PORT OF PORTLAND

Chapter One

INVENTORY

INVENTORY

The first step in updating the Hillsboro Airport Master Plan was to collect information on the existing conditions at the airport and within the community. Within this chapter, an inventory is made of pertinent information with regard to existing airport facilities, local airspace, existing uses of airport property, environmental factors, and the local socioeconomic condition.

Information on current airport facilities and utilization serves as a basis, with additional analysis and data collection, for the Future Role, Forecasts of Aviation Demand and Aviation Facility Requirements determinations. The inventory of existing conditions is the first step in the complex process of determining those factors which impact aviation demand in the community and region and the types and sizes of airport facilities needed to meet that demand. The inventory of environmental factors will assist in shaping a development program for the airport that minimizes impacts on the environment.

AIRPORT SETTING

Hillsboro Airport is located within the jurisdictional boundaries of the City of Hillsboro, Oregon, along the City's north-central border and in unincorporated Washington County. As shown on **Exhibit 1A**, the City of Hillsboro is located in central Washington County, on the west side of the Portland metropolitan area. The Portland metropolitan area is generally defined as Washington, Multnomah, Clackamas, Yamhill, and Columbia counties in Oregon, and Clark County in Washington.

The Hillsboro Airport site encompasses approximately 928 acres. The airport is bordered by Cornell Road to the south, Brookwood Parkway to the east, N.E. 25^{th} Avenue to the west, and Evergreen Road to the north.

AIRPORT HISTORY

The Hillsboro Airport was originally founded as a private airport in 1925 by Dr. Elmer Smith. Dr. Smith purchased 100 acres of the Hawthorne Estate to accommodate the two original turf runways. The turf runways were constructed with the assistance of the Hillsboro American Legion. Prior to the purchase of the airport site by Dr. Smith, local pilots used Hillsboro's first airstrip, a short and grassy plot of ground approximately four blocks north of Main Street.

After Dr. Smith's death in the early 1930's, several local businessmen acquired the deed for the airport site, leasing it to the City of Hillsboro for a period of five years. The lease provided the City the option to purchase the airport at the end of the lease period. Between 1933 and 1938, the City constructed two runways, one 3,000 feet long (oriented northeast to southwest) and one 2,800 feet long (oriented northwest-southeast). This work was done as a WPA project. The City bought the airport in 1935 for $7,500.

During World War II, the federal government invested over $600,000 in improving the Hillsboro Airport to serve as a satellite field for the Portland Air Base. Improvements included grading, drainage, and lighting equipment. The airport site was also expanded by 280 acres. The Army did not use Hillsboro Airport significantly during the war. The airport returned to civilian use in 1945.

The Port of Portland (Port) assumed ownership of Hillsboro Airport on February 1, 1966. With federal assistance, the Port constructed two parallel taxiways, acquired additional land for approach protection and installed fencing. In 1967, the airport traffic control tower (ATCT) was constructed. In the early 1970's, the terminal building was constructed and the Port acquired an additional 700 acres of land. Runway 12-30 was extended to 6,300 feet in 1976, when the Instrument Landing System (ILS) was also installed. In 1977 and new threshold taxiway was constructed at the Runway 30 end that produced a 6,600' usable length for Runway 12-30.

RECENT CAPITAL IMPROVEMENTS

Between 1997 and 2002, the Port invested over $11.9 million in improvements at Hillsboro Airport. **Table 1A** summarizes these projects and their total expenditures over this six-year period. In Fiscal Year (FY) 2003, the Port expects to invest an additional

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Exhibit 1A

LOCATION MAP

$6.1 million, mostly for the Runway 12-30 runway safety area (RSA) improvements. Therefore, for the seven-year period from 1997 to 2003, the Port will have invested over $18.0 million in Hillsboro Airport.

TABLE 1A Port of Portland Capital Investments at Hillsboro Airport, 1997-2002		
Port Project Number	**Project Description**	**Total Expenditures**
Fiscal Year 1997		
21141	Apron and West Hangar Pavement Slurry Seal	$126
22251	Purchase Flatbed Truck	25,458
22423	Land Acquisition	812,170
23221	Connecting Taxiway (Slurry Seal)	11,341
Subtotal FY 1997		**$849,097**
Fiscal Year 1998		
21954	Land Acquisition	$1,700
22251	Connecting Taxiway (Slurry Seal)	14,127
22423	Land Acquisition	9,277
22947	Construct Taxiway "F" and Install Perimeter Road and Fencing	107,749
23092	PHA Land Purchases	2,000
23221	Connecting Taxiway (Slurry Seal)	1,998
23224	Pavement Crack Seal	43,052
23342	Tractor Overhaul	18,087
23344	PHA Maintenance Building Roof Replacement	36,867
23599	Reconstruct Northwest Corporate Taxiway	1,741
Subtotal FY 1998		**$236,601**
Fiscal Year 1999		
21954	Land Acquisition	$1,250
22423	Land Acquisition	1,088
22947	Construct Taxiway "F" and Install Perimeter Road and Fencing	1,080,777
23221	Connecting Taxiway (Slurry Seal)	35,080
23224	Pavement Crack Seal	25,262
23599	Reconstruct Northwest Corporate Taxiway	52,764
23638	Runway 12-30 RSA Improvements	61,091
Subtotal FY 1999		**$1,257,314**
Fiscal Year 2000		
22423	Land Acquisition	$24,148
22947	Construct Taxiway "F" and Install Perimeter Road and Fencing	136,578
23221	Connecting Taxiway (Slurry Seal)	536
23599	Reconstruct Northwest Corporate Taxiway	536
23638	Runway 12-30 RSA Improvements	290,189
23811	Purchase Spray Tank	6,975
23823	Install Used Oil Heater	9,269
Subtotal FY 2000		**$468,232**
Fiscal Year 2001		
22423	Land Acquisition	$397,986
22947	Construct Taxiway "F" and Install Perimeter Road and Fencing	10,102
23512	Replace Tractor and Mower	105,986
23638	Runway 12-30 RSA Improvements	2,700,950
24026	Noise Monitoring System	48,600
Subtotal FY 2001		**$3,263,625**

TABLE 1A (Continued) Port of Portland Capital Investments at Hillsboro Airport, 1997-2002		
Port Project Number	**Project Description**	**Total Expenditures**
Fiscal Year 2002		
23387	Terminal Building Upgrade – Phase I	$123,935
24078	Administration Building HVAC Rehabilitation	50,965
23092	Land Acquisition	1,663,950
23601	Reconstruct NE T-Hangar Taxiway	91,295
23638	Runway 12-30 RSA Improvements	3,511,917
23804	NE Corporate Hangar Infrastructure	360,903
24026	Noise Monitoring System	22,800
Subtotal FY 2002		**$5,825,765**
Total All Projects, 1997-2002		**$11,900,634**
Source: Port of Portland		

To assist in funding the capital improvements listed above, the Federal Aviation Administration (FAA) has provided funding assistance to the Port through the Airport Improvement Program (AIP). The AIP is funded through the Aviation Trust Fund, which was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Trust Fund also finances a portion of the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

Table 1B summarizes FAA AIP grants for Federal Fiscal Year (FFY) 1997 through FFY 2002. The FAA has offered a total of $14,873,167 in the past five years, for capital improvements at Hillsboro Airport.

TABLE 1B Federal Grants Offered to Hillsboro Airport, 1997-2002			
Date	**Grant Number**	**Project Description**	**Total Grant Funds**
June 1997	03-41-0025-08	Land Acquisition	$990,606
May 1999	03-41-0025-09	(22947)	$894,600
March 1999	03-41-0025-10	Runway 12-30 RSA Improvements	$1,936,376
September 1999	03-41-0025-11	Runway 12-30 RSA Improvements	$344,668
July 2001	03-41-0025-12	Runway 12-30 RSA Improvements	$5,650,000
March 2002	03-41-0025-13	Runway 12-30 RSA Improvements	$5,020,000
September 1997	03-41-0410-01	Pavement Crack Seal	$21,928
June 1998	03-41-0410-02	Pavement Crack Seal	$14,989
Total FAA Grant Funds			$14,873,167
Source: Port of Portland			

The Oregon Department of Aviation has also provided financing assistance to the Port for Runway 12-30 RSA improvements. In December 2002, ODOT offered $10,000 through their Financial Aid to Municipalities Program.

HISTORICAL ACTIVITY

The number of aircraft operations and based aircraft are used to define the type and level of activity at general aviation airports such as Hillsboro Airport. **Table 1C** summarizes the historical aircraft operations recorded by the FAA ATCT at Hillsboro Airport between 1990 and 2004. These represent only the aircraft operations observed during the hours the ATCT was open. Presently, the ATCT is open from 6:00 a.m. to 10:00 p.m.

TABLE 1C
Historical Aircraft Operations
Hillsboro Airport

	Itinerant					Local				%
Year	**Air Carrier**	**Air Taxi**	**General Aviation**	**Military**	**Total Itinerant**	**General Aviation**	**Military**	**Total Local**	**Total Operations**	**Increase/ Decrease**
1990	--	1,946	87,979	903	90,828	120,015	766	120,781	211,609	N/A
1991	--	3,039	87,479	712	91,230	121,054	499	121,533	212,783	0.6%
1992	--	2,899	85,964	706	89,569	109,124	748	109,872	199,441	-6.3%
1993	--	3,112	86,797	634	90,543	102,632	628	103,260	193,803	-2.8%
1994	--	3,562	87,746	755	92,063	118,523	724	119,247	211,310	9.0%
1995	--	3,371	89,467	1,068	93,906	127,233	715	127,948	221,854	5.0%
1996	--	4,175	88,148	1,491	93,814	119,630	378	120,008	213,822	-3.6%
1997	--	5,631	96,284	735	102,650	129,381	364	129,745	232,395	8.7%
1998	--	5,710	85,619	1,133	92,462	138,105	599	138,704	231,166	-0.5%
1999	--	6,553	89,386	871	96,810	154,123	824	154,947	251,757	8.9%
2000	--	7,230	83,201	1,103	91,534	151,645	1,332	152,977	244,511	-2.9%
2001	12	7,931	84,639	873	93,455	141,880	48	141,928	235,383	-3.7%
2002	6	9,078	82,493	426	92,003	131,495	91	131,586	223,589	-5.0%
2003[1]	--	9,386	78,492	450	88,778	129,141	199	129,340	218,118	-2.4%
2004[1]	--	8,287	72,446	852	81,585	111,250	18	111,268	192,853	-11.5%

Source: FAA ATADS
[1] General aviation local operations and total operations not comparable to earlier years due to a change in the method of counting operations by the ATCT.

An operation is defined as either a takeoff or landing. As shown in this table, aircraft operations have varied annually at the airport since 1990. The lowest recorded level of total operations during the period was 192,853 operations in 2004. The highest level of total operations of 251,757 was recorded in 1999. Twelve of the past 15 years have had recorded operations in excess of 200,000 annually. Seven of these years have had recorded operations in excess of 220,000, five years had operations in excess of 230,000, while there was one year each with recorded operations in excess of 240,000 and 250,000 annually, respectively.

Aircraft operations are classified as either local or itinerant and separated further into air carrier, air taxi, general aviation, and military. Local operations are performed by aircraft which:

(a) Operate in the local traffic pattern or within sight of the airport;

(b) Are known to be departing for or arriving from flight in local practice areas located within a 20-mile radius of the airport;

(c) Execute simulated instrument approaches or low passes at the airport.

Itinerant operations are all other operations and essentially represent the originating or departing aircraft.

For traffic count purposes, the air carrier category is defined as an aircraft capable of carrying more than 60 passengers or a maximum payload capacity of more than 18,000 pounds. While the title of this category may imply that scheduled airline operations were conducted at the airport, it should not be viewed in that manner. The ATCT classifies aircraft in categories based on the size and capabilities of the aircraft. With a number of aircraft manufacturers now marketing corporate/business versions of common air carrier aircraft, these aircraft are now conducting operations at general aviation airports. A prime example is the Boeing 737, which is the most common air carrier aircraft in the U.S. fleet. This aircraft is also sold as the Boeing Business Jet. The air carrier operations in the past two years are the result of this aircraft operating at the airport, not the existence of scheduled airline service.

The air taxi category comprises aircraft designed to have a seating capacity of 60 seats or less, or a maximum payload capacity of 18,000 pounds or less, carrying passengers or cargo for hire or compensation. This category includes a wide range of civil aircraft conducting charter operations.

General aviation comprises the takeoffs and landings of all remaining civil aircraft. All operations within the air taxi category are recorded as transient, while military and general aviation activity is divided into local and itinerant categories.

Since 1990, local operations have averaged 58 percent or more of all operations, with itinerant operations comprising the remaining 42 percent. Since 1990, general aviation aircraft have conducted 99 percent of local operations and accounted for 93 percent of itinerant operations, while air taxi and military aircraft have accounted for 5.3 percent and 0.9 percent of itinerant operations, respectively. The air taxi category has grown in recent years, increasing from 2.1 percent of itinerant operations in 1990, to over 10 percent of operations in 2003 and 2004. This trend indicates the growing business and corporate use of Hillsboro Airport, along with Hillsboro Airport becoming more of a general aviation destination airport. The majority of local operations at Hillsboro Airport are representative of the flight training operations that have historically been based at the Airport.

At times, aircraft may operate at the airport without ATCT services. During these periods, aircraft operations at the airport are not included in the ATCT count. Since October 2003, some helicopter operations at Hillsboro Airport are no longer being included in the overall ATCT count due to changes in air traffic control accounting procedures. Helicopter activity in the helicopter training patterns after October 2003 were considered by air traffic control guidance to be activity operating independently of ATC, and therefore, no count is authorized. Air traffic control guidance allows for the ATCT to count the entry into the training pattern and the departure from the training pattern. However, the ATCT cannot record operations occurring within the training patterns. The ATCT can also count those times when the ATCT advises a helicopter to "remain below 50 feet," as required when other aircraft are conducting an instrument approach or planned missed approach (an aborted approach to landing).

Prior to October 2003, the practice of the ATCT was to count all training operations within the helicopter training patterns. Each flight, or circuit, within a helicopter training pattern was counted as two operations. Therefore, the 2003 and 2004 total local general aviation operational counts are not comparable to previous years.

Table 1D summarizes historical total based aircraft for Hillsboro Airport since 1980. For 1990 to 2000, based aircraft totals were derived from historical records maintained by the FAA. The Port does not maintain an independent record of historical based aircraft. However, the Port determined the 2003 based aircraft number through tenant surveys and field observations. As shown in this table, based aircraft levels have fluctuated over the past 23 years from a low of 322 to a high of 399.

TABLE 1D
Historical Based Aircraft
Hillsboro Airport

Year	Based Aircraft
1980	349
1985	322
1990	341
1995	399
2000	392
2003	363

Source: 1980 to 2000, FAA TAF; 2003 Port of Portland

Based aircraft are also classified according to type. **Table 1E** summarizes the mix of aircraft based at Hillsboro Airport in 2003. Aircraft type categories include single engine piston, multi-engine piston, turboprop, turbojet, and rotorcraft. The single engine piston includes all aircraft that are piston-powered and have a single powerplant. This category represents 67 percent of based aircraft at Hillsboro Airport in 2003. The multi-engine piston category includes all aircraft that are piston-powered and have more than one powerplant. This category of aircraft represented 10 percent of based aircraft in 2003. The turboprop category includes both single engine and multi-engine turbine-powered aircraft with propellers. The turboprop category represented four percent of 2003 based aircraft. The turbojet category comprised 11 percent of 2003 based aircraft and includes all turbine-powered aircraft with fan-ducted power plants. This can include business and corporate aircraft as well as a number of models of military jet aircraft that have now become part of the civilian aircraft fleet. Finally, the rotorcraft category includes all helicopters whether they are piston-powered, turbine-powered, or have more than one power plant. Rotorcraft aircraft represented eight percent of HIO's total based aircraft in 2003. There was one balloon based at the airport in 2003. It is included in the category entitled "Other."

TABLE 1E
2003 Based Aircraft Fleet Mix

Total Based Aircraft	Single Engine Piston	Multi-Engine Piston	Turboprop	Turbojet	Rotorcraft	Other
363	244	35	13	41	29	1

Source: Port of Portland.

OWNERSHIP AND MANAGEMENT

Hillsboro Airport is owned by the Port of Portland (Port). The Port is a regional government encompassing Clackamas, Multnomah, and Washington counties. The Port is directed by a nine-member commission appointed by the governor of Oregon and confirmed by the Oregon Senate. At least two commissioners must live in each of the three counties. The remaining three members may live in any part of the State. Commissioners serve four-year terms and can be reappointed. The Commission meets monthly, and appoints the Port's Executive Director.

In addition to Hillsboro Airport, the Port also owns and manages Troutdale Airport, Mulino Airport, and Portland International Airport. Management of all Port airports falls within the Port's Aviation Division. Troutdale Airport, Mulino Airport, and Hillsboro Airport fall under the direction of the Manager of General Aviation. The day-to-day operation of all three general aviation airports is managed by the General Aviation Department's Operations Manager. Hillsboro Airport has two full-time maintenance personnel.

ECONOMIC IMPACT

The total number of jobs, total employee earnings, total business revenue, total state taxes collected, and total local taxes collected as a result of the use of Hillsboro Airport were recently determined through an economic study completed under a separate contract by Martin Associates in September 2003. A summary of the direct impacts (airport-generated impacts generated by activities conducted on the airport), indirect (visitor industry impacts generated by local visitors who came to the area using the airport), and induced impacts (economic activity generated as direct income recirculated through the economy) are shown in **Table 1F**. The complete document can be obtained from the Port. These impacts are calculated for the Portland metropolitan area.

TABLE 1F
Economic Impacts of Hillsboro Airport

Impact Category	Hillsboro Airport Generated	Hillsboro Airport Visitors	Combined Total Impacts
Jobs			
Direct	558	76	634
Induced	305	29	334
Indirect	496	N/A	496
Total	1,359	105	1,464
Personal Income			
Direct	$22,221,000	$2,016,000	$24,237,000
Induced	23,409,000	1,734,000	25,143,000
Indirect	16,178,000	N/A	16,178,000
Total	$61,808,000	$3,750,000	$65,558,000
Avg. Income/ Direct Employee	$39,823	$26,526,000	$38,229
Business Revenue	$106,821,000	$3,466,000	$110,287,000
Local Purchases	$40,958,000	N/A	$40,958,000
State and Local Taxes	$5,814,000	$353,000	$6,167,000

Source: *The Economic Impacts of Hillsboro Airport on the Local and Regional Economy*, Martin Associates, September 2003

As shown in Table 1F, there are 558 direct jobs on Hillsboro Airport, generating over $22 million in annual income. These 558 jobs support an additional 305 induced jobs in the community that collectively earn another $23 million. Finally, activity at Hillsboro Airport was found to support an additional 496 indirect jobs and over $16 million in income. Another segment of activities affected by HIO's presence is the visitor industry (i.e., hotels, car rental agencies, etc.). This represents individuals who travel to Hillsboro by air and stay an average of 2.2 nights per trip. Last year, this group generated 76 direct and 29 indirect jobs and provided $2.0 million and $1.7 million in personal income, respectively. In summary, the use of Hillsboro Airport generated over $110 million for the local economy in 2002, supported 1,464 jobs, and provided over $6.1 million in state and local tax revenues.

AIRSIDE FACILITIES

Airside facilities include runways, taxiways, lighting, and navigational aids. Airside facilities are depicted on **Exhibit 1B.**

RUNWAYS

The Hillsboro Airport has two runways as depicted on Exhibit 1B. Runway 12-30 is 6,600 feet by 150 feet, and has a 200-foot blast pad on each end. The second runway is Runway 2-20, which is 4,049 feet by 100 feet, and has a displaced threshold on the 20 end of the runway.

Runway 12-30 was originally built in 1942, along with Runway 2-20. Both runways were built 4,050 feet long. In 1976, Runway 12 was extended and Runway 30 relocated to a length of 6,600 feet. 600 feet of the relocated runway was designated as a stop way.

The pavement section and strength history is summarized in **Table 1G.**

TABLE 1G
Runway Pavement Section and Strength

Runway 12-30			
Pavement Section	**Surface**	**Base**	**Subbase**
Runway 30 – South 3,450 ft.	3.5" AC (1993) Fabric (1993) 3-5" AC (1984) 2" AC (1942)	6" (1942)	8" (1942)
500 ft. at Exit A-4	Fog Seal (2002) 3.5" AC (1992) Fabric (1992) 0-2.5" AC (1984) 5" AC (1997)	6" Crushed Aggregate (1997)	9" Lime or Cement Treated Subbase (1997)
North – 3,150 ft.	Fog Seal (2002) 3.5" AC (1992) Fabric (1992) 5" AC (1997)	6" Crushed Aggregate (1997)	9" Lime or Cement Treated Subbase (1976)
Runway 12 – 163 ft. Extension	Fog Seal (2002) 4" AC (2002)	8" Crushed Aggregate (2002)	12" Crushed Aggregate (2002) Fabric (2002)
Runway 12 Blast Pad	Fog Seal (2002) 3" AC (2002	12" Crushed Aggregate (2002)	Fabric (2002)
Pavement Strength			
Single Wheel Gear	50,000#		
Dual Wheel Gear	70,000#		
Dual-Tandem Gear	110,000#		
Runway 2-20			
Pavement Section	**Surface**	**Base**	**Subbase**
4,050 ft. runway	2" AC (1992)	6" Pulverized Base (1993) 6" (1942)	8" (1942)
Pavement Strength			
Single Wheel Gear	45,000#		
Dual Wheel Gear	58,000#		
Dual-Tandem Gear	90,000#		

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Exhibit 1B

EXISTING AIRFIELD FACILITIES

PAVEMENT CONDITION INDEX

The Federal Aviation Administration has mandated that any airport sponsor receiving and/or requesting federal funds for pavement improvement projects must have implemented a pavement maintenance management program. To ensure that its airport system complies with this Federal mandate, the Port of Portland elected to implement a pavement management system for its four airports.

Part of the pavement maintenance management program is to develop a Pavement Condition Index (PCI) rating. This rating is based as the guidelines contained in FAA Advisory Circular 150/5380-6, *Guidelines and Procedures for Maintenance of Airport Pavements*.

The PCI procedure was developed to collect data that would provide engineers and managers with a numerical value indicating overall pavement conditions to reflect both pavement structural integrity and operational surface condition. A PCI survey is performed by measuring the amount and severity of certain distresses (defects) observed within a pavement sample unit.

Exhibit 1C identifies the 2002 PCI ratings (i.e., good, fair, etc) of the pavements at Hillsboro Airport. This information, along with the Ports management information, will be used later in the report to identify pavement maintenance strategies and their cost.

TAXIWAY AND TAXILANES

There are three parallel taxiways, Taxiway A (parallel to Runway 12-30), Taxiway B (south parallel to Runway 2-20), and Taxiway C (north parallel to Runway 2-20). Taxiways A and B are 50 feet wide, built in 1967, and Taxiway C is 40 feet wide and built in 1983. Taxiway A has eight connecting taxiways to Runway 12-20, Taxiway B has three, and Taxiway C has two, connecting respectively to Runway 2-20. In addition, a secondary partial parallel taxiway, AA, runs from Taxiway A-4 to Taxiway C and parallel to Taxiway A. Taxiway AA is 40 feet wide and was built in 1984. Taxiway CC is 28 feet wide.

AIRFIELD LIGHTING & SIGNAGE

Runway 12-30 and 2-20 are equipped with runway edge lighting and runway end-threshold lighting. Runway 12-30 has a High Intensity Runway Lighting (HIRL) system, while Runway 2-20 has a Medium Intensity Runway Lighting (MIRL) system. In addition, Runway 30 is equipped with Runway End Identifier Lights (REILs), which are flashing lights on either side of the runway threshold that help delineate the end of the runway. With the exception of Taxiways CC and AA, all taxiways and associated connecting taxiways, are equipped with Medium Intensity Taxiway Lights (MITL).

The airport has all of the FAA required lighted location signs, mandatory signs, directional and designation signs.

A Precision Approach Path Indicator (PAPI-4) is available on Runway 12 and 30. The PAPIs provide approach path guidance with a series of light units. The four-unit PAPI gives the pilot an indication of whether their approach is too low, slightly low, too high, slightly high, or on-path, through the pattern of red and white given by the light unit.

Runway 2 and 20 are equipped with Visual Approach Slope Indicators (VASI-4). A VASI is the older version of the PAPI, and also provides approach path guidance through the patterns of red and white lights.

A rotating beacon is located on a 77-foot-tall steel tower, adjacent to NE Cornell Road at the main airport entrance. The beacon delineates the airport location to pilots with rotating white and green lights located 180 degrees apart. The white and green lights have no individual meaning.

A lighted wind cone is located at the base of the Airport Traffic Control Tower (ATCT). The wind cone indicates wind direction and approximate speed.

The airport lighting and signage system are powered through the electrical equipment building at the base of the ATCT. The ATCT operators have control over the use and intensity settings of the lighting system when the ATCT is open. After the ATCT is closed, the lighting system is pilot-controlled. Using the radio transmitter in the aircraft, the pilots can turn on and choose the intensity of the airfield lighting.

PAVEMENT MARKINGS

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. Precision runway markings identify the runway centerline, designation, touchdown point, threshold, and pavement edge. Nonprecision runway markings identify the runway centerline, threshold, and designation. Runway 12 is equipped with precision runway markings. Runway 30 is equipped with nonprecision runway markings. Runways 2 and 20 are equipped with basic markings which identify the runway centerline and designation.

Taxiway and apron taxilane centerline markings are provided to assist aircraft using these airport surfaces. Centerline markings assist pilots in maintaining proper clearance from pavement edges and objects near the taxilane/taxiway edges. Aircraft hold positions are also marked on all taxiway surfaces. Pavement markings also identify aircraft parking positions.

WEATHER REPORTING

Hillsboro Airport is equipped with an Automated Surface Observation System (ASOS). The ASOS provides automated aviation weather observa-

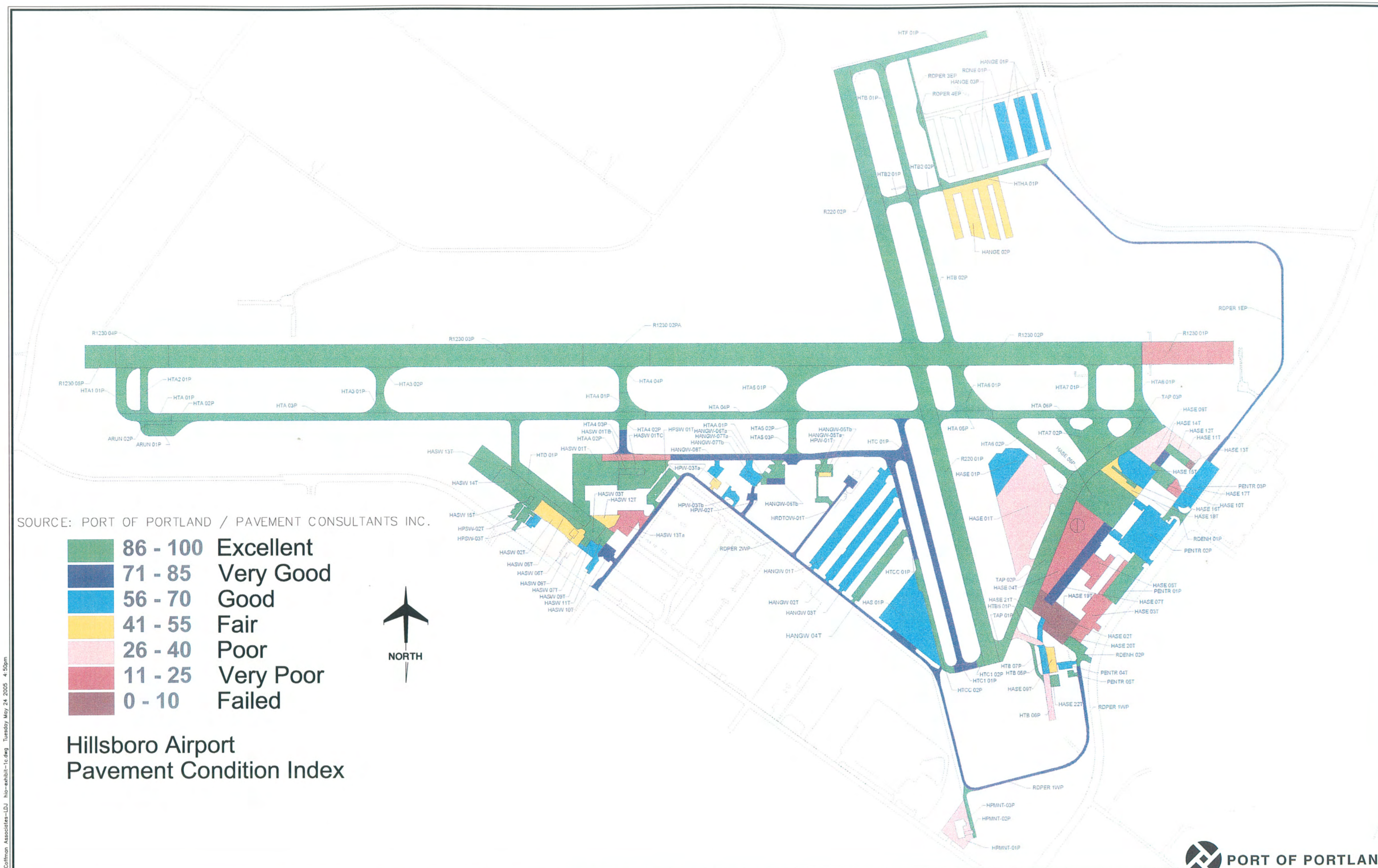

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Exhibit 1C
PAVEMENT CONDITION INDEX

tions 24-hours-a-day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. The ASOS system reports cloud ceiling, visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), and density altitude (airfield elevation corrected for temperature).

AREA AIRSPACE AND AIR TRAFFIC CONTROL

The *Federal Aviation Administration (FAA) Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military segments of the aviation industry. The NAS covers the common network of U.S. airspace, including the following: air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

AIRSPACE STRUCTURE

Airspace within the United States is broadly classified as either "controlled" or "uncontrolled." The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the United States. **Exhibit 1D** shows the airspace classifications and terminology. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Airspace in the vicinity of Hillsboro Airport is depicted on **Exhibit 1E**. There is no Class B airspace in the Portland-Vancouver metropolitan area; therefore, no explanation is necessary in the following paragraphs.

Class A Airspace

Class A airspace includes all airspace from 18,000 feet mean sea level (MSL) to flight level (FL) 600 (approximately 60,000 feet MSL). This airspace is designated in Federal Aviation Regulation (F.A.R.) Part 71.193, for positive control of aircraft. The Positive Control Area (PCA) allows flights governed only under IFR operations. The aircraft must have special radio and navigation equipment, and the pilot must obtain clearance from an air traffic control (ATC) facility to enter Class A airspace. In addition, the pilot must possess an instrument rating.

Class C Airspace

The FAA has established Class C airspace at 120 airports around the country, as a means of regulating air traffic in these areas. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. In order to fly inside Class C airspace, the aircraft must have a two-way radio and an encoding transponder, and the pilot must obtain an ATC clearance. However, aircraft may fly below the floor of the Class C airspace, or above the Class C airspace ceiling without an ATC clearance.

The Portland International Airport Class C airspace is divided into six areas, each with different floor elevations and boundaries. The core of the Class C area is a circular area that extends for approximately 5 nautical miles from the center of Portland International Airport, from the ground up to 4,000 feet above mean sea level (MSL). This core area has a cut-out over Evergreen Airport. The cut-out over Evergreen Airport is incorporated into an outer zone of Class C airspace, with a floor elevation of 2,000 feet MSL and a ceiling of 4,000 feet MSL. The Class C airspace over Pearson Airport has a floor of 1,100 feet MSL and ceiling of 4,000 feet MSL. The crescent shaped portion of Class C airspace northwest of the airport has a floor elevation of 1,800 feet MSL and a ceiling elevation of 4,000 feet MSL. The crescent shaped portion of Class C airspace southwest of Portland International Airport has a floor elevation of 2,300 feet MSL and a ceiling elevation of 4,000 feet MSL. The crescent shaped portion of Class C airspace southeast of Portland International Airport has a floor elevation of 1,700 feet MSL and a ceiling elevation of 4,000 feet MSL.

Class D Airspace

Class D airspace is controlled airspace surrounding airports with an ATCT. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles (NM) from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. If an airport has an instrument approach or departure, the Class D airspace sometimes extends along the approach or departure path.

The Class D airspace for Hillsboro extends for approximately four nautical miles around the airport, from the surface to 2,700 feet MSL. The Hillsboro Airport Class D airspace is effective only during the time the ATCT is operational, which is from 6:00 a.m. to 10:00 p.m., daily. At all other times, Class E airspace surrounds the airport.

Class E Airspace

Class E airspace consists of controlled airspace designed to contain IFR operations near an airport, and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be

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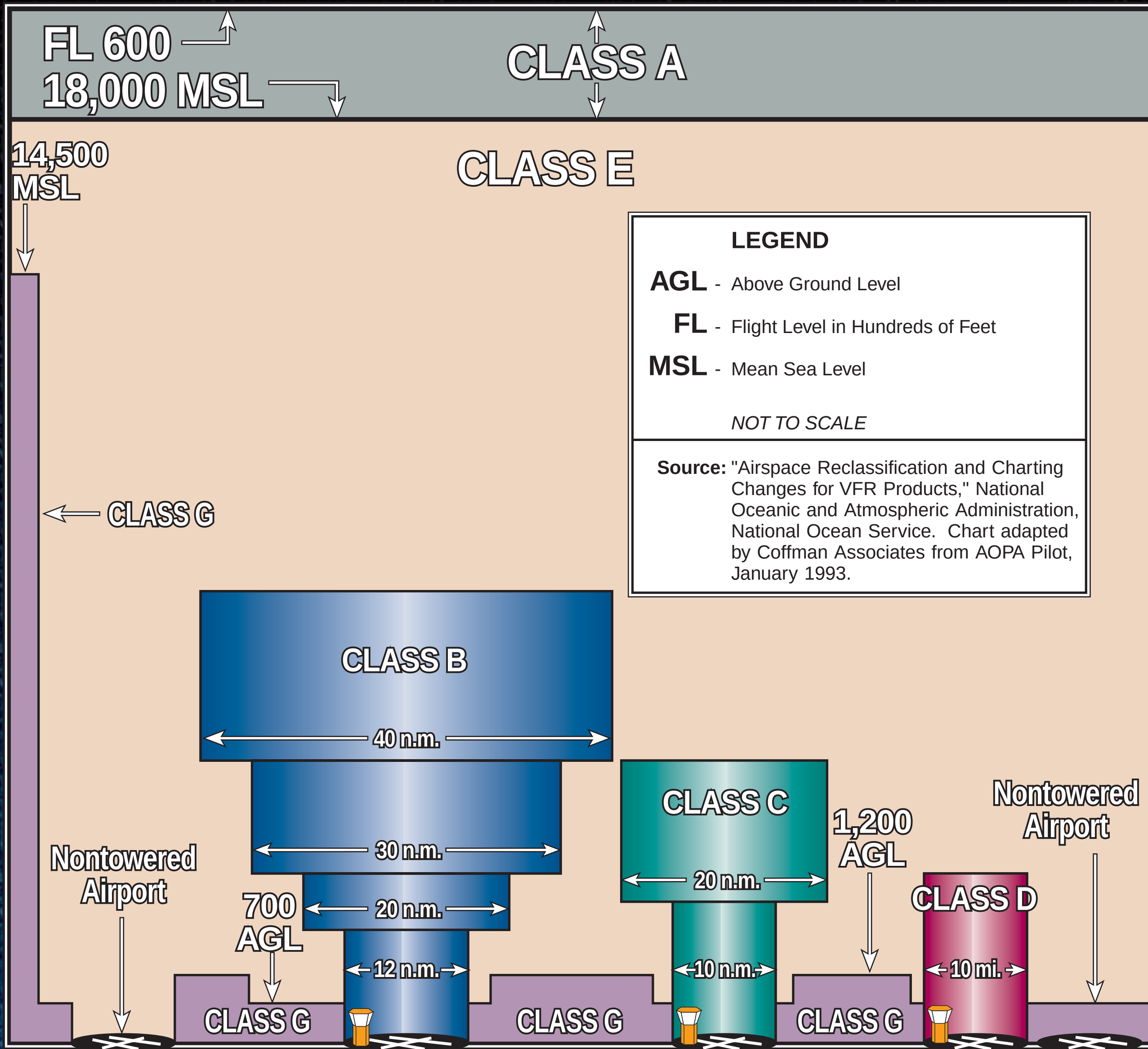

CLASSIFICATION	DEFINITION
CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600 .
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.

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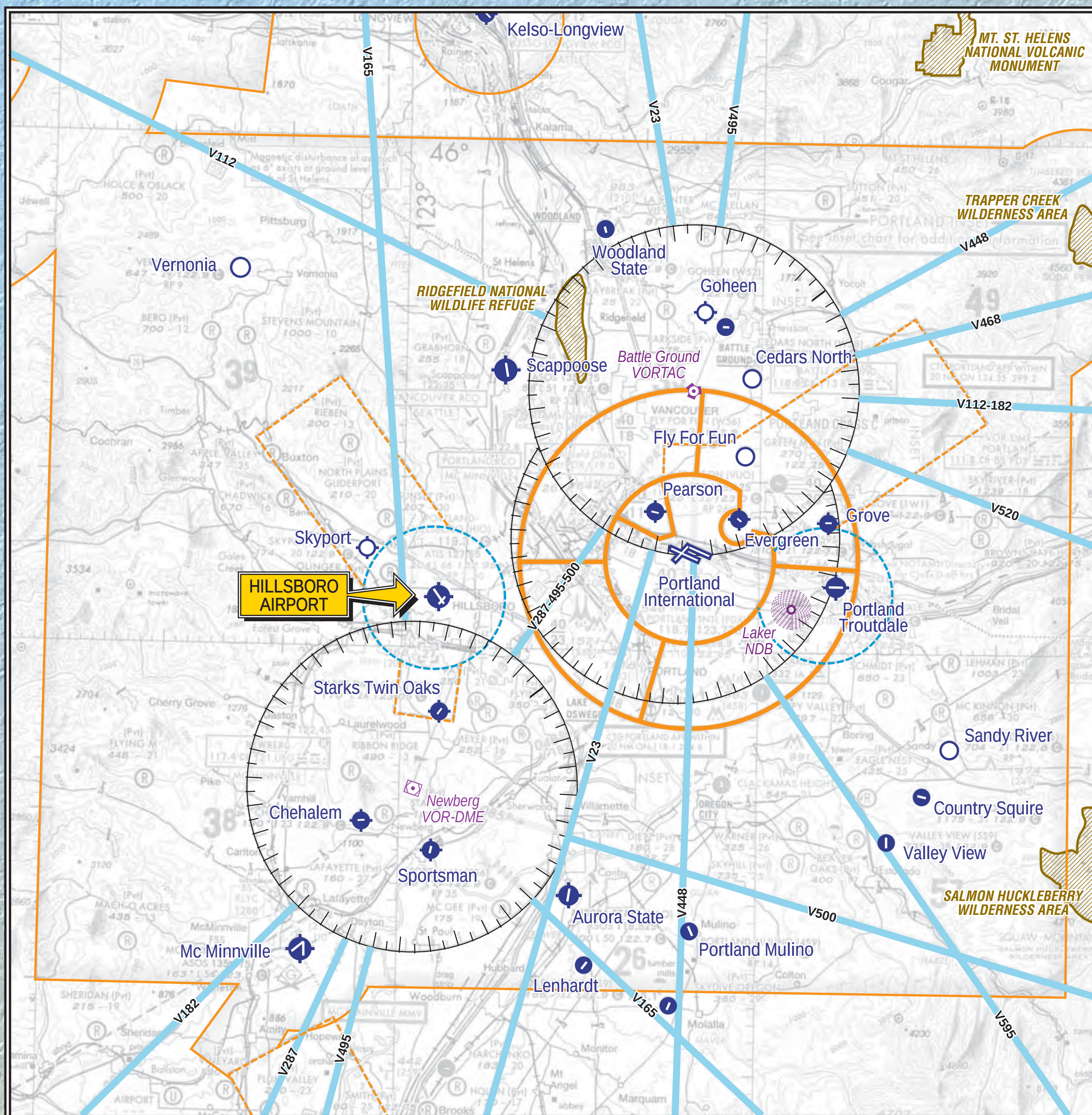

LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Non-Directional Radiobeacon (NDB)
- VORTAC
- VHF Omni Range (VOR)
- VOR-DME
- Compass Rose
- Class C Airspace
- Class D Airspace
- Class E Airspace
- Class E Airspace with floor 700 ft. above surface
- Victor Airways
- Wilderness Area

Source: Seattle Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration June 12, 2003

NORTH

NOT TO SCALE

PORT OF PORTLAND

Exhibit 1E
AIRSPACE MAP

in contact with air traffic control when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communications with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.

Hillsboro Airport has a Class E airspace extension to the northwest of the airport, which encompasses the Runway 12 instrument landing system (ILS) approach procedure, and a Class E airspace extension to the south, which encompasses an instrument approach procedure from the south. The Class E extension airspace begins at the surface and extends upward to Class A airspace.

A Class E airspace transition area surrounds Hillsboro Airport and the entire Portland metropolitan area. This area of controlled airspace has a floor of 700 feet above the surface and extends to Class A airspace, except for the areas of Class D or Class C airspace. This transition area is intended to provide protection for aircraft transitioning from enroute flights, to the airport for landing.

Class G Airspace

Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E airspace (700 to 1,200 feet above ground level [AGL]). Class G airspace extends below the floor of the Class E airspace transition area in the Portland metropolitan area.

While aircraft may technically operate within this Class G airspace without any contact with ATC, it is unlikely that many aircraft will operate this low to the ground. Furthermore, federal regulations specify minimum altitudes for flight. F.A.R. Part 91.119*, Minimum Safe Altitudes*: generally states that except when necessary for takeoff or landing, pilots must not operate an aircraft over any congested area of a city, town, or settlement, or over any open air assembly of persons, at an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft. Over less congested areas, pilots must maintain an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. Finally, this section states that helicopters may be operated at less than the minimums prescribed above if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the FAA.

Wilderness Area

While not considered part of the U.S. airspace structure, the boundaries of National Park Service areas and U.S. Forest and Primitive areas are noted on aeronautical charts. While aircraft operations are not specifically restricted over these areas, aircraft are requested to maintain a minimum altitude of 2,000 feet above the surface while traversing these areas. Exhibit 1E depicts the boundaries of these areas near Hillsboro Airport.

The wilderness areas shown on Exhibit 1E include the Ridgefield National Wildlife Refuge, Mount St. Helen's National Volcanic Monument, Trapper Creek Wilderness Area, and Salmon Huckleberry Wilderness Area. FAA Advisory Circular 91-36C defines the "surface" as the highest terrain within 2,000 feet laterally of the route of flight or the upper-most rim of the canyon or valley.

AIRSPACE CONTROL

The FAA is responsible for the control of aircraft within the Class A, Class C, Class D, and Class E airspace described above. The Seattle Air Route Traffic Control Center (ARTCC) controls aircraft operating in Class A airspace. The Seattle ARTCC is responsible for aircraft operations over the State of Washington, and portions of Montana, Idaho, Oregon, Nevada, and California.

The Portland Terminal Radar Approach Control (TRACON) facility, based at Portland International Airport, controls aircraft operating within the Class C and Class E airspace. The Hillsboro ATCT, located on Hillsboro Airport west of Runway 12-30, controls aircraft operating in the Hillsboro Airport Class D airspace.

NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Hillsboro Airport include: the Very High Frequency Omnidirectional Range (VOR) facility, Nondirectional Beacon (NDB), Global Positioning System (GPS), and Loran-C.

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. A VORTAC provides distance and direction information to civil and military pilots.

The Battle Ground VORTAC and Newberg VOR/DME serve the Portland metropolitan area and Hillsboro Airport. The Battle Ground VORTAC is located approximately 20 nautical miles northwest of Hillsboro Airport. The Newberg VOR/DME is located 10.9 nautical miles south of Hillsboro Airport. These facilities are identified on Exhibit 1E.

VORs define low-altitude (Victor) and high altitude airways through the area. Many aircraft operating under an instrument flight plan enter the area via one of these federal airways. Aircraft assigned to altitudes above 18,000 feet MSL in Class A airspace use the high altitude system. Aircraft operating in Class E and G airspace use the low altitude airways.

Victor Airways in the vicinity of Hillsboro Airport are shown on Exhibit 1D. Radials off the Battle Ground VORTAC or Newberg VOR/DME define the centerline of these flight corridors.

The NDB transmits nondirectional radio signals, whereby the pilot of properly equipped aircraft can determine the bearing to or from the NDB facility and then "home" or track to or from the station. Pilots flying to or from the airport can utilize the Abate NDB located 6.1 nautical miles northwest of the Runway 12 threshold.

Loran-C is a ground-based enroute navigational aid which utilizes a system of transmitters located in various locations across the continental United States. Loran-C varies from the VOR as pilots are not required to navigate using a specific facility (with the VOR, pilots must navigate to and from a specific VOR facility). With a properly equipped aircraft, pilots can navigate to any airport in the United States using Loran-C.

GPS was initially developed by the United States Department of Defense for military navigation around the world. However, GPS is now used extensively for a wide variety of civilian uses, including the civil aircraft navigation. GPS technologies use satellites placed in orbit around the globe to transmit electronic signals, which pilots of properly equipped aircraft use to determine altitude, speed, and navigational information. Similar to Loran-C, pilots do not have to fly from one navigational aid to the next. This provides more freedom in flight planning and allows for more direct routing to the final destination.

A GPS modernization effort is underway by the FAA and focuses on augmenting the GPS signal to satisfy requirements for accuracy, coverage, availability, and integrity. For civil aviation use, this includes the development of the Wide Area Augmentation System (WAAS), which was launched on July 10, 2003. The WAAS uses a system of reference stations to correct signals from the GPS satellites for improved navigation and approach capabilities. The present GPS provides for enroute navigation and instrument approaches with both course and vertical navigation. The WAAS upgrades are expected to allow for the development of approaches to most airports with cloud ceilings as low as 250 feet above the ground and visibilities restricted to three-quarters of a mile. This capability is not expected until after the Year 2015.

INSTRUMENT APPROACH PROCEDURES

Instrument approach procedures are a series of predetermined maneuvers established by the FAA, using electronic navigational aids that assist pilots in locating and landing at an airport during low visibility and low cloud ceilings condition. Hillsboro Airport has three published instrument approach procedures. This includes one precision instrument approach and two nonprecision instrument approaches.

The Runway 12 Instrument Landing System (ILS) approach is a precision instrument approach, as it provides both vertical descent information and course guidance information to the pilot. In contrast, the VOR/DME or GPS-A circling approach and NDB or GPS-B circling approaches are nonprecision approaches, providing only course guidance information to the pilot.

The capability of an instrument is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance the pilot must be able to see in order to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach. **Table 1H** summarizes instrument approach minima for Hillsboro Airport.

TABLE 1H
Instrument Approach Data

	WEATHER MINIMUMS BY AIRCRAFT TYPE					
	Category A/B		**Category C**		**Category D**	
	CH	**VIS**	**CH**	**VIS**	**CH**	**VIS**
ILS RUNWAY 12						
Straight-In ILS	200	0.5	200	0.5	200	0.5
Localizer Only	600	0.5	600	1.0	600	1.0
Circling	600	1.0	600	1.5	600	2.0
VOR/DME or GPS-A						
Circling	500	1.0	500	1.5	600	2.0
NDB or GPS-B						
Circling[1]	900	1.0	900	2.5	600	2.75

Aircraft categories are based on the approach speed of aircraft, which is determined as 1.3 times the stall speed in landing configuration. The approach categories are as follows:

Category A 0-90 knots (Cessna 172)
Category B 91-120 knots (Beechcraft KingAir)
Category C 121-140 knots (Canadair Challenger)
Category D 141-165 knots (Gulfstream IV)

CH – Cloud Height (in feet above ground level)
VIS – Visibility (in statute miles)
[1]For Category B aircraft, visibility minimums are 1.5 miles

Source: U.S. Terminal Procedures

PRECISION INSTRUMENT APPROACH

Most precision approaches in use in the United States today are instrument landing systems (ILS). An ILS provides both exact course alignment and descent paths for an aircraft on final approach to a runway. The system provides three functions: guidance, provided vertically by a glide slope (GS) antenna and horizontally by a localizer (LOC); range, furnished by marker beacons or distance measuring equipment (DME); and visual alignment, supplied by the approach light systems and runway edge lights.

As stated previously, Hillsboro Airport has one published precision instrument approach to Runway 12. The Runway 12 ILS consists of a localizer antenna (located behind the Runway 30 end); glide slope antenna (located east of Runway 12); and an outer marker (the Abate NDB located 6.1 nautical miles northwest of Runway 12) The location of the localizer and glideslope is shown on Exhibit 1B. The Runway 12 ILS has a standard 3.0 degree glide slope. This means that aircraft correctly following the glide slope descend 1-foot vertically for each 20 feet that move forward horizontally.

Visual alignment information is provided by the Medium Intensity Approach Lighting System with Runway Alignment Indicator Lighting (MALSR). The MALSR is a series of light standards extending 2,700 feet northwest of the Runway 12 threshold. The location of the MALSR is shown on Exhibit 1B.

NONPRECISION INSTRUMENT APPROACHES

The VOR/DME or GPS-A approach is one of two published nonprecision approaches for Hillsboro Airport. A pilot using this approach can either use the Newberg VOR/DME navigational aid or GPS navigation system to fly this approach. Pilots flying this approach only have course guidance information. Pilots must maintain the minimum descent altitude indicated for that approach until having the airport in sight, when the landing can be made, or until a designated point (defined in nautical miles from the final approach fix), when a missed approach must be executed.

The second nonprecision approach available at Hillsboro Airport is NDB or GPS-B approach. Similar to the VOR/DME or GPS-A, a pilot flying this approach can either use the Abate NDB navigational aid or GPS navigation system.

STANDARD INSTRUMENT DEPARTURES

Currently, three Standard Instrument Departure (SID) procedures are published for Hillsboro Airport. SIDs are preplanned instrument flight rule (IFR) procedures which provide obstruction clearance from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement and to reduce pilot/controller workload. ATC clearance must be received prior to flying a SID.

The CANBY SIX SID is used for instrument departures to the east. Instrument departures from Runways 12, 30, and 2 are directed by the CANBY SIX SID to follow a heading of 110 degrees after departure, then intercept the 175 degree radial from the Battle Ground VORTAC, then proceed to the CANBY intersection (the CANBY intersection is an imaginary point defined by the intersection of the 175 degree radial from the Battle Ground VORTAC and 085 radial from the Newberg VOR/DME). After intersecting CANBY, the pilot flies the route established by ATC. Departures from Runway 20 follow a 090 degree heading to the Battle Ground VORTAC 175 degree radial.

The FARMINGTON THREE SID is used for instrument departures to the south/southeast. Instrument departures from Runways 12 and 2 are directed by the FARMINGTON THREE SID to follow a heading of 210 degrees after departure, and then intercept the 346-degree radial from the Newberg VOR/DME, then proceed to intercept the Newberg VOR/DME. After intercepting the VOR/DME, the pilot flies the route established by ATC. Departures from Runway 20 and 30 follow a 120-degree heading to the Newberg VOR/DME 346-degree radial.

The SCAPO THREE SID is used for instrument departures to the north. Instrument departures from Runways 12, 2, and 20 are directed by the SCAPO THREE SID to follow a heading of 280 degrees after departure, then intercept the 334-degree radial from the Newberg VOR/DME to SCAPO intersection (the SCAPO intersection is defined by the intersection of the 334-degree radial from the Newberg VOR/DME and Portland International Airport localizer antenna). After intercepting SCAPO, the pilot flies the route established by ATC. Departures from Runway 30 follow runway heading until intercepting the 334-degree radial.

VISUAL FLIGHT RULES (VFR) PROCEDURES

Most flights at Hillsboro Airport are conducted under VFR conditions. Under VFR flight, the pilot is responsible for collision avoidance and is provided basic radar service from ATC. The purpose of basic radar services is to sequence arriving IFR and VFR traffic into the traffic pattern and to provide traffic information and radar vectors to departing VFR traffic. Typically, the pilot will contact the tower when approximately 15 miles from the airport, for sequencing into the traffic pattern for landing. While VFR aircraft arriving and departing Hillsboro Airport are not required to contact the Portland TRACON, they may do so to expedite their progress through the area.

In most situations, under VFR and basic radar services, the pilot is responsible for navigation and choosing the arrival and departure flight paths to and from the airport. However, depending on the needs of the ATCT for sequencing, the pilot may be given directions by the ATC to fly specified headings to position their aircraft behind a preceding aircraft in the approach sequence. Tower controllers sequence arriving and departing aircraft based on observed traffic, pilot reports, and anticipated aircraft maneuvers. The results of individual pilot navigation for sequencing and collision avoidance and ATCT instructions for sequencing and safety are that aircraft do not fly a precise flight path to and from the airport. Therefore, aircraft can be found flying over a wide area around the airport for sequencing and safety reasons.

While aircraft can be expected to operate over most areas of the airport, the density of aircraft operations is higher near the airport. This is the result of aircraft following the established traffic patterns and noise abatement procedures for the airport, and common sequencing techniques used by the ATCT. The traffic pattern is the traffic flow that is prescribed for aircraft landing or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

a. Upwind Leg - A flight path parallel to the landing runway in the direction of landing.

b. Crosswind Leg - A flight path at right angles to the landing runway off its upwind end.

c. Downwind Leg - A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

d. Base Leg - A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

e. Final Approach - a flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway.

Essentially, the traffic pattern defines which side of the runway aircraft will operate. For example, at Hillsboro Airport, Runway 30 and Runway 2 have an established right-hand traffic pattern. For these runways, aircraft make a right turn from base leg to final for landing. Therefore, aircraft operating to Runway 30 remain east of the runway. For Runway 2, aircraft remain south of the runway. When landing to Runway 12, aircraft make left-hand turns. This also allows these aircraft to remain east of Runway 12-30. Aircraft landing to Runway 20 also follow a left-hand traffic pattern. Aircraft landing to Runway 20 remain south of Runway 2-20.

The Port has instituted a voluntary noise abatement program at Hillsboro Airport to assist in minimizing aircraft noise over residential developments near the airport and along primary flight paths to the airport. Safety permitting, aircraft are asked to avoid flying over nearby residential areas when arriving or departing Hillsboro Airport. Furthermore, aircraft are asked to follow the procedures below when safety, weather, and ATC instructions permit:

- Runway 30 is the preferred departure runway.
- Runway 30 is designated the active runway under calm wind conditions (winds of 3 knots or less, irrespective of direction).
- Use of Runway 20 for takeoffs and Runway 2 for landings should be avoided unless wind or operational conditions dictate otherwise.
- Runway 2-20 should be used only when the wind velocity is 10 knots or greater from a direction that is between 170 degrees and 230 degrees or 350 degrees and 050 degrees.
- For closed traffic patterns (touch-and-go operations), Runways 30 and 2 shall use right traffic patterns; standard left traffic patterns shall be used on Runways 12 and 20.
- Runway 2-20 is closed to touch and go landings between 10:00 p.m. and 6:00 a.m.
- Aircraft should avoid unnecessary over flight of the urban residential areas south and west of the airport.

While, the traffic pattern defines the direction of turns that an aircraft will follow on landing or departure; it does not define how far from the runway an aircraft will operate. The distance laterally from the runway centerline an aircraft operates or the distance from the end of the runway is at the discretion of the pilot, based on the operating characteristics of the aircraft, number of aircraft in the traffic pattern, and metrological conditions. The actual ground location of each leg of the traffic pattern varies from aircraft operation to aircraft operation for the reasons of safety, navigation and sequencing described above. The distance that the downwind leg is located laterally from the runway will vary based mostly on the speed of the aircraft. Slower aircraft can operate closer to the runway as their turn radius is smaller.

The FAA has established that piston-powered aircraft operating in the traffic pattern, fly at 1,000 feet above the ground (or 1,200 feet MSL) when on the downwind leg. Turbine-powered aircraft fly the downwind leg at 1,700 feet MSL. The traffic pattern altitude is established so that aircraft have a predictable descent profile on base leg to final for landing.

LANDSIDE FACILITIES

Landside facilities are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include a terminal building, aircraft storage/maintenance hangars, aircraft parking aprons, and support facilities such as fuel storage, automobile parking, roadway access, and aircraft rescue and firefighting. The landside facilities at Hillsboro Airport are identified on **Exhibit 1F**. **Table 1J** provides a building inventory for Hillsboro Airport.

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PORT OF PORTLAND

Exhibit 1F
LANDSIDE FACILITIES

TERMINAL BUILDING

The existing terminal building is located in the airport's south building area adjacent to Cornell Road. The building was dedicated in October 1976, and is a two-story wood frame building with approximately 12,800 square feet per floor.

The terminal building is approximately 50% occupied with a variety of tenants. The following is a list of current tenants:

First Floor
Avis Car Rental
Hertz Car Rental
Bill Foote Aircraft Sales
Alpha Building Maintenance
Intel (as managed by Executive Jet)

Second Floor
KUIK 1360 Radio
Port of Portland

TABLE 1J
Building Inventory

		Approximate Area			
Port Address	**Name**	**Building (s.f.)**	**Lease Lot (acre)**	**Description**	**General Condition**
3355	Terminal/ Administration	12,800 (80 x 160)	Port-Owned	2-Story	Fair * See summary of condition report on page 1-I-27.
1040	PHA Maintenance/ OPS/Mgmt.	8,500	Port-Owned	2-Story Concrete tilt-up construction. 2 maintenance roll-up doors.	Good
3565	Hillsboro Aviation, Inc.	22,000 (100 x 220)	5.4	2 Large hangars adjoined, concrete block walls, wood truss, arch roof. Attached 2-story office building (20 x 100), concrete block walls	Fair – HAI has discussed replacement but has no immediate plans.
3443	Hillsboro Aviation, Inc.	13,200 (120 x 110)	Included above	Large hangars, concrete block walls, wood truss, arch roof. Attached single-story office/maintenance building, each side (20 x 110)	Fair – HAI has discussed replacement but has no immediate plans

TABLE 1J (Continued)
Building Inventory

Port Address	Name	Approximate Area Building (s.f.)	 Lease Lot (acre)	Description	General Condition
3301	Soloflex/Hangar 53 Northwest Avionics	37,600 (multiple structures)	10.4	Large maintenance hangar (140 x 170); steel frame doors at each end.	Good
				Adjoined conventional hangar & office (60 x 100); wood truss frame hangar, attached offices, portion two stories, brick construction	Fair
				Adjoined large hangar (50 x 60); steel frame	Poor
3301A	Soloflex/Hangar 53	8,000 (80 x 100)	Included above	2-story office/shop; concrete block walls	Good
				Lease hold includes fuel island under 90 ft. diameter canopy	Good
3155	Airway Sciences	3,000 (50 x 60)	0.2	Hangar 4 attached wood frame construction Offices/classrooms	Good
3005	Classic Aircraft Aviation Museum/ Premier Jets	5,300 (70 x 80)	0.6	Hangar with attached offices, wood siding	Good
2995	Eagle Flight Center & Tualatin Valley Avionics	4,050 (45 x 90)	0.5	Maintenance hangar, metal construction with B1-fold door	Good
2995	Tower Park Condo Association Hangars	96,200 (3 buildings)	2.7	3 hangar buildings, Building A-east, Section 7 executive hangar units (60 x 370)	Good
				Building B-West, Section 22 T-hangar, 4 executive hangar units (60 x 700)	Good
				Building C-32, T-hangar units (50 x 640). All buildings are metal construction with B1-fold doors	Good

TABLE 1J (Continued)
Building Inventory

Port Address	Name	Approximate Area Building (s.f.)	Approximate Area Lease Lot (acre)	Description	General Condition
2995	Flightline Condo Hangars	44,000 (2 buildings)	2.0	2 hangar buildings, Building A-west, Section 6 executive hangar units (50 x 330)	Good
				Building D-27 T-hangar units (50 x 550), Bi-fold doors. All buildings are metal construction	Good
3115	Teufel Hangar	12,000 (80 x 150)	0.7	Large storage hangar, metal frame construction	Very Good
3121	Aerovertigo Hangar	18,000 (100 x 180)	1.2	Large storage hangar, metal frame construction	Good
2010	Four “S” Properties Hangar (Life Flight	6,400 (80 x 80)	0.8	2-story wood frame construction	Good
2020	Lorentz-Bruun	5,600 (70 x 80)	0.8	Hangar and office, metal construction	Very Good
2050	Aero Air	24,000 (2 Buildings)	7.8	1 large maintenance hangar (135 x 170) metal construction	Very Good
				Large storage/ Maintenance hangar (180 x 190)	Very Good
2140	Premier Jets	4,900 (70 x 70)	1.2	Office building, wood frame construction	Very Good
2146	Premier Jets	4,800 (60 x 80)	Included above	Maintenance/ storage hangar, metal construction	Good
2166	Premier Jets	11,500	Included above	Large maintenance/ Storage hangar, metal construction	Good
2210	Global Aviation	16,000 (100 x 160)	2.3	Corporate hangar/ Storage/Maintenance Metal Construction	Very Good
				Attached offices (50 x 100), wood frame construction	Good

TABLE 1J (Continued) Building Inventory					
		Approximate Area			
Port Address	Name	Building (s.f.)	Lease Lot (acre)	Description	General Condition
2250	Global Aviation	2 buildings 25,200 & 26,400	4.2	Large mainte-nance/ Storage hangar (120 x 210), metal construction	Very Good
				Large mainte-nance/ Storage hangar (120 x 220), metal construction	Very Good
3999	Delta Management	106,000 (6 buildings)	2.2	6 T-hangar buildings Metal construction Building A-10 units Building B-12 units Building C-12 units Building D-11 units Building E-11 units Building F-12 units Total 64 units	All in Fair Condition
4141	International Business Services	68,400 (3 buildings)	1.9	3 T-hangar buildings Metal construction All three buildings have 16 units with extra storage units on each end	All good
2315	Nike, Inc.	32,400	3.4	Large corporate stor-age/maintenance hangar (140 x 180) Metal construction with attached office facilities (40 x 80)	Excellent
	Airport Traffic Control Tower	2,500	No record	ATCT Approximate Height 77 feet Cab and Equipment refurbished in 2003	Good
	Electrical Equip-ment Vault	400	Port-Owned	Located adjacent to ATCT, concrete block construction	Good
	U.S. Customs	200	No record	Located adjacent to Aero Air, wood frame construction	Good

Executive Jet Management operates jet services for Intel Corporation. The space is equipped with a check-in area, metal detection screening device, waiting area for approximately 100 passengers and several small offices with phone and internet access.

Oregon International Airshow leases space for a three-month period between July and September for the Hillsboro Airshow.

The Port of Portland uses space on the second floor for temporary office space, as well as hosting Airport open houses and miscellaneous meetings.

The largest space on the second floor was used by a restaurant that closed in 2002. The building is equipped with an elevator and centrally-located public restroom facilities on both floors that are ADA compliant.

The following is a summary of an Architectural Maintenance Review conducted in 1993 by Gazley Plowman Atkinson Architects of Portland and recently updated by the Port of Portland Maintenance personnel.

General

The basic structure of the building is a combination of tube steel columns and wood posts supporting glulam beams which support 2x6 decking and plywood at the second floor and roof. The ground floor is a concrete slab on grade. The second floor has undergone various tenant improvements since construction, the latest being a major exterior renovation including complete siding replacement in 1988, a stair addition and other modifications to the restaurant in 1991. The building is fully equipped with sprinklers.

Roof

The roof is built-up roofing with cap sheet and the roof is the original roof that was installed. Within the last two years the roof has had a minor rehabilitation to extend its life another 5-7 years. The roof leaks in a number of places and some of the roof drains are not sealed properly. There has also been evidence of trapped water in between the roofing and wood decking as well as evidence of dry rot. The existing roofing needs to be completely removed and replaced.

Exterior Walls/Windows

The exterior walls are wood frame with painted rough sawn plywood and wood trim. The siding was completely replaced in 1988 but has some rotting beginning at the plywood sheet edges. Some of the wood trim is also rotting in places and appears to be loose in spots. The exterior siding will require substantial attention to prevent additional deterioration.

The windows are single pane with a rubber gasket glazing system. There are either wood or metal sills at the windows which were refinished when the exterior siding was replaced and are in fair condition. The ground floor sills are generally in better condition than the second floor sills due to overhangs. The wood sills are in poor condition with dry rot and several have lost their seal. These wood seals require major attention or replacement.

Doors

The wood and glass entry doors are in poor condition. The recessed floor closers have been replaced on a number of occasions and still do not operate properly. The doors themselves are badly in need of refinishing or replacement.

The majority of the interior doors are solid core wood veneer doors, some with vision panels, in hollow metal frames. The doors are in good to fair condition, but need general maintenance such as repainting. In addition, because of the size of the doors, the building does not meet ADA standards.

Interior Walls, Floors and Ceilings

The interior walls are wood frame with painted gypsum board or vinyl wall covering in some areas and demountable vinyl covered gypsum board partitions in other areas. The vinyl wall covering is in various conditions depending on how recently it is replaced, if at all, but generally it is in fair to good condition.

The ground floor is concrete with floor coverings consisting of carpet, ceramic tile, and quarry tile. The 6”x6” quarry tile in the corridor is in fair condition but the grout is discolored and stained. The carpet in the public area is in good condition. The second floor is plywood subfloor on wood decking with floor covering of carpet, ceramic, tile, and quarry tile that resembles brick pavers in two different patterns. This quarry tile is in fair to good condition but appears very outdated. The ceramic tiles in both bathrooms are in fair condition and should be entirely regrouted to reseal the floor to avoid further damage.

The ceilings are suspended type with a mixture of concealed spline 12”x12” system in corridor, 2’x2’ in dining area of restaurant, and 2’x4’ grid system in the office areas. Office areas have 2’x4’ fluorescent light fixtures and the corridors have a combination of 2’x2’surface mounted fluorescent fixtures and surface mounted round fluorescent fixtures. There are also numerous tiles that are broken or cracked and the general condition is poor. All of these tiles should be replaced. Maintenance reports that the size of the tiles makes it difficult to access electrical or plumbing maintenance needs in the ceiling. The lighting fixtures are dated and are no longer economical to run or maintain and should be replaced.

Accessibility

There are disabled parking spaces in the parking lot adjacent to the building with wheelchair accessible curb cuts that provide access to the main building entry.

The toilet rooms on both the first and second floors have accessible sinks and allow access according to ADA guidelines.

The restroom facilities are not sized to handle the amount of traffic within the building. In addition, the facilities are poorly ventilated which keeps the areas from smelling fresh.

The width of the public area corridors is not suitable for the level of passenger traffic with luggage.

The building doesn't have a luggage check-in/pick-up area.

Mechanical

Two gas-fired multi-zone rooftop air conditioning units serve tenants spaces on the first and second floors. A 1-1/2 ton gas-fired single-zone rooftop air conditioning unit was added in 1991 to serve the northeast corner office on the second floor. All controls are electric.

The two multi-zone units were reconditioned approximately two years ago to extend their life 5-7 years. The units should be replaced with units that are energy efficient. In addition, over the years, various tenant improvements have modified internal walls that have the left the HVAC system out of balance and very inefficient.

Plumbing and Fire Protection

Fire Protection: The building is fully equipped with sprinklers. Water supply is from an 8-inch main in the North Frontage Road. The building has 6-inch service with fire department connection, post indicator valve, detector check assembly, and water gong.

Cold Water: The domestic cold water is a 3-inch service. A 3-inch main serves common toilet rooms and a separate 3-inch main serves tenant water needs.

Hot Water: Domestic hot water is served from a 6-inch sanitary service and an 18-inch storm drain. The building has adequate roof drains and overflow roof drains.

Fire protection and plumbing for the building seems adequate. Several leaks have occurred over the years and have been repaired on a temporary basis. As with many other items, a renovation of the plumbing system could be needed in the near future as the building approached 30 years of age.

Electrical

The building is served at 120/208V from a 300KVA pad mounted transformer located at the south west corner of the building. There is a 1600A circuit breaker main distribution panel located on the second floor with three utility metered feeders.

Lighting in general utilizes 4-tube, 2x4 fluorescent fixtures. Emergency power for egress and exit lighting is provided by a 1500W central battery invertor located in the second floor electric room. There is neither a building security system nor a fire alarm system in the building.

Telephone service is located on the first floor within a tenant space.

Based on maintenance reports and the age of the building a complete overhaul of the electrical system is needed to meet current code requirements.

APRONS AND AIRCRAFT PARKING

The main apron (south building area) at the airport is approximately 400 feet by 1,500 feet. The apron is adjacent to three operation areas, Hillsboro Aviation Inc. (HAI) on the east end, the Terminal/Administration Building in the center and Hangar 53 on the west end. HAI's portion of the apron is used for fixed-wing and rotorcraft parking for both itinerant and based aircraft. The terminal portion of the apron is mainly utilized by Executive Jet Management, providing the Intel Shuttle. Hangar 53's portion is used for fueling and central parking for both based and itinerant aircraft.

The apron to the north of the main apron is approximately 400 feet by 500 feet and is used mainly for transient aircraft and overflow based or corporate use. The west apron is approximately 200 feet by 450 feet and is used for based aircraft parking.

Other apron areas are located throughout the airport generally in front of corporate/private hangars. These areas are used for tenant, corporate business, or itinerant aircraft parking, as well as fueling operations.

Table 1K summarizes the permanent aircraft apron parking spaces at Hillsboro Airport.

TABLE 1K
Aircraft Apron Parking Space Locations

Location	Based Aircraft Spaces	Transient Aircraft Spaces
Hillsboro Aviation, Inc.	10	8
Terminal/Administration	3	2
Hangar 53	22	8
Center Apron	20	20
Eagle Flight Center	3	2
West Apron	44	--
Aero Air	11	6
Premier Jet	3	1
Global Aviation	3	1
Global Aviation	4	2
Total	**126**	**50**

FIXED BASE OPERATORS (FBO) AND SPECIALTY AIRCRAFT SHOPS

FBO

Hillsboro Airport currently has three full-service Fixed Base Operators; Hillsboro Aviation Inc.; Hangar 53; and Aero Air. The following is a list of services provided by each FBO.

Hillsboro Aviation
- Aircraft Sales
- Aviation Fuel
- Oxygen Service
- Aircraft Parking (ramp or tiedown)
- Passenger Terminal and Lounge
- Flight School/Flight Training
- Aircraft Rental
- Aerial Tours/Aerial Sightseeing
- Aircraft Maintenance
- Avionics Sales and Service

Hangar 53
- Aviation Fuel
- Oxygen Service
- Aircraft Parking (ramp or tiedown)
- Hangars
- Passenger Terminal and Lounge
- Aircraft Charters
- Aircraft Maintenance
- Avionics Sales and Service
- Aircraft Interiors
- Catering

Aero Air
- Aircraft Sales
- Aviation Fuel
- Oxygen Service
- Aircraft Parking (ramp or tiedown)
- Hangars
- Passenger Terminal and Lounge
- Aircraft Charters
- Aircraft Maintenance
- Avionics Sales and Service
- Aircraft Modifications
- Aircraft Interiors

SPECIALTY AIRCRAFT SHOPS

Several specialty shops provide a variety of services for aircraft owners, operators and enthusiasts. The following is a listing of the businesses and services provided by each.

Eagle Flight Center
- Flight School/Training
- Aircraft Rental
- Aerial Tours/Sightseeing
- Aircraft Charters
- Pilot Supplies

Global Aviation
- Aircraft Charter
- Aviation Fueler
- Aircraft Management

J&J Aircraft
- Aircraft Rental

Northwest Aircraft Maintenance
- Aircraft Maintenance

Premier Jet
- Aircraft Charter
- Cargo and Air Ambulance

Tualatin Valley Avionics
- Aircraft Avionics

Bill Foot Aircraft Sales
- Aircraft Sales

AIRPORT MANAGEMENT/ OPERATIONS AND MAINTENANCE

The Port of Portland acquired a building previously located off airport property to consolidate airport management, operations and maintenance, as well as construction project offices. The facility is located in the southwest corner of the airport and is accessed off N.E. 25th Street. The maintenance portion of the building is tilt-up construction, with two large rollup doors on each side of the building for thru access with equipment. The management and operations offices are located in an attached single-story wood frame building. This space also has a conference room with a thirty-person capacity.

The building and adjacent fenced area houses various mowers, small plows, tractors, dump trucks with snow plow attachments and a small water truck. The facility also has 20 auto parking spaces. Access to the airfield is through a manual gate to the west perimeter road.

FUELING FACILITIES

The three full-service FBO's on the field own and maintain Jet A and 100 low-lead Avgas fuel tanks. Aircraft charter/rental companies, as well as private hangar owners, have fueling facilities on the airport. In addition, the Port has several used oil depositories located around the airport. There are no public self-service fueling facilities on the airport. All three FBOs have 24-hour fueling service, with prior notice after regular business hours. **Table 1L** lists the fuel tanks located at Hillsboro Airport.

UTILITIES

Utilities serving the airport are the City of Hillsboro Public Works for water and sanitary sewer. The storm water system on the airport is maintained by the Port, and off-airport, by Washington County and Clean Water Services. Electrical service is provided by Portland General Electric, phone service by AT&T, natural gas service by Northwest Natural, and cable service is Comcast. The location of existing and utility lines at Hillsboro was compiled as part of the inventory effort. These maps have been provided separately to the Port as a supplemental document.

SECURITY FENCING AND GATES

The entire airport is surrounded by security-type fencing. The fence is FAA standard 8-foot chain-link with three strands of barbwire.

There are over 20 vehicle access gates to the airport. The majority of those are in the south and west building areas. These gates are automatic and operated by a combination punch pad. There also are several swing-type vehicle access gates with padlocks located along the north property line fence. These gates are used mainly by tenant farmers to access the agricultural areas.

Table 1L
Storage Tank Summary
Hillsboro Airport

Owner	Contents	Size (Gallons)	Tank Type
Aeroair	Jet A	10,500	UST
Aeroair	Jet A	10,500	UST
Aeroair	Used Oil	8,000	AST
Eagle	Used Oil	275	AST
Global Aviation	Jet A	12,000	AST
Hangar 53	Avgas	12,000	UST
Hangar 53	Jet A	12,000	UST
Hangar 53	Used Oil	250	AST
Hillsboro Aviation	Avgas	12,000	AST
Hillsboro Aviation	Gasoline	500	AST
Hillsboro Aviation	Jet A	12,000	AST
Global Aviation	Avgas	5,000	UST
Global Aviation	Jet A	30,000	UST
Global Aviation	Used Oil	5,000	AST
Port of Portland	Diesel	500	AST
Port of Portland	Used Oil	250	AST
Port of Portland	Used Oil	280	AST
Port of Portland	Used Oil	280	AST
Port of Portland	Used Oil	675	AST
Premier Jets	Jet A	12,000	AST
Teufel, Inc.	Avgas	6,000	UST
Teufel, Inc.	Jet A	6,000	UST

AGRICULTURAL OPERATIONS AREA

The Port currently has leases with three different agricultural operators: Alan Schaaf and Robert Vanderzanden conduct agricultural operations individually. Dick Vanderzanden and Ken Belt operate a joint operation. Farming is conducted both on and off airport property. **Table 1M** summarizes the operations.

TABLE 1M
Agricultural Operations Areas

			On-Airport		Off-Airport	
Operator	**Total Lease Area**	**Total Farmable Acres**	**Acres**	**Location**	**Acres**	**Location**
Alan Schaaf	109	92	52	Runway 20-RPZ	40	Runway 30-RPZ
Dick Vanderzanden/ Ken Belt	128	118	15	Runway 2-RPZ	6	East of Brookwood
			12	Adjacent to Taxiway A along NE 25th		
			25	East of Runway 30 to Brookwood Parkway		
			62	North of the intersection of Runways 12 & 20		
Robert Vanderzanden	164	142	14	East of Runway 12 Threshold	35	East of N.W. Airport Road to N.W. Evergreen Street
					78	Runway 12-RPZ-North of N.W. Evergreen Street
					10	North of N.W. Evergreen Street between N.W. 268th and 273rd Avenue
					5	West of N.E. 25th Avenue, adjacent to Intel Campus

ACCESS, CIRCULATION AND PARKING

ACCESS TO HILLSBORO AIRPORT – GENERAL TRANSPORTATION FRAMEWORK

The regional transit network is designed to provide convenient transit access and improve connections between transit modes. It is the policy of Metro [RTP Policy 13.0 (Regional Public Transportation Performance)] to provide transit service that is fast, reliable and has competitive travel times compared to the automobile. In addition, it is Metro's policy to enhance mobility and support the use of alternative transportation modes by improving regional accessibility to public transportation.

Objective 1.3.4 of the ODOT Portland-Cannon Beach Junction (US 26) Corridor Plan seeks to improve connections via transit and other modes to Portland International and Hillsboro Airports. Other objectives include promotion of increased transit service throughout the corridor, and the use of Westside Light Rail and other transit to accommodate additional trips. Corridor Plan solutions emphasize support for transportation system and demand management measures, reducing single-occupancy vehicle trips, limited-capacity expansion, reliance on transit, and improvements to the city and county street networks for intracity trips (i.e., using Cornell or Cornelius Pass between Hillsboro and other cities, instead of Highway 26).

GENERAL ACCESS TO HILLSBORO AIRPORT – SURROUNDING ROADS

The airport is surrounded by the arterials of NW Evergreen Road to the north, NE Cornell Road to the south, NE Brookwood Parkway to the east, and NE 25th Avenue to the west (see Exhibit 1B – Existing Airfield Facilities). Additional side streets that lead to airport property include NW Airport Road, NW 264th Avenue, and NW 268th Avenue. These side streets end in locked gates; therefore, no general public access is available at these locations.

Cornell Road is a very busy 5-lane arterial in good condition, with stoplights, bike lanes, sidewalks and curbs in the vicinity of the airport. Evergreen Road is only slightly less busy than Cornell; from 25th to Brookwood Parkway it is 2-3 lanes, with new pavement, some paved median, curbs, sidewalks, and bike lanes. Brookwood is used with less frequency, and is in good condition, with 4 lanes, curbs, and sidewalks. 25th is a fairly busy street, with 2 lanes in good condition, and no curbs, sidewalks, or bike lanes.

Level of Service (LOS) describes a range of operating conditions on a roadway, including: speed and travel time, freedom to maneuver, traffic interruptions, safety, comfort, and convenience. Level A represents the best conditions, with free flow and very low delay or congestion. Level F represents the very worst operating conditions.

The Washington County 2020 Transportation Plan (2002) gives an existing LOS for all Hillsboro Airport surrounding roads of "C" or better. However, this same plan advises that without implementation of the document's recommended transportation improvements, the LOS for Cornell Road will drop to "D" or "E", and LOS for Highway 26 will drop to "E" and "F" (depending on highway section) by 2005. Of much concern to the Airport is the intersection of Cornell and 25th, which in 1999 had a LOS of "D". One of the goals of the Hillsboro Transportation System Plan (1999) is to provide for an efficient transportation system that manages congestion. This is consistent with regional goals. To this end, the Washington County 2020 Plan identifies system capacity improvements that will aid in easing congestion. Projects in the Airport area include the 25th Avenue Improvements, which would widen 25th to 3 lanes with bike lanes, and the Hillsboro to US 26 Improvements, which would improve the Shute Road and Cornell Corridor routes from Hillsboro to Highway 26. In addition, the Tri-Met Westside TMA project implements a transportation management association program aimed at reducing single occupancy automobile work commutes with employers in Western Washington County.

ACCESS TO AIRPORT TERMINAL

Auto: Access to the airport terminal is gained primarily via NE Cornell Road. Additional airport facilities are located to the northeast and northwest of the terminal, and can be reached by turning right onto Brookwood Parkway and NE 25th Avenue respectively, from Cornell.

The airport terminal is located about 3 miles south of Highway 26. Many travelers will be approaching the airport from Highway 26 westbound. Westbound drivers take the Shute Road exit south to Cornell Road. Turn right onto Cornell Road, and follow Cornell to a right-hand turn opposite 34th Avenue, directly into the airport terminal parking area. Highway 26 also has an exit directly to Cornell Road, an exit at 185th in Tanasborne, and an exit at Cornelius Pass Road, however, travel time to the airport will be lengthier using these exits. The exit to NW Jackson School Road will be more convenient for eastbound Highway 26 travelers west of Hillsboro. Eastbound drivers take the NW Jackson School Road exit south to Evergreen Road. Take left onto Evergreen Road, a right onto NE 25th Avenue, and a left onto Cornell Road.

Light Rail: The Fair Complex ("Fairplex")/Airport MAX Station is located about 0.4 mile south of the terminal building. The MAX Blue Line leaves for Hillsboro at 45-minute intervals from 12:00 A.M. to 4:45 A.M., and then 12-14 minute intervals from 5 A.M. to 11:30 P.M. weekdays. Trains to Elmonica/170th are available at 12:30 A.M., 8 A.M., and from 6:30 P.M. to 7:45 P.M. and to Ruby Junction/E 197th Ave from 6:30 A.M. to 8:30 A.M., and 5 P.M. to 11:40 P.M. The MAX Blue Line to Gresham leaves from 4:00 A.M. to 11 P.M. at 13-15 minute intervals. This route allows connections to the Portland International Airport.

Bus: A Tri-Met bus stop is located at the intersection of Cornell Road and 34th Avenue (Route 46 – regular local service to North Hillsboro), with buses leaving weekdays every 45 minutes for the Hillsboro Transit Center, from about noon to 7:30 P.M. This bus stops first at the Fair Complex Transit Center (MAX station), where riders can transfer to light rail. Another bus stop is located at 3355 Cornell, about 0.1 mile west of the Airport. The Route 48 bus leaves here for Willow Creek and the SW 185th Avenue Transit Center at 45 min.-1 hour intervals, from 6 A.M. to 10 P.M. weekdays.

Shuttle: Intel Corporation provides a continuous shuttle service for their employees to and from the Airport at Fairplex Station using Raz Transportation bus service. There is no public shuttle service that goes continuously from the airport to the Fairplex Station or other Hillsboro locales, however, riders can take the Tri-Met Route 46 bus, which makes its first stop at the Fairplex Station. Riders will pay for the entire transit ride (bus and light rail) when they embark on the Route 46 bus.

Cab: Taxis are available on-call. Pacific Cab Co., Hillsboro Taxicab, and Broadway Cab, Inc., are among the local companies providing service to the Airport.

Rental Cars: Hertz and Avis have rental desks in the airport terminal, with parking spaces reserved in the terminal parking lot. An additional 4 spots are reserved for Hertz customers at the terminal building on the Airport West Entrance road.

INTERNAL CIRCULATION

Internal circulation is via a combination of perimeter roads, parking lots, taxilanes and aprons. Beginning at the East Building Area, vehicles can travel along the paved East Perimeter Road, around the end of Runway 30, to the access gate adjacent to Hillsboro Aviation. Perimeter Road, between the northeast T-hangar area and the terminal building area, is restricted to airport staff vehicles, FAA vehicles, and FBO fuel trucks. Perimeter Road is closed to all other traffic because a portion of it is within the Runway 12-30 safety area. Proceeding west, through the parking lots to the paved West Perimeter Road around the end of Runway 2. The road then continues along the west side of the west building area. Access to the Runway ends, Navigational aids and other airfield facilities is via various taxiways, taxilanes, and aprons. The perimeter road doesn't extend to the North side of the airport. Access to this area is through gates along N.E. 268th Avenue and N.W. Airport Road.

Terminal Area Circulation

The main entrance to the terminal is at 34th Avenue off of Cornell Road. This entrance is a single-lane entrance with an immediate 90 degree turn, which can be a difficult movement when more than one car is entering or exiting the parking lot. The area also becomes a bottle neck when freight trucks and/or fuel supply trucks enter for distribution to HAI or Hangar 53. Site distance at this entrance is also limited due to overgrown landscape.

Airfield Circulation

There is limited room for the Intel buses to pick-up and drop-off passengers at the curb in front of the terminal building. During the time that they are parked in front of the building, vehicles in the first row of parking within the vehicle parking lot are somewhat restricted in their ability to enter or exit a parking stall. While parked at the curb, the Intel buses normally keep their engines running and the building's HVAC system will sometimes take into the interior of the building these diesel fumes.

The parking stalls are laid out for a one-way flow through the lot; however, the actual practice is frequently two way or opposite direction to the planned traffic flow.

The Port maintenance staff believes that the parking lot has too many landscape islands which affect circulation and capacity.

The Intel buses currently lay over between flights on the south side of the parking lot, which restricts the use of several diagonal parking spaces.

The general pavement condition of the access road in front of the terminal building is failing as the result of the weight of the buses and freight trucks that are using the road. The parking lot asphalt is also beyond its useful life and needs to be rehabilitated.

PARKING

Terminal Parking Lot: A total of 350 parking spaces. 29 spaces reserved for Hertz, 10 reserved for Avis, and 60 spaces reserved for the Intel Shuttle (as managed by Executive Jet).

Hillsboro Aviation: 64 general spaces, 35 spaces reserved for Hillsboro Aviation customer parking. Lot was about 85% full. In addition, employees park inside the fence adjacent to the office buildings.

West Entrance (Control Tower): 4 spaces reserved for Hertz customers, 11 spaces reserved for Aero Air customers, 33 spaces for general parking. There appears to be ample parking across the street at the business park. Lot was about 95% full.

Other Parking: Northwest Aircraft Maintenance has 15 spaces, Premier Jets and Museum has 10 spaces, Tualatin Valley Avionics and Eagle Flight Center have about 10 spaces. An empty grassy field next to Eagle Flight Center appears to be available for overflow parking, and approximately 30 spaces are available inside the fence adjacent to the West Apron Tiedown Area. In addition, some pilots park their vehicles inside their hangars when flying.

General: A Park-and-Ride lot with about 400 spaces is located at the Fairplex Transit Center. Lot was about 40% full.

SOCIOECONOMIC PROFILE

The socioeconomic profile provides a general look at the socioeconomic make-up of the community that utilizes an airport. It also provides an understanding of the dynamics for growth and the potential changes that may affect aviation demand. Aviation demand forecasts are often directly related to the population base, economic strength of the region, and the ability of the region to sustain a strong economic base over an extended period of time. Current demographic and economic information was collected from Metro for the Portland-Vancouver Primary Metropolitan Statistical Area (PMSA).

POPULATION

As shown in **Table 1N** the population of the Portland metropolitan area nearly doubled between 1970 and 2002, growing by 85 percent and more than 900,000 residents. About 1.6 million or 82 percent of the metropolitan population resides in Oregon. The remaining residents are located in Clark County in the State of Washington. Almost one-half of Oregon's population lives in the metropolitan Portland area. Portland's population is primarily urban and has been for many decades.

Population growth in the metropolitan area has historically outpaced growth for the United States. For example, between 1990 and 2000, the United States population grew by 13 percent, whereas, the metropolitan Portland population grew by 27 percent.

TABLE 1N
Total Population and Households
Portland-Vancouver PMSA

Year	Total Population	Percent Change	Total Households	Percent Change
1970	1,078,100	N/A	N/A	N/A
1975	1,177,600	9.2%	N/A	N/A
1980	1,333,600	13.2%	N/A	N/A
1985	1,378,400	3.4%	N/A	N/A
1990	1,515,500	9.9%	575,500	N/A
1995	1,720,800	13.5%	653,100	13.5%
2000	1,918,100	11.5%	730,200	11.8%
2001	1,946,000	1.5%	741,700	1.6%
2002	1,978,200	1.7%	751,800	1.4%
Average Annual Growth Rate				
1970-1980	2.1%			
1980-1990	1.3%			
1990-2000	2.2%		2.3%	
2000-2002	1.9%			

Source: Economic Report to the Metro Council, 2000-2030 Regional Forecast for the Portland-Vancouver Metropolitan Area, September 2002.

Population growth depends on changes in births, deaths, and migration. The difference between births and deaths is called natural increase.

According to the Population Research Center at Portland State University, natural increase contributed about 134,000 persons, or 18%, of the metropolitan area's growth from 1990 to 2000. Migration, however, has been the main factor affecting population growth in the metropolitan area. According to the Population Research Center, migration accounted for more than two-thirds of the area's population increase from 1990 to 2000.

HOUSEHOLDS

Metro has maintained historical information on the number of households since 1990. The number of households between 1990 and 2002 is summarized in Table 1N. As shown in this table, growth in the number of households has been nearly equivalent to population growth.

EMPLOYMENT

Employment opportunities affect migration to the metropolitan area and population growth. Historically, when unemployment rates have been low in the metropolitan area, net migration has increased. Except for an upswing in 1992-1993, unemployment remained below five percent in the metropolitan area between 1988 and 2000. Unemployment grew to six percent in 2001, and over eight percent in 2002 and 2003.

Table 1P summarizes total employment for the metropolitan area from 1970 to 2002. As shown in the table, the metropolitan area recorded consistent growth in total employment between 1970 and 2000. During that 30-year period, total employment grew by more than 741,000. Between 2000 and 2002, total employment decreased by 5,800. The decline in total employment follows with the increases in unemployment in 2001 and 2002. Between 1970 and 2002, total employment grew at three percent annually. This is 1.1 percent higher than the population growth over that period, which was 1.9 percent annually.

Historically, wage and salary employment has accounted for 80 percent of all employment. Self-employment, partnerships, and wage salary workers accounted for approximately 19 percent, while defense employment has historically accounted for less than one percent of total employment in the Portland-Vancouver PMSA.

Non-manufacturing wage and salary employment has grown the greatest of all employment categories, adding more than 509,000 workers between 1970 and 2002. Only 51,000 manufacturing jobs were added since 1970, with over 46,000 of those in durable manufacturing. The proprietors plus category has grown by over 174,000, whereas military employment has slightly declined.

TABLE 1P
Total Employment
Portland-Vancouver PMSA

	EMPLOYMENT						
	*			Wage and Salary			
Year	**Total Emp. w/Defense**	**Percent Change**	**Proprietors Plus**	**Durable Mtg.**	**Non-Durable Mtg.**	**Non-Mfg.**	**Military**
1970	475,600	N/A	78,700	56,500	32,100	301,500	6,800
1975	561,100	18.0%	99,700	63,000	30,800	359,600	8,000
1980	699,300	24.6%	120,100	86,100	32,700	453,800	6,600
1985	728,500	4.2%	142,500	75,200	32,200	470,900	7,800
1990	891,500	22.4%	168,000	85,300	36,400	593,500	8,300
1995	1,038,800	16.5%	201,100	94,600	40,300	695,600	7,200
2000	1,217,000	17.2%	252,200	107,400	38,100	812,500	6,800
2001	1,215,800	-0.1%	254,300	105,000	37,200	812,500	6,700
2002	1,211,200	-0.4%	253,300	103,300	37,100	810,900	6,600
Average Annual Growth Rate							
1970-1980	3.9%		4.7%	4.39%	0.2%	4.2%	-0.3%
1980-1990	2.5%		3.4%	-0.1%	1.1%	2.7%	2.3%
1990-2000	2.6%		3.5%	1.6%	0.2%	2.6%	-1.9%
2000-2002	3.0%		3.7%	1.9%	0.5%	3.1%	-0.1%

Source: Economic Report to the Metro Council, 2000-2030 Regional Forecast for the Portland-Vancouver Metropolitan Area, September 2002

* Includes Partnerships, self-employed, and wage salary workers

Components of Wage and Salary Employment

Wage and salary employment is categorized by industry to aid in the understanding of employment characteristics in the Portland-Vancouver PMSA. There are nine categories of wage and salary employment as shown in **Table 1Q**. Service is the largest category of employment, representing 29.3 percent of total wage and salary employment in 2002. This category has shown the largest amount of growth since 1970, growing by nearly 210,000 positions. The service category has increased from 17.8 percent of wage and salary employment in 1970.

Growth in the Retail Trade sector since 1970 was second only to growth in the Service category. Between 1970 and 2002, the retail trade category grew by 105,300 positions. State and local government had the third largest employment gain, growing by 59,100 positions. The Manufacturing sector saw the next largest job growth, growing by 51,800 positions. The Finance, Insurance, and Real Estate (F.I.R.E.) sector grew by 39,200 positions during this time period; while Construction and Mining grew by 35,700 positions; Wholesale Trade grew by 32,600 positions; Transportation, Communications, and Utilities grew by 24,000 positions; and Federal Civilian employment grew by 4,000 positions.

TABLE 1Q
Components of Wage and Salary Employment
Portland-Vancouver PMSA

	WAGE AND SALARY EMPLOYMENT									
Year	**Total**	**C&M**	**Man.**	**T.C.&U.**	**Wholesale Trade**	**Retail Trade**	**F.I.R.E.**	**Service**	**St. & Loc. Govt.**	**Fed. Civ. Govt.**
1970	390,100	17,600	88,600	30,500	32,400	62,100	25,300	69,600	49,900	14,100
1975	453,400	18,700	93,800	30,900	36,400	77,500	32,700	88,500	60,000	15,000
1980	572,600	26,000	118,800	37,100	46,000	99,500	46,600	114,200	68,100	16,400
1985	578,300	21,400	107,400	36,800	48,500	102,200	45,000	131,400	69,200	16,600
1990	715,200	36,300	121,700	41,600	55,200	128,200	52,100	182,200	79,900	18,100
1995	830,500	45,000	134,900	47,800	61,800	147,100	59,800	226,100	90,600	17,600
2000	958,000	53,900	145,500	55,400	67,200	168,100	64,500	276,300	108,500	18,500
2001	954,800	53,100	142,200	54,800	65,600	168,100	64,600	278,900	109,700	17,900
2002	951,300	53,300	140,400	54,500	65,000	167,400	64,500	279,100	109,000	18,100
Average Annual Growth Rate										
1970-1980	3.9%	4.0%	3.0%	2.0%	3.6%	4.8%	6.3%	5.1%	3.2%	1.5%
1980-1990	2.2%	3.4%	0.2%	1.2%	1.8%	2.6%	1.1%	4.8%	1.6%	1.0%
1990-2000	3.4%	3.3%	1.2%	2.3%	1.4%	2.2%	1.8%	3.6%	2.6%	0.0%
2000-2002	2.8%	3.5%	1.4%	1.8%	2.2%	3.1%	3.0%	4.4%	2.5%	0.8%

Source: Economic Report to the Metro Council, 2000-2030 Regional Forecast for the Portland-Vancouver Metropolitan Area, September 2002.

C&M -- Construction and Mining
T.C. & U. -- Transportation, Communication, and Utilities
F.I.R.E. -- Finance, Insurance, and Real Estate
St. -- State
Loc. -- Local
Fed. -- Federal
Civ. -- Civilian
Govt. -- Government

PER CAPITA PERSONAL INCOME

Per capita personal income (PCPI) for the Portland-Vancouver PMSA is summarized in **Table 1R.** PCPI is determined by dividing total income by population. Therefore, for PCPI to grow significantly, income growth must outpace population growth. PCPI figures in the table have been adjusted to constant 1996 dollars to eliminate the effects of inflation. As shown in the table, PCPI has grown significantly since 1970, growing at an average annual rate of 6.5 percent between 1970 and 2002. However, PCPI has shown the slowest growth rate lately. Between 1990 and 2002, PCPI grew at only 3.9 percent annually. Between 1980 and 1990, PCPI grew at 6.5 percent annually, while PCPI grew at 10 percent annually between 1970 and 1980.

CLIMATE

Weather plays an important role in the operational capabilities of an airport. Temperature is an important factor in determining runway length required for aircraft operations. The percentage of time that visibility is impaired due to cloud coverage is a major factor in determining the use of instrument approach aids. Wind speed and direction determine runway selection and operational flow.

TABLE 1R Per Capita Personal Income (PCPI) Portland-Vancouver PMSA	
Year	**Per Capita Personal Income, 1996$**
1970	$4,368
1975	6,813
1980	11,324
1985	15,179
1990	20,649
1995	25,377
2000	31,844
2001	32,455
2002	32,563
Average Annual Growth Rate	
1970-1980	10.0%
1980-1990	6.2%
1990-2000	3.9%
2000-2002	6.5%
Source: Economic Report to the Metro Council, 2000-2030 Regional Forecast for the Portland-Vancouver Metropolitan Area, September 2002.	

Approximately 88 percent of the region's annual rainfall total occurs in the months of October through May, 9 percent in June and September, while only 3 percent comes in July and August. Precipitation is mostly rain, as on the average there are only five days each year with measurable snow. Snowfalls are seldom more than a couple of inches, and generally last only a few days. The winter season is marked by relatively mild temperatures, cloudy skies and rain, with southeasterly surface winds predominating. Summer produces pleasantly mild temperatures, northwesterly winds and very little precipitation. Fall and spring are transitional in nature. Fall and early winter are times with the most frequent fog. **Table 1S** summarizes typical temperature and precipitation data for the region.

TABLE 1S Temperature and Precipitation Data			
	Temperature (Fahrenheit)		
	Means		
	Maximum	**Minimum**	**Precipitation (inches)**
January	45.4	33.3	6.31
February	50.6	35.0	4.49
March	55.4	37.0	3.93
April	61.5	39.7	2.21
May	68.1	44.4	1.79
June	73.6	49.5	1.46
July	80.7	52.5	0.48
August	80.7	51.9	0.83
September	76.1	47.7	1.39
October	64.3	41.6	2.95
November	52.6	37.7	5.78
December	46.2	34.3	6.62
Annual	62.9	42.1	38.24
Source: International Station Meteorological Climate Summary, 1926-1995.			

As shown in **Table 1T**, on average, rain falls 196 days per year and visibility is restricted 142 days annually.

TABLE 1T
Mean Number of Days by Month with Precipitation or Obstructions to Vision

	Precipitation (Days)	Obstruction to Vision[1] (Days)
January	22	16
February	19	13
March	21	11
April	19	9
May	16	6
June	13	5
July	7	5
August	8	8
September	11	14
October	16	20
November	21	18
December	23	17
Annual Total	196	142

Source: International Station Meteorological Climate Summary, 1926-1995
[1] Smoke, Haze, Blowing Snow, Sand, Dust

According to Federal Aviation Administration regulations, visual flight conditions exist when the cloud ceilings are 3,000 feet above the ground and visibility is greater than three miles. As shown in **Table 1U**, these conditions occur 81.2 percent of the time in the Portland region. When flight conditions with lower visibility and cloud ceilings exist, pilots must rely on navigational aids to safely navigate and land at Hillsboro Airport. The existing airport navigational aids are relied upon 18.8 percent of the time.

TABLE 1U
Percent Frequency of Ceiling and Visibility Conditions

	Visibility (Statute Miles)			
Ceiling	**> = 1**	**> = ¾**	**> = ½**	**> = ¼**
> = 3,000’	81.2%	81.3%	81.5%	81.6%
> = 500’	96.6%	96.8%	97.0%	97.2%
> = 200’	97.5%	97.9%	98.3%	98.6%
> = 100’	97.6%	98.0%	98.4%	98.8%
> = 0’	97.6%	98.0%	98.4%	98.9%

Source: International Station Meteorological Climate Summary, 1926-1995.

ENVIRONMENTAL FACTORS INVENTORY

As part of the Master Plan update for Portland's Hillsboro Airport (HIO), the Federal Aviation Administration (FAA) recommends early consideration of environmental consequences. This inventory summarizes those aspects of the environment that occur at HIO and how they might be considered within the alternatives planning process. The categories and level of detail presented are in accordance with the Federal Aviation Administration's Airport Environmental Handbook (FAA 5050.4A). The purpose of this inventory is to provide a preliminary review of environmental issues that would need to be analyzed in more detail within the NEPA or the permitting process for specific projects that may trigger the need for such analysis. Consequently, this analysis does not address mitigation or the resolution of environmental impacts.

Each of the environmental categories listed in FAA Order 5050.4A were investigated within this inventory. Data, maps, aerial photographs, published and non-published literature were researched and obtained as listed in the report bibliography. The data sources were primarily from Port of Portland's environmental offices located at its downtown headquarters building and at the Aviation Office located at the Portland International Airport. Other sources included Metro, City of Hillsboro, Washington County, Clean Water Services and federal agencies. Mapped data was reviewed (and updated) in consultation with the Port's environmental managers. Tabular data associated with the GIS mapping was reviewed and summarized for this inventory. None of the resource information was field checked for this preliminary review; however, field verification will be conducted prior to any further NEPA compliance or permitting activity.

There are several environmental resources within the FAA Order 5050.4A that are not relevant to the Hillsboro Airport Master Plan either because they do not exist there or they are being investigated as part of a separate study for the planning effort (i.e., operational noise and land use compatibility). Resource information and opportunities or constraints are presented below for each of the FAA Order 5050.4A categories with the exception of coastal zones and coastal barriers, as these categories do not appear within or near the HIO. Additionally, there are several categories that do not occur in the Airport Environmental Handbook (Order 5050.4A) but are investigated in this inventory because they pertain to HIO.

SOCIAL IMPACTS

Authority: Uniform Relocation Assistance and Real Property Acquisition Policies of 1970 and Washington County and City of Hillsboro Ordinances and Codes.

These impacts are often associated with the relocation of residents or businesses or other community disruptions. The airport is surrounded by residential and industrial land uses. Compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act will be required for the purchase of any residence, business or farmland envisioned for any potential development of the airport.

INDUCED SOCIOECONOMIC IMPACTS

Authority: Washington County and City of Hillsboro Ordinances and Codes

The likelihood of significant induced socioeconomic impacts is extremely low. These impacts, where they occur, include shifts in patterns of population movement and growth, increases in public services demand, and major changes in business and economic activity. If the planning alternatives focus on a preferred alternative that creates significant impacts in noise, land use or direct social impacts, only then would there be greater induced socioeconomic impacts. Again, there would have to be significant direct impacts to result in significant induced impacts.

ENVIRONMENTAL JUSTICE

Authority: Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

The potential for displacement of minority or low income populations at a higher percentage than the general population is low. The principal areas of analysis to determine potential environmental justice impacts to the racial groups are guided by the following three concepts from the USDOT, *Environmental Justice – The Facts*, July 3, 2002.

1) Avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects including social and economic effects on minority and low income populations,

2) Ensure the full and fair participation by residents in the affected community, and

3) Prevent the denial or, reduction in, or significant delay in the receipt of benefits by minority and low income populations.

From the standpoint of Concept 1, the age cohort and income level of residents within the City of Hillsboro are not minority populations or high percentage of elderly; therefore should any displacements occur (which is remote), there would not be a disproportionate adverse effect on these groups.

From the standpoint of Concept 2, the Master Plan project will have numerous public meetings and open houses as well as other media outreach (newsletters, meetings with neighborhood groups). The Port has appointed a Project Advisory Committee (PAC) with neighborhood representatives to assist them in identifying alternatives and decide on the preferred alternative. Neighborhood residents and others will be encouraged to attend all meetings and to contact the Port's project manager should they have any questions regarding the project.

From the standpoint of Concept 3, the Port will identify any direct or secondary impacts to residents in the project study area. For those residents that have the potential to be negatively impacted, the Port would take compensatory actions in the form of financial compensation for property and improvements to be acquired in part or full, relocation benefits, and other measures to ensure that all residents would be fairly treated.

WATER QUALITY

Authority: Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977; 1982 Airport Act

There are two hydrographic basins within the airport property, both part of the Tualatin River basin, a water quality limited river. The DEQ is establishing total maximum daily loads (TMDLs) on waters of the state that have been designated water quality limited. Both Dawson and McKay Creeks eventually discharge to the Tualatin and the TMDLs will be established as part of the Tualatin Basin program.

Approximating the northern boundary of the property, the unnamed tributary flows into McKay Creek approximately 2.6 miles toward the northwest of the airport boundary. The unnamed tributary is an intermittent drainage that flows to McKay Creek which discharges to Dairy Creek, a major tributary of the Tualatin River.

Dawson Creek flows southeast on the eastern portion of the airport property. Dawson Creek is a regionally significant feature that is protected under the jurisdiction of Clean Water Services.

Pesticides are used to control pests and weeds throughout the airport property. This ongoing lawn and landscaping maintenance also require that water quality standards (OAR 340-41) be upheld by the Port or the tenants of the HIO.

An extensive storm water pollution control program (SWPCP) is in place for the Port and industrial tenants at HIO. This program is described under storm water, below. There is some potential for water quality degradation due to storm water runoff from office buildings, parking lots and other non-regulated activities since storm water discharges from site areas not associated with industrial activity are not subject to SWPCP monitoring requirements.

AIR QUALITY

Authority: Section 176 Clean Air Act Amendments of 1977; 1982 Airport Act

The FAA is responsible for assuring that Federal airport actions conform to state Plans for controlling area wide air pollution impacts. Oregon is a state that does not have applicable indirect source review (ISR) requirements, so the need for air quality analysis is assessed based upon the activity levels of the facility. An air quality analysis is required for general aviation airports if the levels of activity forecast in the time frame of the proposed action are greater than 180,000 operations forecast annually. Hillsboro Airport currently has over 200,000 annual operations, so an emissions inventory for the existing airport conditions and forecast conditions with and without the project will be required as part of any future NEPA review. The DEQ Air Quality should be consulted on the format and methods as well as to review the results of the study to be certain that HIO will be in conformance with the State Implementation Plan (SIP). Additional analysis would be required only if the project did not conform to the SIP or that the proposed project resulted in carbon monoxide levels that exceeded state or national standards.

SECTION 4F

Authority: Section 4(f) of the Department of Transportation Act 1966

Section 4(f) of the DOT Act aims to protect key public lands including federal, state or local public parks, recreation areas, wildlife or waterfowl refuges, or historic sites from impacts associated with transportation projects.

Hillsboro Airport is owned by the Port of Portland. There is no public recreation or park land within the airport boundaries. The Washington County fairgrounds is just south of Cornell Road and is accessed from Sewell Road. The Port of Portland may need to address this public use area if any of the alternatives would require use of the County fairgrounds.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Authority: National Historic Preservation Act of 1966, as amended and Archeological and Historic Preservation Act of 1974

There have been several cultural resource surveys of the Hillsboro Airport vicinity for purposes of improvement to Evergreen Road and for the airport runway safety area project. The records search and literature review indicated that the project area lies within the traditional homeland of the Tualatin Indians. As such, there is a probability that archaeological resources could occur especially along the waterways. There are no properties that are eligible for the National Historic Site Register or National Historic Landmarks within the Hillsboro area.

BIOTIC COMMUNITIES

Authority: Clean Water Services, ODFW, Metro, Port of Portland's resource management policies; if affecting water resources- Fish and Wildlife Coordination Act

This section includes discussion of the following aspects of the biotic communities: watershed, creeks and waterways; wildlife habitat types and structure (**Exhibit 1G** and **Exhibit 1H**); vegetation including noxious or invasive plant species and control; wildlife use and potential wildlife hazards; and sensitivity of the biotic communities relative to the region's natural resource goals and policies.

The value of the waterways is discussed under water quality and endangered species sections of this report. Local wildlife habitat (Exhibit 1G) for HIO are homogeneous comprised almost entirely of improved pasture, perennial grass seed hay or grass/forb plant communities. Exceptions to this as previously mentioned are the herbaceous wetland habitats around the waterways and particularly the mixed conifer – hardwood woodlands in the eastern bounds of the airport along Dawson Creek. Riparian vegetation, i.e. cottonwood, willow, ash forest, exists in this same corridor as well as several small patches of medium height conifer.

The Port's GIS database contains specific notes on exotic plants that occur on HIO. Four noxious weeds, i.e. Himalayan blackberry, Scot's broom, English ivy, and bull thistle and four invasive species, i.e. reed canary grass, thistle, teasel and poison hemlock occur on the HIO property. The incidence of these plant species appears to be higher along the natural resource protection zones and waterways; this may be because the Port conducts routine weed control as part of their maintenance. Reed canary grass and Himalayan blackberry and thistle are abundant within the riparian corridor along Dawson Creek. Reed canary grass is also common in the wetlands along the northern boundary of the airport. Control of invasive and noxious weeds is recommended but problematic as chemical treatment is sometimes forbidden and manual removal is costly and often requires repeat treatment (Personal communication, D. Green, July 2003).

Raptors are a threat to aircraft and airfield operations. There are no nest trees on the HIO property and bald eagle do not occur there. Red-tailed hawk may frequent the airport foraging for food and hazing harassment is not effective when a prey base is present. The options to exclude red tails or other raptors include direct intervention or reduction of the prey base. The HIO has a perimeter fence, but the hawk's prey base, e.g. voles, moles, field mice, are present. A preferred method of reducing raptor use on the airfield is to install an exclusion fence with underground apron to exclude the small burrowing mammals from the property.

As much of the airport property has been altered through historic ranching, agriculture, industry and the use of the site as an airfield since the 1930's, the biotic communities within the airport boundaries are of relatively poor quality. The riparian habitat along Dawson Creek provides value to the local wildlife and is protected under Clean Water Services rules for vegetated corridors as well as under the State of Oregon Land Use Law, Goal 5 for Natural Resource Protection. Although much is documented about the sensitivity of the biotic communities, any airport actions would actually provide an opportunity for habitat improvements and wetland restoration and enhancement on sites outside of the airport operations areas. The Randall Site has been planned as a wetland mitigation area for improvements completed along Evergreen Road and in connection with the Runway Safety Area project. Other sites should be considered for natural resource preservation or restoration should the property acquisition continue in the surrounding the airport boundary. Invasive plant species removal and control, wetland restoration, reconnection of the historic flood plains and other mitigative measures are certainly all available and would allow the HIO to better meet the region's natural resource goals and policies.

ENDANGERED AND THREATENED SPECIES

Authority: Section 7 Endangered Species Act, as amended.

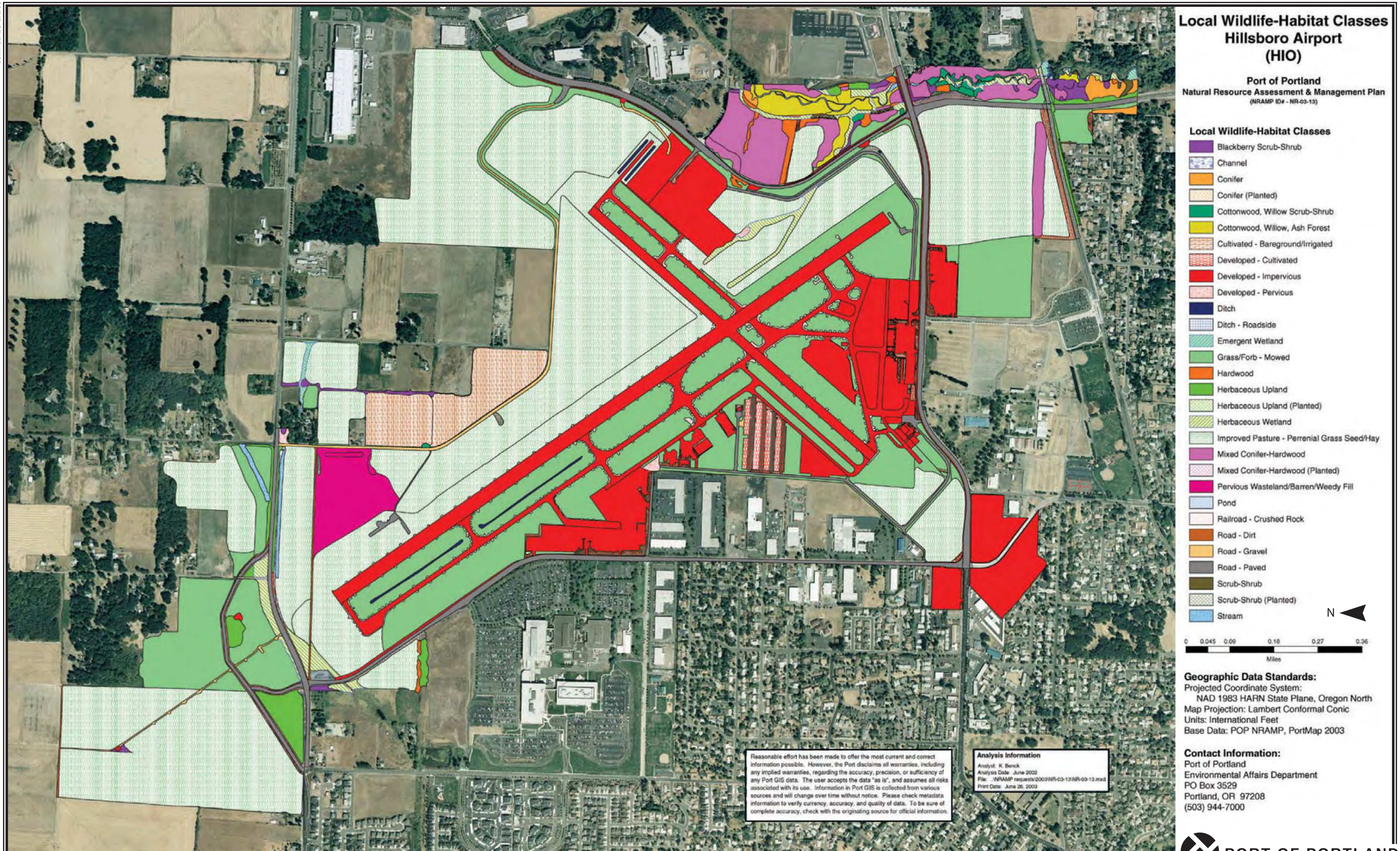
The HIO is in the Tualatin River Basin along an unnamed tributary to McKay Creek and to the west of the Dawson Creek. This section describes the known endangered, threatened or sensitive plant or animal species within the study area. In this case the study area was broadened beyond the airport boundaries to the area of ecological influence, the portion of the Tualatin River Basin that includes the Dawson and McKay Creeks and their tributaries. Agencies that were consulted include the Oregon Natural Heritage Program, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service (NOAA Fisheries). The response to a species request letters from the Oregon Natural Heritage Program included bald eagle, Upper Willamette River steelhead trout (*Oncorhynchus mykiss),* Northwestern Pond Turtle *(Emys marmorata* ssp. *marmorata)* and Shaggy Horkelia (*Horkelia congesta* ssp. *congesta)* as potentially present within a two mile radius of the study area. The significance of this fish listing is discussed in the Section X, Essential Fish Habitat. Wildlife and plants are within the riparian areas that are discussed within Section VIII, Biotic Communities.

ESSENTIAL FISH HABITAT

Authority: Section 305 Magnuson-Stevenson Act of 1996, as amended.

Under Section 305 of the Magnuson-Stevens Act, federal agencies that authorize, fund, or undertake any action that may adversely affect any essential fish habitat (EFH) are required to consult with NOAA-Fisheries to receive recommendations on measures necessary to conserve or enhance EFH. Statutorily defined, EFH is those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. EFH is designated on the basis of information indicating that certain aquatic habitats or conditions are necessary to sustain the fishery. Response from NOAA Fisheries indicates that all aquatic habitat within the project study area is desig-

03MP01-1G-5/6/05



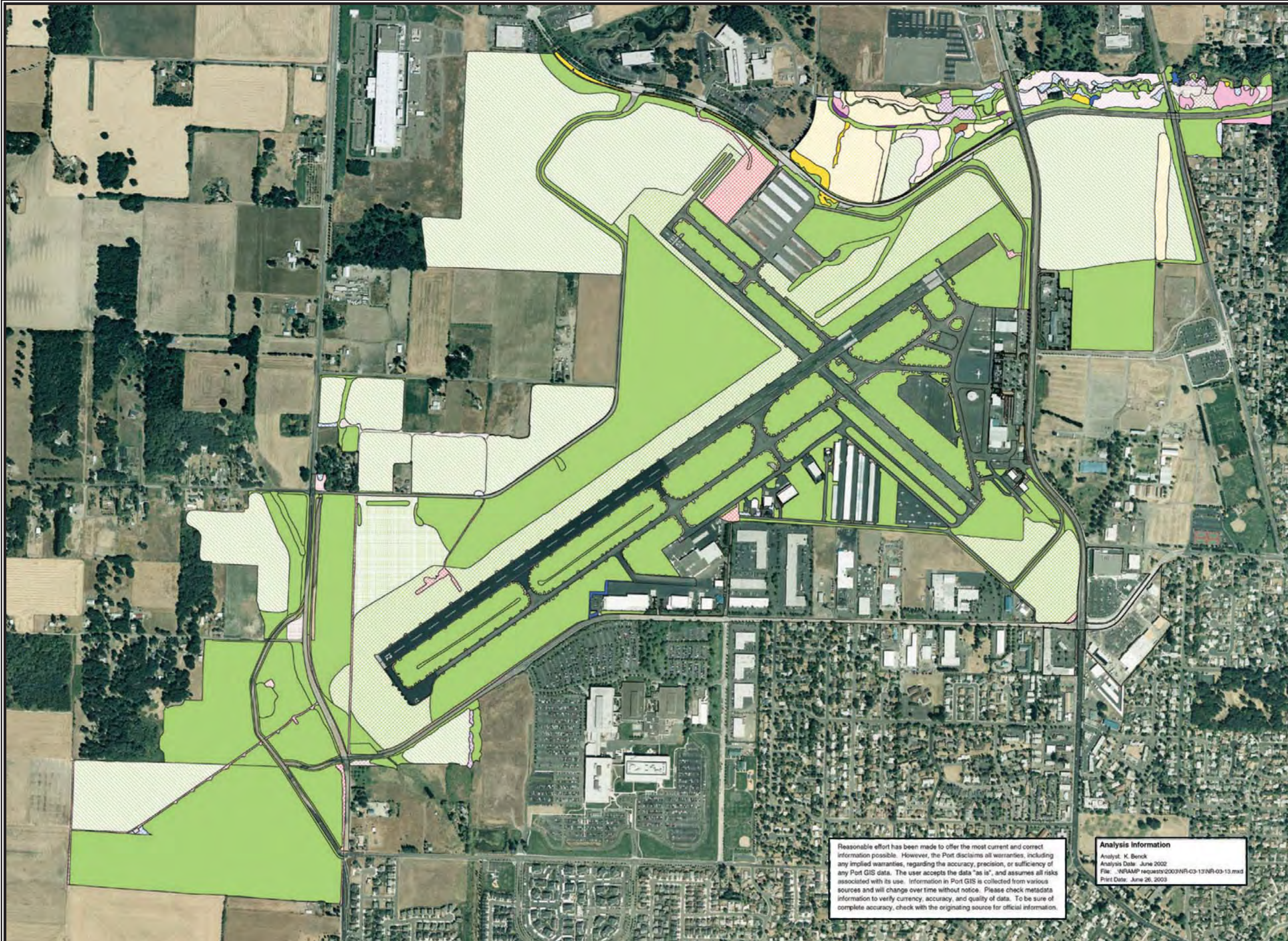
PORT OF PORTLAND

Exhibit 1G
LOCAL WILDLIFE-HABITAT CLASSES

03MP01-1H-5/6/05

Habitat Structural Conditions Hillsboro Airport (HIO)

Port of Portland
Natural Resource Assessment & Management Plan
(NRAMP ID# - NR-03-13)



Structural Conditions (HIO)

- No Structural Conditions Identified
- Agricultural SC's
  - Cultivated Crop
  - Improved Pasture
  - Unimproved Pasture
- Shrub/Grass SC's
  - Grass/Forb
  - Low Shrub - Seedling/Young
  - Medium Shrub - Seedling/Young
  - Medium Shrub - Mature
  - Medium Shrub - Old
  - Tall Shrub - Seedling/Young
  - Tall Shrub - Mature
  - Tall Shrub - Old
- Forested SC's
  - Shrub/Seedling
  - Sapling/Pole
  - Small Tree - Single Story
  - Small Tree - Multi-story
  - Medium Tree - Single Story
  - Medium Tree - Multi-story
  - Large Tree - Multi-story
- Urban SC's
  - Medium Density Urban
  - Low Density Urban

N

0 0.045 0.09 0.18 0.27 0.36
Miles

Geographic Data Standards:
Projected Coordinate System:
NAD 1983 HARN State Plane, Oregon North
Map Projection: Lambert Conformal Conic
Units: International Feet
Base Data: POP NRAMP, PortMap 2003

Contact Information:
Port of Portland
Environmental Affairs Department
PO Box 3529
Portland, OR 97208
(503) 944-7000

PORT OF PORTLAND

Exhibit 1H
HABITAT STRUCTURAL CONDITIONS

nated as EFH for chinook and coho salmon (Correspondence re Hillsboro Airport from NOAA Fisheries, July 2, 2003). The type of EFH potentially affected by this project is freshwater, riverine salmonid spawning and rearing habitat. There is no chinook salmon or steelhead trout spawning or rearing habitat within the intermittent tributary to McKay Creek (Final Biological Assessment for the Runway Safety Area, January 24, 2001). Essential fish habitat for coho and winter-run steelhead occurs within Dawson Creek, therefore, if there is any activity planned that may adversely effect the Dawson Creek system, both the Oregon Department of Fish and Wildlife and NOAA Fisheries should be consulted.

MIGRATORY BIRDS

Authority: Migratory Bird Treaty Act of 1918, as amended.

Migratory birds are protected under this federal law. It is specifically prohibited to pursue, hunt, take, capture, kill, attempt to take, capture or kill …any migratory birds or any part, nest, or eggs of any such bird. For general aviation airports, it is typically upheld by taking measures to exclude (or at least not attract) migratory birds from the airport operations areas. Measures must be taken to limit the open ponded areas or types of landscape vegetation that would be an attractant to the birds as they migrate. Currently there is a storm water collection ditch on the airport runway that collects water from both the runway as well as the filled bench area to the north of the runway. This ditch is filled with water during the bird migration period and it attracts waterfowl (Personal Communication, D. Green, July 2003). Plans are underway to redesign the storm water system as part of the Phase IV Airfield Improvement Program, such that the runoff does not pond but is immediately piped underground thereby eliminating this hazard.

WETLANDS

Authority: Executive Order 11990, Protection of Wetlands, Section 404 Clean Water Act

The wetlands that have been identified on the airport property include riverine slope systems that are associated with the creeks and tributaries to the McKay and Dawson Creeks (**Exhibit 1J**). There are a few isolated wetlands that are depressional closed systems related to historic remnants of pre existing waterways. The Corps of Engineers no longer claims jurisdiction over the isolated depressional closed systems that are not hydrologically connected to the water of the U.S. No comprehensive wetlands inventory has been made for all Port of Portland properties; however, most of the wetlands have been identified from aerial photographic interpretation and from project specific delineations done for the development projects approved on the HIO property within the past five years. The wetlands shown in the areas around the McKay Creek were field verified. Also, the wetlands associated with the Dawson Creek (southeast airport boundary) have been inventoried as part of the Healthy Streams program for the Clean Water Services (formerly Unified Sewerage Agency) as shown on Figures 2 and 4. The Randall Property NW 860 334th Avenue is being used as the Port's mitigation bank for wetland impacts resulting from airport improvements under the current program (Preliminary Final Compensatory Mitigation Plan, Entranco August 24, 2000). Most of the wetland mitigation credits for this site are already slated for (Personal Communication, D. Green, July 2003); therefore it is recommended that additional wetland compensatory mitigation sites be identified for any future needs.

FLOODPLAINS

Authority: Executive Order 11988, Floodplain Management; DOT Order 5650.2 Floodplain Management and Protection

The intent of Executive Order 11988 is to mandate federal agencies to try to avoid flood loss and impact on human health and welfare by identifying and avoiding development within the 100 year floodplain, where practicable. The Order defines floodplains as "the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore including at a minimum that area subject to a one percent or greater chance of flooding in any given year", i.e. the area that would be inundated by a 100-year flood.

There are two floodplains within the HIO boundary (Exhibit 1J). The floodplain hydraulics of the intermittent tributary to McKay Creek are very well known (Entranco, December 12, 2000) because of the engineering modeling conducted as part of the Runway Safety Area project. Dawson Creek floodplain 100-year storm event should be considered if any of the proposed alternatives would be proposed in the southern half of the airport property.

WILD AND SCENIC RIVERS

Authority: Wild and Scenic Rivers Act

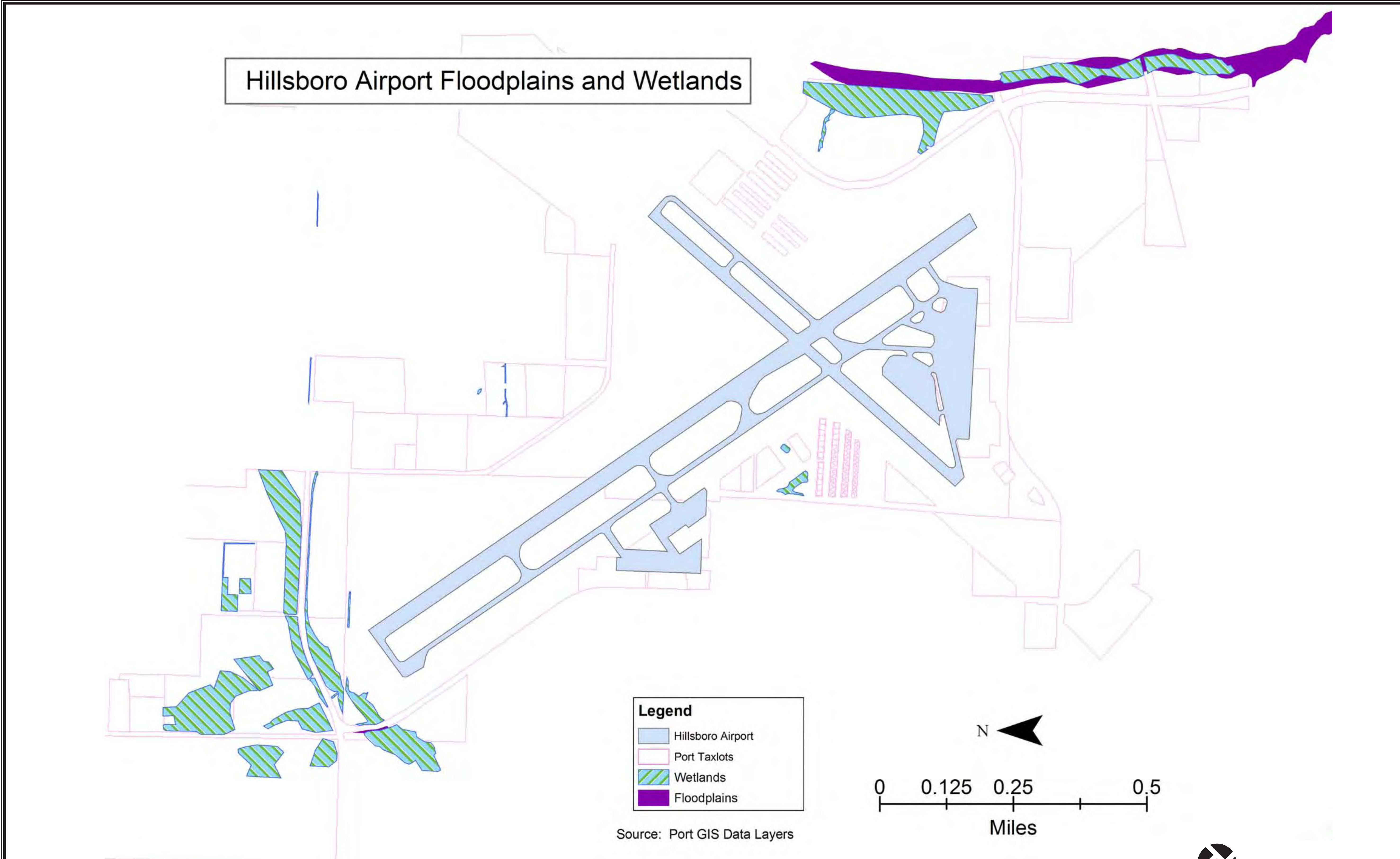
There are no rivers with a wild or scenic designation within the HIO vicinity. Onsite waterways are creeks and intermittent drainages. The nearest major river to the airport is the Tualatin River which is not designated or nominated for wild and/or scenic designation.

FARMLANDS

Authority: Farmland Protection Policy Act (FPPA), P.L. 97 98

This section relates to the degree to which the lands within the HIO qualify as protected agricultural lands, prime or unique farmlands. The Farmland Protection Policy Act (FPPA), P.L. 97 98, authorizes the Department of Agriculture (USDA) to develop criteria for identifying the effects of Federal programs on the conversion of

Hillsboro Airport Floodplains and Wetlands



Source: Port GIS Data Layers

PORT OF PORTLAND

Exhibit 1J

FLOODPLAINS AND WETLANDS

farmland to nonagricultural uses. Federal agencies are directed to use the developed criteria; to identify and take into account the adverse effects of Federal programs on the preservation of farmland; to consider appropriate alternative actions which could lessen adverse effects; and to assure that such Federal programs, to the extent practicable, are compatible with state, unit of local government, and private programs and policies to protect farmland.

Guidelines developed by the USDA became effective August 6, 1984, and apply to Federal activities or responsibilities that involve undertaking, financing or assisting construction or improvement projects or acquiring, managing, or disposing of Federal lands and facilities. For Airports Program actions, this includes proposed Airport Improvement Program projects and requests for conveyances of government land. The guidelines do not cover permitting or licensing programs for activities on private or nonfederal lands. Airport Layout Plan (ALP) approval, involving only development shown on an ALP which is not to be federally funded, even if farmland is involved, is exempt from FPPA. Some categorically excluded actions on prime or unique farmlands will still require coordination under the FPPA.

The land for the Hillsboro Airport was acquired in 1966; therefore, the FPPA does not apply and no formal coordination with the Natural Resource Conservation Service (NRCS) is required because the land was purchased prior to August 6, 1984, for purposes of being converted. For those lands outside of the airport boundary that may be acquired for future development, the prime or unique farmland designation should be confirmed and NRCS should be consulted.

ENERGY SUPPLY AND NATURAL RESOURCES

Authority: none specifically

There is some potential for changes in energy demands (i.e., terminal building heating or for airfield lighting). Should the airport alternatives require increased demands for electricity, Portland General Electric would be contacted. Any change to the airport layout or terminal facilities or industrial tenants could have an increased demand on the gas, electrical, communications or sewer systems. For increased gas or fuel consumption due to the movement of air or ground vehicles, the total volume of this can not be determined until alternative scenarios are identified and clarified.

LIGHT EMISSIONS

Authority: none specifically

The majority of airfield lighting is for the benefit of airborne craft, and is typically placed with an orientation that does not affect nearby residents, as the lighting is oriented toward the sky or the approach. For this preliminary inventory, no lighting was mapped and the Port of Portland airport operations had no record of complaints.

Placement of future lighting at the airfield has the potential to annoy people in the vicinity of the installation. Impacts are a result of increased operations and upgraded facilities. Should this occur, decisions on the placement of new lights must be made in consideration of the proximity to sensitive receptors such as residences or commercial facilities. Measures to shield or make adjustments to the light angle will often lessen the annoyance. Only under special circumstances would high intensity strobe lights be necessary and placement of these must be carefully evaluated with input from the community.

SOLID WASTE

Authority: RCRA, City of Hillsboro Sanitation and Disposal

Solid waste collection and disposal activities must be conducted at sufficient distance from the existing runways and taxiways to avoid interference with runway operations. HIO does not operate an on-site solid waste landfill. **Exhibit 1K** shows the location of the nearest landfill that currently receives refuse and solid waste from HIO. Hillsboro Sanitation and Disposal Services receives the unconsolidated refuse from the airport's 1.5 cubic yard container each week; it is typically underutilized (Personal communication, Sanitation Engineer, Hillsboro Sanitation and Disposal, July 2003). Also a refuse compactor with a 1.23-ton capacity is located at HIO. The refuse from this unit is picked up every three weeks from the airport and hauled to the Forest Grove transfer station and eventually to the McMinnville Landfill (Personal communication, Hillsboro Sanitation and Disposal Service, July 2003).

HAZARDOUS MATERIALS

Authority: CERCLA; SARA; RCRA; TRIS; UST/AST

Potential pollutants are associated with the airport industrial areas operations. Potential pollutants are inventoried as described within the Storm Water Pollution Control Plan (SWPCP) and include a variety of fuels and used oils, washing detergent and oils and grease, herbicides and pesticides, paints, thinners and solvents. The controls and containment catch basins and filters for these fuels and chemicals are part of the airports extensive storm utilities.

For properties that are being considered for acquisition northeast of the airport's primary runway, hazardous materials and storage tanks were inventoried as part of the preliminary site assessments conducted by the Port of Portland for Tax Lots 800, 900, 1100 and 2800. Port of Portland has references for the status of disposition of soil or water contamination, and any tanks that occur either above or under ground on each of these properties (S. Jones, Port of Portland, July 2003).

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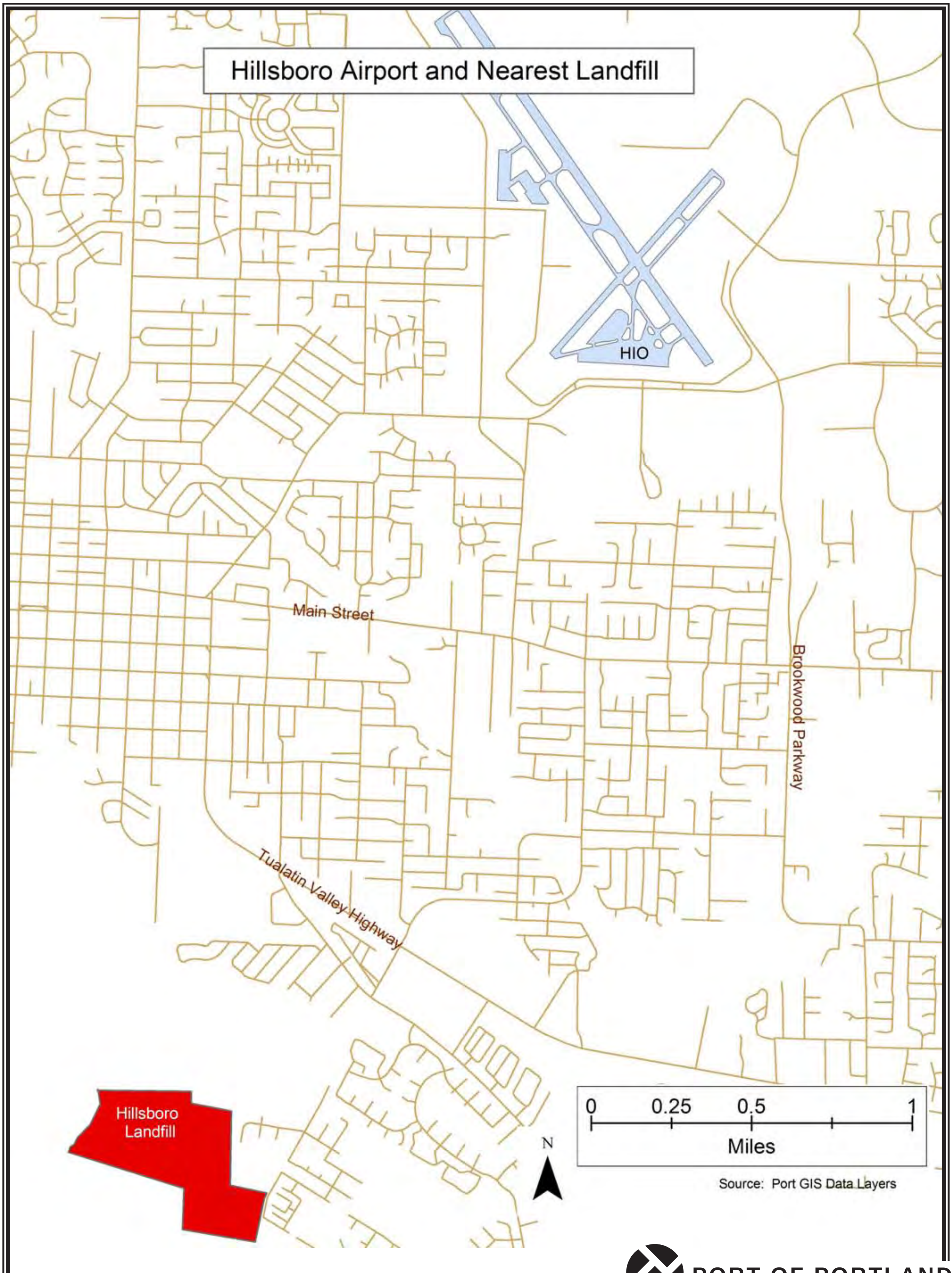

PORT OF PORTLAND

Exhibit 1K

NEAREST LANDFILL

STORM WATER PERMITS, SPCC, AND SWPCP PLANS

Authority: Section 402, Clean Water Act; Underground Injection Control program (OAR 340-044-0050)

Storm water runoff quantity, quality and handling are a primary issue at airports in general and at HIO specifically. An extensive storm water pollution control program is in place for the Port and industrial tenants at HIO (Figure 11). The storm water control and handling system is designed to quickly remove water from the airport surfaces and direct surface runoff into discharge areas that are permitted through the U.S. Environmental Protection Agency pursuant to the National Pollutant Discharge Elimination System. As part of the compliance with the federal and state implementation of the Clean Water Act, a Storm Water Pollution Control Plan (SWPCP) has been developed by the Port of Portland and its thirteen co-permittees. The co-permittees are tenants at HIO that include aeronautics and aircraft maintenance related businesses that use fuels that must be stored either above or under ground.

The control measures outlined in the HIO SWPCP are intended to meet the requirements of the 1200-Z Permit. The Oregon DEQ originally issued the Port of Portland this permit in November 1997 and extensive monthly monitoring is conducted, as required, on all industrial operations within the airport boundaries. Operations include vehicle and aircraft maintenance including rehabilitation, mechanical repairs maintenance painting fueling and lubrication equipment cleaning operations and wholesale bulk petroleum storage and handling facilities. Outfalls of the six drainage areas with industrial activity exposed to storm water are monitored using both grab samples and visual techniques.

OPERATIONAL INVENTORY AND AVIATION NOISE

This section summarizes the October 2002 through September 2003 estimate of the number of operations and type of aircraft operating (typically referred to as the fleet mix) at Hillsboro Airport. This section also provides the calculation of existing or current noise exposure contours generated from the operation of this fleet mix at the Hillsboro Airport during that time period.

This analysis defines the baseline fleet mix and noise exposure condition for Hillsboro Airport. This baseline condition will form the basis for determining the future fleet mix within Chapter Three, Aviation Demand Forecasts, and future facilities needs for the projected fleet mix, which will be defined within Chapter Four, Aviation Facility Requirements.

This analysis does not consider any new noise abatement procedures to reduce noise exposure. The existing noise contour maps shown in this section will serve as a baseline against which the noise exposure patterns resulting from potential changes in the airfield configurations will be compared and evaluated during the alternatives analysis and final concept aspects of the Master Plan.

OPERATIONAL INVENTORY

The number and type of aircraft operating at the airport (typically referred to as the fleet mix) is important for the Airport Master Plan. First, this information is used in the analysis of aircraft noise emissions and air quality (to be completed separately by the Port during future NEPA review). Since different aircraft types generate different noise and emission levels, the computer modeling requires the definition of aircraft by type and the number of operations attributable to those aircraft. Secondly, an understanding of the mix of aircraft operating at the airport is needed to define several critical airport design considerations for the airport. The mix of aircraft is important to defining the capacity of the runway system and size and type of landside facilities such as hangars and aircraft parking aprons. For example, business class aircraft require a different type and size of hangar facility than do smaller, general aviation aircraft.

Annual Operations

Prior to defining the mix of aircraft operating at an airport, a full accounting of annual aircraft operations must be determined. As detailed previously in this chapter, an operation is defined as either a takeoff or a landing. Aircraft operations are further classified as either local or itinerant. Local operations are performed by aircraft which:

(a) Operate in the local traffic pattern or within sight of the airport;

(b) Are known to be departing for or arriving from flight in local practice areas located within a 20-mile radius of the airport;

(c) Execute simulated instrument approaches or low passes at the airport.

Itinerant operations are all other operations and essentially represent the originating or departing aircraft.

The number of recorded local operations at an airport does not equate exactly to the number of flights. Since one aircraft's flight to the airport counts as two operations (one operation for the arrival and one operation for the departure), the number of flights to and from the airport is essentially half of the total number of operations. For example, if there are 100 recorded local operations at the airport at a given time, there would be approximately 50 flights.

It is important to understand this distinction, especially when considering those aircraft that conduct local training operations at an airport and their subsequent flights in the training pattern. A common training practice for helicopter or fixed wing aircraft is a "touch-and-go." A touch-and-go involves the pilot landing, then immediately departing. Since there is a landing and departure, a touch-and-go is counted as two operations even though only one aircraft, or flight, was involved.

Each and every aircraft arrival to and departure from Hillsboro Airport receiving a specific air traffic control instruction is counted by FAA Airport

Traffic Control Tower (ATCT) personnel as one operation. In October 2003, the FAA ATCT changed the manner in which they counted helicopter operations. As detailed earlier, when a helicopter is in the Alpha, Bravo, or Charlie pattern, FAA ATCT personnel only count the entry into the pattern or the exit from the pattern as an operation since this is when they provide a helicopter pilot with specific air traffic instructions. The FAA air traffic controllers keep track of operations by clicking a counter each time an aircraft is issued an instruction.

Airport Traffic Control Tower Count

The Federal Aviation Administration (FAA) Airport Traffic Control Tower (ATCT) is the primary source for the number of operations occurring at an airport. The Hillsboro Airport ATCT is open from 6:00 a.m. to 10:00 p.m. daily. During this period, aircraft operations at the airport are controlled and counted/logged by ATCT personnel. Between 10:00 p.m. and 6:00 a.m., there is no FAA tower-directed control of aircraft landings and departures at Hillsboro Airport. After 10:00 p.m., pilots maintain separation between aircraft by following standard traffic flight patterns and announcing their position and intentions over a radio frequency. Thus, aircraft operations after the tower is closed are not counted by the FAA.

Federal air traffic control guidance specifies for ATCT personnel exactly how operations are to be recorded for the official ATCT count. Keeping in mind that the principal purpose of the FAA ATCT operational count is to define the workload of personnel within the ATCT, national air traffic control guidance allows the ATCT personnel to record as operations only those aircraft operations in which ATCT clearance was issued. ATCT clearance is provided for the departure and arrival of all fixed wing aircraft. Therefore, most fixed wing operations are recorded by the ATCT.

As shown in **Table 1V**, the ATCT recorded 234,627 operations between October 2002 and September 2003. During the summer of 2003 the ATCT estimates that some helicopter operations may not have been fully accounted for in the ATCT count due to the changes in recording operations. For this reason, the ATCT has advised that the local operations count for October 2002 to September 2003, be increased by 15,000 for an adjusted total of 249,627.

TABLE 1V
Annual Operations
Hillsboro Airport
October 2002 – September 2003

	Day			Night			Total
	Local	Itinerant	Subtotal	Local	Itinerant	Subtotal	Operations
ATCT Recorded Operations	143,649	90,978	234,627				
Adjusted ATCT Count	158,649	90,978	249,627				
Port of Portland Estimate				1,753	2,467	4,220	
Total Annual Operations	**158,649**	**90,978**	**249,627**	**1,753**	**2,467**	**4,220**	**253,847**

Source: FAA, Port of Portland

Nighttime Operational Count

Since the ATCT is closed between 10:00 p.m. and 6:00 a.m. (typically referred to as "nighttime"), no operations are recorded by FAA personnel for Hillsboro Airport during this period. However, the assessment of aviation noise and air quality requires an estimate of all operations including those unaccounted for by the ATCT between the above-referenced hours.

To estimate operations between the hours of 10:00 p.m. and 6:00 a.m., the Port completed a review of recorded aircraft radio transmissions on the Hillsboro Airport Common Traffic Advisory Frequency (CTAF). The CTAF is used by pilots after the ATCT is closed, to broadcast their position and intentions to other pilots. Aircraft type is commonly transmitted by pilots on the CTAF.

The process used to estimate annual nighttime operations between October 2002 and September 2003 involved a review of CTAF tapes for three periods of time. These periods were determined by the Port to have similar characteristics in terms of hours of daylight, prevailing weather, and number of aircraft operations. The periods were:

Period 1: January, February, November, December

Period 2: March, April, September, October

Period 3: May through August

For period 1, 10 days of data from January 2004 were reviewed (every 3rd day starting on 1/3/04). This was averaged and multiplied by 3 to create a representative month of data. For period 2, 15 consecutive days in September 2003 were reviewed. The results were then multiplied by 2 to create a representative month. For period 3, every day of August 2003 was monitored and tabulated. The figures derived for each of these periods were added together, divided by three to yield a monthly average for night operations, and then that figure was multiplied by 12 to create an annual estimate. As shown in Table 1V, the Port estimates that there were approximately 4,220 annual operations conducted between October 2002 and September 2003, when the ATCT was closed. This equates to an average of 11 operations per day or approximately 341 per month.

DETERMINING THE FLEET MIX

The type of aircraft operating at Hillsboro Airport is not regularly recorded. One reason for this is that the recording of aircraft type requires actual aircraft observation by a person on the ground, since there is no electronic method to record aircraft operations by type. Aircraft type is not transmitted by an aircraft nor captured by air traffic control radar (most operations at Hillsboro Airport are presently outside radar coverage). While the aircraft type is recorded on aircraft flight plans, not all aircraft operating at Hillsboro Airport file a flight plan.

With the airport open 24 hours a day, 365 days per year, and handling over 250,000 annual operations, this would require a significant level of staff. Since fleet mix information is needed only periodically to reassess airport design parameters and there are alternative methods available to determine fleet mix, the fleet mix for the airport is only reviewed periodically.

To collect fleet mix data for Hillsboro Airport, several data sources and methods of collecting information on the fleet mix were employed. These sources and methods are described below.

Landing Fee Summaries

The Port of Portland collects a landing fee at Hillsboro Airport on general aviation aircraft used for commercial passenger or cargo operations and aircraft weighing 10,000 pounds or more. Since the landing fee is based upon the aircraft weight, the aircraft type must be known to accurately assess the landing fee. An examination of these landing fee reports which identify aircraft by type provided data for defining many turboprop and most turbojet operations at the airport.

Aircraft Operator Records

Some airport tenants maintain operational records by aircraft type. In cooperation with the Port of Portland, records maintained by the airport operators contributed to the definition of the fleet mix at Hillsboro Airport.

Aircraft Radio Transmission Recordings

As discussed earlier, the Port maintains recordings of aircraft radio transmissions on the Hillsboro Airport Common Tower Area Frequency (CTAF). The type of aircraft operating after the ATCT is closed was estimated by the Port after reviewing selected CTAF tapes.

Actual Aircraft Observations

While examining landing fee reports, reviewing CTAF recordings, and utilizing records maintained by airport tenants provides some insight into the mix of aircraft operating at Hillsboro Airport, those data sources do not cover all operations at the airport. To gain a complete understanding of the type of aircraft operating at the airport, as well as how they operate to and from the runway system, actual observations of aircraft activity were completed for Hillsboro Airport.

This observation program involved one or more personnel located on the airport, recording the following relevant data:

- Time of operation
- Aircraft registration number
- Aircraft type

- Aircraft make and model
- Runway or training pattern used
- Approach and/or departure path
- Number of touch-and-go's
- Taxi route
- Total taxi time

Aircraft observations were completed over three seasons – summer (June/July 2003), fall (October 2003), and winter (January 2004). In total, over 7,700 operations were recorded over 37 separate days and 200 hours of observations. Most observation periods lasted between three and four hours, including weekdays, weekends, evening, and daytime hours. **Table 1W** summarizes the days air traffic was observed at Hillsboro Airport and the number of operations observed.

EXISTING FLEET MIX

The estimated fleet mix for Hillsboro Airport for October 2002 to September 2003 is shown in **Table 1X**. This mix was determined using the information sources stated above. Tenant records provided the helicopter count for the daytime local and itinerant count. The daytime fixed wing fleet mix was derived from the aircraft observation program. The nighttime mix was estimated after reviewing the CTAF tapes.

TABLE 1W
Aircraft Observation Program Results

Date	Hours Observed	Total Observed Operations
06/09/03	4	202
06/10/03	4	273
06/11/03	4	102
06/13/03	4	15
06/14/03	6	275
06/16/03	4	273
06/18/03	4	53
06/19/03	5	294
06/21/03	4	217
06/22/03	6	257
06/23/03	4	111
06/24/03	4	272
06/25/03	4	45
06/26/03	4	93
06/28/03	6	171
06/30/03	4	302
07/01/03	4	103
07/02/03	4	127
07/08/03	4	302
07/09/03	4	174
07/10/03	4	158
07/11/03	4	300
07/12/03	6	255
10/04/03	8	135
10/05/03	3	46
10/06/03	8	261
10/07/03	8	473
10/08/03	4	44
10/09/03	14	266
10/10/03	6	282
01/13/04	7	469
01/14/04	6	117
01/15/04	4	8
01/16/04	6	397
01/17/04	10	717
01/18/04	6	22
01/19/04	7	138
Totals	**201**	**7,747**

Source: Port of Portland, Coffman Associates

The analysis of the fleet mix for Hillsboro Airport revealed that there were approximately 165,700 fixed wing operations and 88,100 helicopter operations between October 2002 and September 2003. This resulted in fixed wing aircraft representing approximately 65 percent of total annual operations, whereas helicopter operations comprised the remaining 35 percent of total annual operations.

TABLE 1X
Estimated Fleet Mix and Aircraft Operations

	Day			Night			Total All Operations
Aircraft Type	**Local**	**Itinerant**	**Total**	**Local**	**Itinerant**	**Total**	
Single Engine Piston – Fixed Propeller	72,317	49,644	121,961	1,307	776	2,083	124,044
Single Engine Piston – Variable Pitch Propeller	8,035	8,761	16,796	145	137	282	17,078
Multi-Engine Piston	2,356	4,990	7,346	57	115	172	7,518
Turboprop	2,084	4,797	6,882	72	266	338	7,219
Turbojet	272	8,940	9,212	57	583	640	9,852
Helicopter Piston	72,880	9,808	82,688	115	460	575	83,263
Helicopter Turbine	705	4,038	4,743	0	130	130	4,873
Total	**158,649**	**90,978**	**249,627**	**1,753**	**2,467**	**4,220**	**253,847**

Source: Port of Portland, Coffman Associates analysis

Upon closer examination of the fixed wing fleet mix, it is evident that the single engine piston powered aircraft fleet represented approximately 85 percent of total fixed wing operations. Multi-engine piston powered aircraft, on the other hand, represented only five percent while, turboprop and turbojet aircraft represented four percent and six percent of total annual fixed wing operations, respectively.

For helicopter operations, piston-powered helicopters represented approximately 94 percent of helicopter operations, whereas turbine-powered helicopters represented the remaining six percent of helicopter operations.

AIRCRAFT NOISE ANALYSIS METHODOLOGY

The standard methodology for analyzing the prevailing aircraft noise conditions at airports involves the use of a computer simulation model. The Federal Aviation Administration (FAA) has approved the Integrated Noise Model (INM) for use in assessing aircraft noise. The latest versions of the INM are quite sophisticated in predicting noise levels at a given location, accounting for such variables as airfield elevation, temperature, headwinds, and local topography. INM Version 6.1 was used to prepare noise exposure contours for Hillsboro Airport.

Exhibit 1L depicts generic INM input assumptions. Inputs to the INM include runway configuration, flight track locations, aircraft fleet mix, stage length (trip length) for departures, and numbers of daytime and nighttime operations by aircraft type. The INM provides a database for the general aviation aircraft which commonly operate at Hillsboro Airport. The INM computes typical flight profiles for aircraft operating at the assumed airport location. This location information is based upon an airport's established elevation, average annual temperature, and flight procedure data as provided by aircraft manufacturers.

The FAA, the Oregon Department of Environmental Quality (DEQ) and the Oregon Department of Aviation (ODA) all recognize the use of a single noise metric for assessing aircraft sound emission impacts. Consistent with the findings of the Federal Interagency Committee on Noise (FICON) and the Environmental Protection Agency (EPA), Department of Defense (DOD), and the Department of Housing and Urban Development (HUD), the FAA, ODA, and DEQ use the day-night sound level (DNL) for determining aircraft sound emission impacts at airports.

DNL represents all of the aircraft sound energy present in a 24-hour period at the airport. DNL is calculated by adding up all the sound energy during daytime (0700 – 2159 hours), plus 10 times the sound exposure occurring during the nighttime (2200 – 0659 hours), and averaging this sum by the number of seconds in a day. The multiplication factor of 10 applied to nighttime sound is often referred to as a 10dB penalty. It is intended to account for the increased annoyance attributable to noise at night when the ambient noise levels are lower as people are trying to sleep. DNL is a summation metric which allows objective analysis and can describe aircraft sound exposure comprehensively over a large area.

INM INPUT

Airport and Study Area Description

The runways were input into the INM in terms of latitude and longitude, as well as elevation. As previously mentioned, the INM computes typical flight profiles for aircraft operating at the airport location, based upon the field elevation, temperature, and flight procedure data provided by aircraft manufacturers. The Hillsboro Airport's field elevation is 204 feet above mean sea level (MSL) and its average annual temperature is 53.6 degrees.

It is also possible to incorporate a topographic database into the INM, which allows the INM to account for changes in distances from aircraft in flight to elevated receiver locations. Topographic data from the U.S. Geographical Survey was used in the development of the noise exposure contours for Hillsboro Airport.

Activity Data

The noise evaluations made for the October 2002 to September 2003 pe-

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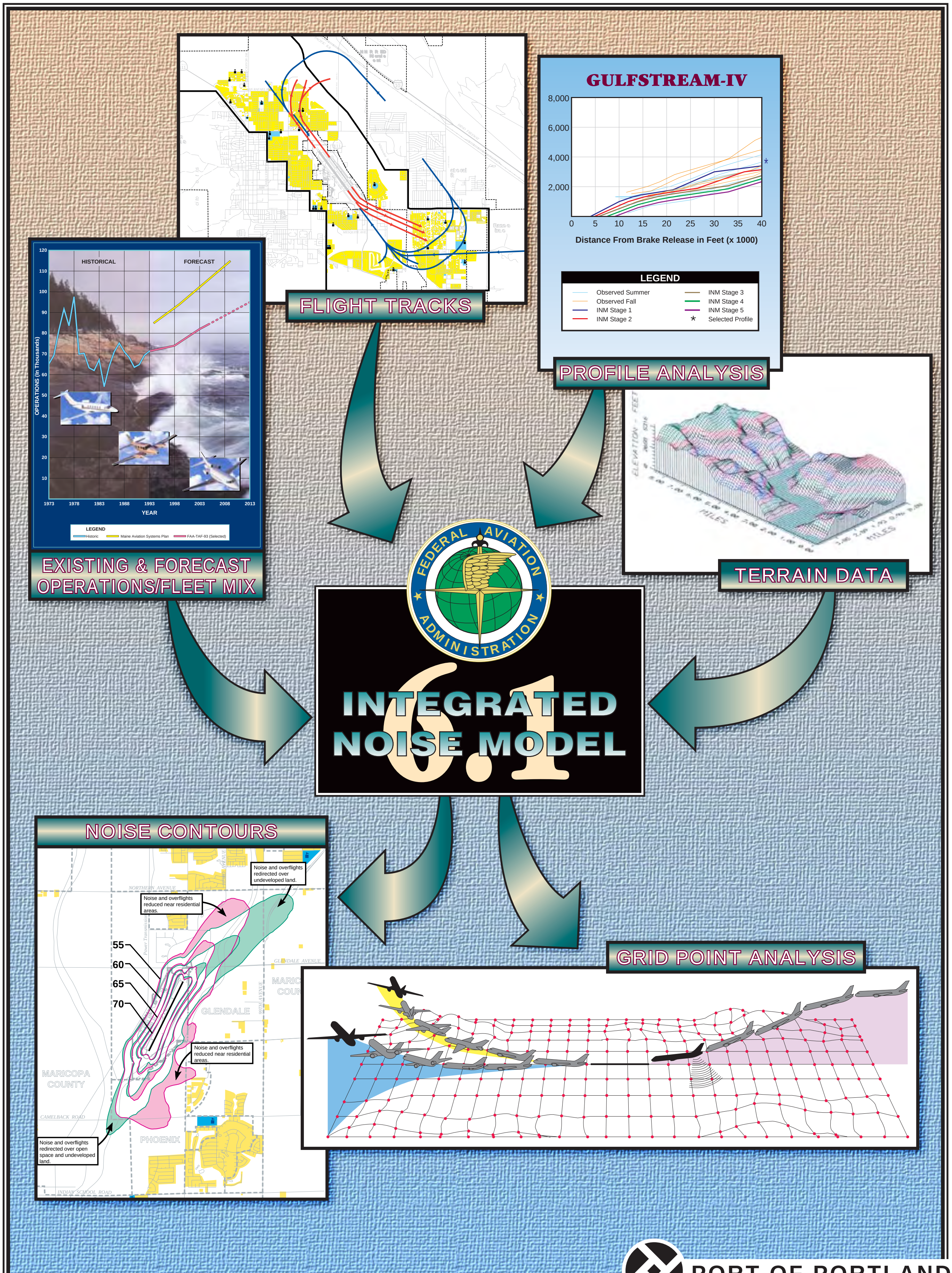

PORT OF PORTLAND

Exhibit 1L
INM PROCESS

riod were based on the annual operational inventory summarized above. Average daily aircraft operations were calculated by dividing total annual operations by 365 days. The distribution of these operations among various categories, users, and types of aircraft is critical to the development of the input model data. **Table 1Y** summarizes the daily operations by aircraft type.

TABLE 1Y
Noise Model Input: Aircraft Operations

		DAY			Night			
Aircraft Type	**INM Aircraft**	**Local**	**Itinerant**	**Subtotal**	**Local**	**Itinerant**	**Subtotal**	**Total**
Single Engine – Fixed Prop.	GASEPF	198.1	136.0	334.1	3.6	2.1	5.7	**339.8**
Single Engine – Variable Prop.	GASEPV	22.0	24.0	46.0	0.4	0.4	0.8	**46.8**
Multi-Engine Piston	BEC58P	6.5	13.7	20.1	0.2	0.3	0.5	**20.6**
Turboprop								
	HS748A	0.0	0.7	0.7	0.0	0.0	0.0	**0.8**
	CNA441	5.7	0.7	6.4	0.2	0.0	0.2	**6.7**
	DHC6	0.0	11.7	11.7	0.0	0.6	0.6	**12.3**
Turbojet								
	LEAR25	0.0	1.8	1.8	0.0	0.1	0.1	**2.0**
	GIIB	0.0	0.1	0.1	0.0	0.0	0.0	**0.2**
	LEAR35	0.7	6.1	6.8	0.2	0.4	0.6	**7.4**
	CL600	0.0	15.0	15.0	0.0	1.0	1.0	**16.0**
	GIV	0.0	1.4	1.4	0.0	0.1	0.1	**1.5**
RP (Helicopter Piston)	H500D	199.7	26.9	226.5	0.3	1.3	1.6	**228.1**
RT (Helicopter Turbine)	B206	1.9	11.1	13.0	0.0	0.4	0.4	**13.3**
Total		**434.7**	**249.3**	**683.9**	**4.8**	**6.8**	**11.6**	**695.5**

Source: Port of Portland, Coffman Associates Analysis

Database Selection

For the INM, aircraft with similar noise emission characteristics are grouped together for noise evaluations. The INM provides a substitution list for most aircraft make and models. This list was consulted to develop the fleet mix shown in Table 1Y.

The FAA aircraft substitution list indicates that the general aviation, single engine variable-pitch propeller model (GASEPV) represents a number of single engine general aviation aircraft (i.e., Beech Bonanza, Cessna 177,Cessna 180, Piper Cherokee Arrow, Piper PA-32, Mooney). The general aviation single engine fixed-pitch propeller model (GASEPF) also represents several single engine general aviation aircraft including the Cessna 150, Cessna 172, Piper Archer, Piper PA-28-140 and 180, and the Piper Tomahawk. The FAA's substitution list recommends the BEC58P or the

Beech Baron to represent the light multi-engine piston aircraft such as the Piper Navajo, Beech Duke, Cessna 310, and others. The Boeing H500 helicopter was used to represent piston helicopter activity. The Bell 206 was used to represent turbine helicopter operations. **Table 1Z** summarizes the substitutions for common turboprop and turbojet aircraft used in this analysis.

TABLE 1Z
Business Aircraft INM Assignment

Aircraft Make and Model	INM Substitution
Turbojet	
Canadair CRJ200	CL600
Embraer ERJ135	
Falcon 900	
Citation X	
Canadair Challenger	
Global Express	
Gulfstream G-II	GIIB
Gulfstream G-III	
Gulfstream IV	GIV
Gulfstream V	
IAI 1124	LEAR25
Astra	
Gulfstream 100	
Westwind	
Hawker 125	
Lear 24	
Lear 25	
Cessna 650	LEAR35
Citation III	
Citation	
Citation II	
BAE 125SE	
Beech 400	
Falcon 10	
Falcon 20	
Falcon 200	
Falcon 50	
Hawker 400	

TABLE 1Z (Continued) Business Aircraft INM Assignment	
Aircraft Make and Model	**INM Substitution**
Turbojet	
Hawker 700	
Hawker 800	
Lear 31	
Lear 35	
Lear 36	
Lear 45	
Lear 55	
Lear 60	
Cessna 550	
Cessna 560	
Turboprop	
Cheyenne	CNA441
Commander 690	
Commander 840	
Fairchild SA227	
King Air F-90	
Beech 200	DHC6
Beechcraft 1900	
King Air 300	
MU-2	
G-I	HS748A
Dash 7	
Source: Port of Portland, Coffman Associates Analysis	

Flight Tracks

Where aircraft fly when arriving and departing the airport is an important consideration for noise modeling. As the person legally in command of the aircraft, the pilot determines route and altitude of flight. Due to variances in aircraft speed, ATCT control, and aircraft performance, an, aircraft can be flown in many different directions and altitudes at Hillsboro Airport. Therefore, aircraft can be seen at times in many different areas around the airport. However, aircraft, for the most part, fly common arrival and departure paths due to common operating practices recommended by the FAA, aircraft manufacturers and local operating procedures at Hillsboro Airport.

Consolidated flight tracks for Hillsboro Airport were developed in conjunction with the ATCT, airport tenants, and after reviewing local and regional air traffic control procedures. Consolidated flight tracks basically describe the average flight corridors that lead to and from Hillsboro Airport. INM consolidated flight tracks are developed by plotting the centerline of a concentrated group of tracks and then dispersing the consolidated track into multiple sub-tracks. All aircraft assigned to each flight track are dispersed over the sub-tracks. Sub-tracks account for the variations in flight paths caused by the reasons stated above.

Exhibit 1M depicts the consolidated arrival flight tracks developed for input into the INM. Arrival tracks at Hillsboro Airport are generally concentrated on the runway centerline due to the precision needed to safely land an aircraft. The wider lines represent the centerline of each consolidated arrival path. The sub tracks are shown with a thinner line. For the most part, aircraft approach the runway along the extended runway centerline or via a left-hand or right-hand turn approximately one-quarter mile to one-half mile from the runway threshold. These arrival paths also account for the instrument approach procedure flight paths.

Exhibit 1N depicts the consolidated departure flight tracks developed for Hillsboro Airport. Due to the need for pilots to intercept their enroute course headings, there are many more departure flight tracks than arrival flight tracks at Hillsboro Airport. These flight tracks reflect the need for pilots to a primary heading after departure. For example, for Runway 30, flight track 30VB allows pilots to depart to the northeast; whereas, 30D allows for pilots to depart to the east and 30E allows for southeasterly departures. Flight track 30C allows for departures to the west and 30F provides for southwesterly departures.

Exhibit 1P depicts the consolidated training or touch-and-go tracks developed for input into the INM. Typically, Hillsboro Airport utilizes a left-hand traffic pattern for each runway. On Runway 12-30, some smaller aircraft fly a "tighter" traffic pattern. This results in two touch-and-go patterns for Runway 12-30.

Exhibit 1P also illustrates helicopter training patterns currently in use and as a result modeled for this analysis. The Bravo training pattern is located southeast of Runway 2-20. The Alpha pattern is located west of Runway 12-30. The Charlie Pattern is located northeast of Runway 12-30 on a separate landing pad. These patterns were designed to allow helicopters to approach and depart from either Taxiway A (Alpha Pattern), Taxiway B (Bravo Pattern), or a paved landing pad (Charlie Pattern) while remaining clear of fixed wing operations. For operations in any pattern, helicopters will land then immediately lift off and follow a ground track that represents paths shown on Exhibit 1P. Finally, the helicopter will land again in nearly the same point on the taxiway and repeat the pattern.

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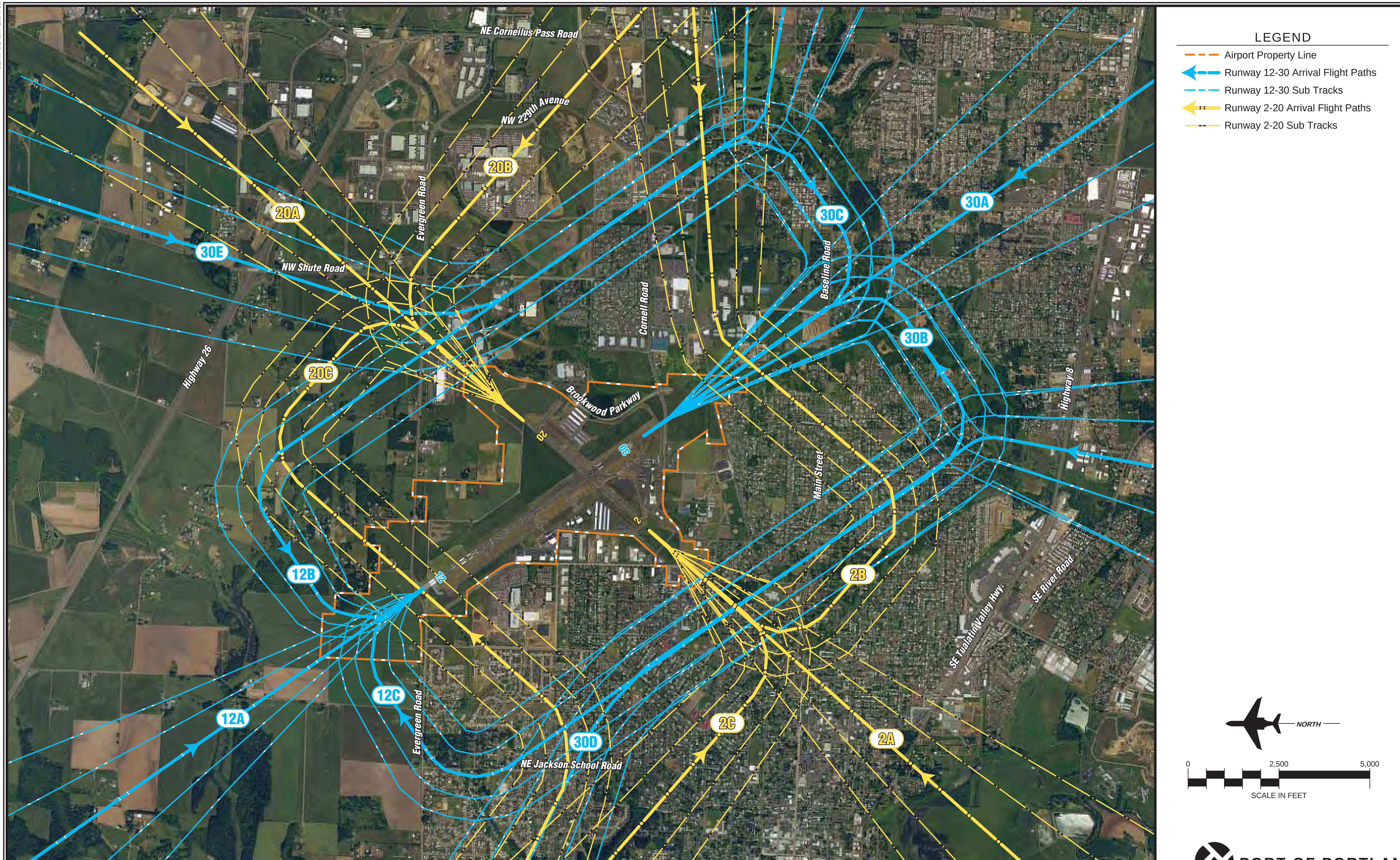

PORT OF PORTLAND

Exhibit 1M

GENERALIZED ARRIVAL FLIGHT TRACKS

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LEGEND

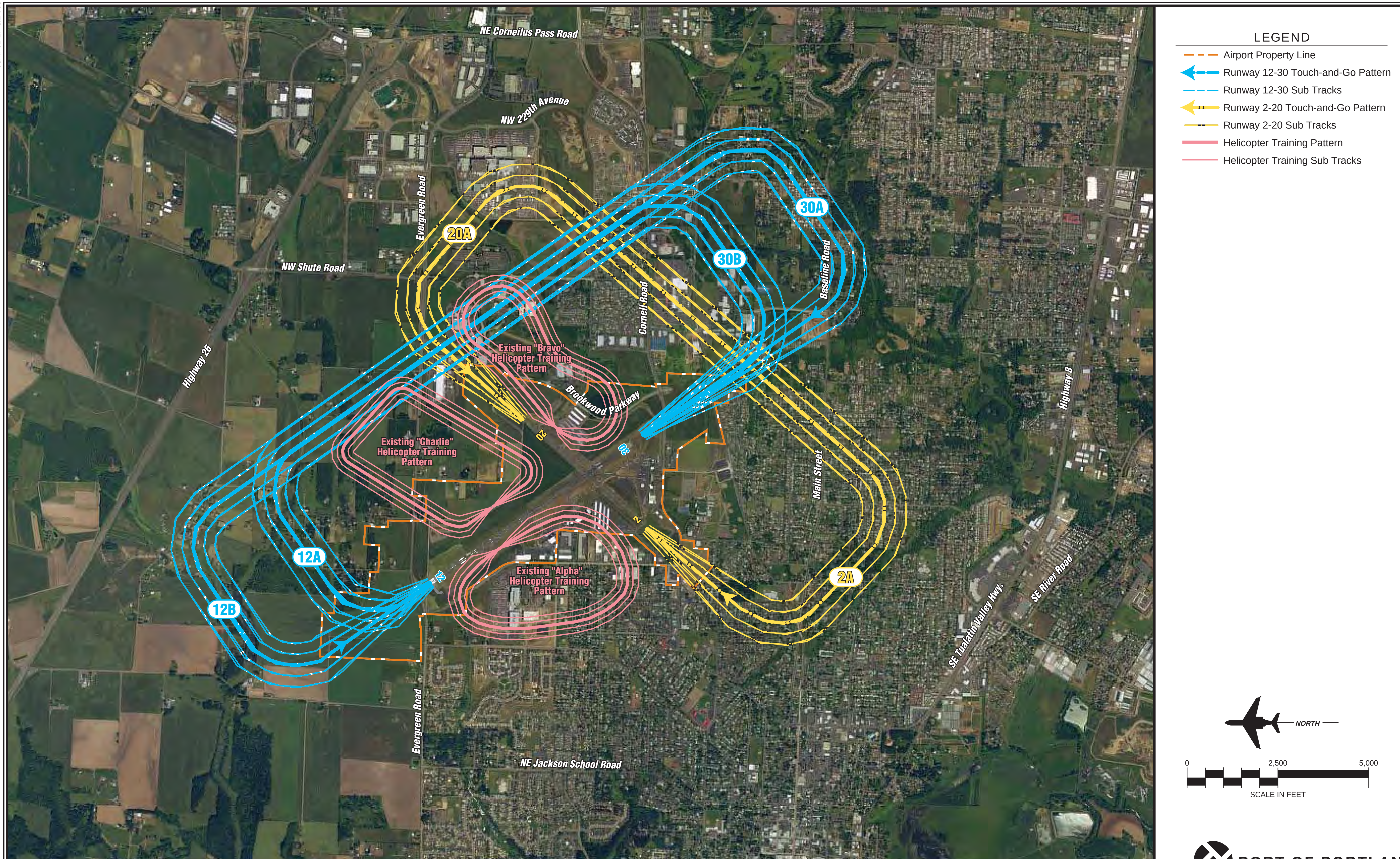
- Airport Property Line
- Runway 12-30 Departure Flight Paths
- Runway 12-30 Sub Tracks
- Runway 2-20 Departure Flight Paths
- Runway 2-20 Sub Tracks

NORTH

0 2,500 5,000
SCALE IN FEET

PORT OF PORTLAND

Exhibit 1N
GENERALIZED DEPARTURE FLIGHT TRACKS



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PORT OF PORTLAND

Exhibit 1P

GENERALIZED TRAINING FLIGHT PATHS

Runway Use

Runway use is another essential input to the INM. For modeling purposes, wind data analysis usually determines runway use percentages. Aircraft will normally land and takeoff into the wind. However, wind analysis provides only the directional availability of a runway and does not consider pilot selection, primary runway operations, or local operating conventions. At Hillsboro Airport, the dual runway configuration offers four directions of choice. Runway usage at Hillsboro Airport was established by the aircraft observation program. **Table 1AA** summarizes the runway use percentages used for the noise modeling as derived from the aircraft observation program.

TABLE 1AA
Runway Use Percentages

	Runway				
Aircraft	**2**	**12**	**20**	**30**	**Total**
Itinerant Operations					
SEPF (Fixed Propeller)	3%	7%	1%	89%	100%
SEPV (Variable Pitch Propeller)	3%	7%	1%	89%	100%
MEP (Multi-Engine Piston)	3%	18%	2%	77%	100%
TP (Turboprop)	3%	27%	0%	70%	100%
J (Turbojet)	1%	24%	0%	75%	100%
RP (Helicopter Piston)	5%	5%	26%	64%	100%
RT (Helicopter Turbine)	5%	5%	26%	64%	100%
Local Operations					
SEPF (Fixed Propeller)	5%	2%	1%	92%	100%
SEPV (Variable Pitch Propeller)	5%	2%	1%	92%	100%
MEP (Multi-Engine Piston)	0%	40%	0%	60%	100%
TP (Turboprop)	0%	40%	0%	60%	100%
J (Turbojet)	0%	0%	0%	100%	100%

Source: Port of Portland, Coffman Associates Analysis

As indicated above, helicopter training is conducted in the Alpha, Bravo, and Charlie patterns. **Table 1AB** specifies the percentage use of each pattern used in this analysis. (Note: the Charlie Pattern was not in use until October 2004 after the initial operational inventory and noise exposure analysis was conducted. A portion of the helicopters that were operating in the Alpha and Bravo patterns during the October 2002 to September 2003 timeframe were reassigned to the Charlie Pattern to establish this baseline contour.)

TABLE 1AB Helicopter Pattern Use		
Pattern A	**Pattern B**	**Pattern C**
12.5%	12.5%	75%
Source: Port of Portland, Coffman Associates Analysis		

Assignment of Flight Tracks

The final step in developing input data for the INM model is the assignment of aircraft to specific flight tracks. **Table 1AC** summarizes the percentage use of each flight track as derived from the aircraft observation program.

TABLE 1AC Primary Flight Track Percentage Use					
Arrivals		**Departures**		**Touch-and-Go**	
Flight Track	**Percentage Use**	**Flight Track**	**Percentage Use**	**Flight Track**	**Percentage Use**
12A	91.0%	12A	66.0%	12A	50.0%
12B	4.0%	12B	3.0%	12B	50.0%
12C	5.0%	12C	10.5%	30A	50.0%
30A	40.0%	12D	10.5%	30B	50.0%
30B	16.0%	30A	31.0%	2A	100.0%
30C	14.0%	30B	7.0%	20A	100.0%
30D	16.0%	30C	24.0%		
30E	14.0%	30D	7.0%		
2A	67.0%	30E	7.0%		
2B	25.0%	30F	24.0%		
2C	80.0%	2A	30.0%		
20A	37.0%	2B	9.0%		
20B	36.0%	2C	9.0%		
20C	27.0%	2D	26.0%		
		2E	26.0%		
		20A	33.0%		
		20B	41.0%		
		20C	13.0%		
		20D	13.0%		
Source: Port of Portland, Coffman Associates Analysis					

Each aircraft's use of a flight track was determined by multiplying a specific aircraft's total annual operations by its runway use percentage, then multiplying that result by the flight track percentage use. For example, the following methodology was used to determine the general aviation single engine piston fixed-pitch propeller (GASEPF) aircraft's use of arrival flight path 12A:

SEPF ANNUAL OPERATIONS	124,044
SEPF Runway 12 Use Percentage	X 7%
SEPF Annual Use of Runway 12 (Operations)	= 8,683
Arrival Flight Path 12A Percentage Use	X 91%
SEPF Annual Use of Flight Path 12A (Operations)	= 7,901

This methodology was applied to all flight track assignments.

INM OUTPUT

Since noise decreases at a constant rate in all directions from a source, points of equal DNL noise levels are indicated by means of a contour line. **Exhibit 1Q** presents the plotted results of the INM contour analysis for the October 2002 to September 2003 period, using the input data and assumptions described in the preceding pages.

It is important to recognize that a line drawn on a map does not imply that a particular noise condition exists on one side of the line and not on the other. DNL calculations do not precisely define noise impacts. Nevertheless, DNL contours can be used to: (1) highlight existing or potential incompatibilities between an airport and any surrounding development; (2) assess relative exposure levels; (3) assist in the preparation of airport environs land use plans; (4) provide guidance in the development of land use control devices such as zoning ordinances, subdivision regulations and building codes; and (5) develop operational procedures to mitigate noise exposure.

Individual responses to noise are highly variable, thus making it very difficult to predict how any one person is likely to react to environmental noise. However, the response of a large group of people to environmental noise is much less variable and has been found to correlate well with cumulative noise metrics such as day-night noise level (DNL). The development of aircraft noise impact analysis techniques has been based on this relationship between average community response and cumulative noise exposure.

The degree of annoyance which people suffer from aircraft noise varies depending on their activities at any given time. People rarely are as disturbed by aircraft noise when they are shopping, working, or driving, as when they are at home. Transient hotel and motel residents seldom express as much concern with aircraft noise as do permanent residents of an area.

The concept of "land use compatibility" has arisen from this systematic variation in human tolerance to aircraft noise. Studies by governmental agencies and private researchers have defined the compatibility of different land uses with varying noise levels. The FAA has established guidelines for defining land use compatibility for use in Federal Aviation Regulations (F.A.R.) Part 150 noise compatibility studies.

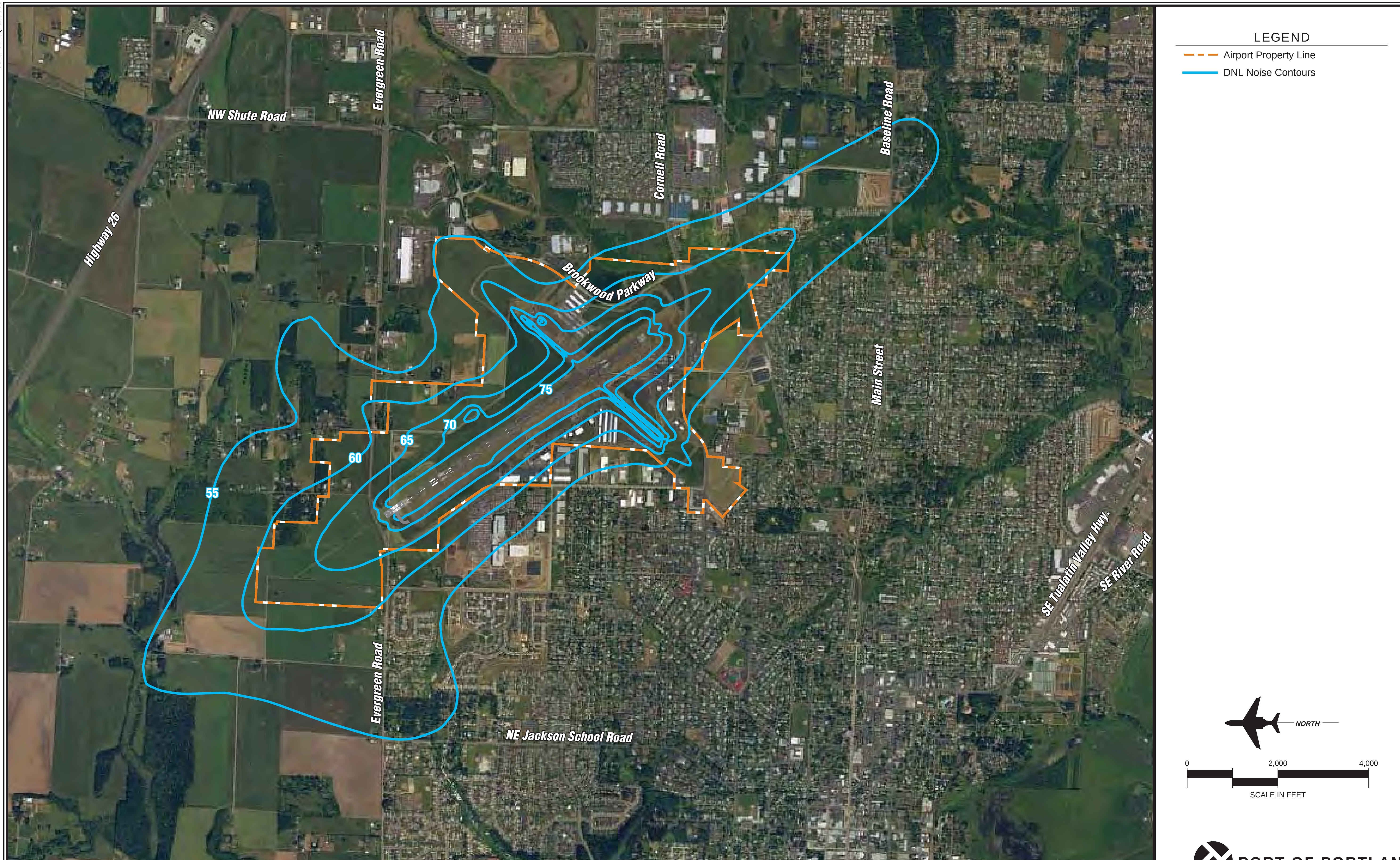
The FAA adopted land use compatibility guidelines when it promulgated F.A.R. Part 150 in the early 1980s the Interim Rule was adopted on January 19, 1981; the Final Rule was adopted on December 13, 1984, was published in the Federal Register on December 18, 1985, and became effective on January 18, 1985). These new guidelines were based on earlier studies and guidelines developed by federal agencies (Federal Interagency Committee of Urban Noise, 1980). These land use compatibility guidelines are only advisory; they are not regulations. Part 150 explicitly states that determinations of noise compatibility and regulation of land use are purely local responsibilities (see Section A150.101(a) and (d) and explanatory note in Table 1 of F.A.R. Part 150). **Exhibit 1R** illustrates the FAA's guidelines with regard to the issue of land use compatibility.

The FAA uses the Part 150 guidelines as the basis for defining areas within which noise compatibility projects may be eligible for federal funding through noise set-aside funds of the Airport Improvement Program (AIP). In general, noise compatibility projects must be within the 65 DNL contour to be eligible for federal funding. According to the AIP Handbook, "Noise compatibility projects usually must be located in areas where noise measured in day-night average sound level (DNL) is 65 (dB) or greater." (See FAA Order 5100.38A, Chapter 7, paragraph 710.b.) Funding is permitted outside the 65 DNL contour only where the airport sponsor has determined that non-compatible land uses exist at lower levels, adopted a change to Table 1 of F.A.R. Part 150, and the FAA has explicitly concurred with that determination.

The FAA guidelines outlined in Exhibit 1R show that residential development, including standard construction (residential construction without special acoustical treatment), mobile homes, and transient lodging are incompatible with noise above 65 DNL. Homes of standard construction and transient lodging may be considered compatible where local communities have determined these uses are permissible. However, noise level reduction measures are recommended for such uses.

Schools and other public-use facilities are generally incompatible with aircraft-generated noise between 65 and 75 DNL. However, the guidelines note that where local communities determine that these uses are permissible, noise level reduction measures should be used. Other land uses considered incompatible at levels exceeding 65 DNL include outdoor music shells and amphitheaters.

Land uses considered incompatible at levels above 75 DNL include hospitals, nursing homes, places of worship, auditoriums, concert halls, livestock breeding, amusement parks, resorts, and camps. Many of these incompatible land uses are considered compatible in areas subject to noise between 65 DNL and 75 DNL, if prescribed



03MP01-1Q-5/24/05

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Exhibit 1Q

2003 NOISE EXPOSURE CONTOURS

03MP01-1R-5/9/05

LAND USE	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
PUBLIC USE						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally-determined land uses for those determined to be appropriate by local authorities in response to locally-determined needs and values in achieving noise compatible land uses.

See other side for notes and key to table.

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Exhibit 1R

LAND USE COMPATIBILITY GUIDELINES

03MP01-1R-5/9/05

KEY

Y (Yes)	Land Use and related structures compatible without restrictions.
N (No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor-to-indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

NOTES

1 Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

2 Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

3 Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

4 Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

5 Land use compatible provided special sound reinforcement systems are installed.

6 Residential buildings require a NLR of 25.

7 Residential buildings require a NLR of 30.

8 Residential buildings not permitted.

Source: ***F.A.R. Part 150***, Appendix A, Table 1.

levels of noise reduction can be achieved. These include hospitals, nursing homes, places of worship, auditoriums, and concert halls.

EXISTING NOISE EXPOSURE CONTOURS

The shape and extent of the existing 2003 baseline noise contours depicted on Exhibit 1Q reflect the underlying flight track assumptions. The contours extend the greatest distance behind the Runway 30 and Runway 12 ends due to the higher number of aircraft utilizing this longer of the two available runways. The long slender shape of the contour behind Runway 30 reflects the dominance of arrivals to Runway 30. The large numbers of departures on Runway 30 contribute to the extended 55 and 60 DNL contours behind the Runway 12 end to the north. The bulges to the west and east on the 55 DNL contour behind the Runway 12 end are attributable to departure turns. The long slender shape of the contour behind the Runway 20 end to the east is attributable to operations in the Bravo helicopter pattern.

The 65, 70, and 75 DNL contours are contained almost entirely on existing airport property. Portions of the 55 and 60 DNL contours extend off airport property. There are no incompatible land uses within the 65 DNL or higher noise contour.

DOCUMENT SOURCES

A variety of sources were used during the inventory process. The following listing reflects a partial compilation of these sources. In addition, considerable information was provided directly to the consultant by the Port of Portland Staff.

AirNAV Airport information, website: www.airnav.com

Hillsboro Airport Master Plan Final Report, prepared for the Port of Portland by W&H Pacific, October 1996.

Portland-Hillsboro Airport Master Plan, prepared for Port of Portland by Hodges and Shatt, September 1990.

Port of Portland website: www.portofptld.com

City of Hillsboro Geographic Information System, GIS.

Exhibit "A" Airport Property Map (draft) prepared by the Port of Portland, November 2002.

Regional Transportation Plan (RTP). Ordinance No. 00-0869A as amended by Ordinance 02-9464A. 2002. Portland Metro.

Oregon Highway Plan. 1999. ODOT.

Portland – Cannon Beach Junction U.S. 26 Corridor Plan, Volume 1. May 18, 1999. ODOT.

Washington County 2020 Transportation Plan. A-Engrossed Ordinance No. 588, Exhibit 14. October 9, 2002. Washington County.

City of Hillsboro Comprehensive Plan. February, 2003. Ordinance No. 2793-4-77, as amended.

City of Hillsboro Transportation System Plan – Final Draft. 1999. DKS Associates.

Economic Report to the Metro Council, 2000-2030 Regional Forecast, September 2002, Metro.

Seattle Sectional Aeronautical Chart, June 12, 2003, Edition

U.S. Terminal Procedures, Northwest Volume 1 or 1, September 4, 2003, Edition

Airport/Facility Directory Northwest U.S., September 4, 2003, Edition

The Economic Impacts of Hillsboro Airport on the Local Economy, Martin Associates, September 2003

Baseline Environmental Conditions Unnamed Tributary to McKay Creek, Shapiro and Associates, Inc, September 2000

Cultural Resources Study for the Hillsboro Airport Runway Safety Area Project Hillsboro and Washington County Oregon, Archeological Investigations Northwest, December 2000

Drainage Report for Runway and Taxiway Improvement – Port of Portland Hillsboro Airport, Entranco, December 2000

Environmental Assessment Hillsboro Airport Runway Safety Area, Century West, February 2001

Natural Resource Assessment – Portland Hillsboro Airport Runway Safety Area Project, Entranco, June 2000

Preliminary Final Compensatory Mitigation Plan – Portland Hillsboro Runway Safety Area Project, Entranco, August 2000

Revised Floodplain Hydraulics for Unnamed Tributary to McKay Creek – Portland Hillsboro Airport Runway Safety Area Project, Entranco, December 2000

Wetland Delineation Report – Portland Hillsboro Airport Runway Safety Area Project, Entranco, May 2000