

# **CHAPTER 3 FACILITY REQUIREMENTS**

## **AIRPORT MASTER PLAN UPDATE OSCODA-WURTSMITH AIRPORT**

Prepared for  
**THE OSCODA-WURTSMITH AIRPORT AUTHORITY**  
Oscoda, Michigan

October 2011  
FINAL DRAFT VERSION

PUBLIC REVIEW

## Table of Contents

<b>LIST OF TABLES</b> .....	i
<b>CHAPTER 3 - Facility Requirements</b> .....	3-1
3.1 Airport Planning & Design Standards .....	3-1
3.1.1 Airport Strategic Vision.....	3-1
3.1.2 Airport Planning Role .....	3-1
3.1.3 FAA Design Standards - Airport Reference Code (ARC) Classification .....	3-2
3.2 Airfield Facility Needs.....	3-3
3.2.1 Primary Runway Dimensional Requirements .....	3-3
3.2.2 Crosswind Runway Dimensional Requirements.....	3-5
3.2.3 Taxiway System .....	3-7
3.2.4 Airfield Pavement Strength.....	3-10
3.2.5 Navigational-Instrument-Visual Aids.....	3-10
3.2.6 Airfield Signage and Marking.....	3-11
3.3 Terminal Facility Requirements .....	3-11
3.3.1 Airport Terminal and Administration Building .....	3-11
3.3.2 Airport General Aviation Terminal Apron .....	3-11
3.3.3 Airport Support Maintenance and Equipment Buildings.....	3-12
3.3.4 Maintenance, Repair and Overhaul (MRO) Requirements .....	3-12
3.3.5 General Aviation / Fixed Base Operator (FBO) Hangars .....	3-12
3.3.6 Aircraft Rescue and Fire Fighting (ARFF) Facility.....	3-13
3.3.7 Aircraft De-Icing .....	3-13
3.3.8 Aircraft Fuel Storage .....	3-13
3.3.9 Airport Auto Access / Entrance Road .....	3-13
3.3.10 Terminal Auto Parking.....	3-14
3.3.11 Security Fencing .....	3-14
3.3.12 Airport Land Acquisition .....	3-14
3.3.13 Pavement Maintenance and Rehabilitation .....	3-14
3.4 Summary of Facility Requirements.....	3-15

### LIST OF TABLES

Table 3-1 FAA Airport Reference Code (ARC) .....	3-2
Table 3-2 Airplane Design Group Aircraft.....	3-3
Table 3-3 Primary Runway Length – FAA Recommended.....	3-4
Table 3-4 Wind Coverage.....	3-5
Table 3-5 Crosswind Runway Length – FAA Recommended .....	3-6
Table 3-6 Taxiway Design Standards.....	3-10
Table 3-7 ARFF Equipment Requirements.....	3-13
Table 3-8 Facility Requirement Summary.....	3-16

## **CHAPTER 3**

# **FACILITY REQUIREMENTS**

This chapter identifies the Airport facilities necessary to satisfy the 20-year aviation demands at the Oscoda-Wurtsmith Airport. Facility needs are identified for the purpose of resolving existing deficiencies, accommodating forecast activity levels, and satisfying the strategic goals as envisioned by the Oscoda-Wurtsmith Airport Authority for long-term development of the Airport.

The following are the key facilities documented in this chapter:

- Airport Facility Design Standards
- Runway and Taxiway System
- Aviation Support Facilities
- Airspace and Navigational Aids
- Aeronautical and Non-Aeronautical Terminal Area Facilities and Access
- Landside/Tenant Area Facilities

The facility improvements are planned in accordance with Federal Aviation Administration (FAA) and Michigan DOT–Aeronautics (MDOT) design standards, as necessary to meet the mission of the Airport. It should be noted that the facility recommendations are not absolute design requirements, but rather options to resolve various types of facility and operational inadequacies, or to make improvements as demand warrants and funding becomes available. Therefore, extenuating circumstances do sometimes require project or scheduling adjustments to meet unforeseen user demand and/or unanticipated facility needs.

### **3.1 AIRPORT PLANNING & DESIGN STANDARDS**

#### **3.1.1 Airport Strategic Vision**

The Airport Authority’s strategic vision clearly seeks to offer airfield facilities suited to support specialized aviation maintenance-related tenants performing aircraft and engine repairs on heavy wide-body transport aircraft. To meet this strategic vision, it is essential to provide the runway and taxiway system capable of accommodating the Boeing 747 critical aircraft, including prospects of more frequent B-747 operations and even occasional larger transport aircraft traffic at Oscoda in the future.

#### **3.1.2 Airport Planning Role**

For planning purposes, the FAA designates the Oscoda-Wurtsmith Airport as a ‘General Aviation’ facility, for which the Airport Layout Plan (ALP) must adhere to ARC D-V design standards as defined by *FAA Advisory Circular 150/5300-13, Airport Design*. MDOT identifies the Airport as a Tier I General Aviation facility. The existing and future Airport role, classification and service level are substantiated by the Forecast Chapter.

### 3.1.3 FAA Design Standards - Airport Reference Code (ARC) Classification

The planning of airport facilities conforms to FAA design standards, as pertaining to the operational and physical characteristics of the 'critical aircraft', or representative of the largest aircraft conducting more than 500 annual itinerant operations (takeoffs and landings) at the Airport. The critical aircraft is evaluated with respect to size, speed and weight, and is the basis for determining the airfield and terminal area standards for various structural dimensions, setback separations, airspace clearances, safety areas and other design considerations. Combined, the 'approach category' (alphabetic letter) and 'design group' (roman numeral) yields the Airport Reference Code (ARC) which determines the type of airplane (family) that the airport is designed to accommodate.

**Table 3-1** shows the ARC design attributes for the D-V category aircraft. As substantiated by the Forecast Chapter, the existing and future Airport Reference Code (ARC) for the Oscoda-Wurtsmith Airport is D-V, as represented by the Boeing-747-200/400 critical aircraft. Therefore, the Airport (airfield) design standards need to accommodate aircraft with an approach speed less than 166 knots and an aircraft wingspan of up to 214 feet.

*Table 3-1*  
**FAA AIRPORT REFERENCE CODE (ARC)**

Existing / Future	ARC Approach Category	Approach Speed (knots)	
	Category A	< 91 knots	
	Category B	91 to < 121 knots	
	Category C	121 to < 141 knots	
<b>Existing/Future ARC --&gt;</b>	<b>Category D</b>	<b>141 to &lt; 166 knots</b>	
	Category E	> 166 knots	
Existing / Future	ARC Design Group	Wingspan (ft)	Tail Height (ft)
	Group I	< 49'	< 20'
	Group II	49' to < 79'	20' to < 30'
	Group III	70' to < 118'	30' to < 45'
	Group IV	118' to < 171'	45' to < 60'
<b>Existing/Future ARC --&gt;</b>	<b>Group V</b>	<b>171' to &lt; 214'</b>	<b>60' to &lt; 66'</b>
	Group VI	214' to < 262'	66' to < 80'

Combined, the 'Approach Category' and 'Design Group' yields the Airport Reference Code (ARC) which determines the type of airplane the airport is designed to accommodate.

Source: FAA Advisory Circular 150/5300-13.

### **OSCODA CRITICAL AIRCRAFT – ARC D-V (BOEING 747)**



*The Boeing-747 (ARC D-V) operates between 400 and 500 annual operations at the Oscoda-Wurtsmith Airport, resulting from Kalitta aircraft maintenance and repair functions*

Source: Airport Photos

**Table 3-2** shows representative aircraft per the ARC design groups. Although these transport aircraft are not necessarily being operated for certified commercial purposes when conducting flights at the Oscoda-Wurtsmith Airport, the Boeing 747 critical aircraft requires similar airfield facility needs as constructed for the Wurtsmith Air Force Base in order to serve large transport aircraft (KC-135 Tanker/C-141 Transport/C-5 Galaxy) missions. These airfield facilities are also comparable to those at large commercial service airports, including hub airports serving international destinations.

*Table 3-2*  
**AIRPLANE DESIGN GROUP AIRCRAFT**

Design Group	Typical Aircraft Category	Representative Aircraft
I	Single-Engine Piston	Cessna 150/210, Cessna 300/400 Twins, Baron 58, Piper Navajo, Swearingen Metro, F-16 Falcon
II	Turboprop   Business Jets   Regional Jets	Beech King Air, Cessna Citation, Falcon 20, Learjets, Saab 340, Canadair Regional Jet
III	Large Corporate   Narrow-body Transports	Dash 8, Gulfstream V, Embreair 195, B-727/737, B-717, Airbus 318/320, DC-9, MD-80
IV	Large Transports	Airbus 300, DC-10, MD-11, B-757, B-767, DC-8
V	Large Wide-Body Transports	B-747-400, Boeing 777, Airbus 340, Lockheed C-141, KC-135 Tanker, Boeing B-52
VI	Large Heavy Lifting Transports	B-747-8F, Airbus 380, Lockheed C-5 Galaxy

Source: FAA Advisory Circular 150/5300-13

## **3.2 AIRFIELD FACILITY NEEDS**

This section describes the airfield facility needs, which include the runway and taxiway system, and navigational/lighting aid components. The airfield geometric dimensions, layout and separations are determined by *FAA Advisory Circular 150/5300-13, Airport Design*, in which the standards coincide with the Airport’s critical aircraft, assigned per runway. The airfield is the primary Airport facility component, and it is essential that existing and future layouts comply with FAA standards, preferably without a deviation or modification to FAA design standards. The major airfield facilities are graphically depicted on the Airport Layout Plan (ALP) drawing, in which the proposed site planning reflects local concurrence and compliance with FAA/MDOT airport planning standards.

### **3.2.1 Primary Runway Dimensional Requirements**

Runway length is determined from the greater of the takeoff or landing performance characteristics of the existing and future critical aircraft operating at the Oscoda-Wurtsmith Airport, or composite family of airplanes as represented by the critical aircraft’s Airport Reference Code.<sup>1</sup> The takeoff length, including takeoff run, takeoff distance, and accelerate-stop distance, is the more demanding of the runway length requirements. The Runway 6/24 critical aircraft is the Boeing 747-400.

<sup>1</sup> Runway performance length factors are used for the development of the recommended runway length and ultimate design of airport runways, and not as a substitute for calculations required by airplane operating rules. For planning purposes, only an “unrestricted” runway length is contemplated, which does not invoke declared distances (displaced landing or takeoff threshold).

**Table 3-3** lists the FAA recommended runway length computed for the primary runway from the *FAA Airport Design Microcomputer Program 4.2D* and *FAA Advisory Circular 150/5325-4B, Runway Length Standards*. The FAA lengths serve as a general planning guide representing a composite group of aircraft, determined by the aircraft’s percent of the fleet and useful payload. Based on the FAA runway length model for aircraft greater than 60,000 pounds (commercial aircraft and business jets), the primary Runway 6/24 length should be not less than 10,500 to 12,000 feet in order to accommodate transport aircraft over 60,000 pounds. The Boeing 747, as the critical aircraft, weighs approximately 400,000 pounds empty. Therefore, the existing 11,800’ length coincides with the general FAA recommended lengths, with latitude for operations conducted during hotter than average days and longer than 500 mile haul distances. The existing 200’ runway width accommodates 100 percent of the D-V aircraft, and is consistent with the ARC Design Group VI aircraft associated with future MRO prospects at Oscoda.

The FAA Policy for *Landing Performance Assessment After Departure for All Turbojet Operators*, implemented through Operations Specification/Management Specification (OpSpec/MSpec) C082, requires all turbojet operators to ensure that a 15 percent safety margin exists beyond the actual required landing distance. The net effect of this rule applied to this study is that the length required is increased by 15 percent. Under OpSPec/MSpec C082, the required landing runway length for the design aircraft on a wet and slippery (contaminated) runway is nearly 11,800’ (wet and slippery adjustment).

*Table 3-3*  
**PRIMARY RUNWAY LENGTH – FAA RECOMMENDED**

Airport elevation	633 Feet
Mean daily maximum temperature of the hottest month	±79 F
Maximum difference in runway centerline elevation	5'
Length of haul for airplanes or more than 60,000 pounds	500 to 6,000 Miles
Wet and slippery conditions	Yes
Aircraft Category	FAA Recommended Runway Length
<b>Airplanes of more than 60,000 lbs. MTOW <sup>1/</sup></b>	<b>11,800'</b>
Note: <sup>1/</sup> MTOW is Maximum Takeoff Weight.	
Note: Runway length round up to next 100-foot increment beyond 30'.	
Source: FAA Airport Design Microcomputer Program 4.2D	

As approved on the 2009 ALP, the Runway 6/24 length and width meets existing and future Airport traffic needs, and no runway extension is proposed. In summary, the following shows the dimensional recommendation for the primary Runway 6/24:

- Runway 6/24 Existing Dimension = 11,800’ x 200’ (ARC D-V)
- Runway 6/24 Future Dimension = Same

### 3.2.2 Crosswind Runway Dimensional Requirements

Crosswind, or secondary runways are typically commensurate to the primary runway by providing an alternate landing direction during strong crosswind conditions. Crosswind runways also provide convenience for taxiing to-and-from terminal/parking areas, instrument approach procedures into the prevailing winds, and access during periods when the primary runway is not operational (weather, accidents, maintenance/repairs).

#### 3.2.2.1 Crosswind Design Consideration

The 2009 FAA approved Airport Layout Plan (ALP) for the Oscoda-Wurtsmith Airport identified a proposed crosswind runway oriented along a north-south alignment approximately 4,400' southwest from the Runway 24 end. The runway was planned in two phases, the initial first phase of 4,200' x 75' with a full-length parallel taxiway offset at 240', and the second phase an extension of 800' to the north to an ultimate length of 5,000' x 75'. The construction of the crosswind runway was also identified in the Airport's Capital Improvement Program (ACIP), planned to be constructed in the 10-year program.

**Table 3-4** lists the crosswind components (as percent coverage) achieved by the existing Runway 6/24 and the proposed crosswind Runway 18/36. Prevailing wind patterns are used to assess the need for crosswind runways, when the primary runway does not provide the FAA recommended 95% crosswind coverage at 10.5 knots. Runway 6/24 has 92.5% coverage at 10.5 knots, missing 95% standard by about 2.5%. Overall, Runway 6/24 achieves more favorable winds than Runway 18/36 at 10.5 knots. When combined with Runway 6/24, the crosswind Runway 18/36 provides greater than 95 percent airfield wind coverage (98% at 10.5 knots).

*Table 3-4*  
**WIND COVERAGE**

Runway	All Weather				IFR			
	Crosswind Component (kts)				Crosswind Component (kts)			
	10.5	13.0	16.0	20.0	10.5	13.0	16.0	20.0
6/24	92.37%	96.03%	98.94%	99.78%	90.58%	95.11%	98.83%	99.81%
18/36	89.60%	94.23%	97.98%	99.43%	91.61%	95.28%	98.23%	99.55%
Combined	97.37%	99.08%	99.76%	99.97%	98.00%	99.40%	99.88%	99.99%

Source: National Climatic Data Center, Oscoda-Wurtsmith Airport, Reporting Period 2000-2009.

Per FAA guidance, small general aviation aircraft are not accommodated at the Airport about 2.5% of the time (95% - 2.5%), and are unable to use Runway 6/24 about 7.5% of the time (100% - 92.5%). Because Runway 6/24 does not achieve 95% coverage at 10.5-knots, the crosswind runway should be planned to accommodate small ARC Category A and B piston and single turboprop aircraft. Based on a north-south crosswind runway alignment, wind patterns indicate that the Runway 18 end (north) would be used nearly 60 percent of the time and the Runway 36 end (south) 40 percent. The wind analysis shows that averaged over a year, the number of small general aviation aircraft flights benefiting from the increased wind coverage due to the presence of a crosswind runway equates to about one flight every two days.

3.2.2.2 Crosswind Length and Width

**Table 3-5** lists the FAA recommended runway length computed for a crosswind runway from the *FAA Airport Design Microcomputer Program 4.2D* and *FAA Advisory Circular 150/5325-4B, Runway Length Standards*. The computed lengths serve as a general planning guide to determine the takeoff distance for a composite group of small piston-aircraft, expressed as a percent of the piston-aircraft fleet. From this, the recommended FAA design length is a minimum of 4,200', which accommodates 100% of the small aircraft fleet with 10 or more passenger seats.

*Table 3-5*  
**CROSSWIND RUNWAY LENGTH – FAA RECOMMENDED**

Airport elevation	633 Feet
Mean daily maximum temperature of the hottest month	79 F
Maximum difference in runway centerline elevation	5'
Length of haul for airplanes of more than 60,000 pounds	500 Miles
Wet and slippery conditions	Yes
<b>FAA Recommended Runway Length (Rounded)</b>	
<b>Aircraft Category</b>	
Small airplanes (Less than 12,500 lbs. MTOW <sup>1/</sup> )	
75% of fleet (Less than 10 seats)	2,600' (2,600')
100% of fleet (Less than 10 seats)	3,730' (3,800')
<b>Small airplanes (Less than 12,500 lbs. MTOW <sup>1/</sup>)</b>	
<b>100% of fleet (10 or more seats)</b>	<b>4,200' (4,200')</b>
Note: <sup>1/</sup> MTOW is Maximum Takeoff Weight.	
Note: Round up beyond 30' increments.	

Source: FAA Airport Design Microcomputer Program 4.2D

Summary of Crosswind Runway 18/36:

- The runway length (4,200' to 5,000'), width (75'), pavement strength (12,500 pounds single wheel gear) and instrument approach procedures accommodate most of the piston-engine general aviation aircraft fleet and smaller turbine aircraft during periods when the crosswind component on Runway 6/24 exceeds 10.5 to 13 knots. Wind conditions suggest the crosswind runway would be used by small piston-engine aircraft about 3 to 5% of the time, or about one flight every 2 days would not be able to land without the crosswind runway.
- The primary Runway 6/24 achieves better crosswind coverage and overall all-weather and instrument wind coverage than a north-to-south aligned crosswind runway. In addition, the 200' width of the primary Runway 6/24 provides additional crosswind margins for small aircraft when operating with crosswind components between 10.5 and 13 knots.

- The crosswind runway has limited utility in accommodating larger utility piston and turbo powered aircraft during periods when the primary Runway 6/24 is not in operation or down for maintenance.
- The limited flight training occurring at Oscoda does not provide compelling justification to shift traffic from the primary Runway 6/24.
- The planned 4,200' crosswind runway length is sufficient to allow for non-precision and precision instrument approach procedures. The 2009 ALP planned for visual and non-precision approach procedures for both crosswind runway ends.
- The crosswind runway activity levels would initially and perhaps ultimately not warrant a partial or full-length parallel taxiway system. Without a parallel taxiway system, ground maneuvering becomes more difficult, and favors the primary runway for takeoffs – as runways without parallel taxiways typically become used as landing runways only. Rather, turnarounds would be planned in lieu of a parallel taxiway system. The taxiing distance between the northside of the crosswind runway and FBO/General Aviation Apron is approximately 2 miles.
- The new crosswind is estimated to cost \$4 million to plan, design and construct. With respect to longer-term maintenance and rehabilitation obligations, the additional crosswind runway and taxiway paved areas total 1.1 million square feet (13.2 acres), an additional 15 percent of the existing airfield paved areas. With respect to financial gains, the crosswind runway will not likely attract new based operators or business tenants, or directly or indirectly generate significant Airport revenues. Also, the crosswind runway competes with local funds on other Airport improvement projects, and is a relatively low priority federal/state project with respect to funding participation.
- The crosswind runway might involve design, transverse grade and drainage issues with crossing the primary Runway 6/24 and taxiway system. While not inherently unsafe, intersecting crosswind runways do invite additional incursion concerns at Airports without air traffic control services.

As approved on the 2009 ALP, the planned Runway 18/36 dimension and layout design meets existing and future Airport traffic needs, as no further runway extension beyond 5,000' is proposed. The following summarizes the dimensional recommendation for the crosswind Runway 18/36:

- Future (Planned) Dimension = 4,200' x 75' (ARC B-II) – Phase 1
- Future (Planned) Dimension = 5,000' x 75' (ARC B-II) – Phase 2

### **3.2.3 Taxiway System**

Taxiways provide access and circulation between the runway environment and terminal area, and other landside areas. The FAA requires a full-length parallel taxiway system associated with precision instrument runways, as is also justified for Airports with traffic levels exceeding 20,000 annual operations, or needing line-of-sight between runway ends.

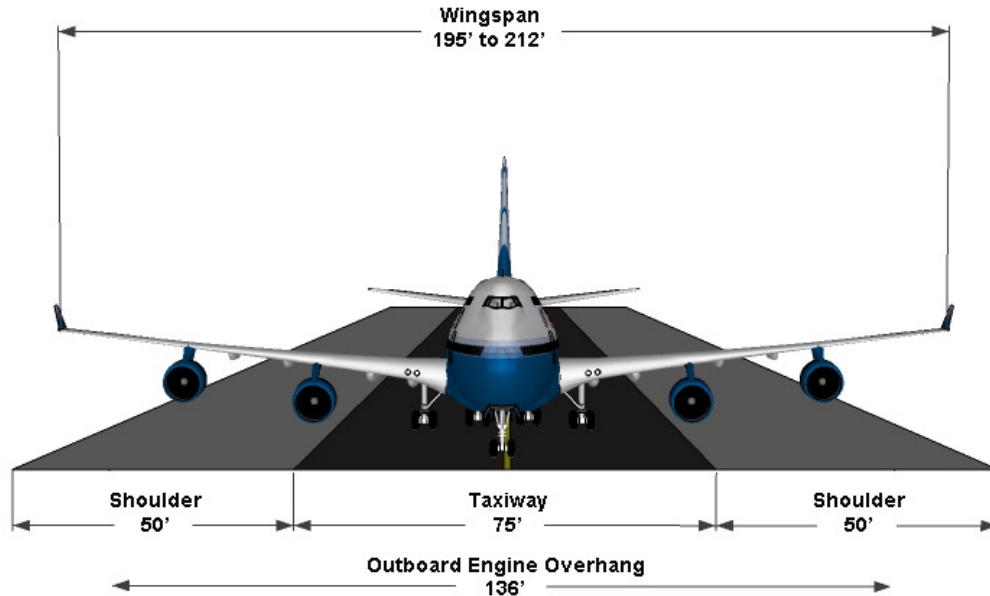
Taxiways are classified as:

- Parallel - facilitate the movement of aircraft to and from the runway.
- Exit Taxiways – provide means of entering and exiting the runway ends (does not include those taxiways designated as connector, parallel, or apron edge taxiways).
- Connector - connect the parallel taxiways with the aprons and aircraft storage facilities.
- Apron Taxiway - primary aircraft access in an aircraft parking apron.
- Taxilane - provide maneuvering between the public-use taxiway system and hangar/ramp areas, with access to individual aircraft parking positions and/or hangar areas. Taxilanes should be constructed commensurate with the type of aircraft requiring access, with sufficient width to accommodate the aircraft wheelbase, turning radius, and allow unencumbered wingtip clearance between fixed objects (hangars, fence, fueling facilities, light poles, etc.).

**Runway 6/24 Taxiway System (Southside):** Taxiways ‘A’, ‘B’, ‘C’ and ‘E’ support Runway 6/24 traffic, and are each 75’ wide with 50’ shoulders. These taxiways, which meet ARC Design Group V standards, provide for an efficient circulation pattern and adequate maneuvering per FAA design standards and engineering policy (FAA Engineering Brief 75). The taxiways supporting Runway 6/24 are to be maintained commensurate with ARC D-V design standards for the Boeing 747-400 critical aircraft, including runway pavement strength for the taxiway and shoulders. Paved taxiway shoulders support aircraft that may inadvertently veer from the taxiway or turning radius, promote better drainage, and provide jet blast and erosion protection for aircraft with extended outboard engines. The parallel Taxiway ‘A’ shoulders are at 50’ per side, and are in need of rehabilitation/reconstruction. **Exhibit 3-1** illustrates the location of the 747-400 outboard engines relative to a 75’ taxiway. The inboard and outboard engines extend beyond the taxiway edge, overhanging the taxiway shoulders. Because of this, the Boeing 747-400 outboard engines are susceptible to ingestion of foreign objects and/or debris. Taxilane ‘E’ provides access to the Losco Apron, extending along the backside of the maintenance hangars, and intersecting the taxiway connecting the Losco Apron. Taxilane ‘E’ is 75 feet wide with 50’ shoulders, and meets design standards for Group V aircraft.

Per FAA guidance, and as applicable to the B-747-400 operations at Oscoda, “paved shoulders are recommended for runways, taxiways and aprons which will accommodate Group III and higher aircraft.” (see appendix for FAA paved shoulder standards). Also, consideration should be given to objects near runway/taxiway/taxilane intersections, which can be impacted by exhaust wake from a turning aircraft. Therefore, the master plan recommends the rehabilitation of the existing 50’ Taxiway ‘A’ shoulders, as currently in place.

*Exhibit 3-1*  
**BOEING 747-400 AIRCRAFT ON 75 FOOT WIDE TAXIWAY**



**Runway 6/24 Taxiway System (Northside):** The taxiway north of Runway 6/24, providing access to the former Air Force Northside Alert Area, is currently restricted with fenced access. In the past, this area has been targeted as a prospective location for accommodating large aircraft parking and other special non-aeronautical events. If ultimately developed for aeronautical purposes, the taxiway system and apron/ramp/parking area should conform to applicable design standards for the types of aircraft using this area.

**General Aviation Taxiway System:** Taxiway 'D' provides access from the airfield to the terminal apron area, the fixed base operator (FBO) and aircraft storage hangars. Taxiway 'D' is 50 feet wide and meets design standards for Group III aircraft. Group III aircraft, including large-cabin business jets and cargo-type aircraft are representative of the larger aircraft accessing these general aviation facilities.

**Table 3-6** summarizes the comparison of the FAA airport design standards with the Airport's taxiway system, based on the existing and future Airport Reference Code (ARC) Design Groups (II, III and V). A checkmark denotes that the standards are currently met. The existing taxiway system currently meets FAA design standards for all applicable ARC groups.

Table 3-6  
TAXIWAY DESIGN STANDARDS

Taxiway Component	ARC Design Group			OSC Taxiways (By Major Designation)				
	II	III	V	'A'	'B'	'C'	'D'	'E'
Taxiway Type	--	--	--	Parallel/Entry	Exit	Exit	Connector	Exit
Applicable ARC Design Group	--	--	--	V	V	V	III	V
Areas Served	--	--	--	Rwy 6/24	Rwy 6/24	Rwy 6/24	GA Apron	Rwy 6/24
Associated Taxiways	--	--	--	--	--	--	--	--
Taxiway Length (Linear Feet)	--	--	--	13,900	940	940	3,800	940
Taxiway Width	35'	50'	75'	75	75	75	50	75
Taxiway Area (Square Feet)	--	--	--	1,042,500	70,500	70,500	190,000	70,500
Taxiway Shoulder Width (Per Side)	10'	20'	25'	50	50	50	--	50
Taxiway Radius (Feet)	75'	100'	150'	--	--	--	--	--
Taxiway Safety Area Width (Per Side)	79' (39.5')	118' (59.0')	214' (120.5')	✓	✓	✓	✓	✓
Taxiway Object Free Area Width (Per Side)	131' (65.5')	186' (93.0')	320' (160.0')	✓	✓	✓	✓	✓
Taxilane Object Free Area Width (Per Side)	115' (57.5')	162' (81.0')	276' (138.0')	✓	✓	✓	✓	✓
Taxiway Safety Edge Margin	7.5'	10'	15'	✓	✓	✓	✓	✓
Taxiway Wingtip Clearance	26'	34'	53'	✓	✓	✓	✓	✓
Taxilane Wingtip Clearance	18'	22'	31'	✓	✓	✓	✓	✓
Taxiway Edge Lighting	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL
Pavement Marking	Centerline	Centerline	Centerline	Centerline	Centerline	Centerline	Centerline	Centerline
Meets FAA Standards	--	--	--	Yes	Yes	Yes	Yes	Yes
FAA Deficiency	--	--	--	None	None	None	None	None

Note: ✓ Existing condition meets FAA standards.

Note: Per FAA standards, the B-747-400 safety area widths for taxiways and taxilanes are as follows:

- Taxiway OFA Width = 1.4 times airplane wingspan plus 20 feet (212' x 1.4 + 20' = 316')
- Taxilane OFA Width = 1.2 times airplane wingspan plus 20 feet (212' x 1.2 + 20' = 275')

Source: FAA Advisory Circular 150/5300-13

The forecast shows an increase in the number of Group V aircraft operating at the Airport during the next five to ten years, ultimately reaching approximately 6,500 operations over the 20-year planning period. It should be noted that Kalitta does not intend to introduce the Boeing 747-8F into its fleet, therefore, the FAA Modification of Standards that apply to this ARC D-VI aircraft do not affect design planning at the Oscoda-Wurtsmith Airport.

### 3.2.4 Airfield Pavement Strength

Pavement strength is determined with respect to the critical aircraft. The large transport jets typically range from 250,000 to 600,000 pounds, with most aircraft over 200,000 pounds having a dual-tandem wheel gear (DTWG) configuration. Therefore, the existing Runway 6/24 pavement strength of 550,000 pounds (DTWG) is sufficient to accommodate the existing and future critical aircraft, as operated for aircraft maintenance and repair configurations. The planned crosswind Runway 18/36 pavement strength is 12,500 pounds, sufficient to accommodate most piston and smaller turboprop general aviation aircraft. **Table 3-8** summarizes the facility needs for pavement strength requirements for during the 20-year planning period.

### 3.2.5 Navigational-Instrument-Visual Aids (NAVAIDs)

The Runway 24 end has a precision instrument (PI) approach. The Runway 6 end has a RNAV (GPS) instrument approach procedure with localizer performance with vertical guidance (LPV) minimums. The Runway 6 end also has a very high frequency omni-directional range station with distance measuring equipment (VOR-DME) approach. The VOR-DME is named the AuSable VOR. The VOR is located on the airfield adjacent to Taxiway A, approximately 1,500' from

Taxiway B with a 1,000' protection buffer. It is recommended the Runway 6 end plan for GPS/WAAS precision instrument capabilities when those standards are determined by the FAA.

**Table 3-8** summarizes the facility needs for navigational aids during the 20-year planning period.

### **3.2.6 Airfield Signage and Marking**

The FAA recommends that all airports install a system of runway and taxiway guidance signs in accordance with the standards found in FAA Advisory Circular 150/5340-18, *Standards for Airport Signage Systems*. Improving taxiway guidance/directional/informational signs and marking might be necessary to provide better wayfinding along Taxiway 'D' for aircraft maneuvering between the Runway 24 end and the Terminal Area. Also, it is recommended that airfield signage be updated/upgraded in the future to meet FAA Safety Management System (SMS) requirements, utilizing SMS standards currently being developed.

The magnetic declination obtained from the National Geophysical Data Center is 8 degrees west. Based on the runway's true bearing (58.14 and 238.17 degrees), the magnetic azimuths indicate the existing runway number designations (6 and 24) should be considered for re-designation to (7 and 25).

## **3.3 TERMINAL FACILITY REQUIREMENTS**

Terminal facilities over the next 20-years will be oriented towards new and replacement buildings and hangars to support general aviation, and tenants requiring airfield access. The core general aviation terminal area is capable of expansion without necessitating major relocation, redevelopment or the acquisition of additional property. The main general aviation apron provides for about 800 linear feet of additional apron frontage to construct new and replacement terminal facilities, including terminal building, hangars and other support buildings. These facilities could be constructed with some pavement modifications for needed access to the apron/ramp and taxiway system, and could be developed largely using the existing roadway system.

It should be noted that any potential improvements to the terminal area must conform to FAA airport planning standards, meet environmental compliance and incorporate applicable local codes.

### **3.3.1 Airport Terminal and Administration Building**

The Airport Terminal and Administration building is in fair condition, and might be a candidate for future replacement. Any future terminal building would be sited in the same general proximity, with direct access to the main apron. A new terminal building could house the FBO operator, or equivalent. Per the Airport's FBO Minimum Standards, the minimum FBO building must accommodate 800 square feet of office space, and 500 square feet of classroom.

### **3.3.2 Airport General Aviation Terminal Apron**

The general aviation apron is sufficient size to handle the current and projected levels of general aviation activity, for either fixed wing or rotorcraft. A marked dedicated helicopter landing area is recommended. In the future, a rehabilitated portion of the former Air Force apron may need to be expanded in the event that FBO, SASO or tenant facilities expand/relocate to the main apron. Per the Airport's FBO Minimum Standards, the minimum FBO ramp is 2,500 square feet.

### **3.3.3 Airport Support Maintenance and Equipment Buildings**

The storage area for the Airport maintenance equipment facilities is aged and undersized. The demand for airport maintenance facilities is directly related to the amount of pavement, lighting equipment, terminal building size, and overall grounds-maintenance that is required by the Airport. It can be assumed that as the airfield and/or facilities increase in size, the existing maintenance facility will likely require expansion and/or relocation.

### **3.3.4 Maintenance, Repair and Overhaul (MRO) Requirements**

Given anticipated growth of MRO services at Oscoda-Wurtsmith Airport, it is recommended that the plan allocate space for additional MRO businesses to include hangar(s), potential hangar ramp, auto parking, and a secured vehicle access/gate system. As part of the MRO development plan, an aircraft run-up area or ground run-up enclosure (GRE) is recommended. The GRE is primarily used for jet aircraft engine run-up/testing in order to reduce and/or redirect engine run-up noise, and often contains a three-sided walled-off area.

### **3.3.5 General Aviation / Fixed Base Operator (FBO) Hangars**

The existing hangars are nearing capacity, with new hangars anticipated in the near-term. Rehabilitation of the FBO buildings/hangars will need to be considered as the facilities continue to age beyond their useful life. Per the Airport's FBO Minimum Standards, the minimum hangar size is 5,000 square feet.

### 3.3.6 Aircraft Rescue and Fire Fighting (ARFF) Facility

Airports that serve certain commercial carriers and operators are required to provide aircraft rescue and fire firefighting (ARFF) facilities and equipment. As shown in **Table 3-7**, ARFF equipment requirements for FAR Part 139 airports are categorized by index ranking (A, B, C, D or E). At Oscoda-Wurtsmith Airport, ARFF vehicle and equipment requirements would likely be determined by specific characteristics of operator insurance requirements, as opposed to the FAR Part 139 regulation for commercial service airports. Based on FAA guidance and similar airport experience, the new ARFF building would need to be 4,500 to 5,000 square feet to accommodate Index B, and approximately 6,500 to 8,000 square feet for Index C.

*Table 3-7*  
**ARFF EQUIPMENT REQUIREMENTS**

<b>Airport Index</b>	<b>Aircraft Length</b>	<b>Number of Vehicles</b>	<b>Scheduled Daily Departures</b>	<b>Agent and Water Foam Requirements</b>
A	Less Than 90 Feet	1	1 or more	500 Pounds of DC/HALON 1211 or 450 Pounds of DC and 100 Gallons of Water
B	90 to 126 Feet	1	Less than 5	Index A equipment and 1,500 Gallons of Water
		2	5 or more	Index A equipment and 1,500 Gallons of Water
C	126 to 159 Feet	2	5 or more	Index A and 3,000 Gallons of Water
			Less than 5	Index A and 3,000 Gallons of Water
D	159 to 200 Feet	3	5 or more	Index A and 4,000 Gallons of Water
			Less than 5	Index A and 4,000 Gallons of Water
E	200 Feet and Greater	3	5 or more	Index A and 6,000 Gallons of Water

Source: FAR Part 139.315 – Aircraft Rescue and Firefighting: Index Determination

### 3.3.7 Aircraft De-icing

Responsibilities for de-icing operations are assumed by the FBO and/or tenant(s) on their respective apron. Fluid storage and equipment requirements are the responsibility of the FBO and/or tenants providing deicing services.

### 3.3.8 Aircraft Fuel Storage

There are no known fuel storage deficiencies. Future fuel storage and dispensing demands will need to meet the Airport regulations and fuel/fire code standards. Future MRO fueling and defueling storage facilities should meet Airport regulations and fuel/fire code standards.

### 3.3.9 Airport Auto Access / Entrance Road

The existing Airport roadway network was constructed to support a military base. Modifications are recommended to provide improved terminal wayfinding, expand roadways and new extensions to access new developments.

### **3.3.10** Terminal Auto Parking

Auto parking at the Airport terminal consists of two adjacent surface lots, which have about 32 parking spaces. The parking lot size is adequate, but might be reconfigured in the future based on possible reconfiguration of the Airport entrance road and future terminal building.

### **3.3.11** Security Fencing

It is generally recommended that the Airport conduct a wildlife hazard assessment study and safety management study (SMS) and to determine the perimeter and internal fence/gate requirements. The minimum recommended fence height to restrict deer is 8 to 10 feet tall.

### **3.3.12** Airport Land Acquisition

Future Airport land acquisition entails property (approximately 110 acres) remaining to be transferred to the Airport Authority from the United States Department of Defense, Air Force. Other future Airport land acquisition interests shall the Runway Protection Zone (RPZ) for the Runway 6 end so as to provide for precision instrument lighting equipment. Land acquisition related to the implementation of the crosswind Runway 18/36 is also required.

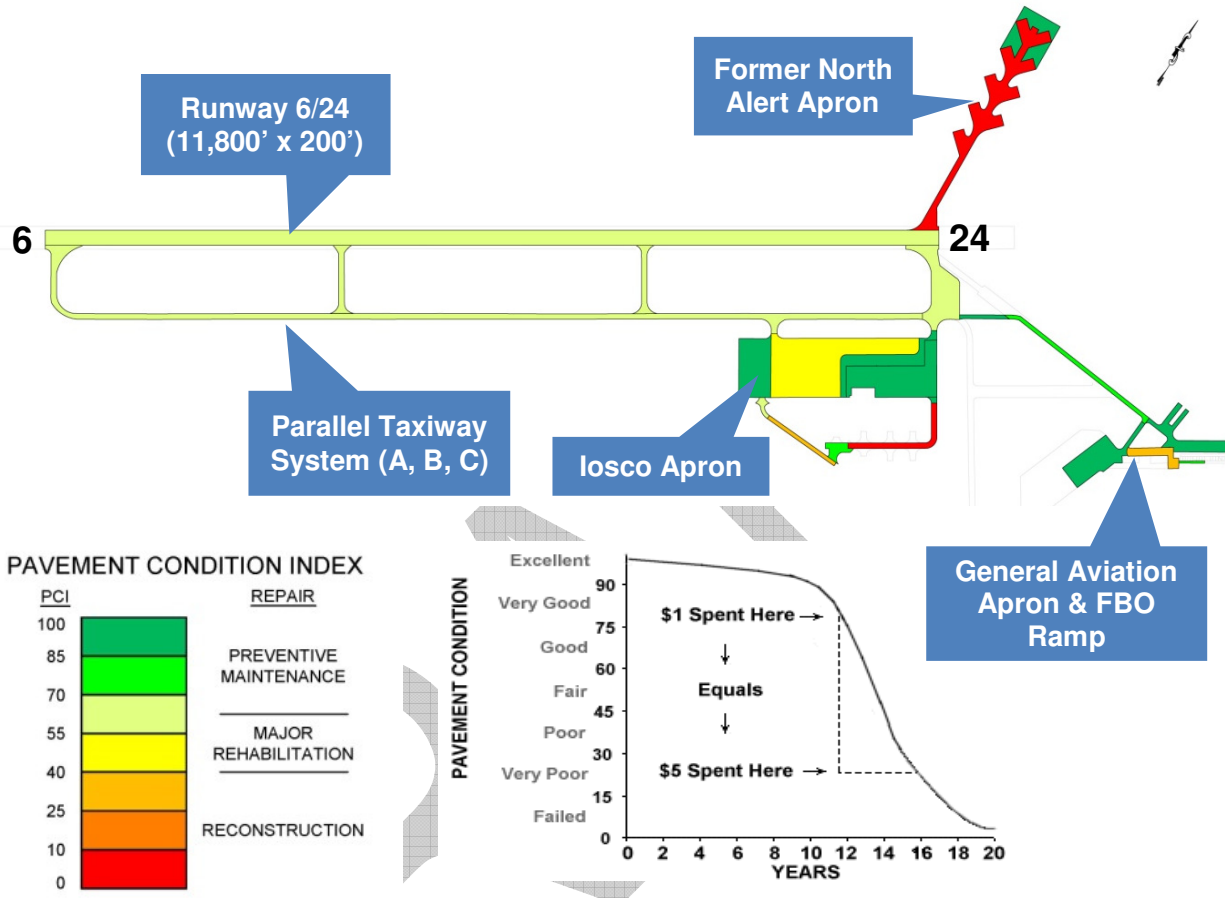
### **3.3.13** Pavement Maintenance and Rehabilitation

**Exhibit 3-2** is an illustration of the 2010 PCI Study mapping. A phasing plan utilizing the pavement condition identified in the PCI Study will be evaluated in subsequent chapters.

**Airfield Pavements:** According to the 2010 PCI inspection, Runway 6-24 and the associated parallel taxiway system (shoulders excluded) which were originally constructed with Portland Concrete Cement (PCC) and asphalt overlaid, are rated in 'fair' condition (color-coded light green). Although not assessed as part of the PCI effort, the runway and taxiway shoulders are experiencing moderate to severe deterioration, as noted on prior MDOT Airfield Inspections. It is recommended that beyond routine maintenance, a runway and taxiway rehabilitation project would be considered within the next ten years in order to restore pavements to good condition.

**Apron Pavements:** It is recommended that the losco Apron phased apron rehabilitation improvements continue in the near-term. Also, the losco Apron taxilanes are in 'fair' to 'failed' condition, and in need of near-term rehabilitation/reconstruction. The Main Apron and the FBO ramp, which were originally constructed with Portland Concrete Cement (PCC) and asphalt overlaid, are generally rated in good condition (shoulders excluded). Rehabilitation of the North Alert Apron is recommended in the future dependent on future tenant/user demand.

Exhibit 3-2  
**AIRFIELD PAVEMENT CONDITION REPORT (PCI)**



Source: MDOT PCI Study (2010)

### 3.4 SUMMARY OF FACILITY REQUIREMENTS

**Table 3-8** is a summary of the facility requirements necessary to satisfy the 20-year aviation demands at the Oscoda-Wurtsmith Airport. This information forms the basis of the 20-year airport development plan as identified in the following chapter. Certain identified facilities will need further analysis based on the recommended development alternatives. Alternatives to satisfy the facilities requirements for each of the fundamental designs area are addressed in the following chapter.

Table 3-8  
FACILITY REQUIREMENT SUMMARY

Facility Requirement	Existing (2010)	2015	2020	2030
<b>AIRFIELD</b>				
<b>Runway 6/24:</b>				
ARC Category	D-V	D-V	D-V	D-V
Length (Ft.)	11,800	11,800	11,800	11,800
Width (Ft.)	200	200	200	200
Shoulders (Ft.)	50	50	50	50
Strength (lbs.)	550,000 DDT	550,000 DDT	550,000 DDT	550,000 DDT
Edge Lighting	HIRL	HIRL	HIRL	HIRL
Runway Aids		ILS, MALSR, PAPI-4L, RNAV, RNP-WAAS Install Distance-to-Go Marker Signs Rwy 6 Precision Instrument Approach Upgrade (No ALS)		
Taxiway Segments	'A', 'B', 'C', 'E'	'A', 'B', 'C', 'E'	'A', 'B', 'C', 'E'	'A', 'B', 'C', 'E'
ARC Category	ARC D-V	ARC D-V	ARC D-V	ARC D-V
Width / Shoulder (Ft.)	75' / 50'	75' / 50'	75' / 50'	75' / 50'
Strength (lbs.)	550,000 DDT	550,000 DDT	550,000 DDT	550,000 DDT
Edge Lighting	MITL	MITL	MITL	MITL
Taxiway Segments	'D'	'D'	'D'	'D'
ARC Category	ARC C-III	ARC C-III	ARC C-III	ARC C-III
Width / Shoulder (Ft.)	50' / N/A	50' / N/A	50' / N/A	50' / N/A
Strength (lbs.)	60,000 DT	60,000 DT	60,000 DT	60,000 DT
<b>Planned (New) Runway18/36</b>				
ARC Category	--	B-II	B-II	B-II
Length (Ft.)	--	4,200 to 5,000	4,200 to 5,000	4,200 to 5,000
Width (Ft.)	--	75	75	75
Shoulders (Ft.)	--	0' to 10'	0' to 10'	0' to 10'
Strength (lbs.)	--	12,500 SWG	12,500 SWG	12,500 SWG
Edge Lighting	--	MIRL	MIRL	MIRL
Runway Aids	--	PAPI-2   REIL	PAPI-2   REIL	PAPI-2   REIL
Taxiway	--	Non-Precision Partial - 35' Wide	Non-Precision Full - 35' Wide	Non-Precision Full - 35' Wide
<b>NAVIGATIONAL AIDS</b>				
NAVAIDS	VOR-DME	VOR-DME	VOR-DME	VOR-DME
Weather System	AWOS-3	AWOS-3	AWOS-3	AWOS-3
Ground Communications	--	GCO	GCO	GCO
<b>AVIATION SUPPORT FACILITIES</b>				
General Aviation Apron (SY)	24,000	24,000	24,000+	24,000+
Isco Apron/Run-Up (SY)	192,500	Potential Expansion	192,500 to 235,000	235,000 to 275,000
T-Hangars (Units)	10	20	30	40
Conventional Hangars	Tenant Demand	Per Tenant Demand	Per Tenant Demand	Per Tenant Demand
Fuel Storage (100LL   Jet A)	15,000   20,000	15,000   20,000	15,000   20,000	15,000   20,000
<b>ACCESS, CIRCULATION AND PARKING</b>				
On-Airport (Perimeter)			Connect/Re-Align Northside	
Airport Entrance Road (On-Off Airport)			Designate Primary Entrance Road Route	
Terminal Parking (Public Use)	±32 Spaces	±32 Spaces	Potential Expansion	Potential Expansion
MRO Auto Parking (Public Use)	±257,000 SF	Potential Expansion	Potential Expansion	Potential Expansion

END OF FACILITY REQUIREMENTS CHAPTER  
THIS CHAPTER ADDRESSES REVIEW COMMENTS FROM:

- THE AIRPORT STAFF (2-8-2011)
- THE AIRPORT ADVISORY COMMITTEES (2- 8- 2011)
- MDOT (9-2010)
- C. BRUMMOND (5-23-11)

DRAFT