Appendix B - 2020 ALP Update Narrative Report

FINAL REPORT

OAKLAND COUNTY MICHIGAN AIRPORTS

OAKLAND/ SOUTHWEST AIRPORT

AIRPORT LAYOUT PLAN UPDATE

Mead & Hunt

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A. Inventory of Existing Conditions

INTRODUCTION. The Oakland/Southwest Airport has been an integral part of the Michigan aviation system for over 70 years. The Airport opened shortly after WWII, serving as a private pilot training facility for veterans. Today, it functions as a public entity, and is home to a privately owned flight school. In addition to its historic and educational roots, Oakland/Southwest is part of a vast network of airports connecting communities. The Airport is one of three publically owned airport facilities in Oakland County, the second most populous county in the state and home to approximately 10% of Michigan residents.

This chapter will examine two basic elements of the Airport: existing airport facilities (runway, taxiways, hangars, ground access, etc.) and the airport environs. Subsequent chapters are comprised of forecasting aviation activity at the Airport, evaluating the airport's ability to meet the projected aviation demand in a safe and efficient manner, and recommendations for future facility development.

The need for this study is rooted in Federal Aviation Administration (FAA) guidance (FAA Advisory Circular 150/5070-6B), which states that master planning studies fall within one of two basic types: Airport Master Plans and Airport Layout Plan (ALP) Updates. The FAA requires that the airport sponsor maintain an ALP that ensures the safety, utility and efficiency of the airport. Although the FAA does not require airports to prepare master plans, it strongly recommends they do so. In this case, the report format will be an ALP Update.

Requirements for future facilities will be evaluated from not only the standpoint of aviation needs, but also the relationship of airport facilities to the surrounding land uses and the community. The planning focus of the Inventory chapter will be on the aviation facility as whole and its surroundings.

Airport Role and Facilities

Oakland County has a population of approximately 1,242,304[1] people. Daimler-Chrysler AG is the largest employer in Oakland County, with approximately 12,300[2] employees with Beaumont Hospitals falling shortly behind at 11,891 employees. There are numerous other business, health, and government opportunities in the community and county. Oakland County covers an area of 907 square miles and is situated approximately 15 miles northwest of downtown Detroit, Michigan; 190 miles northwest of Cleveland, Ohio; 285 miles northeast of Chicago, Illinois; and, 20 miles west of Windsor, Ontario, Canada.

Oakland/Southwest Airport is located on county property within the Township of Lyon. The private airport transitioned to public ownership in 2000, and the County now maintains and operates the Airport. Oakland/Southwest Airport is located one (1) mile southwest of New Hudson, Oakland County, Michigan, in the north-central portion of Lyon Township. Oakland County itself is located in southeastern Michigan, northwest of Detroit, Michigan.

- **Airport Reference Point (ARP): Latitude 42° 30' 11.22"N, Longitude 83° 37' 25.38"W.**
- **FAA Site number: 10157.A.**
- **National Plan of Integrated Airport Systems (NPIAS) classification: Reliever.**
- **Acreage: 67 acres.**
- **Elevation: 926.0 feet above mean sea level (MSL).**
- **Mean normal maximum temperature: 84.6° F.**

Airside Facilities

Runway System. Runway 8/26 is 3,128 feet in length and 40 feet in width. Runway 8 has a 875-foot displaced landing threshold, and Runway 26 has an 860-foot displaced landing threshold. Both of these displacements are due to the presence of vegetative (tree) obstructions at the approach ends of the runway.

- **Pavement: Constructed of asphalt with a gross weight bearing capacity of 12,500 pounds single-wheel main landing gear configuration. Pavement is reported on the FAA 5010-1, *Airport Master Record* to be in fair condition.**
- **Line of Sight/Gradient: According to tpublished end elevation data, the Airport meets Airport Design gradient requirements for aircraft approach category A and B runways of no more than 2%. Additionally, the runway meets the Line of Sight standards for a single runway with a full length parallel taxiway.**
- **Lighting: Low Intensity Runway Lights (LIRL) and 2-box Visual Approach Slope Indicators (VASI) located on the left hand side of Runway 26 and right hand side of Runway 8 (4.00 degree glide path).**
- **Landing Aids: VOR or GPS-A for circling approaches. The approach is available at night but only for circling to Runway 26.**

Taxiway System. Runway 8/26 is served by a full-length, parallel taxiway located north of the runway. The centerline to centerline separation between the runway and taxiway is 77 feet. Access to the parallel taxiway from the runway is provided by five exits. An illustration of existing airport facilities is included in the following figure entitled EXISTING AIRPORT LAYOUT.

[1] 2015 U.S. Census Bureau

[2] https://www.oakgov.com/advantageoakland/media-center/Documents/dat_largestemployers.pdf. 2014 Report.

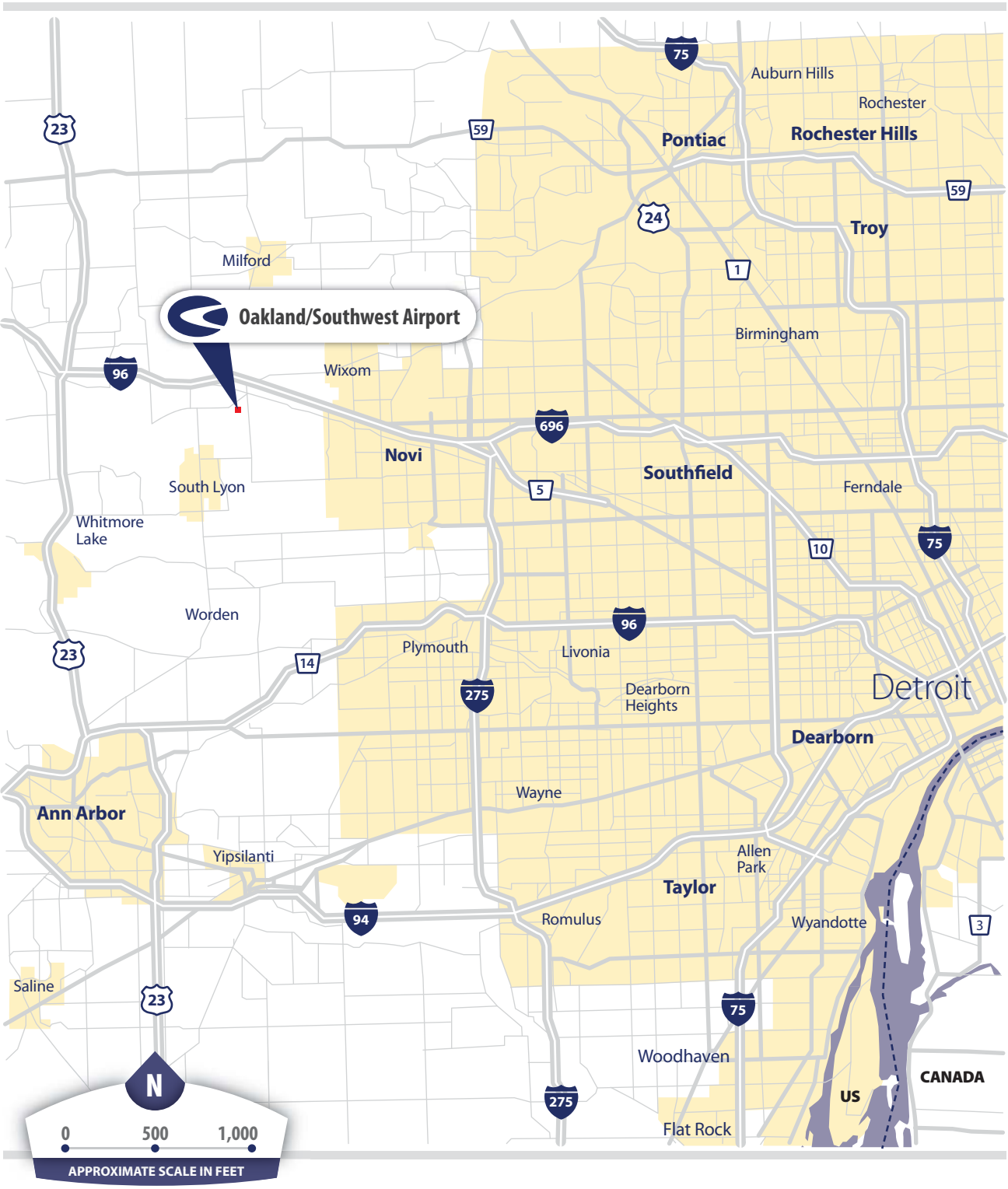


FIGURE A1 **Airport Location Map**

FIGURE A2 **Airport Vicinity Map**

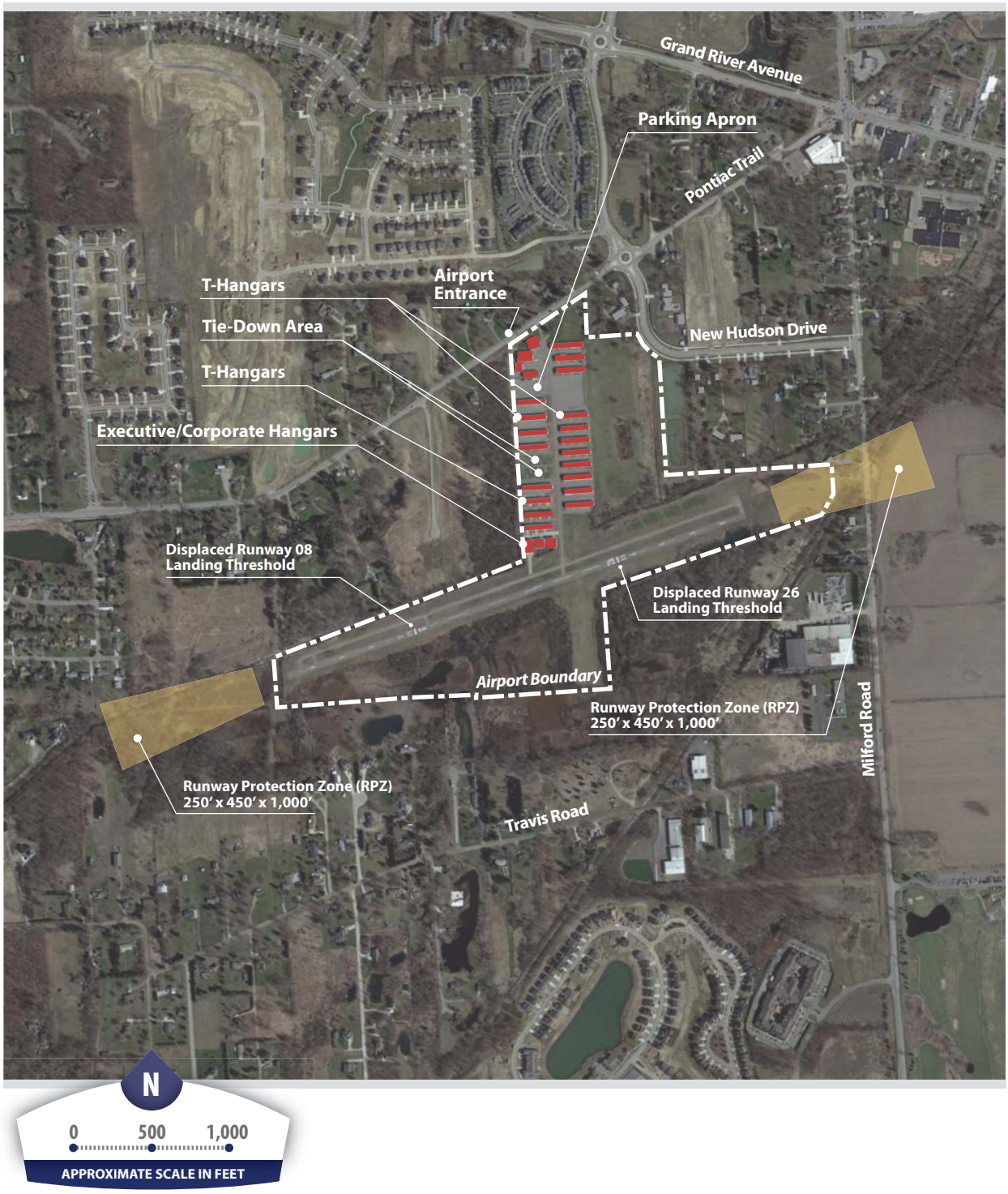


FIGURE A3 Existing Airport Layout

SOURCE: Mead & Hunt, Google Earth (2016).

All taxiways are 22 feet in width and equipped with reflectors. A north/south taxiway provides access from the center portion of the taxiway to the T-hangars and executive/corporate hangars north of the runway.

Aprons. There are three aircraft aprons providing a total of approximately 87,660 square feet of aircraft parking area (aprons of 26,910 sf, 42,750 sf, and 18,000 sf), as well as 28 tie down spaces.

Approaches. The published instrument approach procedure for the Airport is listed in the following table entitled INSTRUMENT APPROACH PROCEDURES AT OAKLAND/SOUTHWEST AIRPORT.

TABLE A1 Instrument Approach Procedures at Oakland/Southwest Airport

Type of Approach	Runway Designation	Ceiling Minimums	Visibility Minimums
VOR or GPS-A	Circling	594’	1-mile

Source: Jeppesen Airway Manual

Landside Facilities

General Aviation Facilities. A review of existing planning documents, as well as previous on-site observations indicate that the facilities at the Airport include an administration building, three (3) executive/corporate hangars, and 19 T-hangar buildings that provide a total of 113 individual T-hangar units. General aviation services, including fuel sales, aircraft rental, maintenance, charter, flight training, and pilot supplies, are provided by the airport Fixed Base Operator (FBO), Oakland Flight Services.

Fuel Storage. 100 Octane aviation fuel (AVGAS) is currently stored in a 12,000-gallon, aboveground tank located on the north side of the west aircraft parking apron.

Vehicular Access and Parking. Immediate vehicular access to the Airport is provided by Pontiac Trail Road. The nearest highway access point to the Airport is via Milford Road, which intersects Pontiac Trail Road just north and east of the Airport, and connects to Interstate 96 (I-96), a major thoroughfare running east/west through Oakland County to Detroit.

Airspace

Oakland/Southwest Airport, as with all airports, functions within the local, regional, and national system of airports and airspace. The following illustration entitled AIRSPACE/NAVAIDS SUMMARY provides a graphic representation of the airspace in the immediate vicinity of the Airport.

FIGURE A4 Airspace/NAVAIDS Summary

SOURCE: Detroit Sectional, 92nd Edition, September 2016.

Airport Environs

A comprehensive inventory of existing land uses, zoning patterns, and the various land use planning and control documents used to guide development near the Airport is central to the airport planning process. Land use compatibility with airport planning can be assured with a thorough knowledge of what land uses are proposed and what, if any, changes need to be made.

Existing Zoning

Lyon Township regulates development and use of land within its borders, and has in place an adopted land use zoning ordinance with criteria for uses to be developed within certain zones. In conjunction with the zoning ordinance, the Township has also adopted a zoning map that divides the city into areas consistent with the zoning ordinance. The Airport itself has been designated as part of a special land use area, allowing the airport within the Residential-Agricultural land use district. West and directly adjacent to the Airport, is 0.3 Single-Family Residential, while north of the Airport is a zoning subarea defined as Neighborhood. Light Industrial is located to the east with 0.5 Single Family Residential to the south. Existing zoning within the vicinity of the Airport is shown in the following illustration entitled GENERALIZED EXISTING ZONING.

Existing Land Use

Land use in the vicinity of the Airport predominately follows the existing zoning pattern and is presented in the following figure entitled GENERALIZED EXISTING LAND USE. Land use in the vicinity of Oakland/Southwest Airport is associated with two types of residential land use development, open space, undeveloped land. Additionally, an industrial area is located southeast of the Airport, as well as an area of commercial land uses at the intersection of I-96, Milford Road, and Pontiac Trail Road.

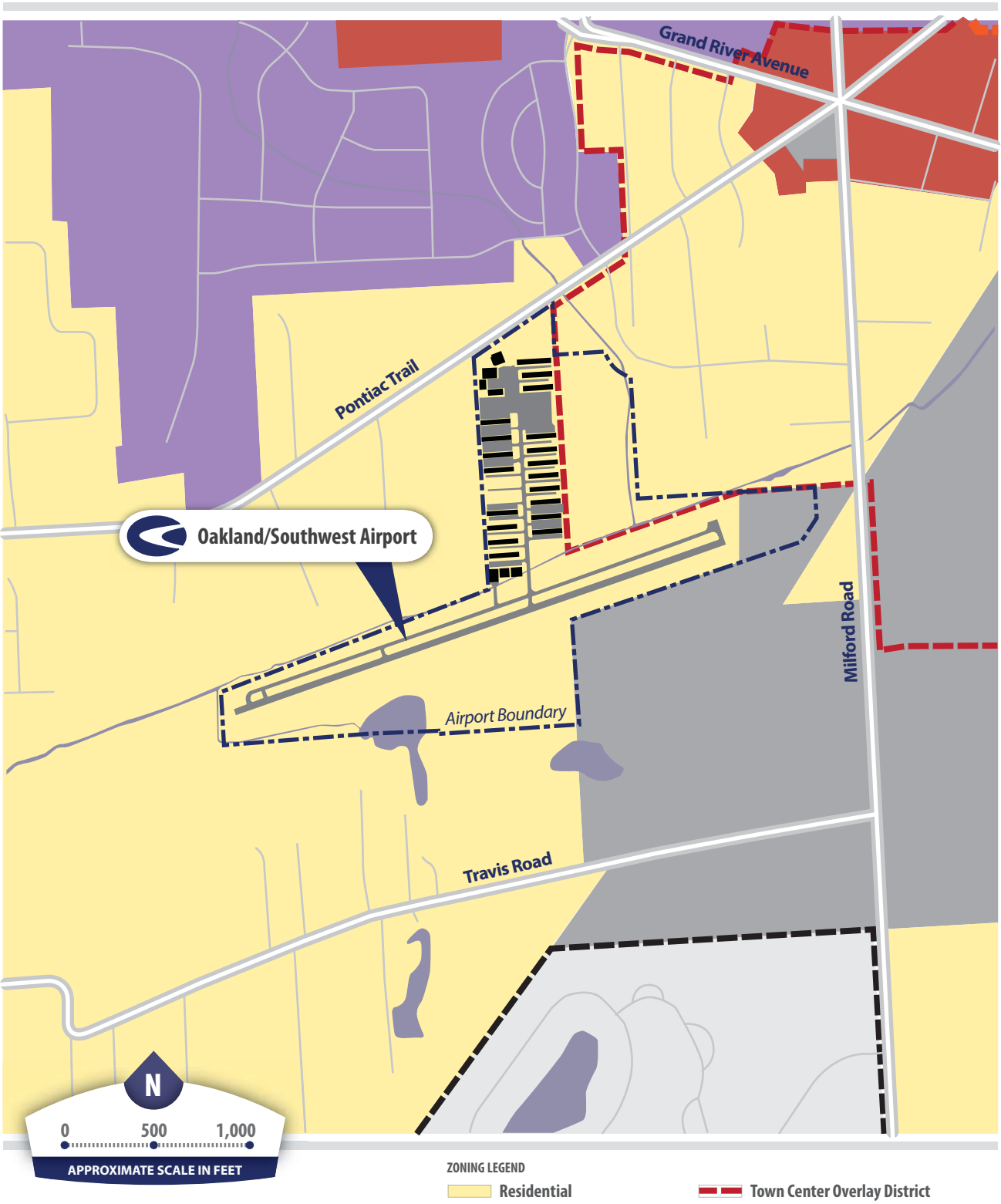


FIGURE A5 **Generalized Existing Zoning**

SOURCE: Township of Lyon, Oakland County, 2013 Zoning Map.

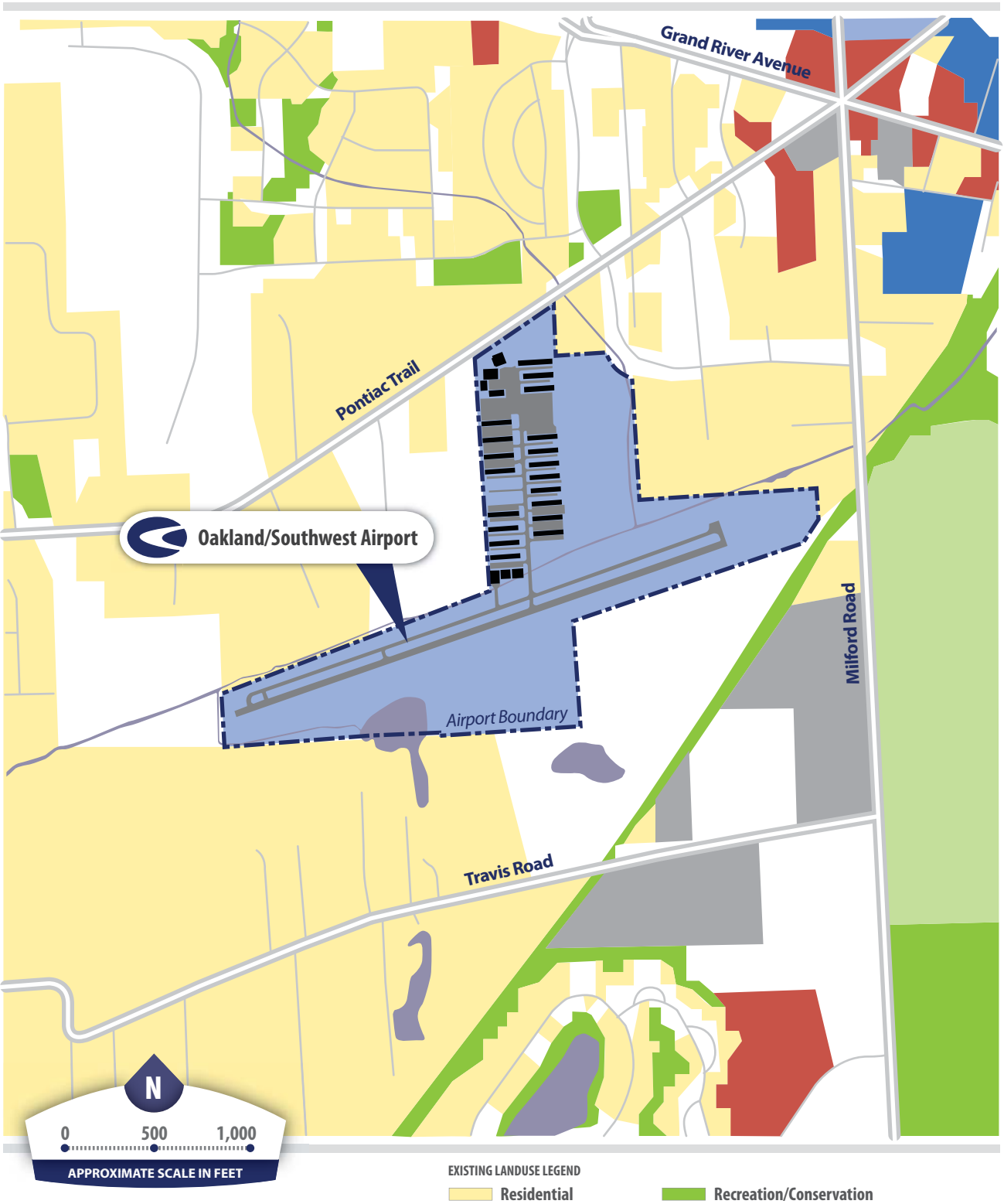


FIGURE A6 Generalized Existing Land Use

SOURCE: *Oakland County, 2015 Land Use.*

B. Forecasts of Aviation Activity

INTRODUCTION. Forecasting is a fundamental part of the planning process, and essential for analyzing how existing facilities meet current demands and future needs. Forecasting is not exact; instead it identifies general parameters and provides a defined rationale for future changes and development. The amount and variation of aviation activity occurring at an airport is dependent upon numerous factors, usually reflective of the services available to aircraft operators, the businesses at the Airport or within the community, and the general economic conditions in the surrounding area.

Regional Socioeconomic Conditions

Historic socioeconomic conditions of the Oakland County region impact and reflect aviation activity. The most often analyzed indicators are population, employment, and income.

Population. Source: US Census data compiled by the Michigan State Data Center.

- **Oakland County: 1,242,304 (2015), projected to increase to 1,404,100 by the year 2020 (an annual growth rate of 2.5%).**
- **State of Michigan: 9,922,576 (2010), projected to increase to 10,454,700 by the year 2020 (annual growth rate of 1.1%).**

Employment. Source: US Bureau of Labor Statistics, 2017.

- **Oakland County: unemployment rate of 4.8%.**
- **State of Michigan: unemployment rate of 5.3%.**
- **United States: unemployment rate of 4.9%.**
- **Major employers: Beaumont Hospitals, Chrysler Group LLC., General Motors Co., St. John Providence Health System, and the U.S. Postal Service[1].**

Income. Source: US Department of Commerce, Bureau of Economic Analysis.

- **Oakland County: $37,728 per capita income (2015)**
- **State of Michigan: $26,607 per capita income (2015)**
- **United States: $28,930 per capita income (2015)**

[1] "Largest Employers, Oakland County's 25 Largest Employers", 2014, https://www.oakgov.com/advantageoakland/media-center/Documents/dat_largestemployers.pdf

Historic and Existing Airport Activity

A tabulation of historical aviation activity since 2007 at Oakland/Southwest Airport is presented in the following table entitled HISTORICAL AVIATION ACTIVITY, 2007-2016. It is important to note that there is no Airport Traffic Control Tower (ATCT) counting or recording operations at this Airport. The most accurate estimate of total annual operations is from MDOT Aero hose counts. These hose counts indicate that operations have remained relatively constant at about 12,000 per year for the past 6 years.

TABLE B1 Historical Aviation Activity, 2007-2016

Year	Air Taxi Operations	Itinerant GA Operations	Local GA Operations	Military Operations	Total Operations
2007[1]	2,350	10,773	13,890	0	27,013
2008[1]	0	7,380	7,380	0	14,760
2009[1]	0	4,890	4,890	0	9,780
2010[1]	0	4,890	4,890	0	9,780
2011[2]	---	---	---	---	14,150
2012[2]	---	---	---	---	12,790
2013[1]	---	---	---	---	11,700
2014[2]	---	---	---	---	11,845
2015[2]	---	---			11,990
2016[2]					11,990

Source: MDOT Aero and FAA
[1] FAA TAF, January 2017
[2] MDOT Aero Hose Counts

Existing Operations by Aircraft Type

The current level of aviation activity by aircraft type is summarized in the following table entitled EXISTING OPERATIONS BY AIRCRAFT TYPE, 2016.

TABLE B2 Existing Operations by Aircraft Type, 2016

Aircraft Type	Operations
General Aviation	11,990
Single Engine Piston	11,743
Multi-Engine Piston	239
Turboprop	4
Business Jet	4
Helicopter	0
Military	0
Total	11,990

Source: Mead & Hunt
[1] Estimates based on the percentage of based aircraft to operations.

Based Aircraft

Historic based aircraft numbers are presented in the following table entitled *SUMMARY OF BASED AIRCRAFT 2007-2016*. Because the National Based Aircraft Inventory is a relatively new program, the FAA TAF was used for all years other than 2016. Unfortunately, the FAA TAF does not differentiate between aircraft type and only lists total based aircraft. Also, the actual list of based aircraft from the National Based Aircraft Inventory Program is listed in the following table entitled BASED AIRCRAFT LIST, 2017.

TABLE B3 Summary of Based Aircraft, 2007-2016

Year	Single Engine Piston	Multi-Engine Piston	Turboprop	Jet	Total
2007[1]	---	---	---	---	93
2008[1]	---	---	---	---	92
2009[1]	---	---	---	---	60
2010[1]	---	---	---	---	60
2011[1]	---	---	---	---	56
2012[1]	---	---	---	---	56
2013[1]	---	---	---	---	73
2014[1]	---	---	---	---	73
2015[1]	---	---	---	---	65
2016[2]	47	1	0	0	48

Source: MDOT Aero and FAA
[1] FAA TAF, January 2017
[2] Oakland County as reported to the National Based Aircraft Inventory Program, 1/23/2017

TABLE B4 Based Aircraft List, 2017

Make	Model	Weight	Engine	Runway Design Code
Cessna	337C Skymaster	4,200	Multi	A-I
Single Engine Experimental	---	---	Single	-
Cessna	150L	1,600	Single	A-I
Piper	PA28R-200	2,491	Single	A-I
Mooney	20C	2,575	Single	A-I
Beech	Bonanza F33A	3,400	Single	A-I
Beech	Bonanza N35	3,325	Single	A-I
Piper	PA28R-235	3,000	Single	A-I
Cessna	172C	2,550	Single	A-I
Cessna	Skylane 182T	3,100	Single	A-I
Cessna	182	2,950	Single	A-I
Cirrus	SR22	3,400	Single	A-I
Piper	PA-WW-150	2,000	Single	A-I
Cessna	C-172	2,300	Single	A-I
Cessna	182	2,950	Single	A-I
Piper	PA-28-180	2,450	Single	A-I
Cessna	177B	2,800	Single	A-I
Aviat	A-1B	1,560	Single	A-I
Cessna	172E	2,150	Single	A-I
Cessna	172K	2,300	Single	A-I
Piper	PA-28-151	2,150	Single	A-I
Piper	PA-28-151	2,150	Single	A-I
Cessna	152	1,184	Single	A-I
Mooney	M20	2,450	Single	A-I
Cessna	172N	2,300	Single	A-I
Piper	PA-28-181	2,550	Single	A-I
Navion	Ryan Navion	---	Single	A-I
Boeing	175N1(PT17)	---	Single	A-I
Piper	PA-28-180	2,450	Single	A-I
Cessna	172F	2,300	Single	A-I
Cessna	172	2,300	Single	A-I
Commander	114	---	Single	A-I
Vans	RV7	---	Single	A-I
Piper	PA-32-300	3,400	Single	A-I
Cessna	182T	2,800	Single	A-I

Make	Model	Weight	Engine	Runway Design Code
Piper Cub	J3C-65 Piper	1,200	Single	A-I
Columbia	300	3,400	Single	A-I
Cessna	150A	1,600	Single	A-I
Piper	Archer	-	Single	A-I
Cessna	150M	1,500	Single	A-I
Home Built	-	---	Single	---
Cessna	182Q	2,950	Single	A-I
Cessna	182	2,950	Single	A-I
Cessna	172	2,150	Single	A-I
Cessna	172	2,150	Single	A-I
Cessna	172	2,150	Single	A-I
Piper Cub	J3C-65	1,200	Single	A-I
Piper	PA-28-180	2,450	Single	A-I
American Champion	7GCBC	---	Single	A-I
Cessna	172 Skyhawk	2,300	Single	A-I
Piper	PA-28-201T	2,900	Single	A-I
Zodiac	601XL	---	Single	A-I
Piper	PA-24-250	2,900	Single	A-I
Piper	PA-28-180	2,450	Single	A-I
Cessna	182	2,800	Single	A-I
Piper	PA-28-180	2,450	Single	A-I
Scottish Bulldog	120	---	Single	A-I
Beech	N35	3,325	Single	A-I

Source: National Based Aircraft Inventory Program, 1/23/2017
--- Data not available

General Aviation Forecasts

In developing the general aviation activity forecasts for Oakland/Southwest Airport, several related forecasts and other local and national trends were reviewed. Included in this assessment, and as presented in the following table entitled GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2016-2036, are the FAA TAF, a straight-line trend projection based on historical data, and three forecast scenarios developed for this ALP Update study.

- **FAA TAF: The current FAA TAF for Oakland/Southwest Airport projects a Compound Annual Growth Rate) CAGR of 1.28%.**
- **Scenario One, No Growth: Given the recent trend of relatively flat growth in operations as indicated by MDOT Aero hose counts for the past 5 years, this scenario estimates flat growth in annual GA operations.**

- **Scenario Two: This scenario estimates GA operations to increase at a rate similar to the FAA Aerospace Forecast for General Aviation Fleet Growth of 0.5%.**
- **Scenario Three: This scenario estimates GA operations to increase at a rate similar to the FAA Aerospace Forecast for General Aviation Hours Flown of 1.2%. *This scenario is the selected operations forecast for this study.***
- **Scenario Four: This scenario estimates GA operations to increase at a rate similar to the projected population growth of Lyon Township according to the Lyon Township Master Plan of 3.5%.**

Original is Scenario Two, changing to Scenario 3.

TABLE B5 General Aviation Operations Forecasts Scenarios, 2016-2036

Year	FAA TAF Jan. 2017 (1.28%)	Scenario One (0.0%)	Scenario Two (0.5%)	Scenario Three (1.2%)	Scenario Four (3.5%)
2016[1]	13,173	11,990	11,990	11,990	11,990
2017[1]	13,350	11,990	12,050	12,134	12,410
2018[1]	13,528	11,990	12,110	12,279	12,844
2019[1]	13,708	11,990	12,272	12,427	13,294
2020[1]	13,892	11,990	12,232	12,576	13,759
2021[1]	14,078	11,990	12,293	12,727	14,240
2026[1]	15,047	11,990	12,603	13,509	16,913
2031[1]	16,079	11,990	12,921	14,339	20,087
2036[1]	17,189	11,990	13,248	15,221	23,858

Source: Mead & Hunt

Military Operations Forecasts

Historically, military operational activity at the Airport has been insignificant. No changes to the levels of military activity are projected.

Operations Forecast By Aircraft Type

The types of aircraft expected to use the Airport assist in determining the amount and types of facilities needed to meet future aviation demand. The following table, entitled SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2016-2036, depicts the approximate level of use by aircraft types that are projected to use Oakland/Southwest Airport.

TABLE B6 Summary of Operations Forecast by Aircraft Type, 2016-2036

Aircraft Type	2016	2021	2026	2031	2036
General Aviation	*11,990*	*12,727*	*13,509*	*14,339*	*15,221*
Single Engine	11,743	12,465	12,231	14,044	12,907
Multi-Engine	239	254	269	286	303
Turboprop	4	4	5	5	5
Jet	4	4	5	5	5
Helicopter	0	0	0	0	0
Military	*0*	*0*	*0*	*0*	*0*

Source: Mead & Hunt

Local and Itinerant Operations Forecast

The current percentage split of local vs. itinerant operations at Oakland/Southwest Airport is estimated at 50/50. This current split is forecast to remain relatively constant through the planning period of the study. The forecast of local and itinerant operation is presented in the following table entitled SUMMARY OF LOCAL AND ITINERANT OPERATIONS FORECAST, 2016-2036.

TABLE B7 Summary of Local and Itinerant Operations Forecast, 2016-2036

Year	Local	Itinerant	Total
2016	5,995	5,995	11,990
2021	6,363	6,363	12,727
2026	6,755	6,755	13,509
2031	7,170	7,170	14,340
2036	7,610	7,610	15,221

Source: Mead & Hunt

Based Aircraft Forecast

The number and type of aircraft anticipated to be based at an airport are important components in developing effective airport plans. Generally, there is a relationship between aviation activity and based aircraft, stated in terms of operations per based aircraft (OPBA). Sometimes a trend can be established from historical information of operations and based aircraft. The national trend has been changing with more aircraft being used for business purposes and less for pleasure flying. This impacts the OPBA in that business aircraft are usually flown more often than pleasure aircraft.

Several based aircraft forecast scenarios are presented in the following table entitled BASED AIRCRAFT FORECAST SCENARIOS, 2016-2036. These include forecast from the FAA TAF, a no growth scenario and two growth scenarios related to various factors and influences.

- **FAA TAF: The current FAA TAF for Oakland/Southwest Airport projects a CAGR of 1.56%.**
- **Scenario One, No Growth: Given the recent trend of declining based aircraft at Oakland/Southwest, this conservative scenario estimates flat growth in based aircraft.**
- **Scenario Two: This scenario estimates based aircraft to increase at a rate similar to the FAA Aerospace Forecast for General Aviation Fleet Growth of 0.5%.**
- **Scenario Three: This scenario estimates based aircraft to increase at a rate similar to the projected regional growth in based aircraft as indicated in the Michigan State System Plan of 0.9%. *This scenario is the selected operations forecast for this study.***

TABLE B8 Based Aircraft Forecast Scenarios, 2016-2036

Year	FAA TAF Jan. 2017 (1.56%)	Scenario One (0.0%)	Scenario Two (0.5%)	Scenario Three (0.9%)
2016[1]	66	48	48	48
2017	67	48	48	48
2018	68	48	48	49
2019	71	48	49	49
2020	72	48	49	50
2021	73	48	49	50
2026	80	48	50	52
2031	85	48	52	55
2036	90	48	53	57

Source: Mead & Hunt

[1] National Based Aircraft Inventory Program, 2017

Summary

A summary of the aviation forecasts to be utilized for this ALP Update study is presented in the following table, entitled SUMMARY OF AVIATION ACTIVITY FORECASTS, 2016-2036. This information will be used in the following chapters to analyze facility requirements, to aid development of alternatives, and to guide the preparation of the plan and program of future airport facilities. In other words, the aviation activity forecasts are the foundation from which future plans will be developed and implementation decisions will be made.

TABLE B9 Summary of Aviation Activity Forecasts, 2016-2036

Operations	2016	2021	2026	2031	2036
General Aviation	*11,990*[1]	*12,727*	*13,509*	*14,339*	*15,221*
Single Engine	11,743	12,465	13,231	14,044	14,907
Multi-Engine	239	254	269	286	303
Turboprop	4	4	5	5	4
Jet	4	4	5	5	4
Helicopter	0	0	0	0	0
Military	*0*	*0*	*0*	*0*	*0*
TOTAL OPERATIONS	11,990	12,727	13,509	14,339	15,221
Local Operations	5,995	6,363	6,755	7,170	7,610
Itinerant Operations	5,995	6,363	6,755	7,170	7,610
Based Aircraft By Type					
Single Engine	47	49	51	54	56
Multi-Engine	1	1	1	1	1
Turboprop	0	0	0	0	0
Jet	0	0	0	0	0
Helicopter	0	0	0	0	0
TOTAL BASED AIRCRAFT	48[2]	50	52	55	57

Source: Mead & Hunt

[1] MDOT Aeronautics Hose Counts

[2] National Based Aircraft Inventory, 2017

C. Facility Requirements

INTRODUCTION. The ability of an Airport to accommodate existing and forecast demand is fundamental to ensuring the long-term viability of that airport. Of prime importance in meeting the current and projected demand are the airport's primary aircraft operational areas, as well as the configuration of key components such as runways and taxiways. Additionally, strong consideration must be given to weather conditions, the surrounding airspace, the availability and type of navigational facilities, the type and arrangement of aircraft storage facilities, the supporting facilities, and the type and amount of landside access.

In February of 2014, the FAA updated Advisory Circular 5300-13A, Airport Design. The new AC, referred to as 5300-13A, includes some minor revisions to the terminology used to code airports. The new terms include Runway Design Code (RDC), which is the code signifying the design standards to which a particular runway is to be built. The RDC is a combination of the design aircraft approach speed and wingspan as well as the instrument approach visibility minimum planned for the runway. Another term included in the AC is the Runway Reference Code (RRC) which is a code signifying the current operational capabilities of an existing runway. The RRC is also a combination of the design aircraft approach speed and wingspan as well as the instrument approach visibility minimum currently published for that runway. The term Airport Reference Code is still used and signifies the highest RDC at the Airport, minus the third (visibility) component of the RDC.

The initial step in determining how an airport is currently performing in relation to its existing demand levels, and thereafter in relation to its forecasted demand levels, is to identify the most demanding aircraft having at least 500 total annual operations at the airport. Having a thorough understanding of the types of aircraft currently using, and those projected to use, Oakland/Southwest provides information concerning the Runway Reference Code (RRC). The RRC is based on the "Design Aircraft" that is judged to be the most critical aircraft using the airport. The RRC relates aircraft operational and physical characteristics to airport design criteria that are applied to various airport components as well as the lowest published instrument approach visibility minimums for the runway. In this case, the lowest approach visibility minimum currently published for the Oakland/Southwest Airport is 1-mile.

Runway Reference Code (RRC)/Design Aircraft Analysis

The first aircraft component, depicted by a letter (i.e., A, B, C, D, or E) is the aircraft approach category and related to aircraft approach speed based upon operational characteristics. The second aircraft component, depicted by a roman numeral (i.e., I, II, III, IV, V, or VI) is the aircraft design group and relates to aircraft wingspan (physical characteristics). Generally, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan is primarily related to separation criteria associated with taxiways and taxilanes with the third component being the lowest approach minimums for that runway.

To determine the existing RDC for Oakland/Southwest Airport, an analysis of aircraft operations by RDC was completed utilizing FAA data, state hose counts, based aircraft, and input received from airport users and county staff.

The FAA data utilized in the analysis was from the Traffic Flow Management System Counts (TFMSC). The TFMSC lists Instrument Flight Rules (IFR) operations (based on flight plans) to or from a particular airport. These IFR operations were analyzed to determine the quantity of operations by differing RDC type aircraft. Over the past 10 years, the TFMSC database include 6,176 total aircraft operations (departures and arrivals) or an average of approximately 618 per year. Of these 6,176 operations, 75 percent were conducted A-I Small (less than 12,500 pounds) aircraft such as Cessna 172s and Piper PA-28 Cherokees. Most of these A-I Small aircraft are single engine piston driven aircraft. Approximately 21 percent were conducted by B-I Small aircraft such as a Beechcraft Baron 58 and a Cessna 421 Golden Eagle. Most of these B-I Small aircraft are either single engine or multi-engine piston driven aircraft. Aircraft in the A-I Small category primarily weigh less than 4,000 pounds while aircraft in the B-I Small category primarily weigh less than 7,000 pounds.

The current based aircraft at Oakland/Southwest Airport were also analyzed to inform the RDC determination. Both County staff and MDOT Aero both report that 60 of the 61 based aircraft at the Airport are single engine piston aircraft in the A-I Small category. One based aircraft is a push/pull type multiengine Cessna 337C Skymaster which also fits into the A-I Small category. Consequently, there is no documentation of regular use (over 500 annual operations) by any category larger than A-I Small and as such, A-I Small is the appropriate RDC for Oakland/Southwest Airport. All of these factors were considered in producing the chart below entitled GENERAL AVIATION OPERATIONS FORECAST BY RDC, 2016-2036.

TABLE C1 General Aviation Operations Forecast by RDC, 2016-2036

Aircraft Type	2016	2021	2026	2031	2036
A-I	11,818	12,114	12,419	12,732	13,055
B-I	125	128	131	135	138
A-II	25	26	26	27	28
B-II	25	26	26	27	28
C-I or greater	0	0	0	0	0

Source: Mead & Hunt and County Airport Management estimates.

Airside Requirements

The analysis of airside requirements focuses on identifying any need for additional facilities and the amount of space that those new facilities would require by weighing the current and forecasted levels of demand against the Airport's existing facilities. This evaluation includes the delineation of airfield dimensional criteria; a review of runway length, orientation, and capacity requirements; the establishment of design parameters for the runway and taxiway systems; and, an identification of airfield instrumentation and lighting needs.

Airport Standards Compliance Inventory

Dimensional standards applicable to Oakland/Southwest Airport are contained in the following table, entitled RUNWAY 8/26 DIMENSIONAL CRITERIA (IN FEET). As shown, Runway 8/26 does not meet many of the dimensional

standards associated with RRC A-I small with the existing 1-mile approach minimums. Based on the existing and forecasted operational demands provided in this ALP Update Study, it has been determined that the RDC A-I, small designation is appropriate for Oakland/Southwest Airport. Additionally, there are no plans to provide improved instrument approach capabilities with visibility minimums of less than 1-mile at the Airport. Some of these dimensional criteria are also shown graphically in the following illustration, entitled DIMENSIONAL CRITERIA and in the table entitled RUNWAY 8/26 DIMENSIONAL CRITERIA (IN FEET).

TABLE C2 Runway 8/26 Dimensional Criteria (in feet)

Item	Existing Dimension	Future RDC A-I Small Aircraft Only, Existing Approach Minimums
Runway Width	**40**	60
Runway Centerline to Parallel Taxiway Centerline	**77**	150
Runway Centerline to Aircraft Parking	240+	125
Runway Centerline to Holdline	66	125
Runway Safety Area Width	120	120
Runway Safety area Length Beyond Runway End		
Runway 8	**70**[1]	240
Runway 26	240	240
Runway Object Free Area Width	250	250
Runway Object Free Area Length Beyond Runway End		
Runway 8	**70**[1]	240
Runway 26	240	240
Runway Obstacle Free Zone Width	250	250
Runway Obstacle Free Zone Length Beyond Runway End		
Runway 8	**70**[1]	200
Runway 26	200	200
Taxiway Width	**22**	25
Taxiway Safety Area Width	N.D.	49
Taxiway Object Free Area Width	N.D.	89
Threshold Siting Criteria Runway 8	Criteria Met[2]	Criteria Met
Threshold Siting Criteria Runway 26	Criteria Met[2]	Criteria Met

Source: FAA Advisory Circular 150/5300-13A, *Airport Design*, Change 1

Notes: N.D. Not Determined
Bold Type dimensions reflect a deficiency in design standards.
[1] Deficiency causes as a result of RSA, ROFA and OFZ not contained within airport property.
[2] Criteria only met because of significant landing threshold displacement.

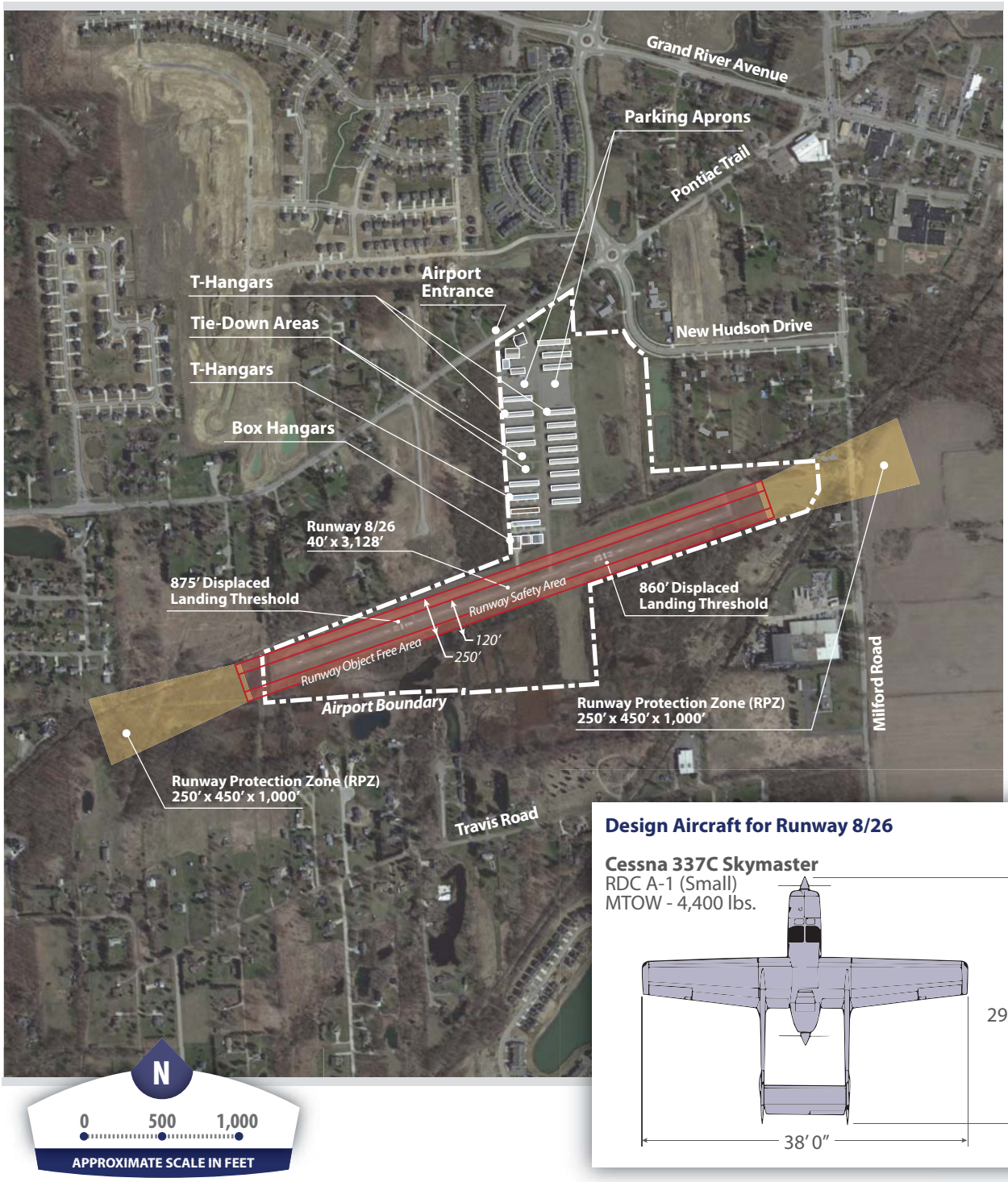


FIGURE C1 Dimensional Criteria

SOURCE: Mead & Hunt, Google Earth (2016).

Objects Affecting Navigable Airspace. The criteria contained in Federal Aviation Regulations (FAR) Part 77, Objects Affecting Navigable Airspace, apply to existing and proposed manmade objects and/or objects of natural growth and terrain (i.e., obstructions). These guidelines define the critical areas in the vicinity of airports that should be kept free of obstructions. Secondary areas may contain obstructions if they are determined to be non-hazardous by an aeronautical study and/or if they are marked and lighted as specified in the aeronautical study determination. Airfield navigational aids, as well as lighting and visual aids, by nature of their location, may constitute obstructions. However, these objects do not violate FAR Part 77 requirements, as they are essential to the operation of the Airport.

According to the 2005 ALP Update study for Oakland/Southwest Airport, there were 69 FAR Part 77 penetrations existing in the vicinity of the Airport, including lateral penetrations of the primary and transitional surfaces. The majority of these penetrations are by vegetation or trees, however, there were some poles, hangars and towers that also penetrated surfaces. As part of this ALP Update, new aerial photography and obstruction mapping is being prepared that will allow further analysis of Part 77 obstructions.

Runway Protection Zones (RPZs). The function of the RPZ is to enhance the protection of people and property on the ground off the end of runways. This is usually achieved through airport control of the property within the RPZ area. This control can be exercised through either fee simple ownership or the purchase of an RPZ easement. The RPZ is trapezoidal in shape and centered about the extended runway centerline. Its inner boundary begins 200 feet beyond the end of the area usable for takeoff or landing. The dimensions of the RPZ are functions of the type of aircraft that regularly operate at the Airport, in conjunction with the specified visibility minimums of the approach (if applicable).

The RPZs, as shown previously in yellow on Figure C1 are based on dimensional standards for RDC A-I Small standards. The County controls a portion of RPZ at the east end of the Airport, but none of the RPZ at the west end of the Airport. In September of 2012, the FAA published new interim guidance on land uses (particularly incompatible land uses) within RPZs. Any potential runway extension, runway shift or improved instrument approach minimums considered in the alternatives analysis of this ALP Update study should be considered a triggering event that will necessitate consideration of this new guidance. The following table, entitled RUNWAY PROTECTION ZONE DIMENSIONS, lists existing RPZ dimensional requirements, along with the requirements for improved approach capabilities and/or more demanding approach category aircraft.

TABLE C3 Runway Protection Zone Dimensions

Item	Width at Runway End (feet)	Width at Outer End (feet)	Length (feet)
Existing RPZ Dimensions			
Runway 8	250	450	1,000
Runway 26	250	450	1,000
Required RPZ Dimensions for Various Visiblity Minimums:			
Visual and not lower than one mile, small aircraft only[1]	250	450	1,000
Not lower than one mile, approach categories A&B	500	700	1,000
Not lower than one mile, approach categories C&D	500	1,010	1,700
Not lower than ¾ mile, all aircraft	1,000	1,510	1,700
Lower than ¾ mile, all aircraft	1,000	1,750	2,500

Source: FAA Advisory Circular 150/5300-13A, *Airport Design*, Change 1

[1] Existing Oakland/Southwest approach visibility minimum = 1 mile.

Runway Requirements

In consideration of the forecasts of future aviation activity, the adequacy of the runway system must be analyzed from several perspectives. These include runway orientation, capacity, length/width, and pavement strength, which will be evaluated in the following sections. The analysis of these various aspects pertaining to the runway system will provide a basis for recommendations of future improvements.

Runway Orientation. Oakland/Southwest Airport currently operates with a single runway system, Runway 8/26, which provides a generally east/west orientation. A wind analysis was not included in the scope of services for this ALP Update; however, updated wind roses will be included to the ALP drawing set.

Runway Capacity. A detailed evaluation of airfield capacity was also not included in the scope of services for this ALP Update study. The FAA Advisory Circular on airport capacity lists a general rule-of-thumb capacity for single runway, general aviation airports at 205,000 annual operations. Given the forecast level of activity (13,248 operations) for Oakland/Southwest is less than seven percent of this rule-of-thumb figure, it is a given that the Airport will not experience capacity limitations in terms of its ability to accommodate aircraft operational demand prior to the end of the planning period.

Runway Width. The current runway width of 40 feet does not meet FAA dimensional criteria standards for an A-I Small Aircraft Only runway. This width should be increased to 60 feet.

Runway Length. The determination of runway length recommendations for Oakland/Southwest Airport are based on several factors. These factors include:

- **Airport elevation;**
- **Mean maximum daily temperature of the hottest month;**
- **Runway gradient; and**
- **Family grouping of critical aircraft for runway length purposes.**

The runway length operational requirements for aircraft are greatly affected by elevation, temperature, and runway gradient. The calculations for runway length requirements at Oakland/Southwest Airport are generally based on an elevation of 926 feet AMSL (Above Mean Sea Level), 83.6 degrees Fahrenheit NMT (mean normal maximum temperature of the hottest month), and a maximum difference in runway elevation at the centerline of approximately 5 feet.

In 2005, FAA published Advisory Circular (AC) 150/5325-4B, entitled RUNWAY LENGTH REQUIREMENTS FOR AIRPORT DESIGN. The AC provides general guidance for determining runway length at airports like Oakland/Southwest that are intended to serve only the small aircraft fleet (i.e., aircraft weighing less than 12,500 pounds). The following table, entitled RUNWAY 8/26 RECOMMENDED LENGTH (IN FEET) identifies the recommended runway lengths in accordance with the guidance of the AC.

TABLE C4 Runway 8/26 Recommended Length (in feet)

Aircraft Category	Takeoff Length	Landing Length
Existing Condition		
Runway 8/26	3,128	2,253/2,268
Small aircraft with approach speeds up to 50 knots		
But Less than 30 knots	328	328
Above 30 knots but less than 50 knots	874	874
Small aircraft (12,500 pounds or less) with less than ten seats		
75% of the fleet[1]	2,760	2,760
95% of the fleet	3,280	3,280

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. Lengths based on 926 feet AMSL, 83.6 degrees F NMT, and a maximum difference in runway centerline elevation of 5 feet.
Notes: [1] 2005 ALP Update, based on FAA AC 5300-13, *Airport Design*

When analyzing the runway length recommendations presented in the preceding table, the actual runway length necessary for each individual aircraft to operate safely is a function of elevation, temperature, and aircraft weight. As mentioned previously, the Airport was designed to serve small aircraft weighing less than 12,500 pounds. However, the maximum weight the heaviest aircraft currently based at the Airport is only 4,200 pounds. As temperatures change on a daily or hourly basis, the runway length needs of aircraft change accordingly (i.e., as the temperature decreases, the runway length need also decreases).

The data indicates that Runway 8/26, with an existing takeoff length of 3,128 and an existing landing lengths of 2,253 feet/2,268 feet respectively, can accommodate 75% of the small aircraft fleet, but cannot fully

accommodate 95 percent of the small aircraft fleet. The data also indicates that the Airport can accommodate small aircraft with approach speeds of 50 knots or less. However, the majority of aircraft in the Oakland/Southwest fleet mix have approach speeds above 50 knots, but also weigh substantially less than 12,500 pounds. Therefore, in accordance with the generalized runway length requirements for small aircraft with maximum takeoff weights of 12,500 pounds or less that were identified using FAA AC 150/5325-4B, the appropriate runway length for Oakland/Southwest ranges between 874 feet and 2,760 feet.
In order to determine a more accurate (i.e., aircraft specific) runway length recommendation, the based aircraft fleet that operates on a regular basis at Oakland/Southwest Airport was analyzed in greater detail. A number of the most demanding aircraft based at the Airport were selected for evaluation based upon their maximum takeoff weight (MTOW) requirements. The following aircraft all have a MTOW of over 3,000 pounds. To determine runway length recommendations for these specific aircraft, the Pilot Operating Handbooks for each of these aircraft were first reviewed. The results of this analysis are presented in the following table entitled FLEET MIX RUNWAY LENGTH ANALYSIS – PILOT OPERATING HANDBOOKS. Second, four of these aircraft are listed in the National Air Transportation Association's (NATA) Ground Service Guide with published takeoff distances over a 50 foot obstacle. The results of this analysis are presented in the following table entitled FLEET MIX RUNWAY LENGTH ANALYSIS – NATA AIRCRAFT GROUND SERVICE GUIDE.

TABLE C5 Fleet Mix Runway Length Analysis – Pilot Operating Handbooks

Aircraft Make	Model	MTOW	Takeoff Length	Takeoff Length – 50' Obstacle	Landing Length	Landing Length – 50' Obstacle
Cessna	337C Skymaster[1]	4,200	800	1,435	700	1,650
Beech	Bonanza F33A and N35[2]	3,400	1,400	2,550	1,080	1,720
Piper	Dakota PA 28-235[3]	3,000	1,300	1,800	920	1,820
Cessna	Skylane 182T[4]	3,100	965	1,845	645	1,440
Cirrus	SR22[5]	3,400	1,265	1,940	1,245	2,490
Piper	PA-32-300[6]	3,400	1,275	1,820	1,165	2,325
Columbia	300[7]	3,400	1,150	2,150	1,700	2,750
Cessna	U206G[8]	3,600	1,095	2,190	800	1,490

Source: Mead & Hunt analysis of individual Pilot Operating Handbooks

Notes: [1] Cessna Super Skymaster, 1971 Owner's Manual, Performance Specifications
[2] Beechraft Bonanza F33A Pilot's Operating Handbook, October 1983, Section V Performance
[3] Piper Dakota Pilot's Operating Handbook, June 1978, Section 5 Performance
[4] Cessna Model 182T Pilot's Operating Handbook, December 2005, Performance Specifications
[5] Cirrus Design SR22 Pilot's Operating Handbook Rev 2, September 2011, Section 5 Performance Data
[6] Piper Cherokee Six 300 Information Manual, July 1973, General Specifications, Performance
[7] Columbia 300 Pilot's Operating Handbook, October 2016, Section 5, Performance
[8] Cessna Stationiar 6, 1978 Model U206G, Performance Specifications

TABLE C6 Fleet Mix Runway Length Analysis – NATA Aircraft Ground Service Guide

Aircraft Make	Model	MTOW	Takeoff Length – 50' Obstacle	Landing Length – 50' Obstacle
Cessna	337C Skymaster	4,200	1,545	1,650
Beech	Bonanza F33A and N35	3,400	1,769	1,324
Cessna	Skylane 182T	3,100	1,515	1,350
Piper	PA-32-300	3,400	1,759	1,612

Source: NATA Aircraft Ground Service Guide

These two sources provide a general range of the optimal runway takeoff and landing lengths for the specific types of aircraft that operate at Oakland/Southwest on a regular basis. It is also important to note that all of these lengths assume zero knots headwind and fully loaded aircraft. Given the fact that the majority of operations at the Airport are recreational and/or flight training related, most aircraft will not be fully loaded in most cases, and do benefit from a headwind when taking off and landing into the wind. Each of these operational factors could contribute to a reduction in the required runway length for these aircraft.

Runway Length Summary. Based on the information in the previous tables, a runway length of 2,400 feet would adequately accommodate the majority of the aircraft based and operating at the Airport on a regular basis. Also, a runway length of 2,400 feet would allow for the elimination of the displaced landing thresholds at the Airport and the associated requirement for published declared distances due to the threshold displacements. MDOT Aeronautics has discourages the use of displaced threshold and declared distances at general aviation airports in Michigan. Specifically, at general aviation airports that are heavily utilized by student and recreational pilots, the use of declared distances is not recommended as this information can be difficult to understand even for more experienced commercial rated pilots. In addition, the requirement for additional runway width will also benefit less experienced student and recreational pilots using the Airport.

The recommendation of 2,400 feet is also consistent with Canton-Plymouth-Mettetal Airport located approximately 12 miles southeast of Oakland/Southwest Airport. The Canton-Plymouth-Mettetal Airport has a runway length of 2,300 feet. Aircraft that cannot operate at this length also have the option of Oakland County International Airport located 13 nautical miles to the northwest or Willow Run Airport located 26 miles to the south.

Landside Requirements

Landside facilities support the airside facilities but are not actually considered part of the aircraft operating areas. These consist of facilities such as terminal buildings, aprons, access roads, hangars, and other aircraft and airport support facilities. From an analysis of the existing facilities, deficiencies can be identified in terms of accommodating both existing and future needs. Due to the fact that total based aircraft have decreased from 93 to 61 in the past 10 years, and given the surplus of hangar storage spaces available, no detailed calculations of hangars space and/or aircraft apron space were conducted. The existing number of 116 hangar spaces and

approximately 9,500 square yards of apron space are assumed to be adequate to accommodate both existing and future demand. A summary of landside requirements is as follows:

Aircraft Storage. Existing hangar storage space considered adequate to accommodate demand.

Aircraft Parking Apron. Existing aircraft parking apron space considered adequate to accommodate demand.

Fuel Storage. Existing AVGAS storage capacity of 12,000 gallons considered adequate to accommodate demand. No need for Jet-A fuel is anticipated.

Other Requirements. Actual number, size and location of FBO storage, maintenance and overnight hangar space dependent on the type of services provided by the FBO. Therefore, the quantity of future large hangars has not been projected, but potential development sites and redevelopment sites will be identified in the development plan. Access and perimeter roadway location, auto parking requirements, and land acquisition requires will be a function of the location of other facilities, as well as the most effective routing of roadways.

Summary

Although many of the existing airport facilities are adequate to meet the anticipated aviation demand, others will need improvement, replacement, or upgrading to provide a safe and efficient aircraft operating environment. The facilities requirements detailed in this chapter will be used as input with respect to several important decisions concerning the future design and development of the Airport. Each of these decisions will be utilized to formulate the overall future Conceptual Development Plan for Oakland/Southwest Airport.

D. Development Alternatives and Concepts Analysis

INTRODUCTION. The purpose of this chapter is to present future development alternatives and development recommendations for the Oakland/Southwest Airport (Airport). There are three alternatives detailed in this chapter, which are designed to meet FAA and MDOT Aeronautics standards for Oakland/Southwest Airport. In concert with the role of the Airport and community input received in the planning process, several basic assumptions and influences have been established that are intended to direct the development of the Airport in the future:

Assumption/Influence One. Oakland/Southwest Airport was purchased by Oakland County (County) in 2000 and therefore, it became a public owned/public use airport. Since the acquisition, the Airport has not completely met FAA and State design standards. In the future, airport improvements must be designed to meet all FAA regulations, federal grant assurances, local ordinances and codes, as well as federal and state statues and requirements.

Assumption/Influence Two. Oakland/Southwest is a general aviation airport, currently serving small general aviation aircraft. The County has no intention of modifying its design to accommodate commercial or military aviation activity.

Assumption/Influence Three. The Airport was previously designated as a B-II Runway Design Code (RDC). The analysis included in the previous chapter resulted in the determination that the Airport's based aircraft, and the aircraft comprising local and itinerant traffic, are all contained within the A-I-Small RDC category. Future improvements will be designed to meet A-I Small RDC standards.

Assumption/Influence Four. The current length of Runway 8/26 is 3,128 feet with displaced thresholds at each end. However, declared distances have not been published to coincide with the displaced thresholds because the Michigan Department of Transportation, Office of Aeronautics (MDOT Aero) currently discourages the use of declared distances at general aviation airports. Consequently, the Airport's runway system should be reconstructed pursuant to the runway length recommendations in the previous chapter without displaced thresholds or declared distances.

Assumption/Influence Five. There are several obstructions and physical features limiting operations at Oakland/Southwest Airport. These include a ditch north of the parallel taxiway, a ditch west of Runway 8/26, vegetation and trees off of both runway ends, powerlines along Huron Valley Trail and Milford Road off of the Runway 26 approach end, and residences off the Runway 26 approach end.

Assumption/Influence Six: MDOT Aero requires Michigan airports to be licensed according to their classification as either an Air Carrier, General Utility or Basic Utility airport. MDOT Aero historically licensed the Airport as General Utility, but recently reduced this license to Basic Utility due to the obstructions off Runway 8/26 ends. MDOT Aero

requires airports such as Oakland/Southwest to maintain a General Utility license. Without a general utility license, the Airport's use of federal and state funding is compromised.

Assumption/Influence Seven: This assumption recognizes that there are a number of existing obstructions off both ends of Runway 8/26, including trees, poles and roads, that must be considered with any proposed runway threshold changes.

Assumption/Influence Eight: This assumption recognizes that the previous development plan for Oakland/Southwest, which was evaluated in an Environmental Assessment (EA) in 2012, will be reconsidered in this planning study. However, the previous plan included a runway length greater than what was recommended in the previous chapter. Therefore, additional alternatives with reduced runway lengths will be considered.

Goals and Objectives for Development

Several goals and objectives accompany these assumptions that were established for purposes of directing the alternatives considered in this study and establishing continuity in the future development at the Airport. These goals and objectives account for several categorical considerations relating to the needs of the Airport, both in the short-term and the long-term, including safety, noise, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness. While all these categorical considerations are project-oriented, some represent more tangible activities than others; however, all considerations are important and appropriate to include in the planning process when evaluating future airport development.

The following goals and objectives are intended to guide the preparation of this Airport Layout Plan (ALP) Update and direct the future development of Oakland/Southwest Airport:

- **Provide effective direction for the future development of Oakland/Southwest Airport through the preparation of a rational, reasonable, and implementable plan that meets both FAA and State standards.**
- **Prepare a plan that allows the Airport to fulfill its mission to facilitate and enhance local aviation services.**
- **Accommodate the forecasted aviation activity levels in a safe and efficient manner by providing the necessary airport facilities and services.**
- **Ensure that the future development of the Airport will accommodate a variety of general aviation activities.**
- **Plan and develop the Airport to meet future small airport needs and the requirements of Oakland County while supporting regional economic development activity.**
- **Continue County efforts related to approach protection and compatible land use within the airport environs.**
- **Encourage and protect the public and private investment in airport land and facilities.**

FAA/State Approach Clearance Standards

Oakland/Southwest Airport currently does not meet FAA and State standards for obstruction clearance off both ends of the runway. As a result, the State requires significant threshold displacements at both runway ends. FAA obstruction standards are described in both FAR Part 77 (Part 77), *Objects Affecting Navigable Airspace* and FAA Advisory Circular 5300-13A, *Airport Design* (FAA AC 5300-13A). Part 77 includes standards related to runway approach surfaces while FAA AC 5300-13A includes standards related to Threshold Siting Surfaces.

FAA Approach Surface and Threshold Siting Surface (TSS). FAA approach surfaces, which were described in the previous chapter, are one of the many civil airport imaginary surfaces that are established as part of design requirements of an airport and runway. The approach surface is longitudinally centered on the extended runway centerline (the primary surface) and extends outward and upward beyond the primary surface. An approach surface is applied to each runway end and it is based upon the type of approach that is available or that is planned for that runway end. Penetrations to an approach surface may be allowed if FAA has determined that they are not a hazard, or if the obstruction can be lighted. Approach surfaces at Oakland/Southwest Airport have a 20:1 slope.

Threshold Siting Surface (TSS) standards are described in Chapter 3 of FAA AC 5300-13A, which states that airport operators should position the runway threshold so that there are no obstacle penetrations to the approach surface as specified in Table 3-2 and so that Runway Safety Area (RSA) and Runway Protection Zone (RPZ) standards are met. FAA AC 5300-13A Table 3-2 is shown on the following figure, entitled THRESHOLD SITING SURFACE STANDARDS, and provides various TSS dimensions based on Runway Type. Given that there is no published straight in approach procedure at Oakland/Southwest, the runway should be defined as a Type 2 runway, or a runway expected to serve small airplanes with approach speeds of 50 knots or more (Visual runways only, day/night). However, based on the VOR/GPS-A circling approach procedure available at Oakland/Southwest, the FAA Detroit Airports District office has determined that the runway should be defined as a Type 4 runway. Type 4 runways have an approach end that supports nighttime instrument operations, and services approach Category A and B aircraft only. Type 4 TSS dimension standards are greater than Type 2 as indicated in the Table 3-2 on the following page. Consequently, development alternatives in this chapter will consider both Type 2 and Type 4 TSS standards to compare the cost/benefit of the approach procedure relative to obstruction clearing/easement requirements.

MDOT Aeronautics Airport Licensing Standards. MDOT Aeronautics Commission rules (section 86(2) of Act No. 327 of the Public Acts of 1945, amended as S259.86(2) of the Michigan Complied Laws) define requirements for airport licensing in the State of Michigan. This regulation requires Michigan airports to be licensed based on their classification as either a Basic Utility airport or a General Utility airport. Each classification includes various airport design standards, including minimum runway lengths as well as various obstruction clearance standards. Oakland/Southwest Airport is currently classified as a Basic Utility airport, however, in the past the Airport has previously been classified as General Utility. A goal of this alternatives analysis is to determine the requirements that allow the Airport to meet standards and reapply for a General Utility license. By meeting General Utility licensing standards, the Airport will meet the requirements set forth by the Michigan Aeronautics Commission and not compromise their federal and state funding capabilities. State standards for approach surfaces also require a 20:1 slope and are illustrated in the following figures entitled MINIMUM STANDARDS FOR BASIC UTILITY AIRPORTS WITH A PAVED RUNWAY and MIMIMUM STANDARDS FOR GENERAL UTILITY AIRPORTS WITH A PAVED RUNWAY.

FIGURE D1 Threshold Siting Surface Standards

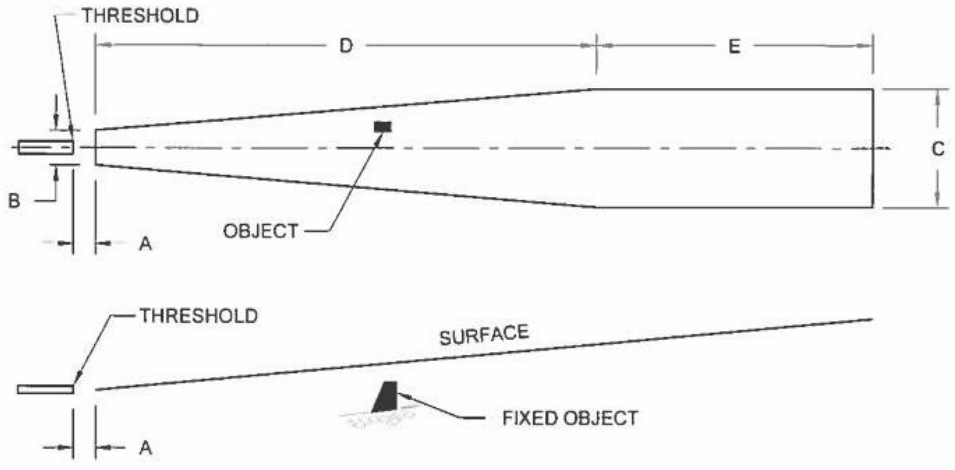
Table 3-2. Approach/departure standards table

	Runway Type	DIMENSIONAL STANDARDS* Feet (Meters) A	B	C	D	E	Slope/ OCS
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night)	0 (0)	120 (37)	300 (91)	500 (152)	2,500 (762)	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	0 (0)	250 (76)	700 (213)	2,250 (686)	2,750 (838)	20:1
3	Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums ≥ 1 statute mile (1.6 km) (day only).	0 (0)	400 (122)	1000 (305)	1,500 (457)	8,500 (2591)	20:1
4	Approach end of runways expected to support instrument night operations, serving approach Category A and B aircraft only. [1]	200 (61)	400 (122)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
5	Approach end of runways expected to support instrument night operations serving greater than approach Category B aircraft. [1]	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
6	Approach end of runways expected to accommodate instrument approaches having visibility minimums ≥ 3/4 but <1 statute mile (≥ 1.2 km but < 1.6 km), day or night.	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
7	Approach end of runways expected to accommodate instrument approaches having visibility minimums < 3/4 statute mile (1.2 km).	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	34:1
8[3,5,6,7]	Approach end of runways expected to accommodate approaches with vertical guidance (Glide Path Qualification Surface [GQS]).	0 (0)	Runway width + 200 (61)	1520 (463)	10,000 [2] (3048)	0 (0)	30:1
9	Departure runway ends for all instrument operations.	0 [4] (0)	See Figure 3-4.				40:1

* The letters are keyed to those shown in Figure 3-2.

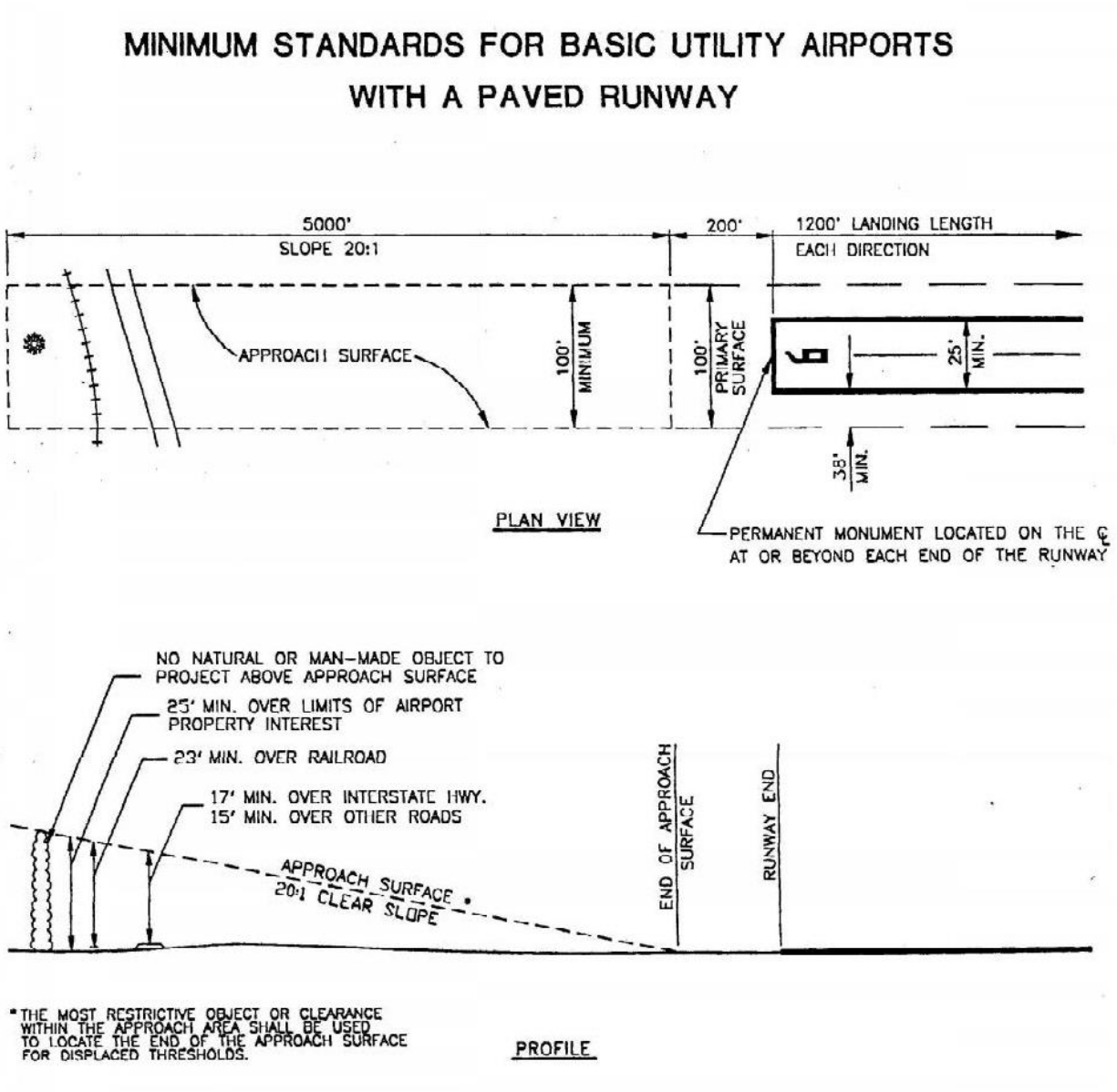
Notes:

1. Marking and lighting of obstacle penetrations to this surface or the use of a Visual Guidance Slope Indicator (VGSI), as defined by Order 8260.3, may avoid displacing the threshold.



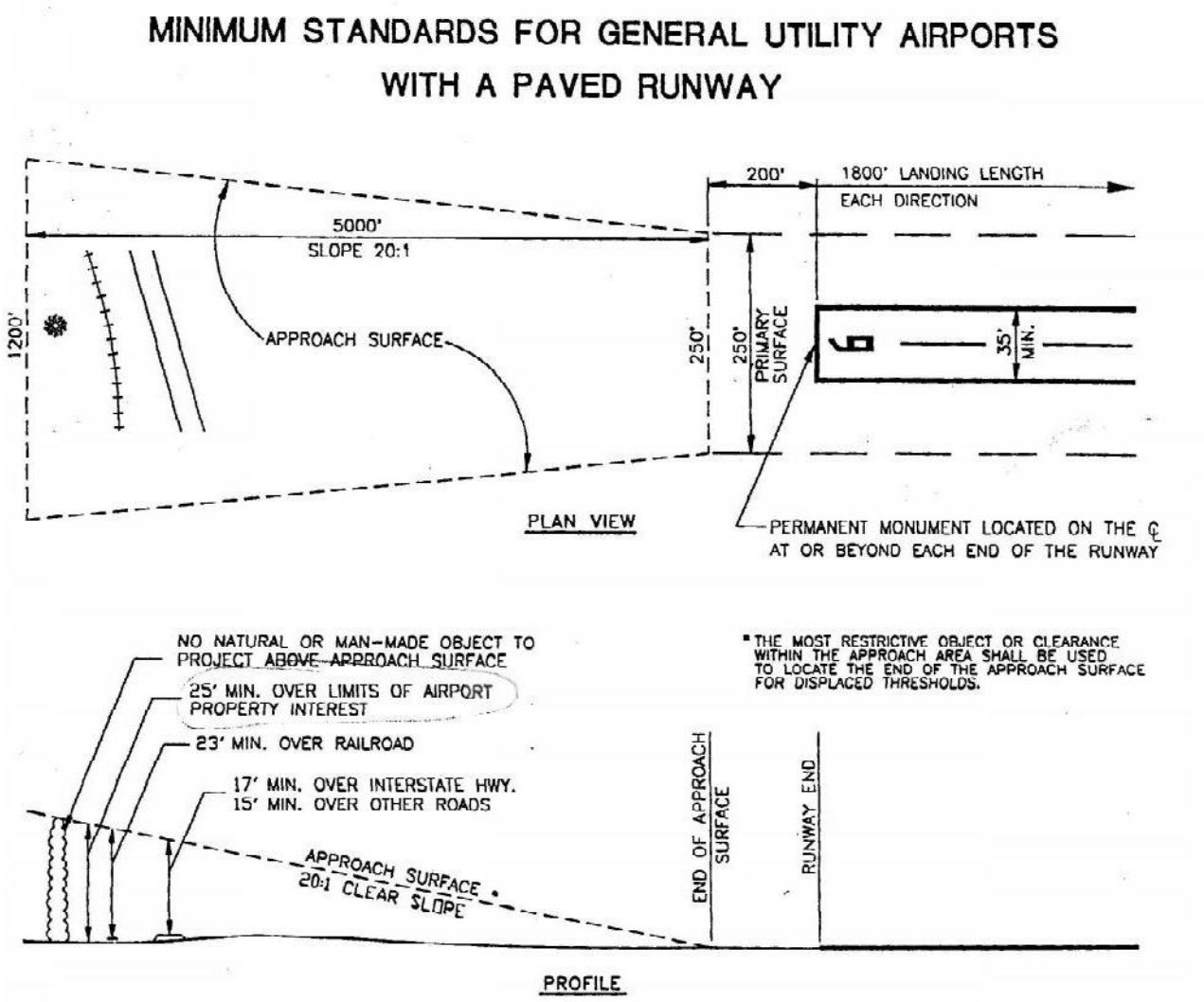
Source: FAA AC 5300-13A, Change 1, Airport Design.

FIGURE D2 Minimum Standards for Basic Utility Airports with a Paved Runway



Source: MDOT Aeronautics Commission rules (section 86(2) of Act No. 327 of the Public Acts of 1945, amended as S259.86(2) of the Michigan Complied Laws).

FIGURE D3 Minimum Standards for General Utility Airports with a Paved Runway



Source: MDOT Aeronautics Commission rules (section 86(2) of Act No. 327 of the Public Acts of 1945, amended as S259.86(2) of the Michigan Complied Laws).

Airside Development Concepts and Alternatives

The primary focus for this ALP Update Study is to reconfigure the airfield at Oakland/Southwest Airport and remove/mitigate for obstructions to the approach surfaces at the Airport. Airside facilities incorporate all components required for a pilot to transition from land to air and air to land, and include the runway and taxiway systems. Clear approaches provide a safe operating environment for pilots operating at the Airport.

There are three alternatives presented in this chapter that focus on airfield reconfiguration and address the obstructions off both approach ends of Runway 8/26. For obstruction clearing purposes, each of the three alternatives is designed to meet TSS Type 2 standards. Also, each alternative includes a sub alternative with obstruction clearing recommendations based on TSS Type 4 standards.

As mentioned in the assumptions and influences considered in this alternatives analysis, the County would like to meet the General Utility licensing standards again to avoid compromising their federal and state funding capabilities. For comparative purposes, the following three alternatives considered obstruction clearing requirements for both TSS Type 2 and TSS Type 4.

Airside Alternative One

Airside Alternative One is similar to what was considered the preferred alternative from the 2012 EA. This alternative was developed to rectify the nonstandard RSA off the approach end of Runway 8, along with other nonstandard conditions, including approach obstructions. This alternative meets FAA design standards by widening the runway to a width of 60 feet. Due to the runway's poor condition it is also assumed that full depth reconstruction will be required as part of this alternative. This alternative maintains the full 3,128 feet of runway length and removes the displaced thresholds in place for Runways 8 and 26. In addition to tree clearing/removal off both runway ends, Alternative One includes the burial of the powerline east of the Airport and acquisition of three residences located within the Runway 26 RPZ. Other improvements include partial parallel taxiway relocation to meet FAA design standards, land and easement acquisition, and drainage ditch relocation.

Reconstruct Runway 8/26 and Widen Runway to a 60-foot Width.

- **The runway will be reconstructed, and will be widened to 60 feet.**
- **The runway will be reconstructed to its current length of 3,128 feet with no displaced thresholds.**
- **Obstructions will be cleared/removed to meet TSS Type 2 standards with a 20:1 slope at both runway ends.**

Acquire Property, Easements and Relocate Drainage Ditch

- **Approximately 1.14 acres of property will be acquired west of the Airport to meet RSA standards.**
- **Approximately 29 parcels will require easements both east and west of the Airports to meet RPZ and approach clearing standards.**
- **The drainage ditch west of the Airport will be relocated outside of the RSA.**

Relocate Partial Taxiway North of Runway 26

- **A section of the parallel taxiway will be removed and relocated to a standard separation of 150 feet.**
- **The remaining portion of the parallel taxiway would remain at a nonstandard separation of 78 feet and would require a Modification to Standards from FAA.**
- **The taxiway will be constructed to a width of 25 feet.**

Cost Estimate for Airside Alternative One

The following list includes the planning level construction cost estimates for Airside Alternative One. Land acquisition estimates and wetland mitigation estimates are based on the 2010 RSA study for the airport, and include inflation. Avigation easement estimates are based off of the assumption of 7 percent of fair market value for each parcel, and tree removal costs are estimated at $12,000 per tree.

Airfield Improvements	$5,220,000
Avigation Easement Acquisition	$933,500
Land Acquisition	$275,000
Wetland Impacts/Mitigation	$287,000
Obstruction/Tree Removal	$232,200
Other Obstruction Removal/Powerline	$480,000
ALTERNATIVE TOTAL	**$7,430,700**

Positive Qualities of Airside Alternative One

The potential positive and negative qualities associated with Alternative One are described below and illustrated in the following figures entitled TSS Type 2 – Alternative One and TSS Type 4 – Alternative One A.

Positive qualities associated with Airside Alternative One:

- **Reconstructing and widening the runway would meet FAA design standards for A-I Small runway.**
- **The land acquisition would meet FAA RSA standards off the approach end of Runway 8.**
- **The easement acquisition and tree clearing would meet MDOT Aero General Utility licensing standards.**
- **A runway length of 3,128 feet with no displaced thresholds meets General Utility runway length standards of 1,800 feet landing length in each direction.**
- **The partial parallel taxiway allow pilots to avoid back taxiing on the runway.**

Negative qualities associated Airside Alterative One:

- **The partial parallel taxiway requires a significant increase in pavement to be constructed and maintained.**
- **The portion of the parallel taxiway remaining at 78 feet of separation from the runway would require an FAA Modification to Standards.**
- **The 3,128 feet of runway length provided exceeds the recommended runway length from the previous chapter of 2,400 feet.**
- **This alternative requires property acquisition at both ends of the Airport. The acquisition at the east end is needed to meet RSA design standards at the approach end to Runway 8 and the property acquisition is needed at the west end for the removal of three residences from within RPZ at the approach end of Runway 26.**
- **This alternative requires negotiation and acquisition of at least 29 easements for the purposes of tree/obstruction removal. A total of 196 trees would need to be removed.**

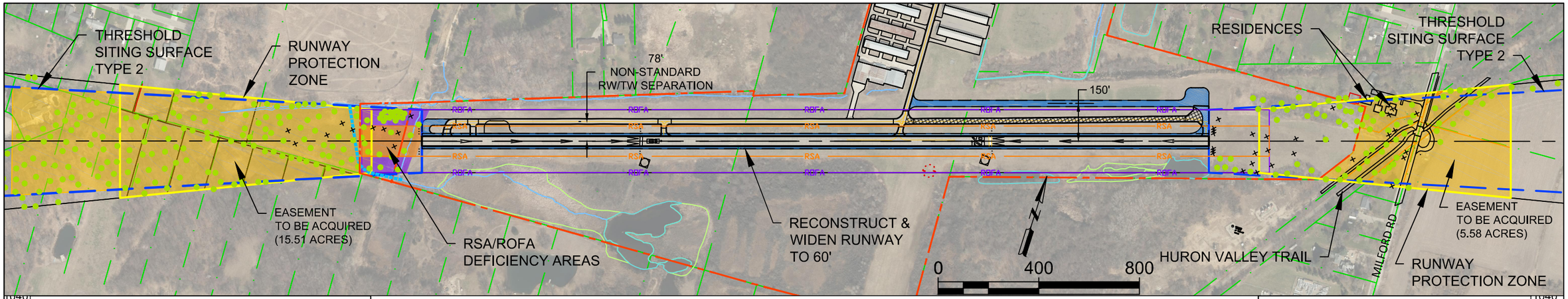
- **Alternative One requires the relocation or burial of the powerline adjacent to Milford Road and some relocation of fences that are obstructions at both ends of the runway.**
- **The Huron Valley Trail and Milford Road remain in the RPZ which are considered nonstandard land uses within an RPZ.**
- **It is the most expensive alternative at approximately $7.4 Million.**

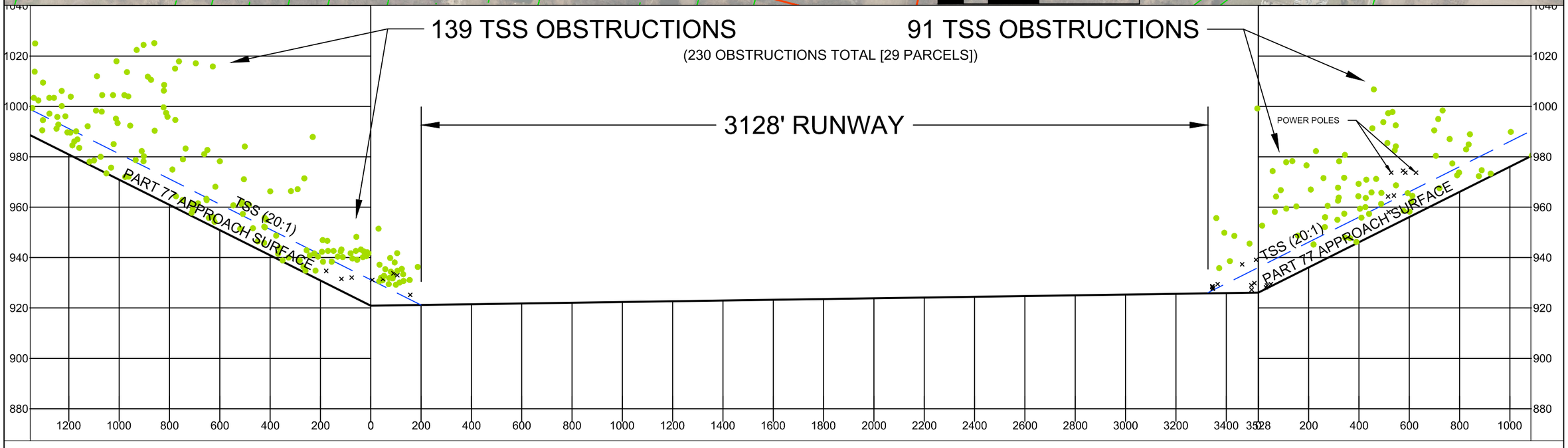
A second version of this alternative entitled Alternative OneA includes the same airfield layout and runway configuration as Alternative One, but includes TSS Type 4 standards. This alternative is presented in the following figure entitled Alternative OneA and the planning level cost estimate for Alternative One A is presented in the following section.

Cost Estimate for Airside Alternative OneA

The following list includes the planning level construction cost estimates for Airside Alternative OneA:

Airfield Improvements	$5,220,000
Avigation Easement Acquisition	$1,167,800
Land Acquisition	$275,000
Wetland Impacts/Mitigation	$287,000
Obstruction/Tree Removal	$573,000
Other Obstruction Removal/Powerline	$480,000
ALTERNATIVE TOTAL	**$8,002,800**





DRAWING LEGEND

- RUNWAY PROTECTION ZONES
- PART 77 APPROACH SURFACES
- THRESHOLD SITING SURFACES
- IDENTIFIED OBSTRUCTIONS
- EXISTING AIRPORT PROPERTY
- FUTURE AIRFIELD PAVEMENT
- AIRFIELD PAVEMENT TO BE REMOVED

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Figure D4 TSS Type 2 - Alternative One

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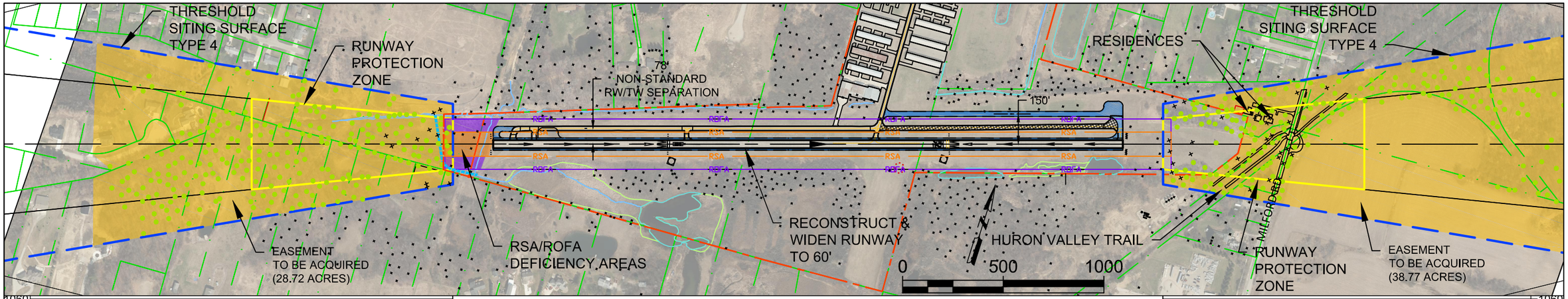

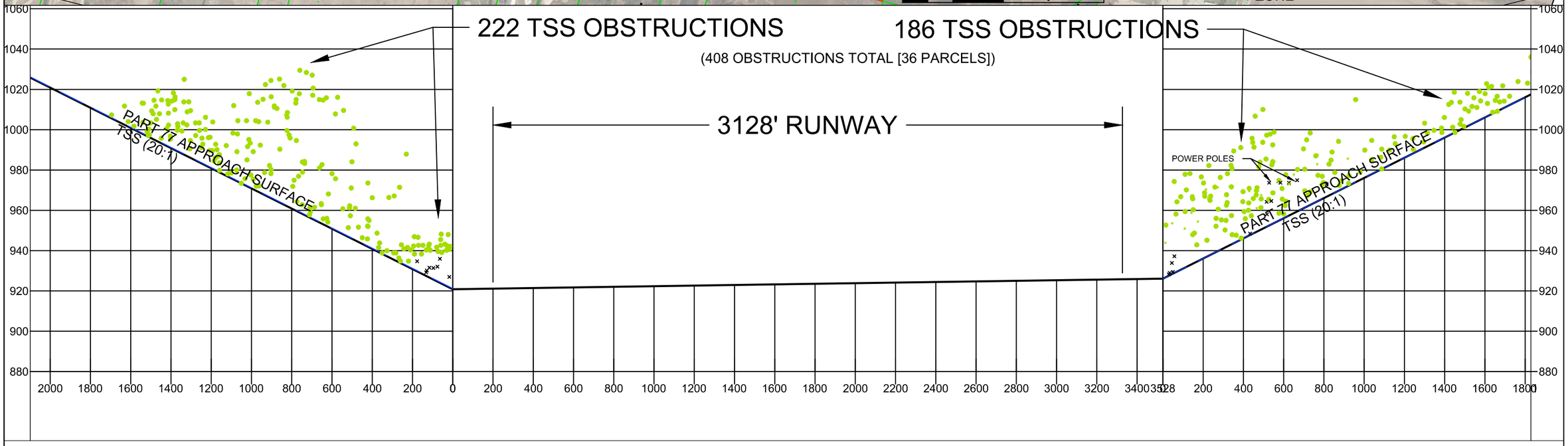

DRAWING LEGEND

- RUNWAY PROTECTION ZONES
- PART 77 APPROACH SURFACES
- THRESHOLD SITING SURFACES
- IDENTIFIED OBSTRUCTIONS
- EXISTING AIRPORT PROPERTY
- FUTURE AIRFIELD PAVEMENT
- AIRFIELD PAVEMENT TO BE REMOVED

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Figure D5 TSS Type 4 - Alternative OneA

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Airside Alternative Two

Alternative Two was also developed to meet FAA and State standards, and to accommodate the recommended runway length of 2,400 feet, as recommended in the previous chapter. This alternative includes reconstruction and widening of the runway to 60 feet, and it recommends demolition of the nonstandard parallel taxiway. Given the low activity levels at the Airport, a full length parallel taxiway is not required since pilots can back taxi on the runway to access the landside areas of the Airport. However, this does require the ability of the aircraft to make a 180 degree turn at each end of the runway. As such, a bypass taxiway is recommended at the approach end of Runway 26. At the approach end of Runway 8, there is not enough land for a full bypass taxiway and therefore, a simple paved turnaround area is recommended.

Alternative Two does satisfy RSA design standards within the airport property boundary and does not require land acquisition at Runway 8 approach end. However, Alternative Two does require the acquisition of three residences located within the Runway 26 RPZ. Additional components of Alternative Two are listed below:

Reconstruct Runway 8/26 to 2,400 feet and Widen to 60 feet.

- **The runway will be reconstructed and widened to 60 feet.**
- **Reconstructing the runway to a 2,400-foot length will eliminate the need for displaced thresholds and declared distances, which meets the primary goal of future development at the Airport.**

Remove Parallel Taxiway and construct a Bypass Taxiway for Runway 26 and Turnaround for Runway 8.

- **The parallel runway serving Runway 8/26 will be removed and replaced with a bypass taxiway that will serve Runway 26 and a simple turnaround area will serve Runway 8.**

Construct a Taxiway Connector from executive hangar to Runway 8/26.

- **Due to the removal of the parallel taxiway, the connector leading from one executive hangar to the taxiway will be lost. Therefore, a connector will be added between the executive hangar and the runway.**

Remove unnecessary runway pavement.

- **The runway pavement not utilized in the 2,400-foot runway length and the existing parallel taxiway pavement will be removed as it is not needed.**

Acquire residences and easements west of Runway 8 and east of Runway 26

- **Three residences located within the Runway 26 RPZ will be acquired.**
- **Easements for approximately 29 parcels will be required the purpose of obstruction/tree removal.**

Cost Estimate for Airside Alternative Two

The following list includes the planning level construction cost estimates for Airside Alternative Two:

Airfield Improvements	$3,890,000
Avigation Easement Acquisition	$933,700
Land Acquisition	$275,000
Wetland Impacts/Mitigation	$0
Obstruction/Tree Removal	$114,000
Other Obstruction Removal/Powerline	$0
ALTERNATIVE TOTAL	**$5,212,700**

Positive Qualities Associated with Airside Alternative Two

Positive qualities associated with Alternative Two are described below and illustrated in the following figure entitled TSS Type 2 – Alternative Two.

- **Meets FAA and State design standards and will allow the Airport to be licensed as General Utility.**
- **Enhances safety and efficiency of the Airport by removing obstructions off both ends of the runway.**
- **Results in a significant reduction in the amount of pavement to be reconstructed and maintained when compared to Alternative One.**
- **The construction costs for both airfield improvements, easement acquisition and obstruction/tree removal are substantially reduced from Alternative One.**
- **Does not require wetland mitigation costs and powerline removal costs associated with Alternative One.**
- **The tree removal requirements decrease from 230 in Alternative One to 90 in Alternative Two.**
- **No land acquisition is required to meet RSA design standards.**
- **Milford Road and the associated powerlines are no longer located within the RPZ and are not considered obstructions.**

Negative Qualities Associated with Airside Alternative Two

Below is a list of potential negative qualities of Airside Alterative Two:

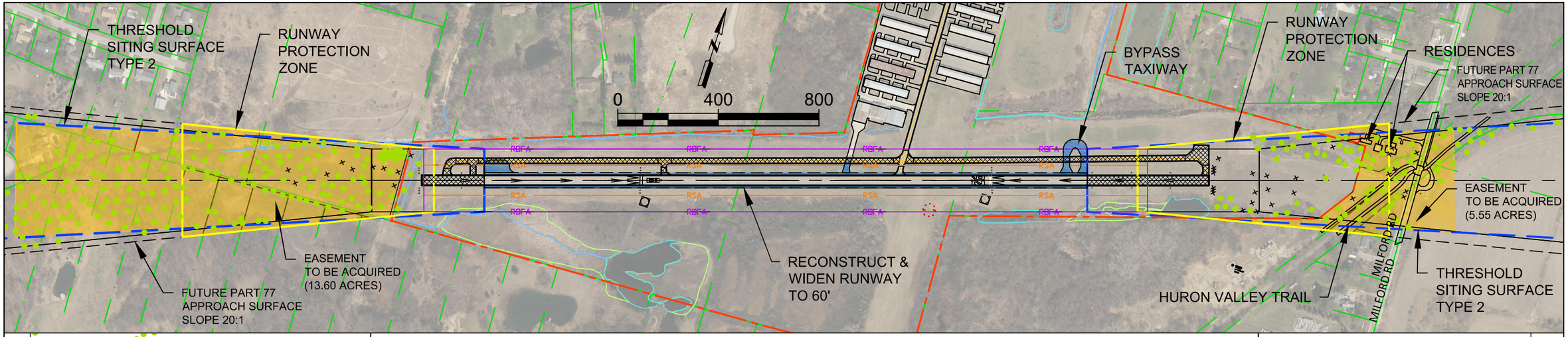
- **Acquisition of three residences would be required to meet RPZ land use standards.**
- **Approximately 29 parcels of land would require negotiation of easements for the purposes of obstruction removal and removal of approximately 90 trees.**
- **Huron Valley trail and a private drive are located within the Runway 26 RPZ.**
- **TSS Type 2 standards only would potentially limit circling instrument approach to daytime only.**

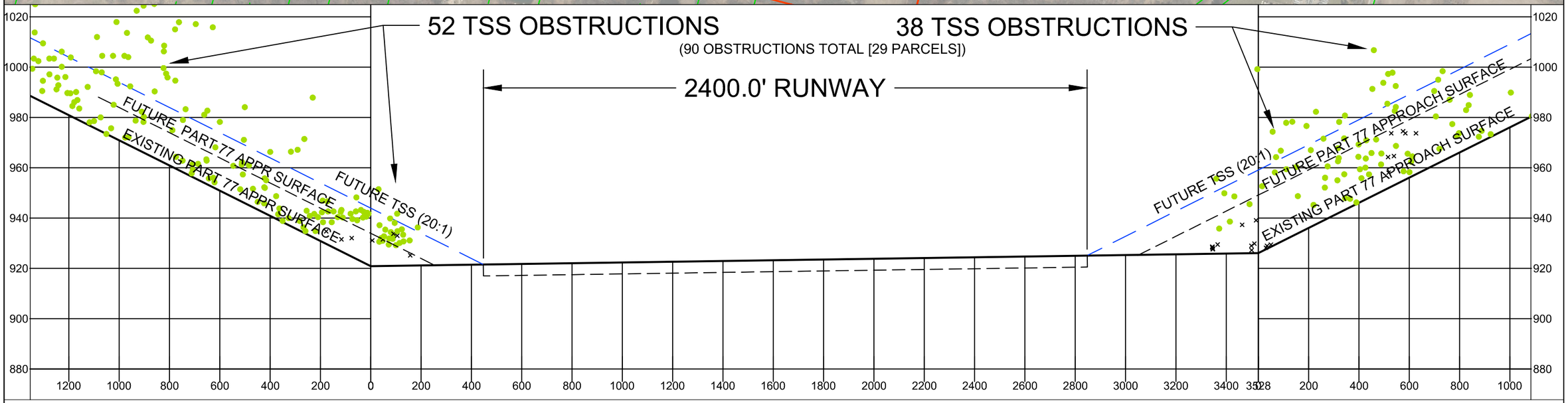
A second version of this alternative entitled Alternative TwoA includes the same airfield layout and runway configuration as Alternative Two, but includes TSS Type 4 standards. This alternative is presented in the following figure entitled Alternative TwoA and the planning level cost estimate for Alternative TwoA is presented in the following section.

Cost Estimate for Airside Alternative TwoA

The following list includes the planning level construction cost estimates for Airside Alternative TwoA:

Airfield Improvements	$3,890,000
Avigation Easement Acquisition	$1,288,000
Land Acquisition	$275,000
Wetland Impacts/Mitigation	$0
Obstruction/Tree Removal	$271,200
Other Obstruction Removal/Powerline	$0
ALTERNATIVE TOTAL	**$5,724,200**





DRAWING LEGEND

- RUNWAY PROTECTION ZONES
- PART 77 APPROACH SURFACES
- THRESHOLD SITING SURFACES
- IDENTIFIED OBSTRUCTIONS
- EXISTING AIRPORT PROPERTY
- FUTURE AIRFIELD PAVEMENT
- AIRFIELD PAVEMENT TO BE REMOVED

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Figure D6 TSS Type 2 - Alternative Two

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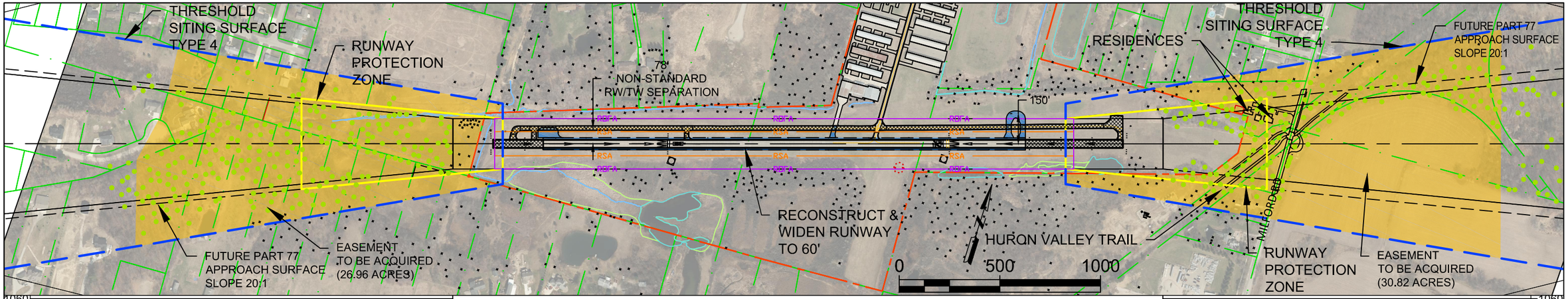

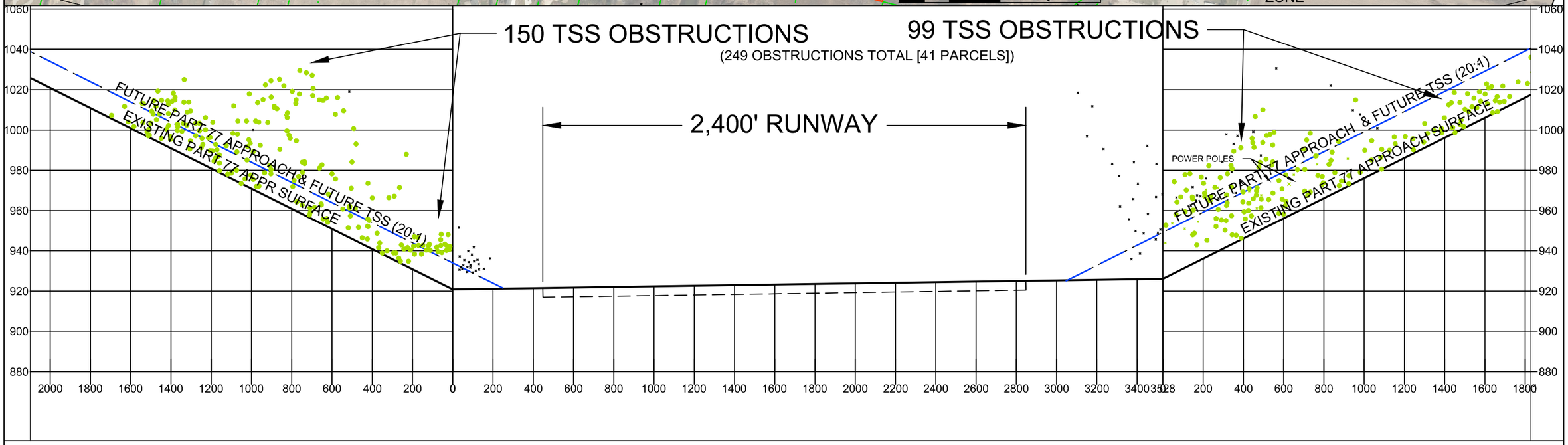

- RUNWAY PROTECTION ZONES
- PART 77 APPROACH SURFACES
- THRESHOLD SITING SURFACES
- IDENTIFIED OBSTRUCTIONS
- EXISTING AIRPORT PROPERTY
- FUTURE AIRFIELD PAVEMENT
- AIRFIELD PAVEMENT TO BE REMOVED

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Figure D7 TSS Type 4 - Alternative TwoA

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Airside Alternative Three

Alternative Three was developed to meet FAA and State design standards, but it also eliminates the need for the County to acquire residential parcels within the RPZ. Alternative Three includes the same components as Alterative Two, except that it requires 100 feet less runway length. This reduction in runway length from Alternative Two eliminates the need to acquire the three residential parcels to the east of the Airport. It also may be possible to phase a development program under this alternative and include a future runway extension to the west by 100 feet to fully meet the recommended runway length from the previous chapter.

Alternative Three does not require land acquisition to meet RSA design standards to the west or RPZ design standards to the east, and it meets RSA design standards within the existing airport property line. Additional components of Alternative Three are listed below:

Reconstruct Runway 8/26 at a length of 2,300 feet and Widen to 60 feet.

- **The runway will be reconstructed and widened to 60 feet.**
- **Reconstructing the runway to a 2,300-foot length will eliminate the need for displaced thresholds and declared distances, which meets the goals presented previously.**

Remove Parallel Taxiway and construct a Bypass Taxiway for Runway 26 and Turnaround for Runway 8.

- **The parallel runway serving Runway 8/26 will be removed and replaced with a bypass taxiway that will serve Runway 26, along with a simple turnaround area that will be constructed to serve Runway 8.**

Construct a Taxiway Connector from executive hangar to Runway 8/26.

- **Due to the removal of the parallel taxiway, the connector leading from one executive hangar to the taxiway will be lost. To rectify this situation, a connector will be added between the executive hangar and the runway.**

Remove unnecessary runway pavement.

- **The runway pavement not utilized in the 2,300-foot runway length and the existing parallel taxiway pavement will be removed as it is not needed.**

Acquire easements west of Runway 8 and east of Runway 26.

- **Easements for approximately 27 parcels will be required to address obstructions and tree removal.**

Cost Estimate for Airside Alternative Three

The following list includes the planning level construction cost estimates for Airside Alternative Three:

Airfield Improvements	$3,780,000
Avigation Easement Acquisition	$872,500
Land Acquisition	$0
Wetland Impacts/Mitigation	$0
Obstruction/Tree Removal	$108,000
Other Obstruction Removal/Powerline	$0
ALTERNATIVE TOTAL	**$4,476,000**

Positive Qualities of Airside Alternative Three

Some potential positive and negative qualities of this alternative are described below and the alternative is illustrated in the following figure, entitled TSS TYPE 2 – ALTERNATIVE THREE.

- **Meets FAA and State design standards and would allow the Airport to be licensed as General Utility.**
- **Enhances safety and efficiency of the Airport by removing obstructions at both runway ends.**
- **This alternative results in a significant reduction in the amount of pavement to be reconstructed and maintained when compared to Alternative One, and a slight reduction when compared to Alternative Two.**
- **The construction costs for both airfield improvements, acquisition of easements and obstruction/tree removal are substantially reduced from Alternative One, and slightly reduced from Alternative Two.**
- **This alternative does not require the wetland mitigation costs and powerline removal costs associated with Alternative One.**
- **The tree removal requirements decrease from 230 in Alternative One to 67 in Alternative Three.**
- **No land acquisition is required to meet RSA design standards.**
- **Milford Road and the associated powerlines are no longer located within the RPZ and are not considered obstructions.**

Below is a list of potential negative qualities of Airside Alterative Three:

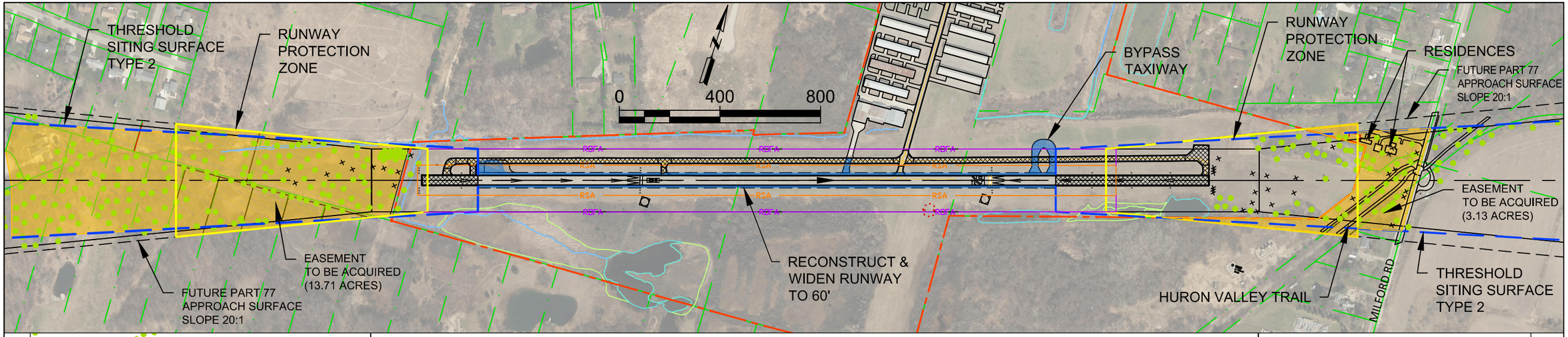
- **Does not meet the recommended runway length of 2,400 feet from the previous chapter.**
- **Easement negotiations for approximately 27 parcels will be required for the purposes of obstruction/tree removal, and approximately 67 trees would require removal.**
- **Huron Valley Trail and a private drive are located within the Runway 26 RPZ, which are considered non-compatible land uses within an RPZ.**

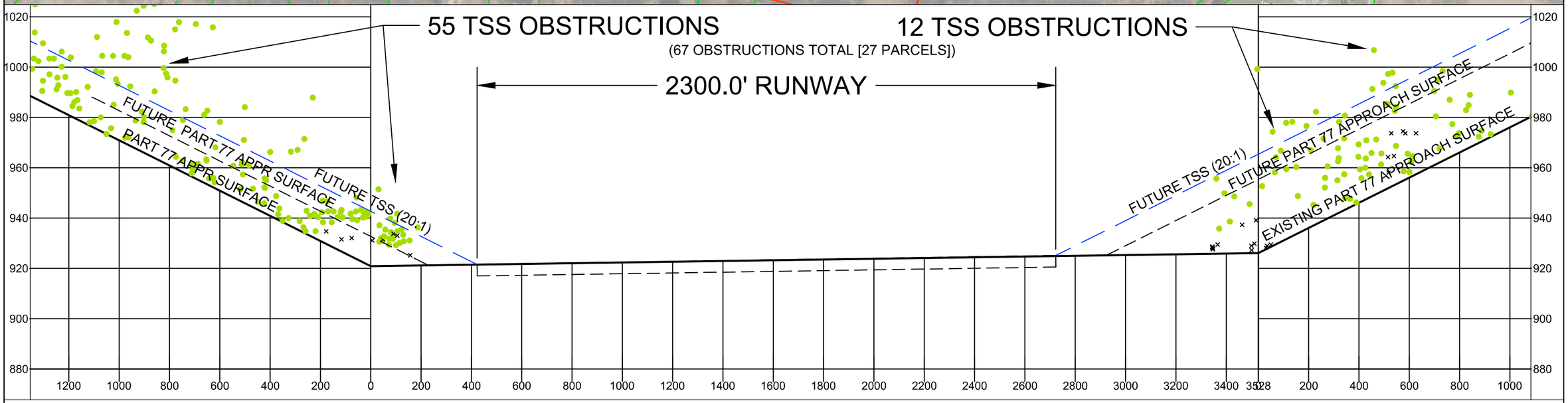
A second alternative entitled Alternative ThreeA includes the same airfield layout and runway configuration as Alternative Three, but includes TSS Type 4 standards. This alternative is presented in the following figure entitled Alternative ThreeA and the planning level cost estimate for Alternative ThreeA is presented below.

Cost Estimate for Airside Alternative ThreeA

The following list includes the planning level construction cost estimates for Airside Alternative ThreeA:

Airfield Improvements	$3,780,000
Avigation Easement Acquisition	$1,390,500
Land Acquisition	$0
Wetland Impacts/Mitigation	$0
Obstruction/Tree Removal	$288,000
Other Obstruction Removal/Powerline	$0
ALTERNATIVE TOTAL	**$5,458,500**





DRAWING LEGEND

- RUNWAY PROTECTION ZONES
- PART 77 APPROACH SURFACES
- THRESHOLD SITING SURFACES
- IDENTIFIED OBSTRUCTIONS
- EXISTING AIRPORT PROPERTY
- FUTURE AIRFIELD PAVEMENT
- AIRFIELD PAVEMENT TO BE REMOVED

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Figure D8 TSS Type 2 - Alternative Three

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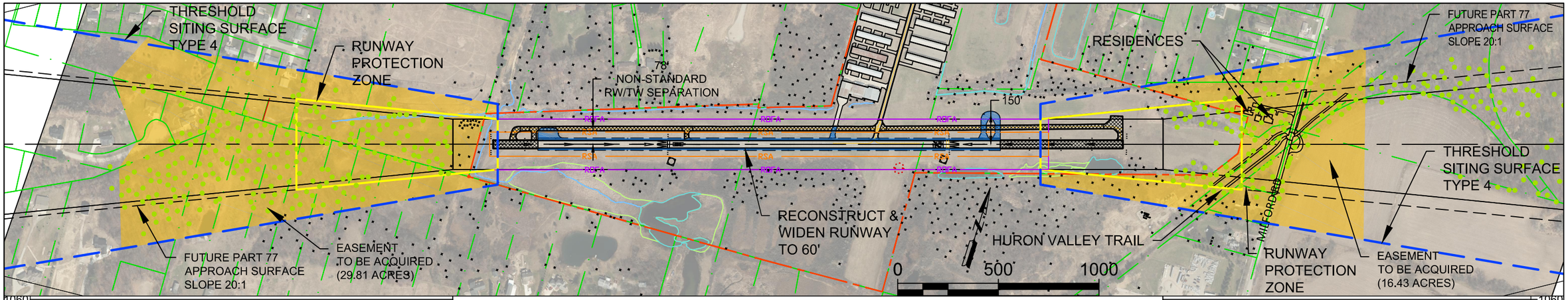

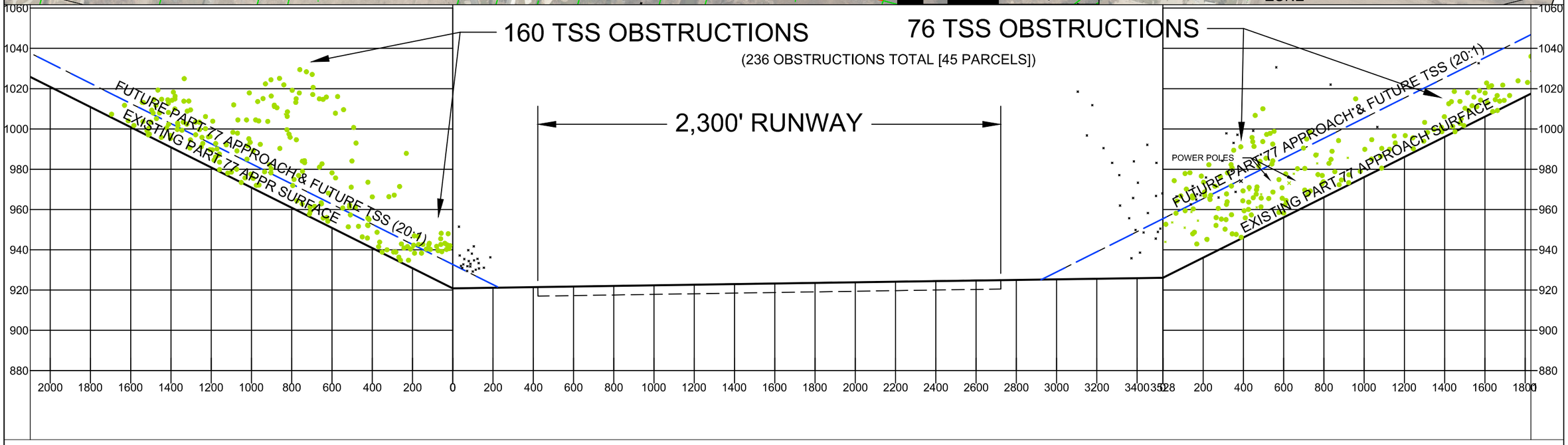

- RUNWAY PROTECTION ZONES
- PART 77 APPROACH SURFACES
- THRESHOLD SITING SURFACES
- IDENTIFIED OBSTRUCTIONS
- EXISTING AIRPORT PROPERTY
- FUTURE AIRFIELD PAVEMENT
- AIRFIELD PAVEMENT TO BE REMOVED

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Figure D9 TSS Type 4 - Alternative ThreeA

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Development Alternatives Summary

A summary of Alternative One, Two and Three, as well as the three sub alternatives OneA, TwoA and ThreeA. is presented in the following table entitled DEVELOPMENT ALTERNATIVES SUMMARY.

TABLE D1 Development Alternatives Summary

	One	OneA	Two	TwoA	Three	ThreeA
Runway 8/26 Dimensions	60' x 3,128'	60' x 3,128'	60' x 2,400'	60' x 2,400'	60' x 2,300'	60' x 2,300'
Runway Design Code	A-I Small Aircraft	A-I Small Aircraft	A-I Small Aircraft	A-I Small Aircraft	A-I Small Aircraft	A-I Small Aircraft
Parallel Taxiway	Partial	Partial	None	None	None	None
Threshold Siting Surface (TSS)	Type 2	Type 4	Type 2	Type 4	Type 2	Type 4
Incompatible RPZ Land Uses	Residences, Milford Road, powerlines, trail, private drive	Residences, Milford Road, powerlines, trail, private drive	Residences, trail, private drive	Residences, trail, private drive	Trail, private drive	Trail, private drive
Residences to be Acquired within RPZ	3	3	3	3	0	0
Acres to be Acquired for RSA	1.14	1.14	0	0	0	0
Avigation Easement Parcels[1]	29	36	29	41	27	40
Trees to be Removed	196	478	95	226	90	240
Potential Wetland Impacts	Yes	Yes	No	No	No	No
Total Cost Estimate	$7.4 Million	$8.0 Million	$5.2 Million	$5.7 Million	$4.5 Million	$5.5 Million

Source: Mead & Hunt, 2017.

Notes: [1] If RPZ or TSS overlays any portion of the parcel, it was assumed that an aviation easement would be required.

Summary

As described throughout this chapter, the primary goal of future development at the Airport is to meet FAA and State design standards, particularly those related to obstructions and approach surfaces at both ends of Runway 8/26, which is a difficult task at Oakland/Southwest Airport. The sheer number of trees that have grown to be obstructions at both ends of the runway alone makes the task difficult, and the easement negotiation process that is required to address these tree growth obstructions is difficult. The County must approach each landowner individually and negotiate an aviation easement whereby a property right is acquired which protects the use of airspace above a specified height, and imposes limitations on land uses within the easement. Easements will also require provisions whereby the County may trim or remove trees that are considered obstructions to approach surfaces at the Airport.

E. Conceptual Development Plan

INTRODUCTION. The purpose of this chapter is to present the Conceptual Development Plan (CDP) for Oakland/Southwest Airport. This chapter builds upon the various factors and influences presented in the previous Development Alternatives chapter and forms the basis for the Airport's long-term development program. Environmental and engineering considerations related to the proposed development program are also presented.

A recommended CDP for the Airport has been selected following discussions with the Study Committee as well as with Airport staff, Michigan Department of Transportation (MDOT) Aeronautics and the Federal Aviation Administration (FAA). The CDP consists of a phased combination of alternatives TwoA and ThreeA presented in the previous chapter Alternatives. The CDP has been utilized as the basis for the Environmental Review, the development of the detailed Airport Plans, and the development of the Implementation Plan.

Conceptual Development Plan

The CDP is comprised primarily of airside improvements and is proposed to be completed in three phases, Phases 1, 2 and 3. The first phase will consist of only acquiring easements and removing trees in order to meet State General Utility licensing standards. The second phase will consist of removing pavement from the approach ends of Runway 8 and Runway 26. The inner 2,300 feet of Runway 8/26 with be rehabilitated and widened to the standard width of 60 feet. Phase 2 also includes additional easement acquisition and tree removal.

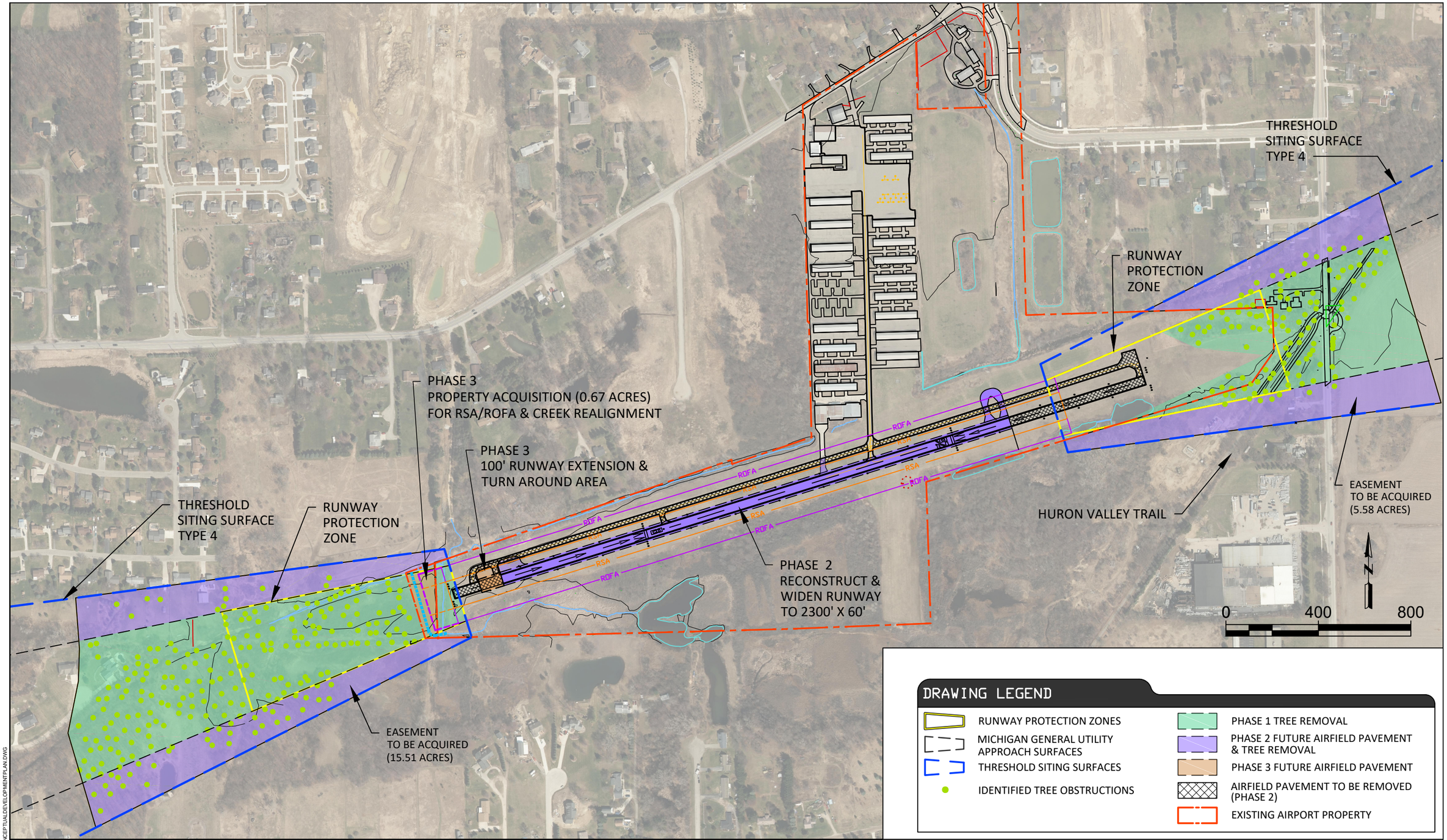
There is currently a full length parallel taxiway serving Runway 8/26. However, a full-length taxiway is not required based on the current and projected activity levels. The taxiway is also located at a nonstandard separation from the runway. It was determined in the previous chapter to remove the taxiway rather than relocate the facility to a standard separation. Phase 2 construction also includes the construction of a taxiway turnaround at both runway ends to facilitate 180 degree turns and back taxiing.

Phase 3 of proposed development at Oakland/Southwest Airport consists of a 100-foot runway extension to the west at the approach end of Runway 8 and an associated taxiway turnaround. The Runway Safety Area (RSA) and Runway Object Free Area (ROFA) associated with the extension will both be located outside of airport property. The RSA and ROFA located off airport property is approximately 0.67 acres. FAA Advisory Circular, 150/5300-13A states a RSA must be:

- **Cleared and graded and have no potentially hazardous ruts, humps, depressions, or other variations**
- **Drained by grading or storm sewers to prevent water accumulation**
- **Capable, under dry conditions, of supporting snow removal equipment, ARFF Equipment, and the occasional passage of aircraft without damage to the aircraft**

- **Free of objects, except for objects that need to be located in the RSA because of their function. Objects higher than three inches (76 mm) above grade must be constructed, to the extent practicable, on LIR supports (frangible mounted structures) of the lowest practicable height with the frangible point no higher than 3 inches (76 mm) above grade.**

The 0.67 acres is proposed to be acquired and the small section of wetland (drainage ditch) will be filled. The drainage ditch should be realigned around the RSA and ROFA or possibly piped under the RSA. The CDP is illustrated in the following figure entitle CONCEPTUAL DEVELOPMENT PLAN.



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OAKLAND SOUTHWEST AIRPORT
OAKLAND COUNTY, MI

1512100-155664.01
AUGUST 2017

Figure E1 Conceptual Development Plan

Mead & Hunt

Engineering Considerations

Absent environmental considerations, which are discussed in a subsequent section of this chapter, there are no insurmountable engineering considerations regarding the CDP for Oakland/Southwest Airport. It should be recognized that several significant engineering features will require satisfactory resolution within the context of these plans, such as the design of the runway rehabilitation and widening as well as the Phase 3 plan to extend the runway, fill wetlands and realign or pipe the drainage ditch.

From a planning perspective, the order of magnitude presented by these engineering considerations is consistent with the scale and scope of this anticipated development program and would likely not cause program altering value engineering requirements.

Instrument Approach Considerations

There is one published instrument approach for Oakland Southwest Airport. The VOR or GPS-A circling approach does not lead straight into either runway end. The approach initiates at 2,700 feet on a 350-degree approach course heading. If the pilot does not have the runway in sight after flying the approach to the minimum descent altitude of 1,520 feet for 5.7 nautical miles after the SVM Vortac, the pilot must initiate a missed approach. The approach is also available to pilots at night.

In order to maintain the nighttime ability of this approach procedure, MDOT Aeronautics has indicated that a clear Type 4 Threshold Siting Surface must be provided at each end of the runway. Phase 1 of the CDP acquires easements and removes trees in order to meeting TSS Type 2 TSS standards which will likely result in the approach being considered daytime only. In Phase 2 of the CDP, additional easements are acquired, and trees removed to meet TSS Type 4 standards and allow the approach to be available at night.

Environmental Review

This section presents a review of the CDP in consideration of relevant and potential environmental considerations. The potential impacts are generalized in a non-quantified fashion. Alternatives for the future configuration of the Airport have been reviewed and summarized in the previous chapter. The major improvements included in Phases 1 and 2 of the CDP can all likely be categorically excluded for the purposes of National Environmental Policy Act (NEPA) documentation. However, it is generally expected that the land acquisition and wetland impacts of Phase 3 will require a higher level of environmental review, likely an Environmental Assessment (EA). These improvements in Phases 1, 2 and 3 include the following:

Phase 1

- **Avigation Easement Acquisition at both ends of Runway 8/26**
- **Tree/Obstruction Removal at both ends of Runway 8/26**

Phase 2

- **Reconstruct Runway 8/26 (2,300 feet in length)**
- **Widen the Runway 8/26 (60 feet in width)**
- **Avigation Easement Acquisition at both ends of Runway 8/26**
- **Tree/Obstruction Removal at both ends of Runway 8/26**

Phase 3

- **Property Acquisition West of Runway 8 approach end**
- **RSA Grading and Ditch Relocation/Burial**
- **Extension of Runway 8 (100 feet in length)**
- **Potential wetland mitigation**

Noise Analysis

Typically, a general aviation airport is required to conduct a noise analysis for proposed development if the airport has over 90,000 annual piston powered aircraft operations or 700 annual jet-powered aircraft operations. The Oakland/Southwest Airport activity levels are much lower than these thresholds and consequently, noise analysis is not required. The change in runway configuration (i.e. removal of displaced thresholds and shortening of the runway to 2,300 feet) is not anticipated to result in substantial changes to the airport noise environment.

Threatened and Endangered Species

In 1973, Congress passed the Endangered Species Act (ESA) with the purpose of protecting threatened and endangered species of fish, wildlife, and plants and the ecosystems they inhabit. In the ESA, Congress observes the substantial loss of species of fish, wildlife, and plants to economic growth and development coupled with lack of concern. Congress later declares the extinct and threatened species of fish, wildlife, and plants of "esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people."

The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) and Commerce Department's National Marine Fisheries Service (NMFS). Section 4 of the ESA requires species to be listed as either endangered or threatened based on their biological status and the threat to their existence. The USFWS lists a total of six threatened and endangered species for Oakland County, Michigan. Of the four endangered species listed, two are of the clam group including the Rayed Bean (Villosa fabalis) and Snuffbox Mussel (Epioblasma triquetra). The Poweshiek skipperling (Oarisma Poweshiek) of the insect group as well as the Indiana bat (Myotis sodalist) of the mammal group are also listed as endangered. The remaining two species are the Northern Long-Eared Bat (Myotis septentrionalis) and the Eastern Massasauga (Sisturus catenatus) of the mammal and reptile group, respectively. Both are listed as threatened.

There is no known habitat for any of these species at the Oakland/Southwest Airport. Therefore, no impacts are anticipated to the listed species as a result of the proposed development included in the CDP.

Wetlands

Wetlands are a valuable resource to human, animal, and plant communities. They are responsible for providing a home to a variety of insects, mammals, vegetation, fish, birds, microbes, and much more. The U.S. Army Corps of Engineers defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands are regulated under Section 404 of the Clean Water Act (CWA), which establishes quality standards for surface water and regulates discharges of pollutant in the waters of the United States. Section 404 of the CWA also requires the obtainment of a permit from the U.S.

Corps of Engineers (USACE) before pursuing any activity that involves discharge of dredged or fill material into the waters of the United States, including wetlands.

The Michigan Department of Environmental Quality also has regulatory responsibility for potential wetland impacts. This agency typically recommends that a site inspection be done before a determination of jurisdictional wetlands can be made. A wetlands assessment and wetlands construction permit are required before any activities (dredging, draining, filling, maintained use, etc.) can be performed in a wetland.

There are four identified wetlands located on airport property; all of different wetland types. South of Runway 8 are portions of a freshwater emergent wetland (seasonally flooded), freshwater pond (intermittently exposed), and freshwater forested/shrub wetland (seasonally flooded). These wetlands are all of the Palustrine System which includes all nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens. Wetlands of the Palustrine System may lack the aforementioned vegetation, but meet the following four characteristics: "(1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2.5 m (8.2 feet) at low water; and (4) salinity due to ocean-derived salts less than 0.5 ppt." Nontidal wetlands are usually seasonal and commonly found along lakes and ponds, on floodplains along rivers and streams, or isolated depressions surrounded by dry land.

A Riverine Wetland (drainage ditch) exists North of Runway 8/26 and flows both west of the Airport and south into the three wetlands previously mentioned. The Riverine Wetland System includes "all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater." This drainage ditch wetland is permanently flooded year-round and 0.12 acres of the wetland will need to be filled for traditional, graded RSA once the 0.67 acres of property is acquire in Phase 3.

Floodplains

Land adjacent to bodies of water, such as rivers, streams, ponds, or drains, that receive the overflow in the event of a flood are considered floodplains. Executive Order 11988 "requires federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative."

The Federal Emergency Management Agency (FEMA) is responsible for producing Flood Insurance Rate Maps (FIRM) for the community. Depicted on these FIRMs are Special Flood Hazard Areas (SFHA), which are areas ranging from Zone A to Zone V and become inundated by the flood event having 1% chance of being exceeded in any given year. Per the two FIRMs that encompass the airport's property, Zone A is located on airport property North and West of Runway 8. Zone A is also located on airport property North of Runway 26. A Zone A SFHA has no established base-flood elevation.

Due to the 100-foot extension of Runway 8/26 during Phase 2 of the CDP, the Zone A SFHA will be impacted. According to Part 31: Water Resources Protection of the Natural Resources and Environmental Protection Act, the State's Floodplains Regulatory Authority requires the attainment of a permit from the Department of Environmental Quality prior to any alteration or occupation of a floodplain. However, a permit is not required under Part 31 for any alterations if the floodplain's drainage area is less than two square miles.

Water Quality

Airport development, such as building, extending, or rehabilitating runways and taxiways, could potentially affect surface waters temporarily and in rare cases, permanently. Due to Airport's close proximity to waterways and wetlands, water quality is a constant concern. The major causes for water pollution produced by airports are construction and deicing activities. Construction can cause sediment runoff to enter waterways, while the runoff comprised of chemicals used in deicing fluids can cause severe dissolved oxygen demands on receiving waters. However, no deicing takes place at Oakland/Southwest Airport.

Runoff pollutants may include: metals, oils, greases, grass clippings, hazardous materials, solids, pesticides, and herbicides. Some pollutants remain on airport property, but storms may cause the once dormant pollutants to flow in nearby creeks, lakes, drains, or streams. Storm runoff from runways, taxiways, aprons, and outdoor storage areas are considered Nonpoint Source Pollution.

Given that the taxiway and portions of the runway will be removed, there will be a net decrease in the total amount of impervious surface at the Airport as a result of the implementation of the CDP. Therefore, water quality impacts are not anticipated.

Farmlands

The Farmland Protection Policy Act (FFPA) is intended to minimize the impacts that federal programs have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. The Web Soil Survey, provided by the U.S. Department of Agriculture's Natural Resources Conservation, lists five soil types that comprise the airport's property: Gillford sandy loam, till plain, 0 to 2 percent slopes; Houghton and Adrian Mucks; Fox-Riddles sandy loams, 1 to 6 percent slopes; Fox sandy loam, till plain, 2 to 6 percent slopes; and Matherton sandy loam, 0 to 3 percent slopes. All five soil types are considered prime farmland, prime farmland if drained, and farmland of local importance.

The Airport is currently within the Residential/Agriculture District. West of Runway 8, the area is scattered with residences. North and East of Runway 26 is Milford road, Interstate 96, and multiple businesses just over a mile away. The FFPA does not declare urban land, built-up land, or water areas as prime farmland. As a result, airport property is not believed to be classified as farmland and therefore the land is not subject to FPPA requirements. No development at Oakland/Southwest Airport will convert farmland to non-agricultural use.

Historical, Architectural, Archeological, and Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to evaluate the effects of their projects on historical properties. Section 106 also requires the same Federal agencies to afford the Advisory Council on Historic Preservation the ability to comment in the event there are impacts resulting to historic properties. According to the National Register of Historic Places, there are 77 historic listings within Oakland County. However, of the 77 listings none are not located in New Hudson or in the vicinity of the Airport.

DOT Section 4(f) Property

Section 4(f) of the Department of Transportation Act of 1966 prohibits the Federal Transit Administration and other U.S. Department of Transportation agencies from using land from publicly owned parks, recreation areas (including recreational trails), wildlife and waterfowl refuges, or public and private historic properties, unless there is no other possible alternative. There is a 12.5-mile recreational trail, Huron Valley Trail, located East of Runway

26. The preferred alternative was selected, in part, to locate the runway further from this trail and minimize potential impacts to this recreational resource. A portion of the trail currently exists within the existing and future Runway 26's Runway Protection Zone (RPZ). However; as mentioned previously, the runway length will be reduced and the Runway 26 threshold located further from the trail. An avigation easement will need to be acquired, but no construction or activity at the Airport will impact the trail. There are no recreational parks or historic properties in the immediate vicinity of the Airport.

Air Quality

Air quality regulations contained in the Federal Clean Air Act Amendment of 1990 are administered by the state Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA). EPA has delegated authority to DEQ to implement federal air quality standards for hazardous air pollutants and new sources. The EPA has established National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants: carbon monoxide (CO), ozone (O3), particulate matter (PM), sulfur dioxide (SO2), oxides of nitrogen (NOX), and lead (Pb). According to the EPA, Oakland County is currently designated as a nonattainment area for ozone (8-hour) and particulate matter (PM2.5). Future projects, particularly the runway extension in Phase 2, may need to be accounted for in the State Implementation Plan and/or be shown not to exceed applicable de minimis levels as defined by General Conformity. Conformity requirements are addressed in Section 176(c)(1) of the Clean Air Act. These requirements are intended to ensure that the federal government does not take, approve, or support actions that are inconsistent with a state's plan to attain and maintain NAAQS.

Hazardous Materials, Pollution Prevention, and Solid Waste

The handling and disposal of hazardous materials, chemicals, substances, and wastes are primarily governed by four laws:

1. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA; as amended by the Superfund Amendments and Reauthorization Act of 1986 and the Community Environmental Response and Facilitation Act of 1992);
2. The Pollution Prevention Act of 1990;
3. The Toxic Substances Control Act of 1976, as amended (TSCA); and,
4. The Resource Conservation and Recovery Act of 1976 (RCRA; as amended by the Solid Waste Disposal Act of 1980 [SWDA], the Hazardous and Solid Waste Amendment of 1984, and the Federal Facility Compliance Act of 1992 [FFCA]).

The amount of hazardous materials stored, handled, or consumed on-site could potentially increase temporarily as construction ensues; however, these impacts are not expected to alter how the Airport currently handles and disposes of hazardous materials, chemicals, substances, and wastes. As such, no significant impacts are expected.

Conceptual Development Plan Summary

The screening of critical criteria including: Engineering, Instrument Approach Procedures, and Environmental considerations have identified likely development considerations resulting from the implementation of the proposed two-phase Conceptual Development Plan (CDP) for Oakland/Southwest Airport. Again, the majority of improvements in Phases 1 and 2 are anticipated to be categorically excluded from detailed NEPA analysis, however, the runway extension/land acquisition in Phase 2 will likely require the preparation of an EA. Inclusion of an EA in the Airport's capital project list will be included in advance of the runway extension project.

The CDP sets the basis for the completion of the ALP Update process. The following chapters will include a detailed Airport Layout Plan Drawing Set and a phased Development Program included a detail project list for the Airport.

F. Airport Plans

INTRODUCTION. The plan for the future development of Oakland/Southwest Airport has evolved from an analysis of many considerations. Among these are: aviation demand forecasts and facility requirements; aircraft operational characteristics; engineering considerations; environmental considerations; and, as characterized in the previously noted statement of goals, the general directions of airport development prescribed by Oakland County.

This chapter presents the Airport Layout Plan (ALP) for Oakland/Southwest Airport along with brief descriptions detailing the individual elements of the drawing set. This ALP is a compilation of all considerations addressed in previous chapters and has been created in accordance with the FAA Standard Operating Procedure 2.0 checklist. The Oakland/Southwest Airport ALP Drawing Set includes the Airport Layout Plan, Airport Airspace Plan and Profile, Inner Approach Plan and Profile, Terminal Area Plan, Airport Land Use Plan, and Airport Property Map.

Airport Layout Plan

The Airport Layout Plan (ALP) is a graphic depiction of existing and ultimate airport facilities that will be required to enable the Airport to properly accommodate the forecast future demand. In addition, the ALP also provides detailed information on both airport and runway design criteria, which is necessary to define relationships with applicable standards. The following illustration, entitled AIRPORT LAYOUT DRAWING, and the following paragraphs describe the major components of the future Airport Plan.

Runway System

Runway 8/26 will undergo reconstruction to meet the A-I Small Runway Design Code (RDC). Currently the runway consists of displaced thresholds on both ends and is 40 feet wide, which is a non-standard width. Runway 8/26 will be shortened and later reconstructed to an initial length of 2,300 feet. This reconstruction will include widening the new runway to a width of 60 feet.

Runway 8 will be extended 100 feet to the west during Phase 2 of construction. Due to the future 2,400 feet runway length, there will be an associated extension of the Runway Safety Area (RSA), Runway Protection Zone (RPZ), Runway Object Free Area (ROFA), and Runway Object Free Zone (ROFZ) for Runway 8/26.

Taxiway System

The full parallel taxiway will be removed and replaced by a turnaround/bypass taxiway at the newly constructed end of Runway 26 during Phase 1 of construction. Due to the positioning of the fence adjacent to the runway, Runway 8 will be served by a holding bay which is to be completed during both Phase 1 and 2 of construction to meet the initial and ultimate runway end. A turnaround/bypass taxiway for Runway 8's end would not meet A-I-Small Taxiway Object Free Area (TOFA) or Taxiway Safety Area (TSA) design standards.

The removal of the full-length taxiway will eliminate the runway centerline to taxiway centerline non-standard condition. The removal of the full length parallel taxiway will also require an additional taxiway to access at least one hangar.

Instrument Approach Procedures

There is currently only one published circling instrument approach for Oakland/Southwest Airport. During this planning process, it was confirmed with MDOT Aeronautics that the runway should be defined with a Type 4 Threshold Siting Surface (TSS) which supports nighttime instrument operations, and services approach Category A and B aircraft only. No changes are proposed to instruct approach procedures, however, significant tree clearing is require to meet TSS Type 4 standards.

Lighting

The low intensity runway lights, threshold lights, and lighted wind cone and segmented circle will be replaced in Phase 2, likely with medium intensity runway lights. The Airport is currently served by two Visual Approach Slope Indicators (VASIs). These VASIs will be replaced with Precision Approach Path Indicators (PAPIs) during the Phase 2 runway reconstruction project.

Design Standards

As mentioned earlier, the Airport is currently listed as B-I Small RDC. The Airport will be designed to A-I Small design standards for future development. The Runway Design Standards are exactly the same for A-I Small and B-I Small.

Property/Easement Acquisition

Phase 1 easement acquisition will consist of 24 parcels and approximately 160 trees to be removed.

In Phase 2, the Type 4 TSS is significantly longer and wider than the current Type 2 TSS, as seen detailed in the Alternatives chapter. In Phase 2, easement acquisition will consist of 13 parcels and approximately 65 trees to be removed.

In Phase 3, the Airport will acquire 0.67 acres and extend the property line west of Runway 8. The property acquisition will allow for the RSA and ROFA to be located on airport property and meet FAA standards listed in the previous chapter. Once the land is acquired, the wetland flowing west and south of Runway 8 will be realigned or piped.

Airport Airspace Plan and Profile

The Airport Airspace Drawings are based upon Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*. Part 77 outlines standards used to determine obstructions to air navigation and navigational and communication facilities. Part 77 also outlines imaginary surfaces known as the horizontal surface, conical surface, primary surface, and approach surface. The penetration of any of the imaginary surfaces are considered obstructions, which are all depicted on the AIRPORT AIRSPACE PLAN drawings.

Inner Approach Plan and Profile

To provide a more detailed view of the inner portions of the Part 77 imaginary approach surfaces, the Threshold Siting Surfaces (TSS) and the Runway Protection Zone (RPZ) areas, the following drawing is provided. An RPZ is trapezoidal in shape, centered about the extended runway centerline and typically begins 200 feet beyond the end of the runway. The RPZs are safety zones within which it is desirable to clear all objects (although some uses are normally acceptable). The size of the RPZ is a function of the design aircraft and the visibility minimums associated with the runway's instrument approach capabilities.

The INNER PORTION OF THE APPROACH SURFACE DRAWING, which is included in the following set of illustrations, provides a large-scale drawing with both plan and profile delineations. This drawing is intended to facilitate identification of the roadways, utility lines, railroads, structures, and other possible obstructions (including trees) that may lie within the confines of the inner approach surface area associated with each runway end. As with the AIRPORT AIRSPACE DRAWINGS, the INNER PORTION OF THE APPROACH SURFACE DRAWING is based upon the ultimate planned runway length, along with the ultimate planned approaches to each runway.

Terminal Area Plan

The following illustration, entitled TERMINAL AREA PLAN presents a detailed view of the developed landside use areas on the Airport including the terminal area which consists of the based aircraft parking areas and hangars.

Airport Land Use Plan

The LAND USE DRAWING, included in the following set of illustrations, depicts existing and recommended use of all land within the ultimate airport property line and in the vicinity of the Airport. The purpose of the on-airport portions of the LAND USE DRAWING is to provide the County with a guide for leasing potential revenue-producing areas on the Airport. The off-airport portions of the LAND USE DRAWING provides guidance to local authorities for establishing appropriate land use zoning in the vicinity of the Airport.

Airport Property Map

The AIRPORT PROPERTY MAP, which concludes the following set of illustrations, indicates how various tracts of land within the airport boundaries were acquired (e.g., federal funds, surplus property, local funds, etc.). The purpose of the AIRPORT PROPERTY MAP is to provide information for analyzing the current and future aeronautical use of land acquired with federal funds and to illustrate potential land and easement acquisition parcels.

GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

PAUL C. AJEGBA
DIRECTOR

January 9, 2020

Cheryl Bush, Manager
Oakland Southwest Airport
6500 Patterson Parkway
Waterford, Michigan 48327

Dear Ms. Bush:

Subject: **Oakland Southwest (Y47)**; New Hudson, Michigan
Airport Layout Plan (ALP) Airspace Approval
Airspace Case No. 2019-AGL-9946-NRA

Under the Federal Aviation Administration (FAA) State Block Grant program, the Michigan Department of Transportation's Office of Aeronautics (AERO) has been assigned the responsibility of coordinating FAA airspace studies for on-airport development occurring at all Michigan airports which are not classified as primary airports. Enclosed is a conditionally approved copy of the **Oakland Southwest Airport**, Airport Layout Plan (ALP), dated January 2019. This letter cancels or supersedes all prior ALP approvals. The ALP approval is based on recognition of and adherence to the following:

1. The approval is not to be considered a commitment of Federal funding for the proposed development. The FAA has concurred with the proposed development for planning purposes only based on current safety, utility, and efficiency standards. Actual development should comply with approved standards applicable at the time of construction. The airport will need to provide the FAA justification of need before seeking FAA financial participation in the following projects:

   - Runway 8/26 approach/RPZ easement acquisition
   - Design Runway 8/26 reconstruct inner 2,300' and taxiway turnarounds
   - Runway 8/26 approach/RPZ tree removal
   - Pavement maintenance
   - Environmental assessment for land acquisition, wetland impacts and runway extension
   - Land acquisition

   The airport sponsor shall agree to keep an accurate ALP updated at all times that is based on the most current design critical aircraft category. The sponsor, by approving this ALP, agrees to closely monitor aircraft usage, specifically for a change in critical aircraft.

2. Our approval does not infer or imply that the land in the airport vicinity is considered compatible with airport operations. Federal requirements stipulate:
   a. All development programs should be reasonably consistent with the plans of local and state planning agencies for the development in the airport vicinity.
   b. That fair consideration has been given to the interest of communities in or near the airport.
   c. That development programs provide for the protection and enhancement of the environment.

3. The FAA offers no objections to the proposed ultimate airspace utilization as depicted on the ALP based on considerations of safe and efficient use of airspace. The ALP has the status of "Plan on File" for the purpose of 14 CFR 77, Obstruction Evaluations, and 14 CFR 152, Airport Aid Program. A review of the airside landing area development was conducted according to the following 14 CFR's: -77, -152, and -157, Notice of Construction, Alteration, Activation, and Deactivation of Airports (reference Aeronautical Study Number **2019-AGL-9946-NRA**). It should be noted that FAA cannot prevent erection of any structure near an airport. Airport environs can only be protected through state and local zoning ordinances, building regulations, and like requirements.

4. All development depicted on this ALP must comply with the National Environmental Policy Act (NEPA) of 1969. FAA environmental approval is required for all airport development actions depicted on this ALP. This would apply to development projects, even if there were no FAA funding involved in the project. Additional requirements concerning FAA NEPA approval can be found in FAA Order 5050.4B. *"National Environmental Policy Act (NEPA) Implementing Instruction for Airport Actions."*

5. To avoid conflicts with future development, we recommend you utilize the ALP when preparing leases. We further recommend you provide copies of this ALP and an updated Airport Approach Plan to the local zoning agencies and encourage them to adopt compatible land use criteria in and around the airport and to comply with MCL 125.3203 (Michigan Zoning Enabling Act, Act 110 of 2006). Please contact the Michigan Department of Transportation's Office of Aeronautics to request an updated Michigan Aeronautics Commission approved Airport Approach Plan. Copies should also be distributed to the Fixed Base Operators (FBO's) and airport users.

6. The Airport and Airway Improvement Act (49 USC 47107 (s) (16) (D)) requires the sponsor to eliminate any adverse effects on Federal facilities, or bear all costs to relocate those facilities, that are a result of an airport change. However, if AIP eligible construction/development items adversely affect FAA facilities, the cost of relocating the facilities may be eligible under AIP. If the proposed development requires any displaced or relocated FAA facility, the construction will have to be coordinated with the FAA in order to establish reimbursable funding for the engineering and relocation.

7. This approval does not include a detailed evaluation of actual construction. Prior to constructing any development on the airport, notice (FAA Form 7460-1) consistent with 14 CFR 77 must be filed with this office. This approval does not include approval for temporary construction equipment which may be used during actual construction, e.g., cranes, equipment staging areas, site access routes, etc. A separate Construction Safety/Phasing Plan for any project should be reviewed by the FAA no less than 60 days prior to beginning any project. The airport must take all measures necessary during construction to ensure there are no runway incursions.

8. If development is planned with or without Aviation Trust Fund investments that will change the status or geometries of runways, taxiways, aprons, or other operating airport surfaces, notice (FAA Form 7480-1) must be filed with this office consistent with 14 CFR 157. The airport should work with the State of Michigan to update the Airport Master Record, FAA Form 5010-1, to reflect new runway data and updated runway changes.

9. Any development that requires relocation or installation of FAA facilities will require a signed and executed reimbursable agreement with the FAA. After the FAA concurs with any proposed development and the environmental review is complete, the sponsor will need to request a reimbursable agreement from the FAA. A preliminary agreement between the FAA and the airport sponsor should be executed upon receipt of airport's letter so that the FAA can begin providing engineering services. FAA will then develop the final reimbursable agreement. On average, 18 months are required from the time the preliminary agreement is signed to the time the final reimbursable agreement is signed.

10. The FAA Flight Procedures Office (FPO) must be notified at least 5 days prior to any temporary displacement and/or relocation of the thresholds. The latitude/longitude and elevation of the displaced/new threshold locations, as well as any new Touch Down Zone elevation information, must be provided. The notification time is necessary for issuance of Notices to Airmen (NOTAMs). The airport manager is responsible for issuing all required local NOTAMs.

11. Any planned runway developments will require new FAA flight procedures. If the FAA concurs with these developments, there will need to be close coordination with different FAA offices. Development on new approaches will not begin until environmental approvals have been given and the sponsor requests the FAA FPO to initiate design of new approaches. Publication of revised Instrument Approach Procedures (IAP's) could take from 18 months to two years, after runway data is submitted. Review of this ALP does not constitute an automatic request for amended procedures.

We trust this letter provides a clear explanation of the conditions and terms of our approval. This approval letter also serves as acknowledgment of the understanding and acceptance of the review comments from the ALP review that were summarized in a letter dated November 19, 2019. If you desire further clarification, please contact Jennifer Forbes of our office at telephone number (517) 281-7790.

Sincerely,

Mark W. Noel

Mark W. Noel, P.E., Manager
Planning and Development Section
Office of Aeronautics

cc: AJW- 327E
AJW-C15A
ASW/AJR-322
DET-ADO
FAA SMO
M&H

OAKLAND COUNTY

OAKLAND/SOUTHWEST AIRPORT

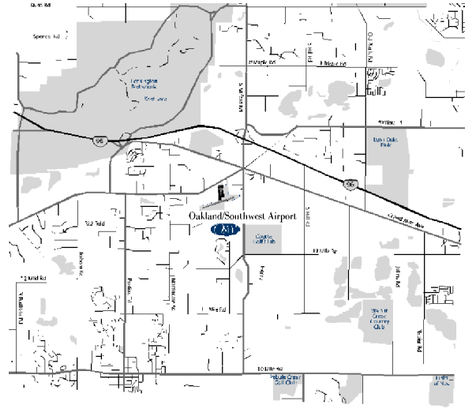
57751 PONTIAC TRAIL

NEW HUDSON, MI 48165

1512100-155664.01

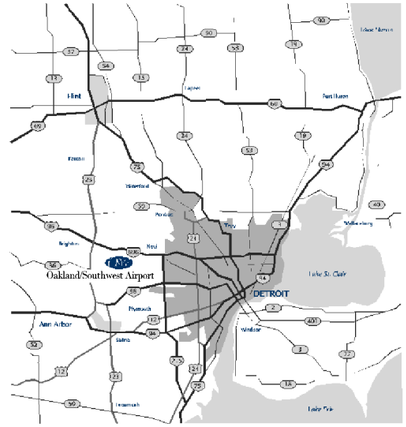
JAN 2019

AIRPORT NO. 63-8



VICINITY MAP

NOT TO SCALE



LOCATION MAP

NOT TO SCALE

REVISIONS			
NO.	ITEM	DATE	COMMENTS

Job Number - 132822
Federal Project Number - B-26-0152-1215
State Contract Number - FM-63-08-MP

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
OFFICE OF AERONAUTICS
LANSING

AIRPORT LAYOUT PLAN SET		
Sheet Number	Sheet Title	Revision
1	COVER SHEET	JAN 2019
2	DATA SHEET	JAN 2019
3	AIRPORT LAYOUT PLAN	JAN 2019
4	AIRPORT AIRSPACE PLAN	JAN 2019
5	AIRPORT AIRSPACE PROFILE	JAN 2019
6	INNER APPROACH PLAN & PROFILE	JAN 2019
7	TERMINAL AREA PLAN	JAN 2019
8	AIRPORT LAND USE PLAN	JAN 2019
9	AIRPORT PROPERTY MAP	JAN 2019

Oakland County

Airport Administration — Date

Certification

On behalf of Mead & Hunt, Inc., I certify that the ALP prepared for Oakland/Southwest Airport was prepared according to the applicable advisory circulars, the current version of the Great Lakes Region ALP Checklist, and accurately depicts the proposed line of airspace at the time of submittal. The ALP conforms with FAA design standards, except as noted.

Ryan E. Hayes, Senior Planner — Date

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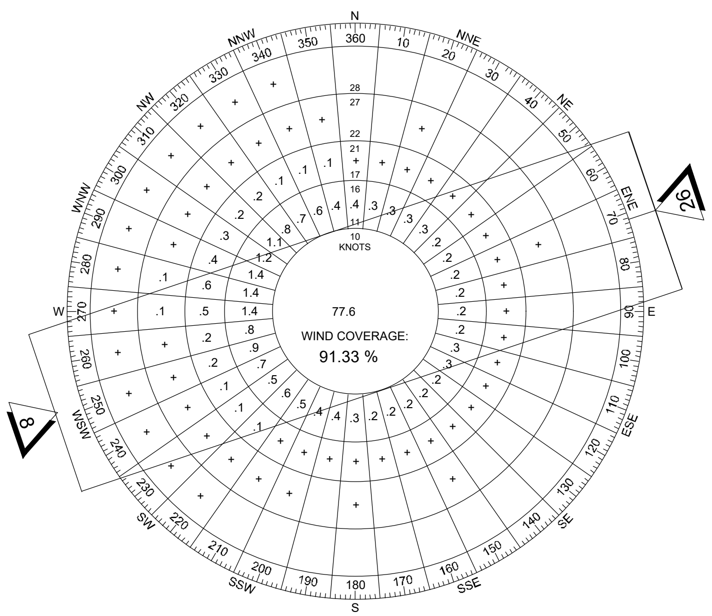
OAKLAND COUNTY
OAKLAND/SOUTHWEST AIRPORT
57751 PONTIAC TRAIL
NEW HUDSON, MI 48165

ISSUED

M&H NO.: 1512100-155664.01
DATE: JAN 2019
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: REH
DO NOT SCALE DRAWINGS

Figure F1
Coversheet

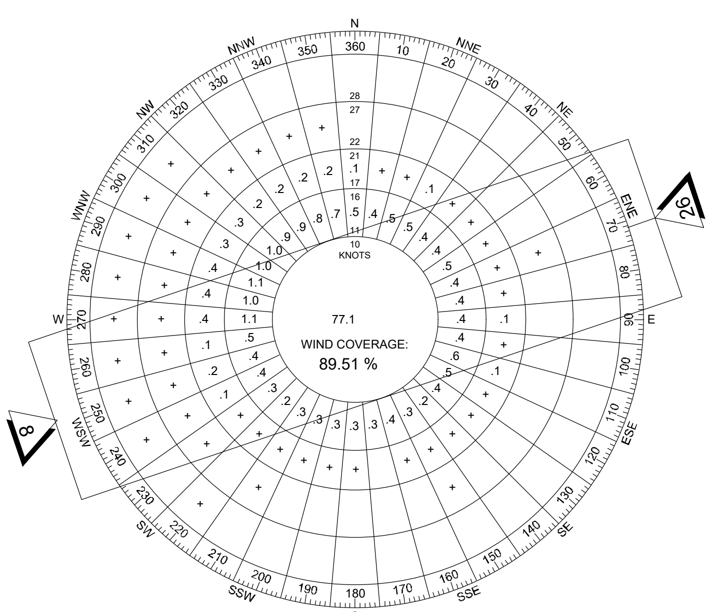


ALL WEATHER WINDROSE

Wind Coverage Provided Under All Weather Conditions 10.5-Knot

Runway 8	66.93%
Runway 26	82.35%
Combined 8/26	91.33%

Source: National Oceanic and Atmospheric Administration, National Climatic Data Center. Station 72637 Pontiac-Oakland, Michigan. Period of Record 2008-2017.



IFR WINDROSE

Wind Coverage Provided Under IFR Conditions 5-Knot Tailwind to Maximum Headwind 10.5-Knot

Runway 8	71.88%
Runway 26	75.5%
Combined 8/26	89.51%

Source: National Oceanic and Atmospheric Administration, National Climatic Data Center. Station 72637 Pontiac-Oakland, Michigan. Period of Record 2008-2017.
[1] Ceiling of less than 1,000 feet, but equal to or greater than 200 feet and/or visibility less than three miles, but equal to or greater than one-half mile.

NOTES

1. This drawing reflects current planning standards applicable to Oakland Southwest Airport to the greatest extent possible. This drawing should not be used as a standard for planning or design.
2. All horizontal coordinate data is NAD83, All vertical elevation data is NAVD88.
3. Airports GIS survey completed by Quantum Spatial 9/2017.

TAXIWAY DATA

ITEM	AIRPLANE DESIGN GROUP I	
	EXISTING	FUTURE
TAXIWAY WIDTH	22' (NON-STANDARD)	25'
TAXIWAY EDGE SAFETY MARGIN	5'	5'
TAXIWAY SHOULDER WIDTH	10'	10'
TAXIWAY SAFETY AREA WIDTH	49'	49'
TAXIWAY OBJECT FREE AREA WIDTH	89'	89'
TAXILANE OBJECT FREE AREA WIDTH	33' (NON-STANDARD)	79'
TAXIWAY/TAXIWAY SEPARATION	70'	70'
TAXIWAY/FIXED OR MOVABLE OBJECT	33' (NON-STANDARD)	44.5'
TAXILANE/TAXILANE SEPARATION	64'	64'
TAXILANE/FIXED OR MOVABLE OBJECT	33' (NON-STANDARD)	39.5
TAXIWAY WINGTIP CLEARANCE	20'	20'
TAXILANE WINGTIP CLEARANCE	15'	15'
TAXIWAY/TAXILANE LIGHTING	LITL	LITL

BUILDING DATA

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	EXECUTIVE/CORPORATE HANGAR	947.28'	16	HANGAR	957.48'
2	EXECUTIVE/CORPORATE HANGAR	949.86'	17	HANGAR	956.26'
3	EXECUTIVE/CORPORATE HANGAR	951.61'	18	HANGAR	955.14'
4	HANGAR	945.19'	19	HANGAR	951.32'
5	HANGAR	944.10'	20	HANGAR	950.85'
6	HANGAR	946.65'	21	HANGAR	949.84'
7	HANGAR	946.97'	22	HANGAR	948.61'
8	HANGAR (w/ LIGHT)	949.67'	23	HANGAR	947.39'
9	HANGAR	950.76'	24	HANGAR	947.41'
10	HANGAR	959.42'	25	HANGAR	947.37'
11	HANGAR	953.11'	26	HANGAR	947.39'
12	FBO	958.70'			
13	FBO	959.88'			
14	FBO OAKLAND FLIGHT SERVICES	966.79'			
15	FBO	966.49'			

AIRPORTS GIS SURVEY COMPLETED BY QUANTUM SPATIAL 9/2017.

REVISIONS

NO.	ITEM	DATE	COMMENTS

NON-STANDARD CONDITIONS

ITEM	STANDARD			NON-STANDARD CONDITION			DISPOSITION
	EXISTING	INITIAL	FUTURE	EXISTING	INITIAL	FUTURE	
R/W 26 RUNWAY SAFETY AREA LENGTH	240'	240'	240'	70'	.	.	RESOLVED w/ PROPERTY ACQUISITION
R/W 26 RUNWAY OBJECT FREE AREA LENGTH	240'	240'	240'	60'	.	.	RESOLVED w/ PROPERTY ACQUISITION
RUNWAY 8/26 PAVEMENT WIDTH	60'	60'	60'	40'	.	.	RESOLVED w/ PAVEMENT WIDENING
PARALLEL TAXIWAY PAVEMENT WIDTH	25'	25'	25'	22'	.	.	REMOVED
R/W 26 OBSTACLE FREE ZONE LENGTH BEYOND R/W END	200'	200'	200'	60'	.	.	RESOLVED w/ PROPERTY ACQUISITION
R/W CENTERLINE TO T/W CENTERLINE SEPARATION	150'	150'	150'	77'	.	.	REMOVED

RUNWAY DATA

	RUNWAY 08			RUNWAY 26		
	EXISTING	*INITIAL*	*FUTURE*	EXISTING	*INITIAL*	*FUTURE*
RUNWAY DESIGN CODE (RDC)	B-I-VIS	*A-I-VIS*	*A-I-VIS*	B-I-VIS	*A-I-VIS*	*A-I-VIS*
RUNWAY REFERENCE CODE (RRC)	B-I-VIS	*A-I-VIS*	*A-I-VIS*	B-I-VIS	*A-I-VIS*	*A-I-VIS*
PAVEMENT TYPE	ASPHALT	*ASPHALT*	*ASPHALT*	ASPHALT	*ASPHALT*	*ASPHALT*
PAVEMENT STRENGTH (IN 1000 LBS.)	12.5 SW	*12.5 SW*	*12.5 SW*	12.5 SW	*12.5 SW*	*12.5 SW*
PAVEMENT STRENGTH PCN	27	27	27	27	27	27
SURFACE TREATMENT	NONE	*NONE*	*NONE*	NONE	*NONE*	*NONE*
EFFECTIVE RUNWAY GRADIENT %	0.2	*0.2*	*0.2*	0.2	*0.2*	*0.2*
WIND COVERAGE % (10.5 KNOTS)	66.93	*66.93*	*66.93*	82.35	*82.35*	*82.35*
RUNWAY WIDTH X LENGTH	40' X 3,128'	*60' X 2,300'*	*60' X 2,400'*	40' X 3,128'	*60' X 2,300'*	*60' X 2,400'*
DISPLACED THRESHOLD ELEVATIONS	921.7'	*N/A*	*N/A*	925.3'	*N/A*	*N/A*
RUNWAY SAFETY AREA WIDTH	120'	*120'*	*120'*	120'	*120'*	*120'*
RUNWAY SAFETY AREA LENGTH BEYOND R/W END	240'	*240'*	*240'*	70'	*240'*	*240'*
RUNWAY END COORDINATES	LAT. 42°30'06.300"N LON. 83°37'45.120"W	*LAT. 42°30'07.00" N LON. W 83°37'42.34"*	*LAT. 42°30'06.68"N LON. 83°37'43.60"W*	LAT. 42°30'16.200"N LON. 83°37'05.560"W	*LAT. 42°30'14.27" N LONG. 83°37'13.25"W*	*LAT. 42°30'14.27" N LONG. 83°37'13.25"W*
RUNWAY LIGHTING	LIRL	*LIRL*	*LIRL*	LIRL	*LIRL*	*LIRL*
RUNWAY PROTECTION ZONES	250'X450'X1000'	*250'X450'X1000'*	*250'X450'X1000'*	250'X450'X1000'	*250'X450'X1000'*	*250'X450'X1000'*
RUNWAY MARKING	BASIC(VISUAL)	*BASIC(VISUAL)*	*BASIC(VISUAL)*	BASIC(VISUAL)	*BASIC(VISUAL)*	*BASIC(VISUAL)*
FAR PART 77 APPROACH SURFACE SLOPE	20:1	*20:1*	*20:1*	20:1	*20:1*	*20:1*
FAR PART 77 CATEGORY	A (V)	*A (V)*	*A (V)*	A (V)	*A (V)*	*A (V)*
APPROACH VISIBILITY MINIMUMS	VISUAL	*VISUAL*	*VISUAL*	VISUAL	*VISUAL*	*VISUAL*
AERONAUTICAL SURVEY	NOT VERT. GUIDED	*NOT VERT. GUIDED*	*NOT VERT. GUIDED*	NOT VERT. GUIDED	*NOT VERT. GUIDED*	*NOT VERT. GUIDED*
DEPARTURE SURFACE	N/A	*N/A*	*N/A*	N/A	*N/A*	*N/A*
RUNWAY OBJECT FREE AREA WIDTH	250'	*250'*	*250'*	250'	*250'*	*250'*
RUNWAY OBJECT FREE AREA LENGTH BEYOND R/W END	240'	*240'*	*240'*	60'	*240'*	*240'*
OBSTACLE FREE ZONE WIDTH	250'	*250'*	*250'*	250'	*250'*	*250'*
OBSTACLE FREE ZONE LENGTH BEYOND R/W END	200'	*200'*	*200'*	60'	*200'*	*200'*
THRESHOLD SITING SURFACE	TYPE 2	*TYPE 4*	*TYPE 4*	TYPE 2	*TYPE 4*	*TYPE 4*
VISUAL NAVAIDS	VASI	*PAPI*	*PAPI*	VASI	*PAPI*	*PAPI*
INSTRUMENT NAVAIDS	VOR, GPS-A	*VOR, GPS-A*	*VOR, GPS-A*	VOR, GPS-A	*VOR, GPS-A*	*VOR, GPS-A*
RUNWAY ELEVATIONS END	921.0'	*921.0'*	*921.0'*	925.98'	*924.0'*	*924.0'*
HIGH POINT	926.0'	*924.0'*	*924.0'*	926.0'	*924.0'*	*924.0'*
LOW POINT	921.0'	*921.0'*	*921.0'*	921.0'	*921.0'*	*921.0'*
TOUCHDOWN ZONE ELEVATION	925.3'	*924.0'*	*924.0'*	926.0'	*924.0'*	*924.0'*
DISPLACED THRESHOLD COORDINATES	LAT. 42°30'09.11"N LON. 83°37'34.08"W			LAT. 42°30'13.41"N LON. 83°37'16.49"W		
THRESHOLD DISPLACEMENT	875'	*NONE*	*NONE*	866'	*NONE*	*NONE*
DECLARED DISTANCES TORA	3,128'	*2,300'*	*2,400'*	3,128'	*2,300'*	*2,400'*
TODA	3,128'	*2,300'*	*2,400'*	3,128'	*2,300'*	*2,400'*
ASDA	3,128'	*2,300'*	*2,400'*	3,128'	*2,300'*	*2,400'*
LDA	2,253'	*2,300'*	*2,400'*	2,262'	*2,300'*	*2,400'*

AIRPORT DATA

	EXISTING	INITIAL	*FUTURE*
AIRPORT REFERENCE CODE (ARC)	B-I (SMALL A/C)	*A-I (SMALL A/C)*	*A-I (SMALL A/C)*
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	84.6°	*84.6°*	*84.6°*
AIRPORT ELEVATION (AMSL)	926.0'	*924.0'*	*924.0'*
VISUAL/NAVAIDS	BEACON	*BEACON*	*BEACON*
AIRPORT REFERENCE POINT (ARP)	LAT. N 42°30'11.220" LON. W 83°37'25.380"	*LAT. N 42°30'10.5" LONG. W 83°37'28.4"*	*LAT. N 42°30'10.5" LONG. W 83°37'28.4"*
MISCELLANEOUS FACILITIES	SEGMENTED CIRLCE/LTD WIND CONE	*SEGMENTED CIRLCE/LTD WIND CONE*	*SEGMENTED CIRLCE/LTD WIND CONE*
CRITICAL AIRCRAFT (A-I SMALL A/C)	CESSNA 421	*CESSNA 332 SKYMASTER*	*CESSNA 332 SKYMASTER*
WINGSPAN	41.1'	*41.1'*	*41.1'*
UNDERCARRIAGE	15.5'	*15.5'*	*15.5'*
APPROACH SPEED	70 Kts	*70 Kts*	*70 Kts*
MAGNETIC VARIATION (DEC 2017)	7°9' W ± 22'	*0°2' W/YEAR*	*0°2' W/YEAR*
NPIAS CATEGORY	RL	*RL*	*RL*
STATE EQUIVALENT SERVICE ROLE	RL	*RL*	*RL*
AIRPORT PROPERTY (ACRES)	67	67.67	67.67
SECTION, TOWNSHIP AND RANGE	SEC. 4 & 9 T1NR7E		

LAYOUT PLAN LEGEND

	EXISTING	*FUTURE*
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
RUNWAY PROTECTION ZONE (RPZ)		
RPZ OR AVIGATION EASEMENT		
BUILDING RESTRICTION LINE	BRL	*BRL*
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA (F)
FUEL STORAGE AREA	F	*F*
LIGHTED WIND CONE & SEGMENTED CIRCLE		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
THRESHOLD LIGHTS	○○○ ○○○	○○○ ○○○
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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OAKLAND COUNTY OAKLAND/SOUTHWEST AIRPORT

57751 PONTIAC TRAIL
NEW HUDSON, MI 48165

ISSUED

NOT FOR CONSTRUCTION

M&H NO.:	1512100-155664.01
DATE:	JAN 2019
DESIGNED BY:	M&H
DRAWN BY:	JWB
CHECKED BY:	REH

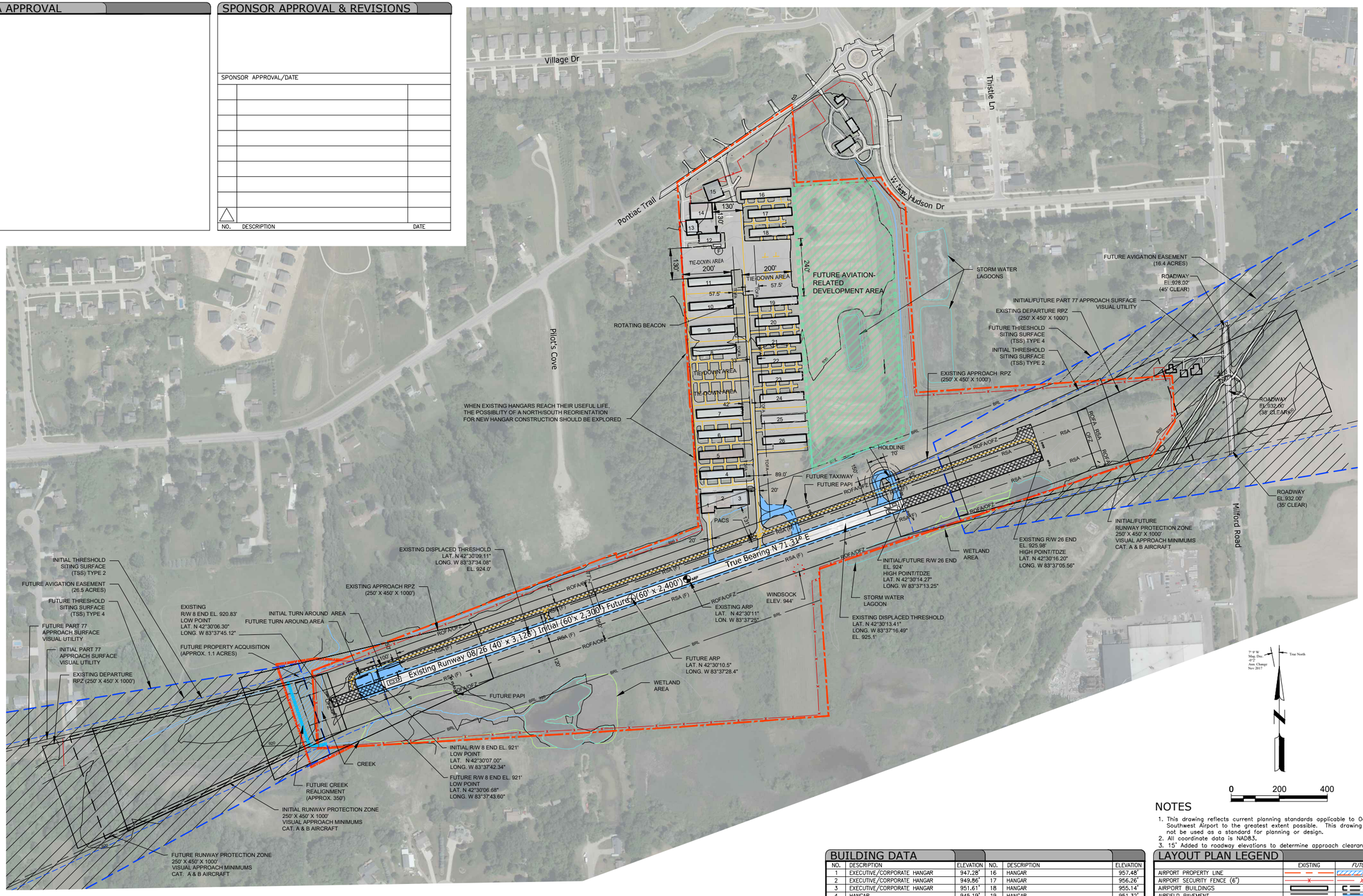
DO NOT SCALE DRAWINGS

Figure F2 Airport Data Sheet

FAA APPROVAL

SPONSOR APPROVAL & REVISIONS

NO.	DESCRIPTION	DATE
	SPONSOR APPROVAL/DATE	
△		



NOTES

1. This drawing reflects current planning standards applicable to Oakland Southwest Airport to the greatest extent possible. This drawing should not be used as a standard for planning or design.
2. All coordinate data is NAD83.
3. 15' Added to roadway elevations to determine approach clearances.

BUILDING DATA

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	EXECUTIVE/CORPORATE HANGAR	947.28'	16	HANGAR	957.48'
2	EXECUTIVE/CORPORATE HANGAR	949.86'	17	HANGAR	956.26'
3	EXECUTIVE/CORPORATE HANGAR	951.61'	18	HANGAR	955.14'
4	HANGAR	945.19'	19	HANGAR	951.32'
5	HANGAR	944.10'	20	HANGAR	950.86'
6	HANGAR	946.65'	21	HANGAR	949.84'
7	HANGAR	946.97'	22	HANGAR	948.61'
8	HANGAR (w/ LIGHT)	949.67'	23	HANGAR	947.39'
9	HANGAR	950.76'	24	HANGAR	947.41'
10	HANGAR	959.42'	25	HANGAR	947.37'
11	HANGAR	953.11'	26	HANGAR	947.39'
12	FBO	958.70'			
13	FBO	959.88'			
14	FBO OAKLAND FLIGHT SERVICES	966.79'			
15	FBO	966.49'			

AIRPORTS GIS SURVEY COMPLETED BY QUANTUM SPATIAL 9/2017.

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE (6')		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
RUNWAY PROTECTION ZONE (RPZ)		
RPZ OR AVIGATION EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA/OFZ
FUEL STORAGE AREA	(F)	
LIGHTED WIND CONE & SEGMENTED CIRCLE		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
THRESHOLD LIGHTS		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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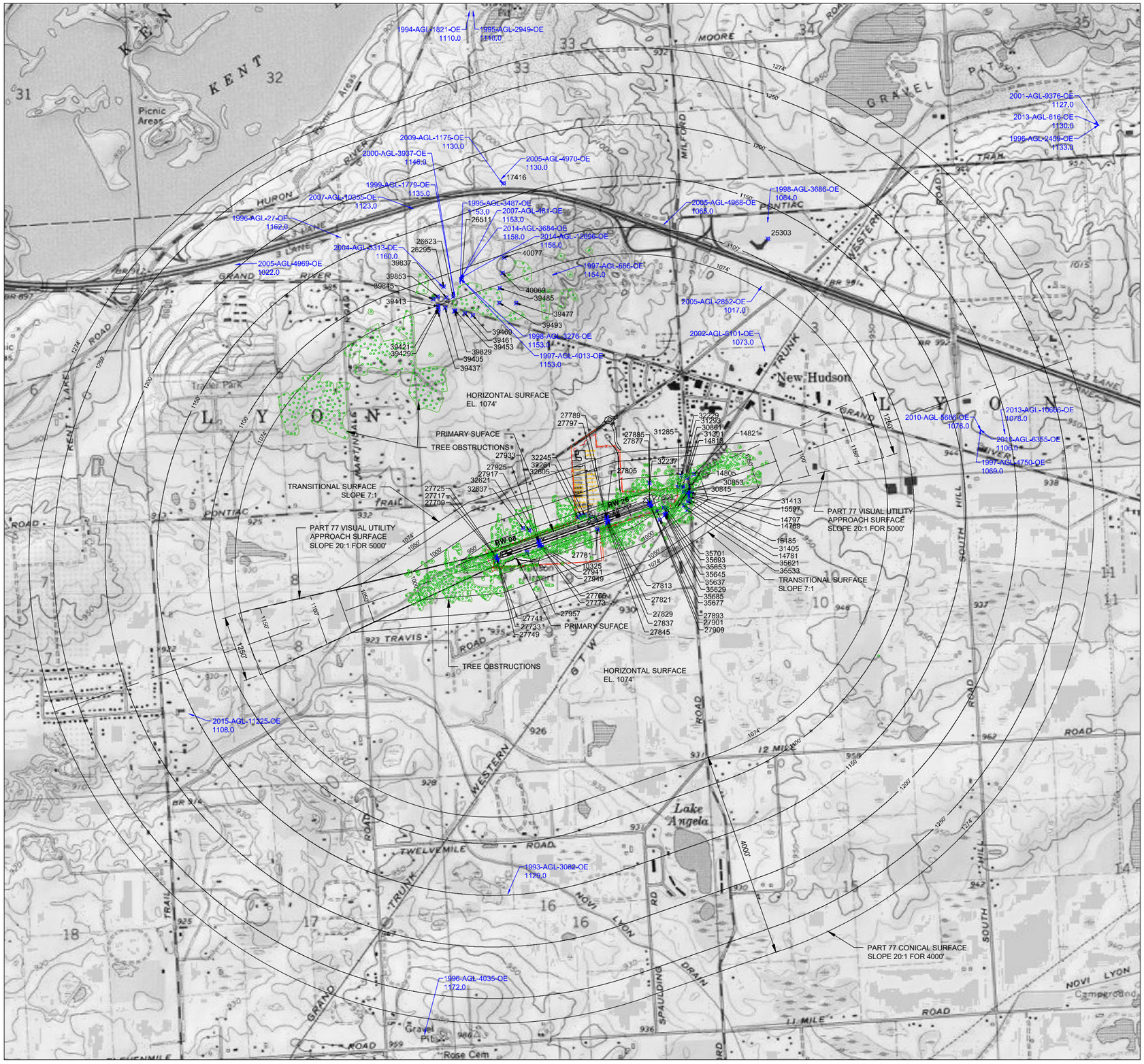
DO NOT SCALE DRAWINGS

SHEET CONTENTS

Figure F3 Airport Layout Plan

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\151210015566 4.011\TECH\CADALP2018\AIRPORT LAYOUT PLAN.DWG
1/17/2020 2:24:09 PM



PART 77 OBSTRUCTIONS

point_id	feature	elevation	surface_id	penval	above ground	ground elevation	disposition
10325	RUNWAY_LIGHT	925.245	P77PS	3	2.651	922.594	none
14781	POLE_UTIL	973.715	P77TS	-6	44.44	929.275	none
14789	POLE_UTIL	974.473	P77AS	-8	43.935	930.538	none
14797	POLE_UTIL	973.715	P77AS	-9	42.673	931.042	none
14805	POLE_UTIL	973.715	P77AS	-12	43.935	929.78	none
14813	POLE_UTIL	974.978	P77TS	6	46.965	928.013	none
14821	POLE_UTIL	972.958	P77TS	-5	44.945	928.013	none
15485	PRIMARY_ROAD	947.593	P77AS	-35	15	932.593	none
15597	POLE_UTIL	955.695	P77AS	-30	24.997	930.698	none
17416	COMMUNICATION_TOWER	1161.016	P77CS	-6	138.749	1022.267	none
25303	COMMUNICATION_TOWER	1115.774	P77CS	14	178.139	937.635	none
26295	CELL_TOWER	1160.435	P77CS	69	127.765	1032.67	none
26511	CELL_TOWER	1155.764	P77CS	63	128.144	1027.62	none
26623	WATER_TOWER	1139.68	P77CS	60	105.418	1034.262	none
27709	RUNWAY_LIGHT	923.399	P77PS	3	4.166	919.233	relocated
27717	RUNWAY_LIGHT	923.399	P77PS	3	4.292	919.107	relocated
27725	RUNWAY_LIGHT	923.02	P77PS	2	4.166	918.854	relocated
27733	RUNWAY_LIGHT	923.651	P77PS	3	3.662	919.989	relocated
27741	RUNWAY_LIGHT	923.651	P77PS	3	3.914	919.737	relocated
27749	RUNWAY_LIGHT	923.399	P77PS	3	3.661	919.738	relocated
27765	NAVAID	924.03	P77PS	2	2.525	921.505	none
27773	UTIL_BOX	923.525	P77PS	1	2.525	921	none
27781	WINDSOCK	948.901	P77PS	25	24.745	924.156	none
27789	RUNWAY_LIGHT	927.439	P77PS	3	3.03	924.409	relocated
27797	RUNWAY_LIGHT	927.313	P77PS	3	3.282	924.031	relocated
27805	RUNWAY_LIGHT	927.06	P77PS	2	2.904	924.156	relocated
27813	RUNWAY_LIGHT	927.06	P77PS	2	2.651	924.409	relocated
27821	RUNWAY_LIGHT	926.934	P77PS	2	3.03	923.904	relocated
27829	RUNWAY_LIGHT	926.808	P77PS	2	3.156	923.652	relocated
27837	NAVAID	926.176	P77PS	2	2.399	923.777	none
27845	UTIL_BOX	925.798	P77PS	1	2.146	923.652	none
27869	RUNWAY_LIGHT	927.818	P77PS	2	2.651	925.167	relocated
27877	RUNWAY_LIGHT	927.818	P77PS	-14	2.777	925.041	relocated
27885	RUNWAY_LIGHT	927.565	P77PS	-15	2.399	925.166	relocated
27893	RUNWAY_LIGHT	928.575	P77PS	-14	2.525	926.05	relocated
27901	RUNWAY_LIGHT	928.575	P77PS	-14	2.399	926.176	relocated
27909	RUNWAY_LIGHT	928.323	P77PS	-14	2.146	926.177	relocated
27917	RUNWAY_LIGHT	924.818	P77PS	2	2.778	922.04	relocated
27925	RUNWAY_LIGHT	924.944	P77PS	3	2.778	922.166	relocated
27933	RUNWAY_LIGHT	925.197	P77PS	3	2.904	922.293	relocated
27941	RUNWAY_LIGHT	925.197	P77PS	3	2.651	922.546	relocated
27949	RUNWAY_LIGHT	925.071	P77PS	3	2.651	922.42	relocated
27957	NAVAID	923.808	P77PS	2	2.525	921.283	none
30845	POLE_UTIL	964.226	P77AS	-6	35.097	929.129	none
30853	POLE_UTIL	964.605	P77AS	-16	36.107	928.498	none
30861	POLE_UTIL	958.041	P77AS	-22	29.795	928.246	none
31285	BUILDING	944.004	P77AS	-32	16.286	927.718	none
31293	BUILDING	942.742	P77AS	-34	14.518	928.224	none
31301	BUILDING	951.566	P77AS	-28	23.861	927.705	none
31405	PRIMARY_ROAD	947.805	P77AS	-36	15	932.805	none
31413	PRIMARY_ROAD	947.552	P77AS	-37	15	932.552	none
32229	POLE_UTIL	967.512	P77TS	-9	41.536	925.976	none
32237	POLE_UTIL	961.777	P77TS	-4	34.845	926.932	none
32245	WINDSOCK	962.195	P77TS	23	11.362	950.833	none
32261	HANGAR	949.745	P77TS	7	25.376	924.369	none
32605	HANGAR	947.236	P77TS	6	23.103	924.133	none
32621	BUILDING	937.863	P77TS	-10	15.403	922.46	none
32637	ANTENNA	951.104	P77TS	-9	7.196	943.908	none
35533	POLE_UTIL	975.583	P77TS	3	44.061	931.522	none
35621	BUILDING	948.5	P77TS	-26	17.801	930.699	none
35629	TANK	954.528	P77TS	5	22.852	931.676	none
35637	TANK	954.528	P77TS	6	22.978	931.55	none
35645	TANK	954.528	P77TS	6	22.978	931.55	none
35653	TANK	949.352	P77TS	2	18.18	931.172	none
35677	VENT_PIPE	947.817	P77TS	-9	15.529	932.288	none
35685	DEBRIS/RUINS	936.663	P77TS	-13	4.924	931.739	none
35693	DEBRIS/RUINS	933.886	P77TS	-22	4.797	929.089	none
35701	DEBRIS/RUINS	937.295	P77TS	-21	7.575	929.72	none
39405	POLE_UTIL	1082.376	P77HS	6	47.723	1034.653	none
39413	POLE_UTIL	1081.871	P77HS	6	47.975	1033.896	none
39421	POLE_UTIL	1076.19	P77HS	0	42.168	1034.022	none
39429	POLE_UTIL	1077.705	P77HS	2	42.925	1034.78	none
39437	POLE_UTIL	1073.413	P77HS	-3	38.885	1034.528	none
39453	POLE_UTIL	1071.266	P77HS	-5	40.022	1031.244	none
39461	POLE_UTIL	1073.539	P77HS	-3	46.46	1027.079	none
39469	POLE_UTIL	1072.908	P77HS	-3	47.343	1025.565	none
39477	FLAGPOLE	1073.665	P77HS	-2	46.081	1027.584	none
39485	POLE_UTIL	1083.386	P77HS	7	50.5	1032.886	none
39493	POLE_UTIL	1066.09	P77HS	-10	44.314	1021.776	none
39829	TANK	1067.858	P77HS	-8	38.127	1029.731	none
39837	BUILDING	1076.549	P77CS	-4	42.42	1034.129	none
39845	POLE_UTIL	1079.743	P77CS	-4	49.238	1030.505	none
39853	FLAGPOLE	1077.789	P77CS	-7	44.819	1032.97	none
40069	POLE_UTIL	1090.557	P77CS	5	43.051	1047.506	none
40077	POLE_UTIL	1091.37	P77CS	-8	41.41	1049.96	none

NOTE: 1. AIRPORTS GIS SURVEY COMPLETED BY QUANTUM SPATIAL 9/2017.
2. TREE AND BRUSH OBSTRUCTIONS ARE NOT INCLUDED IN TABLE.
3. BUILDING HEIGHT RESTRICTION (NO GREATER THAN 35') PER ARTICLE 7-PLANNED DEVELOPMENT.

0 1000 2000

REVISIONS

NO.	ITEM	DATE	COMMENTS

Mead & Hunt

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OAKLAND COUNTY
OAKLAND/SOUTHWEST AIRPORT

57751 PONTIAC TRAIL
NEW HUDSON, MI 48165

ISSUED

NOT FOR CONSTRUCTION

M&H NO.: 1512100-155664.01
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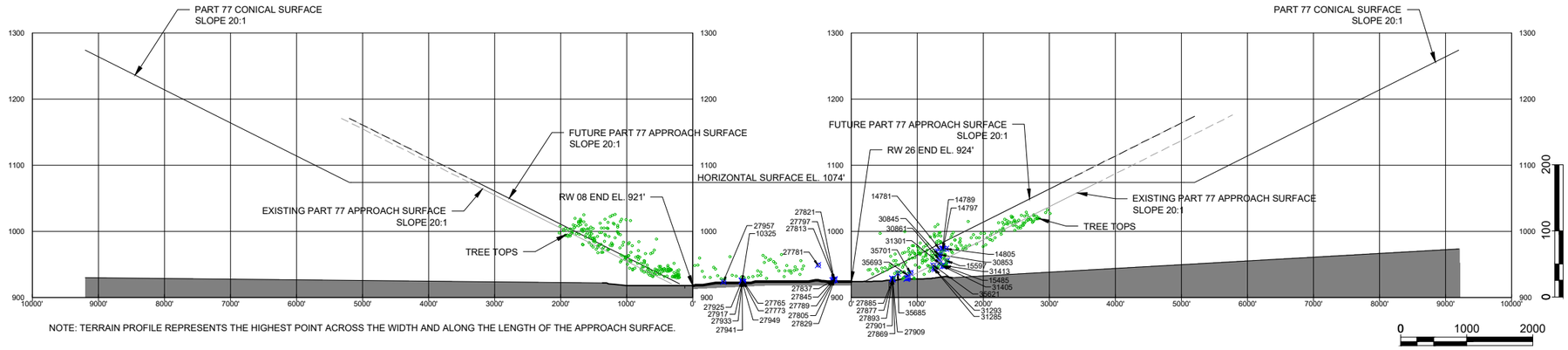
DRAWN BY: JWB
CHECKED BY: REH
DO NOT SCALE DRAWINGS

Figure F4
Airport Airspace Plan



NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.

PART 77 OBSTRUCTIONS

	A	B	C	D	E	F	G	H
1	point_id	feature	elevation	surface_id	penval	above ground	ground elevation	disposition
2	10325	RUNWAY_LIGHT	925.245	P77PS	3	2.651	922.594	relocated
3	14781	POLE_UTIL	973.715	P77TS	-6	44.44	929.275	none
4	14789	POLE_UTIL	974.473	P77AS	-8	43.935	930.538	none
5	14797	POLE_UTIL	973.715	P77AS	-9	42.673	931.042	none
6	14805	POLE_UTIL	973.715	P77AS	-12	43.935	929.78	none
7	15485	PRIMARY_ROAD	947.593	P77AS	-35	15	932.593	none
8	15597	POLE_UTIL	955.695	P77AS	-30	24.997	930.698	none
9	27765	NAVAID	924.03	P77PS	2	2.525	921.505	none
10	27773	UTIL_BOX	923.525	P77PS	1	2.525	921	none
11	27781	WINDSOCK	948.901	P77PS	25	24.745	924.156	none
12	27789	RUNWAY_LIGHT	927.439	P77PS	3	3.03	924.409	relocated
13	27797	RUNWAY_LIGHT	927.313	P77PS	3	3.282	924.031	relocated
14	27805	RUNWAY_LIGHT	927.06	P77PS	2	2.904	924.156	relocated
15	27813	RUNWAY_LIGHT	927.06	P77PS	2	2.651	924.409	relocated
16	27821	RUNWAY_LIGHT	926.934	P77PS	2	3.03	923.904	relocated
17	27829	RUNWAY_LIGHT	926.808	P77PS	2	3.156	923.652	relocated
18	27837	NAVAID	926.176	P77PS	2	2.399	923.777	none
19	27845	UTIL_BOX	925.798	P77PS	1	2.146	923.652	none
20	27869	RUNWAY_LIGHT	927.818	P77PS	2	2.651	925.167	relocated
21	27877	RUNWAY_LIGHT	927.818	P77PS	-14	2.777	925.041	relocated
22	27885	RUNWAY_LIGHT	927.565	P77PS	-15	2.399	925.166	relocated
23	27893	RUNWAY_LIGHT	928.575	P77PS	-14	2.525	926.05	relocated
24	27901	RUNWAY_LIGHT	928.575	P77PS	-14	2.399	926.176	relocated
25	27909	RUNWAY_LIGHT	928.323	P77PS	-14	2.146	926.177	relocated
26	27917	RUNWAY_LIGHT	924.818	P77PS	2	2.778	922.04	relocated
27	27925	RUNWAY_LIGHT	924.944	P77PS	3	2.778	922.166	relocated
28	27933	RUNWAY_LIGHT	925.197	P77PS	3	2.904	922.293	relocated
29	27941	RUNWAY_LIGHT	925.197	P77PS	3	2.651	922.546	relocated
30	27949	RUNWAY_LIGHT	925.071	P77PS	3	2.651	922.42	relocated
31	27957	NAVAID	923.808	P77PS	2	2.525	921.283	none
32	30845	POLE_UTIL	964.226	P77AS	-6	35.097	929.129	none
33	30853	POLE_UTIL	964.605	P77AS	-16	36.107	928.498	none
34	30861	POLE_UTIL	958.041	P77AS	-22	29.795	928.246	none
35	31285	BUILDING	944.004	P77AS	-32	16.286	927.718	none
36	31293	BUILDING	942.742	P77AS	-34	14.518	928.224	none
37	31301	BUILDING	951.566	P77AS	-28	23.861	927.705	none
38	31405	PRIMARY_ROAD	947.805	P77AS	-36	15	932.805	none
39	31413	PRIMARY_ROAD	947.552	P77AS	-37	15	932.552	none
40	35621	BUILDING	948.5	P77TS	-26	17.801	930.699	none
41	35685	DEBRIS/RUINS	936.663	P77TS	-13	4.924	931.739	none
42	35693	DEBRIS/RUINS	933.886	P77TS	-22	4.797	929.089	none
43	35701	DEBRIS/RUINS	937.295	P77TS	-21	7.575	929.72	none

NOTE: 1. AIRPORTS GIS SURVEY COMPLETED BY QUANTUM SPATIAL 9/2017.
2. TREE AND BRUSH OBSTRUCTIONS ARE NOT INCLUDED IN TABLE.
3. BUILDING HEIGHT RESTRICTION (NO GREATER THAN 35') PER ARTICLE 7-PLANNED DEVELOPMENT

REVISIONS

NO.	ITEM	DATE	COMMENTS

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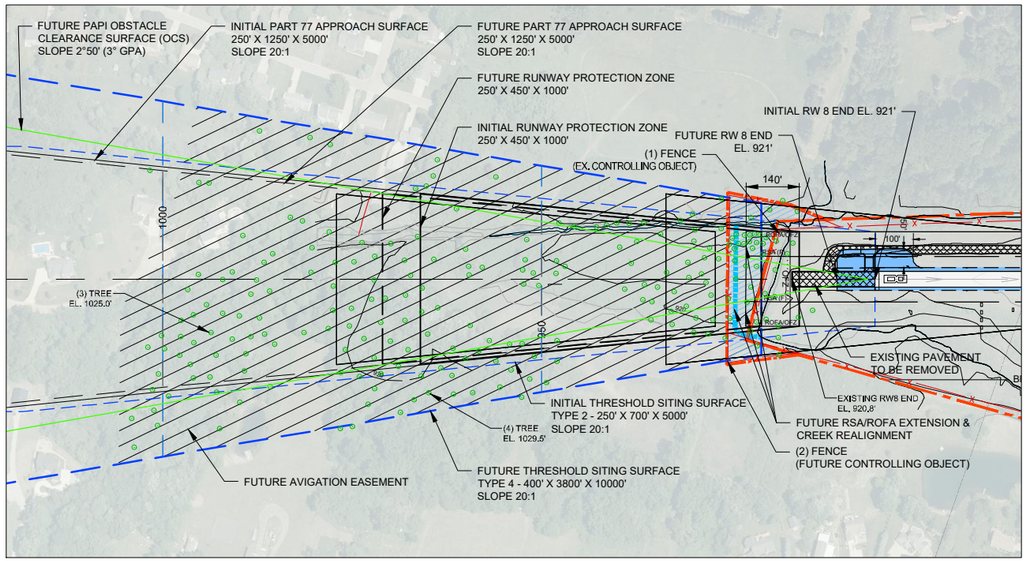
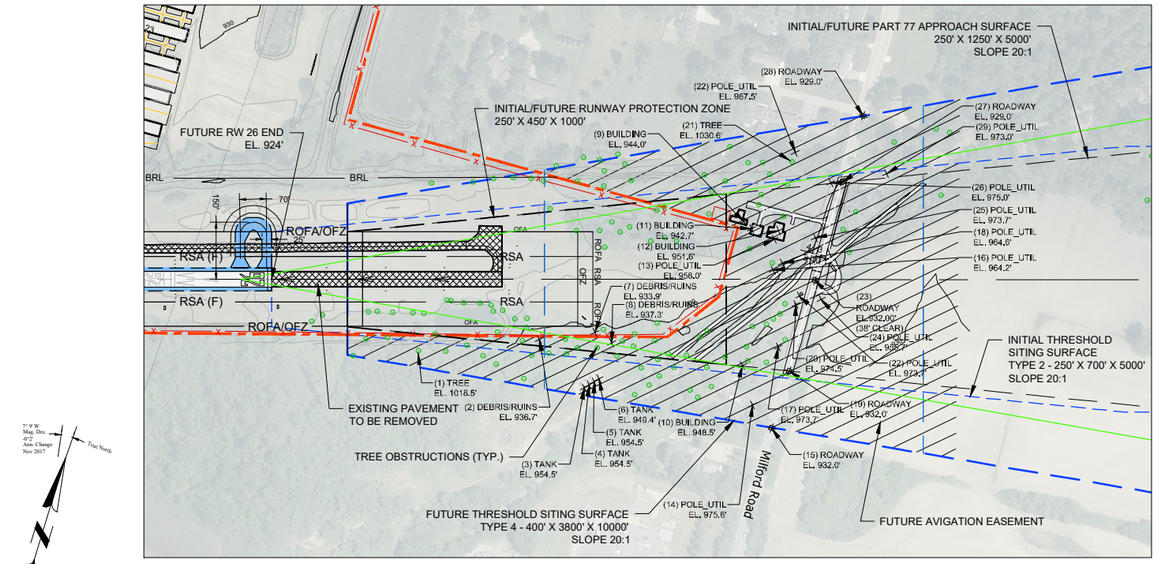
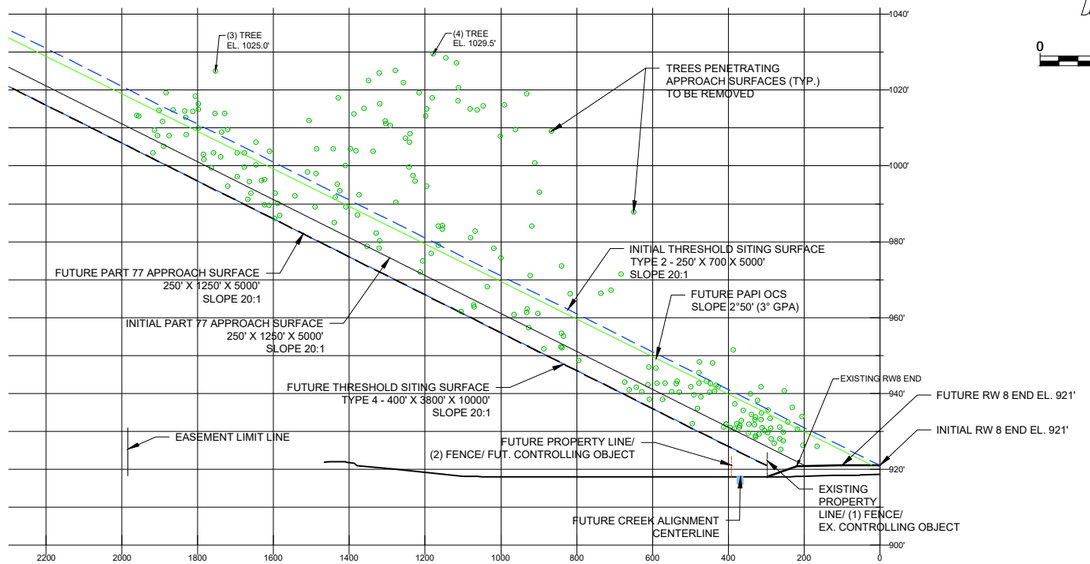
Figure F5
Airport Airspace Profile



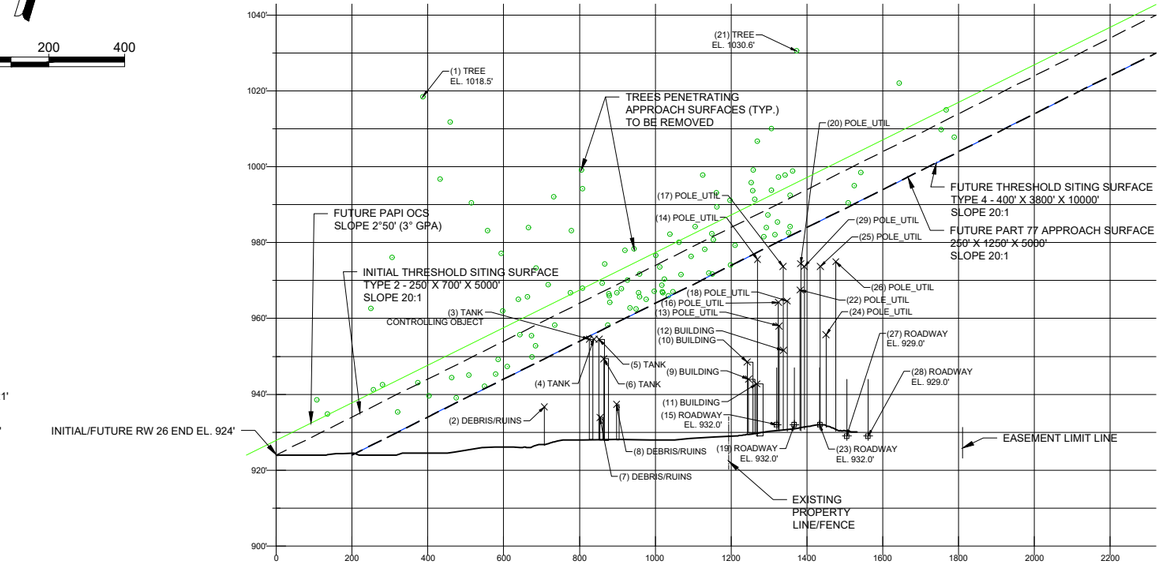
RUNWAY 8 PLAN



RUNWAY 26 PLAN



RUNWAY 8 PROFILE



RUNWAY 26 PROFILE

0 200 400

RUNWAY 8 OBJECTS

AIRPORTS GIS SURVEY COMPLETED 9/2017

NO.	ITEM	ELEV.	AGL	PENETRATION	SURFACE	DISPOSITION
(1)	EXISTING FENCE	924.6'	6'	NONE	NONE	REMOVED
(2)	FUTURE FENCE	924.6'	6'	NONE	NONE	FUTURE CONTROLLING OBJECT
(3)	TREE	1025.0'	103.0'	31.6'	PART77/TSS	REMOVED
(4)	TREE	1029.5'	110.5'	64.3'	TSS	REMOVED

NOTE: NUMEROUS TREES/SHRUBS (APPROX. 218) PENETRATE THE PART 77 AND THRESHOLD SITING SURFACE TO BE REMOVED.

REVISIONS

NO.	ITEM	DATE	COMMENTS

RUNWAY 26 OBJECTS

AIRPORTS GIS SURVEY COMPLETED 9/2017

NO.	ITEM	ELEV.	AGL	PENETRATION	SURFACE	DISPOSITION
(1)	TREE	1018.5'	93.5'	85.1'	PART 77	REMOVED
(2)	DEBRIS/RUINS	936.7'	10.1'	NONE	NONE	NONE
(3)	TANK (CONTROLLING OBJECT)	954.5'	26.4'	NONE	NONE	NONE
(4)	TANK	954.5'	26.4'	NONE	NONE	NONE
(5)	TANK	954.5'	26.4'	NONE	NONE	NONE
(6)	TANK	949.4'	21.4'	NONE	NONE	NONE
(7)	DEBRIS/RUINS	933.9'	5.9'	NONE	NONE	NONE
(8)	DEBRIS/RUINS	937.3'	9.4'	NONE	NONE	NONE
(9)	BUILDING	944.0'	14.6'	NONE	NONE	NONE
(10)	BUILDING	948.5'	19.1'	NONE	NONE	NONE
(11)	BUILDING	942.7'	13.1'	NONE	NONE	NONE
(12)	BUILDING	951.6'	20.9'	NONE	NONE	NONE
(13)	POLE_UTIL	958.0'	27.8'	NONE	NONE	NONE
(14)	POLE_UTIL	975.6'	46.2'	NONE	NONE	NONE
(15)	ROADWAY	932.0'	15'	NONE	NONE	NONE

NOTE: NUMEROUS TREES/SHRUBS (APPROX. 115) PENETRATE THE PART 77 AND THRESHOLD SITING SURFACE TO BE REMOVED.

RUNWAY 26 OBJECTS

AIRPORTS GIS SURVEY COMPLETED 9/2017

NO.	ITEM	ELEV.	AGL	PENETRATION	SURFACE	DISPOSITION
(16)	POLE_UTIL	964.2'	33.5'	NONE	NONE	NONE
(17)	POLE_UTIL	973.7'	43.0'	NONE	NONE	NONE
(18)	POLE_UTIL	964.6'	34.4'	NONE	NONE	NONE
(19)	ROADWAY	932.0'	15'	NONE	NONE	NONE
(20)	POLE_UTIL	974.5'	44.1'	NONE	NONE	NONE
(21)	TREE	1030.6'	100.0'	NONE	NONE	NONE
(22)	POLE_UTIL	967.5'	37.0'	NONE	NONE	NONE
(23)	ROADWAY	932.0'	15'	NONE	NONE	NONE
(24)	POLE_UTIL	955.7'	24.4'	NONE	NONE	NONE
(25)	POLE_UTIL	973.7'	42.4'	NONE	NONE	NONE
(26)	POLE_UTIL	975.0'	44.7'	NONE	NONE	NONE
(27)	ROADWAY	928.0'	15'	NONE	NONE	NONE
(28)	ROADWAY	928.0'	15'	NONE	NONE	NONE
(29)	POLE_UTIL	973.7'	43.0'	NONE	NONE	NONE

NOTE: NUMEROUS TREES/SHRUBS (APPROX. 115) PENETRATE THE PART 77 AND THRESHOLD SITING SURFACE TO BE REMOVED.

NOTES
1. THIS DRAWING REFLECTS CURRENT PLANNING STANDARDS APPLICABLE TO OAKLAND SOUTHWEST AIRPORT TO THE GREATEST EXTENT POSSIBLE. THIS DRAWING SHOULD NOT BE USED AS A STANDARD FOR PLANNING OR DESIGN.
2. ALL COORDINATE DATA IS NAD83.
3. AIRPORTS GIS SURVEY COMPLETED BY QUANTUM SPATIAL 9/2017.

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
RUNWAY PROTECTION ZONE (RPZ)		
RPZ OR AVIGATION EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA/OFZ
FUEL STORAGE AREA	(F)	(F)
LIGHTED WIND CONE & SEGMENTED CIRCLE		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
THRESHOLD LIGHTS		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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OAKLAND COUNTY INTERNATIONAL AIRPORT
OAKLAND/SOUTHWEST AIRPORT

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Figure F6 Inner Approach Plan & Profile

RUNWAY 8 TREES

AIRPORTS GIS SURVEY COMPLETED 9/2017

NO.	NORTHING	EASTING	ELEV.	DESCRIPTION	AGL	PENETRATION	SURFACE	DISPOSITION
11037	365103	13320767	1014.759	tree	95	16.6	PART 77 APPRAOCH	REMOVED
11045	365297.9	13320818	1024.985	tree	105	32.5	PART 77 APPRAOCH	REMOVED
11053	365385.6	13320723	1014.254	tree	94	18.7	PART 77 APPRAOCH	REMOVED
11061	365567.4	13320814	991.15	tree	71	2.9	PART 77 APPRAOCH	REMOVED
11069	365520	13321083	1017.915	tree	98	41.6	PART 77 APPRAOCH	REMOVED
11077	365655.4	13320949	998.347	tree	78	17.9	PART 77 APPRAOCH	REMOVED
11149	365830.8	13322078	951.454	tree	31	27.2	PART 77 APPRAOCH	REMOVED
11157	365798.1	13322167	941.733	tree	22	16.2	PART 77 APPRAOCH	REMOVED
11549	365978.8	13322094	938.072	tree	18	17	PART 77 APPRAOCH	REMOVED
12878	365933.1	13321765	987.868	tree	68	50.5	PART 77 APPRAOCH	REMOVED
12886	365725.4	13322057	947.973	tree	28	21	PART 77 APPRAOCH	REMOVED
12894	365755	13321865	942.292	tree	22	6.8	PART 77 APPRAOCH	REMOVED
12902	365804.3	13321524	984.08	tree	64	33.2	PART 77 APPRAOCH	REMOVED
12910	365769.7	13321643	966.279	tree	46	20.5	PART 77 APPRAOCH	REMOVED
12926	365691.1	13321555	957.315	tree	37	6.1	PART 77 APPRAOCH	REMOVED
12934	365727.1	13321380	981.05	tree	61	22.2	PART 77 APPRAOCH	REMOVED
12942	365849.5	13321227	976.884	tree	57	12.8	PART 77 APPRAOCH	REMOVED
12950	365645.7	13321237	999.609	tree	80	32.6	PART 77 APPRAOCH	REMOVED
12958	365409.3	13321421	1028.394	tree	108	66.2	PART 77 APPRAOCH	REMOVED
12966	365465.8	13321597	1009.583	tree	90	56.7	PART 77 APPRAOCH	REMOVED
12982	365533.2	13321325	1015.012	tree	95	50.3	PART 77 APPRAOCH	REMOVED
12990	365669.2	13320683	1003.397	tree	83	10.6	PART 77 APPRAOCH	REMOVED
13006	365648.8	13320525	1009.33	tree	89	8.8	PART 77 APPRAOCH	REMOVED
13014	365215.2	13321012	992.771	tree	73	8.1	PART 77 APPRAOCH	REMOVED
13022	365379.8	13321049	1011.961	tree	92	31.8	PART 77 APPRAOCH	REMOVED
13030	365429.2	13320884	1006.153	tree	86	18.9	PART 77 APPRAOCH	REMOVED
13038	365248.5	13320696	1019.283	tree	99	20.2	PART 77 APPRAOCH	REMOVED
13054	365973.8	13321934	948.205	tree	28	19.5	PART 77 APPRAOCH	REMOVED
14430	365578.7	13321687	952.005	tree	32	5.2	PART 77 APPRAOCH	REMOVED
14438	365540.6	13321458	982.684	tree	63	24.4	PART 77 APPRAOCH	REMOVED
14502	365432.3	13321272	1025.112	tree	105	56.3	PART 77 APPRAOCH	REMOVED
18443	365932.4	13321393	975.693	tree	56	20.8	PART 77 APPRAOCH	REMOVED
18467	365842.1	13320764	996.272	tree	76	10.2	PART 77 APPRAOCH	REMOVED
18795	365172.3	13321223	1000.06	tree	80	24.6	PART 77 APPRAOCH	REMOVED
18803	365301.4	13321274	1016.346	tree	96	45.5	PART 77 APPRAOCH	REMOVED
19307	365066.6	13320922	1013.845	tree	94	22.5	PART 77 APPRAOCH	REMOVED
27421	365928.7	13322092	939.812	tree	20	17.9	PART 77 APPRAOCH	REMOVED
27429	365994.5	13322186	936.276	tree	16	14.8	PART 77 APPRAOCH	REMOVED
27437	365998.3	13322117	935.519	tree	16	10.9	PART 77 APPRAOCH	REMOVED
27445	365995.6	13322100	934.761	tree	15	9.3	PART 77 APPRAOCH	REMOVED
27453	366016.7	13322118	930.721	tree	11	6.5	PART 77 APPRAOCH	REMOVED
27461	366017.1	13322101	930.09	tree	10	5	PART 77 APPRAOCH	REMOVED
27469	366015.6	13322086	929.206	tree	9	3.4	PART 77 APPRAOCH	REMOVED
27477	366008.1	13322077	932.994	tree	13	11.6	PART 77 APPRAOCH	REMOVED
27485	366003.6	13322062	931.858	tree	12	9.7	PART 77 APPRAOCH	REMOVED
27493	365991.8	13322081	931.731	tree	12	10.3	PART 77 APPRAOCH	REMOVED
27501	365981.7	13322068	929.459	tree	9	7.2	PART 77 APPRAOCH	REMOVED
27509	365977.4	13322055	935.393	tree	15	12.5	PART 77 APPRAOCH	REMOVED
27517	365985.1	13322034	931.984	tree	12	8.2	PART 77 APPRAOCH	REMOVED
27525	365999.1	13322042	932.741	tree	13	9.6	PART 77 APPRAOCH	REMOVED
27533	365967.9	13322033	930.595	tree	11	6.5	PART 77 APPRAOCH	REMOVED
27541	365961.6	13322049	930.974	tree	11	7.5	PART 77 APPRAOCH	REMOVED
27549	365943.3	13322169	931.1	tree	11	8	PART 77 APPRAOCH	REMOVED
27557	365876	13322165	933.373	tree	13	9	PART 77 APPRAOCH	REMOVED
27565	365942.9	13321987	940.569	tree	21	13.9	PART 77 APPRAOCH	REMOVED
27573	365912.3	13321983	940.19	tree	20	12.8	PART 77 APPRAOCH	REMOVED
27581	365870.3	13321989	943.22	tree	23	15.5	PART 77 APPRAOCH	REMOVED
27589	365852.4	13322008	942.463	tree	22	15.3	PART 77 APPRAOCH	REMOVED
27597	365825.9	13322031	942.084	tree	22	15.6	PART 77 APPRAOCH	REMOVED
27605	365765.1	13322058	941.705	tree	22	15.5	PART 77 APPRAOCH	REMOVED
27613	365775.6	13321979	941.705	tree	22	11.9	PART 77 APPRAOCH	REMOVED
27621	365802.6	13321936	940.19	tree	20	8.8	PART 77 APPRAOCH	REMOVED
27629	365750.2	13321946	942.463	tree	22	10.7	PART 77 APPRAOCH	REMOVED
27637	365711.8	13321903	946.629	tree	27	12.2	PART 77 APPRAOCH	REMOVED
27645	365718.4	13321960	943.22	tree	23	11.6	PART 77 APPRAOCH	REMOVED
27653	365717.4	13322021	945.493	tree	25	16.7	PART 77 APPRAOCH	REMOVED
27685	365838.2	13322127	934.383	tree	14	12.6	PART 77 APPRAOCH	REMOVED
27693	365783.7	13322098	937.16	tree	17	13.1	PART 77 APPRAOCH	REMOVED
27973	365922.5	13322019	931.1	tree	11	5.6	PART 77 APPRAOCH	REMOVED
27981	365936	13322120	932.994	tree	13	12	PART 77 APPRAOCH	REMOVED
27989	365879.6	13322123	933.752	tree	14	12.5	PART 77 APPRAOCH	REMOVED
27997	365970.3	13322125	929.585	tree	10	8.4	PART 77 APPRAOCH	REMOVED
28781	365875.4	13322297	925.961	tree	6	5.2	PART 77 APPRAOCH	REMOVED
28789	365845.4	13322268	926.213	tree	6	5.4	PART 77 APPRAOCH	REMOVED
28797	365807.1	13322226	927.476	tree	7	6.4	PART 77 APPRAOCH	REMOVED
28805	365813.1	13322190	927.981	tree	8	6.7	PART 77 APPRAOCH	REMOVED
28813	365877.5	13322192	927.981	tree	8	6.9	PART 77 APPRAOCH	REMOVED
28829	366026.1	13322190	930.506	tree	11	9.7	PART 77 APPRAOCH	REMOVED
28837	366015.8	13322147	925.203	tree	5	4.3	PART 77 APPRAOCH	REMOVED
29053	365931.4	13322061	931.479	tree	11	8.1	PART 77 APPRAOCH	REMOVED
29061	365730.1	13322104	930.974	tree	11	6.3	PART 77 APPRAOCH	REMOVED
29069	365769.8	13322161	928.449	tree	8	7.1	PART 77 APPRAOCH	REMOVED
29077	365778.4	13322235	929.712	tree	10	8.6	PART 77 APPRAOCH	REMOVED
29181	365944.7	13321942	942.639	tree	23	13.9	PART 77 APPRAOCH	REMOVED
29189	365843.9	13321901	940.366	tree	20	8	PART 77 APPRAOCH	REMOVED
29197	365849.4	13321961	939.609	tree	20	10.2	PART 77 APPRAOCH	REMOVED
29205	365799.2	13321891	938.346	tree	18	4.8	PART 77 APPRAOCH	REMOVED
29213	365764.9	13321811	940.871	tree	21	3	PART 77 APPRAOCH	REMOVED
29221	365835.5	13321805	941.629	tree	22	4.6	PART 77 APPRAOCH	REMOVED
29229	365865.6	13321762	942.891	tree	23	4.3	PART 77 APPRAOCH	REMOVED
29237	365893.8	13321801	940.366	tree	20	4.1	PART 77 APPRAOCH	REMOVED
29245	365933	13321853	942.639	tree	23	9.4	PART 77 APPRAOCH	REMOVED
29253	365947.2	13321802	946.931	tree	27	11.6	PART 77 APPRAOCH	REMOVED
29261	365923.4	13321733	971.424	tree	51	32.4	PART 77 APPRAOCH	REMOVED
29269	365909.4	13321709	967.131	tree	47	26.8	PART 77 APPRAOCH	REMOVED
29277	365896	13321686	966.374	tree	46	24.7	PART 77 APPRAOCH	REMOVED
29285	365877.1	13321630	948.699	tree	29	4.1	PART 77 APPRAOCH	REMOVED
29293	365873.4	13321590	955.011	tree	35	8.4	PART 77 APPRAOCH	REMOVED
29309	365776.4	13321617	955.769	tree	36	8.9	PART 77 APPRAOCH	REMOVED
29317	365745.2	13321626	952.234	tree	32	5.3	PART 77 APPRAOCH	REMOVED
29333	365699.4	13321594	951.637	tree	32	2.4	PART 77 APPRAOCH	REMOVED
29341	365724.5	13321540	962.242	tree	42	10.8	PART 77 APPRAOCH	REMOVED
29349	365726.1	13321568	960.98	tree	41	11	PART 77 APPRAOCH	REMOVED
29357	365752.1	13321538	971.08	tree	51	20.1	PART 77 APPRAOCH	REMOVED
29429	365757.8	13321890	942.64	tree	23	8.3	PART 77 APPRAOCH	REMOVED
29445	365886.9	13321945	932.035	tree	12	2.4	PART 77 APPRAOCH	REMOVED
29493	365793.5	13321857	938.348	tree	18	3.1	PART 77 APPRAOCH	REMOVED
29501	365756.2	13322013	939.105	tree	19	10.6	PART 77 APPRAOCH	REMOVED
29517	365541	13321602	961.266	tree	41	9.8	PART 77 APPRAOCH	REMOVED
29525	365528.5	13321571	960.761	tree	41	7.6	PART 77 APPRAOCH	REMOVED
29541	365519.7	13321518	978.216	tree	58	22.4	PART 77 APPRAOCH	REMOVED
29549	365469.4	13321434	1017.101	tree	97	56.5	PART 77 APPRAOCH	REMOVED
29557	365483	13321358	1017.858	tree	98	53.9	PART 77 APPRAOCH	REMOVED

ABOVE GROUND ELEVATION (AGL) AND PENETRATION VALUES ARE APPROXIMATE.

RUNWAY 8 TREES

AIRPORTS GIS SURVEY COMPLETED 9/2017

NO.	NORTHING	EASTING	ELEV.	DESCRIPTION	AGL	PENETRATION	SURFACE	DISPOSITION
29565	365483.7	13321501	1015.838	tree	96	58.6	PART 77 APPRAOCH	REMOVED
29581	365695.9	13321438	968.116	tree	48	11.4	PART 77 APPRAOCH	REMOVED
29589	365687.3	13321403	963.318	tree	43	4.8	PART 77 APPRAOCH	REMOVED
29597	365666	13321411	962.813	tree	43	4.4	PART 77 APPRAOCH	REMOVED
29613	365673.3	13321309	978.973	tree	59	15.8	PART 77 APPRAOCH	REMOVED
29621	365613.8	13321265	995.891	tree	76	29.7	PART 77 APPRAOCH	REMOVED
29629	365560.6	13321269	1008.516	tree	89	41.7	PART 77 APPRAOCH	REMOVED
29637	365535.2	13321223	1010.536	tree	91	41.1	PART 77 APPRAOCH	REMOVED
29645	365470.7	13321231	1011.798	tree	92	41.7	PART 77 APPRAOCH	REMOVED
29653	365496.6	13321290	1006.243	tree	86	39.3	PART 77 APPRAOCH	REMOVED
29661	365376.6	13321314	1021.898	tree	102	54.1	PART 77 APPRAOCH	REMOVED
29669	365377.2	13321246	1024.423	tree	104	53.5	PART 77 APPRAOCH	REMOVED
29677	365415.9	13321204	1022.403	tree	102	50.1	PART 77 APPRAOCH	REMOVED
29685	365480	13321146	1003.971	tree	84	30	PART 77 APPRAOCH	REMOVED
29693	365410.8	13321106	1004.476	tree	84	27.5	PART 77 APPRAOCH	REMOVED
29701	365459.8	13321101	995.133	tree	75	18.7	PART 77 APPRAOCH	REMOVED
29709	365534.8	13321015	997.911	tree	78	18.6	PART 77 APPRAOCH	REMOVED
29717	365596.9	13320996	1004.476	tree	84	25.3	PART 77 APPRAOCH	REMOVED
29725	365651.5	13321025	985.033	tree	65	8.1	PART 77 APPRAOCH	REMOVED
29749	365653.5	13321117	978.721	tree	59	6.2	PART 77 APPRAOCH	REMOVED
29757	365598.6	13321113	992.356	tree	72	18.7	PART 77 APPRAOCH	REMOVED
29765	365580.4	13321066	993.366	tree	73	17.3	PART 77 APPRAOCH	REMOVED
29773	365630.3	13321159	980.236	tree	60	9.3	PART 77 APPRAOCH	REMOVED
29781	365675.4	13321189	990.336	tree	70	21.6	PART 77 APPRAOCH	REMOVED
29789	365717.1	13321250	974.933	tree	55	9.7	PART 77 APPRAOCH	REMOVED
29821	365819.9	13321321	961.551	tree	42	1.4	PART 77 APPRAOCH	REMOVED
29885	365556.8	13321361	983.266	tree	63	20.7	PART 77 APPRAOCH	REMOVED
29893	365592.5	13321305	994.628	tree	75	30	PART 77 APPRAOCH	REMOVED
29901	365571.1	13321179	978.216	tree	58	7.2	PART 77 APPRAOCH	REMOVED
29909	365520.7	13321189	982.256	tree	62	10.9	PART 77 APPRAOCH	REMOVED
29917	365372.5	13321167	1004.476	tree	84	29.7	PART 77 APPRAOCH	REMOVED
29925	365318	13321225	1015.081	tree	95	42.2	PART 77 APPRAOCH	REMOVED
29933	365337.9	13321412	1029.473	tree	109	65.7	PART 77 APPRAOCH	REMOVED
29941	365355.2	13321476	1020.636	tree	101	60.2	PART 77 APPRAOCH	REMOVED
29957	365413.2	13321584	1016.091	tree	96	61.7	PART 77 APPRAOCH	REMOVED
29965	365406.5	13321648	1018.995	tree	99	67.5	PART 77 APPRAOCH	REMOVED
29973	365464.7	13321697	1009.147	tree	89	60.9	PART 77 APPRAOCH	REMOVED
29981	365519.9	13321644	992.987	tree	73	43.2	PART 77 APPRAOCH	REMOVED
29989	365526.3	13321704	973.545	tree	54	26.7	PART 77 APPRAOCH	REMOVED
30077	365426.6	13321324	997.406	tree	77	30.9	PART 77 APPRAOCH	REMOVED
30109	365453	13320928	986.059	tree	66	1.3	PART 77 APPRAOCH	REMOVED
30117	365518.9	13320889	989.594	tree	70	4.1	PART 77 APPRAOCH	REMOVED
30125	365547.8	13320903	990.099	tree	70	5.7	PART 77 APPRAOCH	REMOVED
30149	365654.3	13320915	992.119	tree	72	10.1	PART 77 APPRAOCH	REMOVED
30165	365432.5	13320736	1002.951	tree	83	8.8	PART 77 APPRAOCH	REMOVED
30173	365467.8	13320819	997.123	tree	77	7.5	PART 77 APPRAOCH	REMOVED
30237	365377.6	13320926	989.703	tree	70	3.6	PART 77 APPRAOCH	REMOVED
30245	365341.5	13320952	1003.843	tree	84	18.4	PART 77 APPRAOCH	REMOVED
30253	365324.4	13320986	986.907	tree	67	2.8	PART 77 APPRAOCH	REMOVED
30261	365276.4	13320923	992.788	tree	73	4.9	PART 77 APPRAOCH	REMOVED
30269	365232.1	13320934	995.818	tree	76	7.7	PART 77 APPRAOCH	REMOVED
30277	365246.3	13320849	1002.383	tree	82	10.5	PART 77 APPRAOCH	REMOVED
30285	365300.6	13320876	1003.393	tree	83	13.7	PART 77 APPRAOCH	REMOVED
30293	365364.8	13320874	1003.393	tree	83	14.6	PART 77 APPRAOCH	REMOVED
30301	365356.8	13320830	1009.453	tree	89	18.5	PART 77 APPRAOCH	REMOVED
30309	365201.2	13320794	1018.291	tree	98	23.1	PART 77 APPRAOCH	REMOVED
30317	365258.1	13320783	1016.271	tree	96	21.5	PART 77 APPRAOCH	REMOVED
30325	365303.4	13320733	1008.191	tree	88	11.8	PART 77 APPRAOCH	REMOVED
30333	365327.7	13320758	1009.958	tree	90	15.1	PART 77 APPRAOCH	REMOVED
30341	365363.5	13320783	999.353	tree	79	6.3	PART 77 APPRAOCH	REMOVED
30349	365440.3	13320801	994.556	tree	75	3.6	PART 77 APPRAOCH	REMOVED
30365	365468.2	13320886	996.071	tree	76	9.6	PART 77 APPRAOCH	REMOVED
30373	365323.2	13320921	1000.138	tree	80	12.9	PART 77 APPRAOCH	REMOVED
30397	365154.6	13320883	1008.849	tree	89	17.1	PART 77 APPRAOCH	REMOVED
30429	365170.3	13320813	1014.909	tree	95	20.1	PART 77 APPRAOCH	REMOVED
30437	365150.3	13320723	1005.142	tree	85	5.7	PART 77 APPRAOCH	REMOVED
30445	365206.9	13320674	1003.375	tree	83	2.6	PART 77 APPRAOCH	REMOVED
30453	365217.5	13320715	1007.92	tree	88	9.3	PART 77 APPRAOCH	REMOVED
30461	365214.5	13320760	1014.485	tree	94	17.9	PART 77 APPRAOCH	REMOVED
30469	365262.3	13320746	1012.717	tree	93	16.3	PART 77 APPRAOCH	REMOVED
30661	365435.3	13321156	1013.598	tree	94	39.3	PART 77 APPRAOCH	REMOVED
32661	365870.4	13320896	989.108	tree	69	9.7	PART 77 APPRAOCH	REMOVED
32669	365869.3	13320952	991.633	tree	72	14.9	PART 77 APPRAOCH	REMOVED
32677	365661.7	13320658	1001.643	tree	82	7.6	PART 77 APPRAOCH	REMOVED
32685	365834.1	13321202	971.886	tree	52	6.4	PART 77 APPRAOCH	REMOVED
32693	365881.9	13321236	984.006	tree	64	20.9	PART 77 APPRAOCH	REMOVED
32701	365925.2	13321232	984.226	tree	64	21.6	PART 77 APPRAOCH	REMOVED
32789	366074.3	13321973	931.881	tree	12	6.7	PART 77 APPRAOCH	REMOVED
32797	366011.2	13321915	935.967	tree	16	7	PART 77 APPRAOCH	REMOVED
32805	365985.2	13321889	931.422	tree	11	0.8	PART 77 APPRAOCH	REMOVED
32853	366123.1	13322128	932.429	tree	12	11.6	PART 77 APPRAOCH	REMOVED
32861	366108.3	13322174	933.847	tree	14	13	PART 77 APPRAOCH	REMOVED
33173	366052.2	13322063	928.754	tree	9	7.5	PART 77 APPRAOCH	REMOVED
33181	366088.9	13322103	926.732	tree	7	5.9	PART 77 APPRAOCH	REMOVED
33725	366000.1	13321999	931.9	tree	12	6.7	PART 77 APPRAOCH	REMOVED
35717	364945.8	13320725	1013.137	tree	93	10.5	PART 77 APPRAOCH	REMOVED
35725	365016.3	13320695	1013.23	tree	93	10.3	PART 77 APPRAOCH	REMOVED
35733	365020.7	13320765	1011.715	tree	92	12.2	PART 77 APPRAOCH	REMOVED
35741	365055.6	13320743	1014.614	tree	95	14.6	PART 77 APPRAOCH	REMOVED
35749	365105.1	13320721	1007.896	tree	88	7.7	PART 77 APPRAOCH	REMOVED
35765	365149.9	13320949	999.676	tree	80	11	PART 77 APPRAOCH	REMOVED
35781	365312.1	13321176	989.114	tree	69	13.8	PART 77 APPRAOCH	REMOVED
35797	365187.7	13321251	987.06	tree	67	13.2	PART 77 APPRAOCH	REMOVED
35805	365256.3	13321271	1003.749	tree	84	32	PART 77 APPRAOCH	REMOVED
35813	365343.5	13321276	1011.128	tree	91	41	PART 77 APPRAOCH	REMOVED
35821	365307.1	13321382	1019.185	tree	99	53.5	PART 77 APPRAOCH	REMOVED
35829	365264.3	13321359	1007.318	tree	87	39.9	PART 77 APPRAOCH	REMOVED
35901	365400.5	13321455	1027.069	tree	107	66.4	PART 77 APPRAOCH	REMOVED
35909	365372.3	13321379	1013.181	tree	93	48.4	PART 77 APPRAOCH	REMOVED
35917	365455.2	13321474	1014.949	tree	95	56	PART 77 APPRAOCH	REMOVED
35925	365374.9	13321521	1014.696	tree	95	56.7	PART 77 APPRAOCH	REMOVED
35941	365473.7	13321552	1007.8	tree	88	52.9	PART 77 APPRAOCH	REMOVED
35949	365459.1	13321653	1000.73	tree	81	50.3	PART 77 APPRAOCH	REMOVED
36205	365736.5	13322253	940.687	tree	21	19.7	PART 77 APPRAOCH	REMOVED
36277	365739.6	13322191	930.916	tree	11	10	PART 77 APPRAOCH	REMOVED
42422	365187	13320854	1013.773	tree	94	21.2	PART 77 APPRAOCH	REMOVED

ABOVE GROUND ELEVATION (AGL) AND PENETRATION VALUES ARE APPROXIMATE.

RUNWAY 26 TREES

AIRPORTS GIS SURVEY COMPLETED 9/2017

NO.	NORTHING	EASTING	ELEV.	DESCRIPTION	AGL	PENETRATION	SURFACE	DISPOSITION
12237	366819.8	13325354	992.107	tree	68	41.6	PART 77 APPROACH	REMOVED
12245	366734.8	13325095	1011.802	tree	88	74.9	PART 77 APPROACH	REMOVED
12341	367292.2	13325210	1017.231	tree	93	65.7	PART 77 APPROACH	REMOVED
12349	367148.7	13325317	999.177	tree	75	44.9	PART 77 APPROACH	REMOVED
14454	366875.6	13325179	949.171	tree	25	6	PART 77 APPROACH	REMOVED
15213	367552.9	13326195	1014.941	tree	91	12.6	PART 77 APPROACH	REMOVED
15229	367437.5	13325996	998.402	tree	74	7.3	PART 77 APPROACH	REMOVED
15237	367331.6	13326015	994.993	tree	71	4.8	PART 77 APPROACH	REMOVED
15245	367254.5	13325764	991.332	tree	67	14.2	PART 77 APPROACH	REMOVED
15253	367062.1	13325837	1006.735	tree	83	29.3	PART 77 APPROACH	REMOVED
15269	366986	13325904	1010.017	tree	86	30.7	PART 77 APPROACH	REMOVED
15277	366990.7	13325716	978.202	tree	54	7.7	PART 77 APPROACH	REMOVED
15285	366913	13325527	970.122	tree	46	9.8	PART 77 APPROACH	REMOVED
15293	367207.8	13325543	982.242	tree	58	16.4	PART 77 APPROACH	REMOVED
15301	367362.6	13325620	989.438	tree	65	17.4	PART 77 APPROACH	REMOVED
15309	367398.8	13325746	983.883	tree	60	5.5	PART 77 APPROACH	REMOVED
15325	367268.6	13325499	968.685	tree	45	3.9	PART 77 APPROACH	REMOVED
15333	367283.4	13325513	965.907	tree	42	0.2	PART 77 APPROACH	REMOVED
15373	367203.7	13325445	978.277	tree	54	17.1	PART 77 APPROACH	REMOVED
15637	367445.2	13325803	998.833	tree	75	16.8	PART 77 APPROACH	REMOVED
20187	367344.9	13325314	978.206	tree	54	20.9	PART 77 APPROACH	REMOVED
20203	367507.2	13325794	1030.6	tree	107	48	PART 77 APPROACH	REMOVED
20331	367644.8	13326032	1022.015	tree	98	25.9	PART 77 APPROACH	REMOVED
20867	366839.3	13325763	997.82	tree	74	27.6	PART 77 APPROACH	REMOVED
28413	366693	13324736	938.453	tree	14	14.5	PART 77 APPROACH	REMOVED
28421	366765.6	13324869	941.154	tree	17	14.4	PART 77 APPROACH	REMOVED
28437	366802.7	13324980	943.037	tree	19	10.4	PART 77 APPROACH	REMOVED
28445	366810.7	13325008	939.502	tree	16	5.4	PART 77 APPROACH	REMOVED
28453	366863.4	13325054	944.298	tree	20	7.2	PART 77 APPROACH	REMOVED
28461	366865.9	13325065	938.995	tree	15	1.3	PART 77 APPROACH	REMOVED
28469	366871.9	13325099	945.055	tree	21	5.7	PART 77 APPROACH	REMOVED
28477	366883.9	13325139	942.025	tree	18	0.6	PART 77 APPROACH	REMOVED
28485	366889	13325168	945.308	tree	21	2.4	PART 77 APPROACH	REMOVED
28493	366885.7	13325202	947.328	tree	23	2.9	PART 77 APPROACH	REMOVED
28501	366875.5	13325240	955.66	tree	32	9.6	PART 77 APPROACH	REMOVED
28509	366828.2	13325208	961.973	tree	38	18.2	PART 77 APPROACH	REMOVED
28517	366864.7	13325276	955.408	tree	31	7.8	PART 77 APPROACH	REMOVED
28533	366887.3	13325269	949.853	tree	26	2.2	PART 77 APPROACH	REMOVED
28613	366785.5	13324930	935.303	tree	11	5.3	PART 77 APPROACH	REMOVED
28621	366718.7	13324757	934.798	tree	11	10.8	PART 77 APPROACH	REMOVED
30725	366925.3	13325469	958.15	tree	34	0.4	PART 77 APPROACH	REMOVED
30749	366941	13325551	965.725	tree	42	3.8	PART 77 APPROACH	REMOVED
30757	366988.8	13325598	966.988	tree	43	2.1	PART 77 APPROACH	REMOVED
30765	366943	13325607	973.553	tree	50	9	PART 77 APPROACH	REMOVED
30797	367012	13325730	971.659	tree	48	0.2	PART 77 APPROACH	REMOVED
30885	367209.3	13325574	971.548	tree	48	4.2	PART 77 APPROACH	REMOVED
30893	367186.7	13325511	976.598	tree	53	12.6	PART 77 APPROACH	REMOVED
30901	367183.4	13325426	977.86	tree	54	17.9	PART 77 APPROACH	REMOVED
30909	367168.5	13325375	974.325	tree	50	17.1	PART 77 APPROACH	REMOVED
30917	367132.4	13325402	964.225	tree	40	6.3	PART 77 APPROACH	REMOVED
30925	366933.2	13325699	976.327	tree	52	7.6	PART 77 APPROACH	REMOVED
30933	366893.2	13325678	980.115	tree	56	13	PART 77 APPROACH	REMOVED
30941	366899.2	13325631	966.732	tree	43	1.8	PART 77 APPROACH	REMOVED
30949	366862.8	13325597	964.965	tree	41	2.2	PART 77 APPROACH	REMOVED
30957	366910.9	13325559	966.732	tree	43	5	PART 77 APPROACH	REMOVED
30965	366872.1	13325525	967.742	tree	44	8.2	PART 77 APPROACH	REMOVED
30973	366875.9	13325470	969.257	tree	45	12.3	PART 77 APPROACH	REMOVED
30981	366858.2	13325420	967.995	tree	44	13.7	PART 77 APPROACH	REMOVED
30989	366833.2	13325398	983.145	tree	59	30.3	PART 77 APPROACH	REMOVED
30997	366868.5	13325383	966.732	tree	43	14	PART 77 APPROACH	REMOVED
31005	366828.3	13325277	965.722	tree	42	18.6	PART 77 APPROACH	REMOVED
31013	366799	13325312	973.297	tree	49	25	PART 77 APPROACH	REMOVED
31021	366734.2	13325313	983.902	tree	60	36.6	PART 77 APPROACH	REMOVED
31029	366745.6	13325233	977.085	tree	53	33.5	PART 77 APPROACH	REMOVED
31037	366756.1	13325192	983.145	tree	59	41.3	PART 77 APPROACH	REMOVED
31045	366767.9	13325142	990.467	tree	66	50.7	PART 77 APPROACH	REMOVED
31061	366712.7	13325026	1018.495	tree	94	85.2	PART 77 APPROACH	REMOVED
31069	366718.2	13324938	976.075	tree	52	46.8	PART 77 APPROACH	REMOVED
31077	366768.5	13325054	996.78	tree	73	61.2	PART 77 APPROACH	REMOVED
31093	367007	13325840	995.77	tree	72	19.2	PART 77 APPROACH	REMOVED
31101	367080.2	13325871	993.75	tree	70	14.5	PART 77 APPROACH	REMOVED
31109	367099.5	13325885	997.285	tree	73	17.1	PART 77 APPROACH	REMOVED
31117	367117.8	13325897	997.79	tree	74	16.7	PART 77 APPROACH	REMOVED
31125	367147.3	13325900	992.487	tree	68	10.8	PART 77 APPROACH	REMOVED
31205	367304.6	13325631	980.743	tree	57	9.1	PART 77 APPROACH	REMOVED
31309	367238.2	13325833	985.447	tree	61	5.4	PART 77 APPROACH	REMOVED
31373	367371.4	13325749	981.564	tree	58	3.3	PART 77 APPROACH	REMOVED
31381	367363.7	13325821	982.574	tree	59	1	PART 77 APPROACH	REMOVED
31389	367058	13325931	984.145	tree	60	2.4	PART 77 APPROACH	REMOVED
31429	367383	13325980	990.494	tree	66	1.1	PART 77 APPROACH	REMOVED
32101	367713.9	13326125	1009.795	tree	86	8.1	PART 77 APPROACH	REMOVED
32109	367716.1	13326161	1007.775	tree	84	4.4	PART 77 APPROACH	REMOVED
34717	367180.5	13325232	958.23	tree	34	7.5	PART 77 APPROACH	REMOVED
34757	367282.9	13325347	966.474	tree	42	8.6	PART 77 APPROACH	REMOVED
34773	367355.4	13325381	962.752	tree	39	2.1	PART 77 APPROACH	REMOVED
34781	367374.9	13325353	961.489	tree	37	1.8	PART 77 APPROACH	REMOVED
34789	367321.4	13325409	962.531	tree	39	1.1	PART 77 APPROACH	REMOVED
34805	367398.4	13325586	971.907	tree	48	0.9	PART 77 APPROACH	REMOVED
34821	367402	13325645	974.076	tree	50	0.2	PART 77 APPROACH	REMOVED
34837	367466.8	13325686	999.09	tree	75	22.2	PART 77 APPROACH	REMOVED
34901	367321	13325334	965.867	tree	42	8	PART 77 APPROACH	REMOVED
34909	367273.1	13325276	994.147	tree	70	39.8	PART 77 APPROACH	REMOVED
34917	367338.2	13325271	975.209	tree	51	20	PART 77 APPROACH	REMOVED
35005	367490.7	13325626	979.265	tree	55	4.8	PART 77 APPROACH	REMOVED
35021	367480.9	13325722	987.308	tree	63	8.5	PART 77 APPROACH	REMOVED
35029	367457	13325750	982.006	tree	58	2.3	PART 77 APPROACH	REMOVED
35045	367201.3	13325398	966.762	tree	43	7.9	PART 77 APPROACH	REMOVED
35093	367141.3	13324915	944.146	tree	20	9	PART 77 APPROACH	REMOVED
35117	367180.1	13325017	946.261	tree	22	5.7	PART 77 APPROACH	REMOVED
35125	367206.3	13325065	967.471	tree	43	24.2	PART 77 APPROACH	REMOVED
35149	367239.3	13325158	952.745	tree	29	4.5	PART 77 APPROACH	REMOVED
35157	367243.4	13325191	968.905	tree	45	19.1	PART 77 APPROACH	REMOVED
35181	367225.7	13325113	965.035	tree	41	19.2	PART 77 APPROACH	REMOVED
35589	366876.8	13325788	993.074	tree	69	21.1	PART 77 APPROACH	REMOVED
35597	366921.4	13325760	982.294	tree	58	10.9	PART 77 APPROACH	REMOVED
35605	366964	13325796	991.132	tree	67	17.3	PART 77 APPROACH	REMOVED
35613	366972.2	13325856	993.657	tree	70	16.9	PART 77 APPROACH	REMOVED
37389	366695.9	13324886	962.626	tree	39	36.2	PART 77 APPROACH	REMOVED
37397	366643.7	13324869	959.848	tree	36	35.1	PART 77 APPROACH	REMOVED
38021	366850.7	13325738	984.192	tree	60	15	PART 77 APPROACH	REMOVED
38053	366859	13325649	970.349	tree	46	5.2	PART 77 APPROACH	REMOVED
38061	366826.7	13325632	967.067	tree	43	3.3	PART 77 APPROACH	REMOVED
38069	366790.9	13325603	971.612	tree	48	9.7	PART 77 APPROACH	REMOVED
38125	366922.1	13325652	967.024	tree	43	0.7	PART 77 APPROACH	REMOVED
42339	366775.6	13324891	942.416	tree	18	14.4	PART 77 APPROACH	REMOVED
							PART 77 APPROACH	REMOVED

ABOVE GROUND ELEVATION (AGL) AND PENETRATION VALUES ARE APPROXIMATE.

NOTES
1. THIS DRAWING REFLECTS CURRENT PLANNING STANDARDS APPLICABLE TO OAKLAND SOUTHWEST AIRPORT TO THE GREATEST EXTENT POSSIBLE. THIS DRAWING SHOULD NOT BE USED AS A STANDARD FOR PLANNING OR DESIGN.
2. ALL COORDINATE DATA IS NAD83.
3. AIRPORTS GIS SURVEY COMPLETED BY QUANTUM SPATIAL 9/2017.

REVISIONS

NO.	ITEM	DATE	COMMENTS

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OAKLAND COUNTY
OAKLAND/SOUTHWEST AIRPORT

57751 PONTIAC TRAIL
NEW HUDSON, MI 48165

ISSUED

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DRAWN BY: JWB
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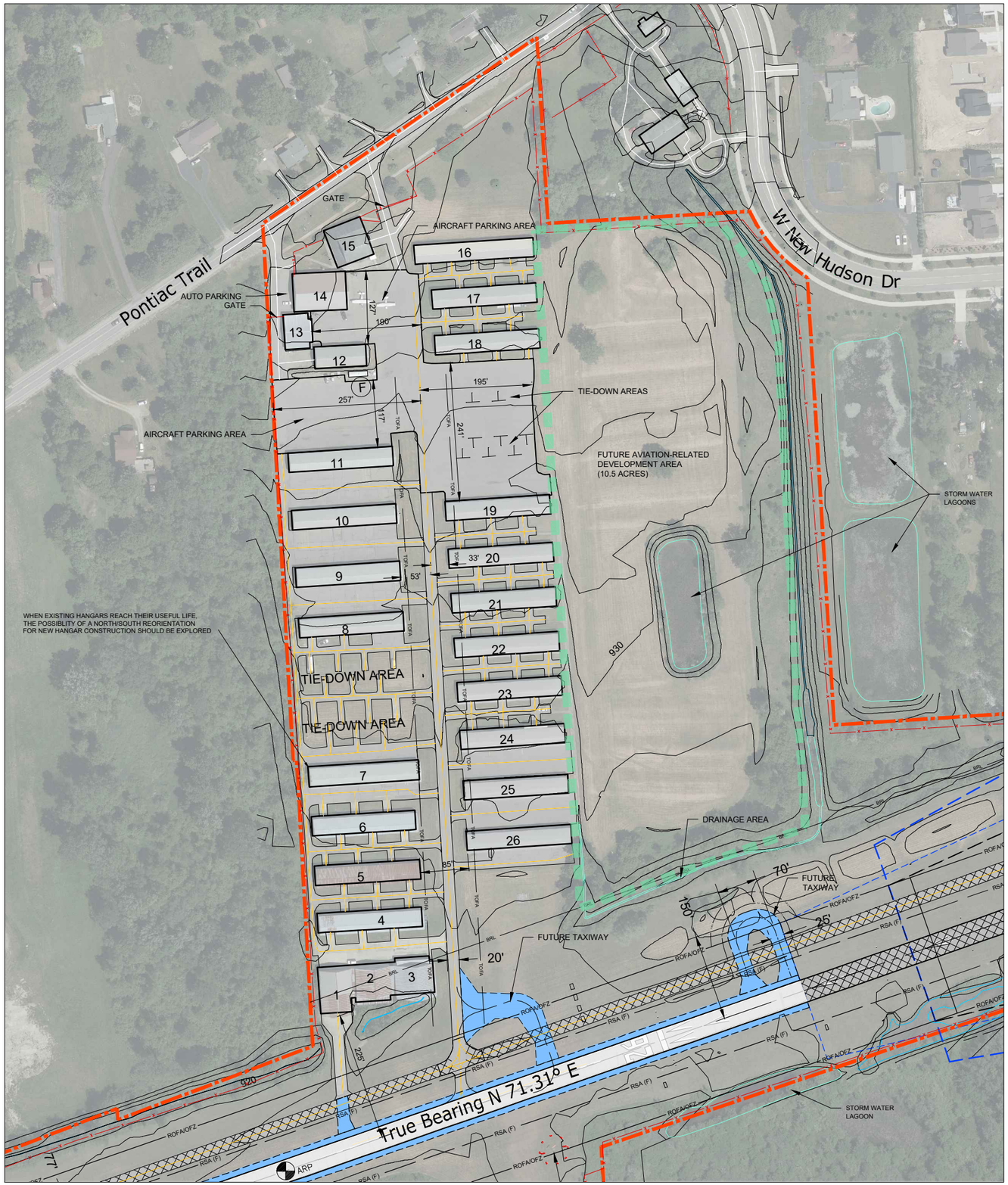
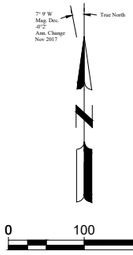
SHEET CONTENTS

Figure F6a Inner Approach Obstruction Tables





0 100 200

BUILDING DATA

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	EXECUTIVE/CORPORATE HANGAR	947.28'	16	HANGAR	957.48'
2	EXECUTIVE/CORPORATE HANGAR	949.86'	17	HANGAR	956.26'
3	EXECUTIVE/CORPORATE HANGAR	951.61'	18	HANGAR	955.14'
4	HANGAR	945.19'	19	HANGAR	951.32'
5	HANGAR	944.10'	20	HANGAR	950.85'
6	HANGAR	946.65'	21	HANGAR	949.84'
7	HANGAR	946.97'	22	HANGAR	948.61'
8	HANGAR (w/ LIGHT)	949.67'	23	HANGAR	947.39'
9	HANGAR	950.76'	24	HANGAR	947.41'
10	HANGAR	959.42'	25	HANGAR	947.37'
11	HANGAR	953.11'	26	HANGAR	947.39'
12	FBO	958.70'			
13	FBO	959.88'			
14	FBO OAKLAND FLIGHT SERVICES	966.79'			
15	FBO	966.49'			

BUILDING HEIGHT ELEVATIONS SURVEYED BY PECKHAM ENGINEERING, INC. (11/09/01)

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
RUNWAY PROTECTION ZONE (RPZ)		
RPZ OR AVIGATION EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA/OFZ
FUEL STORAGE AREA	(F)	(F)
LIGHTED WIND CONE & SEGMENTED CIRCLE		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
THRESHOLD LIGHTS		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		

REVISIONS

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OAKLAND/SOUTHWEST AIRPORT

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NEW HUDSON, MI 48165

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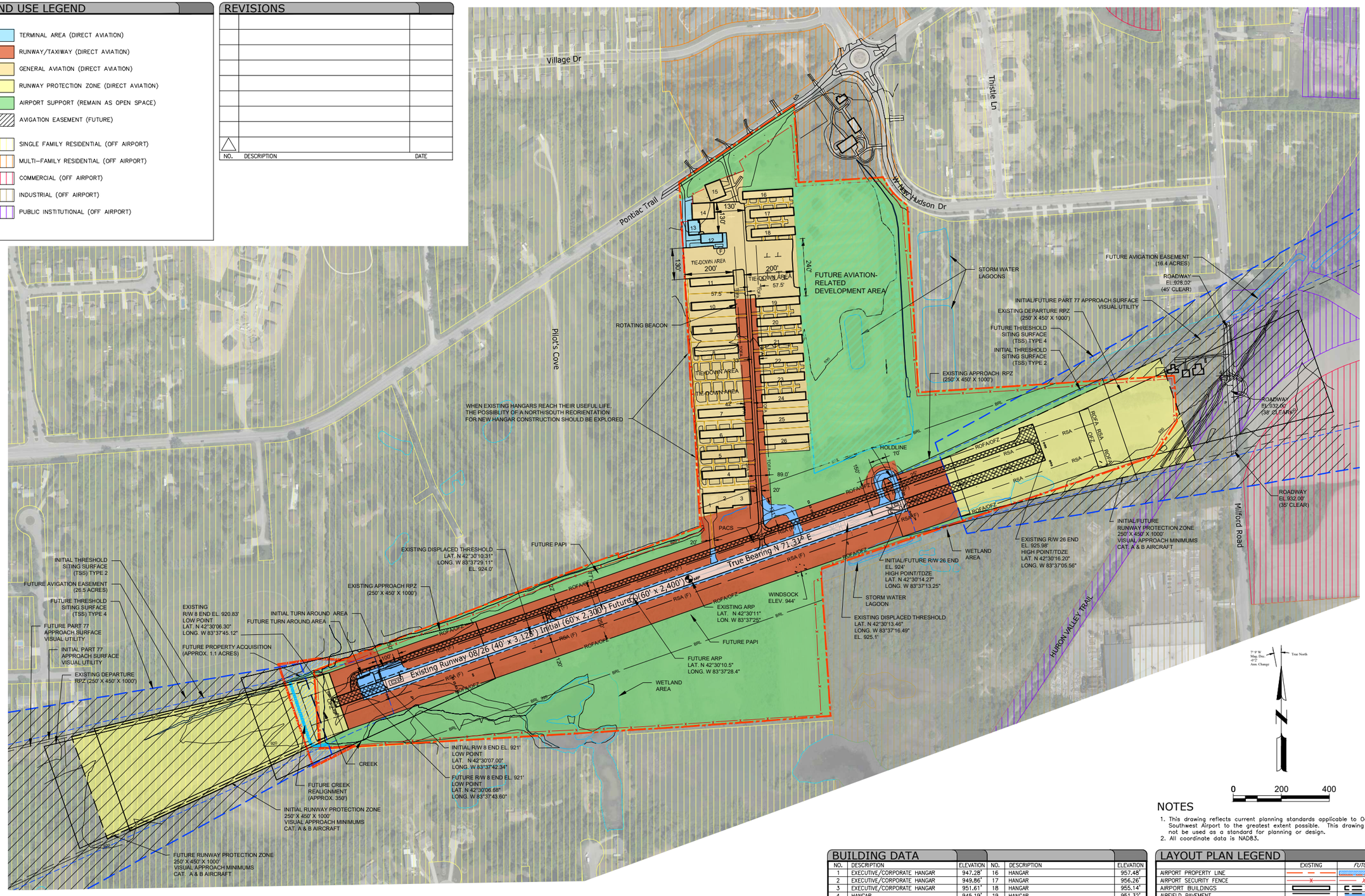
Figure F7
Terminal Area Plan

LAND USE LEGEND

- TERMINAL AREA (DIRECT AVIATION)
- RUNWAY/TAXIWAY (DIRECT AVIATION)
- GENERAL AVIATION (DIRECT AVIATION)
- RUNWAY PROTECTION ZONE (DIRECT AVIATION)
- AIRPORT SUPPORT (REMAIN AS OPEN SPACE)
- AVIGATION EASEMENT (FUTURE)
- SINGLE FAMILY RESIDENTIAL (OFF AIRPORT)
- MULTI-FAMILY RESIDENTIAL (OFF AIRPORT)
- COMMERCIAL (OFF AIRPORT)
- INDUSTRIAL (OFF AIRPORT)
- PUBLIC INSTITUTIONAL (OFF AIRPORT)

REVISIONS

NO.	DESCRIPTION	DATE
△		



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NOTES

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2. All coordinate data is NAD83.

BUILDING DATA

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	EXECUTIVE/CORPORATE HANGAR	947.28'	16	HANGAR	957.48'
2	EXECUTIVE/CORPORATE HANGAR	949.86'	17	HANGAR	956.26'
3	EXECUTIVE/CORPORATE HANGAR	951.61'	18	HANGAR	955.14'
4	HANGAR	945.19'	19	HANGAR	951.32'
5	HANGAR	944.10'	20	HANGAR	950.85'
6	HANGAR	946.65'	21	HANGAR	949.84'
7	HANGAR	946.97'	22	HANGAR	948.61'
8	HANGAR (w/ LIGHT)	949.67'	23	HANGAR	947.39'
9	HANGAR	950.76'	24	HANGAR	947.41'
10	HANGAR	959.42'	25	HANGAR	947.37'
11	HANGAR	953.11'	26	HANGAR	947.39'
12	FBO	958.70'			
13	FBO	959.88'			
14	FBO OAKLAND FLIGHT SERVICES	966.79'			
15	FBO	966.49'			

AIRPORTS GIS SURVEY COMPLETED BY QUANTUM SPATIAL 9/2017.

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
RUNWAY PROTECTION ZONE (RPZ)		
RPZ OR AVIGATION EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA (F)
FUEL STORAGE AREA	F	F
LIGHTED WIND CONE & SEGMENTED CIRCLE		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
THRESHOLD LIGHTS		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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Figure F8 Airport Land Use Plan

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\151210O\155664.011\TECH\CADAL\P2018\AIRPORT LAND USE PLAN.DWG
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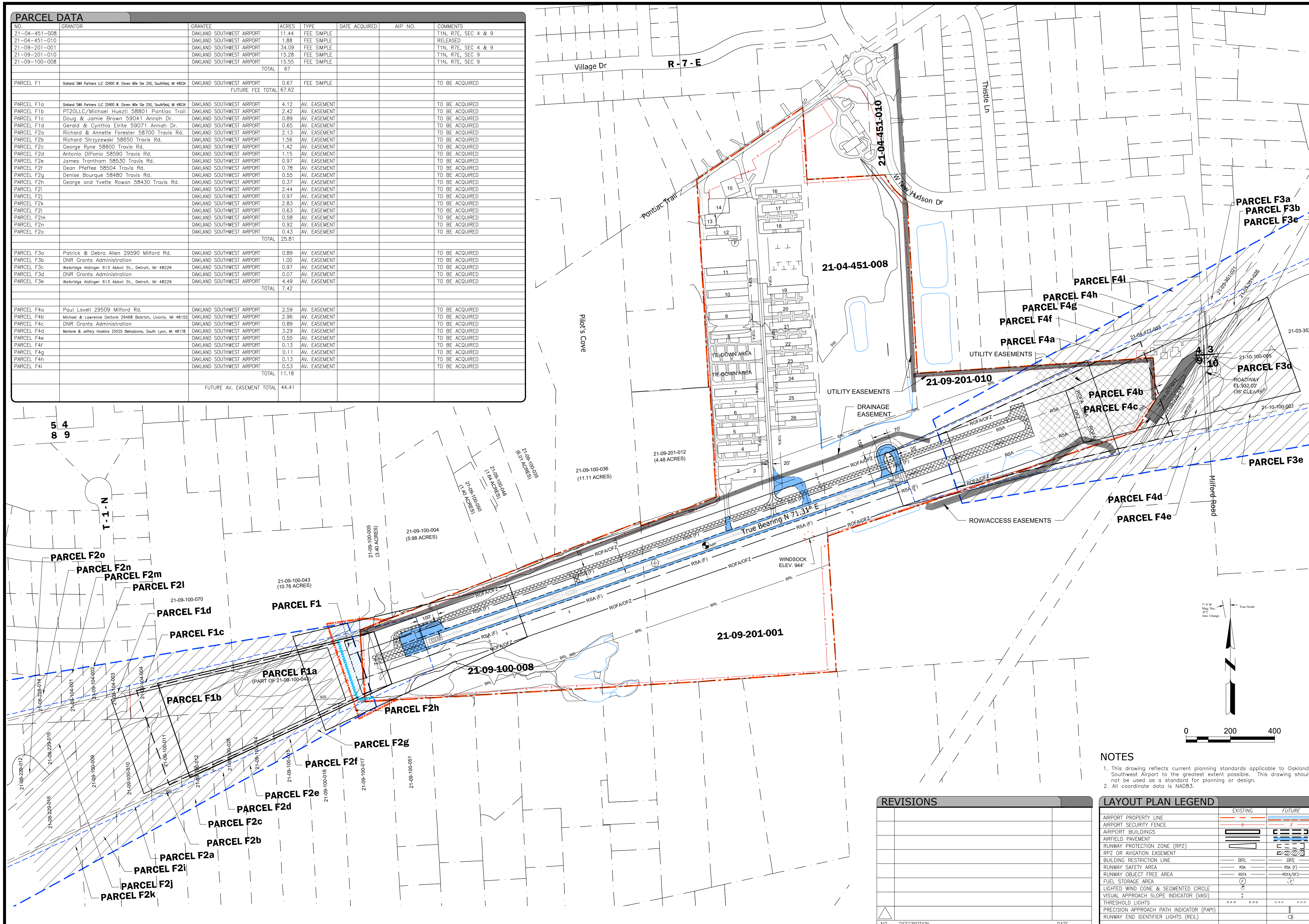
PARCEL DATA

NO.	GRANTOR	GRANTEE	ACRES	TYPE	DATE ACQUIRED	AIP NO.	COMMENTS
21-04-451-008		OAKLAND SOUTHWEST AIRPORT	11.44	FEE SIMPLE			T1N, R7E, SEC 4 & 9
21-04-451-010		OAKLAND SOUTHWEST AIRPORT	1.88	FEE SIMPLE			RELEASED
21-09-201-001		OAKLAND SOUTHWEST AIRPORT	34.09	FEE SIMPLE			T1N, R7E, SEC 4 & 9
21-09-201-010		OAKLAND SOUTHWEST AIRPORT	15.28	FEE SIMPLE			T1N, R7E, SEC 9
21-09-100-008		OAKLAND SOUTHWEST AIRPORT	15.55	FEE SIMPLE			T1N, R7E, SEC 9
		TOTAL	67				
PARCEL F1	Oakland SWA Partners LLC 25900 W. Eleven Mile Ste 250, Southfield, MI 48034	OAKLAND SOUTHWEST AIRPORT	0.67	FEE SIMPLE			TO BE ACQUIRED
		FUTURE FEE TOTAL	67.62				
PARCEL F1a	Oakland SWA Partners LLC 25900 W. Eleven Mile Ste 250, Southfield, MI 48034	OAKLAND SOUTHWEST AIRPORT	4.12	AV. EASEMENT			TO BE ACQUIRED
PARCEL F1b	PT20LLC/Michael Huszti 58801 Pontiac Trail	OAKLAND SOUTHWEST AIRPORT	2.42	AV. EASEMENT			TO BE ACQUIRED
PARCEL F1c	Doug & Jamie Brown 59041 Annah Dr.	OAKLAND SOUTHWEST AIRPORT	0.89	AV. EASEMENT			TO BE ACQUIRED
PARCEL F1d	Gerald & Cynthia Elrite 59071 Annah Dr.	OAKLAND SOUTHWEST AIRPORT	0.65	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2a	Richard & Annette Forester 58700 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	2.13	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2b	Richard Strzyzewski 58650 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	1.56	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2c	George Ryne 58600 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	1.42	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2d	Antonio DiPonio 58590 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	1.15	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2e	James Trantham 58530 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	0.97	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2f	Dean Pfeffee 58504 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	0.78	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2g	Denise Bourque 58480 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	0.55	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2h	George and Yvette Rowan 58430 Travis Rd.	OAKLAND SOUTHWEST AIRPORT	0.37	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2i		OAKLAND SOUTHWEST AIRPORT	2.44	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2j		OAKLAND SOUTHWEST AIRPORT	0.97	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2k		OAKLAND SOUTHWEST AIRPORT	2.83	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2l		OAKLAND SOUTHWEST AIRPORT	0.63	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2m		OAKLAND SOUTHWEST AIRPORT	0.58	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2n		OAKLAND SOUTHWEST AIRPORT	0.92	AV. EASEMENT			TO BE ACQUIRED
PARCEL F2o		OAKLAND SOUTHWEST AIRPORT	0.43	AV. EASEMENT			TO BE ACQUIRED
		TOTAL	25.81				
PARCEL F3a	Patrick & Debra Allen 29590 Milford Rd.	OAKLAND SOUTHWEST AIRPORT	0.89	AV. EASEMENT			TO BE ACQUIRED
PARCEL F3b	DNR Grants Administration	OAKLAND SOUTHWEST AIRPORT	1.00	AV. EASEMENT			TO BE ACQUIRED
PARCEL F3c	Walbridge Aldinger 613 Abbot St., Detroit, MI 48226	OAKLAND SOUTHWEST AIRPORT	0.97	AV. EASEMENT			TO BE ACQUIRED
PARCEL F3d	DNR Grants Administration	OAKLAND SOUTHWEST AIRPORT	0.07	AV. EASEMENT			TO BE ACQUIRED
PARCEL F3e	Walbridge Aldinger 613 Abbot St., Detroit, MI 48226	OAKLAND SOUTHWEST AIRPORT	4.49	AV. EASEMENT			TO BE ACQUIRED
		TOTAL	7.42				
PARCEL F4a	Paul Lovell 29509 Milford Rd.	OAKLAND SOUTHWEST AIRPORT	2.59	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4b	Michael & Lawrence Dettore 29468 Bobrich, Livonia, MI 48152	OAKLAND SOUTHWEST AIRPORT	2.96	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4c	DNR Grants Administration	OAKLAND SOUTHWEST AIRPORT	0.89	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4d	Marlene & Jeffery Hoskins 25525 Belladonna, South Lyon, MI 48178	OAKLAND SOUTHWEST AIRPORT	3.29	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4e		OAKLAND SOUTHWEST AIRPORT	0.55	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4f		OAKLAND SOUTHWEST AIRPORT	0.13	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4g		OAKLAND SOUTHWEST AIRPORT	0.11	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4h		OAKLAND SOUTHWEST AIRPORT	0.13	AV. EASEMENT			TO BE ACQUIRED
PARCEL F4i		OAKLAND SOUTHWEST AIRPORT	0.53	AV. EASEMENT			TO BE ACQUIRED
		TOTAL	11.18				
		FUTURE AV. EASEMENT TOTAL	44.41				



NOTES

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2. All coordinate data is NAD83.

REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
RUNWAY PROTECTION ZONE (RPZ)		
RPZ OR AVIGATION EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA/OFZ
FUEL STORAGE AREA	F	F
LIGHTED WIND CONE & SEGMENTED CIRCLE		
VISUAL APPROACH SLOPE INDICATOR (VASI)		
THRESHOLD LIGHTS		
PRECISION APPROACH PATH INDICATOR (PAPI)		
RUNWAY END IDENTIFIER LIGHTS (REIL)		

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Figure F9 Airport Property Map

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G. Airport Development Program

INTRODUCTION. The Development Program chapter focuses on funding available for Oakland/Southwest Airport, so it may continue forward with the needed development to meet FAA A-I Small design standards and receive necessary FAA and MDOT Aeronautics support. Like most airports, the main source of funding is the Airport Improvement Program (AIP) by the FAA. Under the AIP is the Capital Improvement Program (CIP), which is responsible for not only organizing the development projects needed at airports by priority, but also identifies potential funding sources. It is important to understand that the FAA is not obligated to disperse funding simply because an airport's projects are listed in the CIP. Funding is based on availability and priority ranking.

The improvements necessary to accommodate the current and future needs of Oakland/Southwest Airport have been placed into three phases: Phases 1, 2 and 3. The suggested program for these phased projects is provided in Table G1.

Implementation Schedule and Project List

A list of capital improvement projects has been assembled from the documentation previously presented, utilizing the Airport's existing Capital Improvement Program (CIP) as a starting point. The project list has been coordinated with the Airport Layout Plan drawing set and the CIP that is periodically updated by Oakland County and MDOT Aeronautics. The projects for the first five years are listed in priority order by year. In years 6-20, the projects are listed without year designators. Oakland/Southwest Airport's proposed phased Capital Improvement Program, entitled DEVELOPMENT PROGRAM PROJECT COSTS, is presented in Tables G1 and G2 in this chapter. It is anticipated that the project phasing will invariably be altered as local and federal priorities evolve over the coming months and years.

The details of the Development Program (including a capital improvement project list, project cost estimates, a finalized phasing list, and a financial feasibility analysis) have been formulated in consideration of comments received from Airport staff, the FAA/MDOT, and the Study Committee. The Phase 1 (2019) projects are primarily intended to address the tree obstructions and allow the Airport to again meet Michigan General Utility standards. While Phase 1 is estimated at $919,000, the funding breakdown for this phase has yet to be determined.

TABLE G1 Phases 1 and 2 (0-5 Years) Development Program Project Costs

Project Description		Total Costs	Federal Ent. (a)	Federal Apportion (b)	Federal Disc. (c)	State (d)	Local (e)	Other (f)
2019 Projects (Phase 1)								
A. 1	Runway 8/26 Approach/RPZ Easement Acquisition	$725,000	$0	$0	$0	$0	$0	$0
A. 2	Runway 8/26 Obstruction Removal (to meet TSS Type 2 Standards)	$194,000	$0	$0	$0	$0	$0	$0
	Sub-Total/2019 Projects	$919,000	$0	$0	$0	$0	$0	$0
2020 Projects (Phase 2)								
B. 1	Runway 8/26 Approach/RPZ Easement Acquisition	$450,000	$405,000	$0	$0	$22,500	$22,500	$0
B. 2	Design Runway 8/26 Reconstruct Inner 2,300 feet and Construct Taxiway Turnarounds and Pavement Removal	$380,000	$342,000	$0	$0	$19,000	$19,000	$0
	Sub-Total/2020 Projects	$830,000	$747,000	$0	$0	$41,500	$41,500	$0
2021 Projects (Phase 2)								
B. 3	Runway 8/26 Obstruction/Tree Removal (to meet TSS Type 4)	$80,000	$72,000	$0	$0	$4,000	$4,000	$0
B. 4	Construct Runway 8/26 Reconstruct Inner 2,300 feet and Construct Taxiway Turnarounds and Runway/Taxiway Pavement Removal	$3,800,000	$0	$0	$3,420,000	$190,000	$190,000	$0
B. 5	Pavement Maintenance – Two Apron Areas, West Side (A01NH-10)	$88,000	$79,200	$0	$0	$4,400	$4,400	$0
	Sub-Total/2021 Projects	$3,968,000	$151,200	$0	$3,420,000	$198,400	$198,400	$0
2022 Projects (Phase 2)								
B. 6	Pavement Maintenance – 7 West Side and 1 East Side Taxilanes (TH01NH-20)	$40,500	$36,450	$0	$0	$2,025	$2,025	$0
	Sub-Total/2022 Projects	$40,500	$36,450	$0	$0	$2,025	$2,025	$0
2023 Projects (Phase 2)								
B. 7	Pavement Maintenance – 1 East Side Taxilane (TH01NH-30)	$7,000	$6,300	$0	$0	$350	$350	$0
B. 8	Pavement Maintenance – 3 West Side Taxilanes (TH01NH-10)	$54,000	$48,600	$0	$0	$2,700	$2,700	$0
	Sub-Total/2023 Projects	$61,000	$54,900	$0	$0	$3,050	$3,050	$0
	Total Phase 1 and 2 (2019-2023)	**$5,818,500**	**$989,550**	**$0**	**$3,420,000**	**$244,975**	**$244,975**	**$0**

Table G2 Phase 3 (6-20 Years) Development Program Project Costs

	Project Description	Total Costs	Federal Ent. (a)	Federal Apportion (b)	Federal Disc. (c)	State (d)	Local (e)	Other (f)
Phase II Projects (6-20 Years)								
C.1	Environmental Assessment for Land Acquisition, Wetlands Impacts and Runway Extension	$200,000	$180,000	$0	$0	$10,000	$10,000	$0
C.2	Pavement Maintenance – Center Taxilane (TWBNH-10)	$40,500	$36,450	$0	$0	$2,025	2,025	$0
C. 3	Acquire 0.67 acres for Runway Extension	$275,000	$247,500	$0	$0	$13,750	$13,750	$0
C. 4	Extend Runway 8/26 by 100 feet	$250,000	$225,000	$0	$0	$12,500	$12,500	$0
C. 5	Pavement Maintenance – 7 East Side Taxilanes (TH01NH-40)	$34,000	$30,600	$0	$0	$1,700	$1,700	$0
C. 6	Pavement Maintenance East Side Apron (A01NH-20)	$74,500	$67,050	$0	$0	$3,725	$3,725	$0
C. 7	Pavement Maintenance 3 East Side Taxilanes (TH01NH-10)	$34,000	$30,600	$0	$0	$1,700	$1,700	$0
C. 8	Pavement Maintenance – Runway Rehab (RW826NH-10)	$850,000	$765,000	$0	$0	42,500	$42,500	$0
	Total Phase II Projects	**$1,758,000**	**$1,582,200**	**$0**	**$0**	**$87,900**	**$87,900**	**$0**
	GRAND TOTALS	**$7,576,500**	**$2,571,750**	**$0**	**$3,420,000**	**$332,875**	**$332,875**	**$0**

Notes: (a Federal Ent. – FAA Airport Improvement Program (AIP) Entitlement Grants

(b Federal Apportion. – FAA Airport Improvement Program (AIP) State Apportionment Grants
(c Federal Disc. – FAA Airport Improvement Program (AIP) Discretionary Grants
(d State – MDOT Office of Aeronautics, Discretionary Aviation Grants
(e Local – Airport Net Revenues, Cash Reserves
(f Other Unidentified Funding

Cost Estimates

Planning level cost estimates have been prepared for the proposed projects in Phases 1/2 and Phase 3. These estimates should only be used as a planning tool due to costs reflecting 2017 dollars. Also, the number of trees to be removed is only an estimate based on the Airport Geographical Information System (AGIS) survey conducted for this study.

Capital Improvement Program

The Airport Capital Improvement Program (ACIP) is a document prepared by the FAA under the Airport Improvement Program (AIP). This document serves as the primary planning tool for identifying and prioritizing critical airport development for airports within the National Plan of Integrated Airport Systems (NPIAS). The CIP is also the basis for distribution of grant funds to airports. For smaller airports, grant funds from the FAA range from 90-95 percent per project. In some states, like Michigan, the state's DOT Aeronautics Division manages the ACIP in coordination with the Airport and FAA.

Phasing Plans

To supplement the information provided by the project list and project cost estimates, a phasing illustration was prepared. The following illustration, entitled PHASING PLAN indicates the suggested three phased approach for the proposed improvement projects throughout the 20-year planning period.

The plans represent a suggested schedule, but variance from it may be necessary, especially during the latter time periods. Attention has been given to the first five years because the projects outlined in this time frame include many critical improvements including the critical runway reconstruction/widening project. The demand for certain facilities, especially in the latter time frame, and the economic feasibility of their development, are to be the prime factors influencing the timing of individual project construction. Care must be taken to provide for adequate lead-time for detailed planning and construction of facilities, in order to meet aviation demands. It is also important to minimize the disruptive scheduling, where a portion of the facility may become inoperative due to construction, and to prevent extra costs resulting from improper project scheduling.

Financial Plan and Implementation Strategy

Like most airports, there are three main funding sources for airports: the FAA Airport Improvement Program, the State's Department of Transportation Aeronautics Division, and lastly the Sponsor. Funding depends on availability of outside funds, project eligibility, and the priority of the project within the Capital Improvement Program. MDOT Aeronautics is responsible for the overall administration of airport development projects within the state for general aviation airports and distributing funds allocated by the FAA. Its authority encompasses programming, planning, design, and construction of all airport development projects. State funding for aviation projects derives from two sources: 1) the Michigan Aeronautics Fund, and 2) the state General Fund (GF).

For planning purposes, assumptions were made related to the funding source of each proposed capital improvement. The project costs provided in the previous tables are identified with likely funding sources.

Sources of Capital Funding

The development of the Master Plan Update CIP is anticipated to be funded from several sources. These sources include federal grants, state aviation grants, and local funding. Airport management has indicated that its overriding policy for funding capital projects is to identify funding sources for all projects and devise a plan to obtain these sources. If a planned funding source is not available in the nature, amount or time frame that is needed for a project, then the project will be delayed until the funding is secured. Each identified source of funds is described in the following section.

Federal/State/Local Airport Development Program

This program is designed for use by airports with relatively large capital projects, i.e., new runways, runway extensions, parallel taxiways, etc. Funding from this program is divided as follows: 90 percent federal/5 percent state/5 percent local (subject to current funding limitations). Funding splits are also subject to federal legislation. In addition to capital improvement projects, planning projects may also be considered for funding under this

program. Federal and state funds may not be used for operations at airport facilities, as these are the sole responsibility of the airport sponsor/owner.

State/Local Only Small Airport Development Program

This program provides state and local funds for capital improvement projects at airports with less than 150 based aircraft. State funds are limited to 90 percent of an eligible project with the remaining 10 percent derived from local funds. Large projects that are ineligible or projects that do not meet qualifications to be included in the federal program are funded under this program.

State/Local Airport Development Program

The State/Local Airport Development Program provides matching funds for capital improvement projects. State funds are limited to $150,000, and must be matched with local funds on a 50/50 basis. In addition, the state has a statewide preventative maintenance program that assists with crack sealing and pavement marking projects. The development of airport zoning plans may be funded under the state/local program.

Loan Program

The Bureau of Aeronautics Loan Program allows publicly owned airports to borrow up to $100,000 for airport related projects. Loans can be used by the sponsor for the local match, but the loan may not exceed 90 percent of the sponsor's match.

Local Funding

Airport revenues, over and above funds that are required to cover operational expenses at all three of Oakland County's airports, are utilized for Capital Improvement Projects. The Oakland County Airport System, for the most part, has been successful in generating sufficient funds to support capital improvements; however, the fiscal reality is that this is difficult at general aviation airports without commercial passenger service.

Many airports use private third-party financing when the planned improvements will be primarily used by a private business or for other "non-public" uses. Such projects are not eligible for federal funding. Projects of this kind typically include corporate hangars, FBO facilities, cargo facilities, exclusive aircraft parking aprons, and various other projects that are private use facilities.

PHASING LEGEND

- PHASE 1 (0-1 YEARS)
- AIRFIELD PAVEMENT TO BE REMOVED (PHASE 2)
- PHASE 2 (1-5 YEARS)
- PHASE 3 (6-20 YEARS)

B.5
C.7
C.6
B.8
C.5
C.5
B.6
B.7
B.6
B.4
B.4
C.2

C.3
PHASE 3
PROPERTY ACQUISITION (0.67 ACRES)
FOR RSA/ROFA & CREEK REALIGNMENT

C.4
PHASE 3
100' RUNWAY EXTENSION &
TURN AROUND AREA

B.4

B.2, B.4

PHASE 2
RECONSTRUCT &
WIDEN RUNWAY
TO 2300' X 60'

THRESHOLD
SITING SURFACE
TYPE 4

RUNWAY
PROTECTION
ZONE

B.2, B.4
A.1, A.2
B.1, B.3

EASEMENT
TO BE ACQUIRED
(5.58 ACRES)

THRESHOLD
SITING SURFACE
TYPE 4

RUNWAY
PROTECTION
ZONE

A.1, A.2

EASEMENT
TO BE ACQUIRED
(15.51 ACRES)

B1, B.3

HURON VALLEY TRAIL

N

0 400 800

DRAWING LEGEND

- EXISTING AIRPORT PROPERTY
- RUNWAY PROTECTION ZONES
- PART 77 APPROACH SURFACES
- THRESHOLD SITING SURFACES
- ON-AIRPORT TREE OBSTRUCTIONS
- PHASE 1 (Michigan General Utility Approach Surface) TREE OBSTRUCTIONS
- PHASE 2 (AC 150-5300 13a TYPE 4 TSS) TREE OBSTRUCTIONS

OAKLAND SOUTHWEST AIRPORT
OAKLAND COUNTY, MI

1512100-155664.01
AUGUST 2017

Figure G1 Phasing Plan

Mead & Hunt

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