Chapter One:

Inventory

CHAPTER ONE: INVENTORY

The inventory analysis is a systematic and comprehensive data collection process that is used to provide an understanding of the nature and scale of aviation and airport related factors. The information that is compiled is analyzed and then forms the basis for developing forecasts of aviation demand and in determining existing and future airport facility requirements.

The inventory process for the Renton Municipal Airport involved several elements, including:

- A physical inventory of existing airport facilities and services and an assessment of current historic airport activity levels;
- Visits to adjacent area airports to identify airspace requirements, current facilities and activity levels, and their future development objectives;
- The collection of background information pertaining to City of Renton and Puget Sound region, including population and socioeconomic characteristics;
- A comprehensive review of existing local and regional plans and studies to determine their effect and consistency with future airport development planning;
- A review of master planning programs that were conducted in 1978 and 1988, and other airport and airport related studies;
- A survey of representatives of various firms and industries that currently use or may use the airport facility to determine their transportation needs; and
- A survey of FBO and tenant representatives, airport operators, and area pilots to determine their airport requirements and general attitude toward future airport improvements.

An accurate and complete inventory is an essential element to the success of the Master Plan because the findings and assumptions made throughout the report are dependent on the information that is assembled concerning conditions on and around the airport.

1.1 AIRPORT SETTING AND ROLE

Renton Municipal Airport is a general aviation facility serving the City of Renton and other nearby communities of Western King County. General aviation activity includes all aviation activity except that of certified air carriers and military. The airport provides regional aviation services for air

charter, air taxi, corporate, business and recreational flyers. It is also an FAA-designated "Reliever" airport diverting general aviation aircraft traffic from Sea-Tac International Airport.

Comprised of approximately 170 acres, the Airport is a densely developed and heavily used facility. The Boeing Company located on, and adjacent to, the airport manufactures Boeing 737's and 757's and uses the airport for their initial flights to Boeing Field. Its use by predominately single engine piston aircraft ranks the facility among the top five airports in the State in terms of aircraft landings and takeoffs.

Seaplane (or floatplane) operations also comprise a significant level of activity at the airport. The seaplane facilities, which include a floating dock and access ramp, provided by the Renton Municipal Airport, are referred to as the Will Rogers/Wiley Post Memorial Seaplane Base. The takeoff and landing area for seaplanes is a 5,000 foot by 200 foot waterlane located in Lake Washington. Although not under control of the Renton Municipal Airport, maintaining dockage and access ramps on airport property essentially controls the amount of seaplane activity at this location.

1.1.1 Geographic Location

As shown in Exhibit 1-1, the City of Renton is located in the north-western quadrant of Washington State, approximately 25 minutes south of downtown Seattle. Renton is situated in the center of the regional transportation network that connects State Highways 167, 169, 515, and 900 to Interstate Highways 5, 405, and 90. As shown in Exhibit 1-2, Renton Municipal Airport is located in King County, situated at the southern end of Lake Washington only minutes away from the City of Renton's central business district.

1.2 HISTORICAL DEVELOPMENT

The present site of the Renton Municipal Airport was originally a narrow finger of ground bounded by a swampy area of Lake Washington to the Duwamish River and finally Puget Sound. The Cedar River ran into the Black River at the existing intersection of Airport Way and Rainier Avenue. In 1917, Lake Washington was lowered during the construction of the U.S. Army Corps of Engineers locks, which eliminated the Black River as drainage for the lake. The Cedar River channel was constructed so as to run directly into Lake Washington. The old Black River channel is the location of a concrete drainage box culvert for surface runoff from surrounding areas into Lake Washington.

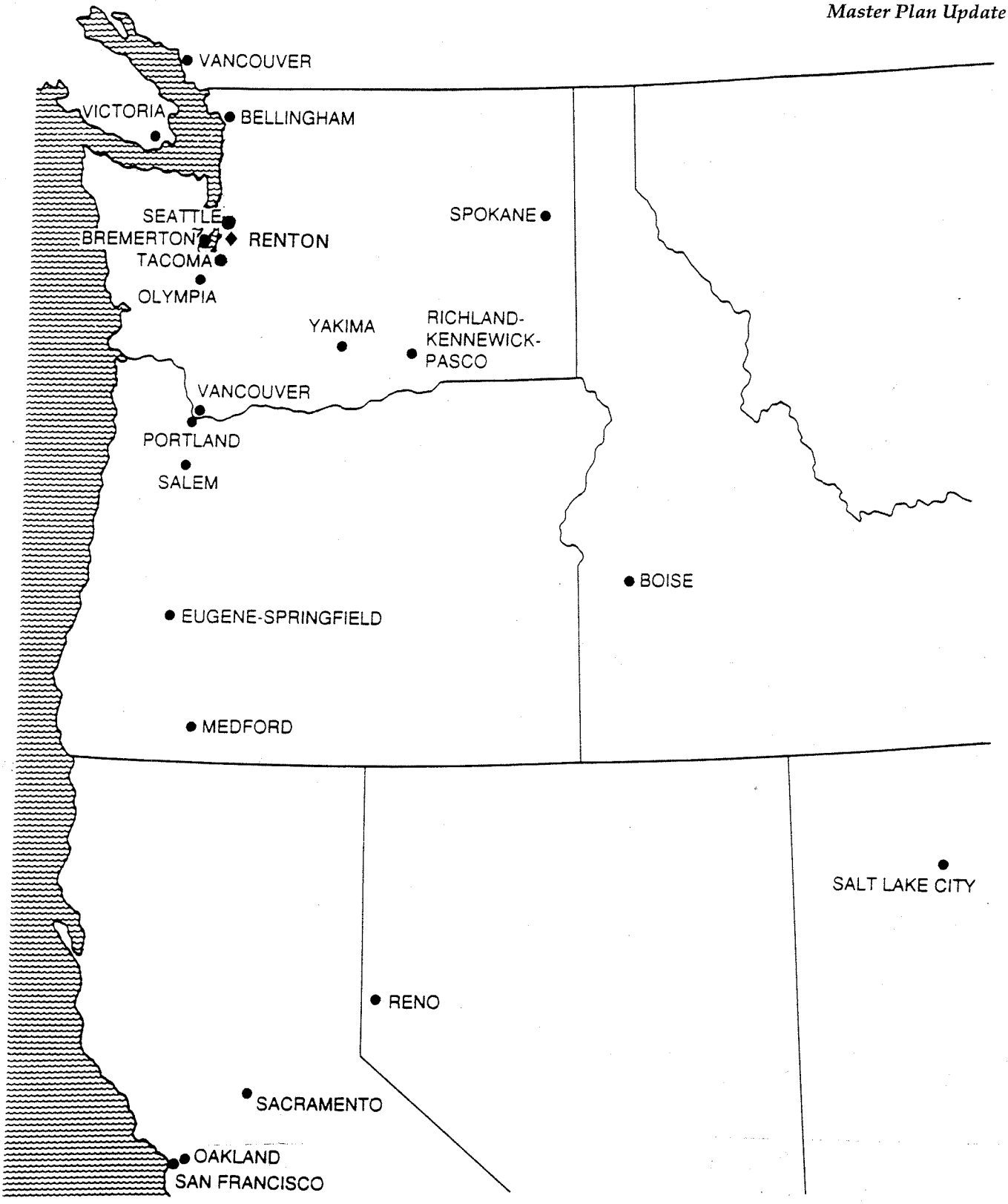
For many years the Bonnell Nursery occupied the area of the present airport in front of the FAA Tower. In the 1920's Allen Blum opened a short turf strip between the nursery and the lake called Bryn Mawr Airfield. Early Bryn Mawr pilots had to make their final approach by flying parallel to high power lines then dropping over a row of poplar trees which had been planted to discourage flights over the nursery area.

On August 7, 1935, Bryn Mawr Airfield served as the take-off point for Will Rogers and Wiley Post on their scheduled flight to Alaska. Because the strip was adjacent to the lake, it provided an excellent base for conducting land and water flight activities. Aircraft could land on the strip, be outfitted with pontoons and continue the flights to Alaska, where water operations were almost mandatory. Will Rogers and Wiley Post never completed their flight. They crashed in Alaska the same day. There is a monument to Rogers and Post on Rainier Avenue near the Chamber of Commerce office, and the seaplane base at the north end of the field was named Will Rogers-Wiley Post Memorial Seaplane Base in their honor.

In 1941, the Department of the Navy constructed the first portion of the existing Boeing plant to develop an experimental flying aircraft called the "Sea Ranger." The existing runway was constructed in 1943 to provide checkout and take-off capability for the Boeing B-29 Superfortress. Over 1,100 B-29's were flown off Renton Field.

The City of Renton purchased the airport from the Federal Government's War Assets Administration in 1946 for $1.00. The post-war general aviation boom brought a temporary surge of fixed base operators to the airport.

In 1952, the Boeing Company began to produce its first prototype jet transport. Later, the Commercial Airplane Division selected their Renton plant for production of the commercial transport aircraft. Even though the Boeing manufacturing facility is located off airport property, it has access to the field by means of a Boeing-owned bridge over the Cedar River. Boeing occupies about 52 percent of the rentable area on the airport for their aircraft operations.

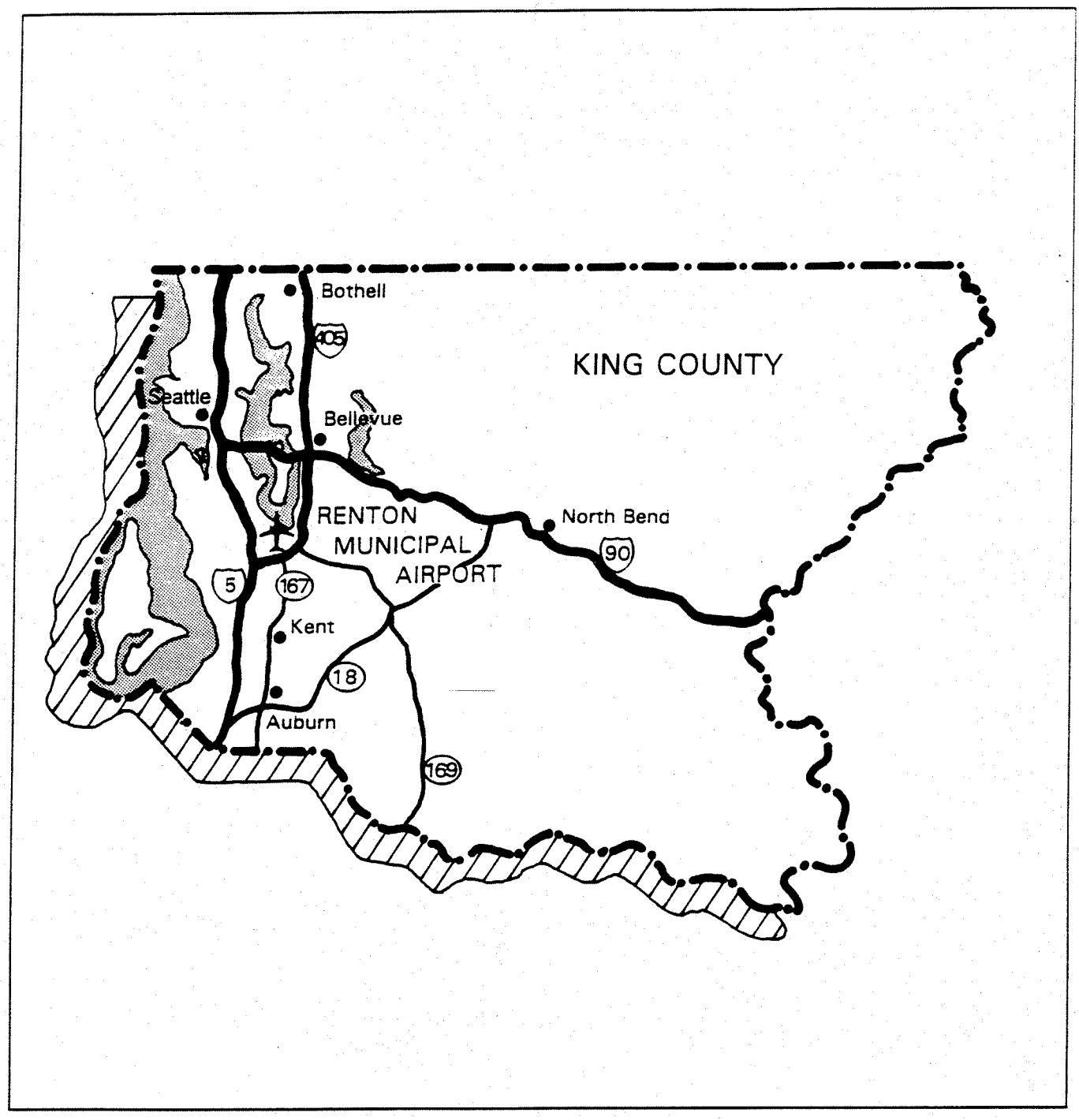


AIRPORT MASTER PLAN UPDATE

EXHIBIT 1-1

RENTON MUNICIPAL AIRPORT
Renton, Washington

GEOGRAPHIC LOCATION MAP



AIRPORT MASTER PLAN UPDATE EXHIBIT 1-2

RENTON MUNICIPAL AIRPORT
Renton, Washington

AREA LOCATION MAP

1.2.1 Previous Airport Planning Efforts

A number of studies and planning documents have been initiated over time relating to the growth and development of the Renton Municipal Airport. Listed below is a summary of those that are related to the master planning process.

Renton Municipal Airport Master Plan Update; December 1988. This Master Plan Update did not clearly delineate findings and recommendations. Instead, recommendations for policy considerations were identified. These policy statements were approved by the City Council on December 5, 1988 and are thus considered to have established City policy concerning the future development of the airport (see Section 1.12.3 Community and Regional Planning of this report).

Renton Municipal Airport and Will Rogers-Wiley Post Memorial Seaplane Base Master Plan Report; February 1978. The original 1978 master plan findings and recommendations are listed below:

1. Renton Municipal Airport is developed almost to capacity;

2. Seaplane activity is accommodated on the airport and does not have its own identifiable facility;

3. There is substantial demand for airport/seaplane base space within the region served by the airport;

4. The ability of the Renton Municipal Airport to satisfy this demand is limited by the physical constraints of the site;

5. The character of general aviation flying at Renton will continue its slow shift from pleasure flying to business flying over the next twenty years;

6. Most improvements that can be made to the airport are "fine tuning" of design features to increase capacity, improve efficiency, or enhance safety;

7. The installation of a microwave landing system (MLS) in the future is possible; however, the landing minimums are limited by high terrain west of the field;

8. Unrestricted auto access to the aircraft operating areas needs to be controlled;

9. The use of Boeing Apron C space for parking of additional general aviation aircraft would increase the capacity of the field;

10. The relocation of Taxiway A closer to the runway would gain approximately 80 aircraft parking spaces;

11. The environmental impacts of new development are minimal for the airport; and

12. The most adverse environmental impact for the airport is associated with the jet testing facilities in Boeing Area A. It recommended that the Boeing Company further investigate ways to mitigate the noise associated with the engine testing facilities.

1993 Washington State Continuous Airport System Plan; May 1993, Washington State Department of Transportation, Aeronautics Division. The Washington State Aviation System Plan (SASP) lists Renton Municipal Airport and the Will Rogers/Wiley Post Memorial Seaplane Base as Washington State System Plan airports, making them eligible for State funding.

The SASP study forecasts based aircraft and operations to increase by almost 16 percent at the airport by year 2005. To accommodate this increase of activity, the study recommends, among other things, new runway end identifier lights (REILs), an extension of the east side taxiway, pavement rehabilitation and reconstruction, reconstruction of a new seaplane ramp, and airport drainage improvements.

Task 4 Report: Seaplane Facility Needs, Regional Airport System Project; April 1986, Puget Sound Council of Governments. This Study was one of a series of technical studies related to the Puget Sound Regional Airport Systems Plan. The study concluded that seaplanes provide convenient air travel directly to water-related destinations difficult to access by other modes of transportation except for helicopters. It was anticipated that the demand for seaplane facilities will continue to increase over the twenty year planning period in response to existing travel patterns and the significant costs associated with upgrading facilities for other transportation modes.

Seaplane System Program; May 1993, Washington State Department of Transportation, Aeronautics Division. This report examined jurisdictional issues, community concerns, and operator requirements for floatplane activity in Washington State. It provided operational estimates for the Will Rogers-Wiley Post Seaplane Base and identified the seaplane base as a US Customs Landing Rights Airport.

1.2.2 Airport Facility Classifications

Aviation facilities can range from small, rural, unpaved airstrips to short-haul commuter airports, to large, long-haul international commercial service airports. Because of this wide diversity of facilities with broad ranges of operating parameters and design standards, a means of systematizing these facilities is needed. Currently, three classification systems apply to the Renton Municipal Airport. The first two classification systems are functional classification systems that were designed

to reflect the type of public service the facility provides to the national and the state airport system, while the third is an FAA design classification system.

National Plan of Integrated Airport Systems (NPIAS)

The National Plan of Integrated Systems (NPIAS) is a national airport system plan developed by the FAA to indicate aviation facilities of national significance. NPIAS airports are eligible for federal grants for airport planning and various capital improvements. The NPIAS uses two categories in defining an airport's status: service level and role. The service level of an airport reflects the type of public service the airport provides to the community. The service level also reflects the funding categories established by Congress to assist in airport development. The role of an airport is closely related to its design. The role classifications for NPIAS airports are based on the class of aircraft the respective runway systems can accommodate based on runway dimensions and pavement strength. There are two general design type categories used to classify NPIAS airports; Utility and Transport.

The Renton Municipal Airport is classified in the NPIAS as a Reliever/Transport Airport. Reliever airports are metropolitan area general aviation airports that serve to reduce air carrier airport congestion by providing facilities and service suitable for attracting and diverting general aviation activity away from major air carrier airports. A Transport airport type serves aircraft with wingspans greater than 118 feet and with approach speeds of 121 knots or more. Transport runways usually have the capability for precision approach operations.

Airport Reference Code

The Airport Reference Code (ARC) is a coding system developed by the FAA to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at an airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and relates to aircraft approach speed. The second component, depicted by a Roman numeral, is the airplane design group and relates to airplane wingspan. Generally, aircraft approach speed applies to runways and runway related facilities. Airplane wingspan primarily relates to separation criteria involving taxiways and taxilanes.

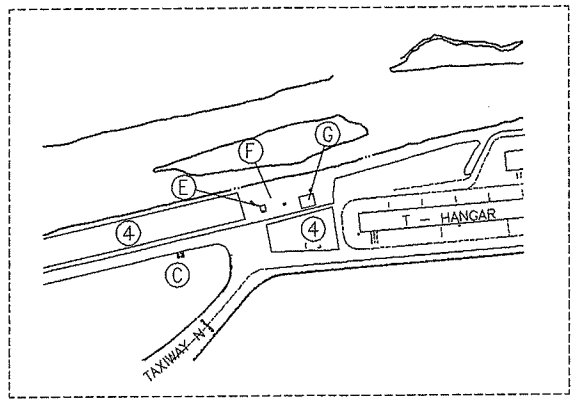
Airports expected to accommodate single-engine airplanes normally fall into Airport Reference Code B-I. Airports serving larger general aviation and commuter-type planes are usually Airport Reference Code B-II or C-II. Small to medium-sized airports serving air carriers are usually Airport Reference Code C-III, while larger air carrier airports are usually Airport Reference Code D-VI.

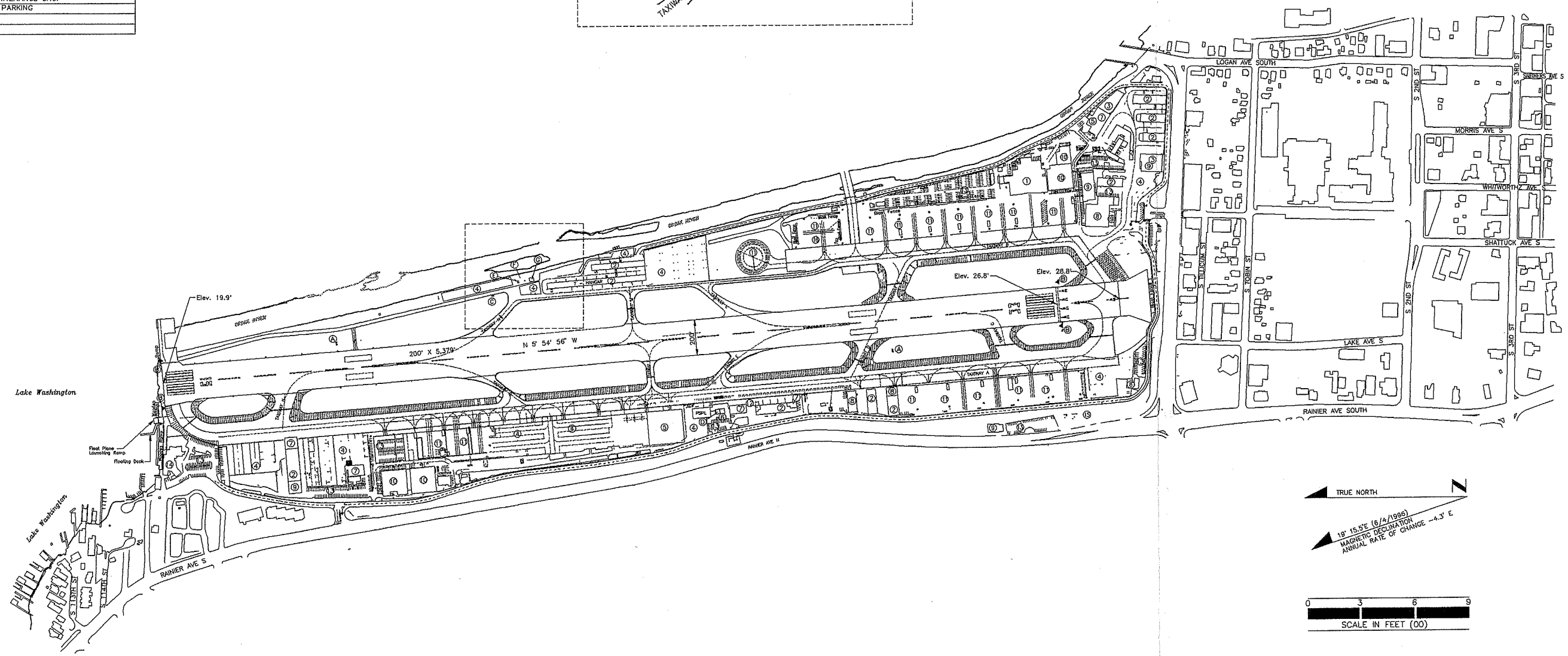
The Renton Municipal Airport's runway is currently classified as a C-IV facility because of the use of the airport by Boeing 757s.

EXISTING FACILITIES

BUILDINGS AND FACILITIES		
EXISTING	ULTIMATE	
①	①	PAINT HANGAR
②	②	AIRCRAFT T-HANGAR
③	③	AIRCRAFT CONV. HANGAR
④	④	AIRCRAFT TIE-DOWNS
⑤	⑤	PRIVATE FUEL FACILITY
⑥	⑥	PUBLIC FUEL SALES
⑦	⑦	AIRFRAME/ENGINE REPAIR
⑧	⑧	FBO HANGAR
⑨	⑨	OFFICES
⑩	⑩	MANUFACTORING AREA
⑪	⑪	HARD STANDS
⑫	⑫	AIRPORT MAINTENANCE SHOP
⑬	⑬	AUTOMOBILE PARKING
⑭	⑭	RESTAURANT
⑮	⑮	PARK

NAVIGATIONAL AIDS		
EXISTING	ULTIMATE	
Ⓐ	Ⓐ	PAPI
Ⓑ	Ⓑ	REIL
Ⓒ	Ⓒ	NDB
Ⓓ	Ⓓ	ROTATING BEACON
Ⓔ	Ⓔ	AWOS
Ⓕ	Ⓕ	CEILOMETER
Ⓖ	Ⓖ	FAA EQUIPMENT/COMM TOWER





CITY OF RENTON, WASHINGTON

RENTON MUNICIPAL AIRPORT

EXISTING FACILITIES

JOB NO. 93307.07	DESIGNED BY: TEP	DATE: 9-27-93	REVISIONS
DRAWING NO. ONE	DRAWN BY: KWC	DATE: 9-27-93	
SCALE AS SHOWN	CHECKED BY: TEP	DATE:	
SHEET: 1 OF 1	BUCHER, WILLIS & RATLIFF CORPORATION		

KANSAS • MISSOURI • TEXAS • ILLINOIS • COLORADO • WASHINGTON

1.3 AIRSIDE FACILITIES

The airside facilities of the Renton Municipal Airport include the runways, taxiways, navigational aids, runway protection zones, and other facilities required to safely and efficiently accommodate the take off and landing of an aircraft. Descriptions of these facilities are given in the following sections. The current airport layout is depicted in Exhibit 1-3.

1.3.1 Runways and Taxiways

The airport has a single asphalt and concrete runway known as Runway 15-33, with a full parallel taxiway on the west side and a partial parallel taxiway along the southern two-thirds of the east side. Runway 15-33 has a physical length of 5,379 feet and a width of 200 feet, with a threshold displacement of 340 feet at the south end, resulting in a usable length of 5,029 feet. A 20 foot blast fence is located 340 (503) feet south of the displaced threshold. Exhibit 1-4 provides further details on runway characteristics.

EXHIBIT 1-4: RUNWAY DATA TABLE

Item	Runway 15-33
Length	5,379 ft.
Width	200 ft.
Threshold Displacement	340 ft.
Classification	Transport
Composition	Asphalt-Conc
Condition	Good
Strength	
- Single wheel	100,000 lbs.
- Dual Wheel	130,000 lbs.
- Dual Tandem	340,000 lbs.
Marking	Nonprecision

Source: Airport/Facility Directory, Northwest U.S., July 1993, NOAA

1.3.2 Runway and Taxiway Lighting

A variety of lighting aids are available at the airport to facilitate identification, approach, landing, and taxiway operations at night or in adverse weather conditions. The lighting facilities are described below.

Airport Beacon

The location and presence of an airport at night is universally indicated by a rotating beacon equipped with an optical system that projects a green and a white beacon of light 180 degrees apart. At Renton Municipal this beacon is located on the roof of the FAA control tower.

Obstruction Lighting

In the vicinity of an airport, obstructions are marked and or lighted to alert pilots to their presence.

Approach Lighting

To assist with visual approaches, the airport is equipped with precision approach path indicators (PAPIs). These provide pilots with visual guidance to establish a safe path to the runway and are primarily intended for use during day or night visual flight rules (VFR) weather conditions. Runway 15 is equipped with a 2-box PAPI on the left side of the runway with a approach slope angle of 3.0 degrees and a threshold crossing height of 50 feet. Runway 33 has a 2-box PAPI on the left side of the runway with a 3.45 degree approach slope and a threshold crossing height of 62 feet.

Runway End Lighting

Both ends of the runway are equipped with runway end identifier lights (REIL). These lights are used for rapid and positive identification of the approach end of the runway. The system consists of two synchronized flashing lights, one on each side of the runway threshold. Runway 33 REILs are owned and maintained by the FAA, while Runway 15 REILs are owned and maintained by the airport.

Runway Lighting

After crossing the threshold, pilots must complete a touchdown and a rollout on the runway. Runway lighting aids for this landing phase are designed to give pilots information on alignment, lateral displacement, roll and distance. Runway 15-33 is equipped with medium intensity runway lights (MIRLs).

Taxiway Lighting

Since pilots must maneuver aircraft on the taxiway system to and from the hangar and terminal areas, edge lighting is provided to indicate the location and limit of taxiways. At Renton, blue edge lights are installed on all but two taxiways. Taxiways Foxtrot and Mike are not lighted.

1.3.3 Electronic Navigational Aids

A variety of electronic navigational aids are available to assist pilots in landing at an airport. The type of navigational aid can affect the type of *approach minimums* in effect for landing at a particular airport. The term minimum refers to the lowest altitude a pilot can descend without having visual contact with the runway. The more sophisticated the NAVAID, the lower the minimum for approach (provided, of course, that the aircraft is properly equipped and the pilot is appropriately instrument rated).

Nonprecision Instrument Approach (NPI)

A nonprecision instrument approach system provides for horizontal guidance for pilots with instrument landing capabilities. A straight-in nondirectional beacon (NDB) approach and circling approach is available to Runway 15. Minimums for the straight in approach are 860 foot ceiling and one mile visibility for approach category A aircraft. A circling approach is also available to the airport. Minimums for a circling approach are a 900 foot ceiling and one mile visibility. The NDB frequency is 353 with no voice over.

Nondirectional Beacon

Providing support for instrument approaches to the airport is a nondirectional beacon (NDB). An NDB is a general purpose, low frequency, radio beacon operating between 200-415 Kilohertz which helps pilots approaching the airport to determine the aircraft's bearing relative to the transmitter and home in on the station.

Other Navigational Aids

In addition to the previously mentioned airport navigational aids, the airport also provides a windsock, ceilometer, ASOS, and traffic pattern indicators. The airport also has a straight in non-precision NDB approach to Runway 15 and a GPS overlay.

1.4 AIRSPACE AND IMAGINARY SURFACES

Related to the physical layout of the airfield are the airspace requirements and imaginary surfaces required by the FAA. Descriptions of these standards as they apply to the Renton Municipal Airport are presented as follows:

- Approach and Runway Protection Zones, and
- Federal Aviation Regulations (FAR) Part 77 Surfaces.

These represent the key components of the airspace at the airport and have an influence on the location of airport and off airport buildings and above ground facilities.

1.4.1 Approach and Runway Protection Zones

A *Runway Protection Zone* (RPZ) is a trapezoidal area representing the ground level at the innermost portion of the runway approach. The exact dimensions of this zone are defined by the type of aircraft and operations to be conducted on the runway. Ideally, these areas are controlled by the airport in order to assure that the safety of the approach is protected and congregations of people are avoided. The RPZ begins 200 feet beyond the runway threshold at the end of the area usable for takeoff and landings, and is centered along the extended runway centerline. Exhibit 1-5 presents the regulatory dimensions of the individual RPZs associated with the runway at Renton Municipal Airport.

EXHIBIT 1-5: RPZ DATA BASE

Runway	Aircraft Served	Approved Approach	Approach Slope	Zone Length	Inner Width	Outer Width
15	Large	Non Precision	34:1	1,700'	500'	1,010'
33	Large	Visual	20:1	1,000'	500'	700'

As stated above, the runway RPZs represent the inner most segment of the applicable approach surface. The approach surface is defined as a surface longitudinally centered on the extended runway centerline and extending outward and upward from the end of the runway pavement. An approach surface is applied to the end of a runway based on the type of approach available or planned for that runway. Exhibit 1-6 presents the dimensions of the various approaches at the airport.

EXHIBIT 1-6: RUNWAY APPROACH SURFACES

Runway	Aircraft Served	Approach	Slope	Length	Inner Width	Outer Width
15	Large	Non Precision	34:1	10,000'	500'	3,500'
33	Large	Visual	20:1	5,000'	500'	1,500'

1.4.2 FAR Part 77 Imaginary Surfaces

Ideally, airports should be located so that the surrounding airspace is free and clear of obstructions that could be hazardous to aircraft on takeoff or approach paths. It is therefore necessary to maintain the surrounding airspace free from obstacles, preventing the development and growth of obstructions to airspace that could cause the airport to become unusable. The regulations for the protection of airspace in the vicinity of airports are established by the definition of imaginary obstacle limitation surfaces, penetration of which represents an obstruction to air navigation. The geometry of the imaginary surfaces is governed by regulations set forth in Federal Aviation Regulations (FAR) Part 77. The protected airspace around the Renton Municipal Airport is made up of five principal imaginary surfaces:

- **Primary Surface:** A surface that is longitudinally centered on the runway, extending 200 feet beyond the threshold in each direction and measuring 500 feet wide for Runway 15-33.

- **Approach Surface:** As defined in Exhibit 1-6.

- **Horizontal Surface:** A horizontal plane 150 feet above the established airport elevation, in this case 29 feet above mean sea level. The plane dimensions of the horizontal surface are set forth by arcs of specified dimensions from the end of the primary surfaces, connected by tangents. This arc measures 10,000 feet for Runway 15-33.

- **Transition Surface:** An inclined plane with a slope of 7:1 extending upward and outward from the primary and approach surfaces, terminating at the point where they intersect with the horizontal surface or any other surface where more critical restrictions are intercepted.

- **Conical Surface:** An inclined plane at a slope of 20:1 extending upward and outward from the periphery of the horizontal surface for a horizontal distance of 4,000 feet.

Part 77 approach surfaces will be shown later in the report under Airport Plans.

1.5 AIRFIELD SUPPORT FACILITIES

Airfield support facilities include the air traffic control tower (ATCT), the airport administration building, and airport maintenance area. These are discussed below.

1.5.1 Air Traffic Control Tower

The air traffic control tower is located midfield on the west side of the airport above the airport manager's office. Its hours of operations are: from 7:00 a.m. to 8:00 p.m. daily, October through April, and 7:00 a.m. to 9:00 p.m. daily, May through September.

1.5.2 Airport Administration Building

The airport administration offices are housed beneath the air traffic control tower. Total area is estimated to be approximately 412 square feet.

1.5.3 Airport Maintenance Area

The airport maintenance area is a small 400 square foot portion of the north end of the City owned T-hangar. No area is currently available for storage of airport maintenance equipment or vehicles.

1.6 GENERAL AVIATION FACILITIES

The general aviation inventory is organized as follows:

- Tenants and Services;
- Aircraft Storage Inventory; and
- Floatplane facilities.

Each of these categories are discussed in detail below.

1.6.1 Tenants and Services

There are 14 aviation related businesses providing services for general aviation pilots and the public. These services include hangar and tie-down rental, fueling, aircraft maintenance and repair, flight instruction, aircraft charter, and seaplane towing service. Other tenants include Boeing, an aviation fuel system research and development firm, the Boeing Employees Flying Association, and private operators.

A number of commercial seaplane air taxi firms also operate from the airport during much of the year. These include Action Aviation, Northwest Seaplanes, and Sound Flight. These operators provide nonscheduled and contract air taxi services throughout Washington State and British Columbia.

1.6.2 Aircraft Storage and Hangar Inventory

Conventional and T-hangar space, as well as tie-downs, are available at the airport. Exhibit 1-7 provides a summary of these facilities.

1.6.3 Fuel Facilities

Aircraft fuel on the airport is supplied by Action Aviation. They provide 100LL avgas, Mogas, and jet A1+ fuel. Fuel storage facilities consist of two 10,000 gallon tanks for 100LL and one 8,000 gallon for Mogas and one 6,000 gallon tank for Jet fuel.

1.6.4 Seaplane Facilities

The Renton Municipal Airport also facilitates use of the Will Rogers/Wiley Post Memorial Seaplane Base, located in Lake Washington, by maintaining dockage and access ramps on the northwest corner of airport property. These facilities consist of a floating seaplane dock and amphibious ramp.

EXHIBIT 1-7: AIRCRAFT HANGAR AND STORAGE DATA

Location	No. of Conventional Hangars	Conventional Hangars Sq. Ft.	T-Hangars	Based Tie-Downs	Itinerant Tie-Downs
Action Aviation	0	0	0	46	0
Boeing Employees Flying Assoc.	1[1]	3,000	0	31	0
BHC, Inc.	1	4,620[2]	7	0	0
Cedar River Hangars	0	0	29	60	0
Kaynan	1	4,160	25	2	1
Lake Union Air	0	0	0	16	0
Lane Aviation	1[1]	na[3]	12	0	0
Liens	3	na	0	3	0
Northwest Seaplanes	0	0	6	12	0
Job Master	1	na	0	0	1
Public Facilities	0	0	10	0	8
Puget Sound Power & Light	1	na	0	1	0
Puget Sound Helicopters	1	na	0	7[4]	0
JVC Aviation	0	0	0	10	0
Total			89	188	10

Source: Airport Management Record and Survey Forms/Field Survey na = Not Available

[1] Used as maintenance hangars.

[2] Leased by Northwest Seaplanes for maintenance hangars.

[3] Leased by JVC Aviation for maintenance hangars.

[4] Puget Sound Helicopters also has 4 helicopter tiedowns not included in this total.

1.7 AVIATION AND NON-AVIATION RELATED COMMERCIAL/INDUSTRIAL USES

On airport aviation and non-aviation related commercial/industrial uses include the Boeing Company, Ellison Fluid Systems, and a restaurant facility.

1.7.1 Boeing Company

The Renton Division of the Boeing Company produces the 757, a 194 seat aircraft with a range of 4,500 miles, and three versions of the new generation 737: the 737-300, with a capacity of 128 passengers, the 737-400, which can carry 146 people, and the smallest version, the 737-500, which carries 108 passengers. Approximately 11,000 people are employed at the Renton assembly site. The Renton Municipal Airport is used by Boeing to perform pre-flight tests on all 737s and 757s before they make their initial test flight. After the flight, planes land at King County International Airport (Boeing Field), in Seattle, where final preparations are made before delivering the aircraft to the customer.

Boeing Renton Field Operations

All Renton Division airplanes enter the Renton Municipal Airport flight line for final preparation, testing and installation by Preflight (R-3460) and Electronics (R-3470). The planes are essentially complete prior to roll-out from the factory except for some electronic installations and critical functional testing. The major activities on the field include the painting of all 757 airplanes and an occasional 737 airplane as well as the weighing of all airplanes painted here. Functional testing of all mechanical, electrical, flight control and avionic systems; the fueling and leak check of all airplane tanks, engine testing and first flight.

Paint: Planes come from the factory with spraylat covering the exterior surfaces for protection. The spraylat is removed, the surface is abraded and cleaned; then paint application begins. This two-shift operation uses the third shift for heat cure, when temperatures inside the hangar reach 120°. All 757 and an occasional 737 are painted in the upgraded 4-41 building (previously called the "CAMO" building). The paint hangar on Renton Field is used as a backup paint hangar in the event maintenance is required on the 4-41 building. It will also be used as a maintenance hangar for emergent work that is required to be done out of the weather.

Fueling: Fueling of both models is accomplished on Apron B, which is located on the southwest end of the airport. The stalls in this location have been outfitted with water barriers for safety reasons, and are in an isolated area away from the lake. They have an oil-water separator and other environmental provisions to contain fuel in case of a large spill.

The airplanes are fueled to the very maximum capacity and allowed to set for a specified amount of time to identify any leaks. The fuel indication system as well as the defueling, fuel feed and fuel pumps systems are checked for proper operation after the leak check is accomplished. At the same time these items are being accomplished, the engines are being serviced and prepared for the initial

engine run. To accomplish this run, the airplanes must be moved to the east side of the field; 757s to Apron A and 737s across the Cedar River to Apron D.

Engine Run: Initial engine testing usually takes two to three days, during which all attachments are checked. Air-bleed, starting systems, oil-pressure, the auxiliary power unit, hydraulic pumps, generators, lighting, warning and many other systems and functions are tested. This testing concludes with an airplane wholly functioning under its own power and considered `live'.

First Flight: The morning of First Flight the test pilot reevaluates all systems; any failure may abort the flight. Electronic flight analysts from Renton are part of the flight crew; they check the avionics and other operating systems during flight and correct irregularities, if possible. An average First Flight (B1) is three hours, which allows time to test many interrelated components of the aircraft. The minimum flight path is over Lake Washington to the Commercial Delivery Center in Seattle at King County International Airport (Boeing Field), only 8 miles and a few minutes away.

Personnel: The following is a list of numbers of employees involved in Renton Preflight activities that make the First Flight possible:

Mechanics, electricians and supervisors (3 shifts)	96
Painters and supervisors (2 shifts)	24
Avionics technicians and supervisors (3 shifts)	57
Quality assurance, including records (3 shifts)	64
Liaison Engineering	12
Field maintenance and transportation (3 shifts)	16
Industrial Engineering (1 shift)	6
Production stores (2 shifts)	8

1.7.2 Ellison Fluid Systems

Ellison Fluid Systems is a research and development firm involved in the product development and manufacture of aircraft fueling components. The company operates out of a hangar on the southeast portion of the airport, located at 350 Airport Way.

1.7.3 Restaurant Facility

The Specialty Restaurant Corporation restaurant building is located on the northwest end of the airfield near Lake Washington. It is a single story wood frame structure and is marked with an obstruction light. The lease area of the restaurant is approximately 81,000 square feet, which includes building, grounds, and auto parking.

1.8 UTILITIES

The City of Renton provides water and sewer to the south half of the airport, and Bryn Mawr provides water and sewer to the northwest quadrant. Electrical power is supplied by Puget Sound Power & Light and telephone service is provided by US West Communications. There is no natural gas available. Sanitary sewer facilities in the northwest quadrant are privately operated lift stations, pumping up to the Bryn Mawr trunk sewage lines.

1.9 HISTORICAL AIRPORT ACTIVITY LEVELS

This section of the inventory presents an overview and summary of historical aviation activity at the Renton Municipal Airport. Data concerning levels of aircraft operations and based aircraft serve as the basis for forecasting future demand, assessing existing capacity, and identifying additional facility requirements. Data was collected from Airport Management Records and Air Traffic Control Tower records (FAA Form 7230-1).

Aviation activity descriptors are presented in the following sections:

- Operations, and
- Based Aircraft.

1.9.1 Aircraft Operations

An "Operation" refers to either the taking-off or landing of an aircraft. Exhibit 1-8 details the number of annual aircraft operations over the last 11 years. The peak month for aircraft activity is July and represents approximately 12 percent of the yearly total.

1.9.2 Based Aircraft

A based aircraft is a general aviation aircraft that is permanently stationed at an airport. The number of general aviation aircraft that can be expected to base at an airport is an important factor in the planning of future airfield and landside facilities. Exhibit 1-9 lists the number and type of aircraft based at Renton Municipal Airport since 1982.

Since no government agency routinely collects this information in a detailed fashion, some gaps and inconsistencies exist. Nevertheless, based aircraft at the Renton Municipal Airport have remained fairly steady at around 250 to 256 aircraft. Information on based floatplanes is even more difficult to obtain, as some aircraft operate as land based aircraft during the winter and are float based during the warmer months.

A survey of based aircraft owners, with a return rate of approximately 25 percent, indicates that there are an estimated 40 based amphibious aircraft (equipped with floats with retractable wheels that allow for land or water operations) and/or floatplanes based at the airport. Approximately 35 percent of these aircraft operate on floats fulltime. A windshield survey of apron storage areas revealed approximately sixty pairs of empty floats that are utilized over the year.

EXHIBIT 1-8: HISTORICAL ANNUAL OPERATIONS

Year	Air Carrier	Air Taxi	Itinerant GA	Local GA	Military	Total
1980	0	15	48,300	10,500	180	149,100
1981	0	10	45,900	97,300	165	143,400
1982	0	45	44,400	61,500	130	106,000
1983	0	30	63,800	114,900	145	178,800
1984	0	140	58,200	88,200	255	146,700
1985	0	530	55,500	83,000	300	139,400
1986	0	460	49,400	83,300	225	133,400
1987	240	240	59,100	109,500	245	169,100
1988	130	370	63,200	98,900	180	162,800
1989	245	455	51,700	89,800	260	142,500
1990	230	1,420	54,000	95,400	245	151,300
1991	325	1,575	54,000	83,000	160	139,100
1992	330	1,280	59,600	83,800	210	145,100
1993	265	2,175	45,200	66,500	140	114,300

Source: Air Traffic Control Tower Records for respective fiscal years (Oct.1-Sept.30)

EXHIBIT 1-9: RENTON MUNICIPAL AIRPORT HISTORICAL BASED AIRCRAFT

Year	Single Engine Piston	Multi Engine Piston	Jet	Total	Float-plane	Roto Craft
1982	218	42	0	260	—	1
1983	218	42	0	260	21	1
1984	220	40	0	260	20	1
1985	—	—	—	—	—	—
1986	230	21	5	256	—	2
1987	230	21	5	256	7	2
1988	230	21	5	256	7	2
1989	—	—	—	—	—	—
1990	230	21	5	256	—	2
1991	230	21	1	252	—	0
1992	230	21	1	252	7	0

Source: Airport Master Record, FAA form 5010-2, for respective years.

1.10 FINANCIAL DATA

(Information and Exhibit 1-10: Renton Municipal Airport Revenues & Expenditures to be prepared.)

1.11 REGIONAL AIRPORTS AND AIRSPACE

This section describes the regional airspace system in order to allow proper consideration to possible airspace impacts of future development plans. Components of this system include:

- Regional Airports;
- Airspace; and
- Air Traffic Control.

1.11.1 Area Airports

Other airports in the vicinity of Renton Municipal Airport may exert some influence on the airport in terms of competing services and facilities, and airspace. The general character and services associated with these airports are shown in Exhibit 1-10.

EXHIBIT 1-10: AREAWIDE PUBLIC USE AIRPORTS

Airport	Ownership	No. of Runways	Longest Runway (feet)	Instrument Approach	Location Relative to RNT
Auburn Municipal	Public	1	3,400	None	12 mi
Boeing Field	Public	2	10,001	ILS	7 mi
Crest Airpark	Private	1	3,267	None	8 mi
Sea-Tac	Public	2	11,900	ILS	7 mi

Source: Seattle Sectional Aeronautical Chart, NOAA 1/9/92

1.11.2 Area Airspace

This section examines airspace patterns and navigational aids in the Puget Sound area. This information will be used later in the study to determine operational capacity constraints, if any.

The airspace structure in the Puget Sound is either *uncontrolled* (Class G Airspace) or *controlled* (Class E Airspace). Uncontrolled airspace is defined as all airspace that has not been designated as controlled, and within which Air Traffic Control (ATC) has neither the authority nor responsibility for control. Controlled airspace, on the other hand, is supported by ground/air communications, navigational aids, and air traffic services. Controlled airspace consists of those areas designated as *Continental Control Area, Control Area, Control Zones, Terminal Control Areas, Airport Radar Service Areas,* and *Transition Areas,* within which some or all aircraft may be subject to ATC. Virtually all airspace above 14,500 feet mean sea level is considered controlled. Airspace under that altitude can be either controlled or uncontrolled, depending upon the air traffic density, proximity to an airport, and geographic factors.

Another category of controlled airspace is designated *Special Use.* Special use airspace consists of that airspace where limitations are imposed upon aircraft operations usually because of military activity. Special use airspace is classified as Restricted Areas, Military Operation Areas, and Prohibited Areas. Restricted Areas are military related or have tethered radar balloons and related equipment. When active, restricted areas are closed to overflight up to a specified flight levels. Military operating areas (MOA) are also associated with military training, but can tolerate throughflight when in use. Extreme caution is advised when traversing an active MOA.

No special use airspace impacts operations at Renton Municipal Airport.

1.11.3 Air Traffic Control

The purpose of this section is to describe the management of airspace in the vicinity of Renton Municipal Airport. Much of this discussion is based on information obtained in FAA documents and discussions with FAA personnel.

Within the Puget Sound area there are two major jurisdictional categories of airspace -- Air Route Traffic Control Center Airspace (ARTCCA) and Air Traffic Control Tower (ATC) Airspace. These categories define a specific volume of airspace and are discussed below.

Air Route Traffic Control Centers

All aircraft flying under instrument Flight Rules (IFR) and not under control of military or terminal facilities are monitored by air route traffic control centers (ARTCC). These centers control an aircraft's route of flight between airports and provide separation of services, traffic advisories, and weather advisories. Aircraft flying under visual flight rules (VFR) may also be monitored by these centers if they have filed a flight plan with a Flight Service Station (FSS) prior to takeoff.

The United States is divided into approximately 20 different ARTCCS; the Puget Sound area falls within the Seattle ARTCC area of responsibility.

Airport Traffic Control Tower Airspace

An Airport Traffic Area, or air traffic control tower airspace, is the airspace under jurisdiction of an air traffic control tower (ATCT). For Renton Municipal Airport this area is defined as a Control Zone (Class D Airspace). This is generally a circular area with a radius of five square miles with extensions to include instrument approach and departure paths. The Class D Airspace around the Renton Municipal Airport is unique as it sits under the Terminal Control Area (Class B Airspace) for Sea-Tac International Airport. It has a ceiling of 2,500 feet and a semi-circular shape with an extension to the south related to the instrument approach to Runway 15.

1.12 STUDY AREA CHARACTERISTICS

The historic and present character of an airport's environs have a direct relationship to the historic and existing character of the airport itself. Future changes in these area characteristics will likely cause changes in the airport or, conversely, be caused by developments at the airport. For these reasons, defining the historical, present, and future characteristics of the airports's study area is an important step in master planning.

Past and present conditions are readily determined while selecting a future growth scenario is much less precise. This section describes the study area and defines its historic and existing characteristics while reviewing the various growth trends and projections developed for the area. Selection of a

future community growth scenario will be accomplished in the context of established community plans and policies, and with personal interviews with civic, governmental, and industry leaders.

1.12.1 Study Area

Renton covers approximately 16 square miles of land at the south end of Lake Washington. Its location between Seattle, Bellevue, and Tacoma places Renton in the center of a region that is the economic hub of the State. The City is at the cross roads of a regional transportation network, where seven State and Interstate highways converge, and is central to national and international air traffic.

Renton is currently home to more than 43,600 people and ranks forth in population in King County. An additional 60,000 people live in the unincorporated area surrounding the City. Over 45,000 people work in the City each day. Most of these work for Boeing Corporation or PACCAR Company, which continue to be major players in the regional economy.

1.12.2 Socioeconomic Characteristics

An area's socioeconomic profile can have a direct relationship to its demand for aviation related activities. Experience has shown that the most significant factors typically in this profile are population, income, and employment. Each of these are assessed in the following pages.

Population

Population in the Puget Sound has grown significantly over the past ten years. Renton has also experienced relatively rapid population growth over the past several years and currently ranks fourth in population in King County. Between 1960 and 1970, the city experienced an increase of approximately 40 percent and gained about four square miles of territory. The 1993 population is approximately 43,000 and an additional estimated 60,000 people live in the unincorporated area surrounding the city. Recent population forecasts by the Puget Sound Regional Council (PSRC) anticipates 126,537 residents in the city's planning area by year 2010. Historical and forecast population for Renton and King County are shown in Exhibit 1-11.

Income

The discretionary purchasing power available to residents over any period of time is a good indicator of consumers' financial ability to travel. High levels of discretionary income in an area served by an airport provide a strong basis for higher than average levels of consumer spending on air travel. Exhibit 1-12 lists historical per capita income for Renton and King County.

EXHIBIT 1-11: RENTON AND KING COUNTY HISTORICAL AND FORECAST POPULATION

Year	Renton Pop.	King County Pop.	King County Households
1970	25,878[1]	1,159,369[1]	---
1980	30,083[1]	1,269,749[1]	497,263[5]
1990	41,688[1]	1,507,319[1]	615,792[5]
Forecast			
1995	43,265[2]	1,618,810[2]	674,746[2]
2000	44,787[3]	1,730,300[5]	733,700[5]
2005	46,639[2]	1,787,400[2]	788,650[2]
2010	48,325[2]	1,844,500[5]	823,600[5]
2020	51,755[3]	1,963,200[5]	909,500[5]

Source:[1] US Census, respective years; [2] Extrapolation by BWR; [3] Forecasts by the Puget Sound Regional Council of Governments, 1988; [4] Washington State Office of Financial Management, County Population Projections, Jan. 31, 1992.[5] Forecasts by the Puget Sound Regional Council of Governments, 1992

EXHIBIT 1-12: PER CAPITA INCOME FOR RENTON AND KING COUNTY

Year	Renton	King County
1980	$ 8,864	$ 12,933
1981	$ 9,607	$ 14,315
1982	$ 10,351	$ 15,037
1983	$ 11,094	$ 15,680
1984	$ 11,838	$ 16,732
1985	$ 12,581	$ 17,812
1986	$ 13,324	$ 18,829
1987	$ 14,068	$ 19,621
1988	$ 14,811	$ 20,781
1989	$ 15,555	$ 22,384
1990	$ 16,298	$ 23,671
1991	$ 17,041	$24,837

Source: Washington State Employment Security Dept.; 1990 Census of Population and Housing, US Dept. of Commerce.

Employment

Over half of the wage and salary jobs in the State of Washington are in the Puget Sound Region. King County accounts for almost one million nonagricultural wage and salary jobs. There were an estimated 40,771 jobs in Renton as of July 1989. Data concerning the number of employees and businesses by business type compiled by the City of Renton indicates that the air transportation industry continues to dominate the job market in Renton with medical services trailing second. The services sector, including business and medical services, is the second largest source of employment in Renton and the number one source of jobs for all of King County. Employment data is shown in Exhibit 1-13.

EXHIBIT 1-13: KING COUNTY EMPLOYMENT DATA

Year	Total Jobs
1980	697,400
1990	969,000
Forecast	
2000	1,157,200
2010	1,301,800
2020	1,415,000

Source: Puget Sound Regional Council of Governments, 1992

1.12.3 Community/Physical Environment

The Renton Municipal Airport is located within the political boundaries of the City of Renton. The Airport is wedged into a location tightly bounded by Lake Washington, the Cedar River, Airport Way, Rainier Avenue, and West Hill. Beyond these barriers, urban uses are located to the east, south, and west.

The Will Rogers-Wiley Post Memorial Seaplane Base is associated with the Renton Municipal Airport. It consists of a 5,000 by 200 foot waterlane north of the airport in Lake Washington. A seaplane ramp along the lakeshore and docking facilities are under control of the City of Renton. Jurisdiction over the waterlane, however, is unclear, and is most likely shared among various Federal, State, and local agencies.

Existing Land Use

Examination of communitywide land use and growth patterns is useful in determining where future concentrations of residential, commercial, and industrial uses are likely to occur. Land use analysis in the vicinity of the airport is of particular importance since any local zoning ordinances or known land use conflicts must be carefully considered when evaluating alternatives for airport development.

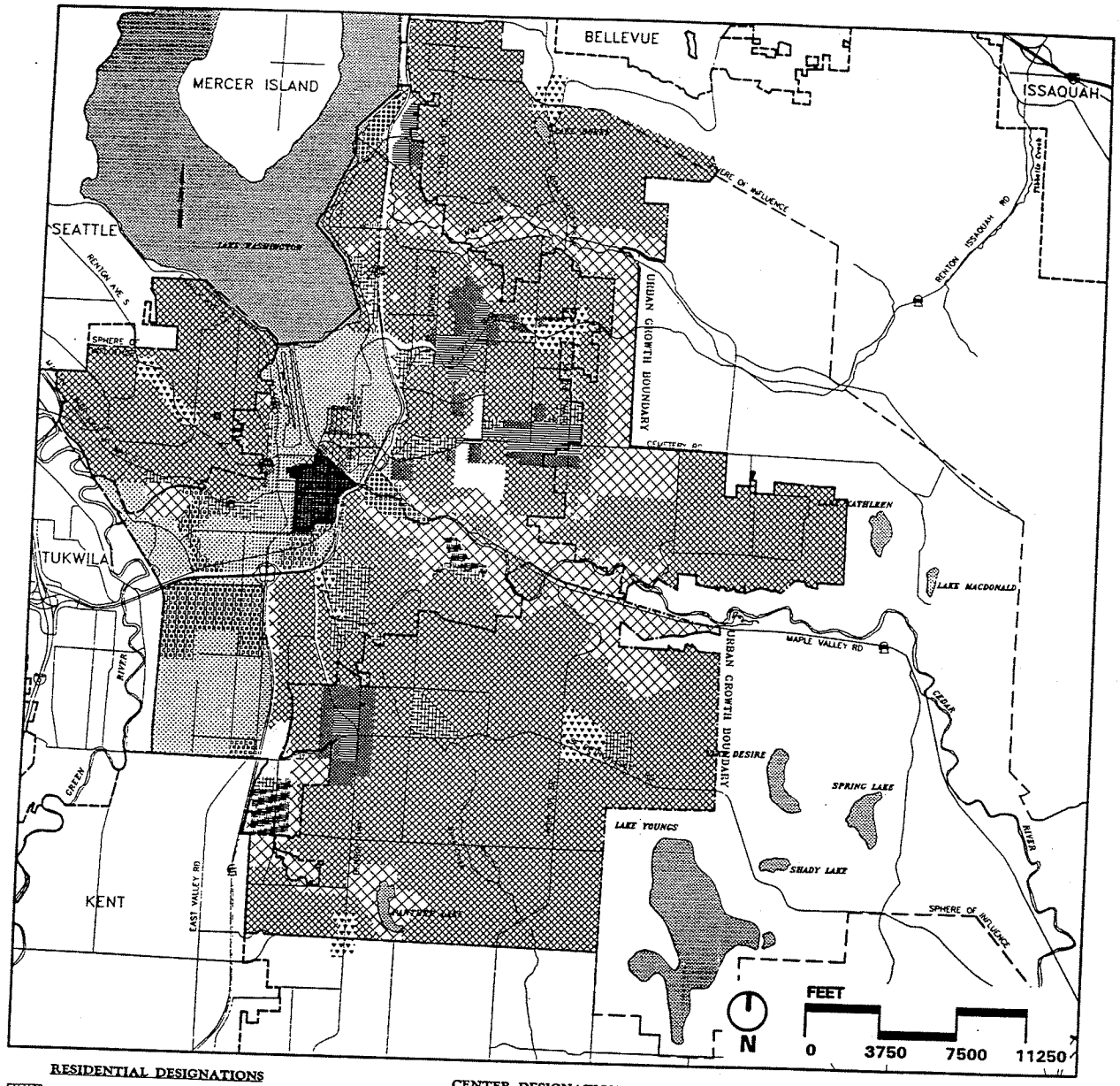
The existing land use pattern of the City of Renton reflects 100 years of settlement and expansion. The original city was settled in the broad floodplains at the confluence of the Cedar and Black Rivers along the shore of Lake Washington. This area continues to be the heart of Renton with its mix of heavy industrial uses and the airport along Lake Washington, the central business district at the foot of Renton Hill, all interspersed with older single family housing mixed with small apartment complexes.

Surrounding the original settlement are the residential areas on the hills and plateaus, much of which was originally developed in the County and annexed into the City. Single family residential neighborhoods are concentrated in the Highlands, Kennydale Hill, West Hill, Earlington Hill, Talbot Hill, and along the ridges of Maple Valley.

As shown in Exhibit 1-14, the land uses surrounding the airport are predominately urban with a mix of commercial, manufacturing/industrial, public use, and residential.

Zoning

The City of Renton, in order to implement the Land Use Element of the Comprehensive Plan, has established zoning regulations to guide land use decisions. The zoning in the immediate airport area to the east is predominantly heavy industrial with some residential to the southwest. To the west of the airport is arterial commercial transitioning to single family residential; and to the south arterial commercial transitioning to mixed commercial to residential and multi-family.



RESIDENTIAL DESIGNATIONS

- Low Density Single Family
- Single Family Residential – 8 du/ac
- Single Family/Up to 4 Units Mix
- Existing Multi-Family District
- Planned Neighborhood

CENTER DESIGNATIONS

- Mixed Use – City Core
- Community Center
- Neighborhood Center
- Office/Residential Center
- Institution Center

EMPLOYMENT AREA DESIGNATIONS

- Employment Area – Commercial
- Employment Area – Industrial
- Employment Area – Office

MISCELLANEOUS DESIGNATIONS

- Convenience Commercial
- City Limits
- Sphere of Influence

AIRPORT MASTER PLAN UPDATE

RENTON MUNICIPAL AIRPORT
Renton, Washington

Exhibit 1-14

EXISTING LAND USE

Community and Regional Planning

A number of local and regional agencies and organizations administer plans and policies that affect airport development. A brief description of their efforts relative to the airport master planning process are summarized below.

City of Renton Land Use Element of the Comprehensive Plan: As identified in the Land Use Element, the City's stated goal regarding the airport is to "... Create efficiently functioning air transportation facilities which are responsibly integrated with the City's transportation system and land use pattern." Specific objective and policy statements related to this goal are:

- **Objective A-1.0:** Promote and develop local air transportation facilities in a responsible and efficient manner;
- **Policy A-1.1:** Support the land base and seaplane base activities;
- **Policy A-1.2:** Support increased air transportation with appropriate mitigation measures of potential adverse impacts;
- **Policy A-1.3:** Use existing airport land primarily for direct aviation related uses;
- **Policy A-1.4:** Develop appropriate land use plans and regulations for structures and vegetation within the airport sphere of influence; and
- **Policy A-1.5:** Minimize conflicts between development regulations and air traffic regulations.

City of Renton Transportation Element of the Comprehensive Plan: According to this document, the following policies were derived from the 1988 Renton Airport Master Plan:

- A balanced mix of aviation should be served. Future proportions of based general aviation should not be allowed to vary significantly from current fleet mix. The basing capacity for light General Aviation aircraft should be maintained at about 260 aircraft. The number of based business aircraft should be kept to less than 20% of the total of non-Boeing General Aviation aircraft on the field. Leasing policy and negotiations may be a tool for implementation.
- The City's airport ownership should not extend east across the Cedar River.
- The use of space at the airport should be maximized. Wherever possible, land uses should be condensed.

- Airport leases that need runway access should have priority. (The airport flightline is a limited resource and should not be given to uses which could operate elsewhere.) In addition, Renton is the only publicly-owned seaplane facility in the area and, therefore, seaplane access deserves a priority along the lakeshore.

- The Community Service Alternative response to demands for use of the Renton Municipal Airport should be the Balanced Response to maintain General Aviation basing capacity. (This option seeks to avoid the loss of general aviation parking areas on the west side apron because of lease recapture by Boeing. Boeing would take over the southeast corner of the airport, displacing non-Boeing general aviation uses to the west side of the airport.)

1.12.4 Surface Transportation Network

Transportation access to the airport is an important factor to be considered in the preparation of the master plan update. Existing transportation networks potentially impact aviation demand throughout the planning period. This section will examine existing and planned surface transportation facilities within the airport service area.

The primary responsibility for preparing, adopting, and maintaining regional transportation plans in the Renton metropolitan area is the Puget Sound Regional Council. The City Renton has primary responsibility for developing the transportation access plan for the airport.

Roadways

Renton is situated in the center of the regional transportation network that connects State Highways 167, 169, 515, and 900 to Interstate Highways 5, 405, and 90.

The major arterial streets providing access to the airport include Interstate 405, State Highway 167, Logan Avenue, Rainier Avenue North, and Airport Way Direct access to airport facilities is off of Rainier Avenue North and Airport Way. Both roadways are high volume four lane urban arterials with over 30,000 vehicles per day (VPD). The peak intersection volumes for Rainier and Airport Way are in the 600 - 700 vphpl range. Congestion problems typically can begin to occur when entering volumes reach 500 vphpl.

Transit

The City and airport area are served by Metro Transit. Metro Transit provides 15 different regularly scheduled routes. One route provides weekday peak hour express service from downtown Seattle to the Boeing plant, however, no direct or regular service is provided to the airport.

1.12.5 Natural Environment

Renton lies in a broad lowland where the terrain is dominated by a broad glacially formed plain that stands several hundred feet above the floors of valleys cut into it. The airport is situated in the broad floodplain of the Cedar River where it flows into the southern end of Lake Washington. It is at an elevation of 29 feet above mean sea level.

Soil

The airport is built primarily on fill dredged from Lake Washington and of soil of the Orida-Seattle-Woodinville Association. This is common to the valleys of the Green and lower Cedar Rivers. The soils in this type tend to be poorly drained, and occur on level areas.

Hydrology

The Airport is within the Cedar River hundred year floodplain. Floodplains are defined by Executive Order 11988, Floodplain Management, as those areas with a one percent chance of flooding in any given year, or once in every 100 years. Examination of Federal Flood Insurance Administration Maps have revealed the existence of 100 year floodplains on the airport. Identification of flood prone areas is a key issue to development of the airport. Sources indicate that existing flood maps may be incorrect.

Airport surface water drains southeast and west from the center line of the runway. From the center line west, runoff drains into the Black River Box Culvert at the west perimeter. From the center line east, runoff drains into Cedar River. The Black River Box Culvert and Cedar River then drain into Lake Washington.

Wildlife

While no wildlife habitats have been identified on airport property, closely associated habitats include the riparian and wetland habitats associated with the Cedar River and Lake Washington, and adjacent open grass areas. Species commonly observed around the airport environment include domestic and Canadian geese, gulls, common song birds, herons and terns.