP (2042)
Short-Term	374	498
Long-Term	2,548	3,398
Economy Close-in (Lots 2 & 3)	1,409	1,879
Economy Remote (Lots 1 & 4)	768	1,025
Total Public Parking Spaces	**5,100**	**6,800**

Table 4.3 Employee Parking Requirement

	Requirement (Spaces)	
	3 MAP (2027)	4 MAP (2042)
Employee	300	400

4.2 Roadways and Curbside

Curbside requirements are based on peak hour operations. The updated passenger forecast estimates a decrease in peak hour passengers through the planning horizon. The curbside requirements have been updated in Table 4.4 to show the current curbside requirements, reflecting both existing and recommended dwell times. Vehicle dwell times, or the time a vehicle stays on the curb to load and unload passengers, has a direct correlation to the amount of curb length required. Currently the average dwell time recorded for private vehicles is 3 minutes for vehicles dropping off departing passengers and 8.7 minutes for vehicles picking up arriving passengers. If vehicle activity on the curb is restricted to active loading and unloading only through stricter enforcement the required curb length would be reduced. Table 4.4 shows the curbside requirements with a recommended 3-minute dwell time for private vehicles to represent active loading and unloading only.

Roadway requirements are consistent with the LeighFisher report.

Table 4.4 Curbside Length Requirement

	Existing Supply	3 MAP (2027)	4 MAP (2042)
Inner Curb	545 feet		
Requirement existing dwell times		550 feet	675 feet
Requirement 3 min dwell times		325 feet	400 feet
Outer Curb	571 feet	610 feet	730 feet

4.3 Rental Car Facilities and Hold Lot

Note that the number of existing rental car ready-return spaces currently provided in the terminal area has increased from 370 spaces in 2014, when the LeighFisher report was completed, to 435 spaces today.

Rental car facilities and commercial vehicle hold lot requirements are consistent with the LeighFisher report. New co-located ready-return facilities will allow efficiencies in rental car ready-return operations.

KEY POINTS

- Chapter 4 includes any changes in assumptions for Program Requirements from the previous 2014 report.
- Terminal Program Requirements will be further developed during Task Order No. 2 (Terminal Programming Study)
- Existing rental car ready-return spaces have increased since 2014.

4.4 Existing and Future Critical Aircraft

The FAA defines the critical aircraft for an airport as the aircraft representing a combination of the most demanding Airport Reference Code (ARC) with greater than 500 annual operations. DSM's existing critical aircraft is the Boeing 767-300, with an ARC passenger designation of D-IV and a Taxiway Design Group (TDG) of 5. The B767-300 has a maximum takeoff weight of 412,000 lbs and is primarily used for cargo operations at DSM. The terminal area is designed to meet Airplane Design Group (ADG) IV standards due to scheduled passenger operations by the B757-200 and other ADG IV aircraft. There is no anticipated critical aircraft change expected in the future. Table 4.5 summarizes the dimension standards of the critical aircraft.

Table 4.5 Critical Aircraft Characteristics

	B757-200 (Passenger)	B767-300 (Cargo)
Length	155.2'	180.1'
Wingspan	134.6'	156.2'
Tail Height	45.1'	52.6'
Maximum Take-off Weight	255,000 lbs	412,000 lbs
Approach Speed	137 kts	145 kts
Aircraft Approach Category	C	D
Airplane Design Group	IV	IV
Taxiway Design Group	4	5

4.5 Runway Design Code

The FAA defines a Runway Design Code (RDC) for every runway that is in the National Airspace System (NAS). The RDC identifies the existing and future design elements of a runway and is made up of three components: Airplane Design Group (ADG), Aircraft Approach Category (AAC), and approach visibility minimums for a specific runway's critical aircraft. The AAC, identifies the range of final approach speeds that can be accommodated by the runway. The ADG, is a function of the wingspan and tail height dimensions of the critical aircraft. The approach visibility minimum is defined as the approved minimum horizontal and vertical visibility that the specific runway accommodates. The RDC is written as a combination of the three elements: AAC/ADG/Approach Visibility Minimum. Table 4.6 summarizes the RDC designations at DSM.

Table 4.6 Runway Design Code Designations

Runway	RDC
5	D/IV/2400
23	D/IV/5000
13	D/IV/2400
31	D/IV/1200

4.6 Taxiways

Taxiways provide a network of pavement for aircraft to move around the airfield, connecting various airfield components and providing access to the runways and aircraft aprons. Taxiways are part of the movement area, which is an area under control by Air Traffic Control (ATC). Taxilanes connect aircraft parking positions with taxiways and are generally not part of the movement area. The geometrical design standards for taxiways and taxilanes are derived from the ADG and the Taxiway Design Group (TDG). Similar to the ADG, the FAA has defined the TDG to determine taxiway/taxilane width standards, fillet radii, and some taxiway/taxilane separations. TDG is based on the undercarriage dimensions of the critical aircraft (main gear width and main gear to cockpit distance). DSM's critical TDG is 5 which is representative of the B767-300 aircraft. The RDC defines most of the separation standards and clearance offsets. Tables 4.7 and 4.8 compare DSM's taxiway/taxilane dimensional standards.

Table 4.7 Taxiway Design Group Comparison

	TDG 3	TDG 4	TDG 5
Taxiway Width	50'	50'	75'
Taxiway Edge Safety Margin	10'	10'	15'
Taxiway Shoulder Width	20'	20'	30'
Taxiway Fillet Dimensions	variable	variable	variable
Representative Aircraft	B737-800/900	B757-200	B767-300

Table 4.8 ADG Taxiway Standards Comparison

	ADG III	ADG IV
Taxiway/Taxilane Safety Area	118'	171'
Taxiway Object Free Area	186'	259'
Taxilane Object Free Area	162'	225'
Taxiway to Parallel Taxiway	152'	215'
Taxiway to FOMO	93'	129.5'
Taxilane to Parallel Taxilane	140'	198'
Taxilane to FOMO	81'	112.5'

FOMO – Fixed or movable object

KEY POINTS

- There is no anticipated critical aircraft change expected in the future
- The airfield and terminal area is designed to meet ADG IV and TDG 5 standards

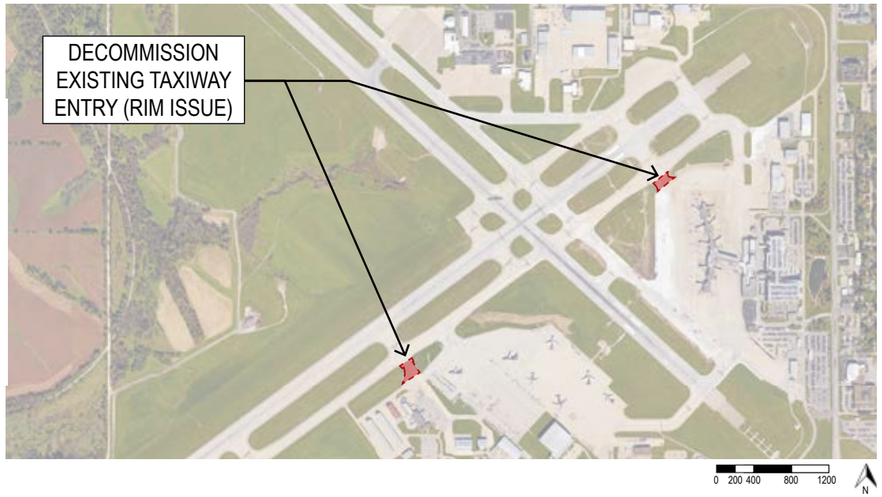
4.7 Runway Incursion Mitigation

The most recent update to the FAA's Airport Design AC 150/5300-13A, change 1, consolidated a variety of recent research findings related to airfield safety. Previously airfield safety enhancement bulletins had been published in FAA orders and engineering briefs. The research correlates existing design geometries with incursion history as well as the future trends in airfield geometry that can result in incursions and have broadly identified them as:

- Complex runway intersections
- Runways beginning near the intersection of a crossing runway
- High energy intersections
- Misaligned runway arrival thresholds
- Complex taxiway intersections
- Extra-wide taxiway pavements
- Runway crossings that lead directly into a ramp
- Direct runway crossings, and
- Entrance taxiways to runways or aligned taxiways.

The alternatives discussed further in Chapter 5 will make sure not to introduce these incompatable geometries. Figure 4.9 highlights the areas of concern.

Figure 4.9 Runway Incursion Mitigation Areas



4.8 Airspace Considerations/NAVAID Critical Areas

Imaginary surfaces such as FAR Part 77 and TERPS are used to determine obstructions to navigational airspace. The exact configuration of these surfaces vary based upon the runway's type of approach/departure. Obstructions are objects that penetrate these surfaces and there are mitigative measures such as obstruction lighting, removal, and/or relocation. To the extent feasible, future obstructions should be kept clear of these surfaces. Objects such as gated or parked aircraft, buildings, and light poles should be kept clear of these surfaces. Chapter 5 will summarize any known impacts to these surfaces.

4.9 Deicing Pad

Based on discussions with the airport, it was determined that there is a future need for up to three deicing positions. These deicing pads should be able to accommodate two ADG-III aircraft and one B757-200 aircraft simultaneously. From a demand/capacity standpoint, the alternative analysis will show a footprint for these three deicing positions. The following section explains the design criteria used to develop the template for these pads.

4.10 Design Criteria – Width of Deicing Positions

The width of each deicing position is based on Table 3-1 of Advisory Circular (AC) 150/5300-14C and assumes that the deicing area will be defined as a non-movement area during deicing events, meaning that the deicing pad will not be under direct Air Traffic control. According to the AC, the width of each parking position is dimensioned from centerline of aircraft deicing position to centerline of the adjacent aircraft deicing position. The separation distance provides for two Vehicle Maneuvering Areas (VMA) of 12.5 feet each and a Vehicle Safety Zone (VSZ) of 10 feet.

The VSZ is for parked vehicles before and after deicing operations and is defined by red crosshatched pavement markings. The VSZ is where deicing trucks would typically stage while an aircraft taxis into and out of a position. Ten feet is the minimum allowable width per the AC. A width of 10 feet allows vehicles to be parked end-to-end (based on an 8.5-foot-wide vehicle), however, a 10-foot wide VSZ does not allow added space for error under potentially dark and inclement weather conditions that are likely to be experienced at the deicing pads. Because of this, HNTB recommends 12.5-foot-wide VSZ widths to provide an additional margin of safety during deicing operations.

The width of an ADG III pad is 187 feet which allows for the 12.5-foot-wide VMA's and VSZ's. The width for the B757-200 aircraft specific pad is 207 feet.

4.11 Design Criteria – Length of Deicing Positions

The length of each position is based on the fuselage length of the most demanding aircraft expected to have regular operations at DSM plus the 12.5-foot-wide VMA's which allow service vehicles to maneuver around the entire aircraft and stay within the pad limits.

Several ADG III lengths were reviewed to protect for the longest aircraft. It was determined that the MD 90-30 length of 153 feet is an appropriate length to use for the two standard ADG III positions. Adding the two 12.5-foot-wide VMA's increases the total length of the ADG III pads to 178 feet. However, it is likely that the three pads will be collocated as is shown on the alternatives in Chapter 5. The B757-200 length is only slightly longer at 155 feet and therefore the total length of 180 feet with the added 12.5-foot-wide VMA's was used for all three deicing pads.

KEY POINTS

- There is a future need for up to three deicing pad positions
- These positions should be able to to accomodate two ADG-III aircraft and one B757-200 aircraft simultaneously.

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Chapter 5

Concept Alternatives Analysis

- Introduction
- General Findings and Approach
- Option 1 (East) Concept
- Option 2 (East) Concept
- Option 3 (East) Concept
- Option 4 (South) Concept
- East: Creating a Zoned Campus
- East Overview
- East Phase 1 - Aircraft Requirements
- East Phase 2 - Aircraft Requirements
- East Option Ultimate Buildout
- Ground Transportation & Parking Breakout
- Relocated Buildings - East Concept (South Quadrant)
- South Overall Zoning - Option 1
- South Overal Zoning - Option 2
- South Overview
- South Phasing
- South Phase 1 - Aircraft Requirements
- South Phase 2 - Aircraft Requirements
- South Ultimate Buildout
- South Parking & Ground Transportation
- South Relocated Buildings
- Master Planning Comparison
- Project Cost Comparison

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5.1. Introduction

This section of the addendum documents the analysis performed from early conceptual planning, through the shortlist process and with the final alternatives for both the south and east sites. These concepts were developed as an enhancement of the previous 2014 study, given the new constraints on the project sites. A major change to the site constraint is that the Iowa Air National Guard (IANG) is remaining in place. This means that the north quadrant is not available for relocation of the buildings from other parts of the airport.

5.2. General Findings and Approach

The approach to the revalidation process was to look at the airport campus as a whole. Given the new constraints and program requirements, a holistic look at all of the various components was reviewed. A zoned campus was created to allow for separation of public/passenger circulation from airport and airline operations. Creating this masterplan also ensures that a clear roadmap for future growth is identified, that is subdivided properly, and that the preferred terminal concept is respected beyond opening day of the terminal.

This analysis includes layout of the following general categories:

- Passenger Terminal
- Air Cargo
- Airline Maintenance
- GA / Corporate
- GA / T-Hangars
- Airport Support
- Iowa Air National Guard (IANG)

Figures 5.1 and 5.2 illustrate the zoning diagrams for the south and east quadrants.

Upon shortlist of a functional and efficient campus zoning diagram, conceptual studies for the siting of the terminal were produced. Within a charrette style worksession, the HNTB team generated site concept studies for both of the shortlisted quadrants (south and east) that include:

- Terminal
- Airside
    - Aircraft parking positions (contact and hardstand)
    - Deice pads
    - Storm water control building
    - Existing RIM (Runway incursion mitigation) issues

Figure 5.1 East Option

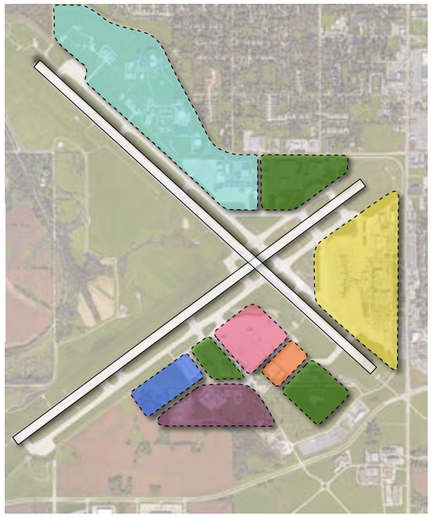
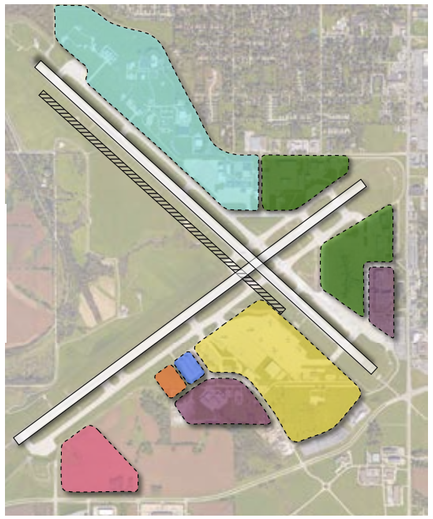


Figure 5.2 South Option



- Air Support
- GA / T-Hangars
- Iowa Air National Guard
- GA / Corporate
- Passenger Terminal
- Airline Maintenance
- Air Cargo

- Landside
    - New terminal roadway loop
    - Parking (structured and surface); includes new and existing
    - Pedestrian connections (terminal to parking)
- Phasing/Construction – initial and ultimate
- Minimizing relocation of existing buildings/tenants and infrastructure
- Avoid the Iowa Air National Guard (IANG) site on the north quadrant

Multiple concept sketches were developed and three concepts for the east and one concept for the south were shortlisted for further refinement. Figures 5.3 through 5.6 illustrate these initial concept sketches.

KEY POINTS

- The Leigh Fisher concepts are no longer feasible since they depended on the IANG Site for relocations. (Since the original 2014 report, this site has become unavailable.)
- Multiple concepts were developed and two were shortlisted.

Zoning Approach:

- Separate each of the seven highlighted categories into separate quadrants
- Enable opportunities for future growth

Figure 5.3. Option 1 (East)

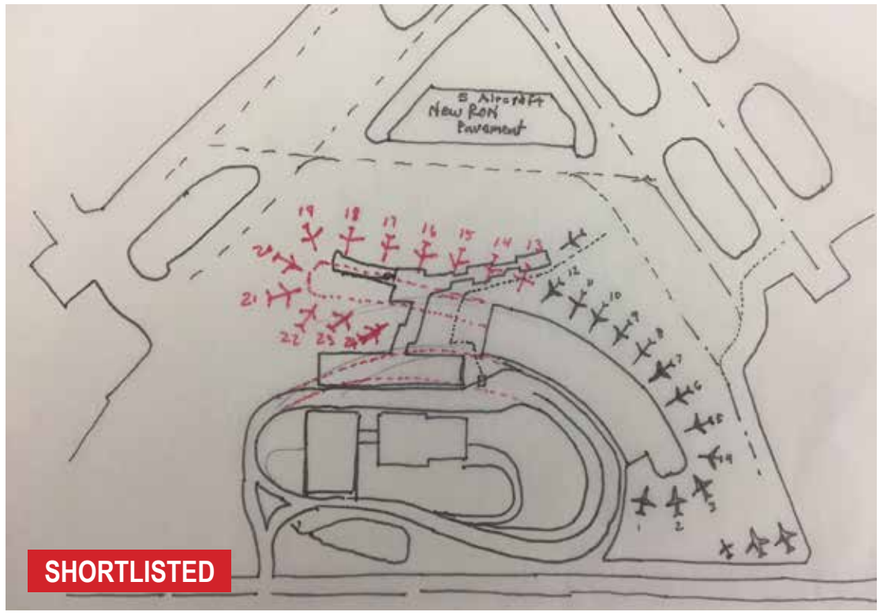


Figure 5.4. Option 2 (East)

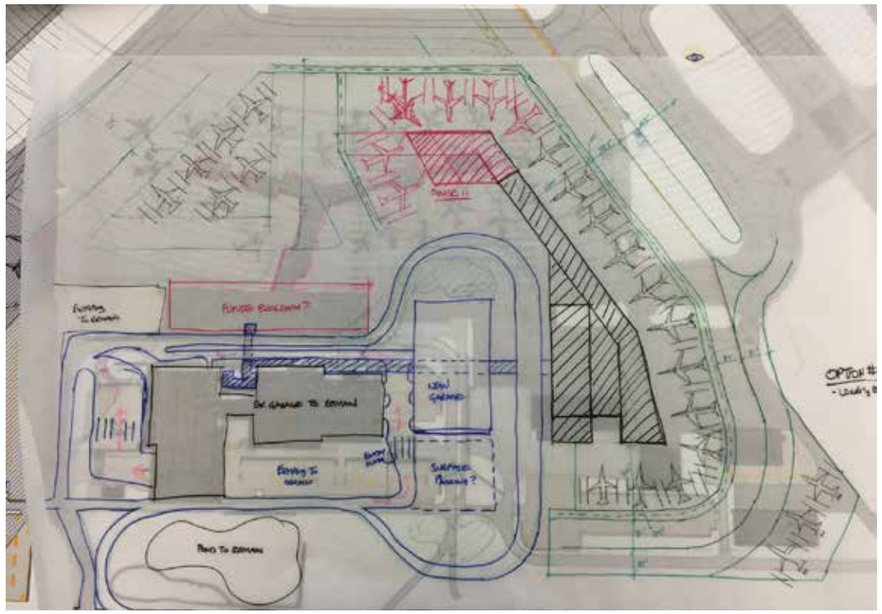


Figure 5.5. Option 3 (East)

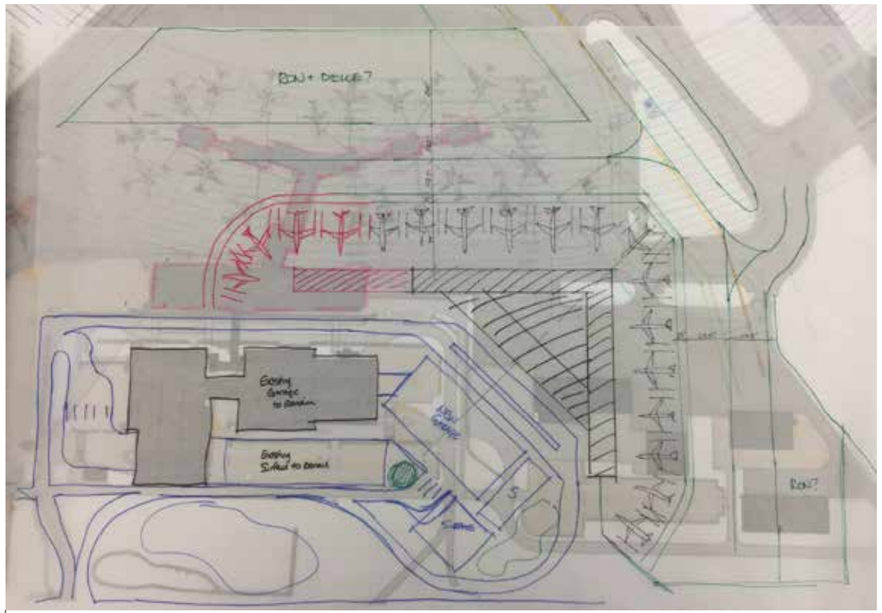


Figure 5.6. Option 4 (South)

KEY POINTS

The internal team has studied several options to determine the better uses of both sites.

1. East Quadrant (Options 1-3)
2. South Quadrant (Opiton 4)

Concepts include:
- Terminal Siting
- Roadways
- Airfield Constraints
- Future Considerations
- Initial Phasing/Construction
- Relocated Buildings
- Avoide the IANG Site

Options 1 and 4 were shortlisted for further study.

Figure 5.7. Option 1 Phase 1

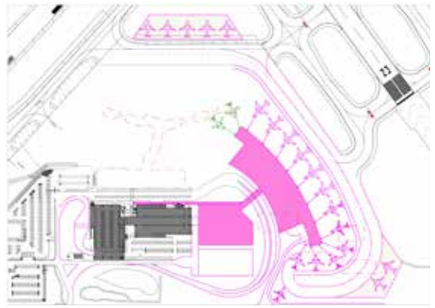


Figure 5.8. Option 1 Phase 2

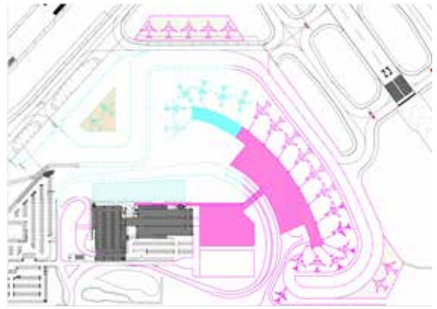


Figure 5.9. Option 2 Phase 1

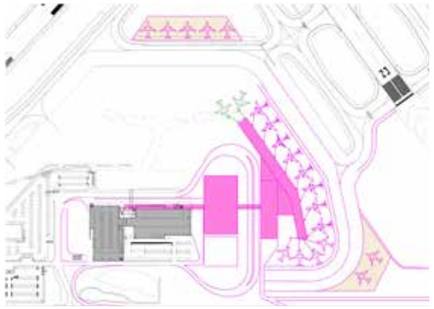
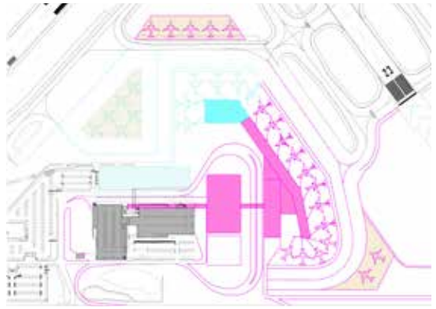


Figure 5.10. Option 2 Phase 2



5.3. Option 1 (East) Concept (shortlisted)

Figures 5.7 and 5.8 represent the first option for a new terminal complex within the East Quadrant. The orientation, placement on the site, and curvilinear form of this design makes it one of the most flexible, cost efficient and sustainable options. This site was the option most similar to the previous "preferred east alternative" produced during the 2014 study.

This concept is different than the previous study site as it allows the existing terminal to remain operational during construction and the new terminal could be constructed in one phase which is critical to efficiency, operations and passenger level of service. Additionally, the placement of the building provides a visual connection to downtown Des Moines (north), which helps with wayfinding for passengers driving to the airport. The building form accommodates the fourteen aircraft required for Phase 1 (the last two aircraft gates will open after the existing Concourse C is demolished) and will extend to eighteen gates once Phase 2 is complete. The ultimate buildout will be constructed from the southeast end of the concourse utilizing the existing concourse area.

This option provides a direct, easy connection for passengers to and from the new and existing parking garages. The departing passengers will enter through a central location in the building and will have minimal walking distances to their gates. The new terminal roadway loop is also maximized for future parking potential.

This is a sustainable option because it attempts to reuse existing utilities, parking structures, apron and taxiways to the full potential.

This option was shortlisted because of its flexibility, cost efficiency, and ability to re-use existing facilities.

5.4. Option 2 (East) Concept

Option 2 for the east quadrant terminal design offers similar benefits to that of Option 1. Its site placement and orientation are advantageous for wayfinding, cost-savings, and operations. However, figures 5.9 and 5.10 display a more linear building form. Future phases will then bend the concourse to the south in the area of the existing concourses. One advantage to this diagram is the straight, intuitive path of travel from the parking garages to the landside terminal (direct path north to south). However, the entry point is no longer central to the overall form and walking distances to each of the gates vary. In addition, this form's landside expansion capability is obstructed by the adjacent roadways and has slightly less landside parking capacity potential in the future.

This option can support fourteen aircraft for Phase 1 with two of the positions opening after the existing concourse C is demolished. Four more aircraft will be added in Phase 2, totaling 18 gates for this terminal option. Ultimate buildout capabilities have not been studied for this option.

Like Option 1, this design will be able to reuse existing utilities, parking structures, apron and taxiways.

This concept was not shortlisted because it does not have the flexibility to expand its landside terminal and the ultimate concourse form was not as elegant and intuitive from a passenger circulation point of view.

KEY POINTS

Option 1 (East)
- Curvilinear Scheme
- Best flexibility for future Landside expansion
- New 14 gate terminal building built in one phase (last 2 aircraft gates open after existing Concourse C demo)
- Easy wayfinding path from garages to terminal

Option 2 (East)
- Linear Scheme
- New 14 gate terminal building built in one phase (last 2 aircraft gates open after existing Concourse C demo)
- Easy wayfinding from all garages to terminal
- Shortest walking distances

Figure 5.11. Option 3 Phase 1

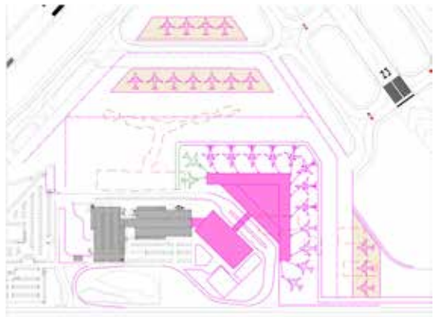


Figure 5.12. Option 3 Phase 2

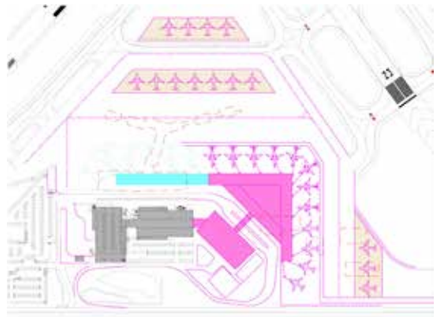


Figure 5.13. Option 4 Phase 1

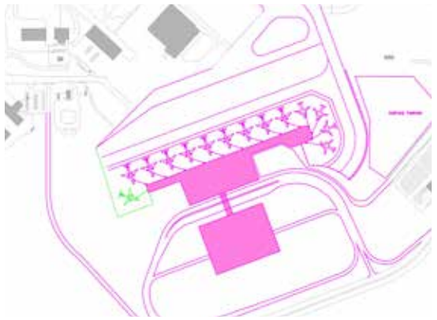
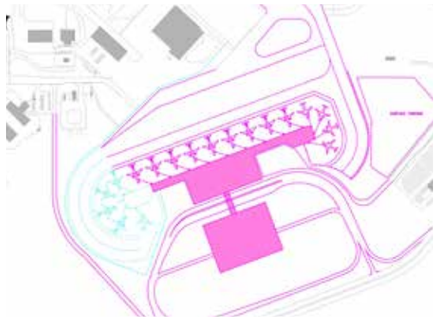


Figure 5.14. Option 4 Phase 2



5.5. Option 3 (East) Concept

Figures 5.11 and 5.12 show the third concept for the East Quadrant. The main advantage of this design is the existing terminal can remain fully operational during construction. In the first and second East Quadrant options, all of the east gates at the existing Concourse C would need to be closed when the phased apron work is completed, but remain operational during the majority of the overall construction period which was a large advantage to this scheme. This scheme also required the least amount of apron repaving, grading and other civil work. From an interior planning perspective, the scheme allows for the largest central concession core with the closest walking distance to the gates. All gates would have great visibility to the central concession core which would maximize revenue generation for the airport.

However, there are several disadvantages to this design. Although the form can still accommodate the same amount of aircraft as the previous two options, the building would constrict the landside site considerably, disabling any expansion capabilities. The passenger pick-up and drop off curbs are also very limited in length.

Construction for Phase 2 cannot begin until the existing landside terminal is completely demolished. The building shape is inefficient for the site because the ultimate south expansion accommodates less potential contact gates. Additionally, there would be a considerable amount of unused apron space west of the new terminal. However, this design can accommodate for 14 RON positions, which is several more than both of the other east options.

This option was not shortlisted because of the constrictive nature of the building form.

5.6. Option 4 (South) Concept (shortlisted)

The fourth option provides a completely different design approach. Instead of re-using the existing campus, this concept places the new terminal in the south quadrant similar to the previously selected preferred alternative from 2014. The new site offers numerous advantages, including the most flexibility, most expansion capability, and no impacts to the existing passengers. The phasing for this option is far less complicated because construction can be completed without impacting the existing facility. The site itself is larger than the site in the east, so the new terminal could eventually hold 33 aircraft – 10 more than any of the options in the east. Wayfinding for passengers is simple and easy once on the campus, but the address is no longer on the main arterial street connecting to the downtown area.

The concept was developed in an attempt to minimize the additional landside infrastructure required in comparison to the previous preferred alternative. While this was accomplished, the scheme did not take into account the large “canyon” or steep topography as you develop directly north of Army Post Road.

Other disadvantages of this option include the inability to re-use existing structures, utilities and apron space. Many of the existing airline operations and maintenance buildings in the south quadrant would need to be demolished and relocated. Because this site is south of the existing runway, a new taxiway would be needed to move planes safely and efficiently to the new terminal. Consequentially, this option would be considerably more expensive than any of the east options.

This option was ultimately shortlisted in concept, however, it was reworked in further iterations to avoid the topography issues as currently shown.

KEY POINTS

Option 3 (East)

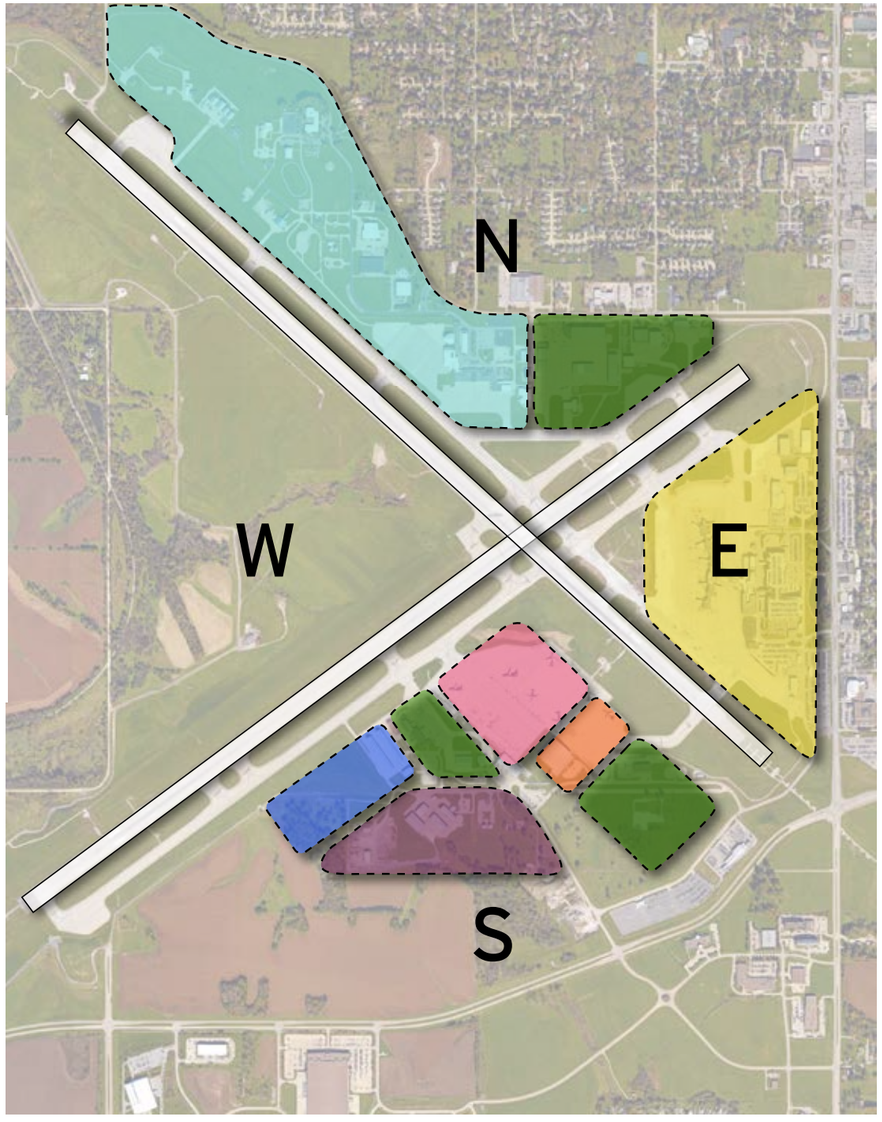
- Linear Scheme
- Offers most use of existing terminal during construction
- New 14 gate terminal built in one phase (last 2-3 aircraft gates open after existing Concourse C demo)

Option 4 (South)

- Linear Scheme
- Flexibility
- New 14 gate terminal building built in one phase
- No impacts to existing operations/ passengers
- Least reuse of existing infrastructure
- Most expensive option

East Concept | 5.7 - 5.13

Figure 5.15. East Overall Zoning



5.7. East: Creating a Zoned Campus

The first step in developing the East concept was to look holistically at the entire airport campus. Segregating dis-similar functions helps to eliminate conflicts in circulation (airfield and vehicular). The creation of a "zoned" campus was developed with all quadrants. One of the main advantages of the East Option is that little modification is needed to re-zone the airport's campus. The following represents a description of the overall campus diagram and is illustrated on Figure 5.15.

West Quadrant – The quadrant is topography challenged and was deemed inappropriate due to the amount of utility and infrastructure relocation required.

North Quadrant – This quadrant is ultimately constrained by residential neighborhoods to the north. The newest constraint on the planning study was the requirement to retain the existing Iowa Air National Guard Site. The existing Corporate/GA campus will also remain. The new concept does not anticipate any impact to the north quadrant area.

East Quadrant - All of the passenger terminal functions are collected within the East Quadrant, nested between Runways 5/23 and 13/31 and Fleur Drive. Keeping all of the passengers in the East Quadrant is an advantage for several reasons: it separates and organizes airport functions, minimizes walking or travelling distances for passengers, and retains the connection to downtown via Fleur Drive. The existing GA campus on the northern portion of the east quadrant would move to the south quadrant to allow for the entire quadrant to be used for passenger/terminal functions.

South Quadrant - The southern boundary for the airport is Highway 5 (Army Post Road), so there is a substantial amount of room within the South Quadrant for its facilities to expand. This option includes an area for a future GA/Corporate campus (indicated in green in Figure 5.15) to the east side of the South Quadrant. The relocation of the DSM Flying Services Hangar, Signature Maintenance Building, Signature Storage Hangar and Signature E Office/Hangar to the South Quadrant is shown located in the west green area. GA / T-Hangar expansion is indicated in blue, and its placement provides ample room for expansion to the southwest. The airline maintenance building will remain.

KEY POINTS

OVERALL ADVANTAGES:
- Avoid the IANG Site
- Separate terminal functions

WEST:
- Deemed inappropriate for construction.

NORTH:
- Reserved for the IANG site & existing Coporate/GA campus.
- New Concepts do not alter this quadrant.

EAST:
- Terminal Functions Only

SOUTH:
- Relocated Signature, DSMFS & Hondajet with other GA/ Corporate future facilities
- Cargo maintained
- Airline Maintenance
- GA/ T-Hangars can expand

5.8. East Overview

Option 1 represents the shortlisted concept for the East quadrant. Option 1, as shown in Figures 5.16 and 5.17, has a curvilinear facade and utilizes existing East Quadrant site amenities.

Terminal - Refinements to this concept include the site orientation/rotation from the initial concept to be nearer to the existing terminal so that walking distances to and from the parking garages could be minimized. This slight rotation maximizes the landside area for future growth without intercepting any of the new roadways. It also places the southern end of the new concourse as close as possible to the existing concourses, while still maintaining proper construction clearances. This will assist with the phasing of the concept.

Airside - This design integrates 14 gate positions at the completion of Phase 1 and 10 Remain Over Night (RON) hardstands. It corrects the Airfield Runway Incursion Mitigation (RIM) problem while taking advantage of the added room for the three new deice pads and four RON positions on the east side of the site (see figure 5.16) while avoiding the containment site.

Landside - Phase 1 also includes the construction of a new parking garage adjacent to the existing garage, which will hold approximately 870 spaces for rental and short term parking. A new pedestrian bridge (shown in green) will safely connect passengers flowing to and from the new terminal, and a route (shown dashed in yellow) will be provided for passengers to get to the bus stop located on Fleur Drive. Additionally, Phase 1 incorporates a new entry from Fleur Drive, a new entry plaza to segregate parking, a new roadway loop and curb in front of the landside terminal, a new long term lot, short term hourly lot, an exit plaza and a new loading dock off of the NE Service Road.

Phase 2 – Phase 2 expansion would be an extension of the uniform curve set in place by Phase 1. Phase 2 will include new concourse space, hold rooms, restrooms, concessions and apron space. Four more aircraft gates will be added with the new extension. A new parking lot south of the landside terminal can be utilized for employees or as a VIP lot before the ultimate buildout is completed. The ultimate buildout will accommodate 23 aircraft.

Figure 5.16. East Overall - Phase 1B Complete

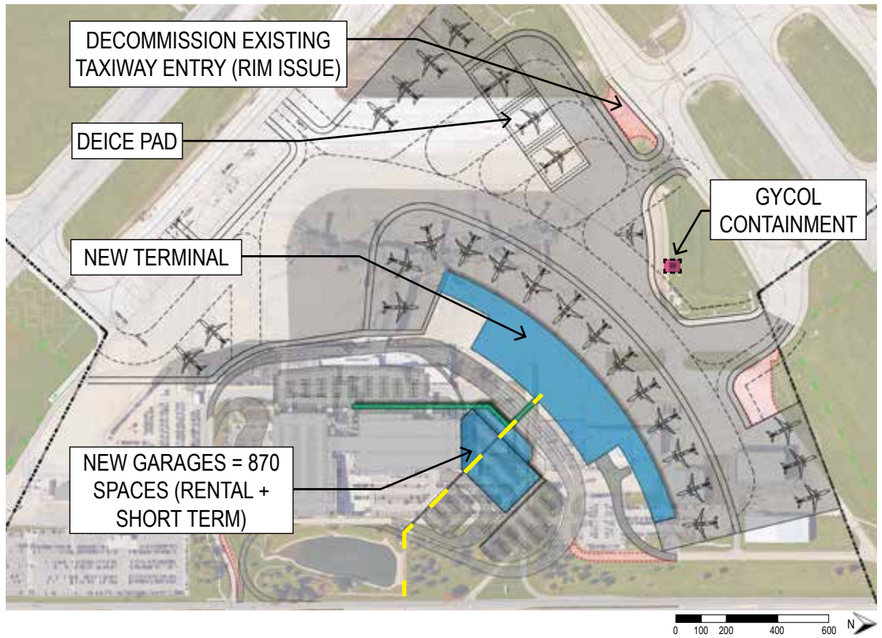
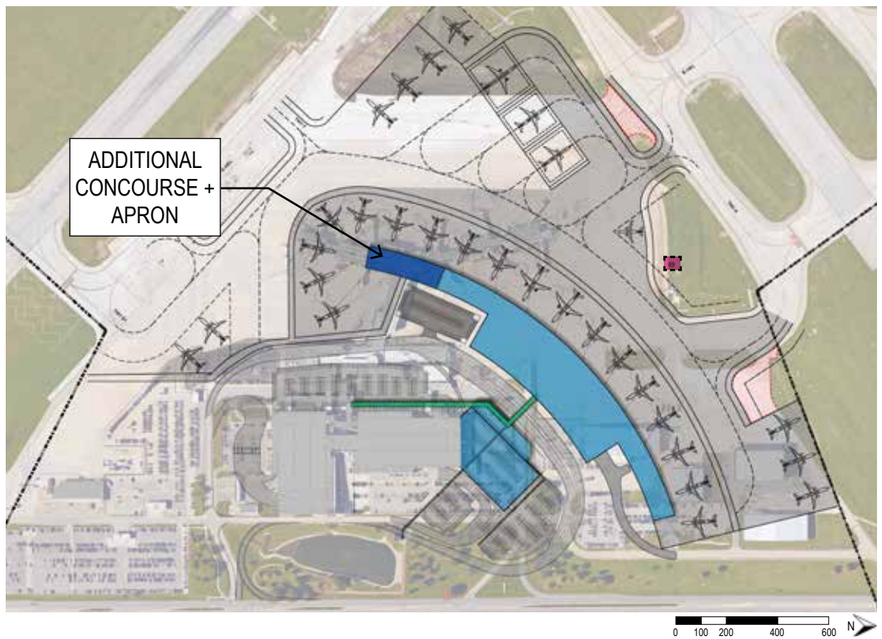


Figure 5.17. East Overall - Phase 2 Complete

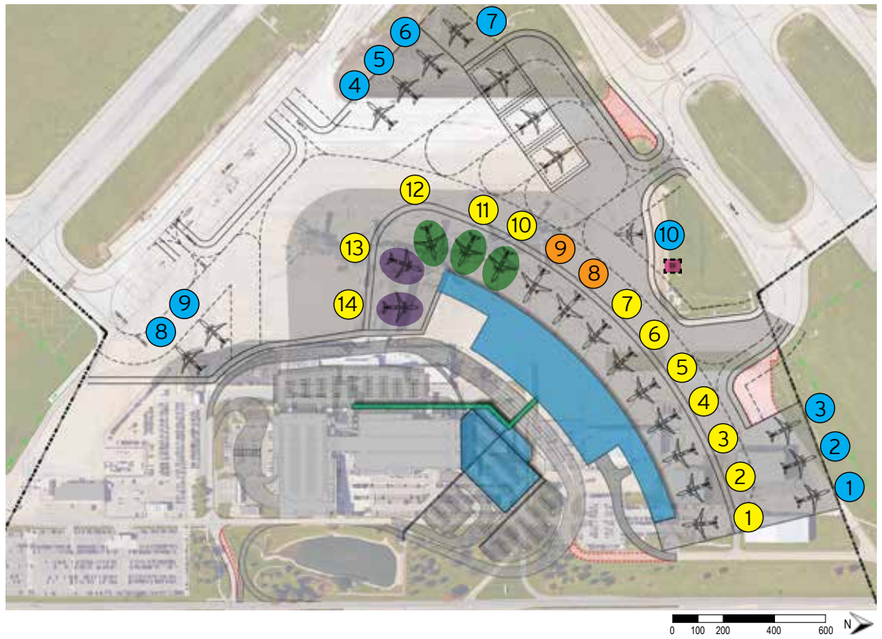


KEY POINTS

Option 1 (East)

- Relocates new terminal building as close to existing terminal as possible to minimize walking distances to parking
- Contains all required contact and RON positions
- New Deice Pad & maintains existing containment tank
- Corrects Airfield RIM issues
- Maximizes Landside Area for future growth
- Flexible airside for future expansion

Figure 5.18. East: Phase 1B - Aircraft

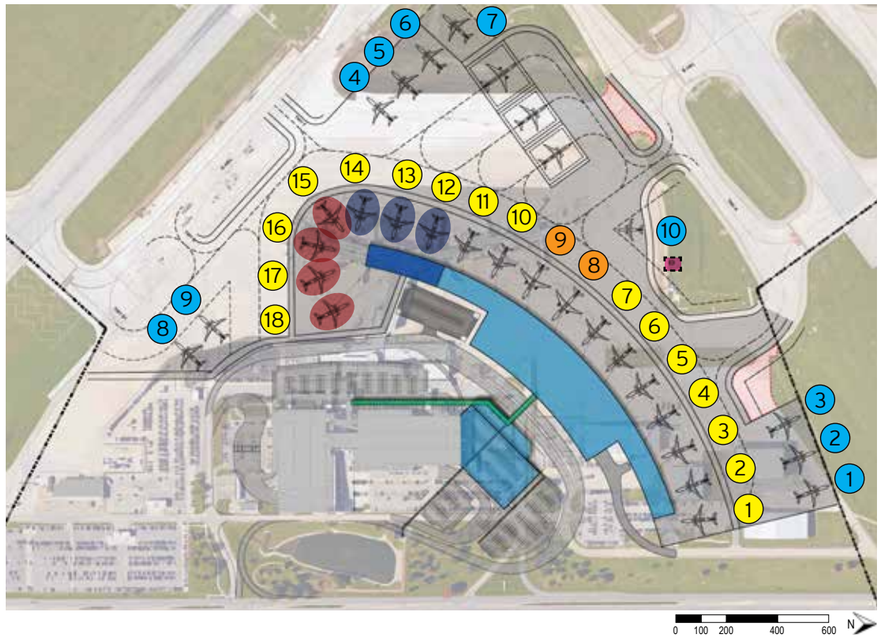


- 737-900/ A321
- 757-200 (Group IV)
- Hardstand Positions
- PHASE 1B - 3 Additional Jetbridges + Apron
- PHASE 1C - Final 2 Jetbridges + Apron

5.9. East Phase 1 - Aircraft Requirements

The construction phasing for this design option will affect the availability of certain gate positions. While the existing Concourse C is being demolished, only the first 9 positions shown in Figure 5.18 will be operational. A temporary conditioned walkway/bridge would connect the new concourse to the existing concourse to provide the required contact gates during Concourse C demolition/apron paving. Existing Concourse A would continue to be utilized but all passengers would still process from landside (ticketing, security checkpoint and baggage) within the new terminal. The existing terminal will be replaced with new apron pavement in phases, first in Phase 1B, allowing positions 10 – 12 to be opened and then in Phase 1C, gates 13 and 14 will expand the aircraft capacity to 14 positions. This first phase will host the larger Group IV planes (for example, B757-220s) at gate positions 8 and 9. This option has room for 10 RON hardstands and three deice pad positions.

Figure 5.19. East: Phase 2 - Aircraft



- 737-900/ A321
- 757-200 (Group IV)
- Hardstand Positions
- PHASE 2 - Rotated Aircraft Positions
- PHASE 2 - New Aircraft Positions

5.10. East Phase 2 - Aircraft Requirements

Phase 2 requires 17 gate positions minimum, and the concept design provides 18. When the concourse is expanded to the south, positions 12 through 14 will rotate to align with the elongated curve of the building's east façade. Four new gates (15 through 18) can be added as a part of the expansion. They will curve around the new terminal's south end as shown in Figure 5.19. During this phase, the East Quadrant can still accommodate 10 RON hardstands as well as the 3 deice positions.

KEY POINTS

Phase 1A-B

- 13 Contact Gates Required
- 14 Gates Shown

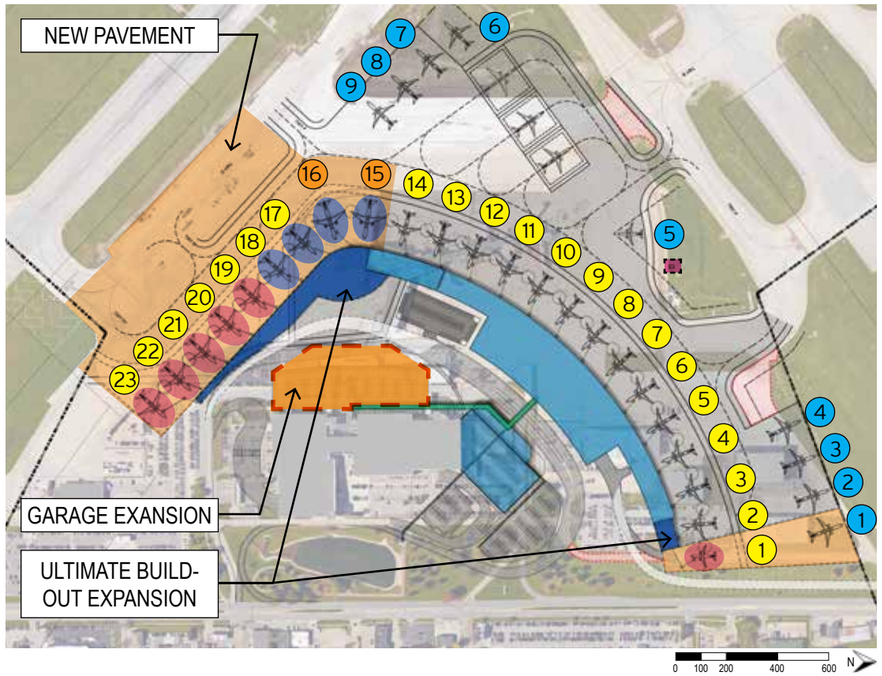
- Min. RON Hardstands required: 7
- 10 Hardstand Positions Shown

Phase 2

- 17 Contact Gates Required
- 18 Gates Shown

- Min. RON Hardstands required: 9
- 10 Hardstand Positions Shown

Figure 5.20. East: Phase 1B - Aircraft



- 737-900/ A321
- 757-200 (Group IV)
- Hardstand Positions
- PHASE 2 - Rotated Aircraft Positions
- PHASE 2 - New Aircraft Positions

5.11. East Option Ultimate Build-out

While planning the East concept, it is important to include provisions for the ultimate buildout. Essentially, how many gates can fit on the site before a new terminal would need to be developed. The ultimate contact gate count for the East concept is 23 aircraft. It is anticipated that this will maintain proper level of service until approximately 2060. At that point the terminal would reach the end of its practical life cycle and a new site would need to developed either way.

The area in orange represents the new apron pavement required to meet pavement slope criteria. The new addition will take over the hardstand positions 8 and 9 shown in previous diagrams but one of those can be relocated to the north to retain nine RON hardstands. Further runway and taxiway improvements may be required at this time.

The final expansion will extend mainly from the south side of the terminal and will grow the number of hold rooms, concessions, restrooms, and airline operation spaces available to the airport. The sharp curve will provide ample space for larger Group IV and V aircraft at positions 15 and 16 and altogether, the south expansion will house five new gate positions indicated in red.

A small addition to the northern tip of the airside terminal can accommodate one additional Group II aircraft. The new apron space for the north expansion will also supply room for another RON hardstand. It should be noted that this will be costly apron work as the site has a significant slope change as it goes to the east towards Fleur Drive.

The curvilinear façade for this concept is advantageous for the expansion capabilities within the landside site. The roadways and curb fronts can be expanded southwest, so that room for the new parking garage indicated in dashed orange on the plan can be constructed. This new garage will sit directly west of the pedestrian bridge indicated in green, making wayfinding to the landside terminal simple and the connection for passengers safe.

KEY POINTS

Approx. maximum year: 2060

- 23 Gates shown
- 9 Hardstand Positions shown

- Will require additional airside pavement replacement to meet required slope criteria.
- Potentially require partial runway/ taxiway improvements.
- Coordinate with future airfield projects.

5.12. Ground Transportation & Parking Breakout

To accommodate all of the required parking in Phase 1 of the terminal development, new parking will be required within the terminal area. Figure 5.21 summarizes the parking provided in the east alternative. All economy lots will remain and a new four level parking structure will be constructed across the curbside from the terminal, accommodating 694 short-term parking spaces on levels 2 through 4 and 176 rental car ready-return spaces on level 1 (Figure 5.22). The structure will connect to the existing north and south garages, as shown on Figure 5.23, which provide 1,618 long-term parking spaces. A new short term surface parking lot (Figure 5.24) serving hourly, meeter-greeter and well-wisher parkers would be located adjacent to the structure with easy access to the terminal. The existing surface lot behind the north garage will remain and be expanded as shown in Figure 5.25, with an additional surface lot provided to the west once the existing terminal and curbside are removed. The lower levels of both the existing north garage and the new garage will be dedicated to rental car parking, providing approximately 421 spaces. All parkers and rental car customers will enter through a single entry plaza located off the entry road prior to the terminal curbside. All public parkers will exit on the south side of the terminal complex through a realigned exit plaza and rental car customers will exit the first floor of the garage directly onto the outbound roadway immediately past the terminal curbside.

The east terminal is located over the current employee parking lot and a new remote lot will be required to accommodate the employee parking demand. These spaces could be accommodated in Economy 1 or 4 until public parking demand increases and those spaces are

Figure 5.21

	Required 3 MAP	Existing	New	Total Existing and New
East Terminal Area				
Short-Term (surface)	*374*	-	120	120
Short-Term (structured)		-	694	694
Long-Term (surface)	*2,548*	214	279	493
Long-Term (structured)		1,618	-	1,618
Rental Car Ready-Return (structure	*420*	245	176	421
Sub-total Terminal Area	***3,342***	***2,077***	***1,269***	***3,346***
Economy 2 & 3	***1,409***	**1,037**		**1,037**
Remote				
New remote				-
Economy 1 (surface)	*768*	848		848
Economy 4 (surface)	-	300		300
Employee (surface)	*300*	-		300
Sub-total Remote	***1,068***	***1,148***		**1,448**
Total	**5,819**	**4,262**	**1,269**	**5,831**

Figure 5.22. New Short Term Parking Structure

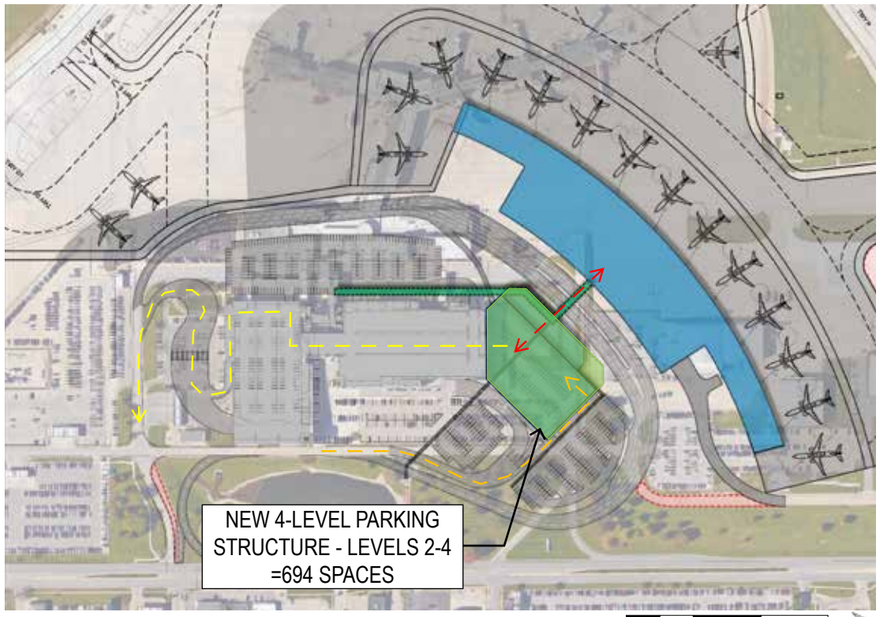
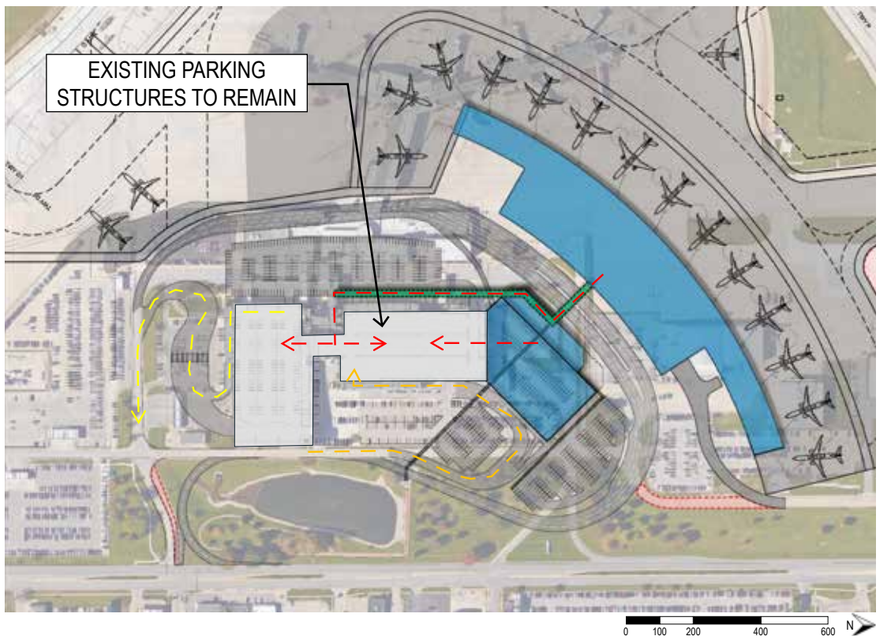


Figure 5.23. Long Term Structured Parking



KEY POINTS

- Additional parking required for Phase 1
- All economy lots to remain
- New four level parking structure: 694 short term spaces; 176 rental car ready-return spaces
- Existing parking structures to remain; connects with new structure.

Pedestrian Access

Parking Entry

Parking Exit

Figure 5.24. New Short term (Hourly) Surface Parking

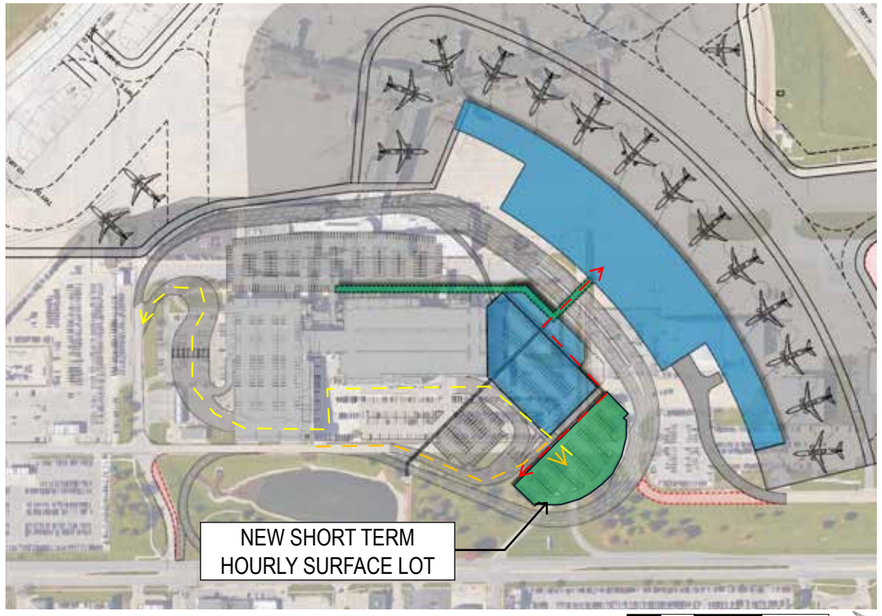


Figure 5.25. Long-Term Surface

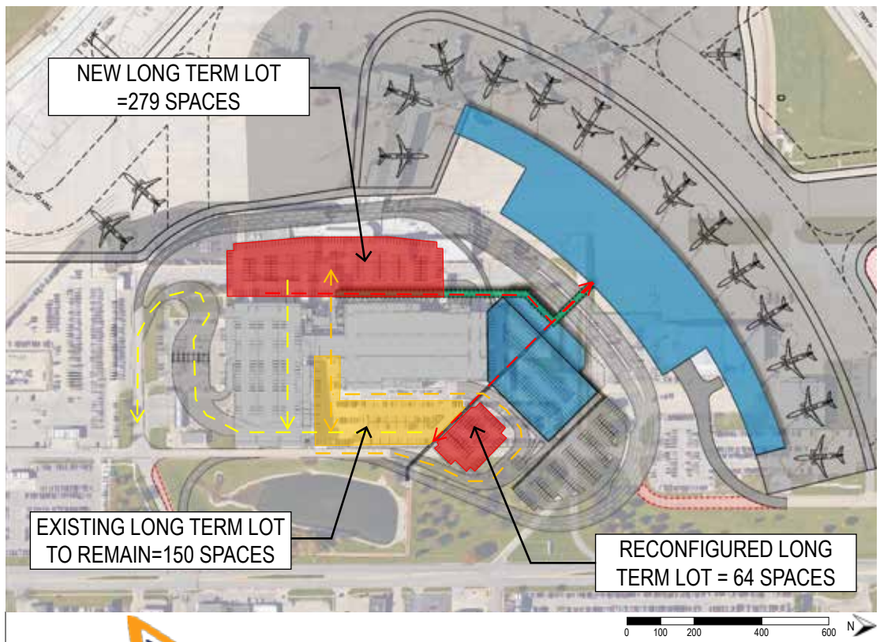
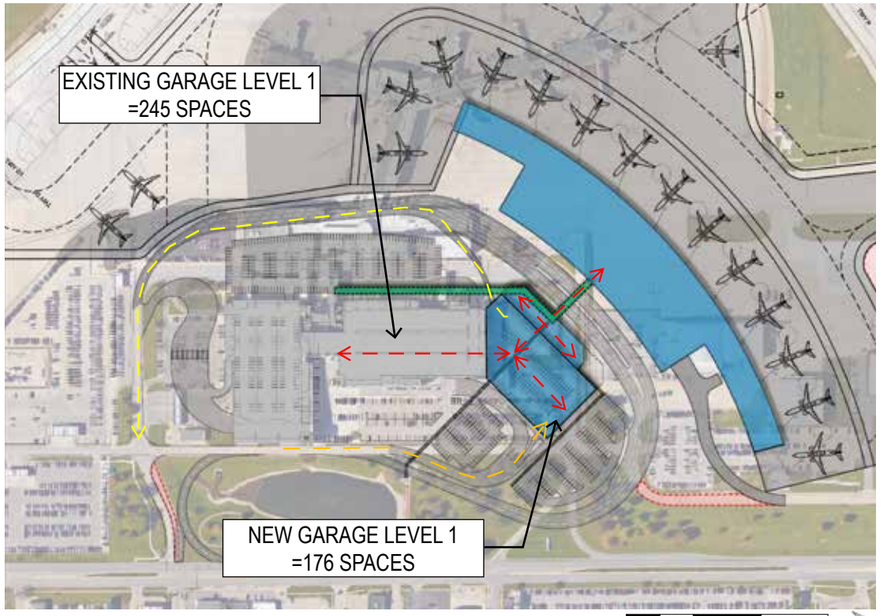


Figure 5.26. Rental Car Ready-Return



KEY POINTS

- New short term (hourly) surface lot
- Existing esat long term parking to remain. Partial reconfiguration required.
- New west long term lot: 279 spaces
- Lower levels of both existing north & new garage dedicated to rental car parking - approx. 421 spcaes.

Pedestrian Access

Parking Entry

Parking Exit

5.13. Relocated Buildings - East Concept (South Quadrant)

For the East concept to become reality, there are enabling projects or relocations that would be required. The existing GA/Corporate hangars are located in the northern portion of the east quadrant and will move to the south as shown on Figure 5.27. The three critical tenants/ buildings that will be relocated include:

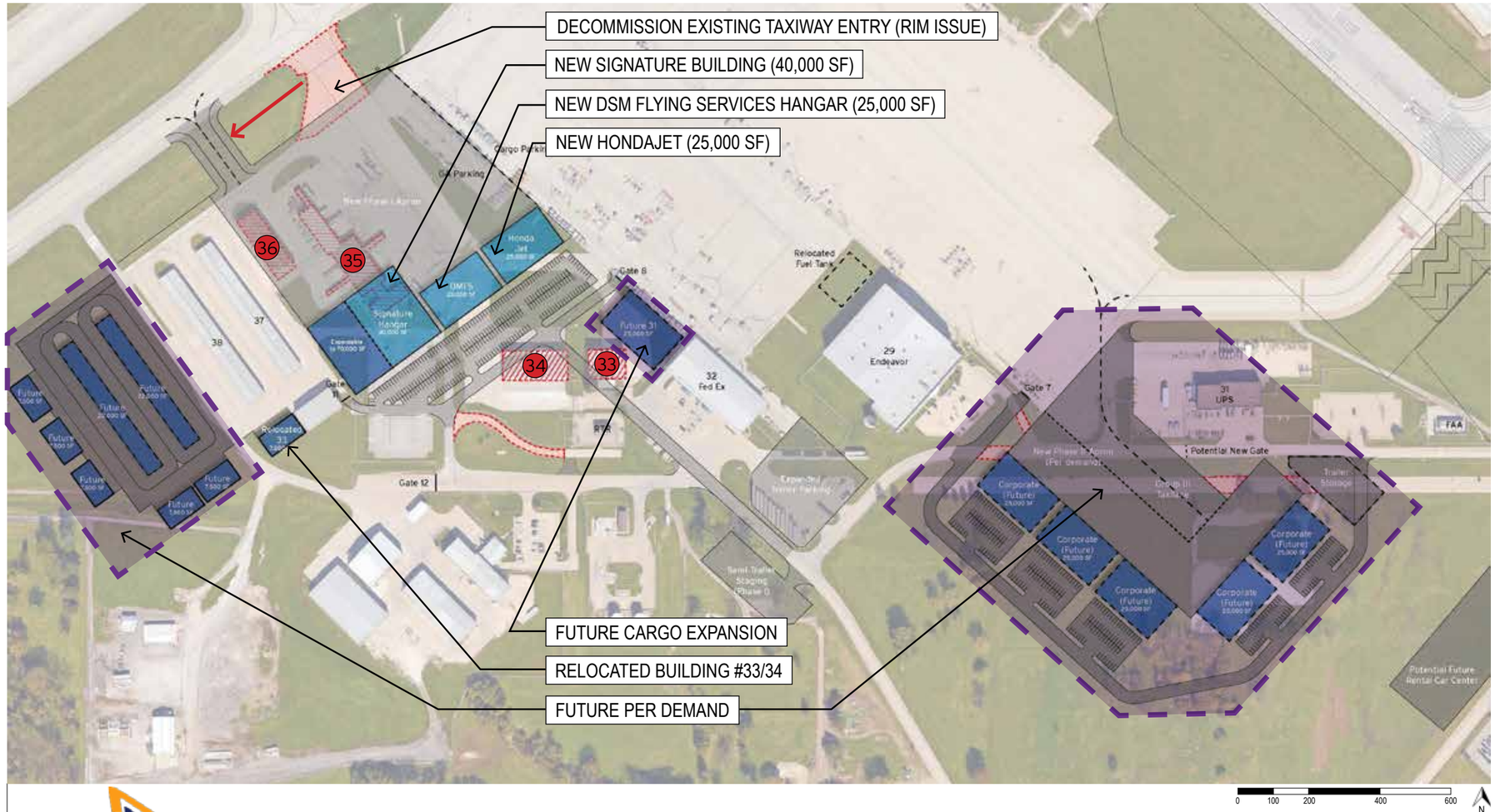
- DSM Flying Services Hangar (25,000 SF)
- Honda Jet Facility (25,000 SF)
- Signature Building which includes storage, maintenance and the Signature E Office/ Hangar (40,000 SF)

See Figure 5.27 for their new locations. New vehicular parking lots would be included in this construction as well as a new entry road that would provide a more direct and intuitive access route from Army Post Road to the new facilities.

Existing buildings 33, 34 and 35 will be demolished. Buildings 33 and 34 will be replaced. The new concept plan has accounted for additional future facilities indicated in purple on the plan, including a new GA campus to the east as well as new T hangars to the west. These will be incorporated with demand.

New apron would be required in Phase I to accommodate the relocated GA/Corporate tenants and a new taxiway entry would be included to eliminate an existing Runway Mitigation Incursion (RIM) issue.

Figure 5.27. Relocated Buildings - East Concept (South Quadrant)



KEY POINTS

Relocated from East Quadrant

- DSM Flying Services Hangar
- Honda Jet Facility
- Signature Building

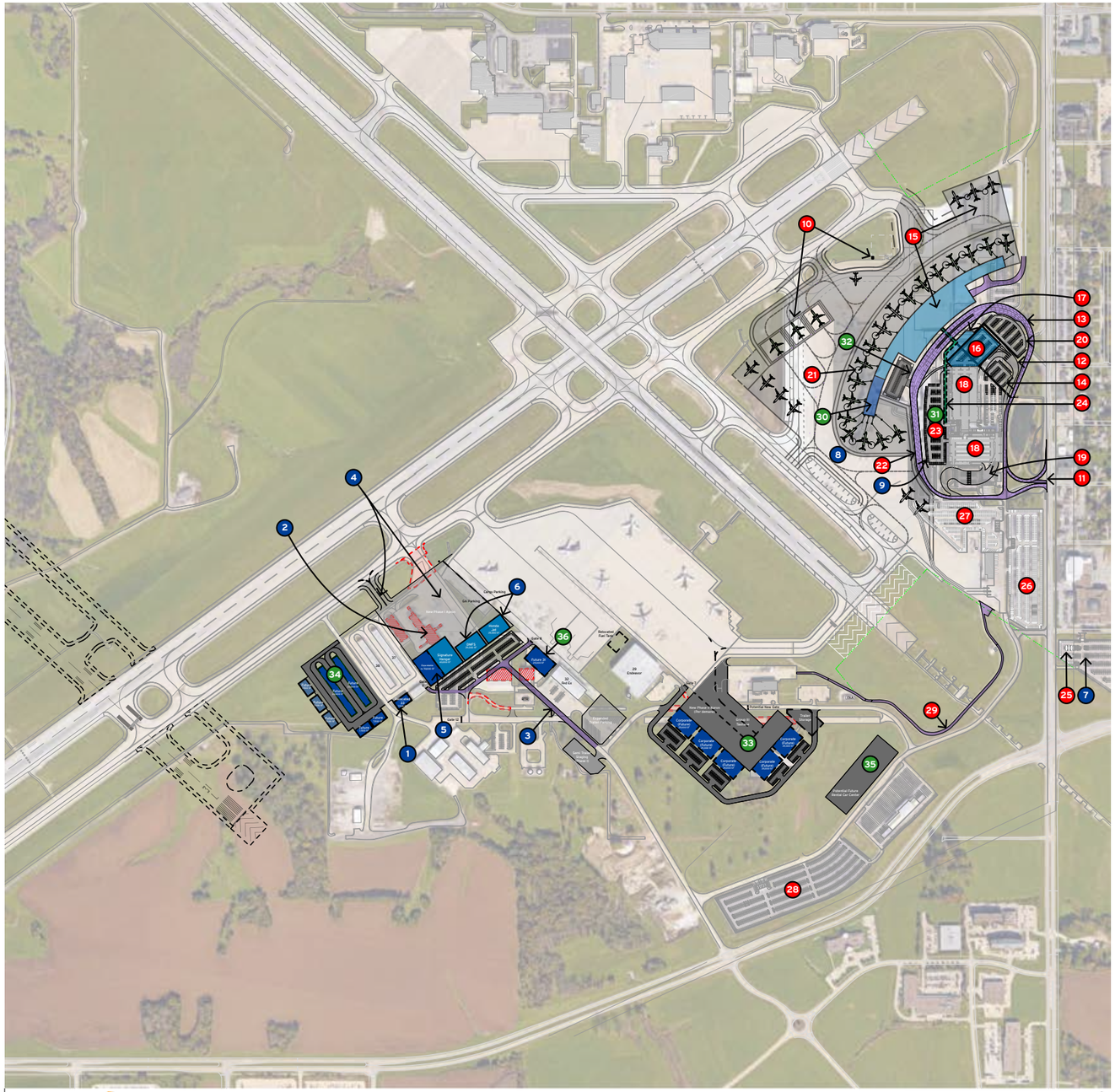
South Quadrant Enhancements

- New parking lots
- New entry road
- Decommission Taxiway Entry
- New Taxiway Entry
- T-Hangar Expansion
- New GA campus
- New apron

South Quadrant Demolition

- Demo / replace Bldgs. 33 & 34
- Bldg. 35 - Old UPS Air Sort & Office

Figure 5.28. East Overall Project Phasing



ENABLING PROJECTS

1. Relocate Building 33/34
2. Demolish Building 35/36
3. New South Roadway Improvements
4. New South Phase 1 Apron + Taxiway Entry
5. Relocate Signature to new site
6. Relocate DSM Flying Services + Hondajet to new site
7. Relocate Employee Parking
8. Install new groundload jetbridge @ A5
9. Temporary loading dock

PASSENGER ACTIVITY LEVELS (PAL) 1.5

10. New Deice, RON pad + relocated Storm Control Building
11. New entry intersection at Fleur Drive
12. New entry plaza to parking
13. New roadway loop/curbside
14. Long term parking lot reconfiguration
15. New terminal and apron for 14 gates and RON
16. New parking structure (4-level with rental car ready/return on first level)
17. New rental car customer service building and elevated pedestrian bridge
18. Existing garages to remain
19. New exit plaza
20. New short term hourly parking lot
21. Existing terminal and concourse demolition
22. Complete new roadway loop
23. New long term parking lot
24. New conditioned landside walkway to long term parking core
25. Lot #1 - public parking to remain
26. Lot #2 - public parking to remain
27. Lot #3 - public parking to remain
28. Lot #4 - public parking to remain
29. Fuel road enhancement

PASSENGER ACTIVITY LEVELS (PAL) 2.0

30. New concourse expansion to south for 4 additional gates
31. New parking structure at long term lot
32. Terminal curbside expansion
33. New GA/Corporate Campus (per demand)
34. GA/T-Hangar expansion (per demand)
35. New Rental Car Facility
36. Cargo expansion (per demand)

- Future Runway 13R - 31 L
- Phase 1 Buildings
- Phase 2 Buildings
- Demolition
- New / Revised Roadways

KEY POINTS

Road map for all the projects and the potential sequence for construction

Includes:

- Enabling projects (blue)
- Phase 1 (red)
- Phase 2 (green)
- Future (per demand)

South Concept | 5.14 - 5.22

Figure 5.29. South Overall Zoning - Option 1

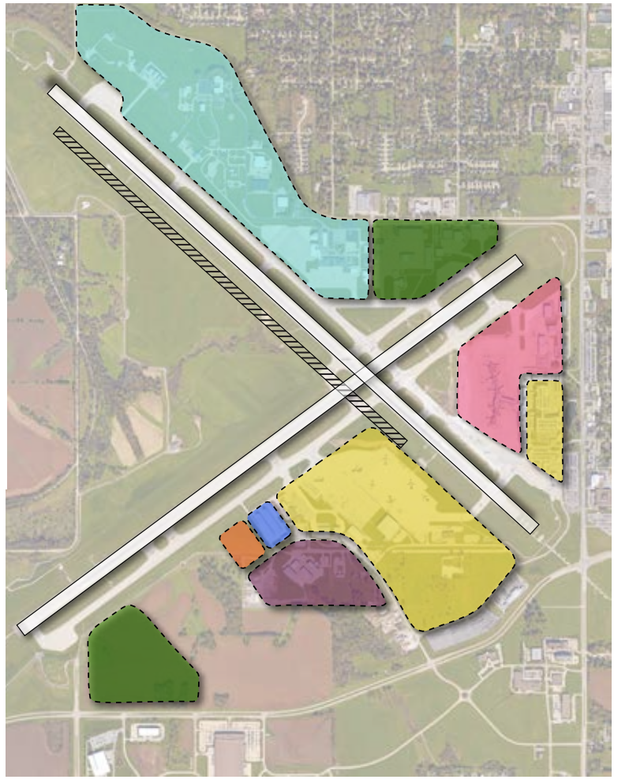
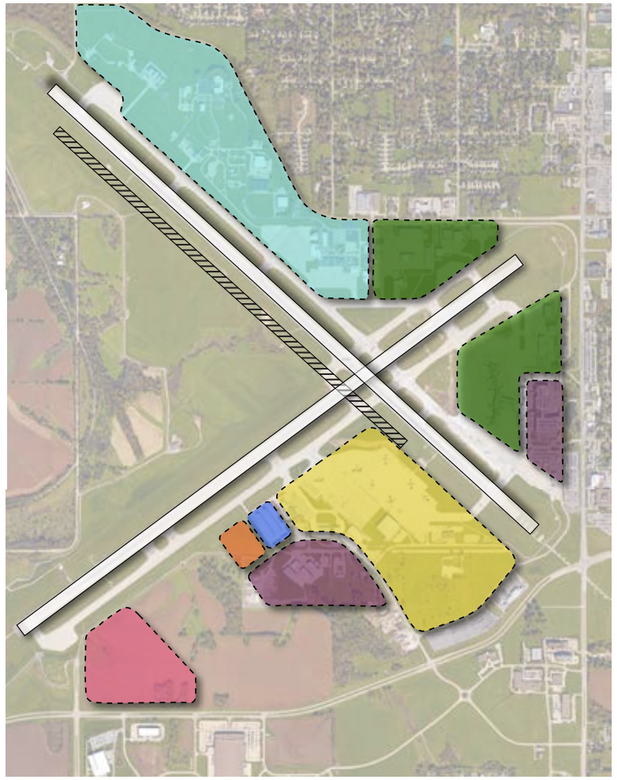


Figure 5.30. South Overall Zoning - Option 2



- Air Support
- GA / T-Hangars
- Iowa Air National Guard
- GA / Corporate
- Passenger Terminal
- Airline Maintenance
- Air Cargo

5.14. South Overall Zoning - Option 1

Similar to the East Concept, an overall zoning study was performed to investigate the most efficient use of the overall campus in order to provide a new terminal in the south quadrant that eliminates congestion for both vehicular and aircraft movement. Figure 5.29 depicts the first overall zoning option for the south concept. Option 1 and 2 both represent viable strategies for creating a new passenger terminal site in the South Quadrant, however, co-mingle with other airport uses more than the East Concept. Both south options require a new parallel taxiway to Runway 13/31 to safely move aircraft to and from the new south passenger terminal site. Additionally, these options avoid the Iowa Air National Guard Site in the North Quadrant.

In the first option, the passenger terminal is located in the South Quadrant, in a similar location to the previous preferred alternative in 2012. The existing parking structures in the East Quadrant would continue to be maintained but a shuttle route will be provided between the two quadrants. In Phase 1 and 2 of the new design, the existing GA/T-Hangars and Air Support facilities can remain in place, without a need for immediate expansion. The Airline Maintenance building that was previously located within the new passenger terminal site will need to be relocated to its position highlighted in orange. Additionally, the South Quadrant site will accommodate a new GA/ Corporate campus near the southwest end of Runway 5/23 that has access to the Army Post Road. In Option 1, the Air Cargo campus will be relocated to the existing terminal site in the East Quadrant, indicated in pink in Figure 5.29.

5.15. South Overall Zoning - Option 2

Option 2 for the South Concept is highlighted in Figure 5.30. Similar to Option 1, the north and west quadrants remain untouched. The orientation and placement of the new terminal is the same as Option 1, thus displacing the Air Cargo, Airline Maintenance, and GA/Corporate Facilities. The new Airline Maintenance facility will be located on the west side of the existing GA/T-Hangars (in blue.) The Air Support area, indicated in purple, can remain relatively untouched, but will need a new access road from the Army Post Road to separate passenger vehicular traffic from the other tenants/uses. The primary difference between the two options is the location of the new GA/ Corporate campus and Air Cargo facility. In the first option, we have placed the new GA/ Corporate campus in the South Quadrant, but in the second option the new site replaces the existing passenger terminal site in the East Quadrant. The Air Cargo Facility is located at the west end of the South Quadrant (shown in pink.) Option 2 would allow Signature, Hondajet and DSM Flying Services to remain in their existing east quadrant location but with the ability to rebuild or renovate their existing facilities.

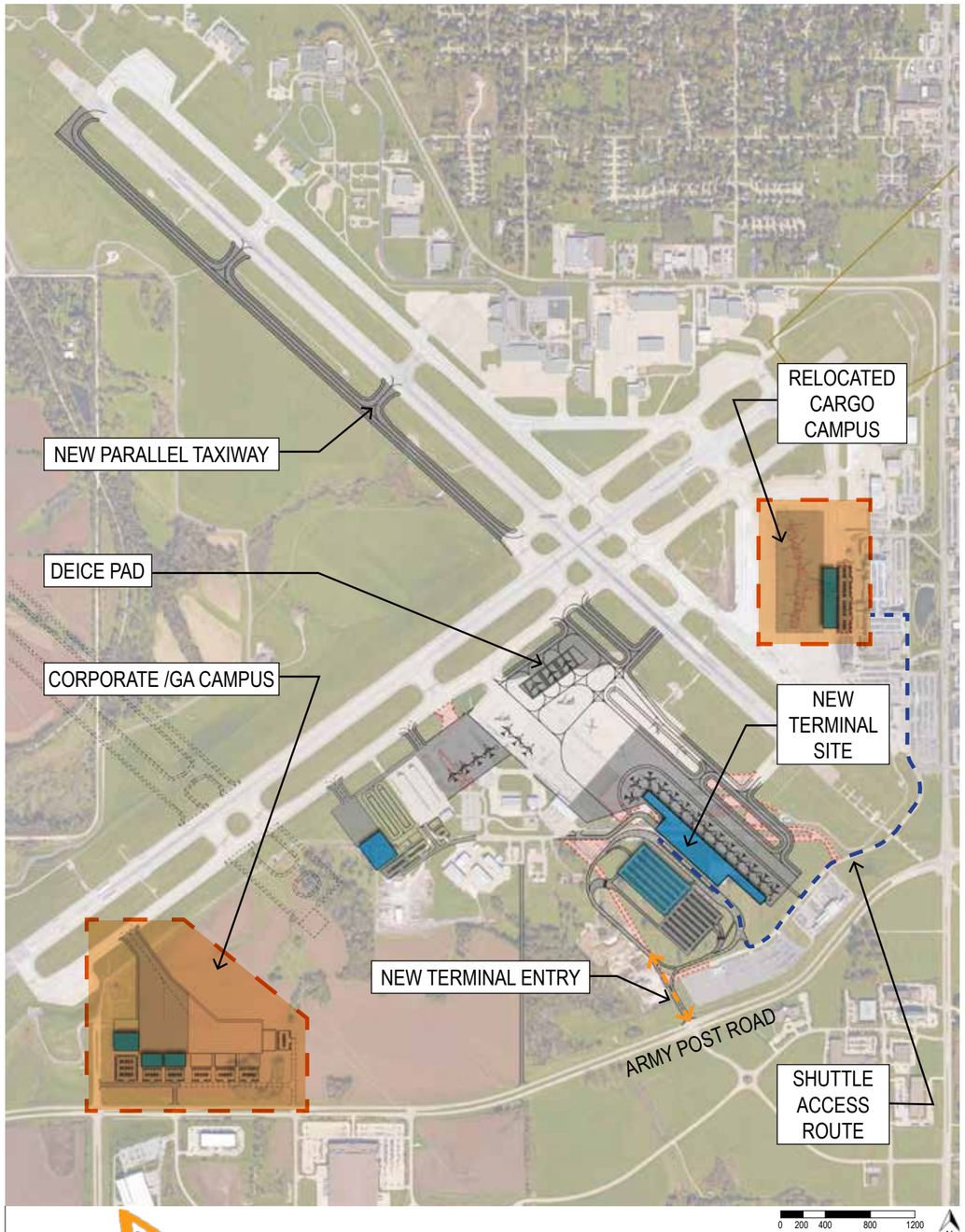
KEY POINTS

South Zoned Campus
- Requires new parallel taxiway
- Terminal is not in a separate zone
- Avoids the IANG Site
- Options to move either cargo or Corporate GA to existing terminal site in east quadrant

Option 1
- Cargo relocated to East Quadrant
- Signature/DMFS/ Hondajet stay in East
- Corporate/ GA in 3 quadrants

Option 2
- Cargo in South Quadrant
- Signature/DSMFS/Hondajet stay in East + future Corporate/GA at existing terminal site

Figure 5.31. South Overall - Phase 1 Complete



5.16. South Overview

The south quadrant option is located directly to the southeast of the previous 2012 preferred alternative site. Primary factors for this adjustment were to lower costs by reducing the amount of landside infrastructure and existing tenant/building relocation.

Terminal – The terminal diagram would be primarily a single loaded concourse except at the ends of the concourse. A linear terminal diagram could be utilized and easy for passenger wayfinding and airline/airport operations. All required contact gates are included.

Landside - This new concept is located as close to the Army Post Road as possible, which will help to minimize infrastructure costs and shorten the overall drive to the terminal. A new intersection would be required at Army Post Road with a new entry road to the terminal site. Existing parking facilities in the east quadrant can still be maintained in this concept, but this will require a shuttle (as indicated in Figure 5.31) to the new terminal. Additional parking (structured and surface) would also be required directly at the new terminal site in the south as well. A tunnel would connect the new terminal to the new parking structure.

Airside – The FAA would require a new parallel taxiway along the NW/SE runway for safety purposes to eliminate aircraft taxi across the active runway. A new deice pad accommodating 3 aircraft is included on the southern quadrant. The previous preferred alternative assumed reuse of the majority of the existing cargo apron currently located at the site. In order to maintain proper slope away from the new terminal building, much of the apron from the new terminal out to the Ground Service Vehicle road would need to be replaced, thus, not saving as much of the existing pavement as once determined.

The southern site has significant grade changes, which poses additional constraints to the overall site and ultimately will increase the cost of the project.

The South Option's new terminal is offset from Fleur Drive, one of the main arterial streets from downtown. This may benefit the traffic flow on Fleur, but the new site becomes disconnected from the community with its new address on Army Post Road. Views to downtown and the approach to the airport are obstructed by the other necessary facilities that will be relocated to the East Quadrant. This greatly contrasts the direct visual connection of the airside terminal in the East Option to Fleur Drive and downtown Des Moines potentially reducing the connection to the community that the currently site possesses.

KEY POINTS

- Linear design provides easy passenger way-finding
- Minimize infrastructure costs by locating as close to Army Post Road as possible
- Maintain existing parking garages in the East Quadrant; connect with shuttle.
- Additional new parking facilities in south quadrant.
- Requires new taxiway
- Slopes require new apron pavement.
- Significant grade changes
- No direct connection to Fleur Drive
- View to downtown from concourse is more obstructed

5.17. South Phasing

Phasing for the south concept is relatively simple because the existing east terminal can remain fully operational during construction. The project can also be built in one phase which may help to expedite the overall duration of construction. Additionally, passengers will not be impacted by construction of the new development.

Before construction begins, a few of the roads and structures in the south quadrant will need to be demolished and relocated. (These are indicated in dashed red in Figure 5.32.) The area represented in green can be maintained, however, the existing airline maintenance building would be relocated to the west of the T-Hangar site. Since SW 28 Street will be demolished to make way for the new roadway loop, a new road to those facilities will need to be provided (dashed orange) to segregate passenger vehicular circulation from GA and other tenant use. The south quadrant already has a large amount of apron space in the northern corner of the site, but a substantial amount of new apron is necessary further east, where the new terminal is sited and to the west, for new RON hardstand positions. New entries to the taxiways are necessary to correct RIM issues.

The South Option can re-use some of the existing parking garages in the east quadrant, but most of the terminal components will be brand-new. The airside and landside terminals will align with Runway 31, and a four level parking structure providing 2,736 spaces will reside behind it. Ultimately, more parking is required in this scheme, because the same number parking stalls needs to be allocated directly at the new terminal (as in the east concept) to provide proper level of service to passengers. It is not acceptable to rely on the existing parking structure in the east quadrant as it creates longer wait times from car to gate and is a lower level of service. The airport would also need to operate the shuttle between the quadrants adding to O&M cost yearly. New surface parking will sit directly southeast, providing optional expansion capabilities for the new garage. A new roadway loop with pick-up, drop-off and bypass lanes will run between the parking garage and the terminal, connecting with entry and exit plazas to access parking. A new loading and trash dock will tuck behind the north end of the landside terminal, easily connecting to the existing facilities to the west and away from view from the public.

In the second phase, as shown in Figure 5.33, the concourse expands northwest along its same axis. The Phase 2 parking structure with 1,123 new spaces will attach to the rear of the garage constructed in the first phase. New T-Hangars and other GA facilities will be incorporated with demand and spread to the west.

Figure 5.32. South Overall - Phase 1 Complete

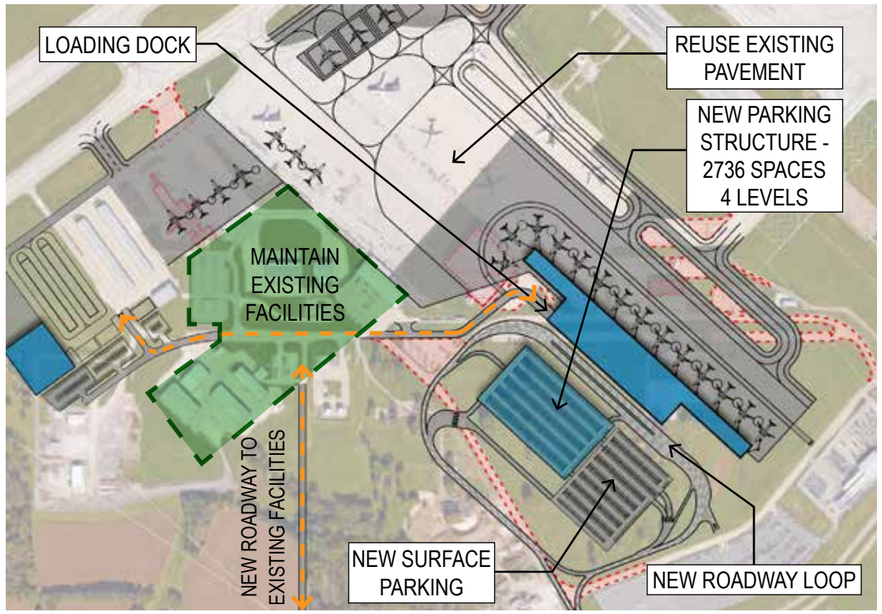
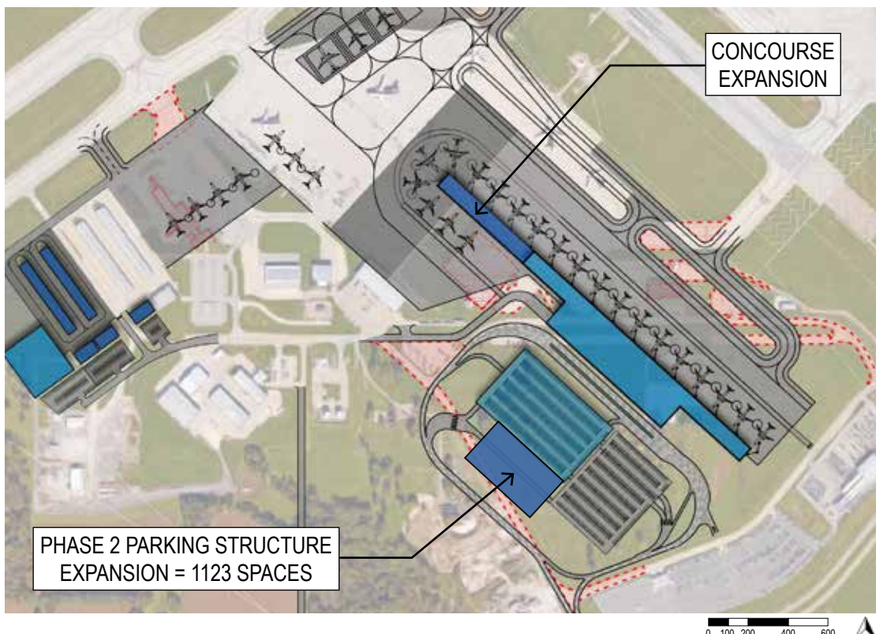


Figure 5.33. East Overall - Phase 2 Complete



KEY POINTS

- **Existing terminal can remain open during construction**
- **Project can be constructed in one phase**

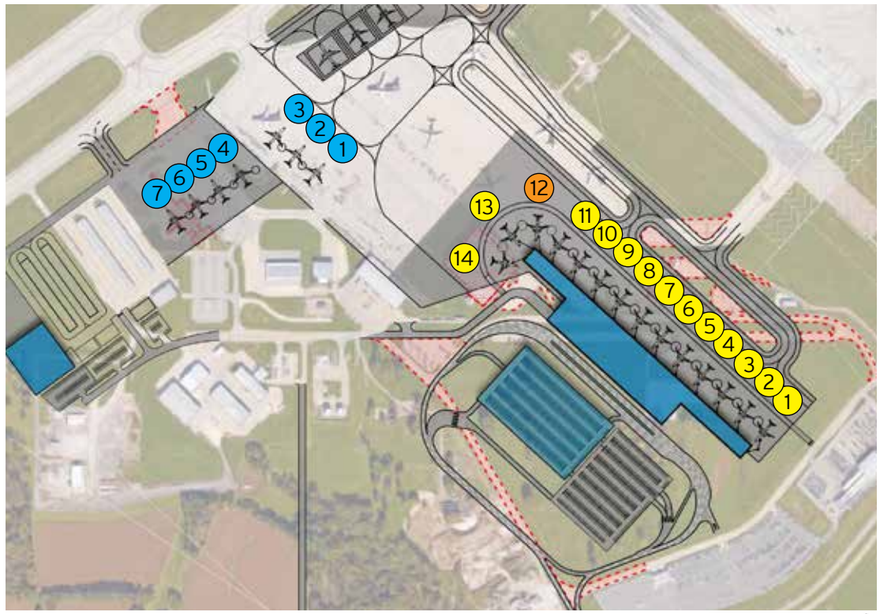
Phase 1

- Demolish and relocate certain south quadrant roads & buildings
- Maintain existing facilities
- New roadways
- New apron pavement required
- New terminal components

Phase 2

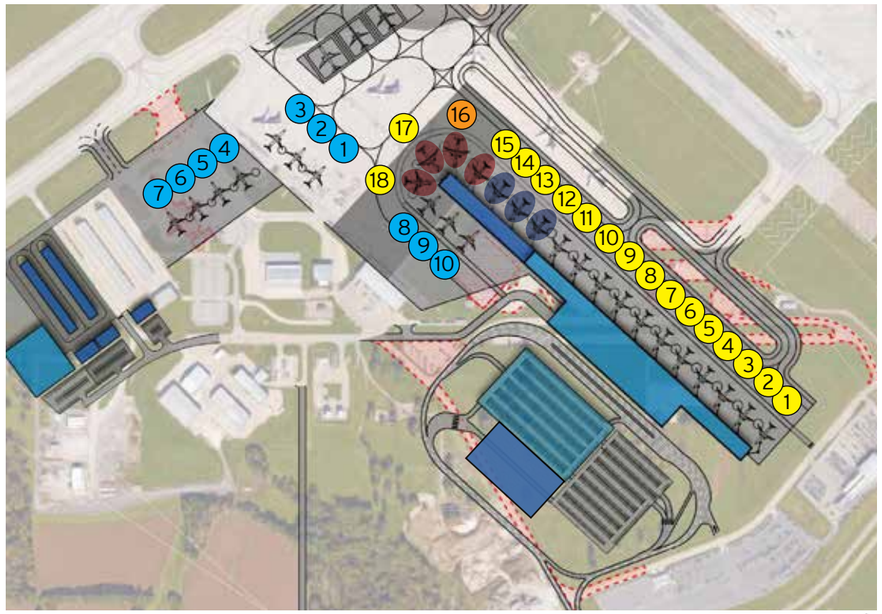
- Linear expansion opportunities

Figure 5.34. South: Phase 1 - Aircraft



737-900/ A321
757-200 (Group IV)
Hardstand Positions

Figure 5.35. South: Phase 2 - Aircraft



737-900/ A321
757-200 (Group IV)
Hardstand Positions
PHASE 2 - Rotated Aircraft Positions
PHASE 2 - New Aircraft Positions

5.18. South Phase 1 - Aircraft Requirements

Phase One requires a new facility with 13 gates and 7 RON hardstands. This scheme allots for 14 positions that start at the southeast end of the airside terminal and run northwest, parallel to the terminal's façade and Runway 31. Since position 12 wraps around the northwest corner, a larger Group IV aircraft will fit at that gate. Positions 13 and 14 continue to wrap around the corner but will be rotated back in alignment with the terminal façade when Phase 2 is completed. This scheme also meets the required number of RON hardstands. They are located in the new apron space northwest of the terminal and partially on the existing cargo ramp. This phase also incorporates space for three deice pads, placed in the far north corner of the site. They can be easily accessed from the new taxiway parallel to Runway 31 and from the existing Taxiway P.

5.19. South Phase 2 - Aircraft Requirements

The aircraft needed will increase from thirteen in Phase 1 to seventeen in Phase 2. When the airside terminal is expanded northwest, it will be able to accommodate at least eighteen gates. Positions 1 through 15 will park perpendicular to the terminal's northeast façade, while positions 16 through 18 wrap around the far northwest end. Position 16 will be the designated gate for the larger Group IV aircraft. The airside terminal expansion leaves room on the backside for three RON hardstands in addition to the seven in place from Phase 1. Figure 5.35 illustrates the site plan after Phase 2 completion.

KEY POINTS

Phase 1

- 13 Contact Gates Required
- 14 Gates Shown

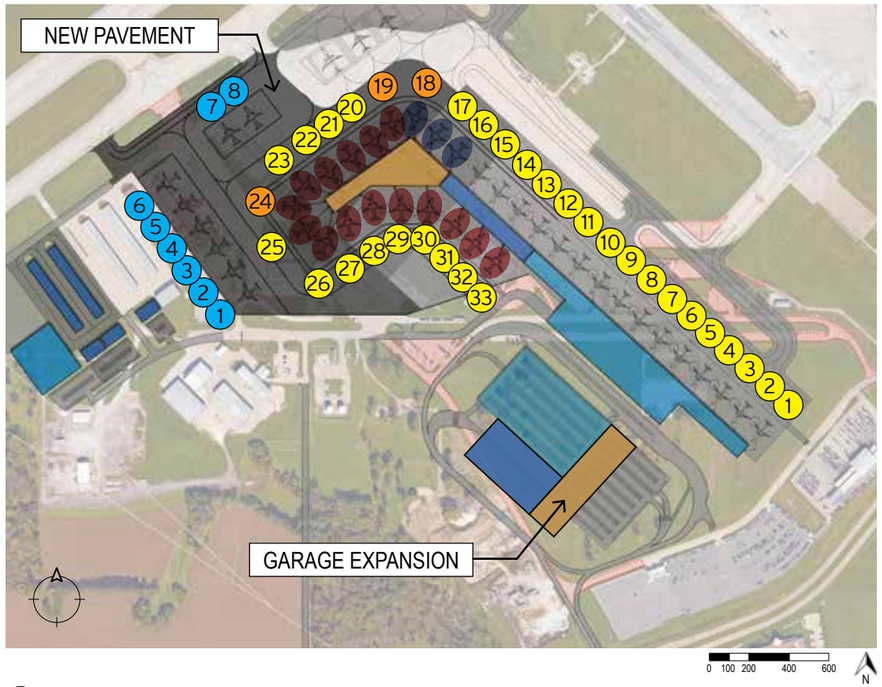
- Minimum RON Hardstands required: 7
- *7 Hardstand Positions shown

Phase 2

- 17 Contact Gates Required
- 18 Gates Shown

- Minimum RON Hardstands required: 9
- *10 Hardstand Positions Shown

Figure 5.36. South: Ultimate Buildout - Aircraft



737-900/ A321
757-200 (Group IV)
Hardstand Positions
PHASE 2 - Rotated Aircraft Positions
PHASE 2 - New Aircraft Positions

5.20. South Ultimate Build-out

When required by demand, the south concept can be expanded to the northwest providing an ultimate buildout of 33 contact gates. The new expansion could include a new concession core as it turns to the west. Due to the potential walking distance to/from baggage and ticketing, we do not recommend concourse expansion beyond what is shown on Figure 5.36. The GA facilities that had been maintained in the first two phases will need to be demolished and relocated to a different site. The new expansion will extend as far northwest as possible, allowing room for a taxilane beyond the new northwest façade that parallels Runway 5. The taxilane will provide access to the new gate positions, the deice pad and RON positions 7 and 8. In addition, we expect that multiple improvements to the runways and taxiways will be necessary. Similar to the East concept we expect that this concept can be maintained through at least the 2060 year timeframe.

The new expansion will be able to accommodate as many as thirty-three aircraft, adding fifteen new positions from Phase 2. The larger Group IV aircraft will be located at the northwest and west convex corners of the building because of the additional length and wingspan space available. The RON hardstands will be relocated to face the T-Hangars on the west side of the site. There are no projected RON or parking requirements for the ultimate buildout. The future garage expansion has been highlighted in brown in Figure 5.36. This garage could project further southeast if needed.

KEY POINTS

Approx. maximum year: 2060

- 33 Gates shown
- 8 Hardstand Positions shown

- Will require additional airside pavement replacement to meet required slope criteria.
- Required runway/taxiway improvements.
- Coordinate with future airfield projects.

5.21. South Parking & Ground Transportation

As summarized on Figure 5.37, the parking provided within the terminal area in the South Alternative matches that provided in the East Alternative. A total of 3,346 parking and rental car spaces are provided in a new 2,733 space parking structure located in front of the terminal and a 613 space surface lot adjacent to the structure. Level two of the structure would accommodate 694 short-term parking spaces while 120 surface spaces serving hourly, meeter-greeter and well-wisher, parkers are located at the front portion of the surface lot closest to the terminal (shown on Figure 5.38). An additional 1,618 long-term public parking spaces are provided in the parking structure with 493 spaces located in the surface lot behind hourly parking (shown on Figure 5.39). As shown in Figure 5.40, 421 rental car ready-return spaces are located on the first level of the parking structure. The total of new and existing exceeds that provided in the East Option, due to the need to provide sufficient new parking immediately adjacent to the new Terminal. All parkers will enter through a single entry plaza located off the inbound roadway and exit through a single exit plaza on the backside of the garage that connects to the outbound roadway. The rental car customers would have a separate entrance into the lower level of the garage from the outer curb and would exit onto the outbound roadway prior to the public parking exit plaza.

All parking within the existing terminal area, along with existing economy parking lots, would remain and serve as remote economy parking for the south terminal. Shuttles would be required to move passengers between the lots and the new south terminal. Employee parking would also be provided within these remote parking lots.

Expanded curbsides will be provided at the new terminal accommodating requirements for private vehicles along an inner curb adjacent to the terminal and commercial vehicle island curbside. A pullout for taxi staging near the curb is provided on the right side of the entry roadway, away from parking entrances, but would necessitate taxis pick-up to be located on the inner curbside.

Figure 5.37

	Required 3 MAP	Existing	New	Total Existing and New
South Terminal Area				
Short-Term (surface)	*374*	-	120	120
Short-Term (structured)		-	694	694
Long-Term (surface)	*2,548*		493	493
Long-Term (structured)			1,618	1,618
Rental Car Ready-Return (structure	*420*	-	421	421
Sub-total Terminal Area	***3,342***	-	***3,346***	3,346
Remote				
Existing Terminal (surface)		645	-	645
Existing Terminal (garage)		1,863	-	1,863
Economy 2 & 3 (near Existing Termi	*1,409*	1,037	-	1,037
Economy 1	*768*	848	-	848
Economy 4 (public overflow)*		300	-	300
Employee	*300*	-	-	-
Sub-total Remote	**2,477**	**4,693**	-	4,693
				-
				-
Total	**5,819**	**4,693**	**3,346**	**8,039**

Figure 5.38. New Short Term Surface (Hourly) Parking

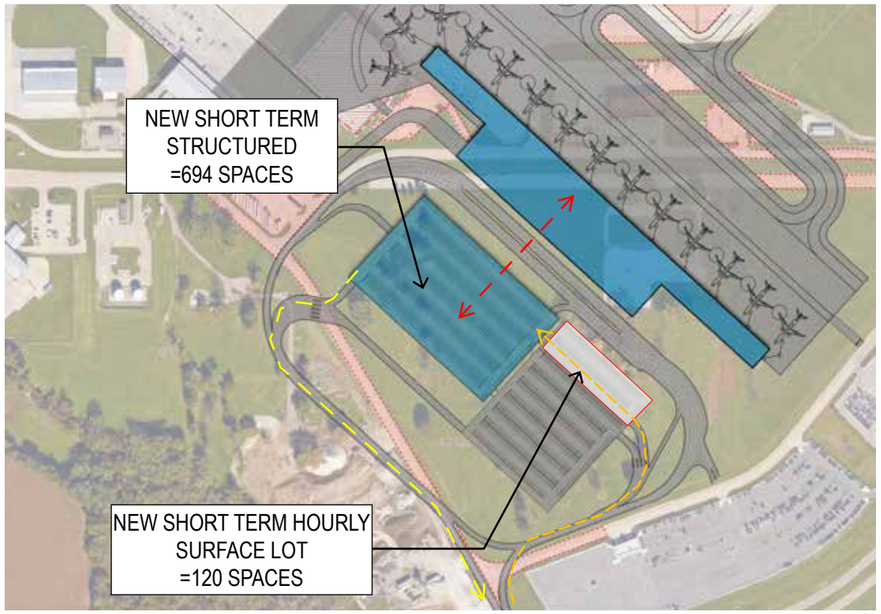
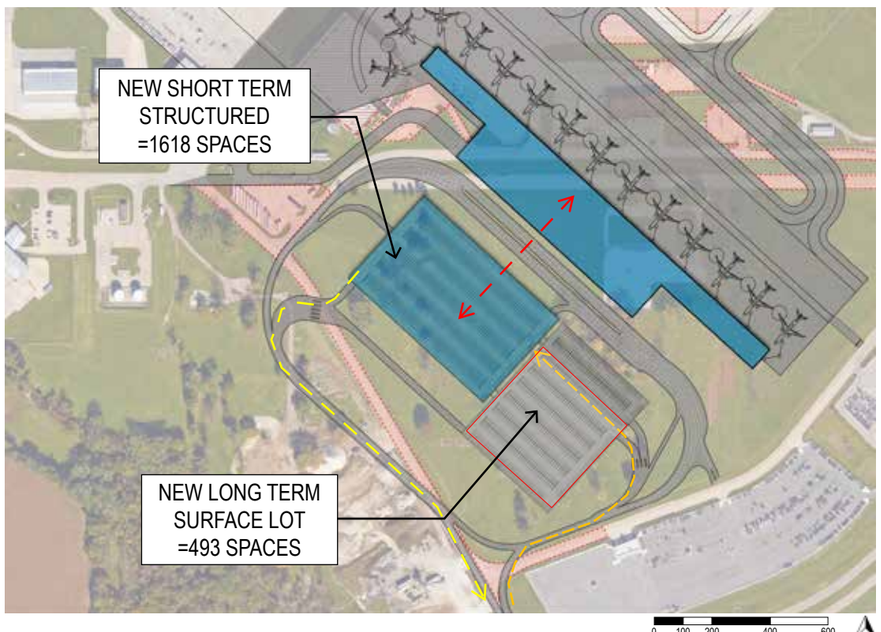


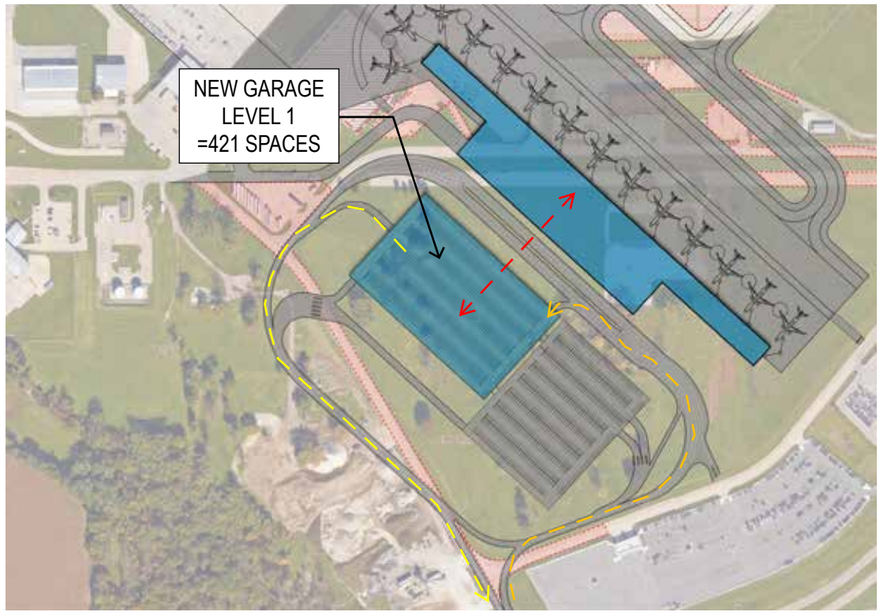
Figure 5.39. Long Term Structured & Surface Parking



KEY POINTS

- New parking structure - 2,733 spaces
- New short term hourly surface lot - 120 spaces
- New long term surface lot: 493 spaces
- All parking within East Quadrant to remain; shuttles required.

Figure 5.40. Rental Car Ready Return



5.22. South Relocated Buildings

With the new terminal placement in the south quadrant, there are several buildings that must be relocated prior to the beginning of new terminal construction. The current air cargo and maintenance facilities are located on this site, so they must be moved to an efficient location elsewhere. In Figure 5.41, the new airline maintenance building location is highlighted in blue. The air cargo campus will be relocated to the east quadrant (dashed in orange) and must avoid the existing parking garage site. As shown in Figure 5.41, there are two options for the relocation of the Signature, DSM Flying Services, HondaJet and future services buildings: the first is in the east quadrant, alongside the cargo campus. The second option is at the southwest end of Runway 5/23.

Figure 5.42 shows an enlarged plan of option 2A (the Corporate/GA Campus with Signature, DSMFS & HondaJet.) It includes a new 40,000 SF signature building with the potential to expand another 30,000 SF; a new 25,000 SF HondaJet facility; a new 25,000 SF DSM Flying Services building, and four new 25,000 SF future corporate / GA facilities. Because of its location, this new campus has a direct connection to Taxiway P as well as the Army Post Road. There is also opportunity for future GA/Corporate growth based upon demand adjacent to this site. This would create a campus that could consolidate all GA/Corporate tenants into one site location.

Figure 5.41. South Relocated Buildings

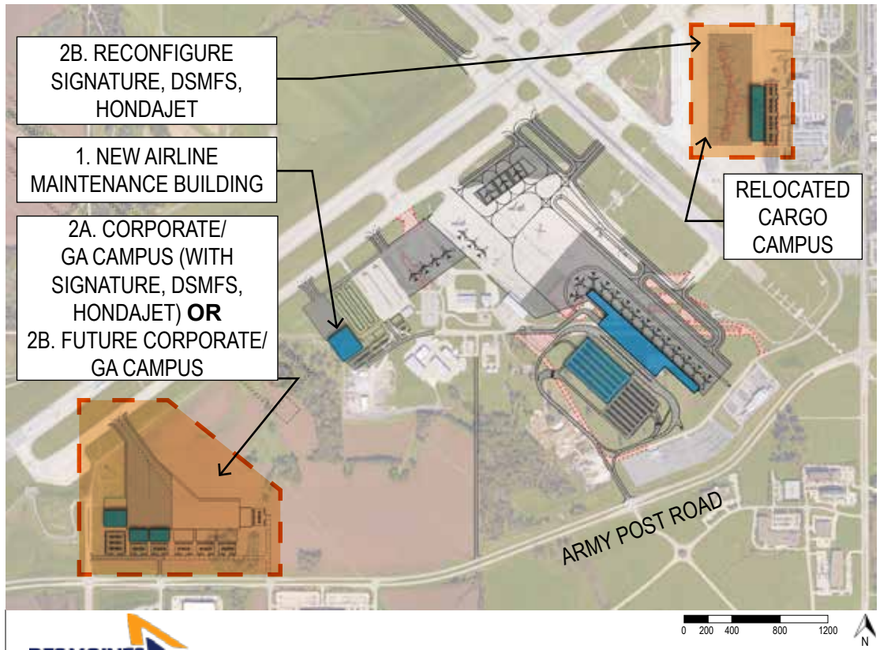
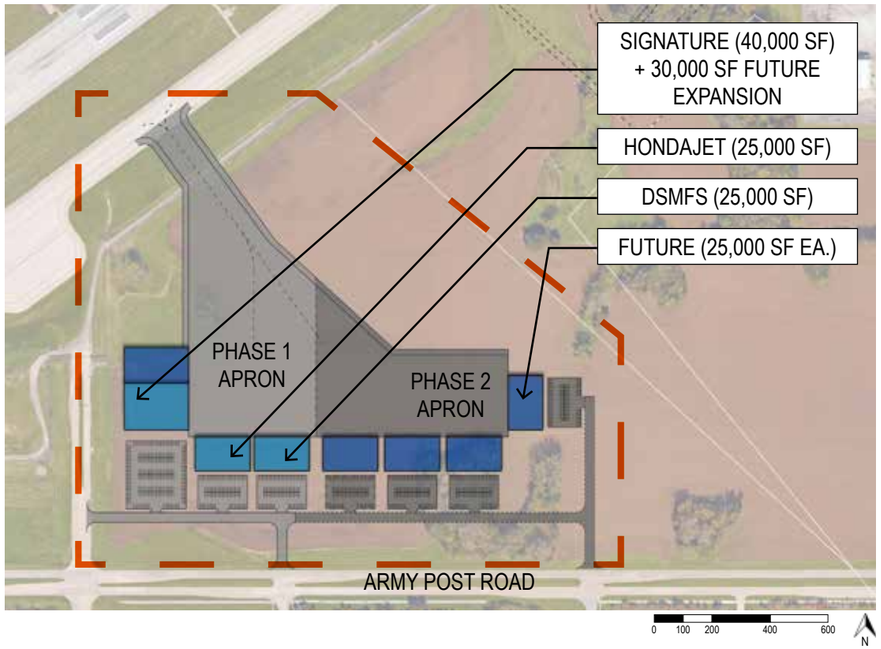


Figure 5.42. South Relocated Buildings



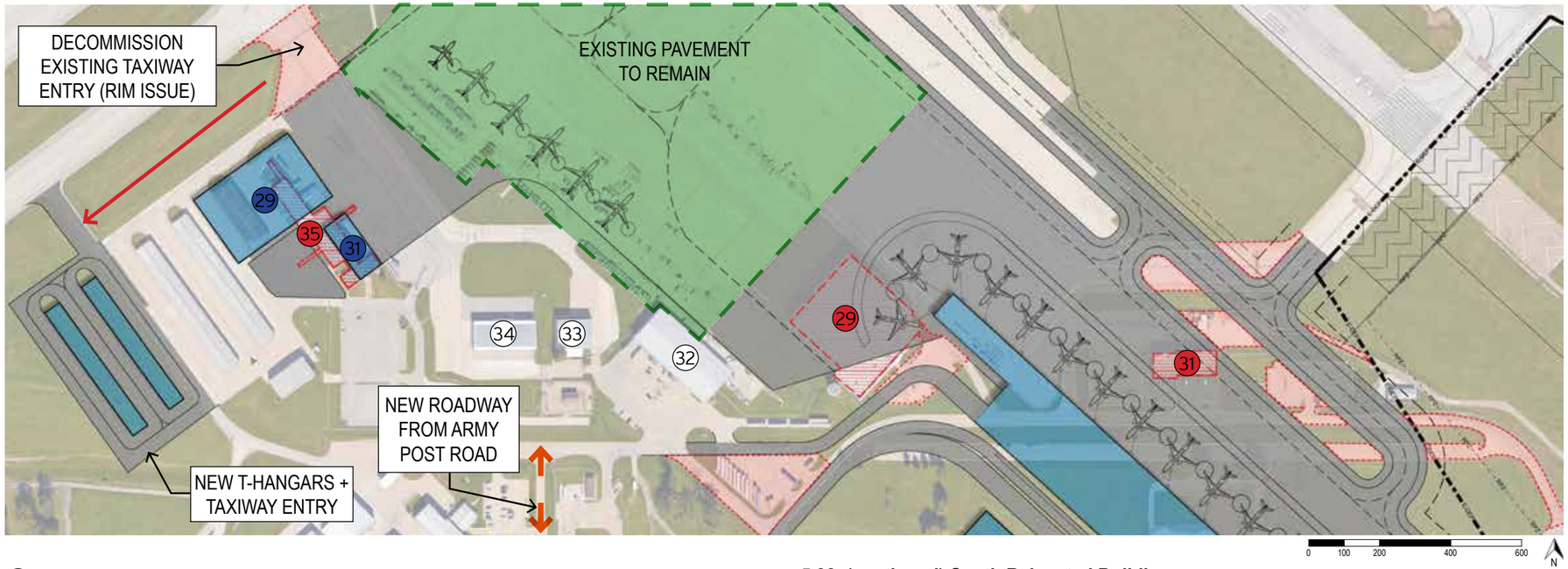
KEY POINTS

- Rental Car Ready return located on Level 1 of new garage - 421 spaces

South Relocated Buildings:

- Airline maintenance building (#29) is demolished and relocated
- New GA/Corporate campus:
  - Signature (40,000 SF)
  - DSM Flying Services (25,000 SF
  - Hondajet (25,000 SF)
  - Future buildings (25,000 SF ea)
- Relocate Cargo

Figure 5.43. Relocated Buildings - South Quadrant



- Relocated Buildings
- Existing Buildings to Remain
- Demolished Building

5.22. (continued) South Relocated Buildings

As previously noted, the south option requires that several of the buildings be demolished before construction of the new terminal can begin. Building 29 (Figure 5.43), the 79,250 SF Aircraft Maintenance facility, will be relocated to the west side of the site (see the rectangular building indicated in blue.) Building 31 is the 12,300 SF South Cargo building. It will be relocated to the west side of the site adjacent to the new Building 29. Buildings 33 and 34 can remain with their adjacent parking lots, but building 35, the Cargo Air Sort & Office Building (UPS) will need to be relocated to the East Quadrant. Several of the roads leading to each of these facilities (highlighted in dashed red) will need to be removed. A new roadway, indicated in orange, will connect these buildings to the Army Post Road. The existing apron pavement to remain has been highlighted in dashed green, but the dark gray areas represent new pavement. The new entry to the taxiway has been pushed west, in alignment with the new T-Hangars and to eliminate existing RIM issues.

KEY POINTS

Demolish & relocate existing:

29. Aircraft Maintenance
31. South Cargo Building

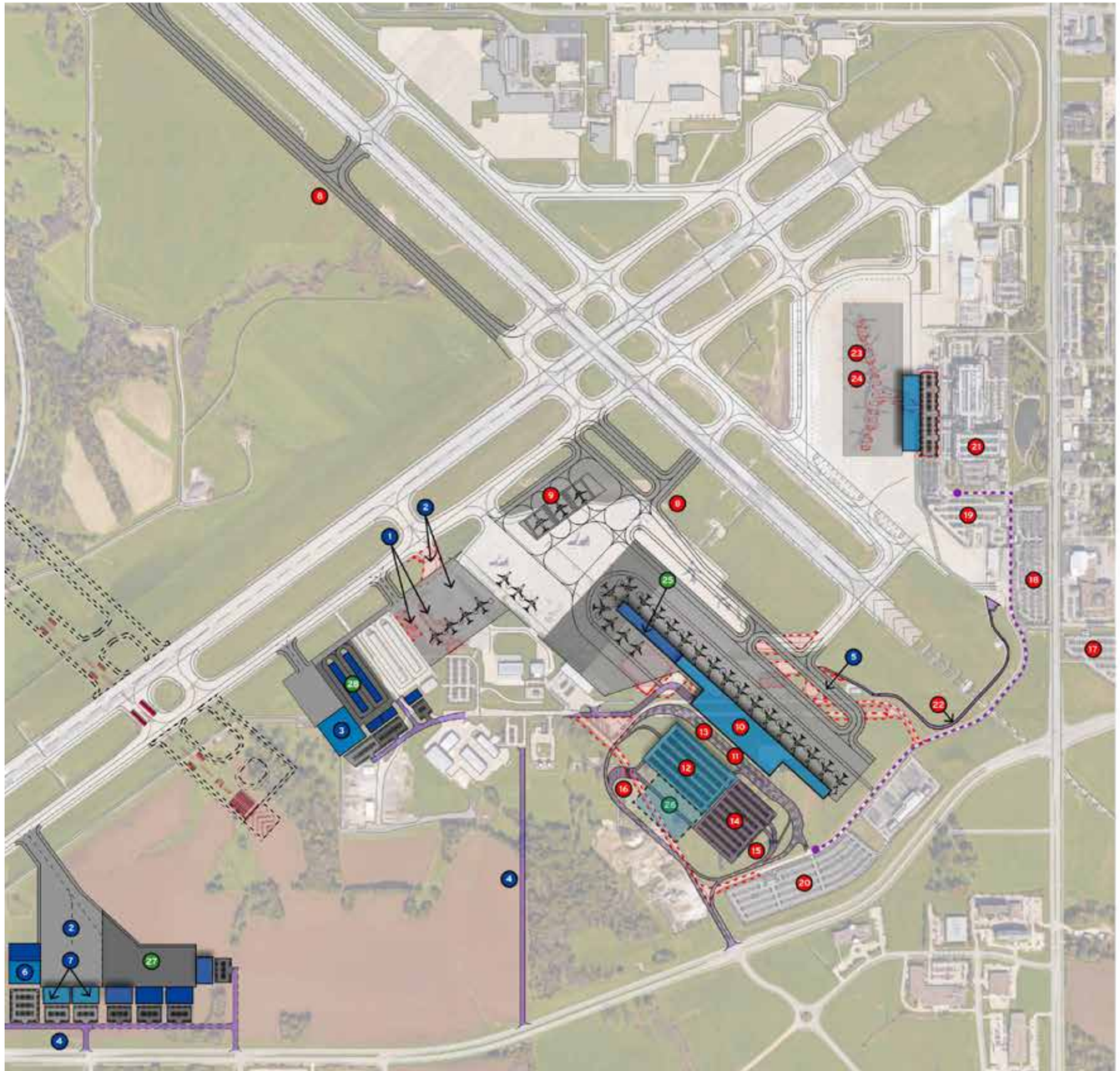
Demolish:

35. UPS Cargo & Office

South Quadrant Site Improvements

- New Apron required in front of new building 29 & 31 locations
- Build new roadway from Army Post Road to segregate traffic from passengers
- Expand T-Hangars
- New Taxiway Entry

Figure 5.44. Overall Project Phasing



ENABLING PROJECTS

1. Demolish Building 35/36
2. New South Phase 1 Apron + Taxiway Entry
3. Relocate Airline Maintenance
4. New South Roadways
5. Demolish Building 31
6. Relocate Signature to new site
7. Relocate DSM Flying Services + Hondajet to new site

PASSENGER ACTIVITY LEVELS (PAL) 1.5

8. New full-length Taxiway
9. New Deice, RON pad + relocated Storm Control Building
10. New terminal and apron for 14 gates
11. New roadways + curbsides
12. New parking structure (4-level with rental car ready/return on first level)
13. New roadway loop/curbside
14. New surface lot
15. New entry plaza
16. New exit plaza
17. Lot #1 - public parking to remain
18. Lot #2 - public parking to remain
19. Convert Lot #3 to employee parking
20. Lot #4 - public parking to remain
21. Existing garages + adjacent surface lots to remain
22. Fuel road enhancement
23. Demolish existing terminal + concourse
24. Relocate Cargo to East quadrant

PASSENGER ACTIVITY LEVELS (PAL) 2.0

25. New concourse expansion to northwest for 4 additional gates
26. Parking Garage expansion
27. New GA/ Corporate Campus (per demand)
28. GA/ T-Hanger expansion (per demand)

- Shuttle Routes
- Future Runway 13R - 31 L
- Phase 1 Buildings
- Phase 2 Buildings
- Demolition
- New / Revised Roadways

KEY POINTS

Road map for all the projects and the potential sequence for construction.

Includes:

- Enabling projects (blue)
- Phase 1 (red)
- Phase 2 (green)
- Future (per demand)

Concept Comparison | 5.23 - 5.24

Figure 5.45. Existing Overall Zoning

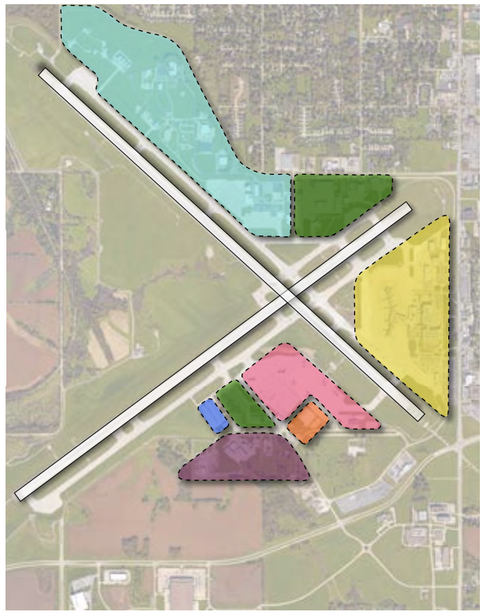


Figure 5.46. East Overall Zoning

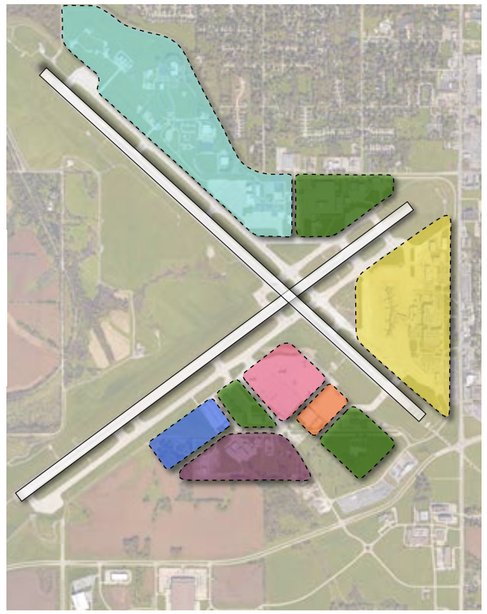
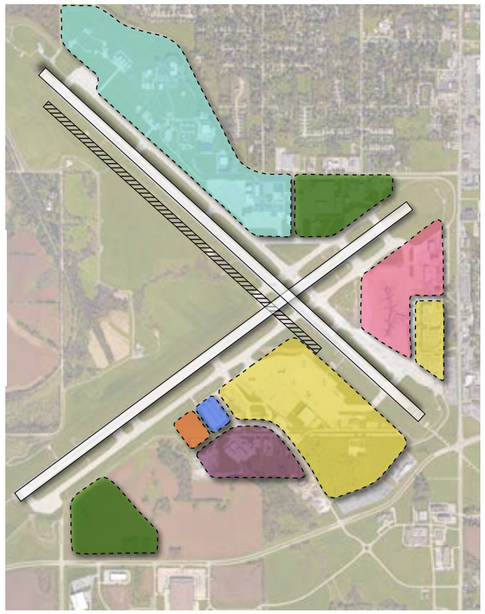


Figure 5.47. South Overall Zoning



- Air Support
- GA / T-Hangars
- Iowa Air National Guard
- GA / Corporate
- Passenger Terminal
- Airline Maintenance
- Air Cargo

5.23. Master Planning Comparison

Projections for the Des Moines International Airport will require some alteration of the existing master plan indicated in Figure 5.45. The new passenger terminal must be designed for a minimum of thirteen contact gates in Phase 1 and have the capacity to expand to a minimum of seventeen gates for Phase 2. This requires a more efficient use of the existing site (East Option) or an entirely new location which will not constrain the terminal's expansion (South Option.) The main goals for the master plan zoning are to avoid the Iowa Air National Guard site, segregate terminal traffic from other tenants, and provide future expansion capabilities. Both East and South Concepts shown in Figures 5.46 and 5.47 respectively meet those requirements.

The East Option requires the least amount of changes to the overall zoning plan. The new terminal will utilize the existing terminal campus, therefore, many of the current utilities can remain in place. The new zoning plan will primarily enlarge certain tenant sites, including the GA / T-Hangars, the GA / Corporate and the Airline Maintenance Spaces in the South Quadrant. The GA / T-Hangar and GA / Corporate sites are placed so that they can expand as needed in the future. Specific advantages to the east site include:

- Ability to keep the passenger terminal in a completely separate quadrant
- Less relocation of the current tenants
- Maintains the connection to downtown by keeping the Fleur Drive address.

The South Option, which was the previously selected preferred location, provides more flexibility for future expansion and ultimately can accommodate at least ten more aircraft than the East Option. However, the additional 10 contact gates would not be needed within the life cycle of the terminal building and therefore makes both sites similar for ultimate buildout potential.

The new south site will require many of the current tenants to be relocated, generating a much higher project cost than the East Option. The South Option will also require a new taxiway, which adds significantly to the project cost. Other disadvantages include:

- Disconnection of the terminal site from Fleur Drive
- Separation of the terminal site from the existing passenger garages in the East Quadrant
- Proximity of the passenger terminal to airline maintenance, GA/T-Hangars and air support sites creates un-needed congestion for vehicular and aircraft movement.

KEY POINTS

Goals:
- Avoid the IANG Site
- Segregate Terminal traffic from other tenants.
- Provide future expansion capabilities

East
- Least amount of changes to the zoning plan
- Utilize existing amenities, relocate less tenants
- Terminal in separate zone
- Connection to downtown with maintaining Fleur address

South
- Most flexibility; can ultimately accommodate 10 more aircraft than the East Concept
- Requires many tenants to be relocated
- Requires taxiway
- Not located on Fleur
- Terminal located in south quadrant with multiple tenants
- Congested vehicular & aircraft movement

5.24. Project Cost Comparison

Projected Phase 1 costs for the East and West Options are shown in Figure 5.48. In addition to the projected construction costs, contingencies of 20% are included due to the conceptual level of the planning for these two options, along with allowances for project soft costs, to provide anticipated Total Program Costs. The Total Program Costs are approximately $491 million for the east Option, and $618 million for the South Option. Costs for the South Option are higher due to the significantly larger scope for the new parking structures and other site facilities. All of the costs shown are in 2016 dollars.

Figure 5.48 Total Project Cost Comparison

		East Option		South Option
Enabling Projects		$44,500,000		$67,500,000
Demolition		$32,250,000		$16,750,000
Terminal Building & PBB's		$132,500,000		$132,250,000
Airside Pavements etc.		$26,000,000		$49,500,000
Landside Structures and Paving		$39,000,000		$82,000,000
Utilities		$44,750,000		$53,250,000
Total Construction Costs		*$318,500,000*		*$401,000,000*
Contingency	20%	$63,750,000	20%	$80,250,000
Total		*$382,275,000*		*$481,250,000*
Soft Costs	28.5%	$109,000,000	28.5%	$137,000,000
Total Program Cost		**$491,250,000**		**$618,250,000**

KEY POINTS

East Concept vs. South Concept Costs:

- East saves a significant amount of money by utilizing existing apron, landside structures & utilities
- South Concept can be constructed in one phase, reducing the cost of complicated phasing and demolition work.

Figure 5.49. East Massing

Figure 5.50. South Massing

Figure 5.51. Comparison Matrix Chart

GOALS	EAST	SOUTH
Functional / Efficient	✓	✓
Pride / Community (Connection to Fleur + Downtown)	✓	–
Future Expansion Capability (Ultimate Buildout)	– (23 Gates)	(33 Gates) ✓
Zoning (Connection to Fleur + Downtown)	✓	–
NEW Parking Required (3,346 total req'd - Phase 1)	✓ (399 Surface) (870 Garage)	(613 Surface) (2,733 Garage) –
NEW Taxiway Required	✓ (NO)	(YES) –
Avoids IANG site	✓	✓
Cost	✓	–

KEY POINTS

- Overall, the East Concept is the most advantageous for the new developments.
- The South Concept is able to accommodate more gates, but that growth to even 23 gates is not projected to occur until after 2060.

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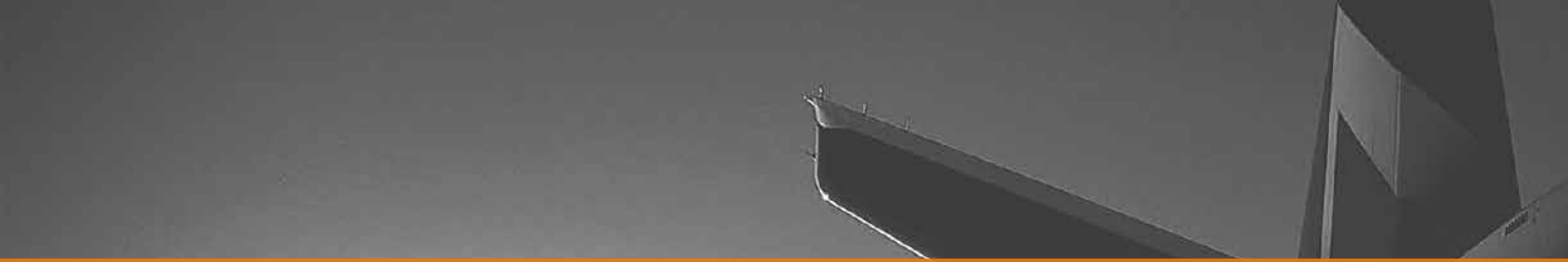

Chapter 6

Preferred Alternatives Refinements

- Campus Zoning
- Concept Overview
- Connection to Downtown
- Walking Distance Comparison
- Existing vs. New Terminal Comparison
- Phase 1 Aircraft
- Landside Zoning
- Parking Breakout
- Curbs
- Proposed Grading Plan
- Enabling Projects
- Phase 0 - Aircraft Requirements
- Phase 1 - Landside
- Phase 2 - Landside
- Phase 3 - Landside
- Phase 4 - Landside
- Phase 5 - Lanside
- Phase 5A - Airside Operations (Opening Day)
- Phase 6 - Landside (Full Airside Operation)
- Phase 7 - Airside (Full Airside Operation)
- Project Cost Analysis

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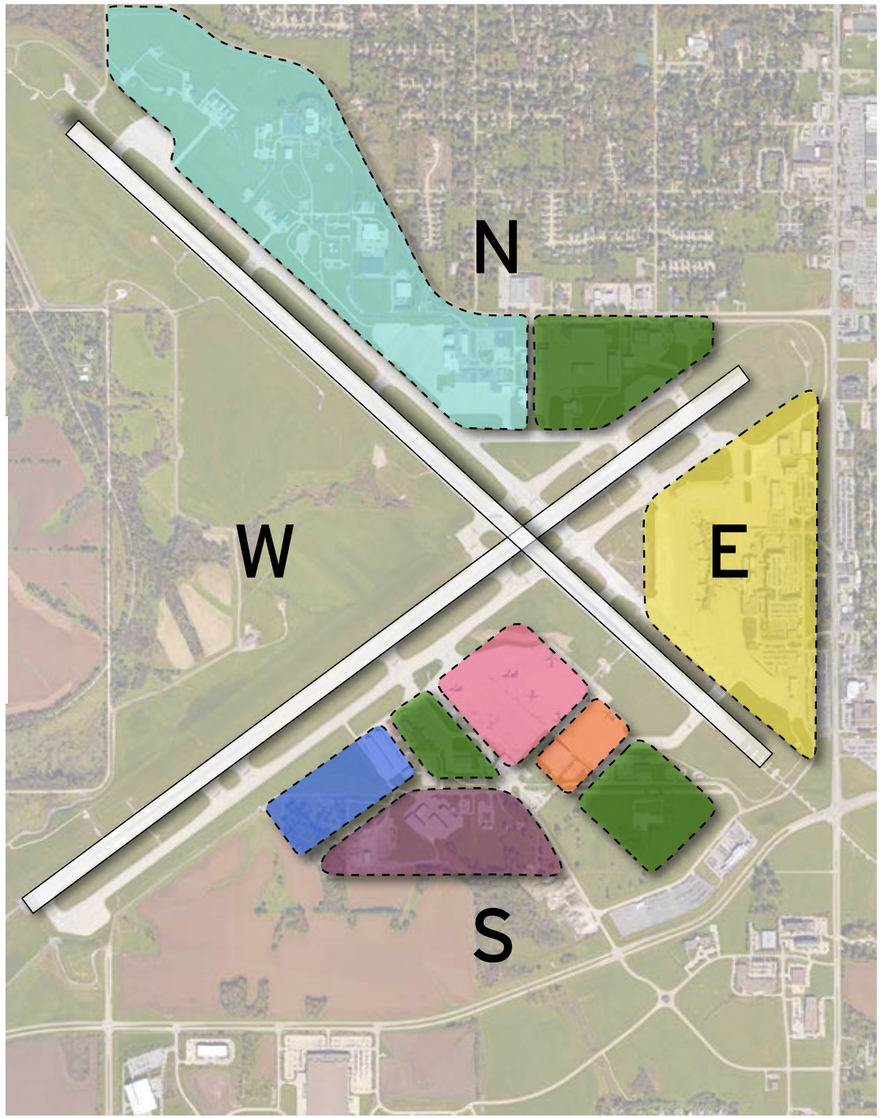
Figure 6.1. East Overall Zoning



Air Support
GA / T-Hangars
Iowa Air National Guard
GA / Corporate
Passenger Terminal
Airline Maintenance
Air Cargo

6.1. Campus Zoning

The Des Moines Airport and the HNTB Team presented both the South and East Options via a public forum on September 13 at the downtown Des Moines Library. The Des Moines Airport Board then approved the East quadrant as the new selected alternative moving forward at their October 11, 2016 board meeting. This chapter further details the final approved alternative.

As discussed in Chapter 5, one of the main advantages of the East Option is that little modification is needed to re-zone the airport's campus. The following describes the entire airport campus by quadrant as shown on Figure 6.1.

West Quadrant – The quadrant is topography challenged and was deemed inappropriate due to the amount of utility and infrastructure relocation required.

North Quadrant – This quadrant is ultimately constrained by residential neighborhoods to the north. The newest constraint on the planning study was the requirement to retain the existing Iowa Air National Guard Site. The existing Corporate/GA campus will also remain. The new concept does not anticipate any impact to the north quadrant area.

East Quadrant - All of the passenger terminal functions are collected within the East Quadrant, nested between Runways 5/23 and 13/31 and Fleur Drive. Keeping all of the passengers in the East Quadrant is an advantage for several reasons: it separates and organizes airport functions, minimizes walking or travelling distances for passengers, and retains the connection to downtown via Fleur Drive. The existing GA campus on the northern portion of the east quadrant would move to the south quadrant to allow for the entire quadrant to be used for passenger/terminal functions.

South Quadrant - The southern boundary for the airport is Highway 5 (Army Post Road), so there is a substantial amount of room within the South Quadrant for its facilities to expand. This option includes an area for a future GA/Corporate campus (indicated in green in Figure 6.1) to the east side of the South Quadrant. The relocation of the DSM Flying Services Hangar, Signature Maintenance Building, Signature Storage Hangar and Signature E Office/Hangar to the South Quadrant is shown located within the west green area. GA / T-Hangar expansion is indicated in blue, and its placement provides ample room for expansion to the southwest. The airline maintenance building will remain.

-

KEY POINTS

EAST:
- Terminal Functions Only

SOUTH:
- Relocated Signature, DSMFS & Hondajet with other GA/ Corporate future facilities
- Cargo maintained
- Airline Maintenance
- GA/ T-Hangars can expand

OVERALL ADVANTAGES:
- Avoid the IANG Site
- Separate terminal functions

6.2 Concept Overview

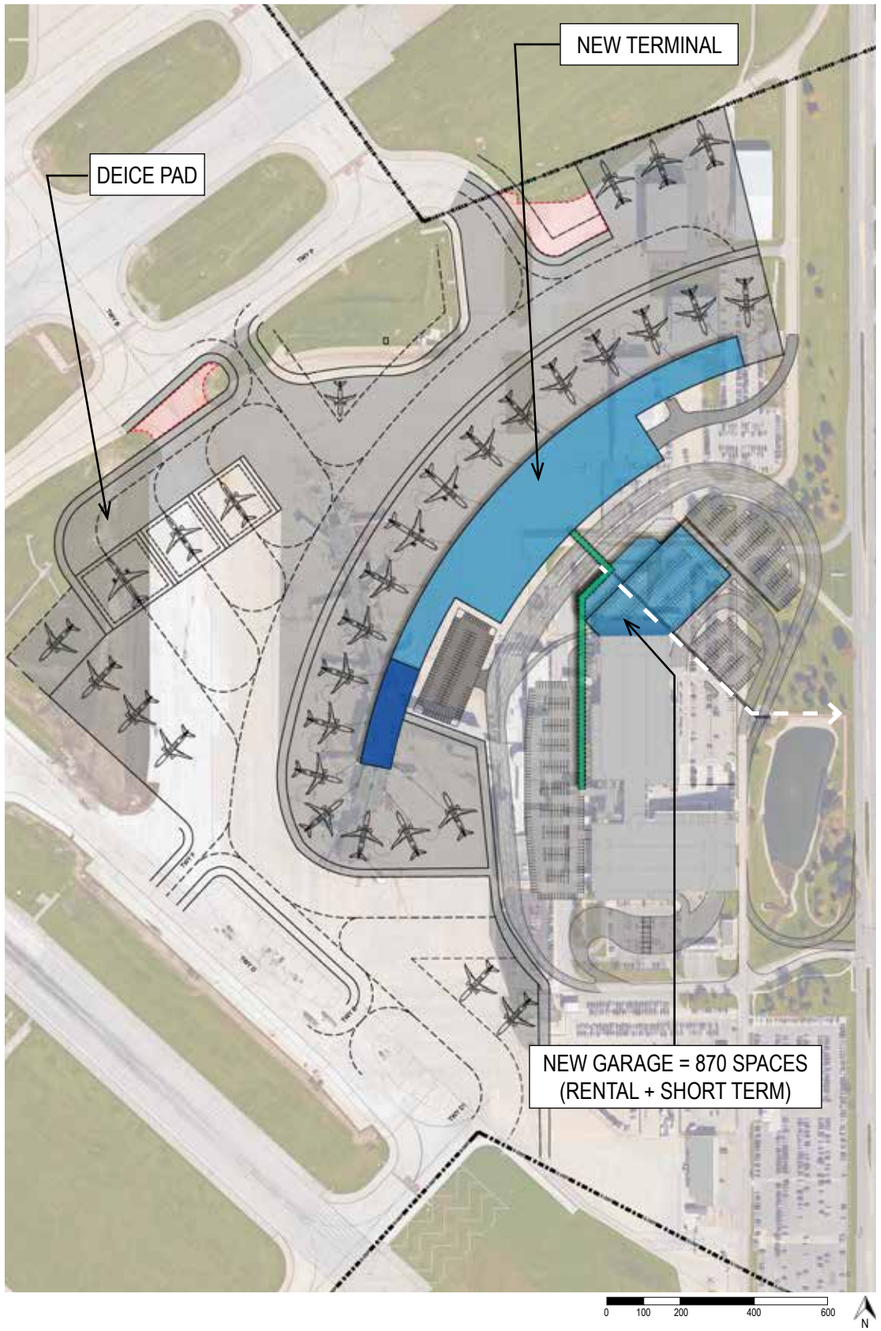
Terminal - Refinements to this concept include the site orientation/rotation from the initial concept to be nearer to the existing terminal so that walking distances to and from the parking garages could be minimized. This slight rotation maximizes the landside area for future growth without intercepting any of the new roadways. It also places the southern end of the new concourse as close as possible to the existing concourses, while still maintaining proper construction clearances. This will assist with the phasing of the concept.

Airside - This design integrates 14 gate positions at the completion of Phase 1 and 10 Remain Over Night (RON) hardstands. It corrects the Airfield Runway Incursion Mitigation (RIM) problem while taking advantage of the added room for the three new deice pads and four RON positions on the east side of the site (see Figure 6.2) while avoiding the containment site.

Landside - Phase 1 also includes the construction of a new parking garage adjacent to the existing garage, which will hold approximately 870 spaces for rental and short term parking. A new pedestrian bridge (shown in green) will safely connect passengers flowing to and from the new terminal, and a route (shown dashed in yellow) will be provided for passengers to get to the bus stop located on Fleur Drive. Additionally, Phase 1 incorporates a new entry from Fleur Drive, a new entry plaza to segregate parking, a new roadway loop and curb in front of the landside terminal, a new long term lot, short term hourly lot, an exit plaza and a new loading dock off of the NE Service Road.

Phase 2 – Phase 2 expansion would be an extension of the uniform curve set in place by Phase 1. Phase 2 will include new concourse space, hold rooms, restrooms, concessions and apron space. Four more aircraft gates will be added with the new extension. A new parking lot south of the landside terminal can be utilized for employees or as a VIP lot before the ultimate buildout is completed. The ultimate buildout will accommodate 23 aircraft.

Figure 6.2. East Overall Zoning



KEY POINTS

- New terminal building close to existing for minimal walking distances to parking
- Accommodates required aircraft parking positions
- New deice pad & maintains existing infrastructure
- Corrects airfield issues
- Maximizes landside area for future growth
- Flexible airside for future expansion

6.3. Connection to Downtown

One of the major advantages to the East quadrant site is its ability to retain its address on Fleur Drive. As one of the main arterial streets coming from downtown, it provides a direct and quick 10 minute drive connection from downtown to the airport. This connection is meaningful because it provides an iconic, grandiose approach to the airport complex as you drive to the south, and could afford views from the new concourse to the downtown skyline and a semblance of familiarity for the residents of Des Moines. This connection provides a great "sense of place" for the new terminal and its patrons.

The new entry plaza off of Fleur Drive and roadway loop approaching the terminal will help with intuitive wayfinding for passengers because they can see their destination clearly while driving. Currently, the terminal is completely obstructed from view as you turn off of Fleur Drive and enter the campus along Cowles Drive. This approach creates a more impactful vehicular entry to the airport and helps to avoid confusion and uncertainty of where the terminal is located, which ultimately is also a safer airport campus.

Figure 6.3. East Concept: Connection to Downtown

KEY POINTS

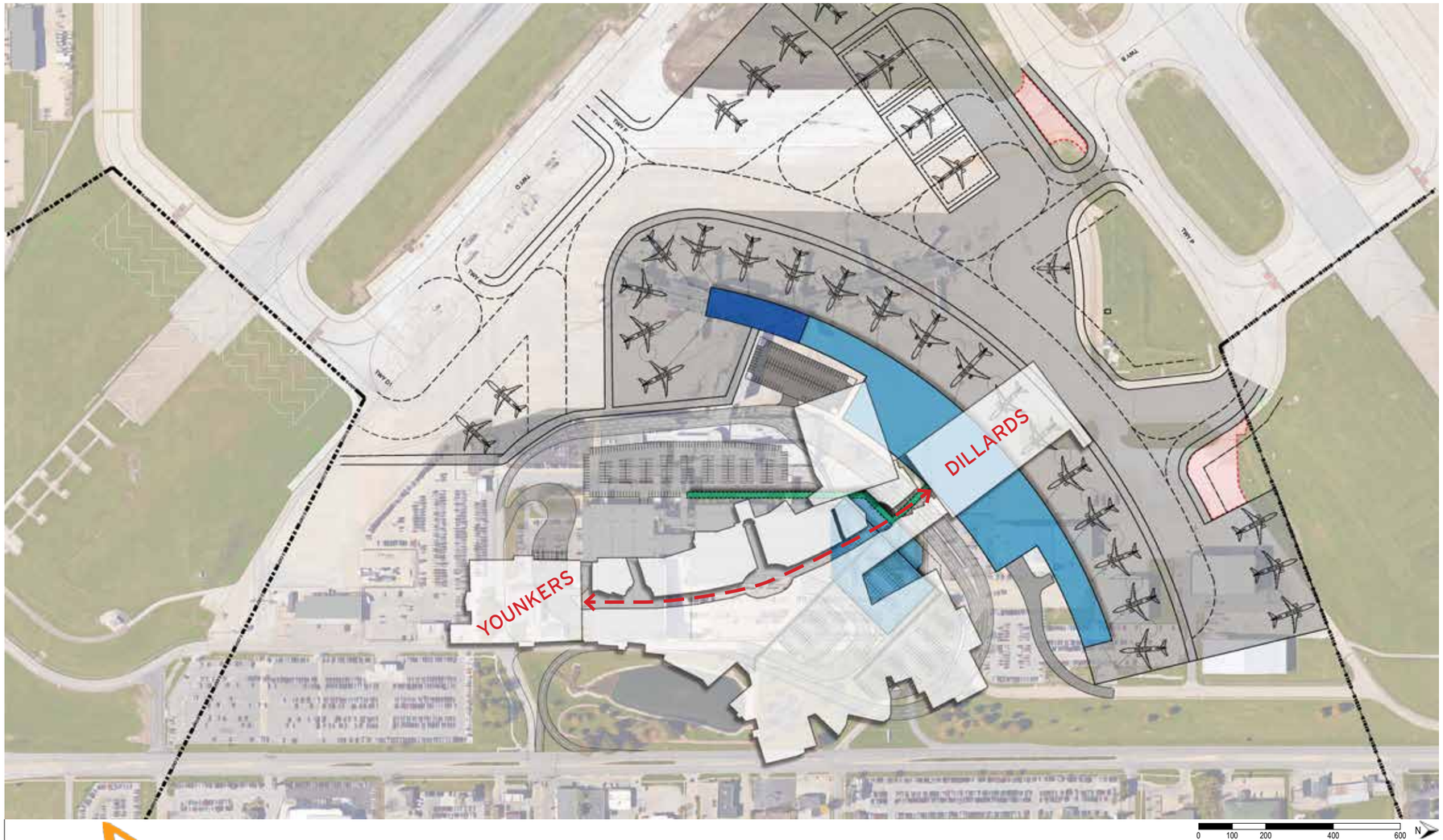
Connection to the Community:

- Familiar Fleur Drive Access
- View from concourse/gates
- Direct connection to downtown
- View on landside roadway loop approaching the terminal
- Direct connection to the terminal. Helps intuitive way finding to see the destination (terminal) while driving.

6.4. Walking Distance Comparison

In order to effectively re-use the existing parking facilities on site, the new terminal was placed in its location to generate the shortest walking distances possible. The lineal footage from the furthest parking space in the existing garage to the entry of the landside terminal is roughly 1,110 LF. To help illustrate this distance, we compared the distance to a widely known building in the Des Moines area, the Jordan Creek Town Center. Figure 6.4 illustrates a simplified Jordan Creek Town Center plan overlaid on the East site to display the walking distance from two of the mall's main tenants, Younkers to Dillards, which is roughly 1,085 LF. This comparison illustrates the longest walk passengers can expect given the current plan.

Figure 6.4. Comparison to Jordan Creek Town Center



KEY POINTS

Dillards to Younkers: **1,085** LF

IS SIMILAR TO

New Terminal to farthest parking space: **1,110** LF

6.5 Exisitng vs. New Terminal Comparison

While the requirements for the new terminal area (SF) are less than the existing terminal, the new terminal will allow for a more efficient use of less space while still allowing for future demand. The existing terminal and its additions were built during a different time that was not as reliant on technology. The airlines have greatly modified their operations and while the existing terminal has been well maintained to extend its useful life, current and future changes will continue to make it more difficult to operate in the existing building.

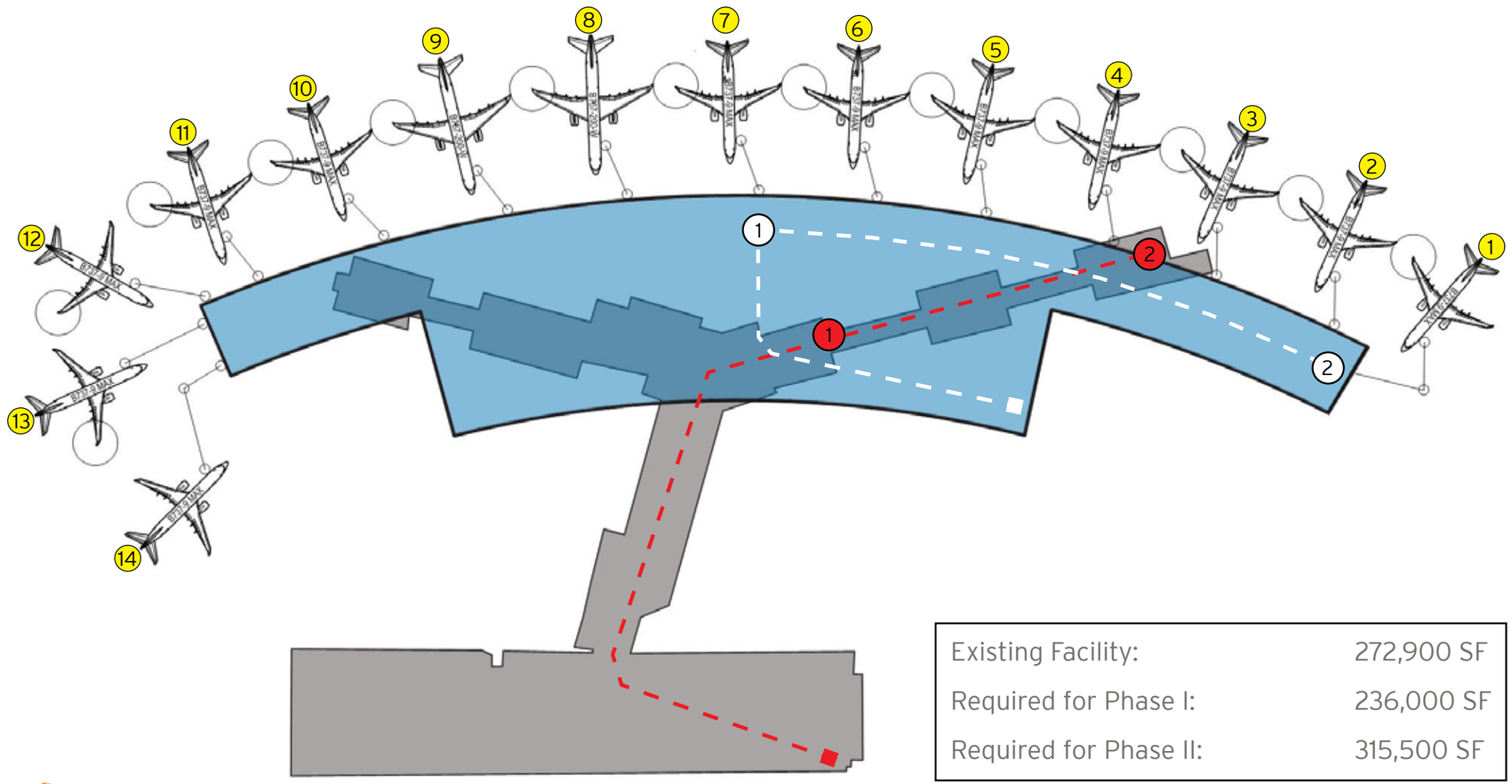
Airline Industry is changing:

- Larger aircraft
- Less 50 seat regional aircraft
- Larger regional (70 seat+) aircraft
- Recent entrants with larger aircraft (737) (Southwest, Allegiant)

Existing building constraints:

- Similar overall SF to proposed new terminal, but in the wrong places
- Concourses undersized to meet higher volume of people (hold rooms, concessions, restrooms)
- Security checkpoint width issues
- Ticketing and Baggage constraints

Figure 6.5 Terminal Comparison



Existing Facility:	272,900 SF
Required for Phase I:	236,000 SF
Required for Phase II:	315,500 SF

KEY POINTS

EXISTING TERMINAL:

- Inefficient layout
- Insufficient spaces
  - Holdrooms
  - Security Checkpoint
  - Concessions

EXISTING TERMINAL:

1. Shortest gate: **880 LF**
2. Farthest gate: **1,200 LF**

NEW TERMINAL:

1. Shortest gate: **465 LF**
2. Farthest gate: **1,000 LF**
14. **Contact gates**

6.6. Phase 1 Aircraft

The preferred alternative (Figure 6.6) provides a flexible airside that contains the required 14 gates in Phase I. All contact gates can accommodate Group III (737-900 / A321) aircraft with two contact positions capable of larger Group IV aircraft. In addition, 10 RON aircraft can be accommodated (9 at Group III and 1 at Group II). One caveat, is that RON position 7 can only be used during non-deice conditions.

A new deice pad will be constructed at the west portion of the quadrant. The new pad can accommodate 3 aircraft positions. Two positions are sized for Group III with the third capable of handling a Group IV aircraft.

The underground storm/deice storage tank can be maintained with no change, however, the above ground Storm Water Control building must be moved slightly to the west to accommodate proper clearances for the new taxilane. The existing building is one-story and an approximately 15'x15' structure.

The existing northeast entry to Taxiway P will be slightly modified for proper access into the new terminal area. In addition, another entrypoint to Taxiway P will be demolished and rebuilt slightly farther to the northeast. This addresses two issues:

- Allows for the necessary area for the 3 deice pads to the southwest.
- Correct an existing Runway Mitigation Incursion (RIM) issue that will need to be addressed according to FAA.

Most of the southern portion of the quadrant can remain without change. Minor re-striping will be required from the terminal area to Taxiway D and near the new RON positions (8-9).

Figure 6.6. East Overall Zoning

KEY POINTS

- 14 Contact gates
- 10 RON positions
- Glycol Building Relocation

737-900/ A321
757-200 (Group IV)
Hardstand Positions

6.7. Landside Zoning

The landside for the preferred alternative (as shown on Figure 6.7) includes modifications to many elements on the property with the intent to provide easier, safer and more intuitive vehicular circulation.

Fleur Drive & Airport Entry/Exit - The existing airport entry intersection from Fleur Drive to Cowles Drive will be eliminated and all vehicles will go through one entrypoint located further to the south near the existing airport exit. Further coordination with City of Des Moines traffic engineering department will occur, but an additional lane will be required along Fleur for traffic to safely maneuver to an "off-lane" before making a gentle curve onto airport property just south of the existing detention pond. This new roadway will be one-way as it meets up with Duck Pond Road to the east of the existing parking garage complex. The northbound traffic from Fleur Drive to the airport will be at a new intersection near the existing exit intersection and will gently merge into the southbound traffic as it approaches Duck Pond Road. The existing exit to Fleur Drive will remain but with potential enlargement. This will be clarified during the next programming task in coordination with the City of Des Moines engineering department.

Roadway Loop - The roadway loop will provide the necessary driving distances for safe deceleration and decision-making for exit into the parking entry plaza or for separation of departure and arrival curbs. The backside of the roadway loop (post-terminal) will be maximized by moving to the west of the existing roadways when the existing terminal is demolished. One important factor to the new roadway system is that there are no intersections or 90 degree turns which make it more efficient for circulation flow but also for safety purposes.

Entry Plaza - The new terminal roadway loop was designed to maximize the potential parking capacity within the loop to ensure parking for future demand. A new entry plaza is planned with 5 entry lanes. All public parking and rental car returns will enter through this plaza with separate lanes per use. The existing entry plaza will be demolished in its entirety.

Surface Parking - A new short term (hourly) parking lot will be included just north of the new entry plaza and can accommodate 120 parking spaces.

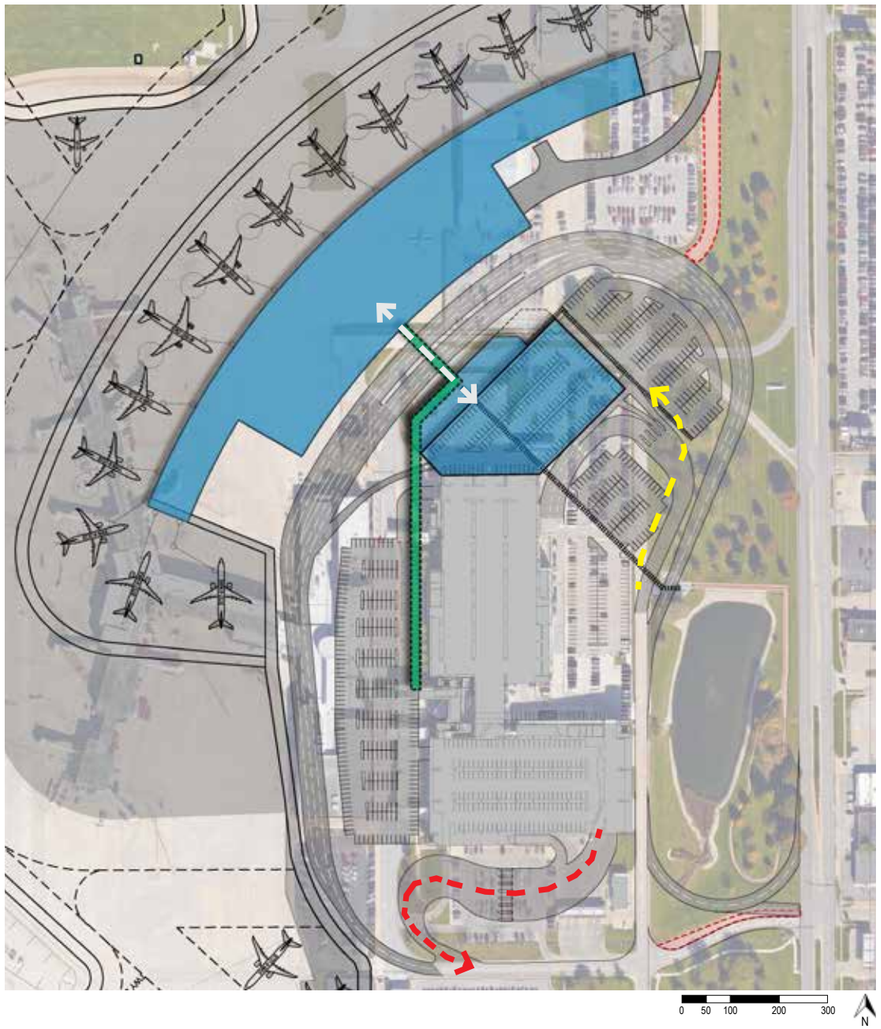
The existing long term lot (behind the existing garages) will be slightly modified to accommodate the new entry plaza. The layout will be modified so that the entire lot will include 214 parking stalls. Additionally, once the existing terminal is demolished, an additional 279 parking stalls can be developed.

Structured Parking – The existing parking structures will remain in their entirety and will become a mix of public long term structured spaces and rental car spaces. A new 4 story parking structure will be built directly in front of the new terminal and connected via a conditioned over-the-road pedestrian bridge. The 870 parking stall garage will accommodate rental car (ready-return) spaces on level 1 and short term parking on levels 2-4. A vehicular ramp will be included on the northeast side of the garage to circulate through the levels and will be directly tied into the existing garage on each level.

A consolidated rental car lobby is envisioned on the north face of the new parking structure. It will be the hub for all parking patrons (long and short term) to access the terminal via the over-the-road pedestrian bridge on level 2. All rental car counters will be located on level 1 of the lobby with easy access to the rental cars in the garage. No rental car counters or offices will be within the terminal building.

An additional conditioned pedestrian walkway is included along the west side of the existing garage that will connect the rental car lobby to the existing vertical circulation core (near the existing terminal to garage bridge). This walkway will also provide a connection to the new west surface parking lot.

Figure 6.7. East Overall Zoning



KEY POINTS

- New 4 - Level parking structure
  - Rental car
  - Public Parking
  - Pedestrian bridge
- Conditioned walkway to existing long term garages
- New entry and exit plazas
- Longer curbside
- Maximizes landside area for future growth

Pedestrian Access

Parking Entry

Parking Exit

Figure 6.8. Public Parking Space by Demand by Product

Type	Existing Supply	3 MAP (2027)	4 MAP (2042)
Short-Term	341	375	498
Long Term	1,732	2,548	3,398
Rental Car Ready-Return	435	420	570
Subtotal Terminal Area	**2,508**	**3,342**	**4,466**
Economy- Close-in (Econ 2&3)	1,037	1,409	1,879
Economy - Remote (Econ 1&4)	1,148	768	1,025
Employee	273	300	400
Rental Car Storage	700	700	1,000

6.8. Parking Breakout

To accommodate all of the required parking in Phase 1 of the terminal development new parking will be required within the terminal area. Figure 6.8 summarizes the parking provided in the east alternative. All economy lots will remain and a new four level parking structure, across the curbside from the terminal, accommodating 694 short-term parking spaces on levels 2 through 4 and 176 rental car ready-return spaces on level 1 (Figure 6.9). The structure will connect to the existing north and south garages, as shown on Figure 6.7, which provide 1,618 long-term parking spaces. A new short term surface parking lot serving hourly, meeter-greeter and well-wisher, parkers would be located adjacent to the structure with easy access to the terminal. The existing surface lot behind the north garage will remain and be expanded with an additional surface lot provided to the west once the existing terminal and curbside are removed. The lower levels of both the existing north garage and the new garage will be dedicated to rental car parking, providing approximately 421 spaces. All parkers and rental car customers will enter through a single entry plaza located off the entry road prior to the terminal curbside. All public parkers will exit on the south side of the terminal complex through a realigned exit plaza and rental car customers will exit the first floor of the garage directly onto the outbound roadway immediately past the terminal curbside.

The east terminal is located over the current employee parking lot and a new remote lot will be required to accommodate the employee parking demand. These spaces could be accommodated in Economy 1 or 4 until public parking demand increases and those spaces are required to meet public demand.

Figure 6.9. Parking Breakout

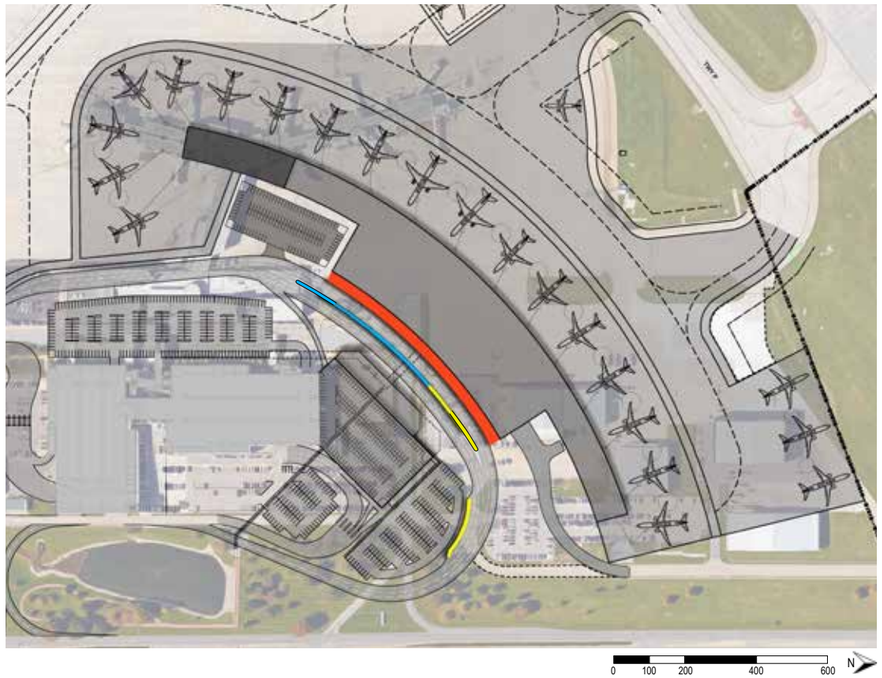
	Required 3 MAP	Existing	New	Total
East Terminal Area				
Short-Term (surface)	374	-	120	120
Short-Term (structured)		-	694	694
Long-Term(surface)	2,548	214	279	493
Long Term (structured)		1,618	-	1,618
Rental Car Ready - Return (structured)	420	245	176	421
Sub-total Terminal Area	**3,342**	**2,077**	**1,269**	**3,346**
Economy 2 &3	**1,409**	**1,037**		**1,037**
Remote				
New Remote				-
Economy 1 (surface)	768	848		848
Economy 4 (surface)	-	300		300
Employee (surface)	300	-		300
Sub-total Remote	1,608	1,148		1,148
Total	**5,819**	**4,262**	**1,269**	**5,831**

KEY POINTS

MAP = Million Annual Passengers

- New parking required witin terminal area
- Economy lots to remain
- New four level parking structure
- New short term surface parking
- Existing surface lot behind north garage to remain & be expanded
- Rental car parking all on garage level 1
- New remote employee parking

Figure 6.10. East: Curbs



Private Vehicle Curb - 630’

Taxi Curb - 150’ (Excluding waiting area)

Commercial Vehicle Curb - 580’

6.9. Curbs

Expanded curbsides (Figure 6.10 and 6.11) will be provided at the new terminal accommodating requirements for private vehicles on an inner curbside adjacent to the terminal through Phase 2 and commercial vehicles on an island curbside through Phase 1. A pullout for taxi staging near the curb is provided on the left side of the entry roadway allowing taxis to remain on the outer curb and not cross the inbound roadway in front of the terminal opposed to how they operate today.

KEY POINTS

Shorter dwell times

↓

Less linear feat of curb required

↓

Less Cost

Figure 6.11. East: Curb Lengths

Type	Required			Provided
	Existing Supply	3 MAP (2027)	4 MAP (2042)	
Inner Curb	545 ft			630 feet
Requirement existing dwell times		550 feet	675 feet	
Requirement 3 min dwell times		325 feet	400 feet	
Outer Curb	571 feet	610 feet	730 feet	730 feet

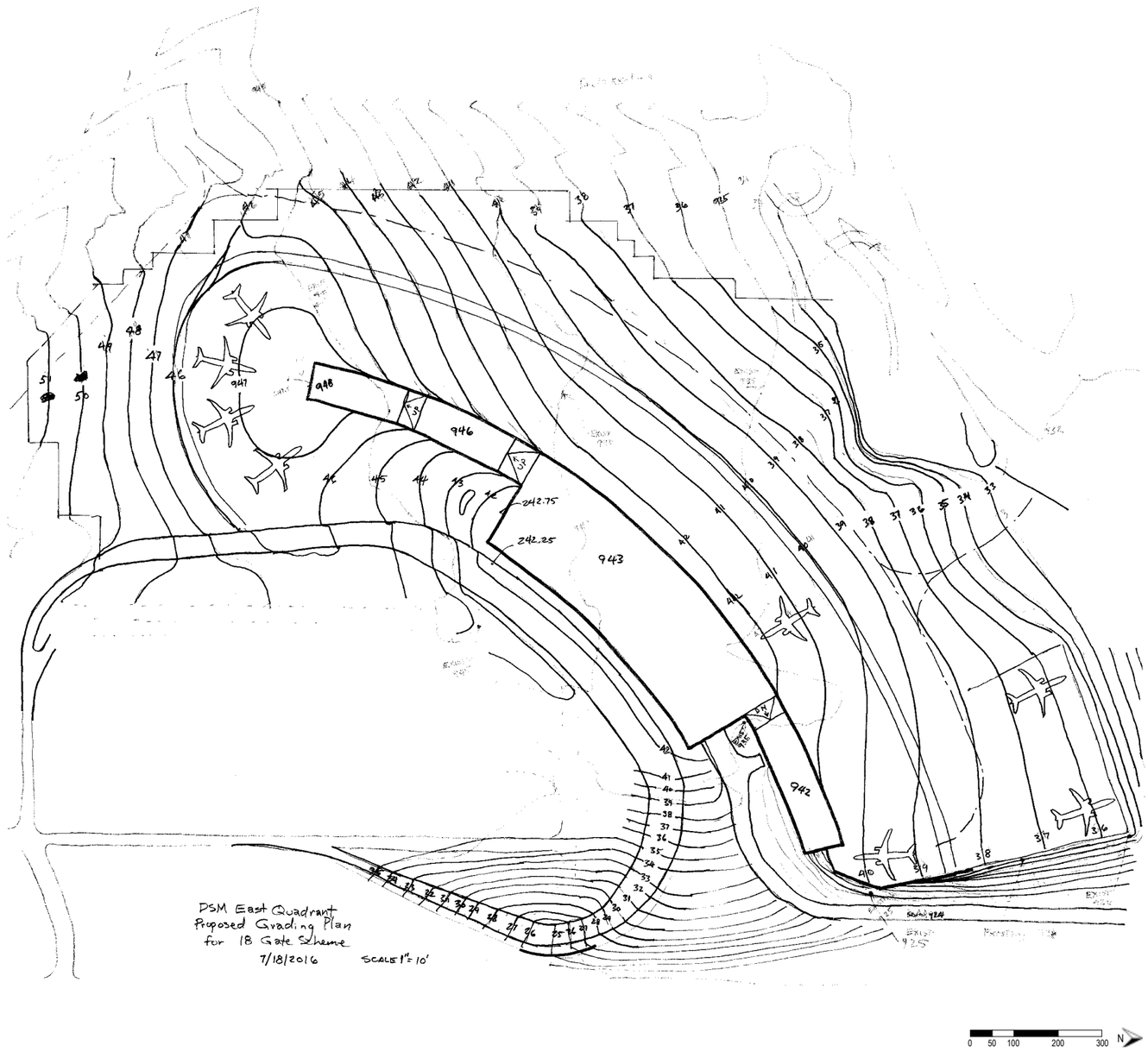
6.10. Proposed Grading Plan

The topography of the entire airport campus is quite diverse with fairly steep elevation changes. This will be a major component of the development of the terminal building site and how the new apron ties into the existing taxiway system. Figure 6.12 to the right illustrates an initial concept study of how to connect the new apron with the existing pavement and helped to determine the limits of new pavement for this concept (and ultimately the cost required). This concept included all 18 contact gates that are required for Phase II. Due to this steep slope, the terminal concourses may be required to include sloped ramps, similar to the existing facility. Further study of this will occur during Advanced Planning and Programming.

Additionally, the new roadway loop will gradually slope upwards to the new terminal curbfront, while the parking within the loop could remain slightly lower. This may help with the "canyon affect" between the terminal and garage and allow more daylight into the terminal ticketing and baggage areas and emphasize the terminal's physical prominence on the site.

Along Fleur Drive (near the new airside pavement), a retaining wall is conceptually shown to help with this vertical transition between the service road and the new airside pavement.

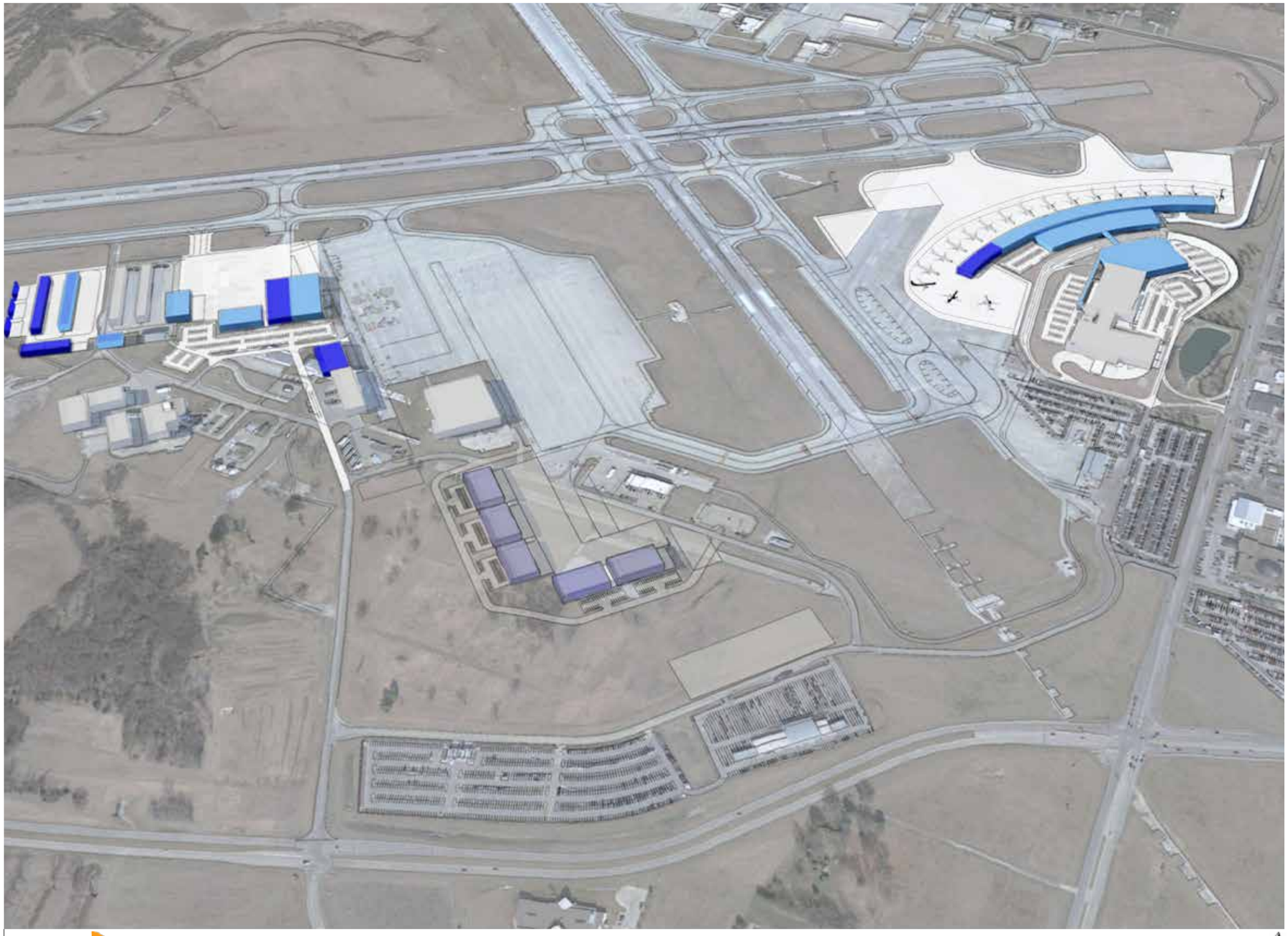
Figure 6.12. East Quadrant: Proposed Grading Plan



KEY POINTS

- Steep elevation changes throughout airport campus
- Proposed grading plan for connecting new apron to existing pavement
- Terminal located at a higher elevation than parking, reducing "canyon effect"

Figure 6.13. East Overall Phasing Diagram



KEY POINTS

- New 4 - level parking structure
  - Rental car
  - Public Parking
  - Pedestrian bridge or tunnel
- Requires more new parking spaces than East Concept
- New entry and exit plazas
- Longer curbside
- Maximizes landside area for future growth

Phase 1 Buildings
Phase 2 Buildings
Potential Future Corporate/GA

Figure 6.14. Existing Loading Dock

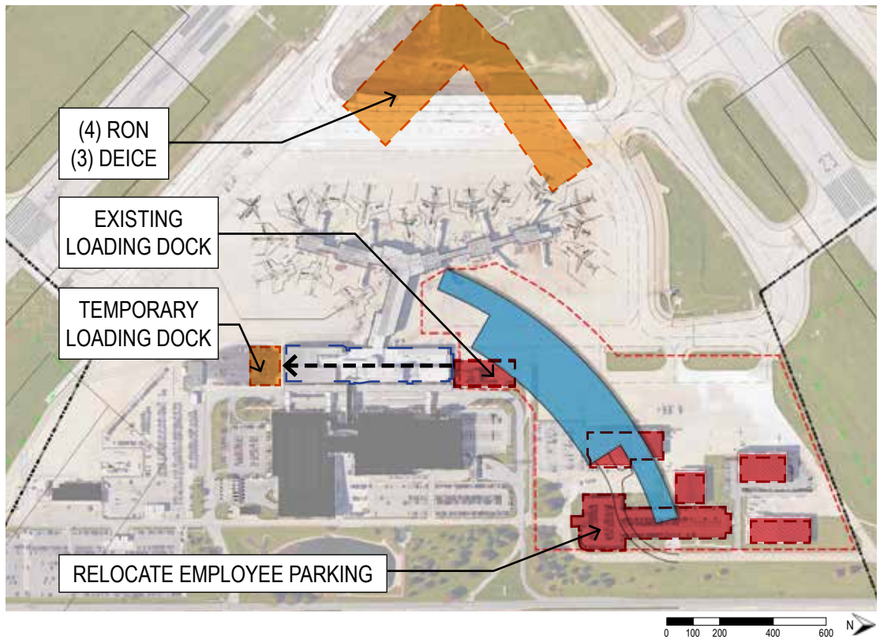
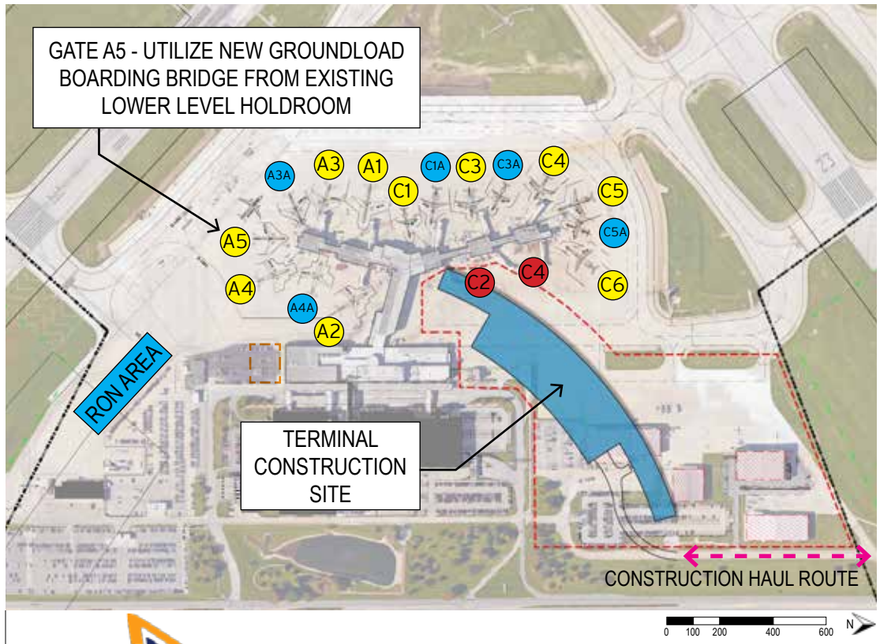


Figure 6.15. East: Phase 0 (Airside Operations)



Contact Gates & Hardstand Positions
Hardstand Positions
Demolish Contact Gates

6.11. Phase Enabling Projects

Before Phase 1 can begin, multiple steps need to be taken to prepare the new terminal site for construction.

GA/Corporate relocation - Within the construction site fence, all GA facilities and utilities including Signature, DSM Flying Services and HondaJet will need to be demolished and relocated (see Figure 6.14).

Employee Parking - The employee parking will be relocated to Lot #3.

Loading Dock - The existing loading dock and storage areas located north of the landside terminal will be demolished. Many options were studied including modifications to an existing freight elevator within the existing building. The final solution is to allocate space in existing rental lot #1 immediately adjacent to the building and install a temporary storage structure on this site. Goods would then be transported to the terminal.

Airside - Three new deice pads and four RON hardstands (indicated in orange on Figure 6.14) will be installed during this phase to maintain the required number of hardstand positions.

Passenger Boarding Bridge - At the existing terminal, a new groundload jetbridge at gate A5 will be installed to make up for the loss of contact gates on Concourse C during construction (gates C2 and C4). The existing building already contains a lower level holdroom with restroom facilities. It is anticipated that DSM will acquire a used groundload jetbridge from a nearby airport for utilization during construction. Foundations and pavement marking will need to be completed as an enabling project.

Utility Relocation & Site Grading – Utilities relocation will be included and after the above relocations, the site will be cleared and regraded to the appropriate slopes.

6.12. Phase 0 - Aircraft Requirements

During construction, existing gates C2 and C4 will be closed due to proximity to the new terminal/concourse. This will leave 10 gate positions open during Phase 0 with 15 RON hardstands at the terminal and 5 additional hardstands to the south. At Gate A5, the enabling project to install the groundload jetbridge will help to retain the required contact gates for operation.

KEY POINTS

- Enabling Projects:
  - Demolish & clear new terminal site; including higher grade
  - Relocate / build replacements for Signature, DSM Flying Services and HondaJet
  - Utility Relocations
  - Relocate Employee Parking
  - Relocate Loading Dock
  - Install new Deice pad & RON
  - Install new ground load jet bridge at gate A5
  - Abandoned freight elevator in existing building. Requires some rework for additional corridor and MEP modifications.
- Phase 0 (Airside Operations)
- Contact Gates:
  - 11 Existing
  - 10 Proposed during construction
- RON:
  - 15 Terminal
  - 5 Hardstand

6.13. Relocated Buildings - (South Quadrant)

For the East concept to become reality, there are enabling projects or relocations that would be required. As shown in Section 6.11, the existing GA/Corporate hangars located in the northern portion of the east quadrant need to move to the south quadrant. The three critical tenants/ buildings that will be relocated include:

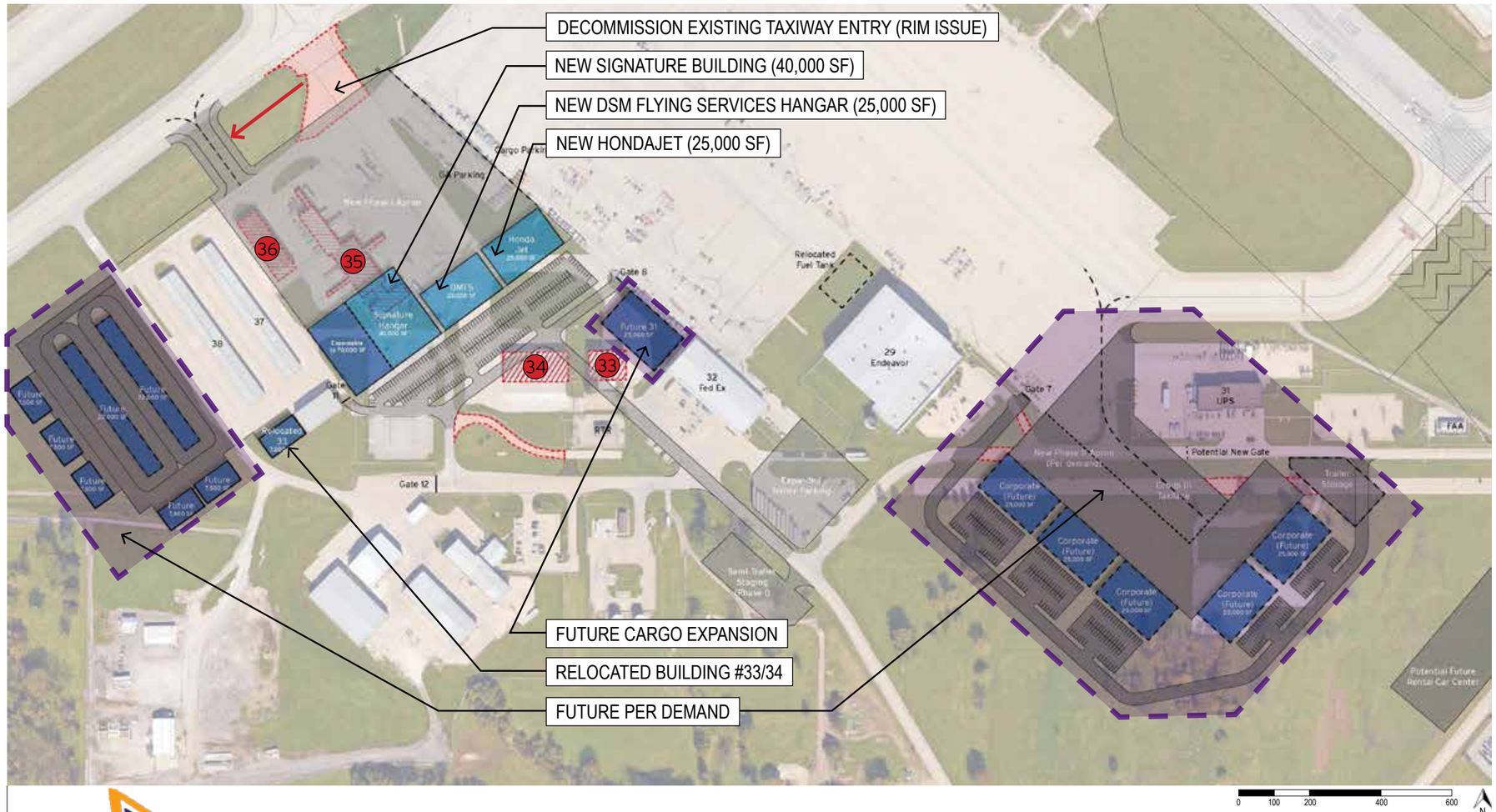
- DSM Flying Services Hangar (25,000 SF)
- Honda Jet Facility (25,000 SF)
- Signature Building which includes storage, maintenance and the Signature E Office/ Hangar

See Figure 6.17 for their new locations. New vehicular parking lots would be included in this construction as well as new entry road that would provide a more direct and intuitive access route from Army Post Road to the new facilities

Existing buildings 33, 34 and 35 will be demolished. Buildings 33 and 34 will be replaced. The new concept plan has accounted for additional future facilities indicated in purple on the plan, including a new GA campus to the east as well as new T hangars to the west. These will be incorporated with demand.

New apron would be required in Phase I to accommodate the relocated GA/Corporate tenants and a new taxiway entry would be included to eliminate an existing Runway Incursion Mitigaiton (RIM) issue.

Figure 6.17. Relocated Buildings - East Concept (South Quadrant)



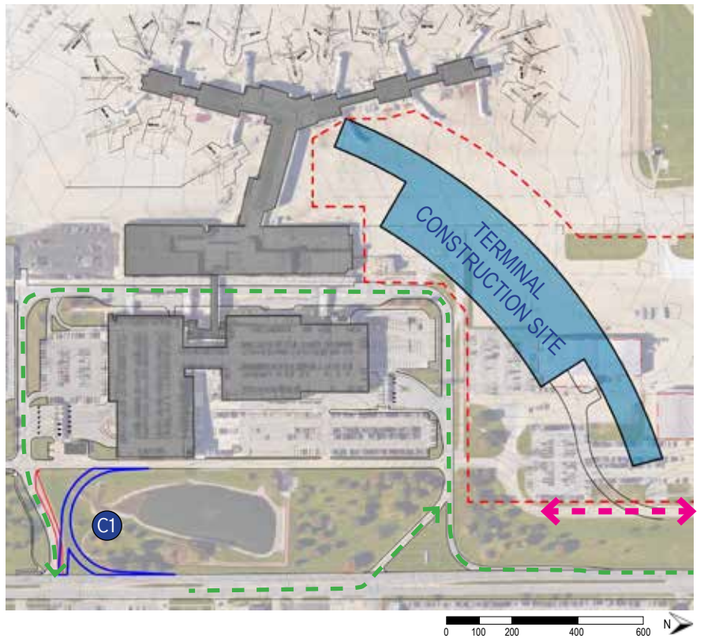
KEY POINTS

Relocated from East Quadrant
- DSM Flying Services Hangar
- Signature Maintenance
- Signature Storage Hangar
- Signature E Office/Hangar

South Quadrant Enhancements
- Decommission Taxiway Entry
- New Taxiway Entry
- T-Hangar Expansion

South Quadrant Demolition
- Bldg. 35 - Old UPS Air Sort & Office

Figure 6.18. East: Phase 1 - Landside



Demo

None

Under Construction

C1 New Entry Roads

Complete

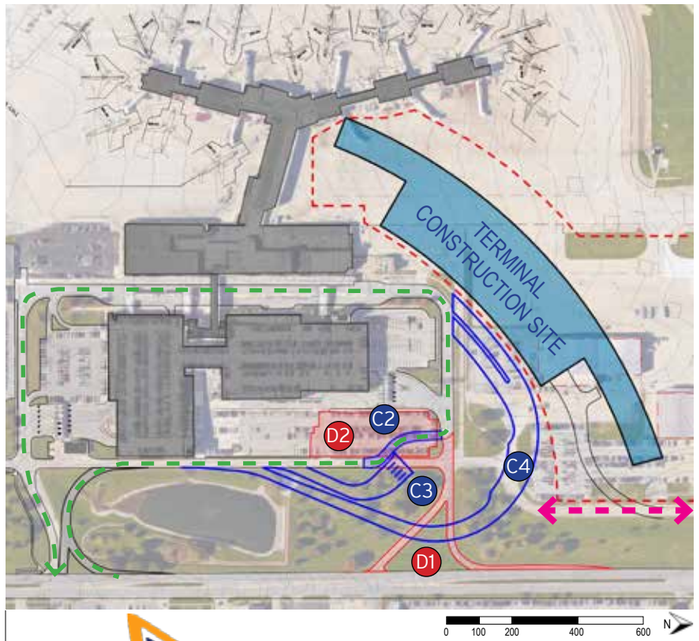
Enabling Projects

Vehicle Traffic

6.14. Phase 1 - Landside

After the enabling projects are complete, the landside phasing will begin with the construction of a new entry at Fleur Drive. One of the existing airport exit lanes on Highview Drive will be removed so that the intersection can accommodate both entry and exit points to the airport. While this new entry is under construction, vehicle traffic indicated in green in Figure 6.18 will continue to enter off of Cowles Drive.

Figure 6.19. East: Phase 2 - Landside



Demo

D1 Existing Cowles Drive entry from Fleur Drive

D2 NE corner long term lot

Under Construction

C2 Temporary Roadway loop lanes in existing parking lot

C3 New entry plaza

C4 New Roadway Loop

Complete

New entry roadways from Fleur Drive

Vehicle Traffic

6.15. Phase 2 - Landside

With the new entry in place at Highview Drive, Cowles Drive to the west of Fleur Drive can be demolished. During Phase 2, the northeast corner of the long term lot will also need to be removed. In its place, a temporary road will cut through the northeast corner of the lot to connect lanes from the new entry to the rest of the existing roadway loop (see C2 in Figure 6.19). Element C3 shows a new ticketing plaza to segregate short term hourly, garage, and long term lot parking. The new roadway loop's construction will also commence during this phase (C4.) It will wrap to the east of the new ticketing plaza and split into several lanes for drop off, pick up and bypass lanes. The new roadway loop will terminate in this phase at the existing roadway loop.

KEY POINTS

Phase 1 - Landside
- Construct new entry roads
- Complete enabling projects

Phase 2 - Landside
- Demolish Cowles Drive entry, NE corner of long term lot
- Construct temporary roadway loop, new entry plaza & new roadway loop
- Complete new entry roadways from Fluer Drive

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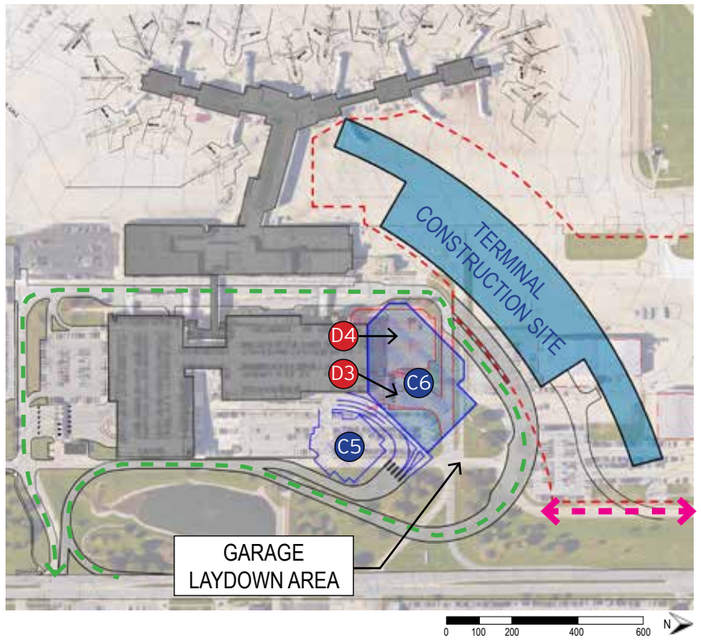
Figure 6.20. East: Phase 3 - Landside



Demo
- D3 Existing entry plaza
- D4 Existing short term lot

Under Construction
- C5 Long term lot expansion
- C6 New parking structure

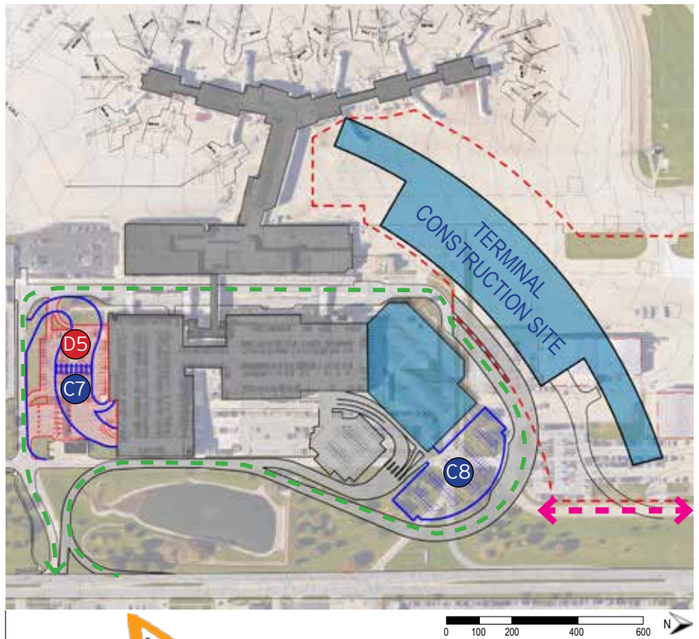
Complete
- New entry plaza
- New roadway loop

Vehicle Traffic

6.16. Phase 3 - Landside

During Phase 3 for the Landside, the existing entry plaza (D3) and short term lot (D4) indicated in Figure 6.20 will be demolished. The temporary road and part of the existing roadway loop to the north will be removed as well, and traffic will begin to flow through the newly completed roadway loop to the east of the entry plaza. New lanes will be constructed from that plaza to segregate traffic into the long term parking lot and existing garages. The long term parking lot will expand in alignment with the new entry plaza. During this phase, construction of the new parking garage across from the new terminal will begin. The laydown area to support construction of the new garage is shown to the northeast within the new roadway loop.

Figure 6.21. East: Phase 4 - Landside



Demo
- D5 Rental Lot 2

Under Construction
- C7 New exit plaza
- C8 New short term hourly lot

Complete
- New parking structure
- New long term layout

Vehicle Traffic

6.17. Phase 4 - Landside

When the new parking structure is completed, the new short term hourly lot (see C8 in Figure 6.21) can be constructed in place of the laydown area. Its boundaries will be offset from the roadway loop to the northeast.

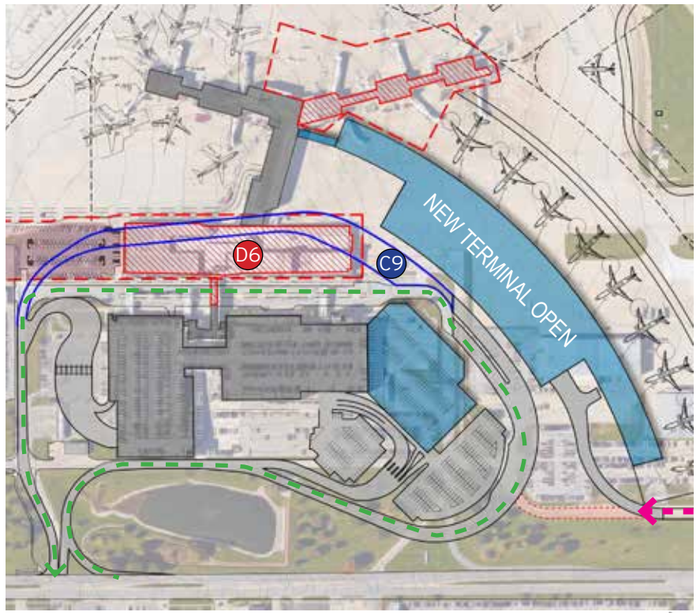
On the south side of the site, the Rental Lot 2 that is adjacent to the existing parking garage will be demolished and a new exit plaza will be established in its place. This exit plaza will capture all of the traffic leaving from the lots and garages within the roadway loop. After cars are cleared to exit, they will turn to merge with the existing roadway loop on Highview Drive to exit the airport complex.

KEY POINTS

Phase 3 - Landside
- Demolish existing entry plaza & short term lot
- Construct long term lot expansion & new parking structure
- Complete new entry plaza & new roadway loop

Phase 4 - Landside
- Demolish Rental Lot 2
- Construct new exit plaza & new short term hourly lot
- Complete new parking structure & new long term layout

Figure 6.22. East: Phase 5 - Landside (Opening Day)



Demo

D6 Existing Terminal

Under Construction

C9 Remainder of roadway loop

Complete

New exit plaza

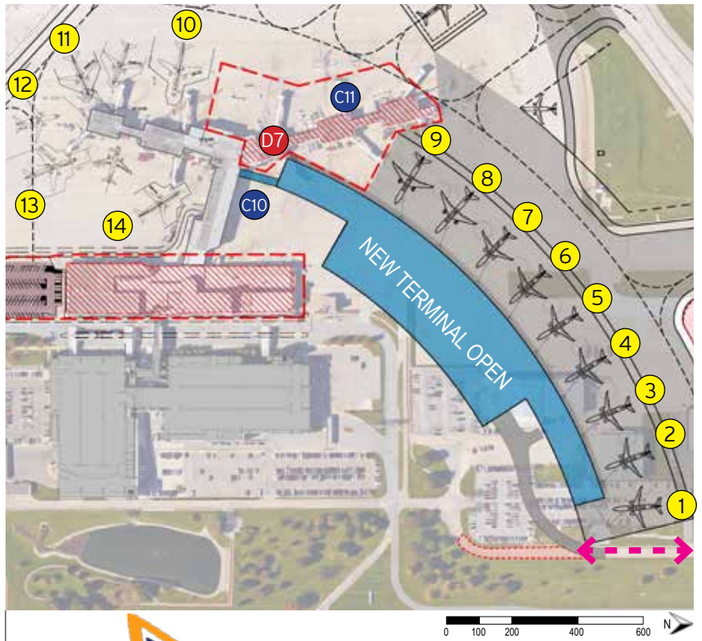
New short term hourly lot

Vehicle Traffic

6.18. Phase 5 - Landside (Opening Day)

Phase 5 for the Landside work will begin on the opening day for the new terminal. As indicated by the green dashed line in Figure 6.22, the vehicular traffic will still flow south adjacent to the existing garages while the existing landside terminal (D6) is being demolished. The north wing of the airside terminal will also be removed during this phase. The remainder of the roadway loop (C9) will be constructed once the landside terminal demolition is complete. The northern piece of the new roadway loop will extend the lanes constructed during Phase 2 and will include drop off, pick-up and bypass lanes. The curb adjacent to the new loop will extend south for future demand.

Figure 6.23. East: Phase 5A - Airside Operations (Opening Day)



Demo

D7 Existing C-gates

Under Construction

C10 Temporary secure bridge from new to existing

C11 New Apron

Complete

New Terminal Phase 1A

6.19. Phase 5A - Airside Operations (Opening Day)

Figure 6.23 represents the completion of Phase 1A for the airside terminal. The new terminal is open and demolition of the existing terminal will begin. The demolition phasing will start with the removal of the northern C-gates (D7.) All passengers will arrive through the new landside terminal and disperse to each of their gates. A temporary secure bridge (C10) will connect arriving and departing passengers using the remaining south A-gates in the existing terminal. As seen in the diagram, the first 9 gates are connected to the new terminal, while gates 10 – 14 are positioned at the old terminal. After the C-gates are demolished, new apron pavement (C11) will be poured to prepare for Phase 1B of the airside terminal development.

During Airside Phase 1B, the southern A-Gates old terminal building will be demolished. Gates 10 through 12 will be relocated to the new terminal once the new apron is complete. The new gates will face the new terminal's northeast façade, in line with positions 1-9. During this phase, the temporary bridge will also be deconstructed.

KEY POINTS

Phase 5 - Landside
- Demolish existing landside terminal
- Construct remainder of roadway loop
- Complete new exit plaza & short term hourly lot

Phase 5 - Airside
- Demolish existing C-gates
- Construct temporary secure bridge from new to existing & new apron
- Complete new airside terminal

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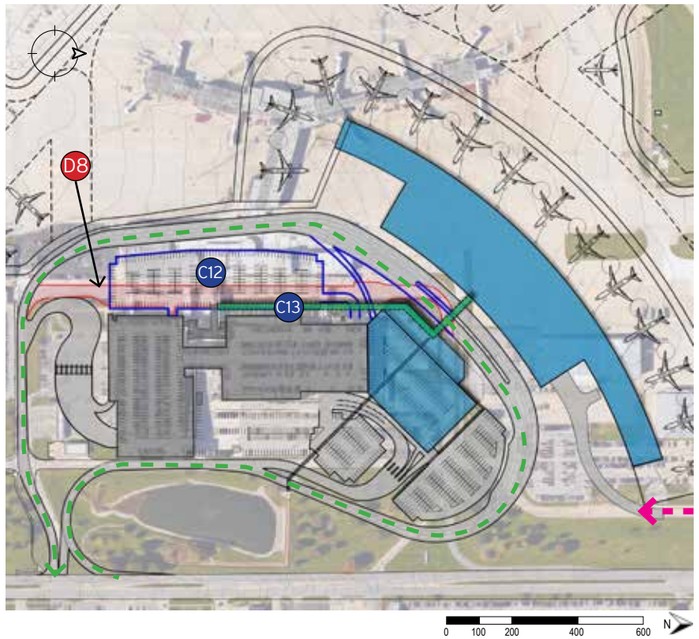
Figure 6.24. East: Phase 6 - Landside Final Completion



Demo

D8 Existing terminal curb front

Under Construction

C12 Long term parking lot expansion

C13 Pedestrian bridge connection to long term parking

Complete

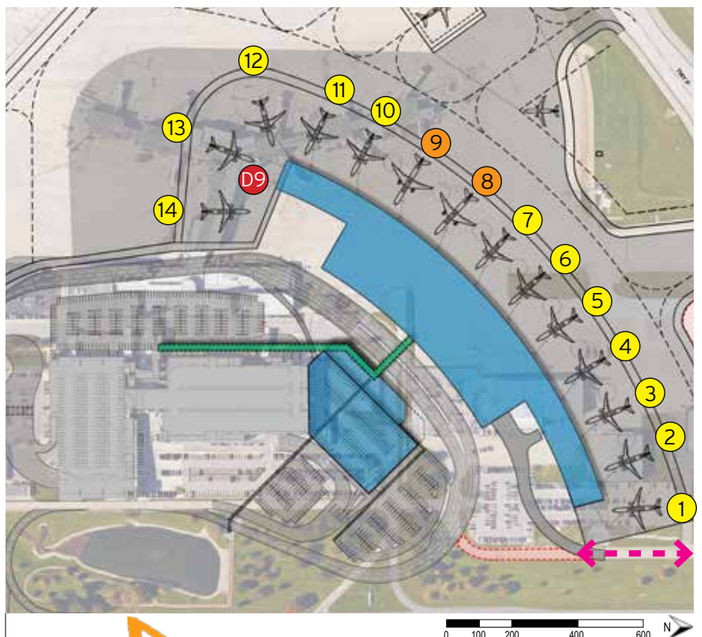
Full roadway loop

Vehicle Traffic

6.20. Phase 6 - Landside (Full Airside Operation)

During the final stage of landside construction, the existing terminal curb front and roadway loop will be demolished (D8 in Figure 6.24.) Traffic will be redirected to the recently completed west roadway loop. In the new open space, a long term surface parking lot will be constructed as an expansion of the long term lot to the east of the parking garage. Next, a new elevated pedestrian bridge (C13) will be added to connect pedestrians from the furthest parking space to the new landside terminal.

Figure 6.25. East: Phase 7 - Airside Final Completion



Demo

D9 Temporary Bridge

Complete

New Apron

6.21. Phase 7 - Airside (Full Airside Operation)

Figure 6.25 represents the final completion of the airside terminal. After Phase 1B is completed, the Airside terminal will hold 12 gates. In the last phase, all remaining elements of the old terminal will be completely removed, including the temporary bridge (D9) and new pavement will be placed for positions 13 and 14 in the diagram.

KEY POINTS

Phase 5 - Landside
- Demolish existing terminal curb-front
- Construct long term parking lot expansion; pedestrian bridge connection to long term parking
- Complete full roadway loop

Phase 5 - Airside
- Remove temporary bridge
- Complete new apron

6.22 Project Cost Analysis

Figure 6.25 shows the projected Phase 1 costs for the selected option for locating the new Terminal at the East Quadrant of the Airport. Construction costs are identified separately for the following areas:

- Enabling Projects include demolition and new buildings and related site work at the South Quadrant. The new buildings include those to replace the Des Moines Flying Services (including Honda Jet) and Signature facilities, which need to be removed from the East Quadrant prior to the start of construction of the new Terminal building.
- Demolition costs are for removal of site work and buildings at the East Quadrant.
- Terminal Building costs include the new 14 gate terminal building and the passenger boarding bridges.
- Airside Pavements include costs for apron paving, deicing pads, retaining walls and related site utilities and adjustments to the glycol management system.
- Landside Structures and Paving include parking garages, rental car facilities, surface parking lots, elevated walkways, changes to the parking entrances and exit plaza, roadway changes and retaining walls.
- Utilities includes costs for utility changes related to the landside structures and paving.

The Total Program Costs of approximately $491 million in 2016 dollars include a Contingency of 20% and Soft Costs of 28.5%.

Table 6.25 Total Project Cost

		East Option
Enabling Projects		$44,500,000
Demolition		$32,250,000
Terminal Building & PBB's		$132,500,000
Airside Pavements etc.		$26,000,000
Landside Structures and Paving		$39,000,000
Utilities		$44,750,000
Total Construction Costs		*$318,500,000*
Contingency	20%	$63,750,000
Total		*$382,275,000*
Soft Costs	28.5%	$109,000,000
Total Program Cost		**$491,250,000**

Figure 6.26 East Massing

KEY POINTS

- Total program costs, including contingency and soft costs, are approximately $491 million in 2016 dollars.

Chapter 7

Preliminary Financial Capacity

- Introduction

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Chapter 7 | PRELIMINARY FINANCIAL CAPACITY

7.1 Introduction

A Financial Feasibility Study will be completed for the East Option. This will be done as part of Detailed Programming, including development of the Program Definition Document, under Task Order No. 2.

KEY POINTS

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