

8.0

Airport Plans



8.0 AIRPORT LAYOUT PLANS

This chapter presents a detailed graphic and narrative description of the selected development concept for General Mitchell International Airport (MKE). The plans package presented in this chapter will serve as the Airport Division's primary planning tool for the long-range development of MKE's airfield and passenger terminal facilities.

The Future Airport Layout Plan (ALP) shows a conceptual layout of the airfield, landside, and ground access areas necessary to support the design year 2022 aviation activity projections. The ALP package includes the following 22 drawings:

- 1 of 21: Title Sheet
- 2 of 21: Existing Airport Layout Plan
- 3 of 21: Future Airport Layout Plan
- 4 of 21: Airport Data Summary
- 5 of 21: Terminal Area Plan
- 6 of 21: Airspace Plan
- 7 of 21: Inner Approach Plan Runway 7L
- 8 of 21: Inner Approach Plan Runway 25R
- 9 of 21: Inner Approach Plan Runway 7C
- 10 of 21: Inner Approach Plan Runway 25C
- 11 of 21: Inner Approach Plan Runway 7R
- 12 of 21: Inner Approach Plan Runway 25L
- 13 of 21: Inner Approach Plan Runway 19L
- 14 of 21: Inner Approach Plan Runway 1R
- 15 of 21: Inner Approach Plan Runway 19R
- 16 of 21: Inner Approach Plan Runway 1L
- 17 of 21: Inner Approach Plan Runway 13
- 18 of 21: Inner Approach Plan Runway 31
- 19 of 21: On-Airport Land Use Plan

20a of 21: Exhibit A Airport Property Map

20b of 21: Exhibit A Airport Property Map

21 of 21: Airport Photograph

8.1 Airport Design Standards

The MKE airport plans package was prepared using Federal Aviation Administration (FAA) standards and guidelines for use in the design of civil airports. The design standards are set forth in FAA Advisory Circular 150-5300-13 *Airport Design (Change 11)*. In addition the airport layout plan package was prepared in accordance with the FAA Great Lakes Region ALP Checklist (2007).

One of the key factors of the airport design advisory circular was to organize the airport design standards by Airport Reference Codes (ARC). The ARC incorporates the operational and physical characteristics of the critical aircraft approach category and an airplane design group. The aircraft approach category, based on the aircraft approach speed, relates to the operational requirements of the aircraft while the airplane design group, based on aircraft wingspan, relates to the physical requirements of the aircraft.

The ARC is based on the most demanding aircraft that is anticipated to serve the Airport during the twenty-year planning period. For MKE the critical aircraft was determined to be the Boeing 747-400 which will remain in service through the twenty-year planning period. The 747-400 is classified under Approach Category D and Airplane Design Group V. The applicable recommended airfield design standards for ARC D-V are shown in **Table 8-1**. Except where noted, all aeronautical and airfield design standards applicable to ARC D-V have been incorporated into the proposed airfield geometry.

Table 8-1
Recommended FAA Airfield Design Standards
(Design Group V)

<u>Design Element</u>	<u>Design Standard (Feet)</u>
• Runway Width	150
• Runway Centerline to Parallel Taxiway Centerline:	400
• Runway Safety Area Width:	400
• Taxiway Width:	75
• Taxiway Centerline to: Parallel Taxiway/Taxilane Centerline:	267
• Taxiway Fixed or Movable Object:	160
• Taxiway Safety Area Width:	245
• Taxilane Centerline to Taxilane Centerline:	245
• Taxilane Fixed of Movable Object:	138

Since the north airfield taxiway system is only used by General Aviation Aircraft types, the perimeter taxiways 'C', 'D', and 'H' will comply with Design Group III object clearance standards which require an object clearance of 93 feet from the centerline of each existing taxiway. Design Group III includes the Boeing BBJ (B-737) which is considered to be the typical largest corporate aircraft that will operate from the north airfield during the twenty-year planning period.

The narrative description on the recommended Airport development program includes 14 major projects. The priority and development staging for each project is depicted on the relevant drawings and discussed in the following three sections:

- Airport Layout Plan (Drawings 1, 2, 3, 4 and 5)
- Runway Approach Plans (Drawings 6 through 18)
- Airport Land Use Plan (Drawings 20, 21 and 21)

8.1.1 *Airport Layout Plan*

The Airport Master Planning process culminates with the FAA’s approval of the ALP. For the County of Milwaukee Department of Public Works / Airport Division (Airport Division), the ALP serves as a “*blueprint*” for the future renovation and development of MKE. The ALP drawings that describe the 20-year development program for MKE are discussed below.

Drawing 1 of 21 Title Sheet: The Title Sheet of the ALP Plans Package contains the following information:

- Project Title: Airport Layout Plans
- Facility Name : General Mitchell International Airport (MKE)
- Airport Sponsor: County of Milwaukee DPW / Aviation Division
- Sponsor Address: 5300 S. Howell Concourse C, MKE,
Milwaukee, WI 53207
- Location Maps: Shows location of MKE in Southern Wisconsin
- Index of Drawings: Nineteen drawings
- FAA Approval: Great Lakes Region Office of the FAA
- WTD/BA Approval: Chief Airport Engineer
- Airport. Div. Approval: Airport Director

Drawing 2 of 21 Existing Airport Layout Plan: The existing ALP is included as a reference plan to complement the Future ALP since the level of proposed development obscures pertinent existing detail in some locations on the Airport.

Drawing 3 of 21; Future Airport Layout Plan, 4 of 21; Airport Data Summary, and 5 of 21; Terminal Area Plan: As the focal point of the Plans Package, the Future Airport Layout Plan

(ALP), Airport Data Summary, and Terminal Area Plan (TAP) delineate all future aeronautical requirements of the Airport.

The improvements presented on the Future ALP and Future TAP are based on the Master Plan Update analysis. Many of these improvements are consistent with the 1992 MKE Airport Master Plan Update. Several of the recommended airfield and terminal area improvements from the 1992 Master Plan Update have been implemented. The remaining major recommendations have either been incorporated into the Future ALP or superseded by current master plan recommendations. These recommendations are described in the following paragraphs.

The design year 2022 Airport Development Program indicated on the Future ALP and TAP are intended to be implemented in three phases. The assignment of projects to each development phase is flexible, as a number of factors influence whether a project will take place at a specific time. For example, some items in Phase I may actually occur in the Phase II time frame. This could be due to project approval delays, Federal and local funding issues, shifts in market demand, aircraft operational activity levels that differ from forecasts, policy issues, and other operational considerations that are unique to the development of a public airport.

The first two phases, which encompass ten years, are proposed to support projects that have been identified to meet a proven need, or those with a high probability of occurrence. The remaining, long-range aviation development projects depict airfield and landside development projects that are related to projected 20-year aviation activity demands described in Chapter 3.0. The three development phases included in the Future ALP are:

- Phase I - 2008-2012
- Phase II - 2013-2017
- Phase III - 2018-2022




The three development phases are carried into and discussed in the financial feasibility plan (Chapter 9.0) following this chapter. This chapter presents brief conceptual level descriptions of the 14 major capital improvement projects. The proposed projects are depicted in

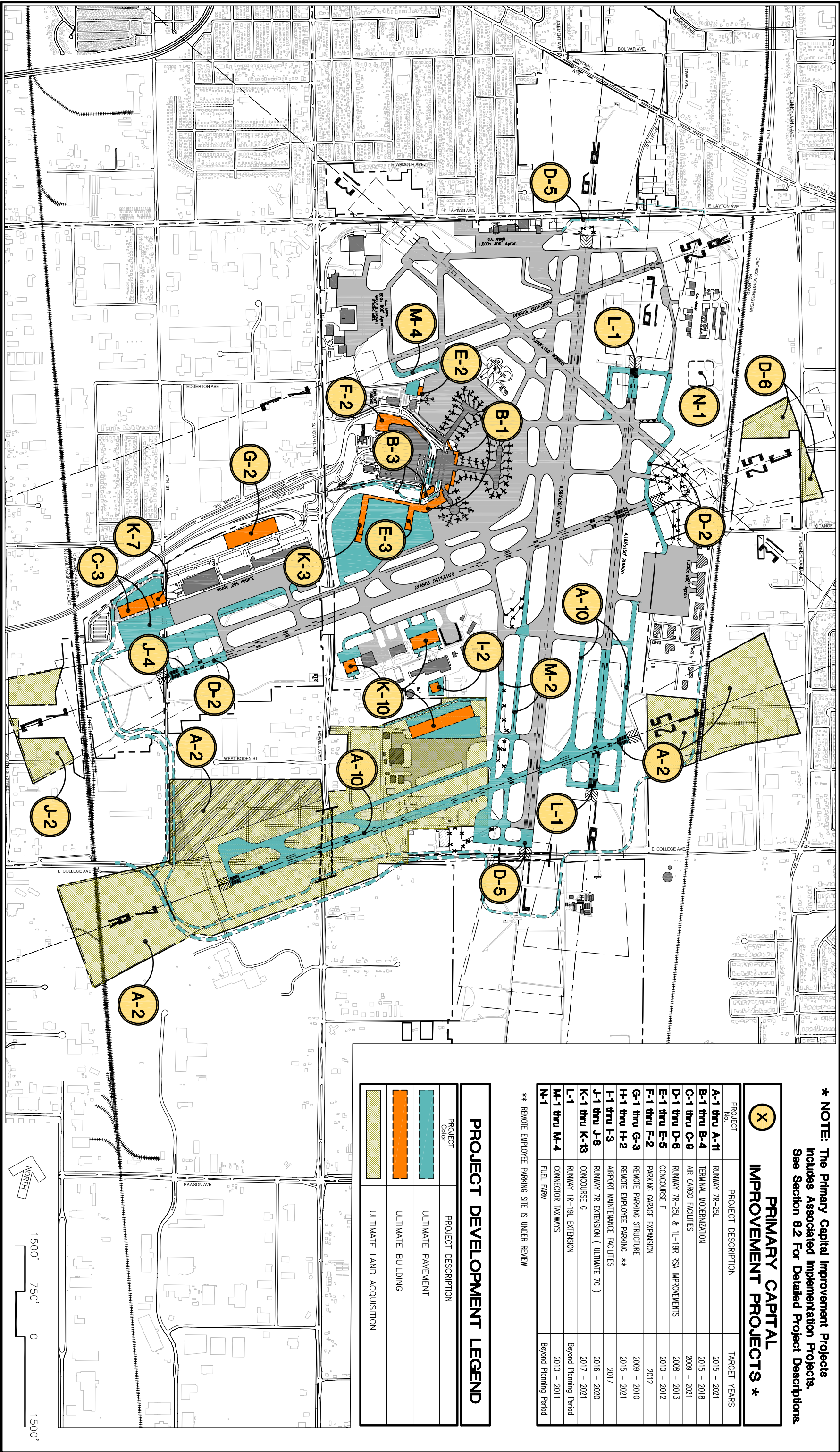
Exhibit 8-1. The estimated construction costs and detailed phasing (by year) for each project is presented in the 20-year financial development plan that is described in the following Chapter 9.0.

*** NOTE: The Primary Capital Improvement Projects**
Includes Associated Implementation Projects.
See Section 8.2 For Detailed Project Descriptions.

PRIMARY CAPITAL IMPROVEMENT PROJECTS *		
PROJECT No.	PROJECT DESCRIPTION	TARGET YEARS
A-1 thru A-11	RUNWAY RR-25L	2015 – 2021
B-1 thru B-4	TERMINAL MODERNIZATION	2015 – 2018
C-1 thru C-9	AIR CARGO FACILITIES	2009 – 2021
D-1 thru D-6	RUNWAY RR-25L & 11-19R R34 IMPROVEMENTS	2008 – 2013
E-1 thru E-6	CONCOURSE F	2010 – 2012
F-1 thru F-2	PARKING GARAGE EXPANSION	2012
G-1 thru G-3	REMOTE PARKING STRUCTURE	2009 – 2010
H-1 thru H-2	REMOTE EMPLOYEE PARKING **	2015 – 2021
I-1 thru I-3	AIRPORT MAINTENANCE FACILITIES	2017
J-1 thru J-6	RUNWAY RR EXTENSION (ULTIMATE 7C)	2016 – 2020
K-1 thru K-13	CONCOURSE G	2017 – 2021
L-1	RUNWAY RR-19L EXTENSION	Beyond Planning Period
M-1 thru M-4	CONNECTOR TAXIWAYS	2010 – 2011
N-1	FUEL FARM	Beyond Planning Period

** REMOTE EMPLOYEE PARKING SITE IS UNDER REVIEW

PROJECT DEVELOPMENT LEGEND	
PROJECT Color	PROJECT DESCRIPTION
	ULTIMATE PAVEMENT
	ULTIMATE BUILDING
	ULTIMATE LAND ACQUISITION



8.2 Capital Development Plan

The MKE Master Plan Study Update was initiated in 2001 with assumed project implementation dates to follow attainment of activity levels that would trigger the need for development, and to follow various Federal, State and local approval processes. The actual start of the proposed airfield and landside development projects may vary due to the timing of activity levels and the multiple government approvals required for project implementation. A summary of the following 14 major Capital Improvement Projects is presented in **Table 8-2**.

TABLE 8.2-1
General Mitchell International Airport
CAPITAL IMPROVEMENT PROGRAM

NO.	PROJECT DESCRIPTION	TARGET YEAR	UNITS	QUANTITY	UNIT COST	TOTAL COST
A	Proposed Runway 7R-25L					\$234,064,547
1	Environmental Impact Statement (EIS)	2015-16	LS	1	\$6,000,000	\$6,000,000
2	Land Acquisition	2017-18	Acres	420	\$295,268	\$124,012,618
3	Demolition of Structures	2018-19	Each	307	\$31,822	\$9,769,265
4	Site Preparation/Drainage	2018-19	Acres	316	\$18,886	\$5,967,940
5	Relocate College Avenue	2018-19	SY	43,000	\$69	\$2,972,768
6	South Howell Tunnel (1,100' X 200')	2018-2019	LS	1	\$40,000,000	\$40,000,000
7	Perimeter Road	2018-19	SY	26,000	\$49	\$1,284,439
8	CAT-I Navigation System	2020	Each	2	\$2,000,000	\$4,000,000
9	Perimeter Fence	2020-21	LF	16,000	\$62	\$993,450
10	Runway Construction	2020-21	SY	116,700	\$209	\$24,341,833
11	Taxiway Construction	2020-21	SY	102,000	\$144	\$14,722,234
B	Terminal Modernization					\$53,237,608
1	Phase I Central Terminal	2015-17	SF	65,000	\$430	\$27,959,058
2	Phase II South Terminal	2017	SF	48,000	\$430	\$20,646,689
3	Phase III Ground Access	2018	SY	13,600	\$49	\$671,860
4	Parking Garage Walking Connector	2018	SF	18,000	\$220	\$3,960,000
C	Air Cargo Facilities					\$30,088,212
1	Environmental Assessment	2009	LS	1	\$400,000	\$400,000
2	Phase I- Site Preparation/Drainage	2012	Acres	20	\$18,886	\$377,718
3	Phase I- Air Cargo Warehouse	2012	SF	60,000	\$150	\$9,000,000
4	Phase I- Air Cargo Apron	2012	SY	49,000	\$138	\$6,744,585
5	Phase I- Truck/Employee Parking	2012	SY	6,600	\$34	\$224,718
6	Phase II-Site Preparation/Drainage	2020	Acres	20	\$18,886	\$377,718
7	Phase II- Air Cargo Warehouse	2021	SF	50,000	\$150	\$7,500,000
8	Phase II- Air Cargo Apron	2021	SY	39,000	\$138	\$5,368,139
9	Phase II- Truck/Employee Parking	2021	SY	2,800	\$34	\$95,335
D	Runways 7R-25L & 1L-19R RSA Improvements ¹					\$52,559,150
1	Re-Route 6th Street to New Alignment	2008-10	LS	1	\$3,029,400	\$3,029,400
2	Shift Rwy 7R 539 ft West & Construct New 25L T/W N	2008-10	LS	1	\$12,010,097	\$12,010,097
3	Construct College Ave. Tunnel Under 1L RSA	2009-12	LS	1	\$25,595,507	\$25,595,507
4	Remove Pavement on 25L - Remark & Relight	2009-2012	LS	1	\$1,247,198	\$1,247,198
5	Phase 2: Extend: Rwy 1L 300 ft., Twy R 300 ft., & Rwy 19R Per. Rd.	2009-13	LS	1	\$6,247,628	\$6,247,628
6	25L RPZ Land Acquisition	2010-13	Acres	15	\$295,288	\$4,429,320
E	Concourse F					\$52,764,623
1	Site Preparation/Drainage	2011-12	Acres	19	\$18,886	\$358,832
2	Relocate GSE	2011-12	SF	6,000	\$50	\$300,000
3	Construct Concourse F	2011-12	SF	90,000	\$430	\$38,712,542
4	Aircraft Apron	2010-11	SY	96,600	\$138	\$13,296,468
5	Fuel Hydrant	2010-11	Each	6	\$16,130	\$96,781
F	Parking Garage Expansion					\$28,284,822
1	Site Preparation/Drainage	2012	Acres	7	\$18,886	\$132,201
2	Parking Garage Construction	2012	Space	1,700	\$16,560	\$28,152,621
G	Remote Parking Structure					\$109,506,156
12	Site Preparation/Drainage	2015-16	Acres	11	\$18,886	\$207,745
2	Phase I- Construction	2015-16	Spaces	3,800	\$16,560	\$62,929,388
3	Phase II- Construction	2020-21	Spaces	2,800	\$16,560	\$46,369,023

H	Remote Employee Parking					\$1,100,664
1	Site Preparation/Drainage	2009	Acres	11	\$18,886	\$207,745
2	Grade Level Parking Lot	2010	Spaces	600	\$1,488	\$892,919
I	Airport Maintenance					\$2,453,824
1	Site Preparation/Drainage	2017	Acres	4	\$18,886	\$75,544
2	Construct Maintenance Building	2017	SF	20,000	\$107	\$2,139,943
3	Storage Yards/Parking	2017	SY	7,000	\$34	\$238,337
J	Runway 7R Extension (Ultimate 7C)					\$13,465,391
1	Environmental Impact Statement (EIS)	2016	LS	1	\$2,000,000	\$2,000,000
2	Land Acquisition Runway Protection Zone	2018	Acres	19	\$295,268	\$5,610,092
3	Site Preparation/Drainage	2019	Acres	12	\$15,106	\$181,271
4	Runway Construction (461 ft. x 150 ft.)	2020	SY	7,680	\$209	\$1,601,930
5	Taxiway Construction	2020	SY	6,250	\$144	\$902,098
6	Aircraft Hold Apron	2020	SY	22,000	\$144	\$3,168,000
7	Relocate CAT-I ILS	2020	LS	1	\$2,000	\$2,000
K	Concourse G					\$132,522,407
1	Site Preparation/Drainage	2017	Acres	28	\$18,886	\$528,805
2	Demolition of 5 Hangars & US Post Office	2017	SF	100,000	\$21	\$2,107,683
3	Construction of Concourse G	2020-21	SF	160,000	\$430	\$68,822,298
4	Federal Inspection Service Facilities in Concourse G	2020-21	SF	40,000	\$200	\$8,000,000
5	Aircraft Apron	2020-21	SY	94,000	\$138	\$12,938,592
6	Post Office Site Preparation/Drainage	2020-21	Acres	4	\$18,886	\$75,544
7	Construction of US Post Office ²	2020-21	SF	40,000	\$150	\$6,000,000
8	Post Office Truck Apron & Parking	2020-21	SY	7,000	\$34	\$238,337
9	Corporate Hangar Area Site Preparation/Drainage	2020-21	Acres	18	\$18,886	\$339,946
10	Construct Corporate Hangars ²	2020-21	Each	5	\$6,000,000	\$30,000,000
11	Corporate Hangar Apron	2020-21	SY	21,300	\$138	\$2,931,830
12	Corporate Hangar Access	2020-21	SY	7,000	\$49	\$345,811
13	Fuel Hydrant System	2020-21	Each	12	\$16,130	\$193,563
L	Runway 1R-19L Extension					Beyond planning period
M	Connector Taxiways					\$10,835,790
1	Site Preparation/Drainage	2010-11	Acres	55	\$18,886	\$1,038,724
2	Taxiway R Extension to Rwy. 1L	2020-21	SY	34,000	\$144	\$4,907,411
3	Taxiway T Extension to Rwy 1L	2020-21	SY	24,000	\$144	\$3,464,055
4	Taxiway V Relocation to 307 ft. Separation - Rwy 7L	2010-11	SY	6,600	\$144	\$950,400
5	Taxiway H Extension to Rwy 31	2010-11	SY	3,300	\$144	\$475,200
N	Fuel Farm					Beyond planning period
Total Capital Project Costs						\$720,883,195
OTHER COSTS						
Mobilization		5%				\$36,044,200
Design & Program Management		20%				\$144,176,600
Contingencies		20%				\$144,176,600
Total Other Costs						\$324,397,400
Total Program Costs						\$1,045,280,595

Source: PB Americas, Inc. and Norris & Associates, Inc.

SY: Square Yards

SF: Square Feet

Estimates based on 2007 dollars

¹ Mead & Hunt RSA Costs

² Project funded by others

Revised: March 26, 2008

A. Proposed Runway 7R-25L

The development of Runway 7R-25L that is proposed to have a length of 7,000 feet and be located 3,540 feet south of Existing Runway 7R-25L (future 7C-25C) includes the following implementation projects:

- A-1 Environmental Impact Statement (EIS) (2015-2016):** The EIS approval process is required by the FAA before the implementation of the runway development project can begin. This study requires approximately two years too complete. Major environmental issues to be assessed include the relocation of approximately 192 residential properties, and the relocation of East College Avenue which will impact the Milwaukee Area Technical College (MATC).
- A-2 Land Acquisition (2017-2018):** In preparation for the construction of the Proposed Runway 7R-25L, this project requires the acquisition of approximately 420 acres of developed land that is required for the proposed 7,000 feet by 150 feet runway, and the associated Group V parallel taxiway system. Properties to be acquired include the recently closed 102-acre 440th U.S.A.F. Reserve base, the approximately 192 single-family homes located on the north side of East College Avenue, approximately 30 commercial properties, and approximately 37 industrial properties. In addition approximately 16 additional public owned properties will be required or their functional use will be impacted by the land acquisition program.
- A-3 Demolition of Structures (2018-2019):** After sufficient land is acquired to initiate the construction of Runway 7R-25L, the demolition of approximately 307 structures will be required. This will include military, commercial, and residential structures. The approximately 90 acres of property located outside the object free areas that are not required to be removed in this project will become a part of the proposed MKE Aviation Related Commercial Land Use Development Area.
- A-4 Site Preparation / Drainage (2018-2019):** This task will require the removal of all USAF facilities, power poles, roadways, and underground utilities that are within the

approximately 316-acre object free area and runway protection zones associated with the proposed Runway 7R-25L. This project also includes site grading of the Runway 7R-25L and the construction of a surface drainage system.

- A-5 Relocate East College Avenue (2018-2019):** To provide for the construction of Runway 7R-25L approximately 5,400 linear feet (43,000 square yards) of East College Avenue will require relocation. The relocated roadway will be located 800 feet to the south and parallel to Runway 7R-25L and tie back in with East College Avenue at the south end of 6th Street.
- A-6 South Howell Avenue Tunnel (2018-2019):** A 1,100 foot x 200 foot section of the existing four-lane South Howell Avenue will require a tunnel under the proposed Runway 7R-25L. This tunnel will pass under the proposed 150 foot wide runway; a 75 foot wide parallel taxiway located 400 feet north of the runway, and an airfield service road located 400 feet south of the runway.
- A-7 Perimeter Road (2018-2019):** For airfield safety, maintenance, and security purposes, a 6,400 foot two-lane (26,000 square yards) airfield perimeter security and airfield service road is required to be constructed 400 feet from the centerline and south of proposed Runway 7R-25L.
- A-8 CAT-I Navigation System (2020):** Instrument landing systems required for both ends of Runway 7R-25L include: Glide Slope (GS) Localizer (LOC), Runway Visual Range (RVR), Approach Lighting System (ALS), Precision Approach Path Indicator (PAPI), Middle Marker (MM), and Outer Marker (OM).
- A-9 Perimeter Fence (2020-2021):** For airfield safety and security purposes the proposed runway will require approximately 16,000 linear feet of ten feet high perimeter fence. The fence will parallel the relocated East College Avenue and be located approximately 750 feet south of the centerline of Runway 7R-25L.

A-10 Runway Construction (2020-2021): The construction of the proposed 7,000 feet x 150 feet Runway 7R-25L will include approximately 116,700 square yards of concrete pavement. This project also includes jet blast pads off of the ends of the runways, runway edge lighting, markings, signing, and ground cover.

A-11 Taxiway Construction (2020-2021): Three sections of 75-foot wide connector taxiways (102,000 square yards) are required to support Runway 7R-25L. This includes the parallel taxiway, two high-speed exit taxiways, and the terminal connector taxiway located 600 feet east of Runway 1L-19R

B. Terminal Modernization

The main terminal improvement program is related to TSA passenger security requirements and growth in scheduled passengers. This project includes the relocation of passenger security areas, concession areas, ticketing areas, baggage claim areas, and terminal access roadway improvements

B-1 Phase-I Central Terminal (2015-2017): This 65,000 square foot project includes the expansion of the main terminal ticketing lobby, baggage claim area, concessions areas, and TSA passenger security areas.

B-2 Phase-II South Terminal (2017): This 48,000 square foot project includes the expansion of the main terminal to the south of Concourse E. Projects include the expansion of second level concessions areas, airline operations areas, baggage claim, and curb-side check-in areas

B-3 Phase III Ground Access (2018): This project requires that approximately 1,700 linear feet (13,600 square yards) of the existing six lane terminal roadway system be expanded. This project also includes the roadway tie-ins with the main parking structure and the ticketing and baggage claim curb fronts.

- B-4 Parking Garage Walkway Connector (2018):** This 18,000 square foot project includes an enclosed overhead passenger walkway that will connect the second level of the parking garage with the new south terminal expansion project.

C. Air Cargo Facilities

To accommodate the projected growth of air cargo tonnage, the proposed air cargo apron and warehouse projects are recommended to be developed west of the existing air cargo area.

- C-1 Environmental Assessment (EA) (2009):** The EA approval process is required by the FAA before the air cargo facility project can begin. Potential environmental issues related to this project may include the clean-up and removal of the existing public parking Lot B.
- C-2 Phase I Site Preparation/Drainage (2012):** This project requires that approximately 20 acres of land located west of the existing air cargo center be cleared, graded, and a surface drainage system installed.
- C-3 Phase I Air Cargo Warehouse (2012):** To accommodate the projected growth in air cargo tonnage, a new 60,000 square foot multi-story air cargo warehouse is proposed to be constructed west of the existing air cargo warehouse.
- C-4 Phase I Air Cargo Apron (2012):** This 49,000 square yard aircraft parking apron will support approximately two additional wide-body air cargo aircraft.
- C-5 Phase I Truck/Employee Parking (2012):** This 6,600 square yard project will include an area for 30 air freight trucks and 60 employee parking spaces.
- C-6 Phase II Site Preparation/Drainage (2020):** This second phase of the air cargo warehouse development project requires that approximately 20 acres of land located west of the Phase-I air cargo project be cleared, graded, and a surface drainage system installed.

- C-7 Phase II Air Cargo Warehouse (2021):** This 50,000 square foot air cargo warehouse expansion project will be located west of the Phase-I air cargo warehouse project.
- C-8 Phase II Air Cargo Apron (2021):** This 39,000 square yard apron expansion project will be located west of the Phase-I apron project and south of the existing air cargo apron that parallels Taxiway A. This apron expansion project will provide space for the parking for approximately two air cargo aircraft.
- C-9 Phase II Truck/Employee Parking (2021):** This 2,800 square yard project will include an area for 20 air freight trucks and 25 employee parking spaces.

D. Runway 7R-25L & 1L-19R RSA Improvements

The existing Runway 25L Extended Runway Safety Area (ERSA) is 600 feet by 500 feet and the FAA requires that the ERSA be 1,000 feet by 500 feet. The following project descriptions discuss the recommended solution which includes the relocation of the Runway 25L threshold by 539 feet, and the extension of Runway 7 by 539 feet. This results in an interim runway length of 8,012 feet.

D-1 Relocate 6th Street (2008-2010): For future access to the mid-field area from the existing terminal complex, as well as to support the existing commercial businesses located along 6th Street, it is recommended that a 6,400 foot by 24 foot (17,400 square yards) section of 6th Street be relocated around the proposed Runway 7R ERSA and tie in with relocated East College Avenue. The existing Amtrak Airport Rail Station and passenger parking area will be maintained and access to the rail station will be from the proposed relocated 6th Street. The impacted public parking spaces in overflow lot 'B' will be relocated to the proposed expanded terminal area parking structure.

D-2 Shift Runway 7R 529 Feet West and Construct Taxiway N for 25L (2009-2010):
This 9,000 square yard paving project includes the extension of Runway 7R and parallel Taxiway 'A' to the west. This project also includes lighting, pavement marking, striping,

signing and ground cover. Associated with this project is the relocation of Taxiway N from the WANG apron to the relocated threshold of Runway 25L, and Runway 31.

- D-3 Construct College Avenue Tunnel Under 1L RSA (2009-2012):** This project includes the construction of a 560 feet long by 100 feet wide two-bore tunnel under College Avenue.
- D-4 Remove Pavement on Runway 25L - Remark & Relight (2009-2013):** This project will include the removal of approximately 21,000 square yards of pavement as well as the lighting and marking for the relocated Runway 25L threshold and relocated Taxiway N.
- D-5 Phase 2 Extend Runway 1L 300 feet, Taxiway R 300 feet & Runway 19R Perimeter Road (2009-2013):** The 300 feet by 200 feet extension of Runway 1L and Taxiway R also includes a new perimeter road around the 1,000 feet long by 800 feet wide Runway Object Free Area (OFA), and the installation of in-pavement approach lighting system in the 300 feet runway extension so as to provide a 300 feet displaced landing threshold.
- D-6 Land Acquisition 25L RPZ (2010-2013):** This project includes the acquisition of approximately 15 acres of property located east of the Chicago-Northwestern Railroad and within the relocated 25L Runway Protection Zone.

E. Concourse F

To provide for increased passenger activity, a two-level 7-gate (6-narrowbody and 1-widebody) aircraft concourse is proposed to be constructed west of existing Concourse E.

- E-1 Site Preparation/Drainage (1011-2012):** Approximately 19-acres of land located southwest of the existing terminal will require clearing, grading and the installation of a surface drainage system.

- E-2 Relocate GSE (2011-2012):** The existing airline owned Ground Service Equipment (GSE) facility that is located in the southwest terminal area is proposed to be relocated to a site on the north side of the terminal apron in the west section of the existing employee parking lot. The facility will include a 2,000 square foot single-story building with a 4,400 square yard equipment storage apron and employee parking area.
- E-3 Construct Concourse F (2011-2012):** This two-level seven-gate concourse will be 450 feet long by 100 feet wide and contain 90,000 square feet of hold rooms, concessions, and airline operations space.
- E-4 Aircraft Apron (2010-2011):** In support of the new seven-gate Concourse F, the Concourse F aircraft parking apron will be expanded to the west by 96,600 square yards. This Group IV (112.5 feet object clearance from taxilane centerline) apron expansion project will tie into Taxiway 'A'.
- E-5 Fuel Hydrant System (2010-2011):** This project will include seven additional fuel pits for Concourse F and the proposed fuel transfer system will connect with the existing Concourse E fuel hydrant system.

F. Parking Garage Expansion

To accommodate projected increases in air passengers, the Master Plan Update recommends the expansion of the existing multi-story parking garage. The project will include 1,700 additional parking spaces. This project will also include modification of the garages entrance and exit roadways.

- F-1 Site Preparation/Drainage (2012):** This project includes the clearing, grading, and surface drainage system for approximately seven acres of land.
- F-2 Parking Garage Construction (2012):** This project includes the construction of 1,700 additional parking spaces in the six story garage as well as the expansion of the entrance and exit roadways and exit plaza.

G. Remote Parking Structure

In support of projected increases in air passengers, the Master Plan Update recommends that a new multi-story public parking garage be constructed in the existing grade level lot A with public access from Air Cargo Way. This parking garage is intended to also replace the resulting loss of grade level parking spaces in lots A and B.

G-1 Site Preparation/Drainage (2015-2016): This project includes clearing, grading, and a surface drainage system for approximately 11 acres of land.

G-2 Phase I Construction (2015-2016): This project includes the construction of a multi-story parking structure that will contain 3,800 spaces. Also included are the associated entrance and exit roadways, toll plazas, signing, lighting, and landscaping.

G-3 Phase II Construction (2020-2021): This project includes the expansion of the Phase-I multi-story parking garage by 2,800 additional spaces. Also included are the associated entrance and exit roadways, toll plaza, signing, lighting, and landscaping.

H. Remote Employee Parking

For long-range employee parking requirements, it is recommended that a surface lot containing 600 spaces be developed on airport property. A suitable location for the remote employee parking lot has not been determined at this time. For long-range capital funding purposes, the proposed employee parking lot project H will be maintained as a future capital improvement project and the specific location of the parking lot will be determined during the development of Runway 7R-25L.

H-1 Site Preparation/Drainage (2010): This project includes the clearing, grading, and surface drainage system for approximately 11 acres of land.

H-2 Grade Level Parking Lot (2010): This project includes the construction of 1,400 grade level employee parking spaces. Also included are security fence, toll plaza, bus stop shelters, striping, lighting, and landscaping.

I. Airport Maintenance

To accommodate additional airfield and terminal area development projects, it is recommended that a new airport maintenance and equipment storage building be constructed on the south side of the existing airport maintenance building No. 26.

I-1 Site Preparation/Drainage (2017): This project includes the clearing, grading, and surface drainage system for approximately 4 acres of land.

I-2 Construct Maintenance Building (2017): This project includes the construction of a one-story 20,000 square feet metal airfield maintenance and equipment storage building.

I-3 Storage Yard/Parking (2017): This project includes 7,000 square yards of equipment storage yards, employee parking, site access road, lighting, and security fencing.

J. Runway 7R Extension (Ultimate 7C)

To provide additional runway length for projected aircraft operations on existing Runway 7R-25L, it is recommended that Runway 7R be extended to its maximum length of 8,473 feet. Due to the location of the CMSPP Railroad, the maximum additional length that can be achieved is 461 feet.

J-1 Environmental Impact Statement (EIS) (2016): An environmental approval process is required by the FAA before the implementation of the runway development project can begin. This study requires approximately one year to complete.

J-2 Land Acquisition Runway Protection Zone (2018): This project requires that approximately 19 acres of commercial property located east of the CMSPP Railroad be acquired.

J-3 Site Preparation/Drainage (2016): This project includes the clearing, grading, and surface drainage system for approximately 12 acres of land.

J-4 Runway Construction (2020): Runway 7R is proposed to be extended 461 feet by 150 feet to the west. This runway extension includes a 200 foot by 200 foot blast pad, lighting, striping, signing, and ground cover.

J-5 Taxiway Construction (2020): This project includes the extension of Taxiway 'A' - 731 feet by 75 feet, the construction of a 150 feet by 431 feet aircraft hold apron, lighting, signing, striping, and ground cover.

J-6 CAT-I Navigation System (2020): This project includes the relocation of the existing Runway 7R Glide Slope, Localizer, PAPI, RVR, and Approach Lighting System.

K. Concourse G

In support of projected increases in air passengers, a two-level 600 foot by 100 foot double sided concourse containing twelve additional aircraft gate positions is recommended to be developed west of Concourse F. The south end of Concourse G will also be utilized for the international arrivals aircraft gate and passenger processing facility (FIS).

K-1 Site Preparation/Drainage (2017): This project includes the clearing, grading, and surface drainage system for approximately 28 acres of land located southwest of Concourse F.

K-2 Demolition of Hangars and U.S. Post Office (2017): In preparation of the development of Concourse G, the five existing corporate hangars (buildings 40, 41, 42, 43, and 44) and the U.S. Post Office that are located in the southwest terminal area will be removed. This project contains approximately 100,000 square feet of building space.

- K-3 Construction of Concourse G (2020-2021):** This project includes 160,000 square feet of concourse hold rooms and airline operations space as well as the 700 feet by 50 feet connector walkway and moving sidewalks that will connect the central terminal and Concourse G.
- K-4 Relocate Federal Inspection Facilities (FIS) (2020-2021):** This project includes the 40,000 square feet of U.S. Customs facilities that are required to process a single flight of 300-400 international passengers. The existing FIS facility located on the north terminal apron will be utilized for the expansion of airport management and terminal support purposes.
- K-5 Aircraft Apron (2020-2021):** The proposed apron area for the 12-gate Concourse G will require approximately 94,000 square yards of concrete. The Group V aircraft parking apron for the FIS gate position will tie directly into Parallel Taxiway 'A'. Apron Taxiway 'B' is restricted to Group IV aircraft.
- K-6 U.S Post Office Site Preparation / Drainage (2020-2021):** To provide for the development of Concourse G, the existing U.S. Postal Service facility that is located in the southwest terminal area is recommended to be relocated to the southwest air cargo area just west of the Airport Surveillance Radar (ASR). This project will require clearing, grading, and the installation of a surface drainage system for approximately four acres of land.
- K-7 Construction of U.S. Post Office (2020-2021):** This proposed 40,000 square foot single level facility will require an FAA determination of potential impacts to the signal quality of the adjacent ASR. The U.S.P.S. will be responsible for the development of the post office.
- K-8 Post Office Truck Apron & Public Parking (2020-2021):** This project requires 7,000 square yards of pavement for mail trucks, employee parking, public parking, and vehicle access from relocated 6th Avenue.

- K-9 Corporate Hangar Site Preparation/Drainage (2020-2021):** It is recommended that the recently closed USAF apron area on the south airfield be utilized for future corporate hangar development and general aviation aircraft parking. In preparation for this hangar development project, approximately 18 acres of land will require clearing, grading and a surface water drainage system. The corporate hangar relocation project includes the reuse of existing USAF hangar No. 217. This existing two-way aircraft access maintenance hangar contains approximately 70,000 square feet and includes maintenance shops and administration offices. The south airfield corporate hangar development project will be developed by individual corporate aircraft operators or Fixed Base Operators (FBO's).
- K-10 Construct Corporate Hangars (2020-2021):** The replacement of the five corporate hangars that will be displaced by the development of Concourse G are recommended to located on the existing U.S.A.F. south airfield apron. These replacement corporate hangars are to be constructed by corporate aircraft operators.
- K-11 Corporate Hangar Apron (2020-2021):** This project includes 21,300 square yards of concrete apron located on the north side of the existing USAF apron area. This apron expansion will include Group III aircraft apron taxiway object free area (93 feet) clearance criteria.
- K-12 Corporate Hangar Access (2020-2021):** This project includes a 1,800 linear foot two-lane access road from South Howell Avenue to the existing south airfield service road. Auto parking for the proposed corporate hangar area and site access includes 7,000 square yards of pavement.
- K-13 Fuel Hydrant System (2020-2021):** This project will include twelve additional fuel pits. The proposed Concourse G fuel transfer system will tie into the adjacent Concourse F fuel hydrant system.

L. Runway 1R-19L Extension

For long-range north-south airfield capacity considerations beyond the 20-year planning period, the 4,143 feet by 150 feet Runway 1R-19L is recommended to be extended to an ultimate length of 7,000 feet.

This project includes a 2,500 foot by 150 foot extension of Runway 1R, and a 500 feet extension of Runway 19L. With the upgrading of the existing 4,183 feet by 150 feet general aviation runway to a Group V air carrier runway requires the complete reconstruction of the existing 4,183 foot long runway and the associated taxiway connector system. The crossing of the proposed extension of Runway 1R with the proposed Runway 7R-25L, requires that in order to maintain the minimum FAA 0.8 percent grade change between runway development projects, results in the section of new runway between the south edge of the intersection of Runway 7C-25C and 1R-19L, be reconstructed to the new 0.8 percent grade. Also, this new 7,000 foot runway will be equipped with CAT-I instrument landing systems on both ends.

M. Connector Taxiways

At such time as the runway capacity of the south airfield requires head-to-head aircraft movements between the terminal apron, the proposed Runway 7R-25L, and the south airfield corporate aviation development area, it is recommended that parallel Taxiways 'R' and 'T' be extended approximately 3,500 feet to the threshold of Runway 1L. Taxiway 'T' will be located 400 feet from the centerline of Runway 1L-19R, and parallel Taxiway 'R' will be located 267 feet from Taxiway 'T'.

M-1 Site Preparation / Drainage (2020-2021): This project will require the clearing, grading, and surface drainage system for approximately 55 acres of land.

M-2 Taxiway 'R' Construction (2020-2021): This 4,000 feet by 75 feet parallel taxiway extension will start near the Taxiway connector 'S' and connect with the previous 300 foot extension of Runway end 1L. This project will include 34,000 square yards of concrete pavement, lighting, signing, striping and ground cover.

M-3 Taxiway ‘T ‘ Construction (2020-2021): This 2,500 feet by 75 feet parallel taxiway extension will start near the Taxiway connector ‘S’ and connect with the previous 300 foot extension of Runway end 1L. This project will include 24,000 square yards of concrete pavement, lighting, signing, striping, and ground cover.

M-4 Taxiway V Relocation (2020-2021): This project includes the relocation of approximately 700 linear feet of Taxiway ‘V’ beginning at Taxiway ‘D’ and extending to the threshold of Runway 7L. This project will result in a parallel taxiway ‘V’ separation distance of 307 feet from Runway 7L-25R. This total project will require approximately 90,400 square yards of pavement.

N. Fuel Farm

The long-range jet-fuel storage requirements for MKE have been projected to be approximately 160,000 barrels. An 8.8 acre site has been reserved by the Airport Division for the development of four 40,000 barrel above-ground fuel storage tanks, secondary truck unloading docks, and for a fuel piping system that will connect to the existing mid-field fuel distribution system. Bulk jet fuel delivery is to be via the existing underground fuel line located along the west side of the Chicago Northwestern Railroad. This project is not required within the 20-year planning period.

8.3 Runway Approach Plans

These drawings (sheets 6 -18 of 21) depict both plan and profile views of the approaches to the ten existing and four proposed runway ends. These drawings document existing and proposed man-made structures, objects of natural growth and terrain which represent obstructions to navigable airspace. The plans depict existing and ultimate approach slopes along with roads and railroads shown on the profile to highest elevation plus the added elevation specified by FAA guidelines. Obstructions to runway approaches are based on the criteria outlined in Federal Aviation Regulations (FAR) Part 77 *Objects Affecting Navigable Airspace*, and FAA Order 8250.3B *United States Standards for Terminal Instrument Procedures (TERPS)*.

The specific airspace obstructions to FAR Part 77 were derived from FAA Airport Obstruction Chart (OC) No. 262, published in July, 2001, and from an airspace obstruction survey for MKE that was performed in March, 1999. This airspace obstruction survey was performed by Aero Metrics, Inc. for the Milwaukee County, Wisconsin.

Drawing 6 of 21 Airspace Plan

This 1 inch = 2,000 feet FAR Part 77 airspace plan shows the five airspace control surfaces depicted over a USGS base map. The Part 77 obstruction control services include: Primary, Approach, Transitional, Horizontal, and Conical services for the existing five runways, the proposed Runway 7R-25L, and the proposed extensions of Runway 1R and 19L.

Drawing 7 & 8 of 21 Approach Plans for Runway 7L-25R

Runway 7L-25R is recommended to continue to support small general aviation aircraft and maintain visual approach procedures.

- The visual approach to Runway 7L has a 20:1 OCS and the obstruction analysis identified three obstructions. The flag pole is recommended to be relocated and the two lighted hangars are recommended to be waived.
- The visual approach to Runway 25R has one obstruction to the 20:1 OCS and this two-foot violation of a street light located outside the RPZ is recommended to continue to be waived.

Drawings 9 & 10 of 21 Approach Plans for Runway 7C-25C

Existing Runway 7L-25R (Ultimate Runway 7C-25C) is recommended to have a 1,000 foot extension to Runway 7C.

- The obstruction analysis for this ultimate 50:1 precision approach OCS for 7C identified five obstructions. These trees and poles are recommended to be removed or lowered to comply with the OCS.

- The obstruction analysis for 25C identified eight obstructions to the existing 50:1 OCS. These obstructions include railroad tracks, lighted poles, and trees. The proposed relocated threshold for 25C will remove these obstructions to the FAR Part 77 50:1 obstruction control surface

Drawings 11 & 12 of 21 Approach Plans for Future Runway 7R-25L

The airspace obstruction analysis for Runway 7R-25L did not identify obstructions to the ultimate 50:1 approach surfaces.

- After 7R-25L is constructed and the existing roadways and structures are removed, no obstructions to the Runway 7R precision 50:1 OCS have been identified.
- After 7R-25L is constructed and the existing roadways and structures are removed, no obstructions to the Runway 25L precision 50:1 OCS have been identified.

Drawings 13 & 14 of 21 Approach Plans for Runway 1R-19L

Runway 1R-19L currently has visual approach surfaces with 20:1 Obstruction Control Surfaces (OCS).

- The ultimate plan for 1R-19L is to lengthen the runway to 7,000 feet, provide GPS precision approach capability, and provide 50:1 obstruction control surfaces. The obstruction analysis for the ultimate 50:1 OCS for 1R did not identify any airspace obstructions.
- The obstruction analysis for the ultimate 50:1 OCS for Runway 19L identified several trees that are recommended to be removed.

Drawings 15 & 16 of 21 Approach Plans for Runway 1L-19R

Runway 1L-19R currently has precision approaches with 50:1 OCS's. The approach to Runway 19R will not change and the threshold to Runway 1L will be extended to the south by 300 feet. The arrival threshold for Runway 1L will not change and will result in a 300 feet displaced

threshold. The departure threshold for Runway 1L will begin at the new 300 feet runway extension.

- The obstruction analysis for 1L identified one tree that penetrates the 50:1 OCS and this tree is recommended to be removed.
- The obstruction analysis for 19R identified 15 trees and obstruction lighted poles in the OCS. Also a major high tension electric transmission tower (lighted) was identified that has an 18-foot violation to the OCS. The plan shows the trees and poles to be removed and the transmission tower is recommended to continue to be waived.

Drawings 17 & 18 of 21 Approach Plans for Runway 13-31

Runway 13-31 is recommended to be maintained as a general aviation runway with visual approach procedures:

- The visual approach to Runway 13 has a 20:1 OCS and the obstruction analysis identified a roadway and several trees. The existing displaced threshold is to remain therefore no obstructions are within the relocated 20:1 Part 77 displaced threshold obstruction control surface.
- The visual approach to Runway 31 has a 20:1 OCS and the obstruction analysis identified five obstructions to the OCS. With the proposed relocation of the threshold of Runway 31, no obstructions to the Part 77 20:1 obstruction control surface will exist.

8.4 Airport Land Use Plans (Drawings 19, 20 and 21)

The recommended MKE land use plans are depicted on the following three drawings:

Drawing 19 of 21 On-Airport Land Use Plan

The Airport Land Use Plan provides the MKE Airport Division with data to assist in establishing a vision for the aeronautical and non-aeronautical land uses that are located on airport property.

The recommended on-airport land use categories for MKE include:

Airfield:

- Airfield Operating Areas
- Runway Protection Zones & Object Free Areas
- Navaid Critical Areas

Terminal Area

- Air Carrier Apron Areas
- Terminal Facilities
- Public Parking & Terminal Access

Air Cargo Areas

- Air Cargo Aprons and Warehouses
- Freight Forwarders
- US Postal Service
- Express Freight

Airfield & Terminal Support Areas

- Flight Kitchens
- Rental Car Storage Areas
- Air Carrier Aircraft Support Areas
- Taxi & limo Stating Areas
- Fuel Farm
- Airport Grounds Maintenance
- ARFF
- Air Traffic Control Tower
- FAA Navaid Maintenance
- Airport Security
- Aircraft Engine Run-Up Areas
- Employee Parking

Airport Reserve Areas

- Airport Noise Buffer
- Surface Drainage
- 4-F Lands
- Green Space
- Community Compatible Development Areas
- Community Recreational Areas

Aviation Related Commercial Development Areas

- Revenue Generating Uses
- Hotel & Related Air Traveler Services
- Restaurants
- Airline Administration
- FAA and Other Government Offices
- Free Trade Zones
- Aviation Warehousing
- Agriculture
- Airline Aircraft Maintenance Hangars

Military Operations Areas

- Military Aircraft Aprons
- Military Hangars
- Military Support Facilities
- Military Fuel Storage

General Aviation Areas

- Corporate Hangars
- Fixed Base Operator (FBO) Terminals
- FBO Based & Transient Aircraft Aprons
- T-Hangars

Drawings 21a & 21b of 21 Exhibit A Airport Property Map

The airport property map depicts the existing and ultimate airport property boundaries beginning with the initial land purchase in 1946. The Airport Property Map also depicts the detailed history of the Federal financial participation in the individual parcels as well as land acquisition with State, County, and Local funds. This includes existing and ultimate fee simple land acquisitions as well as noise mitigation program easements.

Descriptions of the potential land acquisition parcels 1 thru 309 that may be impacted by the construction of Runway 7R-25L are included as **Appendix E** which is attached to the end of this Master Plan Update Report.

The determination of the exact amount of Fee-Simple land to be acquired acquisition versus Avigation Easements to be acquired by Milwaukee County will be determined during the Runway 7R-25L land acquisition program process.

Drawing 21 of 22 Airport Photograph

The Airport Photograph is at the same scale (1 inch=600 feet) as the Airport Layout Plan (ALP) and depicts the Airport and the surrounding areas at the time the MKE Airport Master Plan Update was undertaken. The Airport Photograph is dated June 7, 2002.