APPENDIX A

GLOSSARY

AVIATION GLOSSARY OF TERMS

Above Ground Level (AGL). An altitude that is measured with respect to the underlying ground.

Accelerate-stop distance available (ASDA). The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.

Administrator. Federal Aviation Administrator or any person to whom he has delegated his authority in the matter concerned.

Advisory Circular (AC). External communications or publications issued by the FAA to provide non-regulatory guidelines for the recommendations relative to a policy, and guidance and information relative to a specific aviation subject matter.

Air Carrier. A person or company who undertakes directly by lease, or other arrangement, to engage in air transportation.

Aircraft. A device that is used or intended to be used for flight in the air.

> ***Airplane.*** An engine-driven fixed-wing aircraft heavier than air that is supported in flight by the dynamic reaction of the air against its wings.
>
> - ***Large Airplane.*** An airplane of more than 12,500 pounds maximum certified takeoff weight.
> - ***Small Airplane.*** An airplane of 12,500 pounds or less maximum certified takeoff weight.
>
> ***Balloon.*** A lighter-than-air aircraft that is not engine-driven, and that sustains flight through the use of either gas buoyancy or an airborne heater.
>
> ***Glider.*** A heavier-than-air aircraft that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine.
>
> ***Heavy Aircraft.*** Aircraft capable of takeoff weight of more than 255,000 pounds whether or not they are operating at this weight during particular phase of flight.
>
> ***Helicopter.*** A rotorcraft that, for horizontal motion, depends principally on its engine-driven rotors.
>
> ***Large Aircraft.*** Aircraft of more than 41,000 pounds maximum certified takeoff weight, up to 255,000 pounds
>
> ***Regional Jet (RJ).*** There is no regulatory definition for an RJ; however, for FAA use, an RJ is a commercial jet airplane that carries fewer than 100 passengers.
>
> ***Rocket.*** An aircraft propelled by ejected expanding gases generate in engine from self-contained propellants and not dependants on the intake of outside substances.
>
> ***Rotorcraft.*** A heavier-than-air aircraft that depends principally for it support in flight on the lift generated by one or more rotors.
>
> ***Small Aircraft.*** Aircraft of 41,000 pounds or less maximum certified takeoff weight.

Aircraft Accident Safety Zone. This zone represents data clusters of historical aircraft accidents. The data is collected from the NTSB and analyzed in several studies to first determine the shape of the zone based on the greatest cluster of accident sites per acre and second on the ratio of accidents per acre changes.

Aircraft Approach Category. An alphabetical classification of an aircraft based upon 1.3 times the stall speed in a landing configuration at their maximum certified landing weight. The categories are as follows:

Category A: Speed less than 91 knots.

Category B: Speed 91 knots or more but less than 121 knots

Category C: Speed 121 knots or more but less than 141 knots.

Category D: Speed 141 knots or more but less than 166 knots.

Category E: Speed 166 knots or more.

Aircraft Deicing Pad. *See Deicing Pad.*

Aircraft Operation. *See Operation.*

Aircraft Rescue and Fire Fighting (ARFF). A special category of fire fighting that involves the response, hazard mitigation, evacuation and possible rescue of passengers and crew of an aircraft involved in (typically) an airport ground emergency.

ARFF Building. A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

Airplane. *See Aircraft*

Airplane Design Group (ADG). A numerical classification aircraft based on wingspan or tail height. Where an airplane is in two categories, the most demanding category should be used. The groups are as follows:

Group I: Up to but not including 49 feet wingspan or tail height up to but not including 20 feet. (e.g. Cessna 172)

Group II: 49 feet up to but not including 79 feet wingspan or tail height from 20 up to not including 30 feet. (e.g. Cessna Citation Business jet).

Group III: 79 feet up to but not including 118 feet wingspan or tail height from 30 up to but not including 45 feet. (e.g. Boeing 737)

Group IV: 118 feet up to but not including 171 feet wingspan or tail height from 60 up to but not including 66 feet. (e.g. Boeing 767)

Group V: 171 feet up to but not including 214 feet wingspan or tail height from 60 up to but not including 66 feet. (e.g. Boeing 747)

Group VI: 214 feet up to but not including 262 feet wingspan or tail height from 66 up to but not including 80 feet. (e.g. Airbus A380)

Table: Airplane Design Groups (ADG)		
Group #	**Tail Height (ft.)**	**Wingspan (ft.)**
I	<20	<49
II	20 ≤30	49 ≤79
III	30 ≤45	79 ≤118
IV	45 ≤60	118≤171
V	60 ≤66	171≤214
VI	66 ≤80	214 ≤262

Airport. An area of land or water that is used or intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities, if any.

Cargo Service Airport. An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100 million pounds.

Certificated Airport. An airport that has been issued an Airport Operating Certificate by the FAA under the authority of FAR Part 139, Certification and Operation.

Commercial Service Airport. A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

General Aviation Airport. An airport that provides air service to only general aviation.

Hub Airport. An airport that an airline uses as a transfer point to get passengers to their intended destination. It is part of a hub and spoke model, where travelers moving between airports not served by direct flights change planes en route to their destinations.

Large Hub Airport. An airport that handles over 1% of the country's annual enplanements.

Medium Hub Airport. An airport that handles 0.25% ≥ 1% of the country's annual enplanements.

Small Hub Airport. An airport that handles 0.05% ≥ 0.25% of the country's annual enplanements.

Non-Hub Airport. An airport that handles over 10,000 enplanements, but less than 0.05% of the country's annual enplanements.

Incursions. *See Runway Incursion.*

International Airport. Relating to international flight, it means:

- An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for customs service.
- A landing rights airport at which specific permission to land must be obtained from customs authorities in advance of contemplated use.
- Airports designated under the Convention on ICAO as an airport for use by international commercial air transport and/or international general aviation.

Primary Airport. A commercial service airport that enplanes at least 10,000 annual passengers.

Reliever Airport. General aviation airports in a major metropolitan area that provides pilots with attractive alternatives to using congested hub airports.

Uncontrolled Airport. An airport without an air traffic control tower at which the control of VFR traffic is not exercised. Pilots "see and avoid" other traffic without the aid of air traffic control.

Airport Authority. A quasi-government public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

Airport Capital Improvement Plan. The planning program used by the FAA to identify, prioritize, and distribute funds for airport development and the needs of National Airspace System (NAS) to meet specified national goals and objectives.

Airport Elevation. The highest point of an airport's usable runway(s) expressed in feet above mean sea level (MSL).

Airport Facility Directory. A publication with information on all airports, seaplane bases, and heliports open to the public. This publication is issued in seven volumes according to geographical area, and includes communications data, navigational facilities, and certain special notices and procedures.

Airport Improvement Program (AIP). A program authorized by the Airport and Airway Improvement Act of 1982 that provides funding for the airport planning and development.

Airport Influence Area. The area defined by overlaying the FAR Part 77 Imaginary Surfaces, Aircraft Accident Safety Zone data, and Noise Contour data over the top of an existing land use map, critical areas map or other base map.

Airport Layout Plan (ALP). A scaled drawing of the airport showing the layout of existing and proposed facilities necessary for current and future operation and development of the airport.

Airport Layout Plan Drawing Set. A set of planning drawings that depicts existing airport facilities and proposed development as determined from the planners' review of the aviation activity forecasts, facility requirements, and alternative analysis. Minimum components of the set are:

- Cover Sheet
- Airport Layout Plan (ALP)
- Data Sheet
- Facilities Layout Plan
- Terminal Area Plan(s)
- Airspace Drawing
- Inner Approach Surface Drawing(s)
- Departure Surface Drawing(s)
- On-Airport Land Use Drawing
- Off-Airport Land Use Drawing
- Airport Property (also known as the Exhibit A)
- Utility Drawing(s)

Airport Lighting. Various lighting aids that may be installed on an airport. Types of airport lighting include:

ALS. *See Approach Light System.*

Boundary Lights. Lights defining the perimeter of an airport or landing area.

Runway Centerline Lighting. Flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway. Only used on Category II/III ILS Runways.

Runway Edge Lights. Lights used to outline the edges of the runways during periods of darkness or restricted visibility conditions. They are usually uniformly spaced at intervals of approximately 200 feet, and intensity may be controlled or preset. These light systems are classified according to the intensity they are capable of producing:

- *High Intensity Runway Lights (HIRLs).*
- *Medium Intensity Runway Lights (MIRLs).*
- *Low Intensity Runway Lights (LIRLs).*

Runway End Identifier Lights (REIL).Provides rapid and positive identification of the approach end of particular runway. The system consists of a pair of synchronized flashing lights, one on each side of the runway threshold.

Threshold Lights. Fixed lights arranged symmetrically left and right of the runway centerline, identifying the runway threshold. Lights are green for arriving aircraft and red for departing aircraft.

Touchdown Zone Lighting. Two rows of transverse light bars located symmetrically about the runway centerline normally at 100 foot intervals. Only used on Category II/III ILS Runways.

Airport Markings. Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage such as: 1) Visual, 2) Nonprecision instrument, 3) Precision Instrument.

Airport Master Plan. A comprehensive study of an airport that focuses on the short-, medium-, and long-term development plan to meet future aviation demand of the airport.

Airport Obstruction Chart. A scaled drawing depicting the FAR Part 77 imaginary airspace surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads, and other detail in the vicinity of the airport.

Airport Operations Area (AOA). An area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An AOA includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.

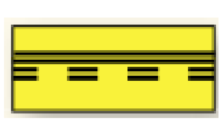
Airport Operator. The operator (private or public) or sponsor of a public-use airport.

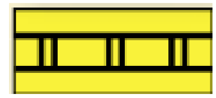
Airport Reference Code (ARC). A coding system used to relate the airport design criteria to the operational and physical characteristics of the airplanes intended to use the airport or the critical aircraft. It is a two character code consisting of the Aircraft Approach Category and the Airplane Design Group.

Airport Reference Point (ARP). The latitude and longitude of the approximate center of the runway(s) at an airport.

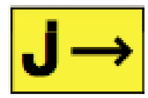
Airport Signs. Signs used to identify items and locations on the airport.

Boundary Sign. These signs are used to identify the location of the boundary of the RSA/ROFZ or ILS critical areas for a pilot, or an existing the runway. These signs have a black inscription on a yellow background.

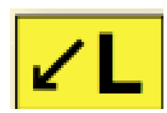




Destination Sign. These signs indicate the general direction to a remote location. They have black inscriptions on a yellow background and ALWAYS contain an arrow.



Direction Sign. These signs indicate directions of taxiways leading out of an intersection. They may also be used to indicate a taxiway exit from a runway. These signs have black inscriptions on a yellow background and ALWAYS contain arrows.



Information Sign. These signs are installed on the airside of an airport and are considered to be signs other than mandatory signs. They have black inscriptions on a yellow background.

Location Sign. These signs identify the taxiway or runway upon which the aircraft is located. The sign has a yellow inscriptions on a black background with a yellow border and does NOT use arrows.

Mandatory Instruction Sign. They denote taxiway/runway intersections, runway/runway intersections, ILS critical areas, OFZ boundaries, runway approach areas, CAT II/II operations areas, military landing zones, and no entry areas. These signs have white inscriptions with a black outline on a red background.

Roadway Sign. These signs are located on the airfield and are solely intended for vehicle operators. They should conform to the categorical color codes established by the Manual on Uniform Traffic Control Devices (MUTCD).

Runway Distance Remaining Signs. These signs are used to provide distance remaining information to pilots during takeoff and landing operations. These signs have a white numeral inscription on a black background.

Airport Sponsor. The entity that is legally responsible for the management and operation of an airport including the fulfillment of the requirements of laws and regulations related thereto.

Airport Surveillance Radar (ASR). A radar system used at airports to detect and display the position of aircraft in the terminal area.

Air Route Traffic Control Centers (ATRCC). A facility responsible for en route control of aircraft operating under IFR in a particular volume of airspace (within its area of jurisdiction) at high altitudes between airport approaches and departures. Approximately 26 such centers cover the United States.

Airside. The portion of an airport that contains the facilities necessary for the operations of aircraft.

Air Taxi. An aircraft operating under an air taxi operating certificate for the purpose of carrying passengers, mail, cargo for revenue in accordance with FAR 121 or FAR Part 135.

Air Traffic. Any aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

Air Traffic Control (ATC). A service provided by ground-based controllers who direct aircraft on the ground and in the air. The primary purpose of ATC systems is to *separate* aircraft to prevent collisions, to organize and expedite the flow of traffic, and to provide information and other support for pilots when able.

Air Traffic Control Tower (ATCT). A facility in the terminal air traffic control system located at an airport which consists of a tower cab structure and an associated instrument flight rules rooms, if radar equipped, that uses ground-to-air and air-to-ground communications and radar, visual, signaling, and other devices to provide for the safe and expeditious movement of terminal area air traffic in the airspace and airports within its jurisdiction.

Annual Service Volume (ASV). The number of annual operations that can reasonably be expected to occur at the airport based on a given level of delay.

Anti-Icing. Following aircraft deicing, anti-icing chemicals can applied to protect against the accumulation of ice or snow for a limited period of time, known as the holdover time.

Approach (or Departure) Airspace. The airspace, within five statue miles of an airport, through which aircraft more during landing and takeoff.

Approach Surface. *See Imaginary Surfaces.*

Approach Light System (ALS). An airport lighting facility aids in runway identification during the transition from instrument flight to visual flight for landing. Typical approach lighting systems used at airports include:

> ***Approach Light System with Sequenced Flashing (ALFS).***
>
> ***Lead-in-light System (LDIN).*** Consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.
>
> ***Medium-Intensity Approach Light System with Runway Alignment Indicator (MALSR).*** A lighting system installed on the approach end of a runway and consists of a series of lightbars, strobe lights, or a combination that extends outward from the runway end. It usually serves a runway that has an instrument approach procedure associated with it and allows the pilot to visually identify and align self with the runway environment once the pilot has arrived at a prescribed point on the approach.
>
> ***Omnidirectional Approach Lighting System (ODALS).*** Consist of seven omnidirectional flashing lights located in the approach area of a non-precision runway. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located on each side of the runway, with a lateral distance of 40 feet from the runway edge, or 75v feet from the runway edge when installed on a runway equipped with VASI.
>
> ***Runway Alignment Indicator Lights (RAILS).*** Sequenced Flashing Lights which are installed only in combination with other lighting systems.

Apron. A specific portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft. Also referred to as ramp or tarmac.

Approach (or Departure) Airspace. The airspace, within five statue miles of an airport, through which aircraft more during landing and takeoff.

Approach Surface. *See Imaginary Surfaces.*

Arrival Time. The time an aircraft touches down on arrival.

Automated Flight Service Station (AFSS). An automated air traffic facility that provides information and services to aircraft pilots before, during, and after flights, but it is not responsible for giving instructions or clearances or providing separation.

Automated Surface Observation System (ASOS). Similar data reporting as an AWOS, but usually owned and maintained by the National Weather Service.

Automated Weather Observation System (AWOS). An automated sensor suite which is voice synthesized to provide a weather report that can be transmitted via VHF radio, NDB, or VOR ensuring that pilots on approach have up-to-date airport weather for safe and efficient aviation operations. Most AWOS observe and record temperature and dew point in degrees Celsius, wind speed and direction in knots, visibility, cloud coverage and ceiling up to 12,000 feet, freezing rain, thunderstorm (lightning), and altimeter setting.

Avigation Easement. A contractual right or a property interest in land over which a right of unobstructed flight in the airspace can occur.

Balloon. *See Aircraft.*

Baggage Claim. *A*n area where passengers obtain luggage that was previously checked at an airline ticket counter at the departing airport.

Based Aircraft. The general aviation aircraft that use a specific airport as a home base.

Base Leg. *See Traffic Pattern.*

Benefit-Cost Analysis (BCA). An analysis of the cost, benefit, and the uncertainty associated with a project or action. A formal BCA is required for capacity projects of $5 million or more AIP discretionary funds.

Birds Balls. High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.

Blast Fence. A barrier used to divert or dissipate jet blast or propeller wash.

Boundary Lights. *See Airport Lighting.*

Boundary Sign. *See Airport Signs.*

Building Restriction Line (BRL). A line that identifies suitable building area locations on airports to limit building proximity to aircraft movement areas. Typically base on the FAR Part 77 Airport Imaginary Surfaces.

Capacity (Throughput Capacity). A measure of the maximum number of aircraft operations or their airport components which can be accommodated on the airport.

Capital Improvement Plan (CIP). The planning program used by the FAA to indentify, prioritize, and distribute AIP funds for airport development and the needs of the NAS to meet specified national goals and objectives.

Cargo Service Airport. *See Airport.*

Ceiling. The height above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as broken, overcast or obscured.

Certificated Airport. *See Airport.*

Citizen's Advisory Committee (CAC). A group of individuals that weight recommendations against community goals, values, and needs, typically during a Master Plan.

Clear Zone. Former term for Runway Protection Zone.

Clearway (CWY). A defined rectangular area beyond the end of the runway cleared or suitable for use in lieu of runway to satisfy take off distance requirements.

Commercial Service Airport. *See Airport.*

Common Traffic Advisory Frequency (CTAF). The VHF radio frequency used for air-to-air communication at uncontrolled airports or where no control tower is currently active. Pilots use the common frequency to coordinate their arrivals and departures safely, give position reports, and acknowledge other aircraft in the airfield traffic pattern.

Compass Rose. A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction. When marked on the ground it is used to calibrate an aircraft's compass.

Conical Surface. *See Imaginary Surfaces.*

Consultant. A firm, individual, partnership, corporation, or joint venture that performs architectural, engineering or planning service as defined in AC150/5100-14D, employed to undertake work funded under an FAA airport grant assistance program.

Controlled Airspace. Airspace of defined dimensions within which air traffic control service is provided to IFR flight and to VFR flights in accordance with the airspace classification. Controlled airspace is a generic term that covers Class A, Class B, Class C, Class D, and Class E Airspace.

Critical (Design) Aircraft. The most demanding aircraft with at least 500 annual operations that operates, or is expected to operate, at the airport.

Crosswind. A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

Crosswind Component. The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

Crosswind Leg. *See Traffic Pattern.*

Decision Height (DH). This is associated with precision approaches and the aircraft is continually descending on final approach. When the aircraft reaches the DH, the pilot must make a decision to land or execute the missed approach procedure.

Deicing. The removal, though application of a max of heated water and propylene or ethylene glycol, of frost, ice, slush, or snow from the aircraft in order to provide clean surfaces.

Deicing Pad. A facility where an aircraft received deicing or anti-icing.

Delay. The difference between constrained and unconstrained operating time.

Demand. The number of aircraft operations, passengers, or other factors that are required in a specific period of time.

Department of Transportation (DOT). The United States federal department that institutes and coordinates national transportation programs; created in 1966. The FAA is an organization within the DOT.

Departure Airspace. *See Approach Airspace.*

Destination Sign. *See Airport Signs.*

Detention Ponds. Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.

Direction Sign. *See Airport Signs.*

Discretionary Grant Funds*.* Annual Federal grant funds that may be appropriate to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security or mitigating noise.

Displaced Threshold. *See Threshold.*

Distance Measuring Equipment (DME). *See Navigation Aid.*

Downwind Leg. *See Traffic Pattern.*

Emergency Locator Transmitter (ELT). A radio transmitter attached to the aircraft structure that aids in locating downed aircraft by radiating a audio tone on 121.5 MHz or 243 MHz.

Enplanement. The boarding of a passenger, cargo, freight or mail on an aircraft at an airport.

Entitlement Grant Funds. Annual federal funds for which all airports in the NPIAS are eligible for.

Environmental Assessment (EA). An environmental analysis performed pursuant to the Nation Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environment al impact statement.

Environmental Impact Statement (EIS). A document required of federal agencies by the National Environmental Policy Act (NEPA) for major projects or legislative proposals affecting the environment. It is a tool for decision-making describing the positive. If no significant impact is found a Finding of No Significant Impact (FONSI) is issued.

Federal Aviation Administration (FAA). An agency of the United States Department of Transportation with authority to regulate and oversee all aspects of civil aviation in the United States.

Federal Aviation Regulations (FAR). The general and permanent rules established by the executive departments and agencies of the Federal government for aviation which are published in the Federal Register. These are the aviation subset of the U.S. Code of Federal Regulations (CFR).

Federal Grant Agreement. A Federal agreement that represents an agreement made between the FAA (on the behalf of the United States) and an airport sponsor for the grant of Federal Funding.

Federal Grant Assurance. A provision within a Federal grant agreement to which the recipient of Federal airport development assistance has agreed to comply in consideration of the assistance provided.

Finding of No Significant Impact (FONSI). A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

Fixed Base Operator (FBO). A business enterprise located on the airport property that provides services to pilots including aircraft rental, training, fueling, maintenance, parking, and the sale of pilot supplies.

Flight Service Station (FSS). An air traffic facility that provides information and services to aircraft pilots before, during, and after flights, but unlike ATC, is not responsible for giving instructions, clearances, or providing separation.

Flight Standards District Office (FSDO). An FAA field office serving an assigned geographical area and staffed with Flight Standard personnel who serve the aviation industry and the general public on matters relating to the certification and operation of air carrier and general aviation aircraft. Activities include general surveillance of operation safety, certification of airmen and aircraft, accident prevention, investigation, enforcement, etc.

Foreign Object Debris (FOD). Any object found on an airport that does not belong in or near airplanes, and as a result can injure personnel and damage aircraft.

Form 7460-1, Notice of Proposed Construction or Alternation. Federal law requires filing a Notice of Proposed Construction or Alteration (Form 7460) for all structures over 200 feet AGL or lower if closer than 20,000 feet to a public use airport with a runway over 3,200 feet in length.

Form 7480-1, Notice of Landing Area Proposal. Submitted to the FAA Airport Regional Division Office or ADO as formal written notification for project involving the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport.

Fuel Flowage Fee. A tax assessed on the user, which is paid at the pump. Fuel flowage fee revenues are sent to the airport governing body, usually the board or authority and are then used for airport improvements or other expenses.

Gap Analysis. *See Safety Management System.*

Gate. An aircraft parking position used by a single aircraft loading or unloading passengers, mail, or cargo, etc.

General Aviation (GA). The segment of aviation that encompasses all aspects of civil aviation except certified air carriers and other commercial operators, such as airfreight carriers.

General Aviation Airport. *See Airport.*

Geographic Information System (GIS). A technology that manages, analyzes, and disseminates geographic data.

Glider. *See Aircraft.*

Glideslope. *See Instrument Landing System.*

Global Positioning System (GPS). A satellite based navigational system that provides signals in the cockpit of aircraft defining aircraft position in terms of latitude, longitude, and altitude.

GPS Runway. *See Runway.*

Grant Agreement. *See Federal Grant Agreement.*

Ground Access. The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicle for passengers, employees, cargo, freight, and airport services.

Hazard. *See Safety Management System.*

Hazardous Wildlife. Species of wildlife (birds, mammals, reptiles) including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard.

Heavy Aircraft. *See Aircraft.*

Helicopter. *See Aircraft.*

Helipad. A small, designated area, usually with prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, movement area used for takeoff, landing, or parking of helicopters.

Heliport. An area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters.

High Intensity Runway Lighting (HIRL). *See Airport Lighting.*

Holdover Time. The estimated time the application of anti-icing fluid will prevent the formation of frozen contamination on the protected surfaces of an aircraft. With a one-step deicing/anti-icing operation, the holdover beings at the start of the operations; with a two-step operations, the holdover beings at the start of the final anti-icing application.

Horizontal Surface. *See Imaginary Surfaces.*

Hub Airport. *See Airport.*

Imaginary Surfaces. Are surfaces defined in FAR Part 77, and are in relation to the airport and each runway. The size of these imaginary surfaces is based on the category of each runway for current and future airport operations. Any objects which penetrate these surfaces are considered an obstruction and affects navigable airspace.

Approach Surface. An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance upon the type of available or planned approach by aircraft to a runway.

Conical Surface*.* An imaginary obstruction-limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Horizontal Surface. An imagery obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimension of this surface is a function of the types of approaches existing or planned for the runway.

Primary Surface. An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are function of types of approaches existing or planned for the runway.

Transitional Surface. An imaginary obstruction-limiting surface defined in FAR Part 77 that extends outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the slides of the primary surface.

Incursion. The unauthorized entry by an aircraft, vehicle, or obstacle into the defined protected area surrounding an active runway, taxiway, or apron.

Information Sign. *See Airport Signs.*

Inner Marker (IM). *See Instrument Landing System.*

Instrument Approach. A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR). Procedures for the conduct of flight in weather conditions below Visual Flight Rules (VFR) weather minimums. The term IFR is often also used to define weather conditions and type of flight plan under which an aircraft is operating. IFR is defined as the weather condition that occurs whenever the cloud ceiling is at least 500 feet above ground level, but less than 1,000 feet and/or visibility is at least one statue mile, but less than 3 statute miles.

Instrument Landing System (ILS). A precise ground based navigation system for aircraft that provides precision guidance to an aircraft approaching a runway. It uses a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing during instrument meteorological conditions. Normally consists of the following components and visual aids:

Localizer. The component of an ILS which provides horizontal guidance to the runway.

Glideslope. An independent ILS subsystem that provides vertical guidance to aircraft approaching a runway. It is an antenna array that is usually located on one side of the runway touchdown zone.

Outer Marker (OM). A marker beacon at or near the glideslope intercept altitude of an ILS approach and it keyed to transmit two dashes per second.

Middle Marker (MM). A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of DH (CAT I). It is keyed to transmit alternate dots and dashes.

Inner Marker (IM). A marker beacon use with an ILS (CAT II & CAT III) precision approach located between the middle marker and the end of the ILS runway, transmitting a radiation pattern keyed at six dots per second, and indicating that the pilot, both aurally and visually, is at the DH

Approach Lights. *See Approach Lighting Systems.*

ILS Categories:

Precision Approach Category I (CAT I). An instrument approach procedure which provides for an approach to a DH of not less than 200 feet and visibility of not less than ½ mile or RVR 2,400 (RVR 1,800 with operative touchdown zone and runway centerline lights).

Precision Approach Category II (CAT II). An instrument approach procedure which provides for an approach to a minima less than CAT I to as low as a DH of not less than 200 feet and visibility of not less than 100 feet and RVR of not less than RVR 1,200.

Precision Approach Category III (CAT III An instrument approach procedure which provides for an approach to minima less than CAT II.

Instrument Meteorological Conditions (IMC). Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions. IMC are defined as period when cloud ceiling are less than 1,000 feet above ground and/or visibility less than three miles

Instrument Runway. *See Runway.*

International Civil Aviation Organization (ICAO). An agency of the United Nations which codifies the principles and techniques of the international air navigation, and fosters the planning and development of international air transport to ensure safe and orderly growth. The ICAO Council adopts standards and recommended practices concerning air navigation, prevention of unlawful interference, and facilitation of border-crossing procedure for international civil aviation.

Itinerant Operations. *See Operation.*

Knot. A unit of speed equal to one nautical mile per hour, or 1.15 statue mile per hour.

Land and Hold Short Operations (LAHSO). To increase airport capacity, efficiency, and safety, LAHSO clearances usually instruct an aircraft to land, and then hold short of an intersecting runway, taxiway, or predetermined point.

Large Hub Airport. *See Airport.*

Landside. The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

Large Airplane. *See Aircraft.*

Lead-In-Light System (LDIN). *See Approach Light System.*

Localizer. *See Instrument Landing System.*

Local Operations. *See Operation.*

Location Sign. *See Airport Signs.*

Low Intensity Airport Lighting. *See Airport Lighting.*

Magnetic (Compass) Heading. The heading relative to the magnetic poles of the Earth. Is the heading indicated by a magnetic compass.

Mandatory Instruction Sign. *See Airport Signs.*

Maximum Certified Takeoff Weight (MTOW). The Maximum certificated weight for the airplane at takeoff, i.e. the airplane's weight at the start of the takeoff run.

Mean Sea Level (MSL). The average or mean height of the sea, with reference to a suitable reference surface.

Medium Hub Airport. *See Airport.*

Medium Intensity Approach Light System with Runway Alignment Indicator (MASLR). *See Approach Light System.*

Medium Intensity Runway Lights (MIRL). *See Airport Lighting.*

Middle Marker (MM). *See Instrument Landing System.*

Military Operations. *See Operation.*

Minimum Descent Altitude. This is associated with non-precision approaches and is the lowest altitude an aircraft can fly until the pilot sees the airport environment. If the pilot has not found the airport environment by the Missed Approach Point (MAP) a missed approach is initiated.

Missed Approach Point (MAP). The point prescribed in an instrument approach at which a missed approach procedure shall be executed if visual reference of the runway environment is not in sight or the pilot decides it is unsafe to continue. The MAP is similar in principle to the Decision Height.

Movement Area. The runway, taxiways, and other area of an airport an airport/heliport which are utilized for taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, specific approval for entry onto the movement area must be obtained from ATC.

National Airspace System (NAS). The network of air traffic control facilities, air traffic control areas, and navigational facilities throughout the U.S.

National Environmental Policy Act (NEPA). Federal legislation that established environmental policy for the nation. It requires an interdisciplinary framework for federal agencies to evaluate environmental impacts and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account.

National Plan of Integrated Airport Systems (NPIAS). The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

National Transportation Safety Board (NTSB). A federal investigatory board whose mandate is to ensure safe public transportation. As part of the DOT, the NTSB investigates accidents, conducts studies, and makes recommendations to federal agencies and the transportation industry.

Navigation Aid (NAVAID). Any visual electronic device, airborne or on the surface, which provides point-to-point guidance information or position data to aircraft in flight.

Distance Measuring Equipment (DME). Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME NAVAID.

Non-Directional Beacon (NDB). A radio transmitter at a known location used as a NAVIAD. The signal transmitted does not include inherent directional information, in contrast with other NAVIADS such as VOR and TACAN.

Precision Approach Path Indicator (PAPI). A path indicator that uses a single row of lights arranged to provide precision descent guidance information during approach to a runway.

Rotating Beacon. A visual NAVAID used to assist pilots in finding an airport, particularly those flying in IMC or VFR at night. The beacon provides information about the type of airport through the use of a particular set of color filter:

- Green flashed alternated with two quick white flashes: Lighted military land airport.
- Alternating White and green flashes: Lighted civilian land airport.
- Alternating white and yellow flashes: lighted water airport
- Alternating yellow, green, and white: Lighted heliport.

Tactical Air Navigation (TACAN). An ultra-high frequency electronic rho-theta NAVAID which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

Visual Approach Slope Indicator (VASI). A system of lights arranged to provide vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beam.

VOR (Very High Frequency Omni-directional Radio-range). A ground-based electronic NAVAID transmitting very high frequency navigation signals, 360 azimuth, oriented from magnetic north, used as a basis for navigation in NAS.

VORTAC. A NAVAID providing VOR azimuth, TACAN azimuth, and TACAN DME at one site.

Night. The time between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.

Noise Abatement Procedures. Procedures developed by the FAA and community to reduce the level of noise generated by aircraft departing over populated areas.

Noise Contour. A continuous line on a map of the airport vicinity connecting all points of the same noise level. These contours represent noise levels generated from aircraft operations, takeoff and landing of aircraft. They are generated based on mythology developed by the FAA and the data provides information that can be used to identify varying degrees of noise impacts on the surrounding area.

Non-Directional Beacon (NDB). *See Navigation Aid.*

Non-Hub Airport. *See Airport.*

Non-Movement Area. Taxilanes and apron areas not in the movement area and therefore no under the control of traffic control.

Nonprecision Approach Procedure. A standard instrument approach procedure in which no electronic glideslope is provided.

Nonprecision Runway. *See Runway.*

Notice to Airmen (NOTAM).A notice containing information concerning the establishment, condition, or change in any component (facility, service, procedure of, or hazard in the NAS) the timely knowledge of which is essential to personnel concerned with flight operations.

Object. Includes, but is not limited to above ground structures, NAVAIDs, people, equipment, vehicles, natural growth, terrain, and parked aircraft.

Object Free Area (OFA). An area on the ground centered on a runway (ROFA), taxiway (TOFA), or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle. An existing object which may be expected at a fixed location within prescribed area with reference to the vertical clearance that must be provided during flight operations.

Obstacle Free Zone (OFZ). The OFZ is the airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches.

Obstruction. An object of greater height than any of the surfaces presented in FAR Part 77. (Obstructions to air navigation are presumed to be hazards to air navigation until an FAA study has determined otherwise.)

Omnidirectional Approach Lighting System (ODALS). *See Approach Light System.*

Operation. The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport. Operations can be categorized into the following categories:

> ***Itinerant Operations.*** Operations by aircraft that leaves the local airspace.
>
> ***Local Operations.*** Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.
>
> ***Military Operations.*** Aircraft operations performed in military aircraft. May be itinerant or local operations.

Transient Operations. Operations by aircraft that are not based at a specified airport.

Outer Marker (OM). *See Instrument Landing System.*

Parallel Runways. *See Runway.*

Parallel Taxiways. *See Taxiway.*

Passenger Facility Charge (PFC). The collection of PFC fees for every enplaned passenger at commercial airports controlled by public agencies to be used to fund FAA-approved projects that enhance safety, security, or Capacity; reduce noise; or increase air carrier competition.

Peak Hour (PH). An estimate of the busiest hour in a day. This is also known as the design hour.

Performance-Based Navigation (PBN). It specifies that aircraft RNP and RNAV systems performance requirements be defined in terms of accuracy, integrity, availability, continuity and functionality required for the proposed operations in the context of a particular airspace, when supported by the appropriate navigation infrastructure.

Area Navigation (RNAV). A method of navigation that permits aircraft operations on any desired flight path.

Required Navigation Performance (RNP). A type of Performance-Based Navigation (PBN) that allows an aircraft to fly a specific path between two, 3 dimensionally defined points in space.

Planning Activity Level (PAL). Selected activity levels that may trigger the need for additional facilities or improvements.

Planning Advisory Committee (PAC). A group of individuals that provide input on the Master Plan report and recommended development.

Precision Approach Categories I, II, III (CAT I, CAT II, CAT III). *See Instrument Landing System.*

Precision Approach Procedure. A standard precision approach procedure in which an electronic glideslope is provided, such as ILS or PAR.

Primary Airport. *See Airport.*

Primary Surface. *See Imaginary Surfaces.*

Poor Visibility and Ceiling (PVC). Is a condition that exists whenever the cloud ceiling is less than 500 feet and/or the visibility is less than one statue mile.

Precision Approach Path Indicator (PAPI). *See Navigational Aid*

Ramp. Synonymous with Apron. *See Apron.*

Record of Decision (ROD). A public document that reflects the FAA's final decision of an EIS, rationale behind that decision, and commitments to enforce and monitor mitigation.

Regional Jet. *See Aircraft.*

Regression Analysis. A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

Reliever Airport. *See Airport.*

Retention Ponds. Storm water management ponds that hold water for several months.

Risk Assessment. *See Safety Management System.*

RNAV. *See Performance Based Navigation.*

RNP. *See Performance Based Navigation.*

Roadway Sign. *See Airport Signs.*

Rocket. *See Aircraft.*

Rotating Beacon. *See Navigation Aid.*

Rotorcraft. *See Aircraft.*

Runway (RW). Defined as rectangular surface on an airport prepared or suitable for the landing and takeoff of airplanes. Runways can be classified as the following:

Instrument Runway. A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved.

GPS Runway. A runway having a precision or nonprecision approach procedure using GPS navigational guidance with or without vertical guidance.

Nonprecision Instrument Runway. A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance for which a straight-in or side-step nonprecision approach procedure has been approved.

Nonprecision Runway. A runway with only horizontal guidance available.

Parallel Runways. Two or more runways at the same airport whose centerlines are parallel. In addition to runway number, parallel runways are designated as L (left) and R (right) or, if three parallel runways exist, L (left), C (center), and R (right).

Precision Instrument Runway. A runway having an existing instrument approach procedure utilizing air navigation facilities with both horizontal and vertical guidance for which a precision approach procedure has been approved.

Utility Runway. A runway that is constructed for and intended to used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.

Visual Runway. A runway without an existing or planned straight-in instrument approach procedure and no instrument approach procedure/equipment.

Runway Alignment Indicator Lights (RAILS). *See Approach Light System.*

Runway Blast Pad. A surface adjacent to the ends of the runways provided to reduce the erosive effect of jet blast and propeller wash.

Runway Centerline Lighting. *See Airport Lighting.*

Runway Distance Remaining Sign. *See Airport Signs.*

Runway Edge Lights. *See Airport Lighting.*

Runway End Identifier Lights (REIL). *See Airport Lighting.*

Runway Environment. The physical runway and the areas surrounding the runway out to the hold position marking.

Runway Gradient. The ratio of the change in elevation divided by the length of the runway expressed as a percentage.

Runway Heading. The magnetic direction that corresponds with the runway centerline extended.

Runway Incursion. Any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.

Runway Lights. *See Airport Lighting.*

Runway Protection Zone (RPZ). A trapezoidal area off the runway end intended to enhance the protection of people and property on the ground.

Runway Safety Area (RSA). A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Runway Visual Range (RVR). The distance over which a pilot of an aircraft on the centerline of the runway can see the runway surface markings delineating the runway or identifying its centerline. RVR is normally expressed in feet.

Safety Assessment. *See Safety Management System.*

Safety Assurance. *See Safety Management System.*

Safety Management System. The formal top-down business-like approach to managing safety risk. It includes systematic procedures, practices, and policies for the management of safety (including safety risk management, safety policy, safety assurance, and safety promotion).

> ***Gap Analysis.*** Identification of existing safety components, compare to SMS program requirements. Gap analysis provides an airport operator an initial SMS development plan and Safety roadmap to compliance.

Hazard. Any existing or potential condition that can lead to injury, illness, or death to people; damage to or loss of a system, equipment, or property, or damage to the environment. A hazard is a condition that is a prerequisite to an accident or incident.

Risk Assessment. Assessment of the system or component to compare the achieved risk level with the tolerable risk level.

Safety Assessment. A systematic, comprehensive evaluation of an implemented system.

Safety Assurance. SMS process management functions that systematically provides confidence that organizational products/services meet or exceed safety requirements.

Safety Policy. Defines the fundamental approach to managing safety that is to be adopted within an organization. Safety policy further defines the organization's commitment to safety and overall safety vision.

Safety Promotion. A combination of safety culture, training, and data sharing activities that supports the implementation and operation of an SMS in an organization.

Safety Risk Control. Anything that mitigates the safety risk of a hazard. Safety risk controls necessary to mitigate an unacceptable risk should be mandatory, measureable, and monitored for effectiveness.

Safety Risk Management (SRM). A formal process within the SMS composed of describing the system, identifying the hazards, assessing the risk, analyzing the risk, and controlling the risk. The SRM process is embedded in the operation system: is not a separate/distinct process.

Severity. The consequence or impact of a hazard in terms of degree of loss or harm.

Safety Policy. *See Safety Management System.*

Safety Promotion. *See Safety Management System.*

Safety Risk. *See Safety Management System.*

Safety Risk Control. *See Safety Management System.*

Safety Risk Management (SRM). *See Safety Management System.*

Scope. The document that identifies and defines the tasks emphasis, and level of effort associated with a project or study.

Self-Fueling. The fueling of an aircraft by the owner or operator of the aircraft.

Segmented Circle. A circle located on an airport where wind and runway pattern information are located. It performs two function: it aids the pilot in locating the obscure airports, and it provides a centralized location for wind and traffic pattern indicators as may be required on a particular airport.

Separation. The spacing of aircraft to achieve their safe and orderly movement in flight, and while landing and taking off.

Severity. *See Safety Management System.*

Shoulder. An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection.

Small Airplane. *See Aircraft.*

Small Hub Airport. *See Airport*.

Snow Removal Equipment (SRE). Equipment, such as plow trucks and brooms, to remove snow from the paved surfaces on an airport.

Sponsor. A public agency or private owner of a public-use airport that submits to the Secretary an application for financial assistance for the airport.

Surface Movement Guidance and Control System (SMGCS). Systems providing routing, guidance, surveillance and control to aircraft and affected vehicles in order to maintain movement rates under all local weather condition within the Aerodrome Visibility Operational Level (AVOL) whilst maintaining the required level of safety.

System of Airport Reporting (SOAR). The FAA Office of Airport integrated database that contains airport planning, development, and financial information.

Tactical Air Navigation (TACAN). *See Navigation Aid.*

Tailwind. Any wind more than 90 degrees to the longitudinal axis of the runway.

Takeoff Distance Available (TODA). The TORA plus the length of any remaining runway or clearway (CWY) beyond the far end of the TORA.

Takeoff Run Available (TORA). The runway length declared available and suitable for the ground run of an airplane taking off.

Taxi. The movement of an airplane under its own power on the surface of an airport.

Taxilane (TL). The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

Taxiway (TW). A defined path established for the taxiing aircraft from one part of an airport to another.

Parallel Taxiway. A taxiway whose centerline is parallel to an adjacent runway.

Taxiway Safety Area (TSA). A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

Technical Advisory Committee (TAC). A group of individuals that provide input on technical issues.

Terminal Area. A general term used to describe airspace in which approach control service or airport traffic control service is provided.

Terminal Area Forecast (TAF). The official forecast of aviation activity, both aircraft and enplanements, at FAA facilities. This includes FAA-towered airports, federally contracted towered airports, non-federal towered airports, and many non-towered airports.

Terminal Instrument Procedures (TERPS). Published flight procedure standards for conducting instrument approaches to runways under instrument meteorological conditions. Information on TERPS is contained in FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).

Threshold (TH). The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.

Displaced Threshold. A threshold that is located at a point on the runway other than the designated beginning of the runway.

Threshold Lighting. *See Airport Lighting.*

Through-the-Fence Operations. Those activities permitted by the airport sponsor through an agreement that permits access to the public landing area by independent entities or operator offering an aeronautical activity or to owners of aircraft based on land adjacent to, but not a part of, the airport property. The obligation to make an airport available for the use and benefit of the public does not impose any requirement for the airport sponsor to permit ground access by aircraft from adjacent property.

Throughput Capacity. *See Capacity.*

Touchdown Zone Lighting. *See Airport Lighting.*

Traffic Pattern. The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The following defines components of a standard traffic pattern:

> ***Base Leg***. A flight path at right angles to the landing runway off its approach end. The base leg extends from the downwind leg to the intersection of the extended runway centerline.
>
> ***Crosswind Leg.*** A flight path at right angles to the landing runway off its upwind end.
>
> ***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.

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

Transitional Surface. *See Imaginary Surfaces.*

Transient Operations. *See Operation.*

Transportation Security Administration (TSA). An agency established in 2001 to safeguard United States transportation systems and to insure safe air travel. TSA operates under the Department of Homeland Security.

True Heading. A heading relative to the actual North and South Poles of the Earth, rather than the magnetic poles.

Uncontrolled Airport. *See Airport.*

Uncontrolled Airspace. Airspace where an ATC service is not deemed necessary or cannot be provided for practical reasons. Uncontrolled airspace is a generic term that covers Class F and Class G Airspace.

Universal Integrated Communications (UNICOM). An air-ground communication facility operated by a private agency to provide advisory service at uncontrolled airport. Aircraft call the ground station to make announcements of their intentions. In some cases, the ground station is not staffed. If no one is staffing the ground station, pilots broadcast their location and intentions over the UNICOM or CTAF channel. When the ground station is closed this is done without an acknowledgement.

Upwind Leg. *See Traffic Pattern.*

Utility Runway. *See Runway.*

Visibility. A measure of the horizontal opacity of the atmosphere at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night; and is expressed in terms of the horizontal distance at which a person should be able to see and identify, is measured in statute miles.

Visual Approach. An approach conducted on an IFR flight plan which authorizes the pilot to proceed visually and clear of clouds to the airport. The pilot, at all times, must have either the airport or the preceding aircraft in sight. Reported weather at the airport must be ceiling at or above 1,000 feet and visibility of three miles or greater.

Visual Approach Slope Indicator (VASI). *See Navigational Aid.*

Visual Flight Rules (VFR). Procedures for the conduct of flight in weather conditions above Visual Flight Rules (VFR) weather minimums. The term VFR is often also used to define weather conditions and type of flight plan under which an aircraft is operating. VFR is defined as the weather condition whenever the cloud ceiling is at least 1,000 feet above ground level and visibility is at least three statue miles.

Visual Meteorological Conditions (VMC). Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for IMC.

Visual Runway. *See Runway.*

VOR. *See Navigation Aid.*

VORTAC. *See Navigation Aid.*

Wide Area Augmentation System (WAAS). An enhancement of the GPS that includes integrity broadcasts, differential correction, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Wildlife Attractants. Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the approach or departure airspace or the airport's AOA. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.

Wildlife Hazard Assessment (WHA). An ecological study that examines the potential for wildlife strikes at an airport.

Wind Direction. Is the opposite direction in which the windsock is pointing, and is specified in terms of magnetic heading.

Windsock (Wind Cone). A conical textile tube designed to indicate wind direction and relative wind speed.

APPENDIX B

USER SURVEYS

2014 Harvey Field Airport Owner/Operator Survey

Page One

1. Name

2. Email

3. Please select your aircraft:

	Aircraft 1	Aircraft 2	Aircraft 3
Type	Single Engine Piston Multi Engine Piston Turbo-prop Jet Helicopter Other	Single Engine Piston Multi Engine Piston Turbo-prop Jet Helicopter Other	Single Engine Piston Multi Engine Piston Turbo-prop Jet Helicopter Other

4. Please list the make(s) and model(s) of your aircraft regardless of where they are stored the majority of the year.

5. Including Touch-and-Go operations (counts as two operations, both a landing and a takeoff), approximately how many operations (takeoffs and landings) would you estimate that you conduct at Harvey Field in a typical year?

(untitled)

6. Are any of your aircraft stored the majority of the year at Harvey Field?
If yes, please indicate your current lease expiration date.

If no, please indicate where your aircraft is(are) primarily based.

7. Hangar Space:
Do you desire any additional hangar space at Harvey Field?

Yes
No

If yes, please describe the ownership arrangement, size, and type of hangar.

- ☐ Lease a T-hangar unit
- ☐ Construct a T-hangar and lease out units
- ☐ Construct a conventional box hangar 60’x60’ or smaller
- ☐ Construct a conventional box hangar larger than 60’x60’
- ☐ Lease space

8. Runway Length:

Is the existing runway length adequate for your requirements?

Yes
No

Pleases provide any comments regarding runway length.

Page Two

9. FBO Services:

Are the FBO services provided adequate for your needs?

- Yes
- No

Are there additional services that the FBO should provide to better serve you or other members of the flying community?

10. What facilities, activities, or capabilities do you consider essential for the Airport to provide?

- Aircraft Fueling Services (Self-Service, FBO Fueling)
- Aircraft Maintenance
- GA Terminal Facilities
- Aircraft Tie-downs/Hangars
- Rental Cars
- Fire & Rescue
- Tourism/Entertainment Related Activities
- Precision Instrument Approach (e.g. ILS, GPS)
- Flight Instruction, Aircraft Rentals, Aircraft Charter, or Other Activities
- Restaurant
- Other

11. Please rate the following categories based on your experience at Harvey Field.

	[Poor] 1	2	3	4	5	6	7	8	9	10 [Excellent]
Runway Orientation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Runway Length	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Condition of Pavements	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Instrument Approaches	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Visual Aids	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Navigational Aids	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hangar Space	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hangar/Pad Lease Rates	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
FBO Services	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Unicom Services	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Apron Space	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. Please select one of the categories from question 11 that you believe should get the highest priority.

- Runway Orientation
- Runway Length
- Condition of Pavements
- Instrument Approaches
- Visual Aids
- Navigational Aids
- Hangar Space
- Hangar/Pad Lease Rates
- FBO Services
- Unicom Services
- Apron Space

13. Please rate how important you feel the Airport is to the local community and businesses. 1 indicates no value; 5 indicates high value.

14. Please share something based upon your experience that:

Harvey Field Airport does particularly well...

Harvey Field Airport could improve...

15. Please provide any additional thoughts or concerns regarding the facilities or services at Harvey Field.

2014 Harvey Field Tenant Survey

Page One

1. This form was completed by:

Company

Name (optional)

2. Please rate your experience on each of the following items.

Transportation

	[Poor] 1	2	3	4	5	6	7	8	9	10 [Excellent]
Access roads to airport	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Adequate public transportation service	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Parking Factors

	[Poor] 1	2	3	4	5	6	7	8	9	10 [Excellent]
Convenience/walking distance from parking	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Security in parking lots	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Space availability	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Terminal Building

	[Poor] 1	2	3	4	5	6	7	8	9	10 [Excellent]
Condition of infrastructure	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cleanliness of terminal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cleanliness of washrooms	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Availability of washrooms	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Directional signage in terminal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Restaurant

	[Poor] 1	2	3	4	5	6	7	8	9	10 [Excellent]
Selection of food & beverage facilities	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Quality of food & beverage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Quality of service	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Quality of concessions	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

3. Concessions and Services:

Are there other concessions or services you believe should be offered at Harvey Field?

Yes
No

If yes, please describe what concessions or services you believe should be offered.

4. Please rate how important you feel the Airport is to the local community and businesses. 1 indicates no value; 5 indicates high value.

5. Please provide any additional thoughts or concerns regarding the facilities or services at Harvey Field.

2014 Harvey Field Airport Local Business Survey

(untitled)

1. This form was completed by:

First Name

Last Name

Title

Company Name

Phone Number

Email Address

(untitled)

2. How important, on a scale from 1 to 10, do you feel the Airport is to the local community and businesses? 10 indicates most important.

3. Please explain your ranking.

(untitled)

4. What is the proximity of your business to the Airport?

5. Are there improvements to the terminal that you would like to see?

(untitled)

6. Do you use the Airport for any company business?

- Yes
- No

7. If yes, in what capacity?

(untitled)

8. Please provide any additional thoughts or concerns regarding the facilities at Harvey Field Airport.

APPENDIX C

RECOMMENDED ANNUAL OPERATIONS ADJUSTMENTS

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Foundation for the Future

HARVEY FIELD (S43)
9900 Airport Way | Snohomish, WA 98296
Telephone: (360) 568.1541 x 222 | Fax: (360) 568.6034

March 4, 2015

Recommended Annual Operations Adjustments

Harvey Field does not have an operating control tower. Accurately tracking operations absent the control tower and without counters is challenging and estimated. During the first Master Plan Study completed in the early 1980's, WSDOT Aviation's counting device equipment was utilized over a period of 12 months to accurately determine the number of operations conducted at Harvey Field. Since that time, actual counters have not been utilized. Based on a recent study/review of aviation activity trends at Harvey Field beginning with year 2000 and following through year end of 2014, I recommend that the current listed operations be adjusted by a percentage reduction of 28%. The aviation activity trends reviewed between year 2000 and year 2014 were:

- Based Aircraft counts
- Flight Training hours flown (FW & RC)
- Gallons of Jet A sold
- Gallons of 100 LL sold
- Aircraft changes made in Skydiving Operations
    - Traditionally 4 – 6 Cessna 182's and one Cessna 206 were utilized in the Skydiving operations. On occasion a leased Caravan or Otter would be brought in for special functions.
    - Three years ago, the fleet mixed changed from the above to one based Cessna 208B Caravan purchased by the Skydiving organization and two Cessna 182s.
    - The Caravan carries 16 skydivers; as a result, operations were significantly reduced with the purchase of the Cessna Caravan 208B.

Current listed operations: 139,195

Recommended change in listed operations 100,220

Kandace Harvey

Kandace A. Harvey
Airport Sponsor/Owner

FAA APO TERMINAL AREA FORECAST - HARVEY FIELD S43

Forecast Issued January 2015

				AIRCRAFT OPERATIONS									
	Enplanements			Itinerant Operations					Local Operations				
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Ops	Based Aircraft
1990	0	0	0	0	1,504	74,800	1,000	77,304	38,500	0	38,500	115,804	312
1991	0	0	0	0	1,504	74,800	1,000	77,304	38,500	0	38,500	115,804	312
1992	0	0	0	0	1,504	74,800	1,000	77,304	38,500	0	38,500	115,804	312
1993	0	0	0	0	1,504	74,800	1,000	77,304	38,500	0	38,500	115,804	312
1994	0	0	0	0	1,504	74,800	1,000	77,304	38,500	0	38,500	115,804	309
1995	0	0	0	0	1,549	77,044	1,030	79,623	39,655	0	39,655	119,278	316
1996	0	0	0	0	1,549	77,044	1,030	79,623	39,655	0	39,655	119,278	316
1997	0	0	0	0	1,704	84,748	1,133	87,585	40,320	0	40,320	127,905	316
1998	0	0	0	0	1,704	84,748	1,133	87,585	40,320	0	40,320	127,905	316
1999	0	0	0	0	1,879	93,223	1,246	96,348	44,352	0	44,352	140,700	356
2000	0	0	0	0	1,879	93,223	1,246	96,348	44,352	0	44,352	140,700	356
2001	0	0	0	0	1,879	93,223	1,246	96,348	44,352	0	44,352	140,700	356
2002	0	0	0	0	1,879	93,223	1,246	96,348	44,352	0	44,352	140,700	356
2003	0	0	0	0	1,879	93,223	1,246	96,348	44,352	0	44,352	140,700	356
2004	0	0	0	0	1,879	93,223	1,246	96,348	44,352	0	44,352	140,700	348
2005	0	0	0	0	1,879	44,352	1,246	47,477	93,200	0	93,200	140,677	348
2006	0	0	0	0	50	49,524	74	49,648	89,512	0	89,512	139,160	333
2007	0	0	0	0	50	49,524	74	49,648	89,512	0	89,512	139,160	333
2008	0	0	0	0	50	49,524	74	49,648	89,512	0	89,512	139,160	211
2009	0	0	0	0	50	49,524	74	49,648	89,512	0	89,512	139,160	211
2010	0	0	0	0	550	51,726	74	52,350	94,500	0	94,500	146,850	203
2011	0	0	0	0	50	49,524	74	49,648	89,512	0	89,512	139,160	203
2012	0	0	0	0	50	49,524	74	49,648	89,512	0	89,512	139,160	218
2013	0	0	0	0	8,445	86,135	75	94,655	44,540	0	44,540	139,195	241
2014*	0	0	0	0	8,611	87,711	75	96,397	45,342	0	45,342	141,739	243
2015*	0	0	0	0	8,777	89,315	75	98,167	46,158	0	46,158	144,325	245
2016*	0	0	0	0	8,777	89,718	75	98,570	46,370	0	46,370	144,940	248
2017*	0	0	0	0	8,777	90,123	75	98,975	46,584	0	46,584	145,559	250
2018*	0	0	0	0	8,777	90,530	75	99,382	46,798	0	46,798	146,180	252
2019*	0	0	0	0	8,777	90,938	75	99,790	47,013	0	47,013	146,803	254
2020*	0	0	0	0	8,777	91,348	75	100,200	47,229	0	47,229	147,429	256
2021*	0	0	0	0	8,777	91,758	75	100,610	47,447	0	47,447	148,057	259
2022*	0	0	0	0	8,777	92,171	75	101,023	47,665	0	47,665	148,688	261
2023*	0	0	0	0	8,777	92,586	75	101,438	47,884	0	47,884	149,322	263
2024*	0	0	0	0	8,777	93,003	75	101,855	48,104	0	48,104	149,959	265
2025*	0	0	0	0	8,777	93,423	75	102,275	48,325	0	48,325	150,600	267
2026*	0	0	0	0	8,777	93,845	75	102,697	48,547	0	48,547	151,244	269
2027*	0	0	0	0	8,777	94,267	75	103,119	48,770	0	48,770	151,889	271
2028*	0	0	0	0	8,777	94,692	75	103,544	48,994	0	48,994	152,538	273
2029*	0	0	0	0	8,777	95,119	75	103,971	49,219	0	49,219	153,190	275
2030*	0	0	0	0	8,777	95,548	75	104,400	49,446	0	49,446	153,846	277
2031*	0	0	0	0	8,777	95,978	75	104,830	49,674	0	49,674	154,504	279
2032*	0	0	0	0	8,777	96,410	75	105,262	49,903	0	49,903	155,165	281
2033*	0	0	0	0	8,777	96,844	75	105,696	50,133	0	50,133	155,829	283
2034*	0	0	0	0	8,777	97,280	75	106,132	50,364	0	50,364	156,496	285
2035*	0	0	0	0	8,777	97,717	75	106,569	50,596	0	50,596	157,165	287
2036*	0	0	0	0	8,777	98,156	75	107,008	50,829	0	50,829	157,837	289
2037*	0	0	0	0	8,777	98,598	75	107,450	51,063	0	51,063	158,513	291
2038*	0	0	0	0	8,777	99,042	75	107,894	51,298	0	51,298	159,192	293
2039*	0	0	0	0	8,777	99,488	75	108,340	51,534	0	51,534	159,874	295
2040*	0	0	0	0	8,777	99,937	75	108,789	51,771	0	51,771	160,560	297

APPENDIX D

AIRCRAFT PERFORMANCE CHARTS

AIRCRAFT PERFORMANCE TABLES AND CHARTS

Please Note:

Performance charts excerpted from manuals available only in print cannot be 100% reconciled with the computer screen perpendicular axis. The red arrows on performance charts - showing methodology for deriving relevant distances – were applied from a computer screen and are therefore not 100% aligned with the graphs perpendicular axis.

However, takeoff and landing distances reported herein were accurately derived from printed performance charts.

Figure 1 - King Air 250 - Take Off

TAKE-OFF DISTANCE — FLAPS APPROACH

ASSOCIATED CONDITIONS:

POWER..........TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS..........APPROACH
LANDING GEAR..RETRACT AFTER LIFT-OFF
RUNWAY........PAVED, LEVEL, DRY SURFACE

WEIGHT ~ POUNDS	TAKE-OFF SPEED ~ KNOTS	
	V_R	V_2
12,500	94	106
12,000	94	105
11,000	94	103
10,000	94	101
9000	94	99

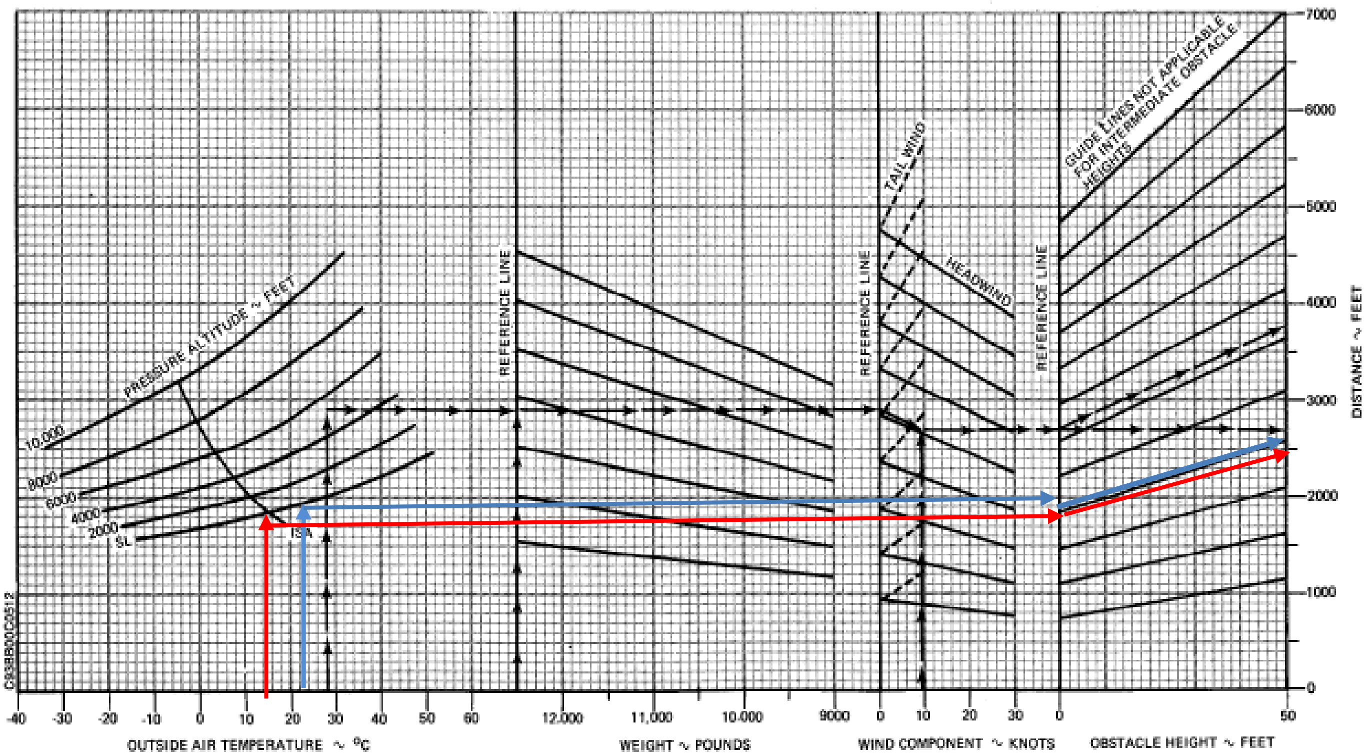
NOTE: FOR OPERATION WITH ICE VANES EXTENDED, ADD 10° C TO THE ACTUAL OAT BEFORE ENTERING GRAPH.

EXAMPLE:

OAT..............................28°C
PRESSURE ALTITUDE..............5433 FT
TAKE-OFF WEIGHT.................12,500 LBS
HEADWIND COMPONENT..........9.5 KTS

GROUND ROLL......................2700 FT
TOTAL DISTANCE OVER 50 FT OBSTACLE............3750 FT
TAKE-OFF SPEED AT V_R............94 KTS
AT V_2............106 KTS

Right - Fold over



Beechcraft King Air 250 Take Off @ Harvey Field: Follow Red Lines on Take Off Distance Chart Above for Harvey Field on 2400' runway @ 15°C (Annual Mean High Temp) @ Max Gross Weight 12.5K lbs. Follow Blue Line for 2600' runway requirement @ Mean Max High Temp 23o C @ Max Gross 12.5K lbs.

1. Follow Airfield Temperature at **15°C or 23°C (Mean Max Temp)** upward vertically to Sea Level curve.
2. Follow horizontally to intercept vertical Gross Weight reference line, then continue horizontally for **12.5K lbs**
3. Continue horizontally to intercept vertical Wind Component reference line.
4. **Assuming no wind**, continue horizontally to intercept Obstacle Height line. Incept point @ O' shows **Ground Roll.**
5. Follow sloping Obstacle Height line up to 50', read **Total Take Off Distance to Clear 50' Obstacle.**

2400' required for Max Gross Take Off at 15°C **Annual Mean High Temp.**

Figure 2 - King Air 250 - Landing

LANDING DISTANCE WITH PROPELLER REVERSING - FLAPS DOWN

ASSOCIATED CONDITIONS:

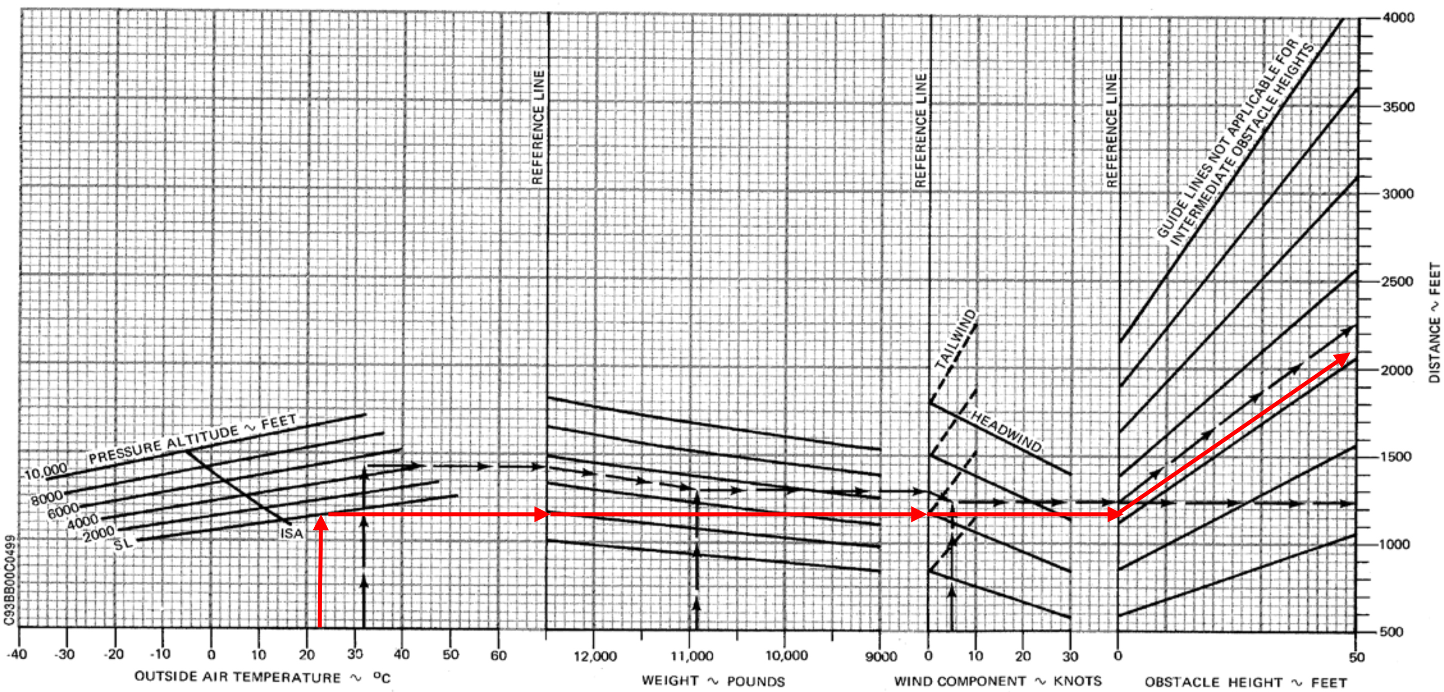
POWER . . . . RETARD TO MAINTAIN 1000 FT/MIN ON FINAL APPROACH
FLAPS . . . . DOWN
RUNWAY . . . . PAVED, LEVEL, DRY SURFACE
APPROACH SPEED . . . . IAS AS TABULATED
BRAKING . . . . MAXIMUM
CONDITION LEVERS . . . . . . HIGH IDLE
PROPELLER CONTROLS . . . FULL FORWARD
POWER LEVERS . . . . MAXIMUM REVERSE AFTER TOUCHDOWN UNTIL FULLY STOPPED

WEIGHT ~ POUNDS	APPROACH SPEED ~ KNOTS
12,500	103
12,000	102
11,000	99
10,000	96
9000	93

EXAMPLE:

OAT . . . . 32°C
PRESSURE ALTITUDE . . . . 4732 FT
LANDING WEIGHT . . . . . . 10,937 POUNDS
HEADWIND COMPONENT . . 4.7 KNOTS

GROUND ROLL . . . . 1240 FEET
TOTAL OVER 50 FOOT OBSTACLE . . . . . . 2260 FEET
APPROACH SPEED . . . . 99 KNOTS



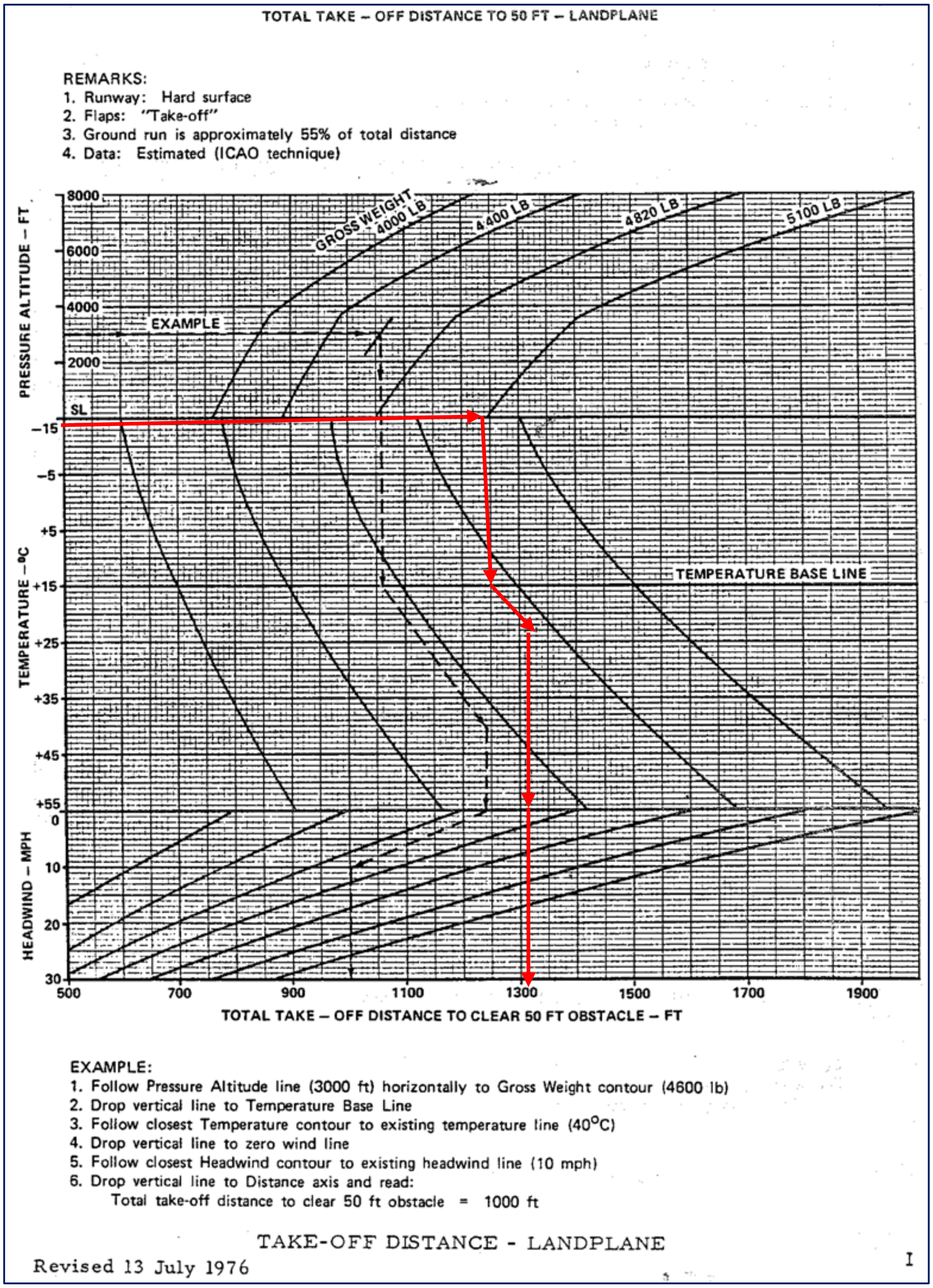
5-144

Beechcraft King Air 250 Landing Distance Required @ Harvey Field: Follow Red Lines on Landing Distance Chart Above for Harvey Field.

1. Follow Airfield Temperature at **23°C (Mean Max Temp**) upward vertically to Sea Level
2. Follow horizontally to intercept vertical Gross Weight reference line at **12.5K lbs.**
3. Continue horizontally to intercept vertical Wind Component reference line.
4. **Assuming no wind**, continue horizontally to intercept Obstacle Height line. Incept point @ O' means **Ground Roll is 1200'.**
5. Follow sloping Obstacle Height line up to 50', reading **Total Landing Distance Over 50' Obstacle is 2100'**.

2100' required for Landing at Max Gross Weight 12.5K pounds - and Mean Max Temp at Harvey Field.

Figure 3 - De Havilland Beaver DHC-2 – Take Off



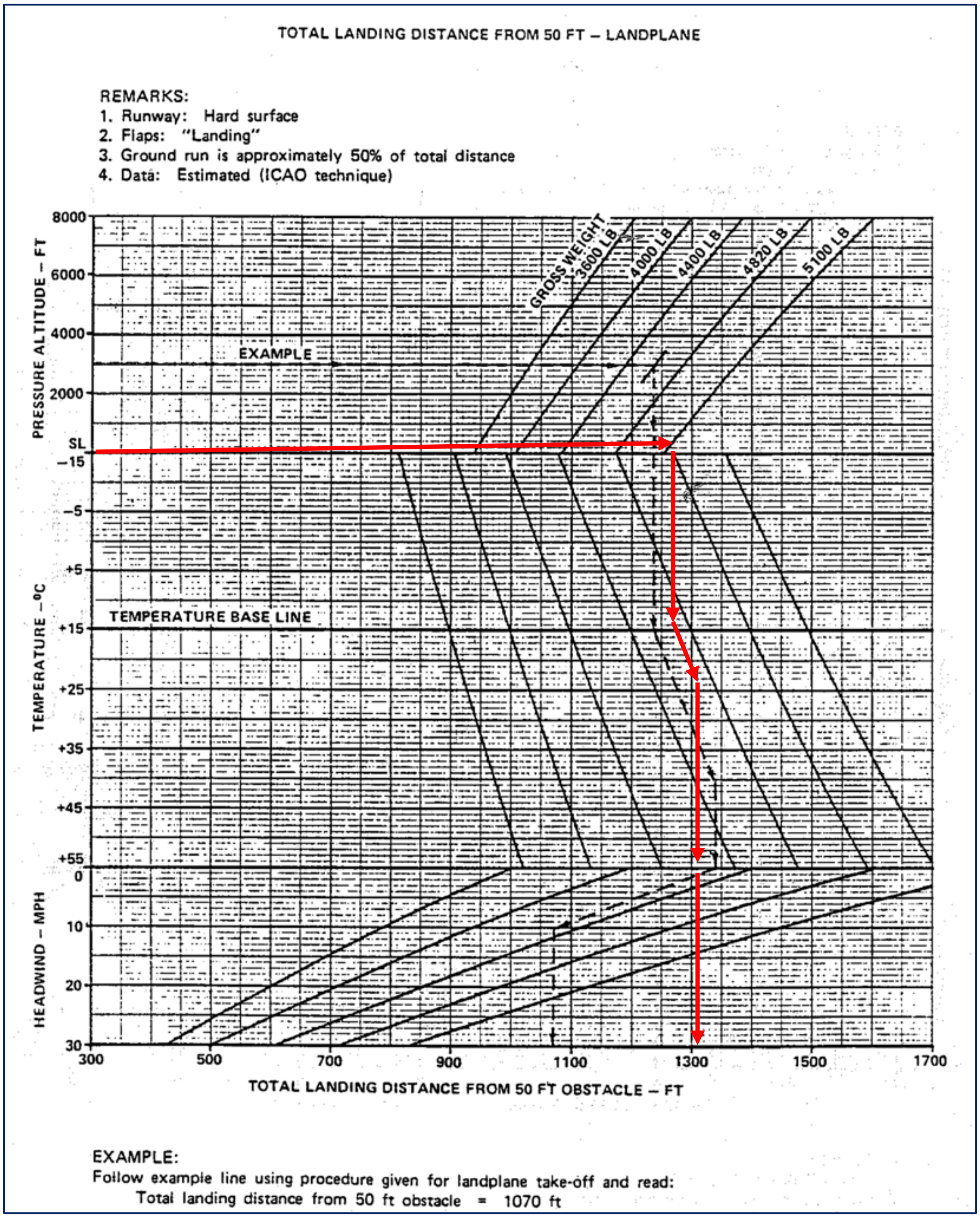
DHC-2 Beaver Take Off @ Harvey Field: Follow Red Lines on Take Off Distance Chart Above for Harvey Field

1. Follow Pressure Altitude line (Sea Level) horizontally to **Max Gross Weight (5100lbs)**
2. Drop vertical line to Temperature Base Line, then follow Temperature contour to **23°C (Mean Max Temp**).
3. Drop vertical line to zero wind line. Assuming zero headwind, drop vertical line to DISTANCE axis, reading:

1310' required for takeoff at Max Gross Take Off Weight and Mean Max Temp at Harvey Field.

Source: DeHavilland, DHC-2 Beaver Flight Manual

Figure 4 - De Havilland Beaver DHC-2 - Landing



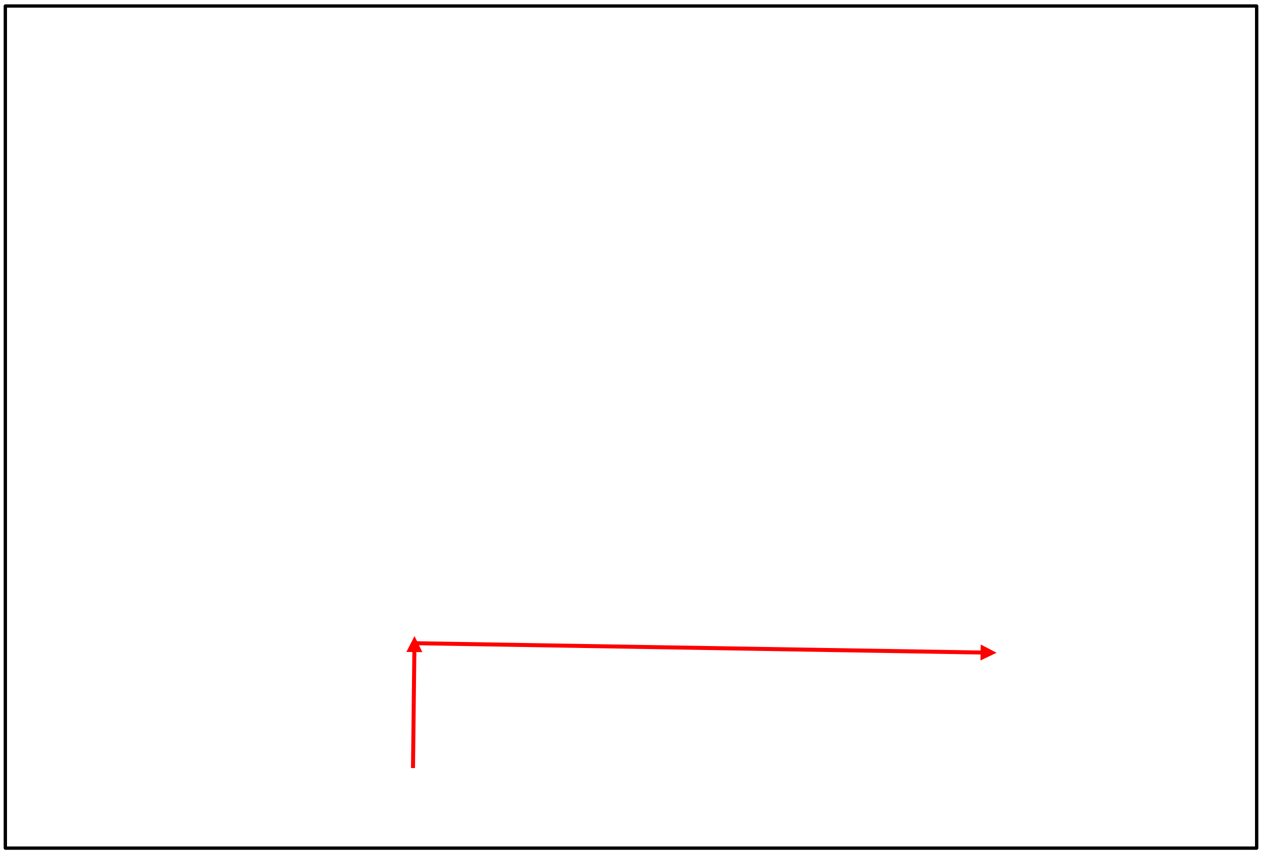
DHC-2 Beaver Landing @ Harvey Field: Follow Red Lines on Landing Distance Chart Above for Harvey Field

1. Follow Pressure Altitude line (Sea Level) horizontally to **Max Gross Weight (5100lbs)**
2. Drop vertical line to Temperature Base Line, then follow Temperature contour to **23°C (Mean Max Temp)**.
3. Drop vertical line to zero wind line. Assuming zero headwind, drop vertical line to DISTANCE axis, reading:

1300' required for landing at Max Gross Weight and Mean Max Temp at Harvey Field

Source: DeHavilland, DHC-2 Beaver Flight Manual

Figure 5 - De Havilland Twin Otter DH-6-300 – Take Off



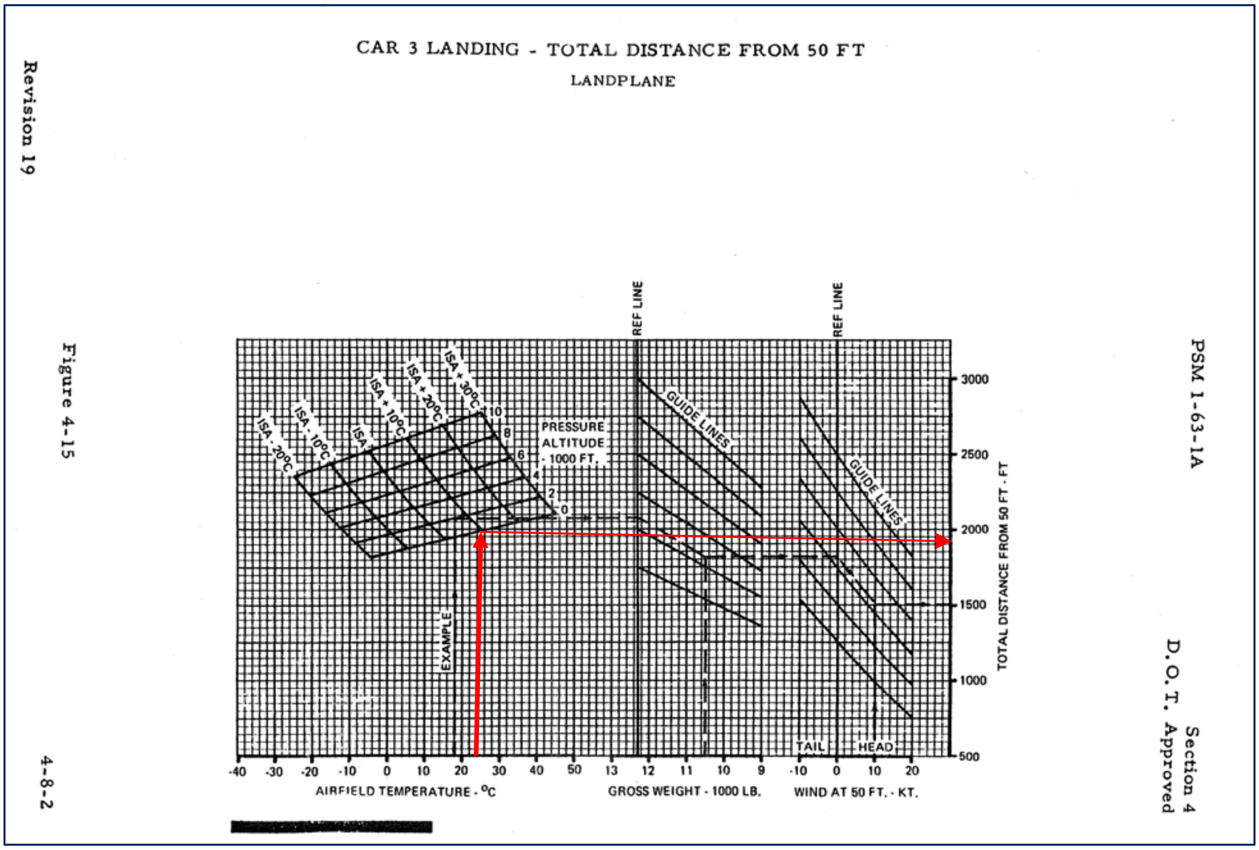
DHC-6 Twin Otter Take Off @ Harvey Field: Follow Red Lines on Take Off Distance Chart Above for Harvey Field.

1. Follow Airfield Temperature at **23°C (Mean Max Temp**) upward vertically to ISA +10°C (equating to 23°C @ Sea Level)
2. Follow horizontally to intercept Gross Weight reference line at **Max Gross Take Off Weight 12.5K lbs**.
3. Continue horizontally to intercept **Zero Wind** line.
4. Continue horizontally reading:

1500' required for Take Off at Max Gross Weight and Mean Max Temp at Harvey Field.

Source: DeHavilland, DHC-6 Aircraft Flight Manual, Section 4

Figure 6 - De Havilland Twin Otter DH-6-300 - Landing



DHC-6 Twin Otter Landing @ Harvey Field: Follow Red Lines on Landing Distance Chart Above for Harvey Field.

1. Follow Airfield Temperature at **23°C (Mean Max Temp**) upward vertically to ISA +10°C (equating to 23°C @ Sea Level)
2. Follow horizontally to intercept Gross Weight reference line at **Max Gross Take Off Weight 12.5K lbs**.
3. Continue horizontally to intercept **Zero Wind** line.
4. Continue horizontally reading:

1975' required for Landing at Max Gross Weight and Mean Max Temp at Harvey Field.

Source: DeHavilland, DHC-6 Aircraft Flight Manual, Section 4

Figure 7 - Socata TBM 700 – Take Off

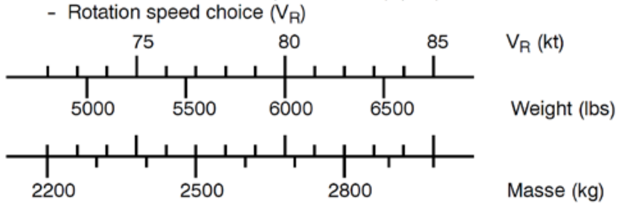
SECTION 5
PERFORMANCE
EASA Approved

TBM
PILOT'S OPERATING HANDBOOK ***700***

TAKEOFF DISTANCES

WEIGHT : 6579 lbs (2984 kg)

Associated conditions :
- Landing gear DN and flaps TO
- 15° of attitude - TRQ = 100 %
- Np = 2000 RPM - BLEED LO
- Hard, dry and level runway
- GR = Ground roll (in ft)
- D_{50} = Takeoff distance (clear to 50 ft) (in ft)
- Rotation speed choice (V_R)



WEIGHT : 6579 lbs (2984 kg)	At 50 ft = 94 KIAS - 108 MPH IAS							
PRESSURE ALTITUDE ft	ISA - 35°C		ISA - 20°C		ISA - 10°C		ISA	
	GR	D50	GR	D50	GR	D50	GR	D50
0	1083	1673	1214	1870	1280	2001	1378	2133
2000	1214	1870	1345	2067	1444	2198	1542	2362
4000	1345	2067	1509	2297	1640	2461	1739	2625
6000	1509	2297	1706	2559	1837	2723	1968	2920
8000	1706	2559	1903	2854	2067	3051	2231	3281
PRESSURE ALTITUDE ft	ISA + 10°C		ISA + 20°C		ISA + 30°C		ISA + 37°C	
	GR	D50	GR	D50	GR	D50	GR	D50
0	1476	2264	1575	2395	1690	2559	1755	2657
2000	1673	2493	1772	2657	1903	2854	1969	2953
4000	1870	2789	2001	2953	2149	3182	2231	3314
6000	2100	3117	2297	3346	2461	3609	2543	3740
8000	2428	3543	2657	3839	2854	4134	2969	4298

Figure 5.8.2 - TAKEOFF DISTANCES - 6579 lbs (2984 kg)

Corrections :
. Reduce total distances of 10 % every 10 kts of headwind
. Increase total distances of 30 % every 10 kts of tail-wind
. Increase by : 7 % on hard grass, 25 % on high grass, 10 % on short grass, 30 % on slippery runway, 15 % on wet runway

NOTE :
Between ISA + 30°C and ISA + 37°C, it may be necessary to cut-off the Bleed in order to set TRQ = 100 % during takeoff while respecting the engine limitations. In this case, reduce power after takeoff to set the Bleed ON.

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Rev. 3

Source: Daher Socata, TBM 700 Pilot Operating Handbook, Section 5

<u>Socata TBM 700 Takeoff **Design** Conditions</u>

- Mean Daily Max Temp 74°F/23°C
- Airport Elevation 24 feet
- Max Takeoff Weight 6579 lbs
- Flap Setting Normal T/O
- 0.3% runway gradient

Note that Mean High Temp @ S43 = 74° F/ 23°C, or ISA + 8°C.

Therefore, from table for ISA and ISA + 10°C (blue ovals), interpolating for ISA + 8°C yields **required take off distance of 2238'.**

Figure 8 - Socata TBM 700 - Landing

TBM

700 PILOT'S OPERATING HANDBOOK

SECTION 5
PERFORMANCE
EASA Approved

5.13 - LANDING DISTANCES

WEIGHT : 6250 lbs (2835 kg)

Associated conditions :
- Landing gear DN and flaps LDG
- Approach speed IAS = 80 KIAS
- Touch-down speed IAS = 65 KIAS
- Maximum braking without reverse
- Hard, dry and level runway
- GR = Ground roll (in ft)
- D_{50} = Landing distance (clear to 50 ft) (in ft)

PRESSURE ALTITUDE ft	ISA - 35°C		ISA - 20°C		ISA - 10°C		ISA	
	GR	D50	GR	D50	GR	D50	GR	D50
0	1050	1900	1115	2000	1180	2070	1215	2135
2000	1115	2000	1215	2100	1245	2200	1310	2265
4000	1180	2100	1280	2230	1345	2330	1410	2395
6000	1280	2230	1380	2360	1445	2460	1510	2525
8000	1380	2360	1475	2490	1540	2590	1610	2690
PRESSURE ALTITUDE ft	ISA + 10°C		ISA + 20°C		ISA + 30°C		ISA + 37°C	
	GR	D50	GR	D50	GR	D50	GR	D50
0	1280	2200	1310	2300	1380	2360	1445	2430
2000	1345	2330	1410	2430	1475	2495	1540	2560
4000	1445	2460	1510	2560	1575	2655	1640	2755
6000	1575	2645	1640	2720	1705	2820	1770	2920
8000	1705	2790	1770	2885	1835	2985	1900	3085

Figure 5.13.1 - LANDING DISTANCES - 6250 lbs (2835 kg)

Corrections : . Reduce total distances of 10 % every 10 kt of headwind
. Increase total distances of 30 % every 10 kt of tail-wind

Other runway surfaces require the following correction factors :

Increase by : 7 % on hard grass 25 % on high grass
10 % on short grass 30 % on slippery runway
15 % on wet runway

Edition 1 - November 30, 2010 Page 5.13.1
Rev. 3

Source: Daher Socata, TBM 700 Pilot Operating Handbook, Section 5

Socata TBM 700 Landing
Design Conditions

- Mean Daily Max Temp: 74ºF/23ºC
- Airport Elevation: 24 feet
- Max Landing Weight: 6250 lbs
- Flap Setting: Normal Landing
- 0.3% runway gradient
- Zero wind

Note that Mean High Temp @ S43 = 74o F/ 23ºC, or ISA + 8ºC.

Therefore, from table for ISA and ISA + 10ºC (blue ovals), interpolating for ISA + 8ºC yields **required landing distance of 2187' @ Max Gross Landing Wt.**

Figure 9 - Quest Kodiak 100 – Take Off

Section 5
PERFORMANCE

Quest Aircraft Company
KODIAK 100 Series

CAUTION: *The takeoff correction factors for runway slope, located on the previous page, are required to be provided. These corrections are applicable to runway slopes up to 3% and should be applied with caution since the published runway slope figures are usually the net slope from one end of the runway to the other. Certain portions of some runways have greater or lesser slopes than the published slope. If the takeoff roll is performed on a portion of the runway that differs from the published slope, the takeoff performance will be greatly affected.*

PRESS ALT (FT)	0° C		10° C		20° C		30° C		40° C		50° C	
	GRND ROLL (FT)	Total Feet to Clear 50' OBS	GRND ROLL (FT)	Total Feet to Clear 50' OBS	GRND ROLL (FT)	Total Feet to Clear 50' OBS	GRND ROLL (FT)	Total Feet to Clear 50' OBS	GRND ROLL (FT)	Total Feet to Clear 50' OBS	GRND ROLL (FT)	Total Feet to Clear 50' OBS
S.L.	691	1089	735	1150	779	1212	890	1384	1035	1612	1223	1913
1000	728	1153	774	1218	842	1319	969	1519	1130	1775	1341	2114
2000	767	1221	815	1290	917	1449	1057	1671	1233	1952	---	---
3000	809	1294	874	1392	1000	1593	1154	1840	1348	2153	---	---
4000	852	1372	954	1533	1092	1753	1260	2026	1473	2374	---	---
5000	920	1493	1042	1689	1191	1928	1374	2228	1609	2615	---	---
6000	1007	1648	1138	1860	1299	2122	1503	2457	---	---	---	---
7000	1100	1816	1244	2050	1421	2342	1648	2718	---	---	---	---
8000	1204	2005	1363	2267	1560	2593	1809	3010	---	---	---	---
9000	1320	2218	1497	2511	1713	2873	1984	3332	---	---	---	---
10000	1445	2450	1640	2777	1880	3182	2182	3699	---	---	---	---
11000	1586	2712	1801	3078	2067	3533	---	---	---	---	---	---
12000	1743	3010	1982	3419	2279	3931	---	---	---	---	---	---

Figure 5-15 – Takeoff Distance (6750 Pounds)

Quest Kodiak 100 Landing **Design** Conditions

- Mean Daily Max Temp: 74°F/23°C
- Airport Elevation: 24 feet
- Max Take Off Weight: 6750 lbs
- Flap Setting: Normal Take Off
- 0.3% runway gradient
- Zero wind

Mean High Temp @ S43 = 74°F/23°C. Interpolating between 20°C and 30°C (blue ovals) yields a **required Take Off Distance of 1264' @ Max Gross T/O Wt.**

Source: Quest Aircraft Company, Kodiak100 Series Pilot Operating Handbook and Aircraft Flight Manual, Section 5

Figure 10 - Quest Kodiak 100 - Landing

Section 5
PERFORMANCE

Quest Aircraft Company
KODIAK 100 Series

WT (LB)	50' Speed (KIAS)	Press Alt (FT)	0°C GRD ROLL (FT)	0°C Total Feet to Clear 50' OBS	20°C GRD ROLL (FT)	20°C Total Feet to Clear 50' OBS	40°C GRD ROLL (FT)	40°C Total Feet to Clear 50' OBS
6690	76	SL	867	1603	931	1681	994	1760
		2000	918	1719	986	1807	1053	1896
		4000	973	1849	1045	1947	1116	2047
		6000	1033	1994	1109	2104	---	---
		8000	1097	2156	1177	2279	---	---
		10000	1165	2336	1251	2475	---	---
6000	72	SL	737	1355	791	1419	845	1484
		2000	781	1452	838	1524	895	1597
		4000	827	1560	888	1640	949	1722
		6000	878	1679	943	1769	---	---
		8000	932	1813	1001	1914	---	---
		10000	991	1962	1063	2075	---	---
5000	65	SL	574	1038	616	1086	658	1134
		2000	608	1111	653	1164	697	1218
		4000	645	1191	692	1251	739	1312
		6000	684	1281	734	1348	---	---
		8000	727	1381	780	1455	---	---
		10000	772	1492	828	1576	---	---

Figure 5-27 – Landing Distance

Quest Kodiak 100 Landing **Design** Conditions

- Mean Daily Max Temp: 74°F/23°C
- Airport Elevation: 24 feet
- Max Landing Weight: 6690 lbs
- Flap Setting: Normal Landing
- 0.3% runway gradient
- Zero wind

Mean High Temp @ S43 = 74°F/23°C. Interpolating between 20°C and 40°C (blue ovals) yields a **required Landing Distance of 1693'.**
Source: Quest Aircraft Company, Kodiak100 Series Pilot Operating Handbook and Aircraft Flight Manual, Section 5

Figure 11 - Cessna Caravan 208B with Blackhawk Engine Conversion – Take Off

POH AND AFM SUPPLEMENT
CESSNA CARAVAN 208B EQUIPPED
WITH PT6A-42A ENGINE

Blackhawk

7601 KARL MAY DR, WACO, TX, 254-755-6711

STC SA02357LA
AFMS 200803

(CARGO POD INSTALLED)
NORMAL TAKEOFF DISTANCE
FLAPS 20°

Sheet 2 of 2

Sheet ½ not included as Sheet 2/2 provides relevant temperature i.e. 23°C.

CONDITIONS:
Flaps 20°
2000 RPM
Inertial Separator - Normal
Cabin Heat - Off
Engine Torque For Takeoff
Paved, Level, Dry Runway
Zero Wind
Cargo Pod Installed

NOTES:

1. Engine Torque for Takeoff is the torque provided on pp. 29-30.
2. Normal takeoff procedure as specified in Section 4.
3. Decrease distances 10% for each 11 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.
5. When takeoff power is below 2232 ft-lbs, increase distance (both ground roll and total distance) by 3% when the inertial separator is in BYPASS and increase ground roll 5% and total distances 10% when cabin heat is on.
6. For operations above 40° C and below the operating temperature limits, increase distances by 20%.
7. Distances included above the temperature limits are provided for interpolation purposes only.

WEIGHT POUNDS	TAKEOFF SPEED - KIAS		PRESS ALT FT	20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRD ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRD ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRD ROLL FT	TOTAL FT TO CLEAR 50 FT OBS
9062	71	86	SL	1205	2075	1280	2195	1450	2505
			2000	1345	2285	1480	2535	1665	2905
			4000	1570	2650	1760	3015	2000	3520
			6000	1865	3175	2090	3650	2355	4250
			8000	2235	3905	2510	4515	2835	5300
			10000	2695	4855	3030	5665	----	----
			12000	3275	6140	3710	7325	----	----
8750	70	83	SL	1100	1885	1170	2005	1320	2280
			2000	1230	2090	1365	2330	1540	2650
			4000	1430	2415	1605	2725	1805	3135
			6000	1700	2865	1900	3270	2140	3795
			8000	2030	3500	2280	4035	2570	4710
			10000	2445	4335	2740	5025	----	----
			12000	2965	5435	3340	6400	----	----
8300	67	80	SL	955	1640	1010	1720	1140	1975

- Mean Daily Max Temp: 74°F/23°C
- Airport Elevation: 24 feet
- Max Take Off Weight: 9062 lbs
- Flap Setting: Normal Take Off
- 0.3% runway gradient
- Zero wind

Mean High Temp @ S43 =74°F/23°C. Interpolating between 20°C and 30°C (blue ovals) yields a required **Take Off Distance of 2111'.**

Figure 12 - Cessna Caravan 208B with Blackhawk Engine Conversion – Landing

POH AND AFM SUPPLEMENT
CESSNA CARAVAN 208B EQUIPPED
WITH PT6A-42A ENGINE

Blackhawk

7601 KARL MAY DR, WACO, TX, 254-755-6711

STC SA02357LA
AFMS 200803

(CARGO POD INSTALLED)
LANDING DISTANCE (CONTINUED)
SHORT FIELD - FLAPS 30°

CONDITIONS:
Flaps 30°

Power Lever – Idle after clearing obstacles, BETA range (lever against spring) after touchdown.
Propeller Control Lever - MAX
Paved, Level, Dry Runway
Zero Wind
Cargo Pod Installed

NOTES:
1. Short field landing procedure Section 4 of the basic Cessna POH and AFM.
2. Decrease distances 10% for each 11 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 40% of the "ground roll" figure.
4. If a landing with flaps up is necessary, increase the approach speed by 15 KIAS and allow for 40% longer distances.
5. Use of maximum reverse thrust after touchdown reduces ground roll by approximately 10%.
6. Distances are provided above the outside temperature limits for interpolation only.

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	20° C GRD ROLL FT	20° C TOTAL FEET TO CLEAR 50 FT OBS	30° C GRD ROLL FT	30° C TOTAL FEET TO CLEAR 50 FT OBS	40° C GRD ROLL FT	40° C TOTAL FEET TO CLEAR 50 FT OBS
9000	80	SL	780	1615	805	1645	830	1690
		2000	825	1695	850	1720	875	1765
		4000	870	1755	900	1800	925	1850
		6000	925	1850	955	1890	985	1935
		8000	985	1940	1015	1985	1045	2035
		10000	1045	2035	1080	2090	----	----
		12000	1115	2155	----	----	----	----
8500	78	SL	755	1580	780	1610	800	1650
		2000	795	1650	820	1685	845	1725
		4000	840	1720	870	1760	895	1810
		6000	895	1805	920	1850	950	1890
		8000	950	1895	980	1940	1005	1985
		12000	995	1965	1025	2015	----	----

- Mean Daily Max Temp: 74°F/23°C
- Airport Elevation: 24 feet
- Max Landing Weight: 9000 lbs
- Flap Setting: Normal Landing
- 0.3% runway gradient
- Zero wind

Mean High Temp @ S43 =74°F/23°C. Interpolating between 20°C and 30°C (blue ovals) yields a required **Take Off Distance of 1625'.**

FAA APPROVED
DATE: Oct 03, 2012

PAGE 66 of 96

APPENDIX E

BIOLOGICAL ASSESSMENT SUMMARY

AND

ENDANGERED AND THREATENED SPECIES TECHNICAL MEMORANDUM

TECHNICAL MEMORANDUM

THE WATERSHED COMPANY

Date: May 22, 2015
To: Renee Dowlin, Jviation, Inc.
From: Ryan Kahlo, PWS, Ecologist
Project Number: 130507
Project Name: Harvey Field Master Plan

Subject: Biological Assessment Summary

All development projects that require federal permits, utilize federal funding, and/or occur on federal lands are required to address the potential project impacts on federally-listed threatened or endangered species and their designated or proposed critical habitat under Section 7 of the Endangered Species Act (ESA). Such projects are also required to address impacts to Essential Fish Habitat under the Magnuson-Stevens Fisheries Management and Conservation Act. Potential impacts include direct impacts, such as injury, mortality, or disturbance (take) of listed species that occur as an immediate effect of a project action, possibly including noise disturbance, habitat loss, or in-water work effects (i.e., turbidity increases, dewatering streams, fish removal) and indirect effect that occurs later in time as a result of the completed project (i.e. long-term storm water impacts, altering predator/prey relationships, and long-term habitat alterations). Impact assessment is addressed through the preparation of a Biological Assessment (BA) study. This BA Summary was done for the Harvey Field Master Plan which, when complete, will include proposed development over the next 20 years. As the Master Plan does not contain the detailed information to prepare a complete BA, this memorandum summarizes the typical review process for a BA, identifies those species likely to be assessed as part of the BA, and recognizes the project components most likely to affect listed species.

The extent of project-related effects (action area) on listed species is determined by the outer limits of disturbance resulting from all project components, aquatic and terrestrial. This can include the distance to which noise disturbances will dissipate to below ambient levels during and after construction; the downstream extent of water quality impacts from turbidity or stormwater effects; the effects from the loss of active river floodplain storage areas; and/or the extent of beneficial effects related to habitat improvements associated with the project implementation.

An analysis of potential effects on listed species through preparation of a BA will yield one of three determinations:

1. no effect;

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p 425.822.5242 | f 425.827.8136 | watershedco.com

2. may affect, not likely to adversely affect; or
3. may affect, likely to adversely affect.

A "no effect" determination would require absolutely no effect, positive or negative, for all species in the action area. Even small behavioral disturbance of a listed species would negate a "no effect" determination. A "no effect" determination is very unlikely given the scope of the project and the proximity of documented listed fish species.

A determination of "may affect, not likely to adversely affect" does not require formal consultation between the governing federal agency – U.S. Fish and Wildlife Service and/or National Marine Fisheries Service (Services). Rather, the federal lead agency for the project would informally consult with Services and, assuming the Services concurred with the effect determination, no in-depth review would occur.

A determination of "may affect, likely to adversely affect" requires formal consultation with the Services. Formal consultation can lead to significant delays in the permitting timeline. Therefore, all feasible attempts should be made to minimize the potential impacts to arrive at a determination of "may affect, not likely to adversely affect."

According to a preliminary review of Priority Habitat and Species Data available from Washington Department of Fish and Wildlife, there are no ESA-listed terrestrial species in the vicinity of Harvey Field, including the topographically low area south of Airport Way. However, multiple threatened or endangered fish species are documented in the Snohomish River and Batt Slough, including Chinook salmon, steelhead, and bull trout. Steelhead and bull trout rearing is documented in the Snohomish River, while the presence of all three species is documented or presumed in Batt Slough. A fish screen is present over the inlet to the culvert at the east end of the Wetland A ditch (beneath the railroad tracks). This screen functions as a complete migration barrier to any of the salmonid fish species mentioned above. Furthermore, water quality in the permanently inundated portions of the ditch is likely too poor to support salmonid fish species. Therefore, the presence of any salmonid fish species in Wetland A can likely be discounted. However, since the ditch associated with Wetland A drains directly to Batt Slough and the Snohomish River, any direct impacts to Wetland A or any areas draining directly to Wetland A, including stormwater impacts, would necessitate assessing the effects on the listed fish species above.

Based on our current understanding of the proposed Master Plan development, the project components mostly likely to adversely affect listed fish species relate to stormwater generated from the new location of the Airport Road connector and the extended runway. Roadway-generated stormwater can have significant detrimental impacts on salmonids. Sediments, heavy metals, polycyclic aromatic hydrocarbons (PAHs), pesticides, and nutrients can enter waterbodies through bank erosion, road run-off, landslides, or overland flow. Heavy metals and PAHs, which are both associated with cars and runoff from roads and parking lots, are disruptive to salmonid physiology and behavior. Therefore, stormwater generated through impervious surfaces with vehicular use is among the highest water quality concerns for salmonids.

In addition to standard conservation measures and best management practices (BMPs) implemented during project construction, a project of this scope will require significant stormwater management. A combination of flow control and enhanced/infiltration treatment mechanisms will be necessary to prevent an increase in pollutant discharge into salmonid-bearing waters. Given the close proximity to such waters, natural dilution will not contribute to reducing pollutant loads prior to reaching endangered species habitat.

Stormwater management must be sufficient to ensure that the likelihood of pollutant concentration, particularly dissolved copper and zinc, exceeding the adverse sub-lethal effect thresholds for the receiving waterbody is insignificant (i.e., less than one percent). If exposure of listed species to stormwater effects is likely and significant, a determination of “may affect, likely to adversely affect” may be warranted, resulting in formal consultation with the Services.

TECHNICAL MEMORANDUM

Date: February 11, 2015
To: Renee Dowlin
From: Ryan Kahlo, PWS
Project Number: 130507
Project Name: Harvey Field

Subject: Summary of ESA-listed Species and Migratory Birds of Conservation Concern in Snohomish County/Project Area

Table 1: ESA-listed Species Present/Historically Present in Snohomish County

Species	Federal Status	Date listed	State Status	Habitat Description
Oregon Spotted Frog *Rana pretiosa*	Threatened	9/29/2014	Endangered	Large, emergent wetlands in forested landscapes near a perennial body of water.
Marbled murrelet *Brachyramphus marmoratus*	Threatened	10/1/1992	Threatened	Nearshore areas of Puget Sound for foraging and old-growth and mature coniferous forests for nesting.
Northern spotted owl *Strix occidentalis caurina*	Threatened	6/26/1990	Endangered	Old-growth and mature coniferous forests.
Streaked horned lark *Eremophila alpestris strigata*	Threatened	11/4/2013	Endangered	Native prairies, coastal dunes, and agricultural fields with substantial areas of bare ground. Only historical presence in Snohomish County.
Yellow-billed cuckoo *Coccyzus americanus*	Threatened	11/3/2014	Species of Concern	Large riparian corridors with dense canopy closures provided by cottonwood and willow communities.
Chinook salmon *Oncorhynchus tshwaytscha*	Threatened	6/28/2005	Species of Concern	Marine environment as adults, and estuarine environments for rearing. Mainstem of larger freshwater streams for spawning and seaward migration..
Steelhead *Oncorhynchus mykiss*	Threatened	5/11/2007	None	Variety of environments, including marine and freshwater. Preferred freshwater habitat is fast-moving, well oxygenated streams with gravel substrate and deep pools.
Bull trout *Salvelinus confluentus*	Threatened	6/10/1998	Species of Concern	Marine environment and cold, clean freshwater streams with stable stream conditions, substantial cover, and clean gravel substrate.

Bocaccio *Sebastes paucispinus*	Endangered	4/28/2010	Species of Concern	Marine environment. Rocky reefs, kelp canopies, and artificial structures as juveniles, transitioning to rocky bottoms and outcrops as adults. Typically found 50-250 meters deep.
Yellow rockfish *Sebastes ruberrimus*	Threatened	4/28/2010	Species of Concern	Rocky reefs, kelp canopies, and artificial structures as juveniles, transitioning to rocky bottoms and outcrops as adults. Typically found 91-180 meters deep.
Canary rockfish *Sebastes pinnigger*	Threatened	4/28/2010	Species of Concern	Marine environment. Rocky reefs, kelp canopies, and artificial structures as juveniles, transitioning to rocky bottoms and outcrops as adults. Typically found 50-250 meters deep.
Green sturgeon (Southern DPS) *Acipenser medirostris*	Threatened	4/7/2006	None	Spawn in mainstems of large, turbulent rivers with cobble substrate and clean cold water. Southern DPS does not spawn in Washington rivers. Adults inhabit oceans, bays, and estuaries. Rare in Puget Sound.
Eulachon *Thaleichthys pacificus*	Threatened	3/18/2010	Species of Concern	Inhabit ocean waters to 300 meters deep. Spawn in large, snowmelt-fed rivers less than 50ºF with sand or coarse gravel substrate. Not believed to spawn in Puget Sound tributaries.
Orca (killer whale) *Orcinus orcus*	Endangered	11/18/2005	Endangered	Marine environment, including Puget Sound residents.
Humpback whale *Megaptera novaeangliae*	Endangered	12/2/1970	Endangered	Marine environment from Central America and Mexico (winter) north to southern British Columbia (summer/fall). Rare in Puget Sound.
Canada lynx *Lynx canadensis*	Threatened	3/24/2000	Threatened	Moist coniferous forests with cold, snowy winters.
Grey wolf *Canis lupis*	Endangered	3/9/1978	Endangered	Anywhere large ungulates are available as prey base and human-caused mortality is not excessive. Only historically found in Snohomish County.
Grizzly bear *Urso arctos horribilus*	Threatened	7/28/1975	Endangered	Areas with extensive forest cover interspersed with shrublands, grasslands and meadows. Home ranges must have complex habitat types. Only historically found in Snohomish County.

*No ESA-listed threatened or endangered plant or insect species are documented to occur in Snohomish County

Table 2: Migratory Birds of Concern Potentially Present within the Project Area

Species	Seasonal Occurrence in Project Area	Habitat
Bald eagle *Haliaeetus leucocephalus*	Year-round	Coastal areas or near large inland lakes and rivers that have abundant fish and shores with large trees.
Black swift *Cypseloides niger*	Breeding	Forested areas near rivers (nesting) or mountainous areas and coastal cliffs (foraging)
Caspian tern *Hydroprogne caspia*	Breeding	Fresh- and saltwater wetlands, especially estuaries, coastal bays, and beaches.
Cassin's finch *Carpodacus cassinii*	Year-round	Dry, open, coniferous forests
Fox sparrow *Passerella liaca*	Year-round	Breed in high elevations, especially in wet meadows or in scattered conifers. Winter in recent clearcuts and tangled brush, especially blackberry thickets.
Olive-sided flycatcher *Contopus coopen*	Breeding	Forest openings, preferring recently-burned or cleared areas.
Peregrine falcon *Falco peregrinus*	Breeding	Hunt in open areas along coasts or large waterbodies. Nest on cliffs or cliff-like structures, including tall buildings in urban environments.
Purple finch *Carpodacus purpureus*	Year-round	Moist coniferous and mixed lowland forests.
Rufous hummingbird *Selasphorus rufus*	Breeding	Edges and open areas within coniferous forests.
Short-eared owl *Asio flammeus*	Year-round	Open terrain, including shrub-steppe, grasslands, agricultural areas, marshes, wet meadows, and shorelines.
Willow flycatcher *Empidonax traillii*	Breeding	Willow thickets and brushy areas near streams, marshes, or other wetlands, and in clear-cuts and other open areas with nearby trees or brush.

Figure 1: Map of Potential Habitat Areas

Map has been removed due to species sensitive information.

APPENDIX F

WATER SURFACE ELEVATION MODELS

TECHNICAL MEMO

Date: 25 August 2016 (Synopses added 24 October 2016)
To: Jviation, Inc.
From: Raymond Walton
RE: **Harvey Field Airport Master Plan: Task 4 – Alternatives - Simulate Airport Way Relocation and Runway Clear Approaches, 8-2016 Proposed Conditions**

PURPOSE

This memo describes our analysis, showing that relocating both Airport Way and the runway/taxiway at Harvey Field would have no measurable (0.00') impact on the 100-year base flood elevation (BFE).

BACKGROUND

Synopsis: FEMA and the Corps of Engineers rely on the flood studies and modeling for the Snohomish River that WEST Consultants (WEST) prepared in 2001. Harvey Field lies entirely within a flood water "storage area", and not within any area where a flooding Snohomish River might significantly flow ("reaches").

In 2001, WEST completed a detailed Flood Insurance Re-Study of the Snohomish River. The study was conducted for the Seattle District, Corps of Engineers, with funding provided by FEMA Region 10. The study became "effective" on September 16, 2005.

The 2001 hydraulic modeling was based on the Corps' model, UNET, a one-dimensional, unsteady-flow model which is FEMA-approved. The Snohomish River was modeled as a combination of "reaches" (the Snohomish River and distributaries, and Marshlands) and "storage areas" (Figure 1). Figure 2 shows the "storage areas" near Harvey Field. Harvey Field, Airport Way, and the area south of Airport Way (where Airport Way is proposed to be re-located) lie entirely within Storage Area #9 (SA#9), which is outlined in purple. Figures 1 and 2 also include information for Storage Areas SA#2 and SA#3, which lie to the east and north, respectively (Figure 1), because they represent overflow pathways from the Snohomish River and therefore directly influence water levels at Harvey Field.

In the UNET model, "storage areas" are treated using only conservation of mass (or water). The change of storage, and therefore water surface elevation, equals flows into the area minus flows leaving. The assumption in treating storage areas in this manner is that water at a given elevation is connected to all waters at the same elevation throughout the storage area.

SIMULATION OF PROPOSED ALTERNATIVE

Synopsis: To calculate the project's impact on BFEs, WEST used the volume of fill needed to build the Airport Way and the runway/taxiway projects. WEST found that the projects would not cause any increase to BFEs. Making sure that fill does not block stored floodwater from flowing from one area to another is important. Further, the proposed projects do not increase the amount of floodwater that would otherwise enter this storage area when the Snohomish River experiences a major flood.

As part of the masterplan process, WEST was tasked with running a numerical model to simulate the hydraulic effects of proposed land changes. Jviation, Inc. provided WEST a spreadsheet of potential earthwork quantities for a proposed condition in which Airport Way is moved to the south, and embankment fill placed to meet County criteria for roadway drainage, and the existing runway and taxiway of Harvey Field were extended towards the south (Table 1 and Figure 3):

Table 1. Cumulative Earthwork Volumes for Airport Way and Runway Relocation

Elevation Range (NAVD)		Incremental Volume	Cumulative Net Volume
Min Elevation	Max Elevation		
FT	FT	CU YD	CU YD
7	8	0.64	0.64
8	9	14.69	15.33
9	10	29.97	45.30
10	11	46.01	91.31
11	12	747.48	838.79
12	13	1898.00	2736.79
13	14	1542.70	4279.49
14	15	2025.71	6305.20
15	16	2604.07	8909.27
16	17	903.15	9812.42
17	18	-825.70	8986.72
18	19	1003.32	9990.04
19	20	3508.77	13498.81
20	21	6291.98	19790.79
21	22	6713.00	26503.79
22	23	6275.77	32779.56
23	24	4534.20	37313.76
24	25	2644.65	39958.41
25	26	1751.75	41710.16
26	27	617.93	42328.09
27	28	31.86	42359.95
28	29	0.00	42359.95

Both the existing conditions and proposed conditions models to evaluate the impact of the relocation of Airport Way. The results showed no increases in flood elevations during the 100-year flood, when compared to two decimal places.

The biggest factor controlling water surface elevations in this area (including SA#2, SA#3, SA#9 and Marshlands) is the amount of water that would overtop the Snohomish River levees during a flood event. As the proposed project has no effect on water levels in the Snohomish River from Monroe to Snohomish, the amount of water entering SA#9, which includes Harvey Field and Airport Way, would be unchanged. Water can exit SA#9 through bridges to Marshlands, and the small loss of storage in SA#9 would be spread out over a much larger area that includes SA#2, SA#3 and Marshlands.

The model results show that the proposed project on its own would cause negligible changes in water surface elevations (0.00 ft rise) during the 1% annual exceedance (100-year) event. Provided the storage area remains hydraulically connected by openings in the roadway embankment, the project would work hydraulically.

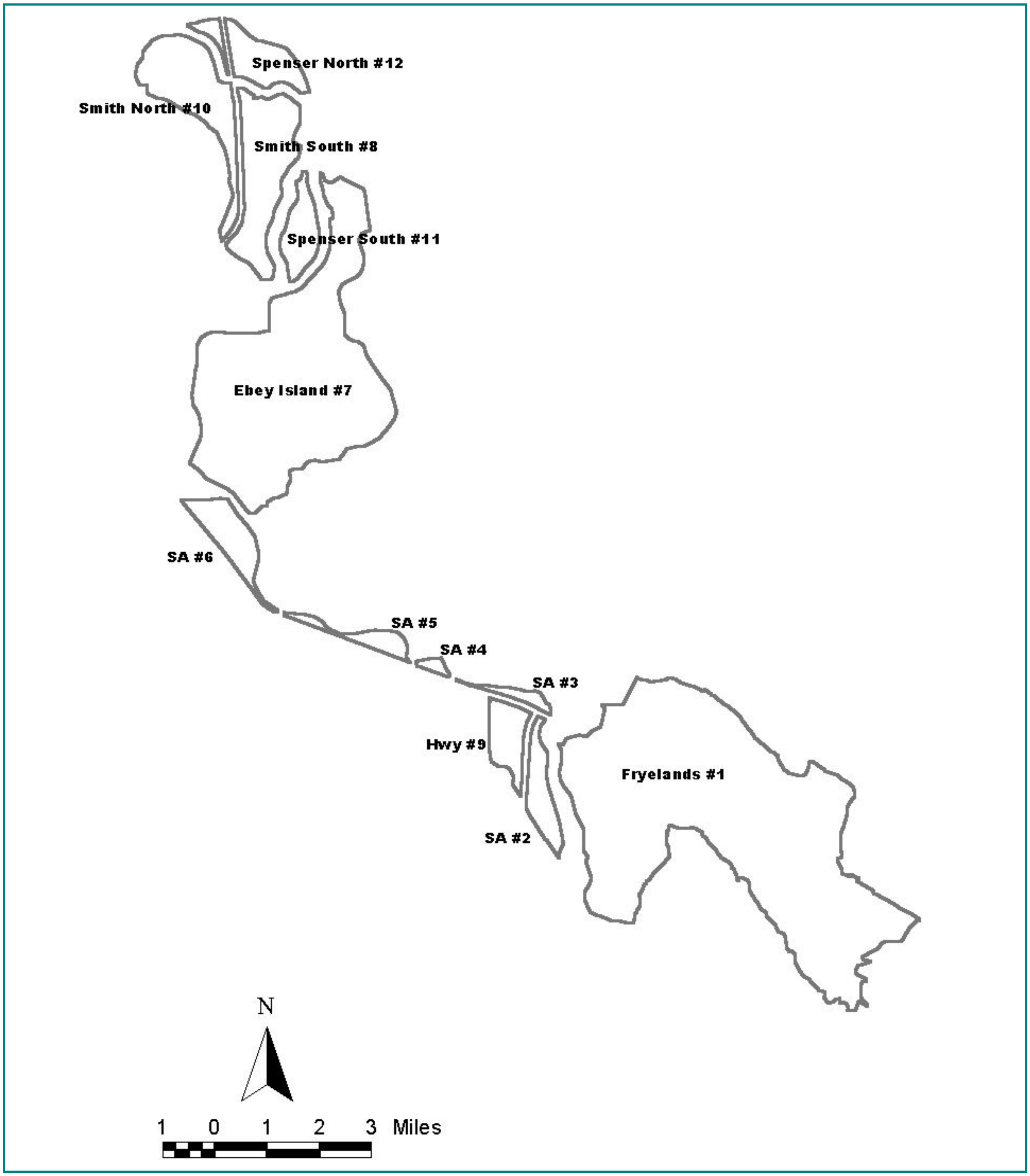


Figure 1. Storage Areas in Snohomish River UNET Model

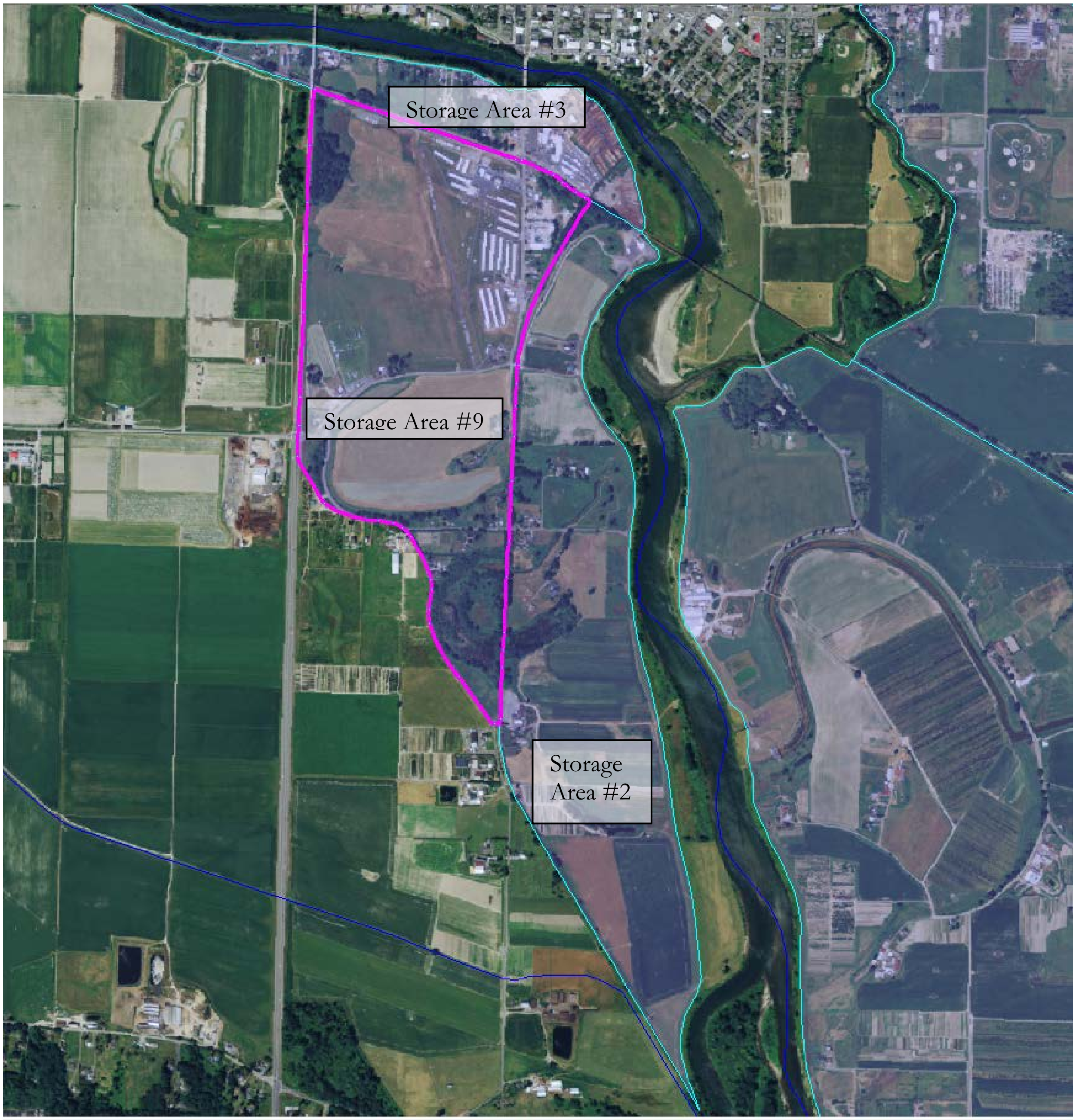


Figure 2. Storage Areas near Harvey Field

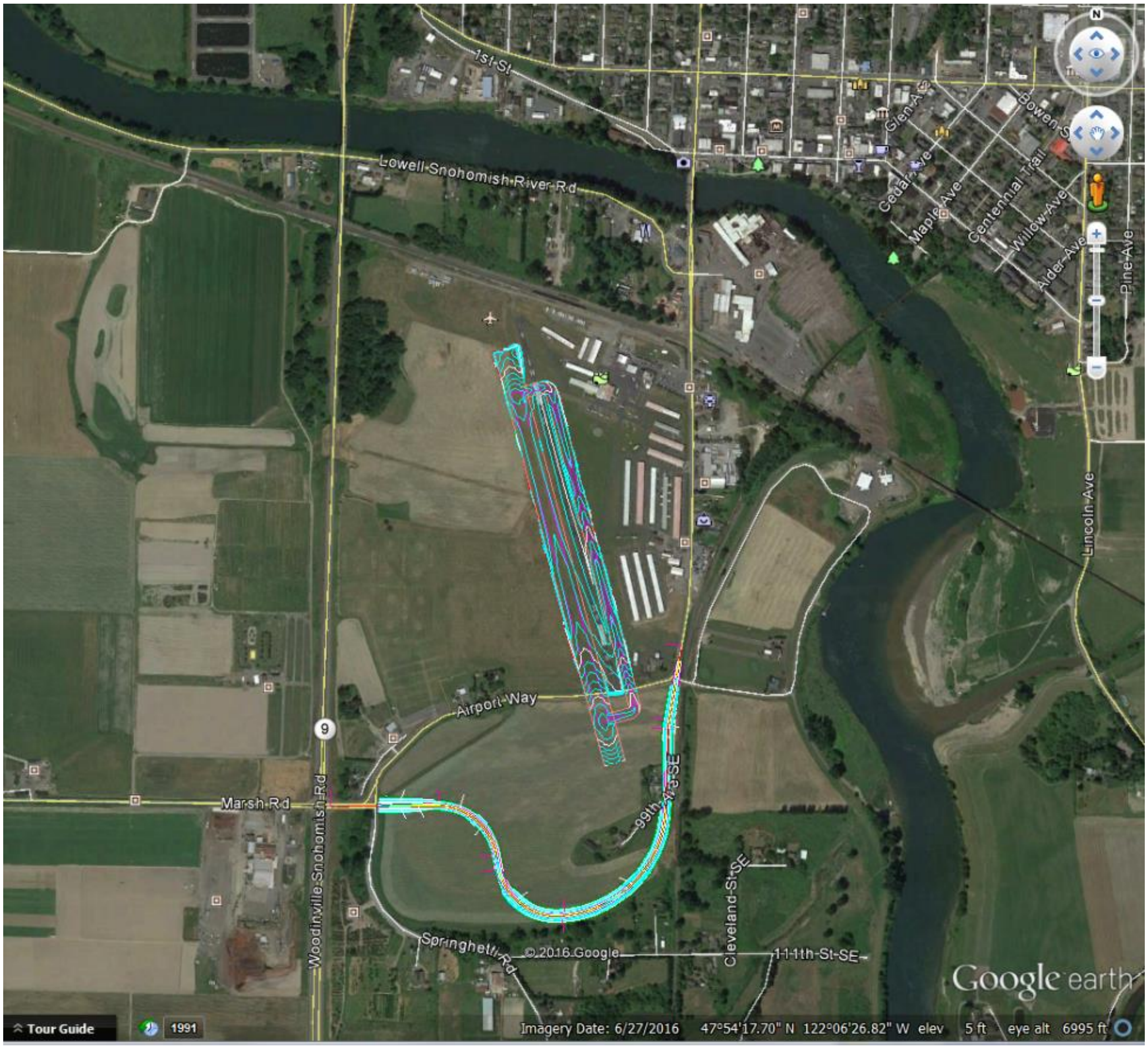


Figure 3. Proposed Layout of Airport Way and Runway Extensions

APPENDIX G

AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

G. AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

The Federal Aviation Administration (FAA) issued a memorandum on September 30, 2014 to provide guidance on preparing airport recycling, reuse, and waste reduction plans as an element of a master plan, master plan update, within a sustainability document, or as a standalone document. The guidance is mandatory when preparing a master plan or update.

The purpose of this document is to review Harvey Field Airport's (S43 or Airport) recycling, reuse, and waste program and provide guidance on ways to reduce waste and improve recycling and reuse at the facility as part of the Master Plan in compliance with the FAA's memorandum. This document serves to meet that requirement and will:

- Review existing practices and solid waste sources (waste audit)
- Review the feasibility of solid waste recycling at the Airport
- Summarize operation and maintenance (O&M) requirements
- Review waste management contracts
- Identify potential cost savings or revenue generation
- Provide recommendation to minimize solid waste generation

G.1 Facility Description and Background

Harvey Field is located approximately one mile south of the City of Snohomish central business district (CBD) and is part of the Urban Growth Area (UGA). The City of Snohomish is located in Snohomish County, which is nestled in the Snohomish River Valley of the Puget Sound Region of Washington. Access to the Airport is provided via Airport Way (Avenue D north of Snohomish River) from U.S. Highway 2 from the north and State Route 9 from the north and south. Additional facility information is in Chapter 1, Inventory of the Master Plan.

Harvey Field continues to remain an important aviation component in the Puget Sound Regional Airport System and to the City of Snohomish and Snohomish County, as well as providing relief to general aviation for the congested Seattle-Tacoma aviation community. Although privately owned, S43 is open for public use without restriction and is listed in the National Plan of Integrated Airport Systems (NPIAS) as a general aviation reliever airport. Harvey Field is a destination for many aircraft in the northwest United States and beyond. This broad reach is a significant asset for the viability and economic health of Snohomish City and County as well as neighboring communities in the region.

G.1.1 Existing Waste Sources

The identification and evaluation of airport waste sources can be complicated. There are many different groups, agreements, operational styles, and collection/disposal processes that play into the overall generation of waste. Harvey Field airport management identified seven primary sources of waste at the Airport; the Hangars/Tenants, Restaurant, Flight School, Espresso Stand, Airport

Manager/Admin, Airfield and Airfield Maintenance/Operations. See **Figure 1** for each area's location.

FIGURE 1 - SOURCES OF WASTE

Source: S43 Airport Management and Jviation, Inc.

The sources of waste can be further broken down by how much control the Airport has on the generation and disposal of waste. The three levels of control are:

Areas where the Airport has direct control of waste management (public space, office space, administrative building, airfield). These areas are controlled by the Airport and they are able to introduce recycling, reuse, and waste reduction programs directly.

Areas where the Airport has no direct control but can influence waste management (tenants). These are areas owned by the Airport; however, they are leased out to tenants. The Airport can recommend that recycling, reuse, and waste reduction programs be used and can include language in the tenant contracts, but realistically can't control what is done.

Areas where the Airport has no control or influence over waste management. These are areas the Airport neither owns or leases (none of which are included in this chapter).

Table 1 shows the identified areas of waste generation, what waste is generated, how the waste is collected, if any reduction and/or recycling programs are in place, and the Airport's level of control.

TABLE 1 - WASTE GENERATION AREAS

Area	Waste Generated	Current Solid Waste Collection	Current Waste Reduction/Recycling	Control
Area 1: Hangars/Tenants	Oil, sump fuel, batteries, tires, oil filters, misc. trash	Oil collection tank, fuel sump tank, contract recycling (batteries/tires), contract dumpster	Waste collection handled independent of Airport.	Influence
Area 2: Restaurant	Cardboard, food, paper, aluminum cans, glass	Waste Management collects dumpster (trash) through contract.	Cardboard	Influence

	bottles, magazines, misc. trash			
Area 3: Flight School	Cardboard, plastics, paper, bathroom trash, misc. trash	Waste Management collects dumpster (trash) through contract.	Rubatino collects cardboard/paper through contract.	Direct
Area 4: Espresso Stand	Plastic jugs, glass bottles, misc. trash	Waste Management collects plastic jugs, glass bottles, misc. trash	None	Influence
Area 5: Airport MGR/Admin	Cardboard, aluminum, tin, plastic, magazines, paper, misc. trash	Waste Management collects dumpster (trash) through contract.	Rubatino picks up cardboard/paper through contract.	Direct
Area 6: Airport Operations/Maintenance	Metal, oil, cardboard, misc. trash	Waste Management collects dumpster (trash) through contract.	Used oil, metal and cardboard recycled	Direct
Area 7: Airfield	General debris found on airfield and construction material (asphalt, concrete, wood, metal)	Collected by construction contractor and/or airport staff, unusable waste deposited into Airport Dumpsters.	None	Direct

Source: Harvey Field Airport staff and Jviation

G.2 Current Waste Management Programs

G.2.1 Snohomish County

Snohomish County provides both recycling and waste disposal facilities for its communities and residents.[1] The facilities include:

- Recycling and Transfer Stations
  - Airport Road Station
  - North County Station
  - Southwest Station
- Neighborhood Recycling and Disposal Centers
  - Dubuque Road Center
  - Granite Falls Center
  - Sultan Center
- Household Hazardous Waste Drop Station (Everett)

The Recycling and Transfer Stations and Rural Drop Box sites all have designated recycling areas that are free of charge for residential customers. Items accepted include:

- Automotive (lead acid batteries, motor oil, oil filters, antifreeze)
- Household batteries
- Cardboard, newspapers, and mixed paper
- Cooking oil

[1] Snohomish County Washington, http://wa-snohomishcounty.civicplus.com/530/Recycling, Accessed March 2016.

- Fluorescent tubes/bulbs
- Glass bottles and jars
- Household appliances (washers/dryers, stoves/ranges, hot water tanks, microwaves, dishwashers)
- Metal food and beverage cans
- Propane tanks
- Scrap metal
- Yard debris/clean wood

G.2.2 City of Snohomish

The City of Snohomish provides weekly and monthly solid waste, recycling, and yard waste pick-up services for its residents. The cost for the services are based on frequency of pick-up and size of dumpsters. Recyclables currently being collected by the City include[2]:

- Paper
  - Newspaper, inserts, magazines, catalogs, and phone books
  - Advertising mail, envelopes, mixed paper
  - Paperback books
  - Cereal and dry food boxes, clean paper cups
  - Shredded paper
  - Non-foil wrapping paper
  - Cartons, frozen food and juice boxes
  - Flattened cardboard
- Plastic
  - Milk, water, juice, and pop bottles
  - Plastic bottles (all colors)
  - Pill bottles
  - Clean plastic food tubs and cups
  - Clean plastic plant pots and 5 gal. buckets
- Glass
  - Bottles and jars
- Metal
  - Clean scrap metal
  - Clean aluminum and metal cans
  - Clean foil and foil trays

[2] City of Snohomish Washington, http://ci.snohomish.wa.us/139/Garbage-Recycling-Yard-Waste, Accessed March 2016.

G.2.3 Harvey Field Airport

The Airport, as discussed previously, strives to actively participate in a recycling program and join in local initiatives when applicable. The Airport currently provides recycling bins in the administrative office and solid waste dumpsters throughout the airport property. Both solid waste and recyclables are collected through contracts with independent companies. Recyclables being collected at the Airport include cardboard, paper, used oil, and scrap metal.

G.3 Review of Recycling Feasibility

Currently, Harvey Field participates in a basic recycling program for the administrative offices and allows tenants to participate in the recycling program if they desire. Challenges identified with the current program are:

- Harvey Field has not updated their recycling program to include plastics and bottles.
- Harvey Field does not require tenants to have recycling containers in place or to participate in airport initiatives. However, the Airport does encourage their tenants to participate as possible.

The Airport recognizes these challenges and plans to revise the types of items included in their recycling program. The Airport also plans to encourage tenants to participate in their recycling program.

G.4 Operation and Maintenance Requirements

The operations staff is currently responsible for the collection of all waste throughout the Airport and airfield. Used oil, metal, cardboard, and paper are collected for recycling. The waste and recyclables are collected at the Airport and disposed of through contracts with independent companies.

G.5 Review of Waste Management Contracts

Harvey Field currently has a contract in place with the Rubatino Trash Services to remove recyclable cardboard and paper on a monthly basis. Waste is collected on a weekly basis through a contract with Waste Management and taken to the local landfill.

Contracts with existing tenants do not require tenants to participate in any recycling programs or provide recycling bins for customers and employees. It is recommended that the Airport add language to future contracts that requires tenants to provide recycling bins in order to increase the amount of recycling.

G.6 Potential for Cost Savings or Revenue Generations

The Airport contracts with Waste Management and Rubatino for trash and recycling collection and removal. The following fees are associated with the trash and recycling collection and removal:

- Waste Management: 4 yd. dumpster/week: $217 per month for trash dumpsters and removal.
- Rubatino: 6 yd. dumpster/month: $45 per month for recycling dumpster and removal.

As the amount of recyclable material and waste increases, the costs associated with removal will also increase. However, increasing the types of recycling material is one way to help minimize additional costs. Without adding significant implementation costs, the Airport could encourage collection of the following materials:

- Plastics
- Glass bottles
- Food waste for compost

G.7 Plan to Minimize Solid Waste Generation

Harvey Field voluntarily participates in a recycling program however, the Airport is aware that their recycling, reuse, and waste reduction program can be improved through a few simple practices such as:

- Provide additional signage with recycling bins clearly showing type of materials accepted.
- Provide educational material to tenants and airport employees on what material should be recycled and the appropriate business contacts.
- Add recycling, reuse, and reduce waste requirements to future tenant leases.
- When feasible, purchase products made from recycled material and encourage tenants to do so as well.

The above mentioned practices are relatively basic; however, the success of implementing a long-term recycling, reuse, and waste reduction program requires management buy-in, staff commitment, planning, and follow-up. **Figure 2** outlines "10 Steps to Design and Implement an Effective Airport Recycling/Waste Minimization Program" as recommended by the FAA in their Recycling, Reuse and Waste Reduction at Airports – A Synthesis Document3. The Airport should follow these steps when implementing their recycling program.

[3] FAA, Recycling, Reuse and Waste Reduction at Airport – A Synthesis Document, 2013

FIGURE 2 - 10 STEPS TO DESIGN AND IMPLEMENT RECYCLING PROGRAM

10 Steps to Design and Implement an Effective Airport Recycling/Waste Minimization Program
1. Commitment from Management 2. Program Leadership 3. Waste Identification 4. Waste Collection and Hauler 5. Waste Management Plan Development 6. Education and Outreach 7. Monitor and Refine 8. Performance Monitoring 9. Promote Success 10. Continuous Improvements

Source: FAA, Recycling, Reuse and Waste Reduction at Airport – A Synthesis Document, 2013

G.8 Conclusion

Harvey Field has a basic recycling program in place; however, with minimal effort and expense they could implement some very basic procedures to improve their program and reduce the amount of solid waste they generate. Through coordination with local entities the Airport could play a more active role in recycling, reusing, and reduce solid waste.

APPENDIX H

NOISE ANALYSIS

Harvey Field Future Noise Analysis

Future Noise

This section discusses the input data developed for the year 2034 Future Build Alternative and the resulting noise contours.

Runway Layout and Use

The runway layout for the 2034 Future Build Alternative included a 2,400-foot replacement runway just to the southwest of the current 15L-33R. The runway use percentages modeled for the year 2034 Future Build Alternative were the same as the 2014 condition.

Aircraft Operations

The Master Plan forecast of operations for the year 2034 by aircraft category is presented in **Table 1.** As shown, the 2034 forecast includes 108,550 annual operations – an average of approximately 297 operations per day.

Table 1. 2034 Annual Aircraft Operations by Category

Aircraft Category	Operations
Air Taxi	1,601
General Aviation Local	55,249
General Aviation Itinerant	51,500
Military	200
Total	**108,550**

Source: Harvey Field Master Plan Update, August, 2015

Operational Time-of-Day

The percentages of nighttime operations (10:00pm-7:00am) modeled for the 2034 Future Build Alternative were the same as those for the Existing Conditions 2014.

Fleet Mix

The 2034 aircraft fleet mix was determined by multiplying the percentages by aircraft type from 2014 by the total operations forecasted to occur at the airport in 2034. The 2034 aircraft operations and fleet mix are provided in **Table 2.**

Table 2. 2034 Annual Operations and INM Fleet Mix

Operation Type	Aircraft Category	Aircraft Types	INM Aircraft	Daytime Operations	Nighttime Operations	Total Operations
GA Itinerant and Air Taxi	Single-Engine Piston	Cessna 150/ 152/ 172/ 177	CNA172	25,028	1,317	26,345
		Beech 33, Mooney M-20J/ K/ L, Piper Dakota/Arrow	GASEPV	6,352	334	6,686
		Cessna 182	CNA182	5,302	279	5,581
		Cessna 180/185/206/210	CNA206	5,135	270	5,405
	Multi-Engine Piston	Beech 18/55/ 58, Aero Commander 500, Cessna 303/310/ 320/ 337, Diamond Twin Star	BEC58P	2,562	135	2,697
	Turboprop	Cessna 208B, TBM-700	CNA208	1,754	92	1,846
		Cessna 441, Super King Air 200/ 300B, King Air 90/100, Mitsubishi MU-2	CNA441	1,753	92	1,845
	Rotorcraft	Schweizer 300C	S300C	1,921	101	2,022
		R-22	R22	640	34	674
		Itinerant Total		**50,447**	**2,654**	**53,101**
GA Local	Single-Engine Piston	Cessna 150/ 152/ 172/ 177	CNA172	41,126	2,164	43,290
	Multi-Engine Piston	Piper PA-23 Apache	BEC58P	4,210	221	4,431
	Turboprop	Cessna 208B	CNA208	2,940	155	3,095
	Rotorcraft	Schweizer 300C	S300C	4,211	222	4,433
		Local Total		52,487	2,762	55,249
Military	Rotorcraft					
		UH-60	S70	200		200
			Grand Total	**103,134**	**5,416**	**108,550**

Sources: FAA's Traffic Flow Management System Counts (TFMSC), Harvey Field Airport Master Plan Update, August, 2015, KB Environmental Sciences, Inc.

Flight Tracks

The INM flight tracks for the 2034 Future Build Alternative were reflective of the replacement runway (i.e., the 2034 flight tracks were shifted to align with the new runway ends). The flight track use percentages, and flight profiles for the 2034 scenario were the same as those for the Existing Conditions 2014.

2034 DNL Noise Contours

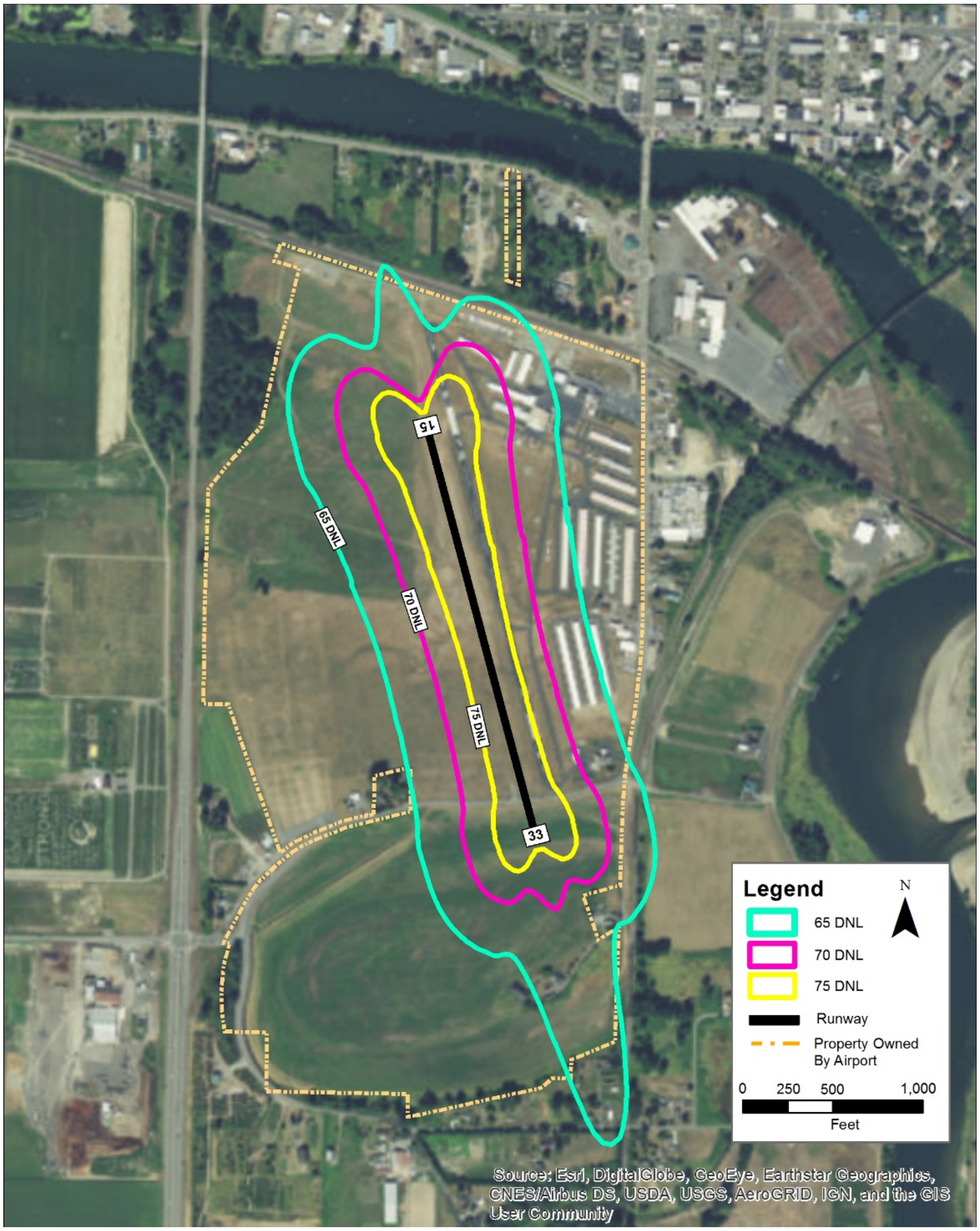
The 2034 DNL contours are provided on **Figure 1.** **Table 3** provides the area, in acres, of each contour interval (i.e., 65-69 DNL, 70-74 DNL, and 75 and greater DNL). As shown, the total area encompassed by the 65 DNL contour is 114 acres. The 65 DNL contour extends slightly beyond the limits of the property owned by the airport both to the north and south. It is estimated that there are six residences within the 2034 65-69 DNL contour limits. All of these residences are located southeast of the Runway 33 threshold.

Table 3. 2034 DNL Noise Contour Areas

DNL (dB(A))	**Area (Acres)**
65 - 69	62
70 - 74	29
75 +	23
Total	*114*

Source: KB Environmental Sciences, Inc.

Figure 1. 2034 DNL Contours



Source: KB Environmental Sciences, Inc.

APPENDIX I

WETLAND DELINEATION STUDY

WETLAND DELINEATION STUDY

Harvey Field Master Plan

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WETLAND DELINEATION STUDY

HARVEY FIELD MASTER PLAN

1 EXECUTIVE SUMMARY

This report presents the findings of a wetland delineation study performed by The Watershed Company for Jviation, Inc. on behalf of the Harvey Field Airport. This effort is part of the environmental review process for the Harvey Field Master Plan, a document that will guide future development at Harvey Field Airport.

This wetland delineation study identifies wetlands present in the study area and evaluates regulatory implications. The study area can be seen on Figure 1. The following table lists the parcels reviewed under this delineation. In addition to examining the study area, an area outside the study area but on airport property was reviewed since wetlands are mapped in that location by the National Wetland Inventory (NWI). A total of three wetlands were identified; however, only one was delineated south of the airport since improvements to this area are the focus of the Master Plan. Snohomish County requires buffers to be applied to the delineated boundary of these features. Any proposed direct impacts to wetlands would require permitting from local, state, and federal agencies. Impacts to associated buffers of these features would also be regulated by Snohomish County.

Table 1: Snohomish County Tax Parcels Reviewed for this Study

Snohomish County Parcel Number	Size (acres)	Notes and limitations
28051300401900	14.81	WSDOT parcel; NW airport corner reconnaissance only - not delineated
28051300402000	23.00	WSDOT parcel; NW airport corner reconnaissance only - not delineated

28052400100300	9.02	Delineation covers parcel areas south of Airport Way only
28052400100800	13.01	Delineation covers parcel areas south of Airport Way only.
28052400100900	0.90	Delineation covers parcel areas south of Airport Way only.
28052400101000	2.46	Delineation covers parcel areas south of Airport Way only.
28052400101100	1.00	Spurling property - not in study area.
28052400101400	1.78	Delineation covers parcel areas south of Airport Way only.
28052400101600	11.59	Delineation covers parcel areas south of Airport Way only.
28052400101700	14.00	Delineation covers parcel areas south of Airport Way only.
28052400102000	2.34	WSDOT parcel. Delineation covers parcel areas south and east of Airport Way only.
28052400102100	4.18	Delineation covers parcel areas south of Airport Way only.
28052400102200	6.45	Delineation covers parcel areas south of Airport Way only.
28052400102300	10.16	Delineation covers parcel areas south of Airport Way only.
28052400102400	10.15	Delineation covers parcel areas south of Airport Way only.
28052400102500	10.10	Delineation covers parcel areas south of Airport Way only.
28052400102600	16.35	Delineation covers parcel areas

		south of Airport Way only.
28052400400100	12.45	Delineation covers parcel areas south of Airport Way only.
28052400400600	1.4	Delineation covers entire parcel
28052400400700	2.77	WSDOT parcel. Delineation covers parcel areas east of Springhetti Road only.
28052400402000	0.38	WSDOT parcel. Delineation covers entire parcel
28052400402100	5.78	Delineation covers entire parcel
28052400402200	6.11	Delineation covers entire parcel
28052400402300	1.33	Delineation covers entire parcel

2 PROJECT OVERVIEW

Harvey Field Airport is undergoing development of a new Master Plan. The document is required by the Federal Aviation Administration so that the airport may remain eligible for federal grant funds. The document will also provide guidance for future development over a 20-year period. One of the requisites for an airport master plan is an environmental inventory and review.

Harvey Field is located at 9900 Airport Way, Snohomish County (Figure 1). From Hwy 9, take the exit toward Snohomish. Turn east onto 2nd Street (0.2 mi), and then turn slightly right to turn onto 1st Street (0.4 mi). Turn right on Airport Way and continue for 0.2 miles.

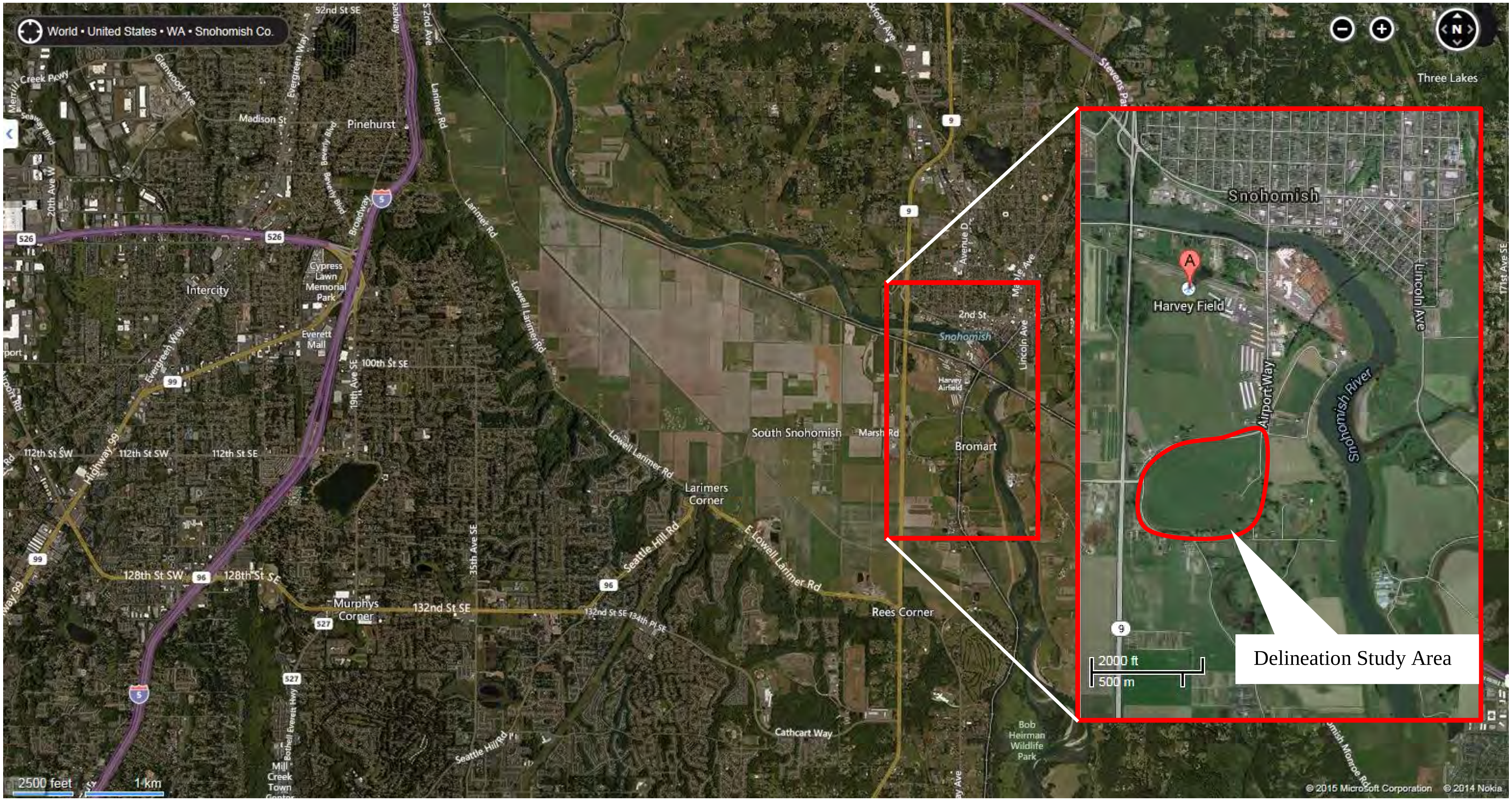

Figure 1. Vicinity Map, Harvey Field Airport. Bing Maps 2015 (background) and Google Maps 2015 (close-up).

3 METHODS

The study area was evaluated for wetlands using methodology from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Regional Supplement) (US Army Corps of Engineers [Corps] May 2010). The wetland boundaries were determined on the basis of an examination of vegetation, soils, and hydrology. Areas meeting the criteria set forth in the Regional Supplement were determined to be wetland. Soil, vegetation, and hydrologic parameters were sampled at several locations along the wetland boundary to make the determination. Data points on-site are marked with yellow- and black-striped flags. We recorded data at nine of these locations. Only Wetland A (see below) was delineated as part of this study.

Delineated, or otherwise verified wetlands, were classified using the *Western Washington Wetland Rating System 2014 Update* (Ecology, January 2015) (Rating System). Wetland A is marked with 378 pink- and black-striped flags.

All delineation flags were GPS-located using a hand-held Trimble Geo-XH unit. Following field location, the GPS data was differentially correcting using GPS Pathfinder Office Program and imported into AutoCAD for mapping.

4 FINDINGS

The Harvey Field Airport and the entire study area is located in the Snohomish Water Resource Inventory Area (WRIA 7) (Section 24, Township 28N, Range 5E). The delineation study area is located on the site of a large, actively-farmed hayfield south of Harvey Field on the south side of Airport Way and east/northeast of Springhetti Road. The interior of the study area is topographically higher than the perimeter, which is the location of a former oxbow (previously known as Hanson Slough) associated with the Snohomish River. One single-family residence, an associated garage, and a barn are located in the delineation study area.

Figure 2: NWI Map of Project Vicinity

4.1 Wetland A

According to NWI maps, the entirety of the former oxbow is identified as wetland. A large depressional wetland, Wetland A, is located across much of the former oxbow, although this delineation study documents the current extent of the wetland as being smaller than what is indicated on the NWI maps. Wetland A occupies much of the northern, western, and southern portions of the delineation study area. Vegetation in the wetland is mostly composed of an emergent Cowardin vegetation community dominated by soft rush, pasture grasses, creeping buttercup, and invasive reed canarygrass. The prevalence of soft rush, a facultative-wetland (FACW) species, within the wetland boundary transitions into a dominance of facultative (FAC) pasture grasses outside of the wetland boundary. A scrub-shrub fringe is present along the southern boundary of the wetland. The indicator soil in Wetland A is typically a high value (4), low chroma (1) loamy mineral soil with redoximorphic features (RMF) present. The soil observed in Wetland A satisfies the criteria for the hydric soil indicator Depleted Matrix (F3). The soil in areas outside of the wetland boundary are typically chroma (2) sandy loam/loamy sand with no RMF present. This soil characteristic was occasionally observed in non-wetland areas that exhibited soil saturation or shallow ponding during flood events (see below).

4.2 Hydrology

Hydrology for Wetland A is provided by a variety of sources, including a seasonally high groundwater table, precipitation, and backwatering from the Snohomish River, which is tidally influenced at this location. Based on a review of historic aerial photographs, some degree of ditching has been present in Wetland A since at least 1933. Presently, a ditch is located through the entirety of Wetland A. While the ditch was presumably created to drain Wetland A as part of on-going agricultural activities at the site, it currently functions as an inlet and an outlet for floodwaters in the wetland. At a date uncertain, the original connection to the Snohomish River eliminated, and the drainage ditch was connected via an approximately 1,100-foot-long culvert to Batt Slough, which drains through a series of open channel segments and culverts to the Snohomish River. Historically, a one-way flap valve was located at the end of the lowermost Batt Slough culvert outlet, where it discharged into the Snohomish River. The valve prevented Snohomish River water from flowing into Batt Slough and the Wetland A drainage ditch (and, by association, Wetland A) during high tides and/or storm events. With the one-way valve properly functioning, much of Wetland A, specifically the northern portions, was effectively drained, eliminating wetland conditions. The lack of wetland hydrology in the northern portions of Wetland A was documented in a 2008 wetland delineation report, *Wetland Assessment Report, Harvey Airfield Master Plan Update, Snohomish, Washington* (Talasaea Consultants, Inc., March 2008) (Talasaea Report). The Talasaea Report recorded groundwater levels at 23 shallow groundwater monitoring wells throughout the drained portions of Wetland A. The results consistently supported the conclusion that these areas no longer exhibited soil saturation within the upper 12 inches of the soil during the growing season.

In 2009-2010, the one-way valve was replaced with a two-valve that can be electronically controlled to allow tidally-influenced water fluctuations and moderate flood events to backwater into Batt Slough, the Wetland A drainage ditch, and Wetland A. The valve is closed during severe flood events to protect properties and resources.

Since Wetland A is connected to Batt Slough via the drainage ditch/culvert, during periods of elevated river levels (i.e., winter/spring high tides and significant rain events), significant flooding is periodically present throughout Wetland A, and shallow flooding is occasionally present in non-wetland areas adjacent to Wetland A – areas that were observed as completely dry during high tide only days before a significant flood event. These water level fluctuations make the wetland functionally unsuitable to native amphibian breeding.

The delineation of Wetland A was conducted over several days during January-February 2015, including during periods of normal precipitation (including high tide) and during periods when the Snohomish River was above flood stage. Given the highly fluctuating water levels in and around Wetland A, daily hydrology observations along portions of the wetland boundary were determined to be somewhat unreliable. Many areas in which shallow inundation is present during flood events do not exhibit soil saturation when river levels recede. Therefore, it was determined that these areas are not saturated for 14 consecutive days during the growing season in years of normal precipitation. The location of the jurisdictional wetland boundary was more accurately determined by examining soil and vegetation.

The entire length of the Wetland A drainage ditch was delineated as jurisdictional wetland. Ditches that were intentionally created from non-wetland areas are not regulated as wetlands under the Snohomish County Code (SCC). However, the drainage ditch currently satisfies wetland criteria and was excavated from an area of historic wetland and is, therefore, considered a wetland for regulatory purposes.

4.3 Habitat

The one-way valve was replaced with a fish-passable two-way valve, primarily, to improve water quality and fish habitat in Batt Slough. However, fish cannot access the Wetland A drainage ditch due to an impassible fish screen at the opening of the 1,100-foot-long culvert. Additionally, the water quality in Wetland A is likely too poor to support fish, particularly salmonid fish. Stormwater from SR-9 discharges directly into the drainage ditch, leaving an obvious petroleum sheen on the water surface. Additionally, the lack of canopy cover in the wetland may elevate water temperatures to ranges that are unfavorable to salmonid fish.


Figure 3: Wetland A on 12/29/14 during normal conditions at high tide (left). Wetland A on 1/8/2015 when Snohomish River was at flood stage (right).


Figure 4: Wetland A on 12/29/14 during normal conditions at high tide (left). Wetland A on 1/8/15 when Snohomish River was at flood stage (right).

4.4 Wetland B

Wetland B, which was not delineated as part of this study, is a depressional wetland located on the main airport property. Wetland B has an exclusively-emergent Cowardin vegetation community dominated by a reed canarygrass monoculture. Hydrology for Wetland B is provided by a perched groundwater table and is supplemented by precipitation. Approximately one foot of ponding was present in Wetland B during the inspection. A drainage ditch connects the southwest corner of Wetland B to a larger drainage ditch that is located adjacent to SR-9. However, as evidenced by the degree of inundation observed during the inspection, the drainage ditch does not effectively drain the wetland.

Figure 5: Wetland B, facing east.

4.5 Wetland C

Wetland C, which was not delineated as part of this study, is a depressional wetland located near the northwest corner of the main airport property. Wetland C is depicted on NWI mapping, although the extent of the wetland is less than indicated on the NWI maps. Wetland C supports a forested Cowardin vegetation community dominated by black cottonwood, Douglas spirea, salmonberry, red-osier dogwood, Pacific willow, and reed canarygrass. Hydrology for Wetland C is provided by a high groundwater table and is likely supplemented by incidental stormwater runoff from the adjacent SR-9. More than one foot of inundation was present in much of Wetland C during the inspection.

Figure 6: Wetland C, facing west.

5 REGULATION

5.1 Local Regulations

Wetlands in Snohomish County are regulated under SCC 30.62A. Under SCC, wetlands are classified as one of four categories based on the Rating System. Snohomish County plans on updating its critical areas regulations, which currently utilize the 2004 Rating System, to adopt the 2014 Rating System. This change is expected to occur sometime in mid-2015. Therefore, the 2014 Rating System was used to classify wetlands.

According to the 2014 Rating System, Wetland A received seven points for water quality functions, six points for hydrologic functions, and four points for wildlife habitat functions, for a total of 17 points. This score qualifies Wetland A as a Category III wetland. Wetland B received six points for water quality functions, six points for hydrologic functions, and three points for wildlife habitat functions, for a total of 15 points. This score qualifies Wetland B as a Category IV wetland. Wetland C received seven points for water quality functions, seven points for hydrologic points, and three points for wildlife habitat functions, for a total of 17 points. This score qualifies Wetland C as a Category III wetland.

Wetland buffers in Snohomish County are determined based a combination of the wetland category and the intensity of the adjacent land use. The current land use in the delineation study area is moderate-intensity agriculture (hayfield) and low-density residential. These land uses do not meet the criteria for “high intensity” or “low intensity.” Therefore, the standard buffer width for Category III wetlands applies to Wetland A. Similarly, Wetlands B and C, while located on the airport property, are more than 800 feet away from the airport operations and are located in a separate zoning area (A-10). Areas zoned for agriculture are not permitted for industrial land uses. Consequently, the “adjacent” land use does not meet the definition of “high intensity,” resulting in the application of the standard buffer widths.

As mentioned, the Snohomish County critical areas regulations are currently being updated to reflect the revisions to the Rating System. The current regulations will likely no longer be in effect by the time local permits for the proposed project are applied for. Therefore, the 2014 Rating System, which may be implemented in Snohomish County as early as June 2015, is referenced in this document. The updated 2014 Rating System uses a different scoring system to classify wetlands than the previous 2004 Rating System. The effect that the 2014 Rating System will have on wetland buffer widths has not been finalized. The most recent draft regulations would require a standard buffer width of 110 feet for all Category III wetlands (i.e., Wetlands A and C). The draft regulations have not proposed buffer widths for Category IV wetlands. Therefore, we can only provide the current standard buffer width for Category IV wetlands, which is 40 feet [SCC 32.62A.320.1(a)]. Table 2 below summarizes the draft widths the County has proposed utilizing the 2014 Rating System.

Table 2: Draft Buffer Widths*

Wetland	**Category**	**Draft Standard Buffer Width**
Wetland A	III	110-ft
Wetland B	IV	New widths currently undecided (current buffer width is 40-ft)
Wetland C	III	110-ft

*Per Snohomish County Memorandum: *Critical Area Regulations Review and Update* 2/11/2015

Allowed Uses

There are certain structures or facilities permitted within wetlands and wetland buffers. These include utilities and transportation structures, provided there is no feasible alternative or the alternative would result in unreasonable or disproportionate costs. In addition, the location and design of such structures must be designed so as to minimize impacts as much as feasible. Other activities allowed within wetlands and wetland buffers include stormwater detention/retention facilities, access and pedestrian walkways, vegetation trimming, and reconstruction or replacement of existing buildings provided the new building does not encroach further into the critical area or buffer than did the original building. A maximum one acre of wetland fill is allowed (SCC 30.62A.320(2) and 30.62A.340).

Under SCC 30.62A.340(4), direct wetland impacts to Category III wetlands, such as those associated with the potential relocation of Airport Way, require compensatory mitigation at an area ratio of 2:1 for wetland creation and 4:1 for wetland enhancement. In addition, the study area is located within the service area for both the Skykomish Habitat Mitigation Bank and the Snohomish Basin Mitigation Bank. Unavoidable wetland impacts can be mitigated by purchasing credits at the bank (SCC 30.62A.550).

6 State and Federal Regulations

Wetlands are also regulated by the Corps under Section 404 of the Clean Water Act. Any filling of waters of the U.S., including wetlands (except isolated wetlands), would require notification and permits from the Corps. It is unlikely that any of the study area wetlands would be considered isolated. A formal isolated status inquiry can be requested from the Corps through the Jurisdictional Determination process. Federally permitted actions; actions that involve federal agencies, such as the Federal Aviation Administration; and/or actions that receive federal funding must document the potential effects of the project on threatened and endangered species through the preparation of a biological assessment study and consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service. Application for Corps permits may also require an individual 401 Water Quality Certification and Coastal Zone Management Consistency determination from Ecology and a Cultural Resource Study in accordance with Section 106 of the National Historic Preservation Act.

In general, neither the Corps nor Ecology regulates wetland buffers, unless direct impacts are proposed. When direct impacts are proposed, mitigated wetlands may be required to employ buffers based on Corps and Ecology joint regulatory guidance.

The use of a mitigation bank is generally the preferred mitigation alternative for wetland impacts under the jurisdiction of the Corps and Ecology.

The information contained in this report is based on the application of technical guidelines currently accepted as the best available science. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available to us at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, State and Federal regulatory authorities. No other warranty, expressed or implied, is made.

REFERENCES

Snohomish County Planning and Development Services. February 11, 2015. Memorandum: Critical Areas Regulations Review and Update.

Talasaea Consultants, Inc. March 2008. Wetland Assessment Report, Harvey Airfield Master Plan Update, Snohomish, Washington.

U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0.

Washington Department of Ecology. January 2015. Western Washington Wetland Rating System 2014 Update.

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APPENDIX A

Wetland A Delineation Map

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CRITICAL AREAS MAP FOR HARVEY FIELD

THE WATERSHED COMPANY

TWC #130507

MAP LEGEND

- Data Point
- Delineated Wetland
- Draft Snohomish County Regulatory Buffer (110')

Wetland was delineated by The Watershed Company between December 29, 2014 and February 10, 2015. Site is not surveyed and all features are located by Trimble GeoXH GPS

Wetland boundaries were delineated using methodology from the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0

Date: 3/27/2015
Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

1 inch = 200 feet

0 100 200 400
Feet

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APPENDIX B

Wetland Determination Data Forms

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

THE WATERSHED COMPANY
750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

DP- 1

Project Site:	**Harvey Field**	Sampling Date:	**12/17/2014**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **1**
Investigator:	**Nell Lund, Ryan Kahlo**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **terrace** Slope (%): <5% Local relief (concave, convex, none): **slightly concave**

Subregion (LRR): **A** Lat: Long: Datum:

Soil Map Unit Name: **Sultan silt loam** NWI classification: **none listed**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☐ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampling Point within a Wetland? Yes ☐ No ☒

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Meadow grasses***	**100**	**Y**	**FAC**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Click here to enter text.

SOIL **Sampling Point – DP-1**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	**2.5Y 3/2**	**100**					**Silty loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____
Depth (inches): ____________________________________

Hydric soil present? Yes ☐ No ☒

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Damp ~ 14" below ground surface, not saturated**

THE WATERSHED COMPANY

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 2

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Harvey Field**	Sampling Date:	**12/17/2014**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **2**
Investigator:	**Nell Lund, Ryan Kahlo**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **terrace** | Slope (%): none | Local relief (concave, convex, none): **none**

Subregion (LRR): **A** | Lat: | Long: | Datum:

Soil Map Unit Name: **Puget silty clay loam** | NWI classification: **PEMA**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☐ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampling Point within a Wetland? Yes ☐ No ☒

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Meadow grass***	**90**	**Y**	**FAC**
2. ***Juncus effusus***	**20**	**N**	**FACW**
3. ***Ranunculus repens***	**20**	**N**	**FAC**
4. ***Trifolium repens***	**5**	**N**	**FAC**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	135	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Click here to enter text.

SOIL

Sampling Point – DP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-14	**2.5Y 4/1**	**75**	**10YR 3/4**	**25**	**C**	**M**	**Silty clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____
Depth (inches): ____________________________________

Hydric soil present? Yes ☒ No ☐

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Top 1/2" wet from current rain, dry below**

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 3

Project Site:	**Harvey Field**	Sampling Date:	**12/17/2014**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **3**
Investigator:	**Nell Lund, Ryan Kahlo**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **Terrace** Slope (%): Click Local relief (concave, convex, none): **Concave**

Subregion (LRR): **A** Lat: Long: Datum:

Soil Map Unit Name: **Puget silty clay loam** NWI classification: **PEMC**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☐ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soils Present?	Yes ☒	No ☐	**Is the Sampling Point within a Wetland?**	Yes ☐ No ☒
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Phalaris arundinacea***	**25**	**Y**	**FACW**
2. ***Juncus effusus***	**50**	**Y**	**FACW**
3. ***Meadow grass***	**40**	**Y**	**FAC**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☒ Dominance test is > 50%
☐ Prevalence test is ≤ 3.0 *
☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants *
☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Click here to enter text.

SOIL **Sampling Point – DP-3**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	**2.5Y 4/1**	**70**	**7.5YR 3/4**	**30**	**C**	**M, PL**	**Silty clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____
Depth (inches): ____________________________________

Hydric soil present? Yes ☒ No ☐

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Can squeeze water out/ damp, not saturated. On-site at high tide. Left pit open for 1 hour, no change, no water**

THE WATERSHED COMPANY
750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP-4

Project Site:	**Harvey Field**	Sampling Date:	**12/17/2014**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **4**
Investigator:	**Nell Lund, Ryan Kahlo**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **hillslope** Slope (%): <5% Local relief (concave, convex, none): **none**

Subregion (LRR): **A** Lat: Long: Datum:

Soil Map Unit Name: **Puget silty clay loam** NWI classification: **PEMA**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☐ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☒	No	☐
Hydric Soils Present?	Yes	☒	No	☐
Wetland Hydrology Present?	Yes	☒	No	☐

Is the Sampling Point within a Wetland? Yes ☒ No ☐

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. ***Juncus effusus***	**50**	**Y**	**FACW**
2. ***Meadow grasses***	**80**	**Y**	**FAC**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	130	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Click here to enter text.

SOIL

Sampling Point – DP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	**5Y 4/1**	**80**	**10YR 3/6**	**20**	**C**	**PL, M**	**Clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____
Depth (inches): ____________________________________

Hydric soil present? Yes ☒ No ☐

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☒ Surface water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☒	No ☐	Depth (in):	**2" ABG**
Water Table Present?	Yes ☒	No ☐	Depth (in):	**0" +**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in):	**0" +**

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **ABG = above ground**

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WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 5

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

Project Site:	**Harvey Field**	Sampling Date:	**1/28/2015**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **5**
Investigator:	**Ryan Kahlo, Nell Lund**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**
Landform (hillslope, terrace, etc): **hillslope**	Slope (%): <5%	Local relief (concave, convex, none): **convex**	
Subregion (LRR): **A**	Lat:	Long:	Datum:
Soil Map Unit Name: **Sultan silt loam**		NWI classification: **none listed**	

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are “Normal Circumstances” present on the site? ☒ Yes ☐ No
Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation☐, Soil ☐, or Hydrology ☐ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampling Point within a Wetland? Yes ☐ No ☒

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. **Mowed meadow grass***	**95**	**Y**	**FAC**
2. ***Phalaris arundinacea***	**7**	**N**	**FACW**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	102	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***assumed FAC**

SOIL **Sampling Point – DP-5**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-14	**2.5Y 3/3**	**100**					**Gravelly sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ____

Depth (inches): ____________________________________

Hydric soil present? Yes ☐ No ☒

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Click here to enter text.

THE WATERSHED COMPANY

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Kirkland, Washington 98033
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WETLAND DETERMINATION DATA FORM

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DP- 6

Project Site:	**Harvey Field**	Sampling Date:	**1/28/2015**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **6**
Investigator:	**Ryan Kahlo, Nell Lund**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **terrace** | Slope (%): none | Local relief (concave, convex, none): **none**

Subregion (LRR): **A** | Lat: | Long: | Datum:

Soil Map Unit Name: **Puget silty clay loam** | NWI classification: **Palustrine Scrub-shrub (PSSC)**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☐ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes		No	
Hydrophytic Vegetation Present?	Yes	☒	No	☐
Hydric Soils Present?	Yes	☐	No	☒
Wetland Hydrology Present?	Yes	☐	No	☒

Is the Sampling Point within a Wetland? Yes ☐ No ☒

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. **Mowed meadow grass***	**100**	**Y**	**FAC**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: **Assumed FAC**

SOIL

Sampling Point – DP-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	**2.5Y 3/2.5**	**100**					**Loamy fine sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ____

Depth (inches): ____________________________________

Hydric soil present? Yes ☐ No ☒

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Top moist, no saturation.**

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THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

DP- 7

Project Site:	**Harvey Field**	Sampling Date:	Click here to enter a date.
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- Click here to enter text.
Investigator:	**Ryan Kahlo, Nell Lund**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **hillslope** Slope (%): ~5% Local relief (concave, convex, none): **none**

Subregion (LRR): **A** Lat: Long: Datum:

Soil Map Unit Name: **Puget silty clay loam** NWI classification: **Palustrine Emergent (PEMA)**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☐ Yes ☒ No **Flood conditions / above average at time of visit**

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☒ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soils Present?	Yes ☐	No ☒	**Is the Sampling Point within a Wetland?**	Yes ☐ No ☒
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **Paired with DP4;**

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. **Meadow grass *(Poa sp.)***	**70**	**Y**	**FAC**
2. ***Plantago lanceolata***	**5**	**N**	**FACU**
3. ***Trifolium repens***	**5**	**N**	**FAC**
4. ***Taraxacum officinale***	**2**	**N**	**FACU**
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	82	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**1**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: **Moss ~ 30%**

SOIL **Sampling Point – DP-7**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-14	**2.5Y 3/2**	**100**					**Loamy sand**	
14-16	**2.5Y 3/2**	**100**					**sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____
Depth (inches): ____________________________________

Hydric soil present? Yes ☐ No ☒

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☒	No ☐	Depth (in): **11" BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **9" BGS**

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **BGS = below ground surface; above average/flood conditions**

THE WATERSHED COMPANY

750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 8

Project Site:	**Harvey Field**	Sampling Date:	**2/10/2015**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **8**
Investigator:	**Ryan Kahlo, Nell Lund**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **hillslope** | Slope (%): 8% | Local relief (concave, convex, none): **concave**

Subregion (LRR): **A** | Lat: | Long: | Datum:

Soil Map Unit Name: **Puget silty clay loam** | NWI classification: **Palustrine emergent (PEMA)**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☐ Yes ☒ No **River at flood stage**

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☒ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☒	No	☐
Hydric Soils Present?	Yes	☐	No	☒
Wetland Hydrology Present?	Yes	☒	No	☐

Is the Sampling Point within a Wetland? Yes ☐ No ☒

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 1m diam.)			
1. **Grass, unknown 1***	**60**	**Y**	**FAC**
2. ***Taraxacum officinale***	**15**	**N**	**FACU**
3. **Grass, unknown 2***	**20**	**Y**	**FAC**
4. **Unknown**	**5**	**N**	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum:			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**2**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

Total % Cover of		Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

- ☒ Dominance test is > 50%
- ☐ Prevalence test is ≤ 3.0 *
- ☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants *
- ☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ***assumed FAC**

SOIL **Sampling Point – DP-8**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-14	**2.5Y 3/2**	**100**					**Loamy sand**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: ____
Depth (inches): ____________________________________

Hydric soil present? Yes ☐ No ☒

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☒	No ☐	Depth (in): **11" BGS**
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (in): **8" BGS**

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **BGS = below ground surface; river at flood stage**

The Watershed Company
750 Sixth Street South
Kirkland, Washington 98033
(425) 822-5242
watershedco.com

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 9

Project Site:	**Harvey Field**	Sampling Date:	**2/10/2015**
Applicant/Owner:	**Jviation, Inc**	Sampling Point:	DP- **9**
Investigator:	**Ryan Kahlo, Nell Lund**	City/County:	**Snohomish County**
Sect., Township, Range:	S **24** T **28N** R **5E**	State:	**WA**

Landform (hillslope, terrace, etc): **terrace** Slope (%): flat Local relief (concave, convex, none): **convex**

Subregion (LRR): **A** Lat: Long: Datum:

Soil Map Unit Name: **Sultan silty loam** NWI classification: **none listed**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)

Are "Normal Circumstances" present on the site? ☒ Yes ☐ No

Are Vegetation☐, Soil ☐, or Hydrology ☐ significantly disturbed?

Are Vegetation☐, Soil ☐, or Hydrology ☐ naturally problematic (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒

Is the Sampling Point within a Wetland? Yes ☐ No ☒

Remarks: Click here to enter text.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 3m diam.)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1m diam.)			
1. ***Taraxacum officinale***	**50**	**Y**	**FACU**
2. **Grass***	**25**	**Y**	**FAC**
3. ***Trifolium repens***	**10**	**N**	**FAC**
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
= Total Cover	**95**		
Woody Vine Stratum (Plot size:)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**2**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

☐ Dominance test is > 50%

☐ Prevalence test is ≤ 3.0 *

☐ Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)

☐ Wetland Non-Vascular Plants *

☐ Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: ***assumed FAC**

SOIL

Sampling Point – DP-

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-14	**2.5Y 3/2**	**100**					**Sandy loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ____

Depth (inches): ____________________________________

Hydric soil present? Yes ☐ No ☒

Remarks: Click here to enter text.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	Yes ☐	No ☒	Depth (in):
Water Table Present?	Yes ☐	No ☒	Depth (in):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Click here to enter text.

APPENDIX C

Wetland Rating Forms

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 2/10/2015

Rated by: Nell Lund, Ryan Kahlo Trained by Ecology? ☒Y ☐N Date of training: 06/2014

HGM Class used for rating: Depressional Wetland has multiple HGM classes? ☐Y ☒N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map: SnoScape, Google Earth

OVERALL WETLAND CATEGORY (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

☐ **Category I** – Total score = 23 - 27

☐ **Category II** – Total score = 20 - 22

☒ **Category III** – Total score = 16 - 19

☐ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality			Hydrologic			Habitat			
							Circle the appropriate ratings			
Site Potential	H	M	L	H	M	L	H	M	L	
Landscape Potential	H	M	L	H	M	L	H	M	L	
Value	H	M	L	H	M	L	H	M	L	TOTAL
Score Based on Ratings	7			6			4			17

Score for each function based on three ratings
(order of ratings is not important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	☒

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	NA*
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

***Figure not included. Contributing basin is all upstream portions of the Snohomish River watershed**

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   ☒NO – go to 2 ☐**YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   ☒NO – go to 3 ☐**YES** – The wetland class is **Flats**
   If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ☐The wetland is on a slope (*slope can be very gradual*),
   ☐The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ☐The water leaves the wetland **without being impounded**.

   ☒NO – go to 5 ☐**YES –** The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ☐The overbank flooding occurs at least once every 2 years.

☒NO – go to 6 ☐**YES –** The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☐NO – go to 7 ☒**YES –** The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☒NO – go to 8 ☐**YES –** The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ***Ditch functions as both an inlet and an outlet, therefore is only an intermittently flowing outlet.** Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*. Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > 1/2 of area points = 3 Wetland has persistent, ungrazed plants > 1/10 of area points = 1 Wetland has persistent, ungrazed plants < 1/10 of area points = 0	1
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	7

Rating of Site Potential If score is: ☐**12-16 = H** ☒**6-11 = M** ☐**0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_________________ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ☐**3 or 4 = H** ☒**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	4

Rating of Value If score is**:** ☒**2-4 = H** ☐**1 = M** ☐**0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outletpoints = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	7
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 ***Contributing basin includes all upstream portions of the Snohomish River watershed. Figure not included.** Entire wetland is in the Flats class points = 5	0
Total for D 4 Add the points in the boxes above	9

Rating of Site Potential If score is: ☐**12-16 = H** ☒**6-11 = M** ☐**0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: ☒**3 = H** ☐**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why The wetland unit is disconnected from the surrounding landscape by roads, undersized culverts, and levees.* points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	0

Rating of Value If score is: ☐**2-4 = H** ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4	
☒ Emergent	3 structures: points = 2	
☒ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1	1
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0	

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☒ Permanently flooded or inundated ***(ditch)***	4 or more types present: points = 3	
☒ Seasonally flooded or inundated	3 types present: points = 2	
☒ Occasionally flooded or inundated	2 types present: points = 1	2
☐ Saturated only	1 type present: points = 0	
☐ Permanently flowing stream or river in, or adjacent to, the wetland		
☐ Seasonally flowing stream in, or adjacent to, the wetland		
☐ **Lake Fringe wetland**	**2 points**	
☐ **Freshwater tidal wetland**	**2 points**	

H 1.3. Richness of plant species

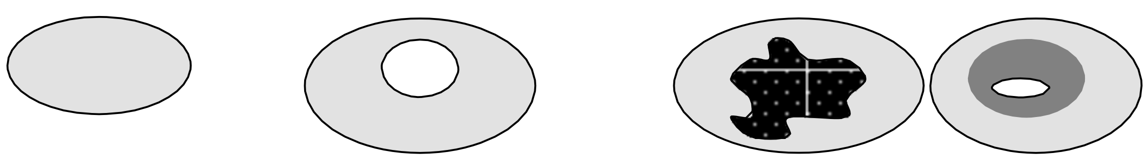
Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2	
5 - 19 species ***: JUEF, grasses, SPDO, COSE, THPL, POBA, SASI, RUSP***	points = 1	1
< 5 species	points = 0	

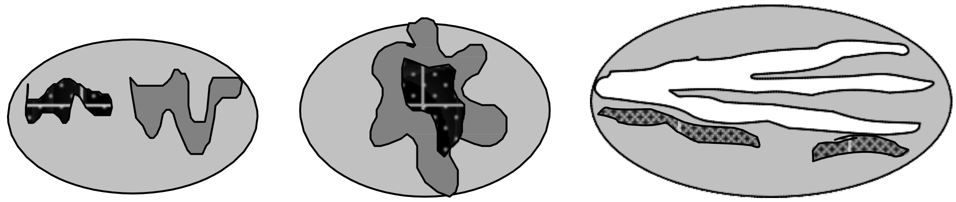
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points **Low** = 1 point **Moderate** = 2 points

All three diagrams in this row are **HIGH** = 3points



Score: 2

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☒ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ☒ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 — Add the points in the boxes above	8

Rating of Site Potential If score is: ☐**15-18 = H** ☒**7-14 = M** ☐**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat: **0 +** [(% moderate and low intensity land uses)/2]: **0 = 0%** If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat: **6 +** [(% moderate and low intensity land uses)0/2]: **0 = 6%** Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	0
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	-2

Rating of Landscape Potential If score is: ☐**4-6 = H** ☐**1-3 = M** ☒**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	0

Rating of Value If score is: ☐**2 = H** ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi- layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

<table>
<tr><td>Wetland Type

Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</td><td>Category</td></tr>
<tr><td>SC 1.0. Estuarine wetlands
Does the wetland meet the following criteria for Estuarine wetlands?
☐ The dominant water regime is tidal,
☐ Vegetated, and
☐ With a salinity greater than 0.5 ppt ☐Yes –Go to SC 1.1 ☒No= Not an estuarine wetland</td><td></td></tr>
<tr><td>SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?
☐Yes = Category I ☐No - Go to SC 1.2</td><td>Cat. I</td></tr>
<tr><td>SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions?
☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are Spartina, see page 25)
☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland.
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐Yes = Category I ☐No= Category II</td><td>Cat. I

Cat. II</td></tr>
<tr><td>SC 2.0. Wetlands of High Conservation Value (WHCV)
SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐Yes – Go to SC 2.2 ☒No – Go to SC 2.3
SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value?
☐Yes = Category I ☐No = Not a WHCV
SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland?
http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf
☐Yes – Contact WNHP/WDNR and go to SC 2.4 ☒No = Not a WHCV
SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐Yes = Category I ☐No = Not a WHCV</td><td>Cat. I</td></tr>
<tr><td>SC 3.0. Bogs
Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? Use the key below. If you answer YES you will still need to rate the wetland based on its functions.
SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐Yes – Go to SC 3.3 ☒No – Go to SC 3.2
SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐Yes – Go to SC 3.3 ☒No = Is not a bog
SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐Yes = Is a Category I bog ☐No – Go to SC 3.4
NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog.
SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy?
☐Yes = Is a Category I bog ☐No = Is not a bog</td><td>Cat. I</td></tr>
</table>

<table>
<tr><td>

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.

☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).

☐Yes = **Category I** ☒No **= Not a forested wetland for this section**

</td><td>**Cat. I**</td></tr>
<tr><td>

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)*

☐Yes – Go to **SC 5.1** ☒No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).

☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland.

☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category II**

</td><td>

Cat. I

Cat. II

</td></tr>
<tr><td>

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

☐ Long Beach Peninsula: Lands west of SR 103

☐ Grayland-Westport: Lands west of SR 105

☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐Yes – Go to **SC 6.1** ☒No = **not an interdunal wetland for rating**

SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? ☐Yes = **Category I** ☐No – Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐Yes = **Category II** ☐No – Go to **SC 6.3**

SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?

☐Yes = **Category III** ☐No = **Category IV**

</td><td>

Cat I

Cat. II

Cat. III

Cat. IV

</td></tr>
<tr><td>

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

</td><td>N/A</td></tr>
</table>

Appendix [A] — ECY 2014 Wetland Rating Form: Depressional figures

Figure 1. Cowardin plant classes - D1.3, H1.1, H1.4

Figure 2. Hydrology: hydroperiods, outlets, and 150ft buffer - D1.1, D1.4, D4.1, H1.2, D2.2, D5.2

Figure 3. Accessible and undisturbed habitat 1km from wetland edge - H2.1, H2.2, H2.3

Figure 4. Screen-capture of 303(d) listed waters in basin - D3.1, D3.2

Figure 5. Screen-capture of TMDL list for WRIA - D3.3

Resources and Links:

Snohomish County GIS
Google Earth 2014
ECY 303(d) list, *accessed January 2, 2014*
TMDL list, *accessed January 2, 2014*

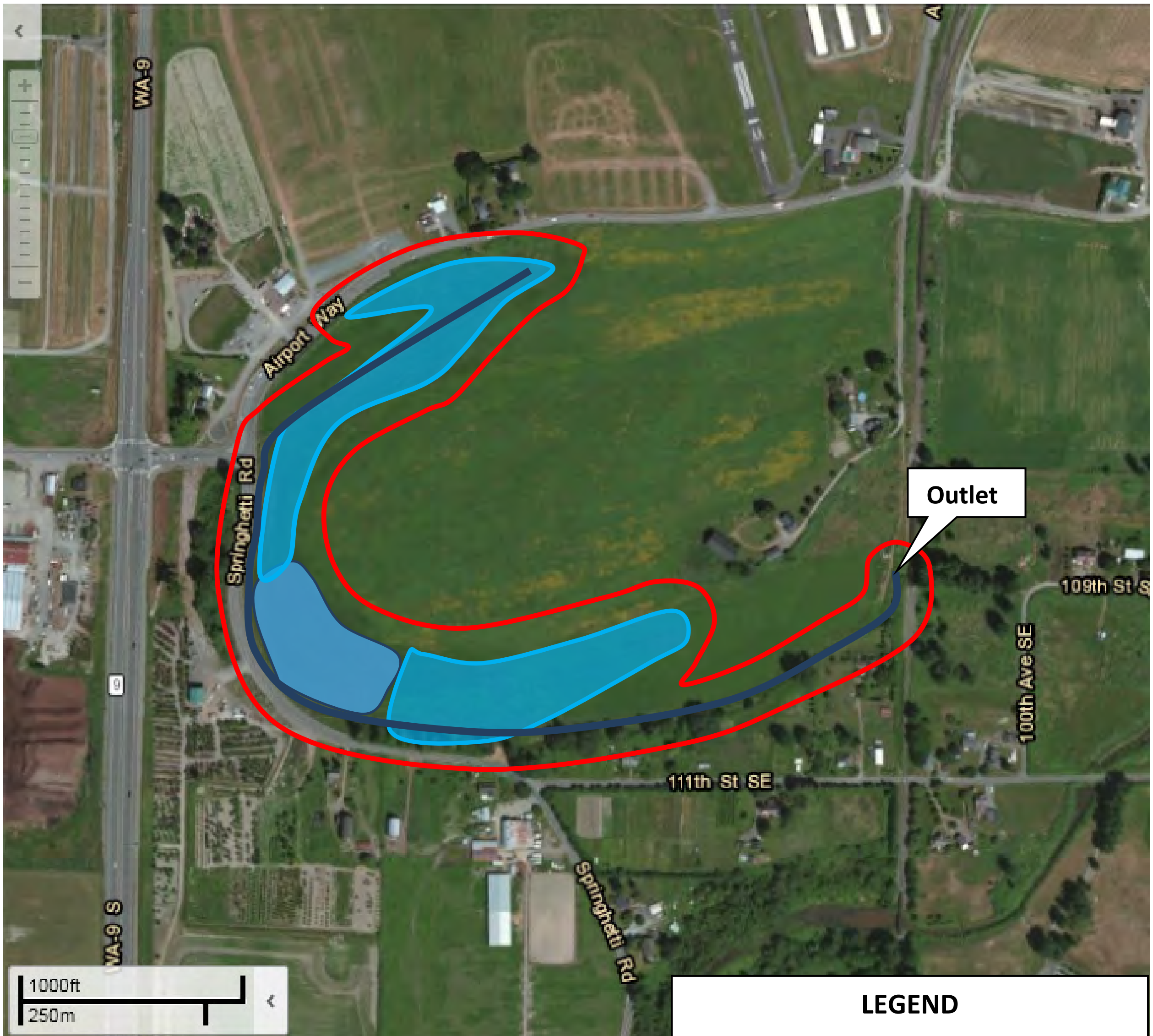
Figure 1. Cowardin plant classes - D1.3, H1.1, H1.4

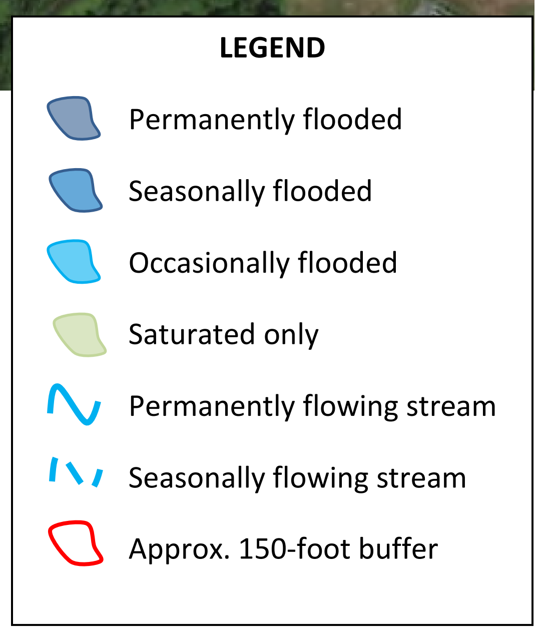
Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

LEGEND

- Palustrine scrub shrub
- Palustrine emergent
- Palustrine aquatic bed
- Wetland boundary

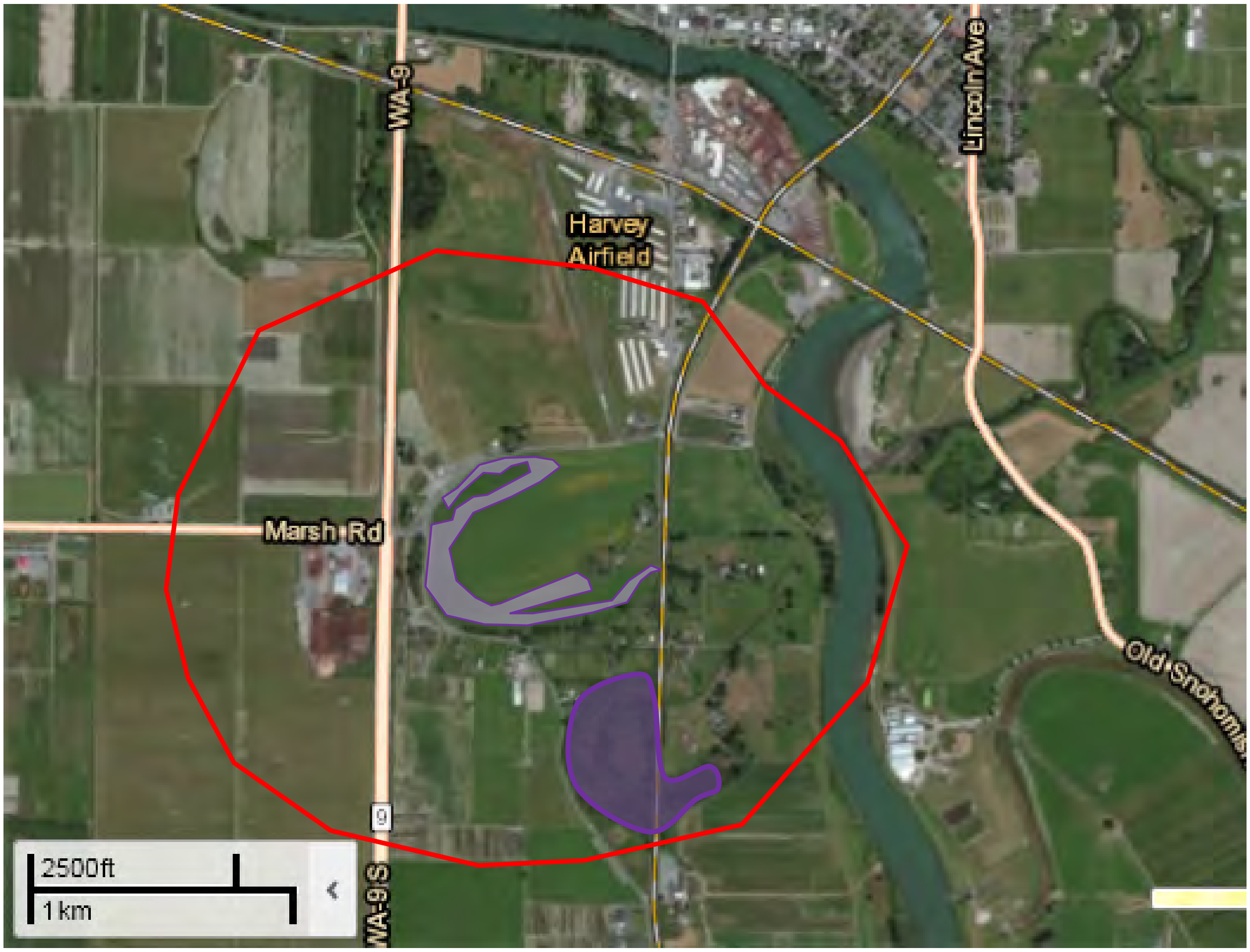
Figure 2. Hydrology: hydroperiods, outlets, and 150ft buffer - D1.1, D1.4, D4.1, H1.2, D2.2, D5.2





Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

Figure 3. Accessible and undisturbed habitat 1km from wetland edge - H2.1, H2.2, H2.3



Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

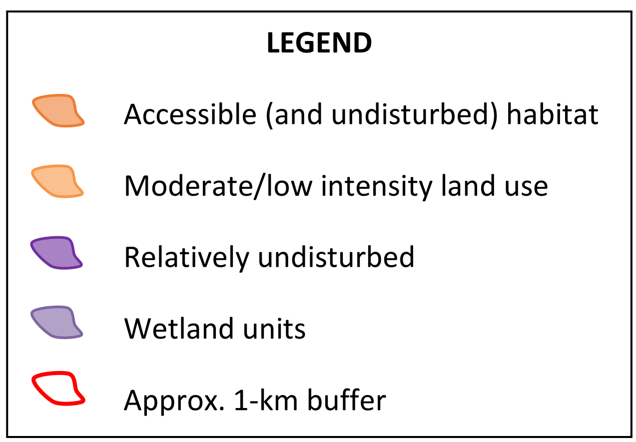


Figure 4. Screen-capture of 303(d) listed waters in basin - D3.1, D3.2. *Accessed January 2, 2014*

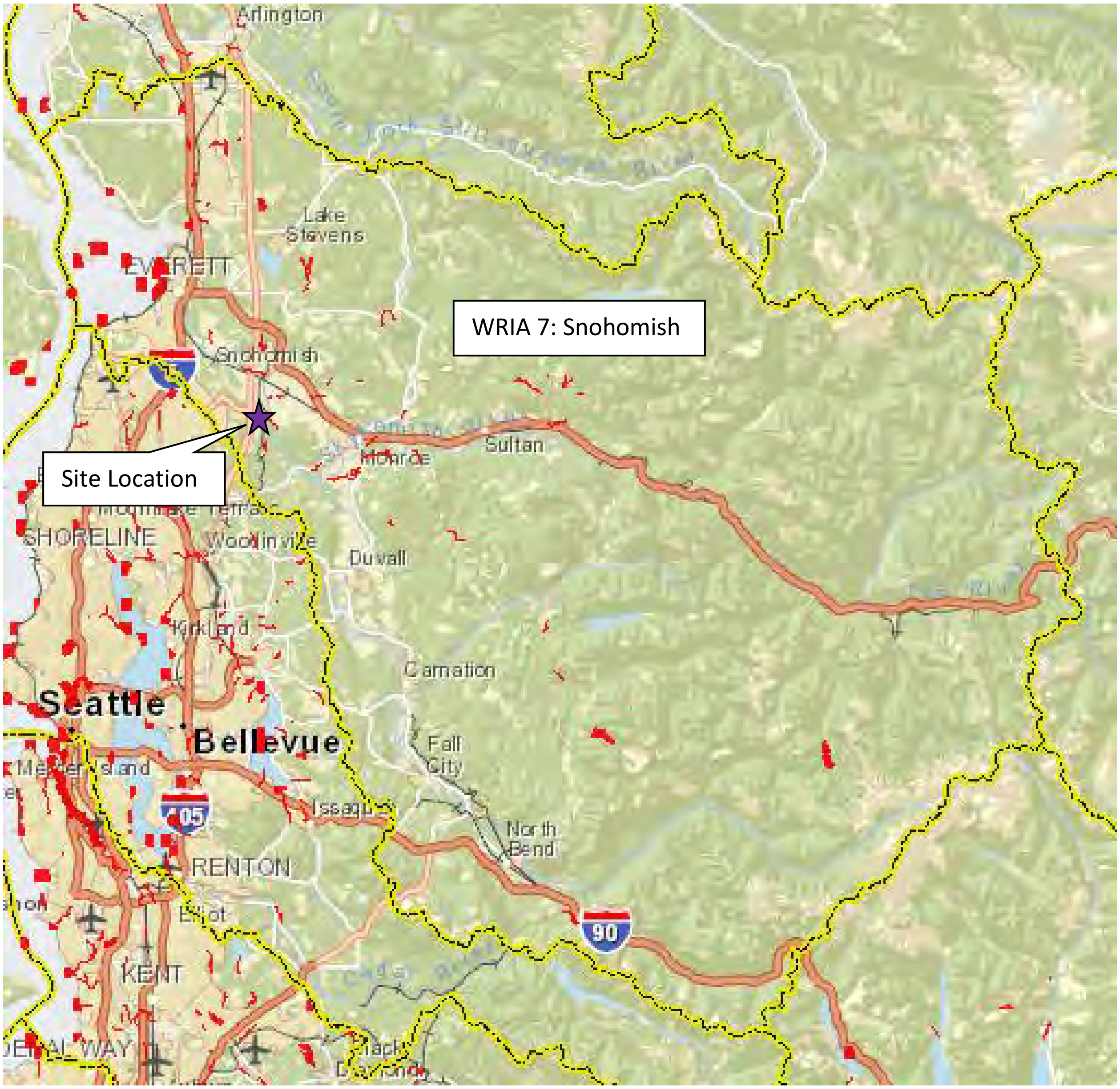
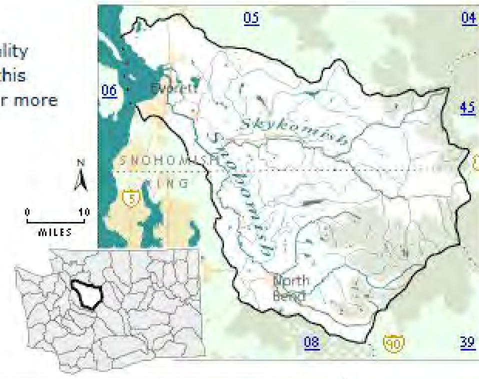


Figure 5. Screen-capture of TMDL list for WRIA in which unit is found - D3.3

accessed January 2, 2014.

WRIA 7: Snohomish

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- King
- Snohomish

Waterbody Name	Pollutant(s)	Status**	TMDL Lead
Lake Loma	Total Phosphorus	Straight to implementation project under development	Tricia Shoblom 425-649-7288
Snohomish River	French Creek / Pilchuck River • Dissolved Oxygen • Temperature	Under development	Ralph Svrjcek 425-649-7165
	Dioxin	EPA approved	Ralph Svrjcek 425-649-7165
	Estuary • Ammonia • BOD	EPA approved	Ralph Svrjcek 425-649-7165
	Tributaries • Fecal Coliform Tributaries: • Allen Creek • Quilceda Creek • French Creek • Woods Creek • Pilchuck River • Marshlands (Wood Creek) {2}	EPA approved	Ralph Svrjcek 425-649-7165
	Snoqualmie River • Ammonia-N • BOD (5-day) • Fecal Coliform Temperature	EPA approved EPA approved Has an implementation plan	Ralph Svrjcek 425-649-7165

*** **Status** will be listed as one of the following: Approved by EPA, Under Development or Implementation*

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RATING SUMMARY – Western Washington

Name of wetland (or ID #): Click here to enter text. Date of site visit: Click here to enter a date.
Rated by: Click here to enter text. Trained by Ecology? ☐Y ☐N Date of training: Choose an item.

HGM Class used for rating: Choose an item. Wetland has multiple HGM classes? ☐Y ☐N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map: Click here to enter text.

OVERALL WETLAND CATEGORY (based on functions ☐ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

☐ **Category I** – Total score = 23 - 27
☐ **Category II** – Total score = 20 - 22
☐ **Category III** – Total score = 16 - 19
☒ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
			Circle the appropriate ratings	
Site Potential	H **M** L	H **M** L	H M **L**	
Landscape Potential	H M **L**	H **M** L	H M **L**	
Value	**H** M L	H **M** L	H M **L**	**TOTAL**
Score Based on Ratings	6	6	3	15

Score for each function based on three ratings
(order of ratings is not important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	☐

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	2
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	2
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	2
Map of the contributing basin	D 4.3, D 5.3	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	6

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   ☒NO – go to 2 ☐**YES –** the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

   If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   ☒NO – go to 3 ☐**YES –** The wetland class is **Flats**

   If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

   ☐The wetland is on a slope (*slope can be very gradual*),

   ☐The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

   ☐The water leaves the wetland **without being impounded.**

   ☒NO – go to 5 ☐**YES –** The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

   ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

   ☐The overbank flooding occurs at least once every 2 years.

☒NO – go to 6 ☐**YES –** The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☒NO – go to 7 ☐**YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐NO – go to 8 ☐**YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number: B

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 **Wetland has an intermittently flowing stream or ditch,** OR highly constricted permanently flowing outlet. **points** = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*. Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > 1/2 of area points = 3 Wetland has persistent, ungrazed plants > 1/10 of area points = 1 **Wetland has persistent, ungrazed plants < 1/10 of area points = 0** ***Mowed**	0
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	6

Rating of Site Potential If score is: ☐**12-16 = H** ☒**6-11 = M** ☐**0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	0
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_________________ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	0

Rating of Landscape Potential If score is: ☐**3 or 4 = H** ☐**1 or 2 = M** ☒**0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: ☒**2-4 = H** ☐**1 = M** ☐**0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 **Wetland has an intermittently flowing stream or ditch**, OR highly constricted permanently flowing outletpoints = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 **Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet** points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 **The area of the basin is 10 to 100 times the area of the unit** points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	3
Total for D 4 Add the points in the boxes above	8

Rating of Site Potential If score is: ☐**12-16 = H** ☒**6-11 = M** ☐**0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ☐**3 = H** ☒**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • **Surface flooding problems are in a sub-basin farther down-gradient. points = 1** Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why*_______________ points = 0 There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	1

Rating of Value If score is: ☐**2-4 = H** ☒**1 = M** ☐**0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed	4 structures or more: points = 4	0
☒ Emergent	3 structures: points = 2	
☐ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1	
☐ Forested (areas where trees have > 30% cover)	1 structure: points = 0	

If the unit has a Forested class, check if:

☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated	4 or more types present: points = 3	0
☒ Seasonally flooded or inundated	3 types present: points = 2	
☐ Occasionally flooded or inundated	2 types present: points = 1	
☐ Saturated only	1 type present: points = 0	
☐ Permanently flowing stream or river in, or adjacent to, the wetland		
☐ Seasonally flowing stream in, or adjacent to, the wetland		
☐ **Lake Fringe wetland**	**2 points**	
☐ **Freshwater tidal wetland**	**2 points**	

H 1.3. Richness of plant species

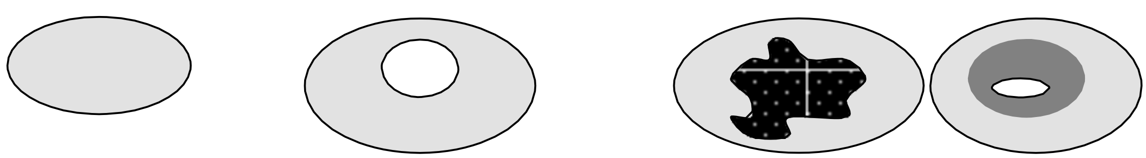
Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2	0
5 - 19 species	points = 1	
< 5 species	points = 0	

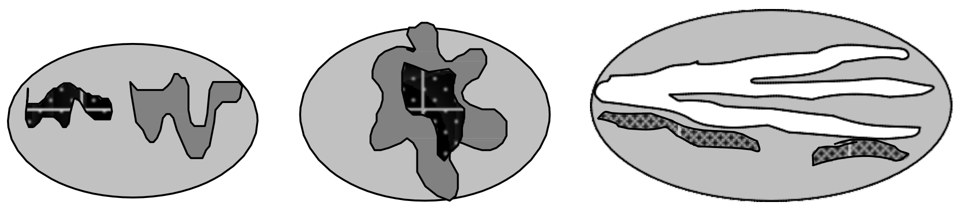
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points **Low** = 1 point **Moderate** = 2 points

All three diagrams in this row are **HIGH** = 3points



0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 — Add the points in the boxes above	0

Rating of Site Potential If score is: ☐**15-18 = H** ☐**7-14 = M** ☒**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat: **0 +** [(% moderate and low intensity land uses)0%/2]: **0%** If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat: **5 +** [(% moderate and low intensity land uses)0/2]: **0 = 5%** Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	0
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	-2

Rating of Landscape Potential If score is: ☐**4-6 = H** ☐**1-3 = M** ☒**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	0

Rating of Value If score is: ☐**2 = H** ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi- layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐Yes –Go to **SC 1.1** ☐No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐Yes = **Category I** ☐No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐Yes = **Category I** ☐No= **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐Yes **–** Go to **SC 2.2** ☐No **–** Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐Yes **= Category** I ☐No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐Yes **– Contact WNHP/WDNR and go to SC 2.4** ☐No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐Yes **= Category I** ☐No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐Yes – Go to **SC 3.3** ☐No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐Yes – Go to **SC 3.3** ☐No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐Yes = **Is a Category I bog** ☐No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐Yes = **Is a Category I bog** ☐No = **Is not a bog**	**Cat. I**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** ☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). ☐Yes = **Category I** ☐No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ☐Yes – Go to **SC 5.1** ☐No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland. ☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) ☐Yes = **Category I** ☐No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 ☐Yes – Go to **SC 6.1** ☐No = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? ☐Yes = **Category I** ☐No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? ☐Yes = **Category II** ☐No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? ☐Yes = **Category III** ☐No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	Click here to enter text.

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Appendix [B] — ECY 2014 Wetland Rating Form: Depressional figures

Figure 1. Cowardin plant classes - D1.3, H1.1, H1.4

Figure 2. Hydrology: hydroperiods, outlets, and 150ft buffer - D1.1, D1.4, D4.1, H1.2, D2.2, D5.2

Figure 3. Contributing upland basin to wetland area - D4.3, D5.3

Figure 4. Accessible and undisturbed habitat 1km from wetland edge - H2.1, H2.2, H2.3

Figure 5. Screen-capture of 303(d) listed waters in basin - D3.1, D3.2

Figure 6. Screen-capture of TMDL list for WRIA - D3.3

Resources and Links:

Snohomish County GIS
Washington Coastal Atlas
Google Earth
ECY 303(d) list
TMDL list

Figure 1. Cowardin plant classes - D1.3, H1.1, H1.4

Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

Figure 2. Hydrology: hydroperiods, outlets, and 150ft buffer - D1.1, D1.4, D4.1, H1.2, D2.2, D5.2

Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment

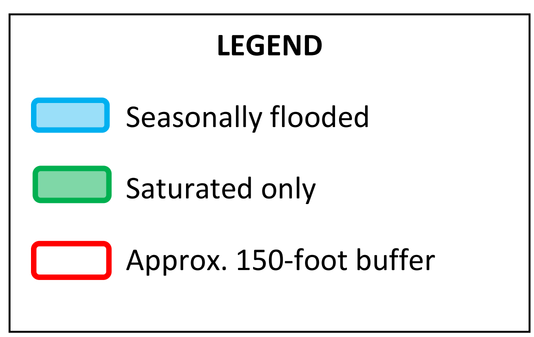
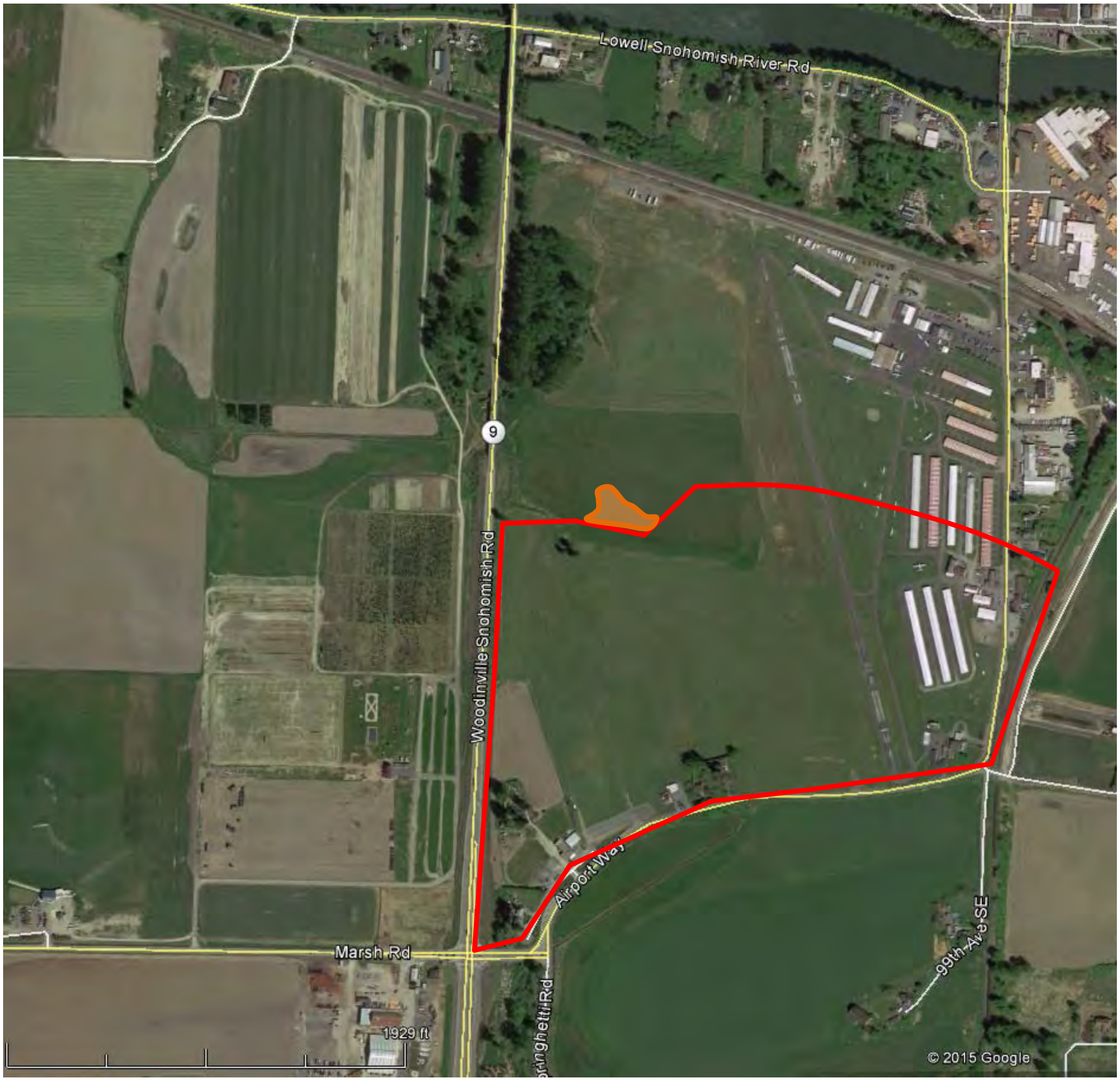


Figure 3. Contributing upland basin to wetland area - D4.3, D5.3



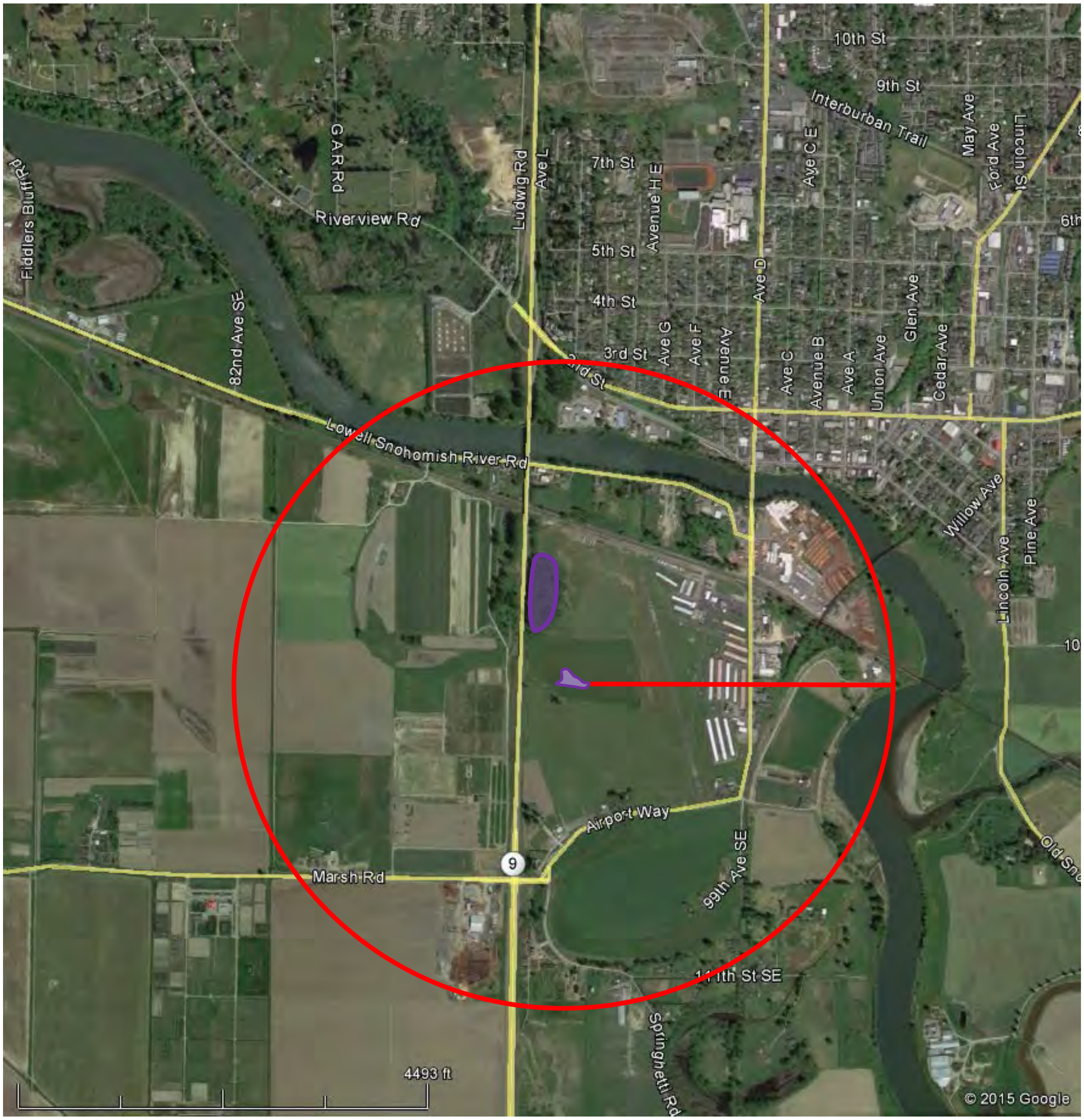
Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

LEGEND

Wetland unit

Approx. basin boundary

Figure 4. Accessible and undisturbed habitat 1km from wetland edge - H2.1, H2.2, H2.3



Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

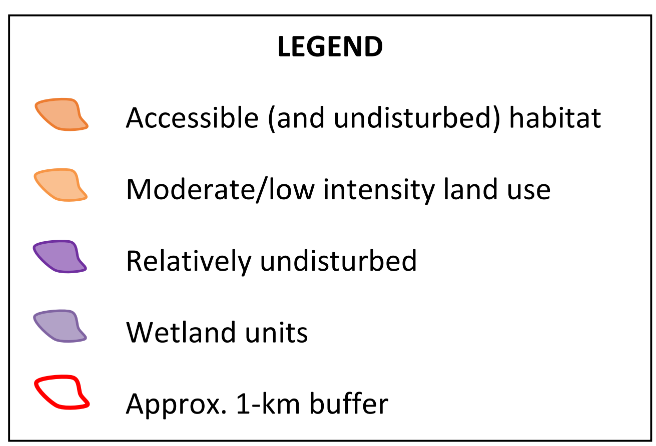


Figure 5. Screen-capture of 303(d) listed waters in basin - D3.1, D3.2

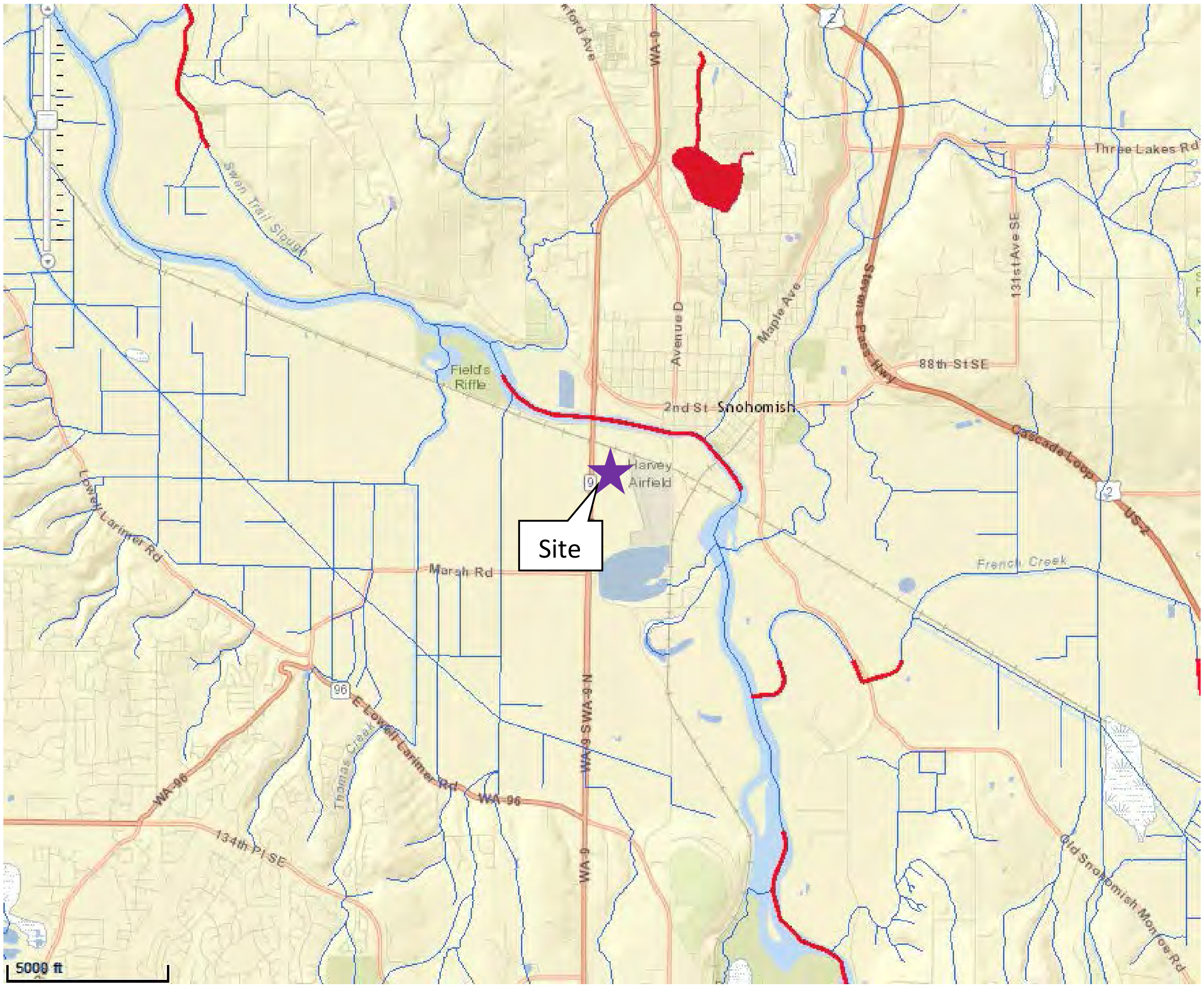


Figure 6. Screen-capture of TMDL list for WRIA in which unit is found - D3.3

Water Quality Improvement Projects (TMDLs)

WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

- Overview of the process
- Project Catalog
  - **by WRIA**
  - **by County**
- Funding Opportunities
- Project Development Priority Lists
- Related Information
- TMDL Contacts

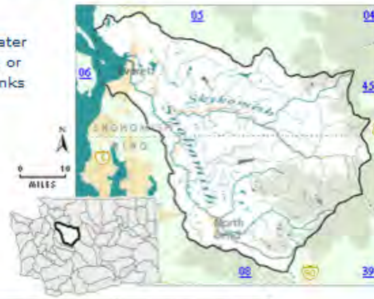
RELATED ECOLOGY PROGRAMS

- Water Quality

Water Quality Improvement > Water Quality Improvement Projects by WRIA > WRIA 7: Snohomish

WRIA 7: Snohomish

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- King
- Snohomish

Waterbody Name	Pollutant(s)	Status**	TMDL Lead
Lake Loma	Total Phosphorus	Straight to implementation project under development	Tricia Shoblom 425-649-7288
Snohomish River	French Creek / Pilchuck River • Dissolved Oxygen • Temperature	Under development	Ralph Svrjcek 425-649-7165
	Dioxin	EPA approved	Ralph Svrjcek 425-649-7165
	Estuary • Ammonia • BOD	EPA approved	Ralph Svrjcek 425-649-7165
	Tributaries • Fecal Coliform Tributaries: • Allen Creek • Quilceda Creek • French Creek • Woods Creek • Pilchuck River • Marshlands (Wood Creek) {2}	EPA approved	Ralph Svrjcek 425-649-7165
	Snoqualmie River • Ammonia-N • BOD (5-day) • Fecal Coliform Temperature	EPA approved EPA approved Has an implementation plan	Ralph Svrjcek 425-649-7165

** *Status will be listed as one of the following: Approved by EPA, Under Development or Implementation*

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland C Date of site visit: 1/27/2015

Rated by: Kahlo, R; Lund, N Trained by Ecology? ☒Y ☐N Date of training: 09/2014

HGM Class used for rating: Depressional Wetland has multiple HGM classes? ☐Y ☒N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.
Source of base aerial photo/map: Google Maps

OVERALL WETLAND CATEGORY (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

- ☐ **Category I** – Total score = 23 - 27
- ☐ **Category II** – Total score = 20 - 22
- ☒ **Category III** – Total score = 16 - 19
- ☐ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	H **M** L	H **M** L	H M **L**	
Landscape Potential	H **M** L	**H** M L	H M **L**	
Value	**H** M L	H **M** L	H M **L**	TOTAL
Score Based on Ratings	7	7	3	17

Score for each function based on three ratings
(order of ratings is not important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	☐

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	2
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	2
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	2
Map of the contributing basin	D 4.3, D 5.3	3
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	6

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   ☒NO – go to 2 ☐**YES –** the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

   If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is an* ***Estuarine*** *wetland and is not scored. This method* ***cannot*** *be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   ☒NO – go to 3 ☐**YES –** The wetland class is **Flats**

   If your wetland can be classified as a Flats wetland, use the form for ***Depressional*** *wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

   ☐The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

   ☐At least 30% of the open water area is deeper than 6.6 ft (2 m).

   ☒NO – go to 4 ☐**YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

   ☐The wetland is on a slope (*slope can be very gradual*),

   ☐The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

   ☐The water leaves the wetland **without being impounded.**

   ☒NO – go to 5 ☐**YES –** The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

   ☐The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

   ☐The overbank flooding occurs at least once every 2 years.

Wetland name or number: C

☒NO – go to 6 ☐**YES –** The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

☒NO – go to 7 ☐**YES –** The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐NO – go to 8 ☐**YES –** The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number: C

DEPRESSIONAL AND FLATS WETLANDS **Water Quality Functions** - Indicators that the site functions to improve water quality	
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. <u>Characteristics of surface water outflows from the wetland</u>: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 **<u>Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.</u>** **<u>points</u>** = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. <u>The soil 2 in below the surface (or duff layer)</u> is true clay or true organic *(use NRCS definitions)*.Yes = 4 No = 0	0
D 1.3. <u>Characteristics and distribution of persistent plants</u> (Emergent, Scrub-shrub, and/or Forested Cowardin classes): **<u>Wetland has persistent, ungrazed, plants > 95% of area points = 5</u>** Wetland has persistent, ungrazed, plants > 1/2 of area points = 3 Wetland has persistent, ungrazed plants > 1/10 of area points = 1 Wetland has persistent, ungrazed plants < 1/10 of area points = 0	5
D 1.4. <u>Characteristics of seasonal ponding or inundation</u>: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	2
Total for D 1 Add the points in the boxes above	9

Rating of Site Potential If score is: ☐**12-16 = H** ☒**6-11 = M** ☐**0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? *Mowing	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_________________ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ☐**3 or 4 = H** ☒**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: ☒**2-4 = H** ☐**1 = M** ☐**0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 **Wetland has intermittently flowing stream or ditch, OR highly constricted permanently flowing outletpoints** = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 **Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet** points = 3 The wetland is a “headwater” wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 **The area of the basin is 10 to 100 times the area of the unit** points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	3
Total for D 4 Add the points in the boxes above	8

Rating of Site Potential If score is: ☐**12-16 = H** ☒**6-11 = M** ☐**0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	3

Rating of Landscape Potential If score is: ☒**3 = H** ☐**1 or 2 = M** ☐**0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • **Surface flooding problems are in a sub-basin farther down-gradient. points = 1** Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why*_______________ points = 0 There are no problems with flooding downstream of the wetland. points = 0	1
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	1

Rating of Value If score is: ☐**2-4 = H** ☒**1 = M** ☐**0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

☐ Aquatic bed — 4 structures or more: points = 4
☐ Emergent — 3 structures: points = 2
☐ Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1
☒ Forested (areas where trees have > 30% cover) — 1 structure: points = 0

If the unit has a Forested class, check if:

☒ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

Score: 1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

☐ Permanently flooded or inundated — 4 or more types present: points = 3
☒ Seasonally flooded or inundated — 3 types present: points = 2
☐ Occasionally flooded or inundated — 2 types present: points = 1
☒ Saturated only — 1 type present: points = 0
☐ Permanently flowing stream or river in, or adjacent to, the wetland
☐ Seasonally flowing stream in, or adjacent to, the wetland
☐ **Lake Fringe wetland** — **2 points**
☐ **Freshwater tidal wetland** — **2 points**

Score: 1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

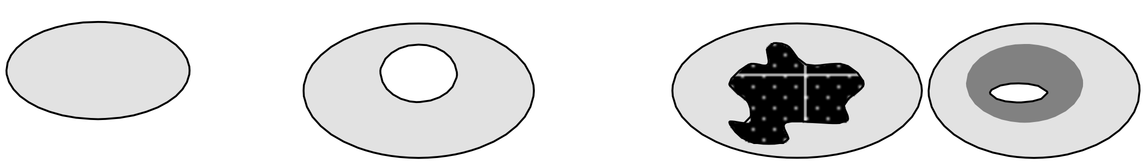
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted:		
	> 19 species	points = 2
	5 - 19 species	points = 1
	< 5 species	points = 0

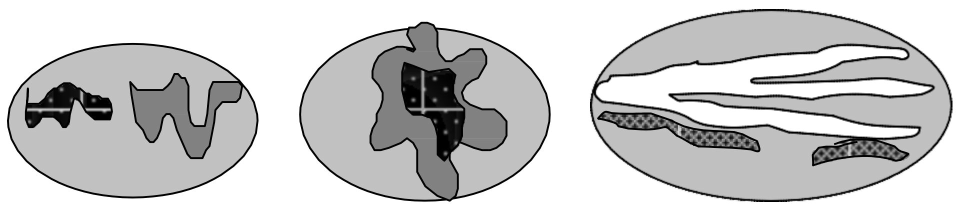
Score: 1

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points | **Low** = 1 point | **Moderate** = 2 points



All three diagrams in this row are **HIGH** = 3points

Score: 0

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ☒ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☒ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	2

Rating of Site Potential If score is: ☐**15-18 = H** ☐**7-14 = M** ☒**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat: **0 +** [(% moderate and low intensity land uses)0%/2]: **0%** If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat: **2 +** [(% moderate and low intensity land uses)0/2]: **0 = 2%** Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	0
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 Add the points in the boxes above	-2

Rating of Landscape Potential If score is**:** ☐**4-6 = H** ☐**1-3 = M** ☒**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = 1 Site does not meet any of the criteria above — points = 0	0

Rating of Value If score is: ☐**2 = H** ☐**1 = M** ☒**0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

☐ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi- layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt ☐Yes –Go to **SC 1.1** ☐No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐Yes = **Category I** ☐No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ☐Yes = **Category I** ☐No= **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☐Yes **–** Go to **SC 2.2** ☐No **–** Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐Yes **= Category** I ☐No **= Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐Yes **– Contact WNHP/WDNR and go to SC 2.4** ☐No **= Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐Yes **= Category I** ☐No **= Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below. **If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ☐Yes – Go to **SC 3.3** ☐No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ☐Yes – Go to **SC 3.3** ☐No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ☐Yes = **Is a Category I bog** ☐No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ☐Yes = **Is a Category I bog** ☐No = **Is not a bog**	**Cat. I**

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** ☐ **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ☐ **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). ☐Yes = **Category I** ☐No **= Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ☐Yes – Go to **SC 5.1** ☐No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un- mowed grassland. ☐ The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) ☐Yes = **Category I** ☐No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 ☐Yes – Go to **SC 6.1** ☐No = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? ☐Yes = **Category I** ☐No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? ☐Yes = **Category II** ☐No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? ☐Yes = **Category III** ☐No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	Click here to enter text.

Appendix [C] — ECY 2014 Wetland Rating Form: Depressional figures

Figure 1. Cowardin plant classes - D1.3, H1.1, H1.4

Figure 2. Hydrology: hydroperiods, outlets, and 150ft buffer - D1.1, D1.4, D4.1, H1.2, D2.2, D5.2

Figure 3. Contributing upland basin to wetland area - D4.3, D5.3

Figure 4. Accessible and undisturbed habitat 1km from wetland edge - H2.1, H2.2, H2.3

Figure 5. Screen-capture of 303(d) listed waters in basin - D3.1, D3.2

Figure 6. Screen-capture of TMDL list for WRIA - D3.3

Resources and Links:

Snohomish County GIS
Washington Coastal Atlas
Google Earth
ECY 303(d) list
TMDL list

Figure 1. Cowardin plant classes - D1.3, H1.1, H1.4

Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

LEGEND

- Palustrine forested
- Palustrine scrub-shrub
- Palustrine emergent
- Palustrine aquatic bed
- Wetland boundary

Figure 2. Hydrology: hydroperiods, outlets, and 150ft buffer - D1.1, D1.4, D4.1, H1.2, D2.2, D5.2

Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment

LEGEND

- Seasonally flooded
- Saturated only
- Approx. 150-foot buffer

Figure 3. Contributing upland basin to wetland area - D4.3, D5.3

Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

LEGEND

Wetland unit

Approx. basin boundary

Figure 4. Accessible and undisturbed habitat 1km from wetland edge - H2.1, H2.2, H2.3

Note: Boundaries depicted may not be to scale. They are sketches based on available data and best professional judgment.

LEGEND

- Accessible (and undisturbed) habitat
- Moderate/low intensity land use
- Relatively undisturbed
- Wetland units
- Approx. 1-km buffer

Figure 5. Screen-capture of 303(d) listed waters in basin - D3.1, D3.2

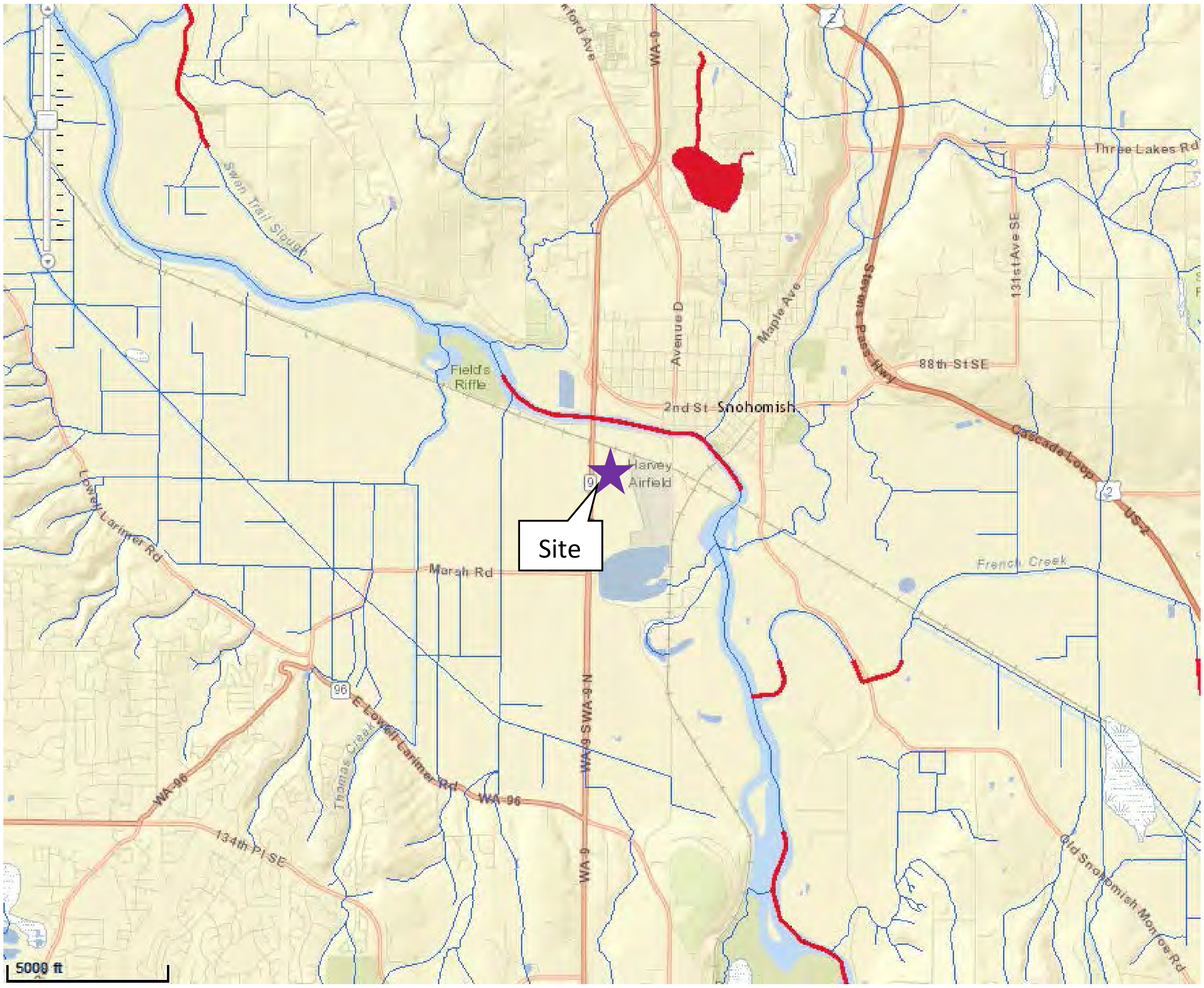
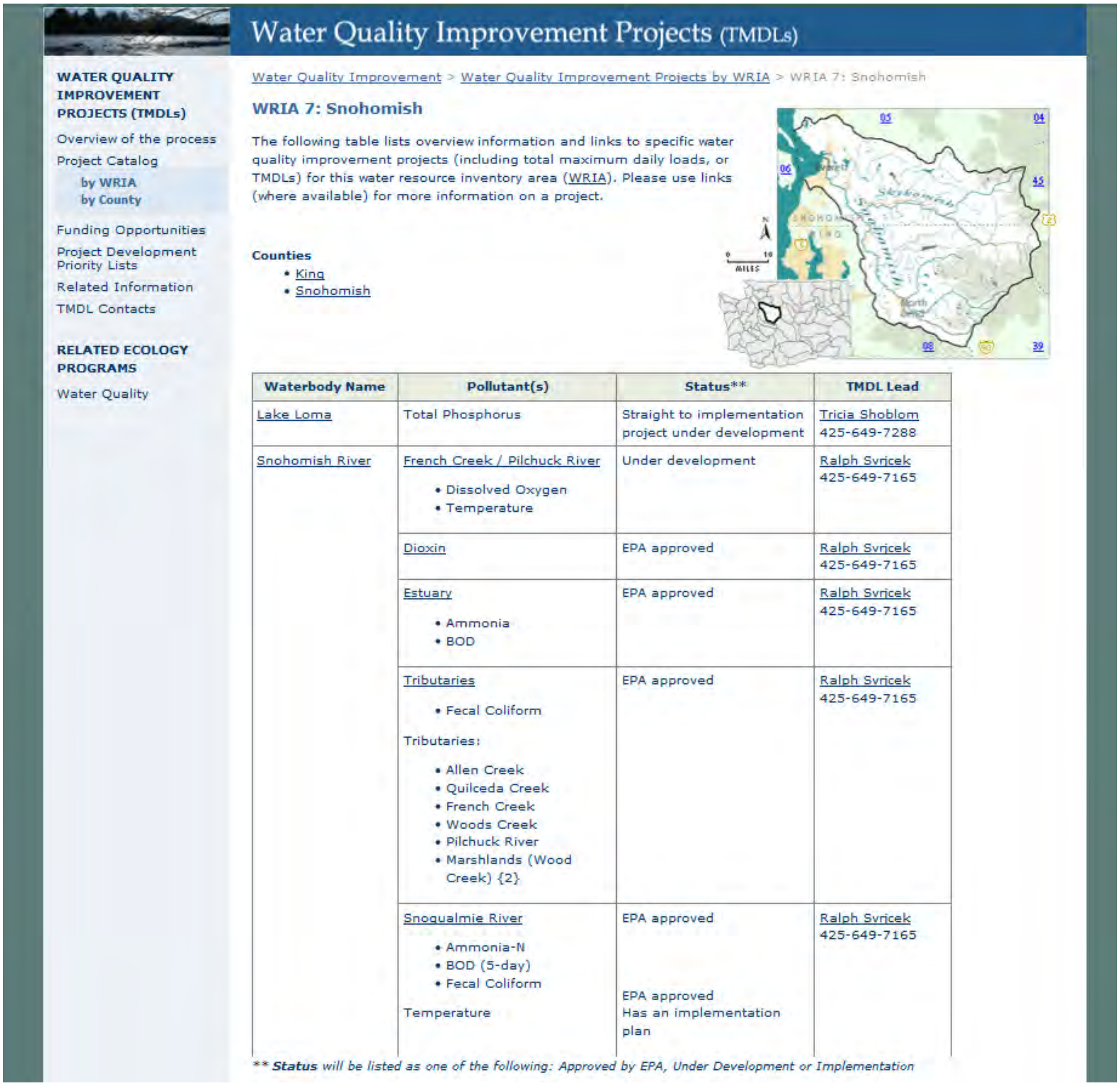


Figure 6. Screen-capture of TMDL list for WRIA in which unit is found - D3.3



Water Quality Improvement Projects (TMDLs)

WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

- Overview of the process
- Project Catalog
  - by WRIA
  - by County
- Funding Opportunities
- Project Development Priority Lists
- Related Information
- TMDL Contacts

RELATED ECOLOGY PROGRAMS

- Water Quality

Water Quality Improvement > Water Quality Improvement Projects by WRIA > WRIA 7: Snohomish

WRIA 7: Snohomish

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.

Counties
- King
- Snohomish

Waterbody Name	Pollutant(s)	Status**	TMDL Lead
Lake Loma	Total Phosphorus	Straight to implementation project under development	Tricia Shoblom 425-649-7288
Snohomish River	French Creek / Pilchuck River • Dissolved Oxygen • Temperature	Under development	Ralph Svrjcek 425-649-7165
	Dioxin	EPA approved	Ralph Svrjcek 425-649-7165
	Estuary • Ammonia • BOD	EPA approved	Ralph Svrjcek 425-649-7165
	Tributaries • Fecal Coliform Tributaries: • Allen Creek • Quilceda Creek • French Creek • Woods Creek • Pilchuck River • Marshlands (Wood Creek) {2}	EPA approved	Ralph Svrjcek 425-649-7165
	Snoqualmie River • Ammonia-N • BOD (5-day) • Fecal Coliform Temperature	EPA approved EPA approved Has an implementation plan	Ralph Svrjcek 425-649-7165

** *Status will be listed as one of the following: Approved by EPA, Under Development or Implementation*

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APPENDIX J

PAC AIRPORT MASTER PLAN UPDATE

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Foundation for the Future

Airport Master Plan Update

June 15, 2017

JVIATION®

www.harveyfield.com

Airport Master Planning

The Master Plan is a ***20-year plan*** to understand the needs of current and future users of the Airport. This is important to ensure that ***safe and orderly development*** of the Airport occurs in a manner that is ***reflective of community values and goals***. This plan is developed through a ***purposeful, inclusive, and educational process***.

Key Features

- Planning is not prejudicial or constrained – *no predetermined outcomes*
- Plan must be based on current conditions, community input, FAA design standards, and forecasts

Master Plan Process

MASTER PLAN PROCESS

INVESTIGATION
- Pre-Planning
- Inventory
- Forecasts and Planning Activity Levels
- Facility Requirements

PREPARATION

SOLUTIONS
- Alternatives Analysis
- Contingency Scenario Development
- Identification of Preferred Alternatives

EVALUATION

IMPLEMENTATION
- Financial Planning
- Improvement Plan (CIP)
- Final Master Plan Documentation
- Airport Layout Plan (ALP)

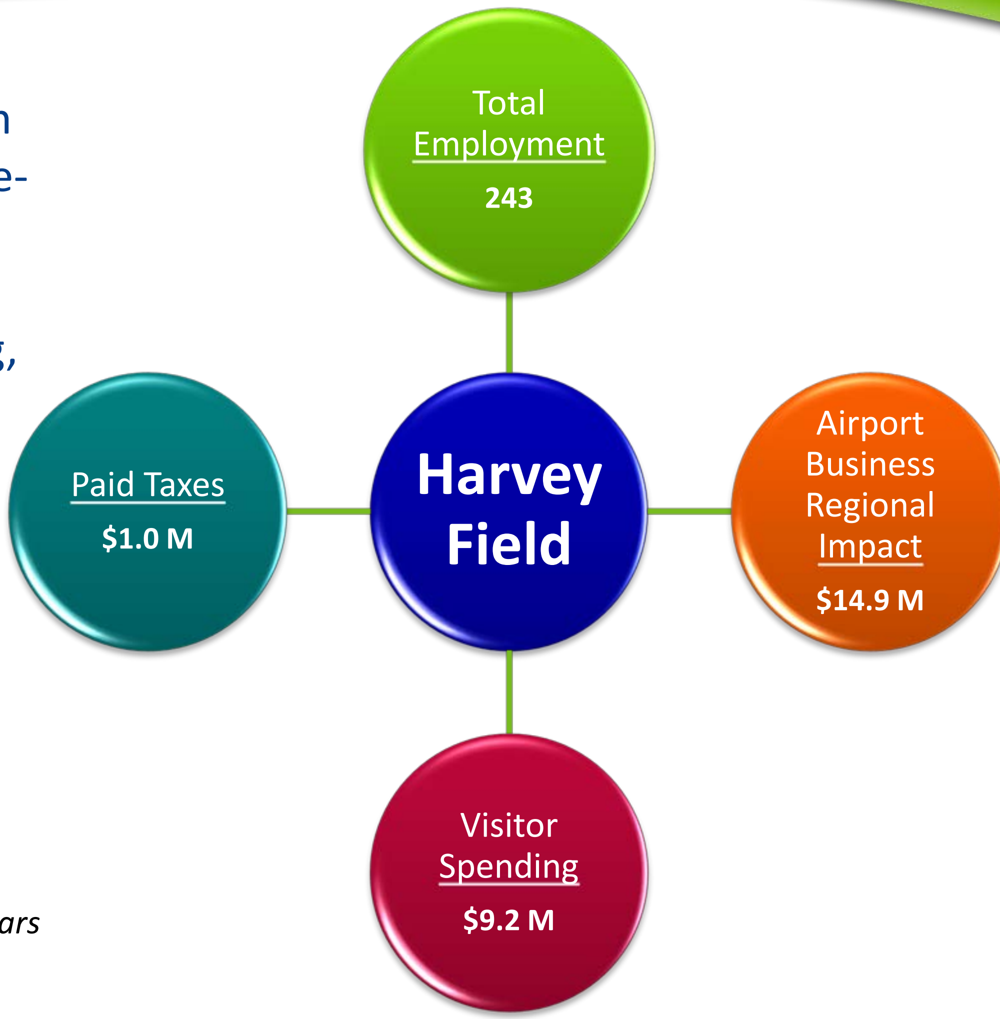
DOCUMENTATION

P U B L I C O U T R E A C H

Airport Economic Impact – 2012 WSDOT Economic Impact Data

Multiplier Effect:

Initial economic impacts from Airport enter economy and re-circulate which generate successive rounds of employment, taxes, spending, and output.



Note: All impacts are shown in 2010 dollars

Outreach

- Planning Advisory Committee
- Website
- Public Open Houses
- Government Briefings
- Focus Groups (Stakeholders)
  - Pilot Group
  - Business Group
  - Noise
  - Floodplain/Hydrology

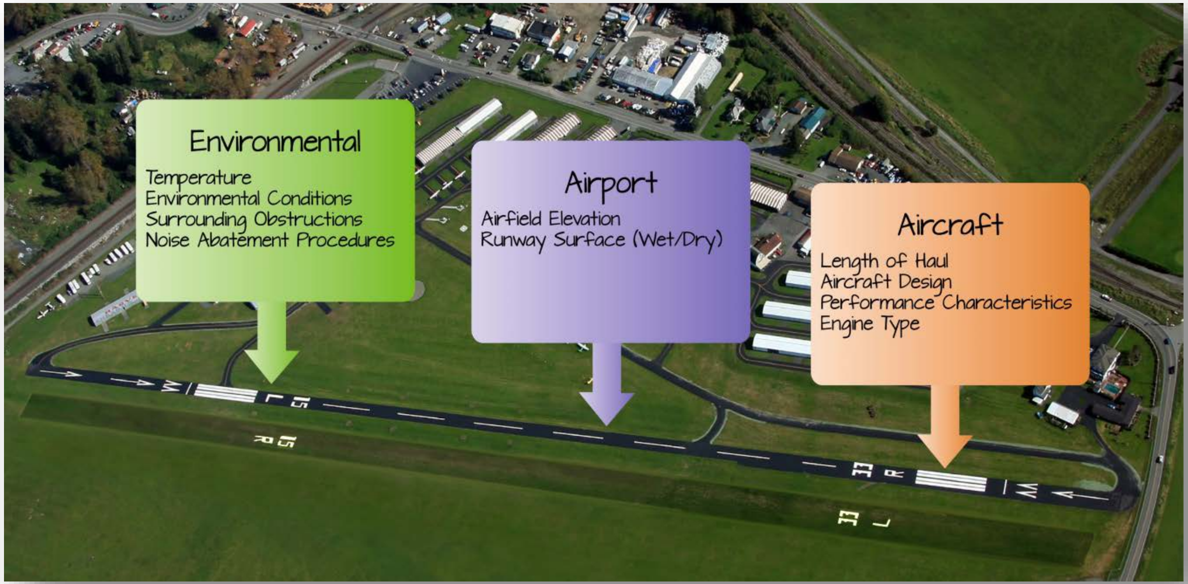
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Airport Overview

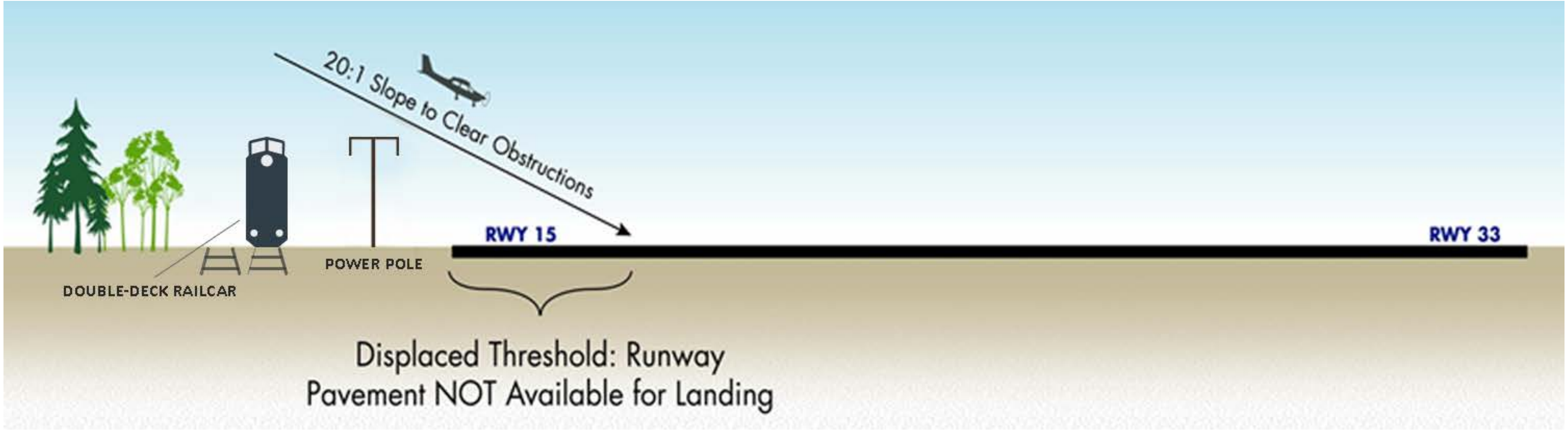
Runway Length

- **Current Runway Length, Width, & Orientation:**
- 15L/33R - 2,671 feet x 36 feet
- Displaced Thresholds:
  - Runway 15 – 452’ to south
  - Runway 33 – 241’ to north

A displaced threshold is a runway threshold located at a point other than the physical beginning or end of the runway. The portion of the runway so displaced may be used for takeoff but not for landing.



Displaced Threshold



HARVEY FIELD AIRPORT
SNOHOMISH, WA

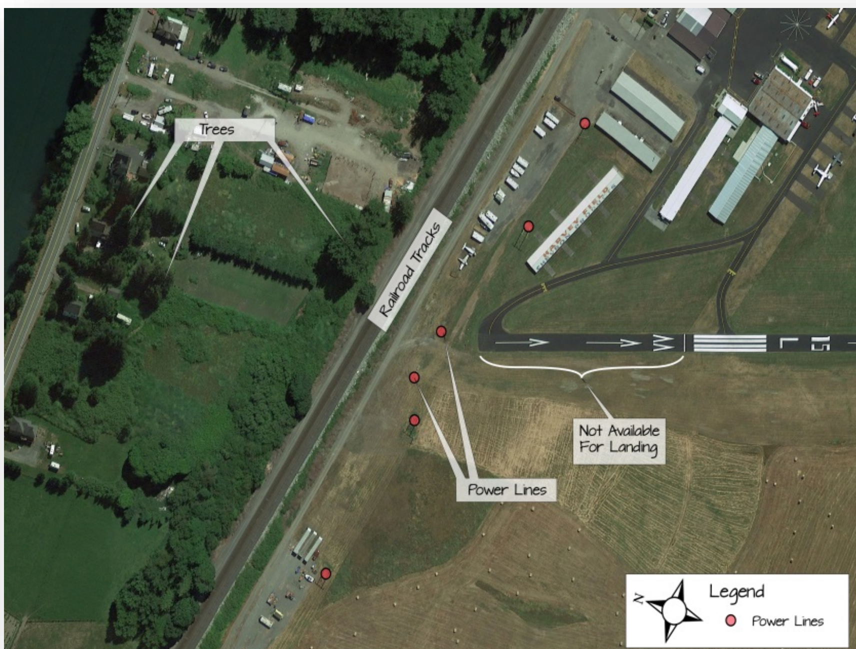
Obstructions – Reason for Displaced Thresholds

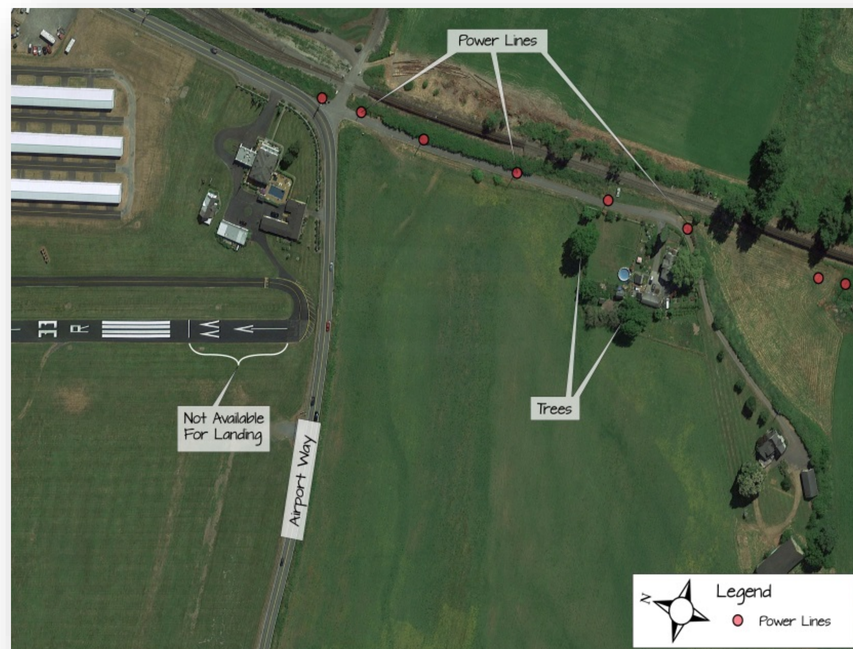
Runway 15L

- Railroad tracks
- Power Lines
- Trees

Runway 33R

- Airport Way
- Power Lines
- Trees





JVIATION

Where We Are Today

- Snohomish County Code (SCC) regarding Density Fringe have been a driving factor since we last met
- Priority has been to resolve safety issues of:
  - Runway Displaced Thresholds
    - Current 2671' runway provides ***useable*** runway length of 2219' for landing to the south and 2430' for landing to the north
    - Full runway length is available for departures
  - Airport Way
    - Current roadway alignment is in the runway protection zone and FAA recognizes it as a safety concern

Recommendation

- To meeting SCC regulations and meet FAA safety standards, our recommendation is a 2400' x 75' runway and a relocation of Airport Way
- This solution serves Harvey Field's existing aircraft fleet mix, improves aviation safety and improves roadway safety
- ***Now, how we got here and what it means….***

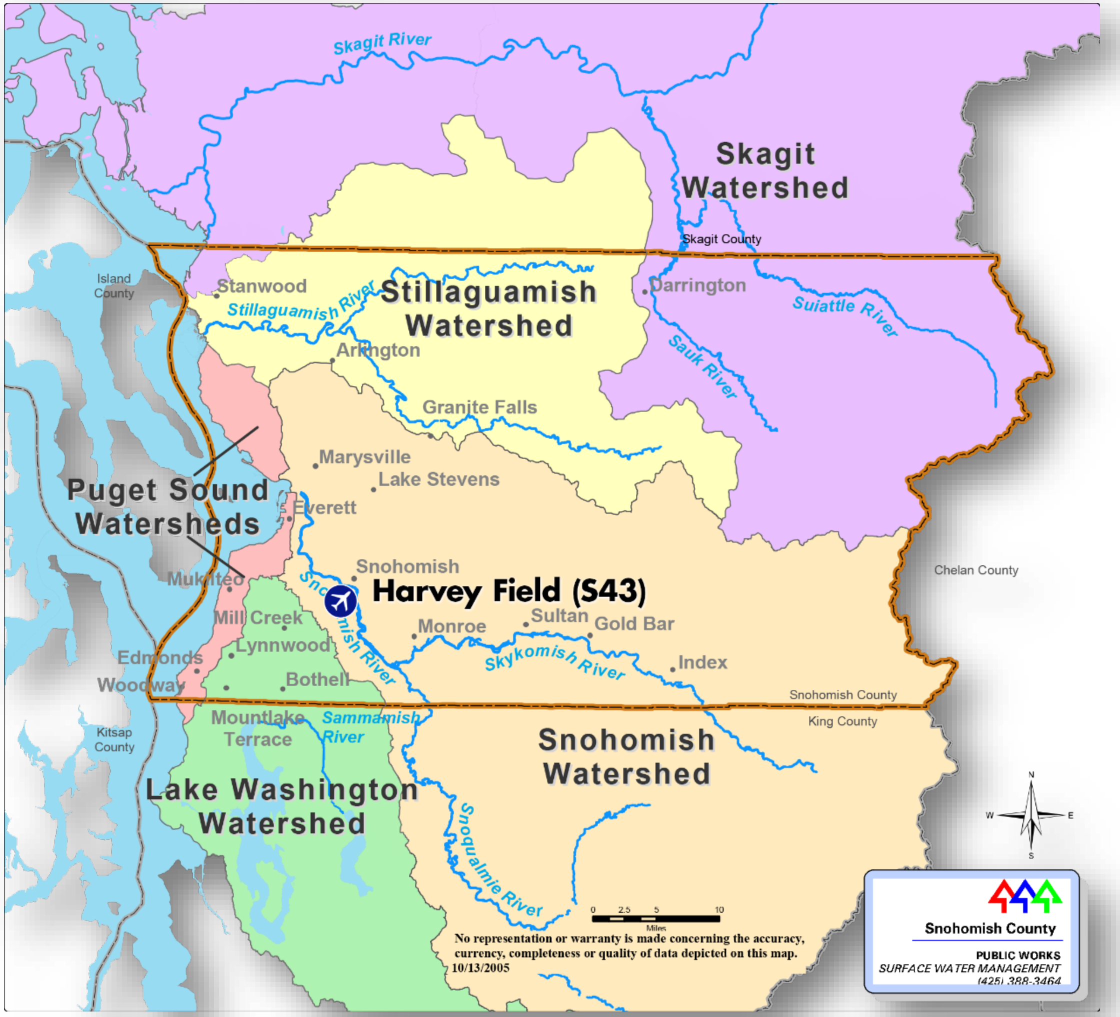
Environmental Inventory

Environmental Categories Inventoried for Harvey Field

- ✓ Air Quality
- ✓ Coastal Resources
- ✓ Compatible Land Uses
- ✓ Construction Impacts
- ✓ Department of Transportation Act 4(f)
- ✓ Farmlands
- ✓ Fish, Wildlife, and Plants
- ✓ Floodplains
- ✓ Hazardous Material, Pollution Prevention, and Solid Waste
- ✓ Historical, Architectural, Archaeological, and Cultural Resources
- ✓ Light Emissions and Visual Impacts
- ✓ Noise
- ✓ Secondary (Induced) Impacts
- ✓ Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks
- ✓ Wetlands
- ✓ Wild and Scenic Rivers

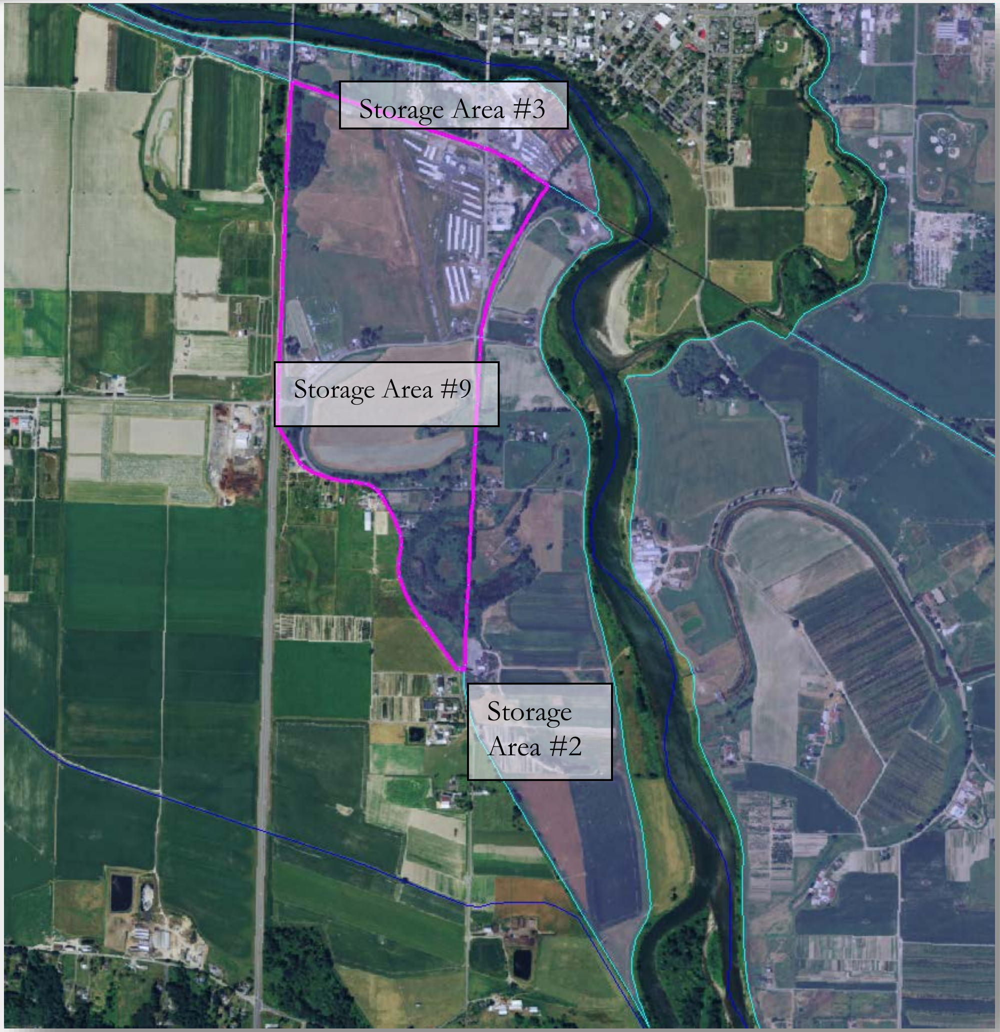
Prior to the construction of any improvement, projects must undergo required local, state and/or federal environmental review and approval processes

Snohomish County Watersheds

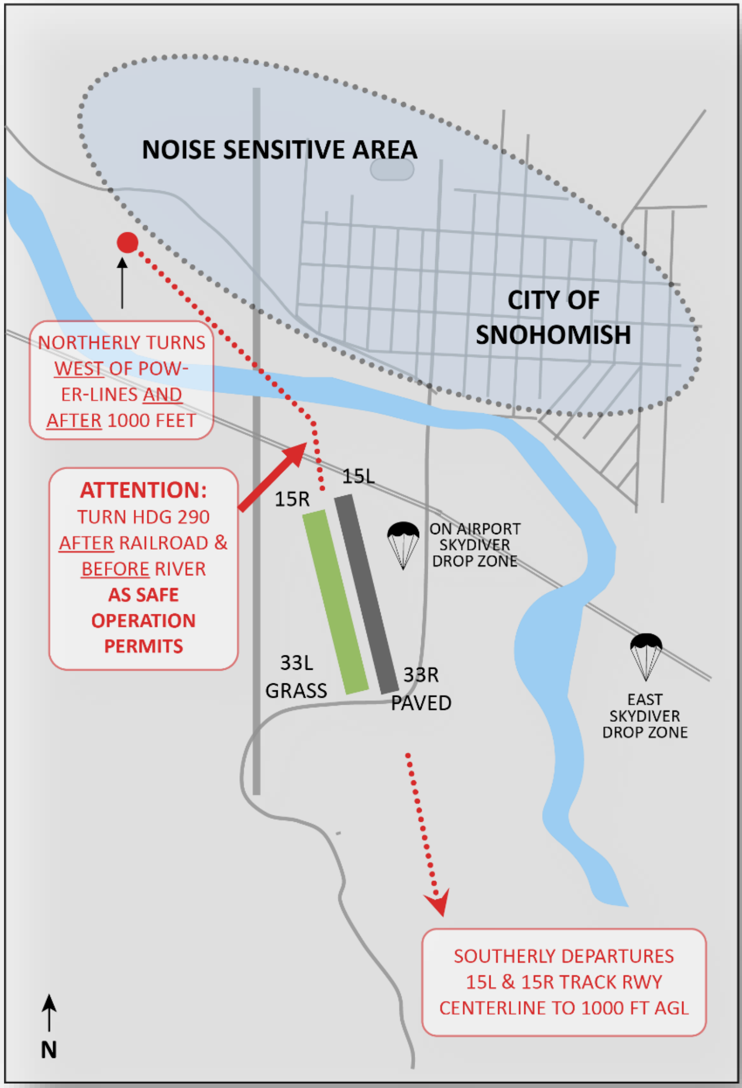


HARVEY FIELD AIRPORT
SNOHOMISH, WA

Snohomish River Storage Area Map



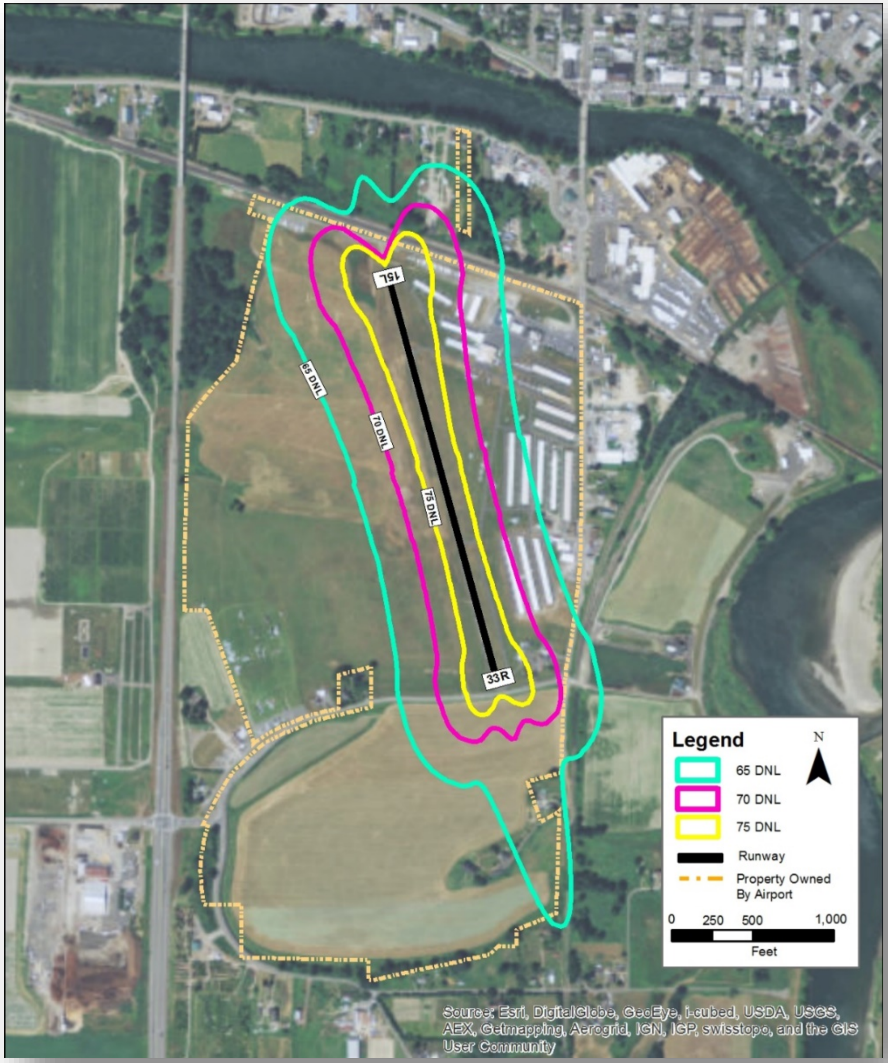
Noise Abatement Procedures



- Long-standing procedures in place at Harvey Field
- Ongoing pilot education
- Noise Hotline -
  - 360-568-1541, ext. 261
- Information at www.harveyfield.com

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Existing Noise Contours



Alternatives Evaluation

Time to Find Workable Options

- Local & FAA standards and regulations
- Planning and engineering standards
- Environmental and floodplain regulations

HARVEY FIELD AIRPORT
SNOHOMISH, WA

FAA Safety Standards for Aircraft Currently at Harvey Field

RUNWAY DESIGN CODE (RDC)

FREQUENT FLYERS AT S43


Cessna Caravan 208B


DeHavilland DHC-2 Beaver


DeHavilland Twin Otter (DHC-6)


TBM 700


Quest Kodiak


KingAir 200

Design Goals

- Airport Way Road Improvement
  - ✓ Build on Airport Property
  - ✓ Build at safe distance from Runway
  - ✓ Meet Density Fringe requirements
  - ✓ Meet FEMA's requirement for base flood elevation (BFE) impact
  - ✓ Meet Snohomish County Road Standards
  - ✓ Improve substandard curves and shoulder widths
  - ✓ Avoid wetlands
- Runway
  - ✓ Serve same aircraft as now
  - ✓ Build at safe distance from Airport Way
  - ✓ Meet Density Fringe and FEMA BFE requirements
  - ✓ Clear approaches over BNSF, Airport Way, and power lines

Evaluation Criteria

SAFETY & OPERATIONAL FACTORS

Ability to safely accommodate future demand aircraft

Safety for vehicles on Airport Way

Evaluated based on anticipated improvements to address:

- Operational safety
- Capacity and delay
- Tenant convenience
- Ability to meet FAA design standards

ENVIRONMENTAL FACTORS

FAA Order 1050.1E

Potential physical impacts to surrounding community

Ability to meet County planning and environmental standards

ECONOMIC CONSIDERATIONS

Historic infrastructure investment

Remaining useful life of existing facilities

Anticipated project costs

Property acquisition requirements

Cost-effectiveness evaluation

Economic impact

IMPLEMENTATION FEASIBILITY

Tangible factors

- Practicality of implementation

Intangible factors

- Community values
- Political environment

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Density Fringe Area: Max Allowable Obstruction SCC 30.65.255

The maximum width (sum of widths) of all new construction, substantial improvements or other development ***shall not exceed 15 percent*** *of the length of a line drawn perpendicular to the known floodwater flow direction at the point where the development(s) is located. The length of said line shall not extend beyond the property boundary or the edge of the density fringe area, whichever is less. The limitations of this section shall not apply to those uses listed in SCC 30.65.260.*

- All of Harvey Field property is within the Density Fringe
- New construction is Fill – anything that diverts or blocks Flood flows
- Sum of Fill widths / Total property width = 15% or less

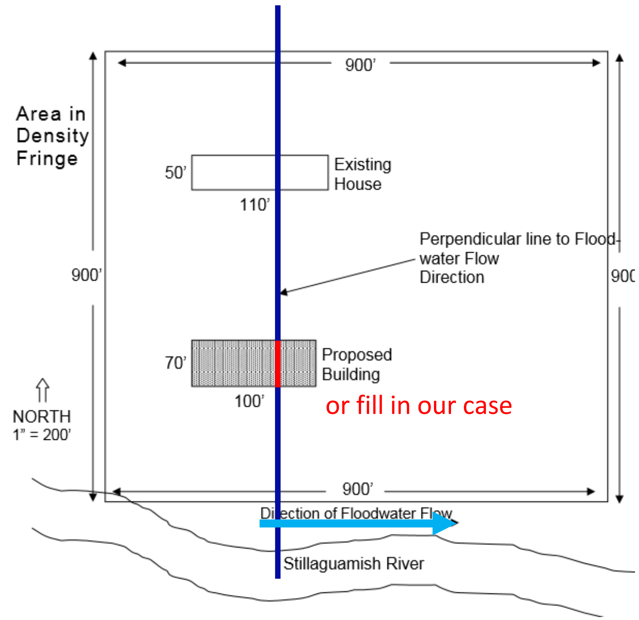
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Density Fringe: Max Allowable Obstruction SCC 30.65.255

Example: Flow Obstruction and Blockage Calculations

Example from County Flood Permit Application:

- Determine the general floodplain flow direction
- Draw a line perpendicular to the flow direction
- Draw the line where it intersects the largest width of new construction as a percentage of property width.
- Sum of Fill widths/Total property width must be less than 15%



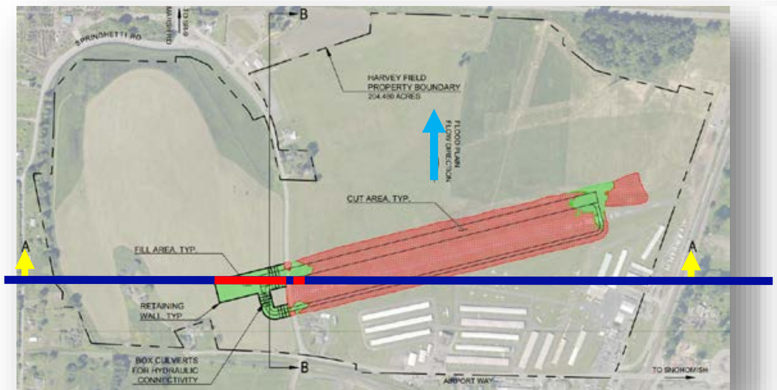
900' property width

70' new obstruction width

70'/900' = 7.8% < 15 %

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Flow Obstruction/Blockage Calculations



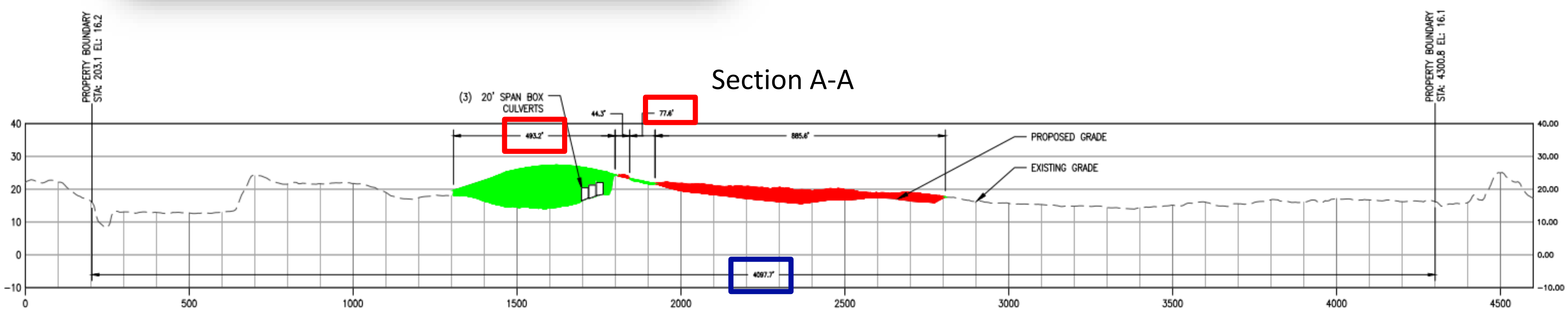
SECTION A–A		
FEATURE	WIDTH	% OF PROPERTY WIDTH
PROPERTY WIDTH	4097.7'	–
NEW FILL	570.8'	13.9%
NEW CUT	929.9'	22.7%
CULVERT OPENINGS	60.0'	1.5%
FILL – CULVERTS	510.8'	12.5%

4098' property width

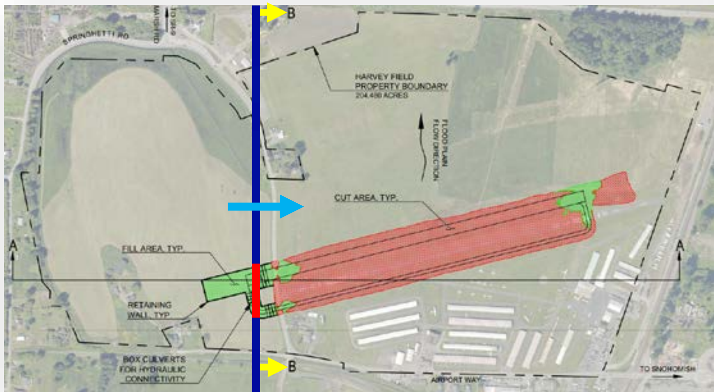
571' new obstruction width

571'/4098' = 13.9% < 15 %

Section A-A



Flow Obstruction/Blockage Calculations

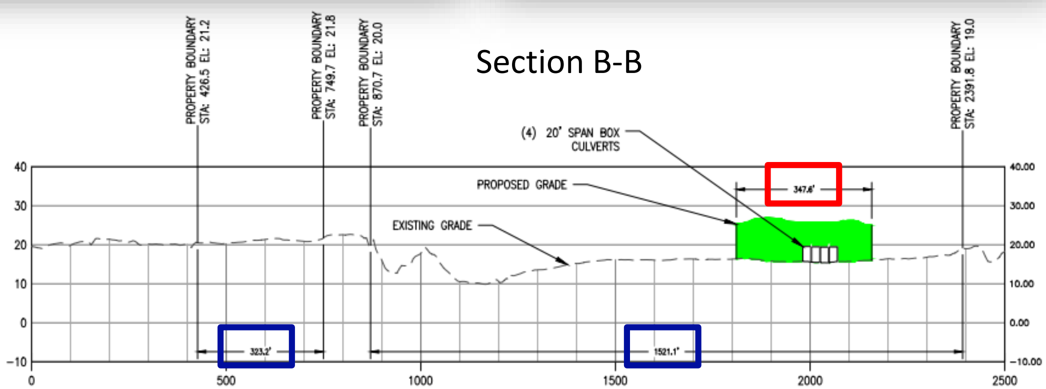


SECTION B–B		
FEATURE	WIDTH	% OF PROPERTY WIDTH
PROPERTY WIDTH	1844.3'	–
NEW FILL	347.6'	18.8%
NEW CUT	0.0'	0.0%
CULVERT OPENINGS	80.0'	4.3%
FILL – CULVERTS	267.6'	14.5%

1844’ property width
348’ new obstruction width less 80’ culvert opening areas from new obstruction width = 268’

348’-80’ = 268’

268’/1844’ = 14.5% < 15%



Section B-B

Density Fringe Area: Max Allowable Density SCC 30.65.250

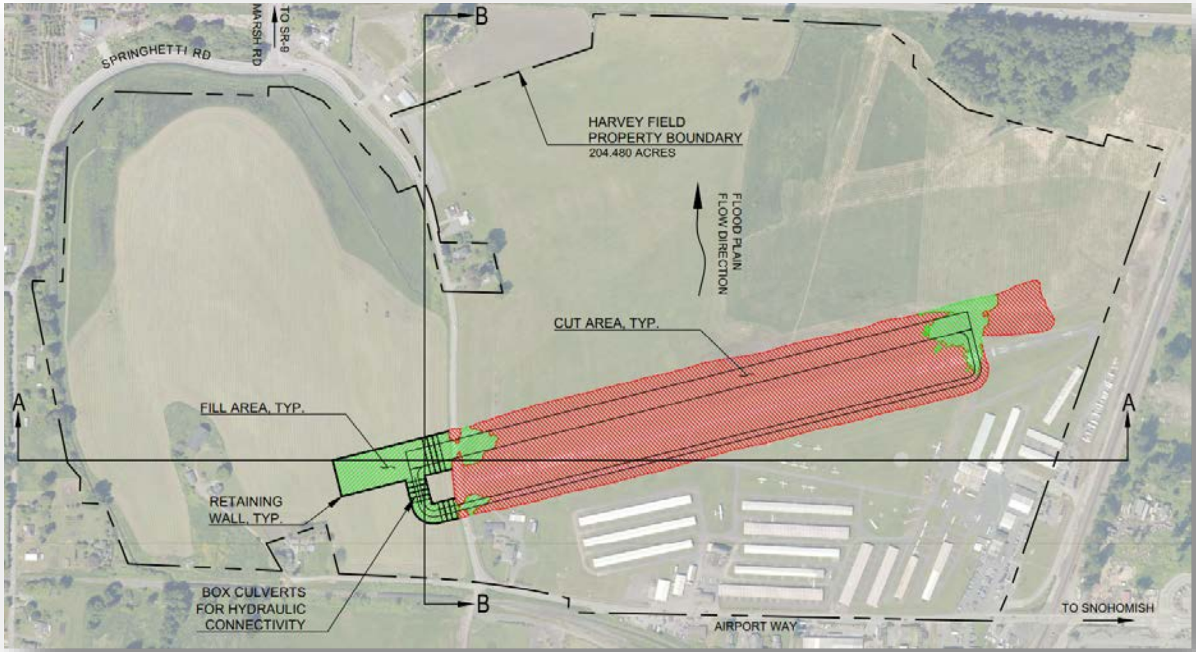
The land area occupied by any use or development permitted by this chapter located in the density fringe area that will displace floodwaters shall not exceed ***two percent*** *of the land area of that portion of the lot. The limitations of this section shall not apply to those uses listed in SCC 30.65.260.*

What does 2% mean with regard to Harvey Field?

- Current flood maps indicate that BFE is 26.63'
- Virtually all of Harvey Field is lower than 26.63'…so SCC applies everywhere
- 2% of 204.48 (Harvey Field property) = 4.090 acres
- 2% Area limit *does NOT apply* to public uses, such as roads, specifically, Airport Way (*SCC 30.65.260)*
- *However, FEMA's BFE requirement*

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Fill & Cut Area Calculations



Green = Fill Area
Red = Cut Area

CUT/FILL AREAS			
FEATURE	AREA (AC.)	% OF PROPERTY AREA	VOLUME (CU. YD.)
HARVEY FIELD PROPERTY	204.480	–	–
NEW FILL	3.927	1.92%	33,940
NEW CUT	18.872	9.23%	57,760
CULVERT OPENINGS	0.448	0.22%	2,890
FILL – CULVERTS	3.479	1.70%	31,050

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Density Fringe Area: Exceptions to Max Allowable Density & Obstruction Limits SCC 30.65.260

*The following uses shall **be exempt** from the maximum allowable density and obstruction limitations of SCC 30.65.250 and 30.65.255:*

(1) Water-dependent utilities; (2) Dikes; (3) Utility facilities; and (4) **Public Works**, when the project proponent demonstrates that the floodwater displacement effects of the proposal when considered together with the maximum potential floodwater displacement allowed by SCC 30.65.250 and 30.65.255 shall not cause a cumulative increase in the base flood elevation of more than one foot.

Snohomish County confirmed ***"Public Works"*** includes Airport Way as a public road

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Density Fringe Area: Exceptions to Max Allowable Density & Obstruction Limits SCC 30.65.260

"...demonstrates that the floodwater displacement effects of the proposal when considered together with the maximum potential floodwater displacement allowed by SCC 30.65.250 and 30.65.255"

- Base Flood = the 100-year flood elevation, as shown on the current FEMA Flood Insurance Rate Maps (FIRMs)
- Floodwater displacement means that for every piece of material placed in construction of the road will take up some space that was previously available for water storage or conveyance during a flood.
- Road relocation floodwater displacement calculation assumes that the maximum 2% area and 15% blockages will eventually occur on all properties located in the floodplain.
- WEST Consultants ran the same model including all of the proposed improvements (Runway, Taxiway, and Airport Way).
- SCC only requires BFE modeling for Public Works projects, i.e. Airport Way.
- ***Our approach included road, runway, and taxiway improvements.***
- ***The model shows an 0.00' rise in the base flood elevation.***

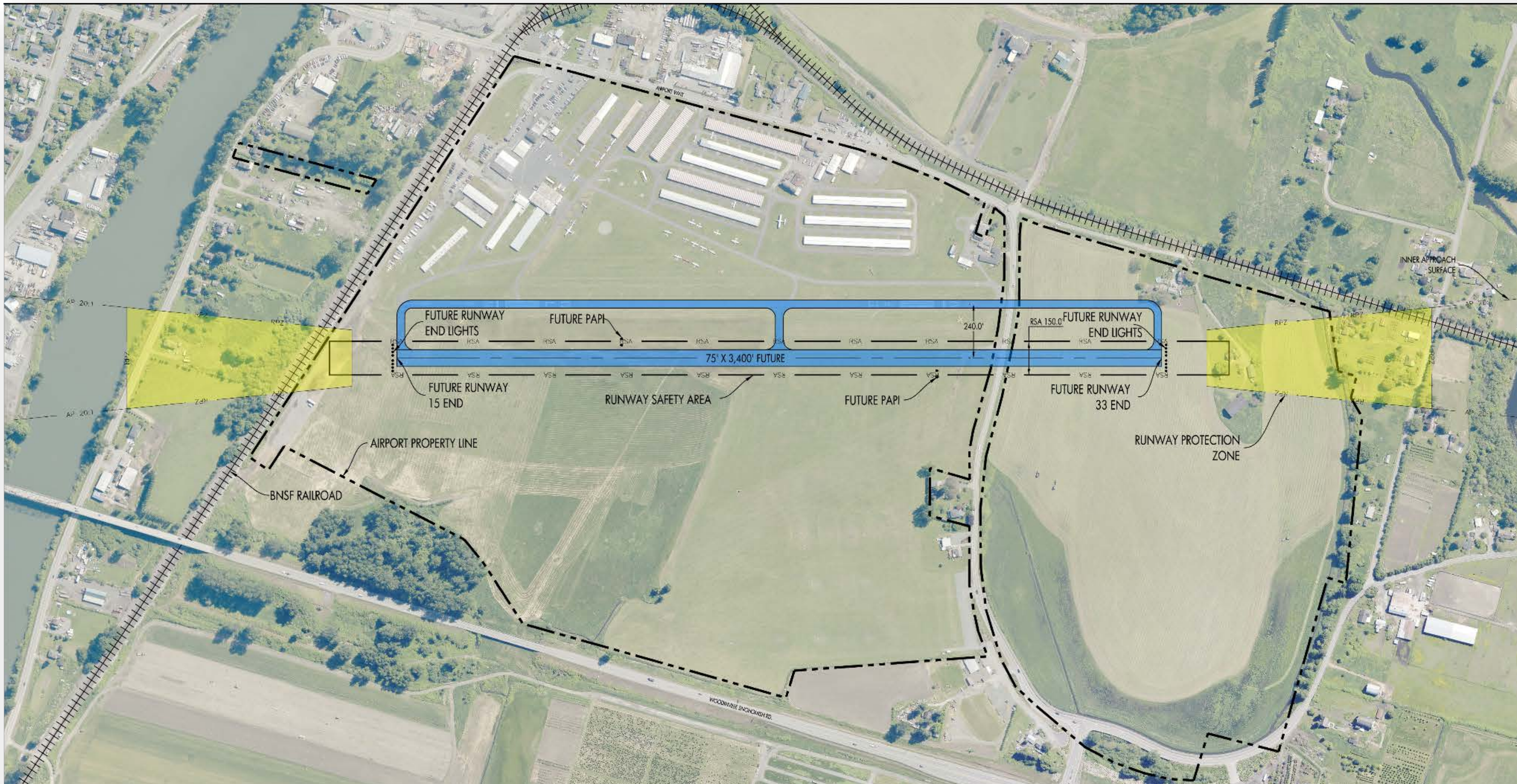
Alternatives

HARVEY FIELD AIRPORT
SNOHOMISH, WA

Airport Way Relocation Options

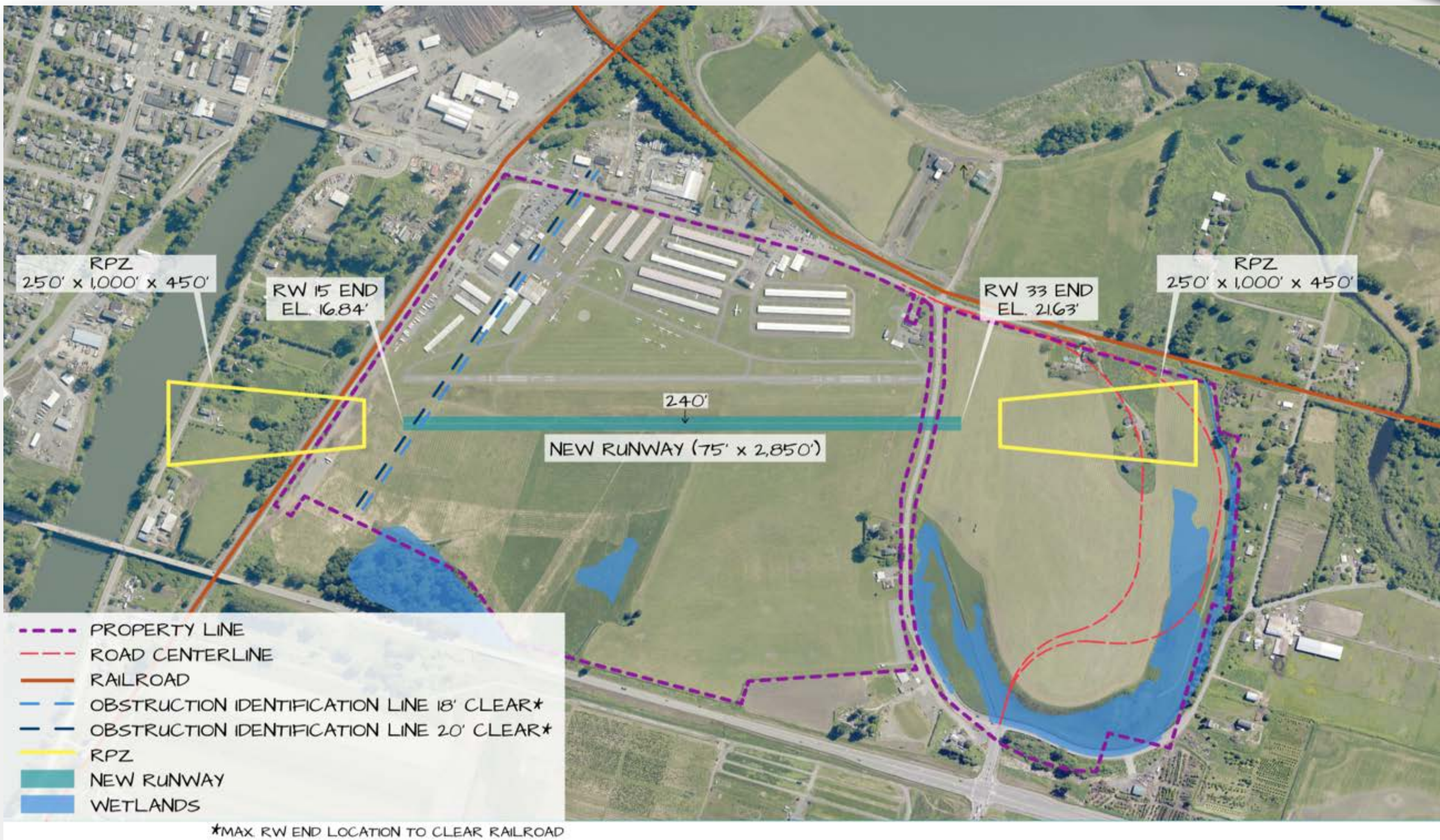
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Alternative 1: New 3,400-foot Runway Using Existing Runway as Taxiway



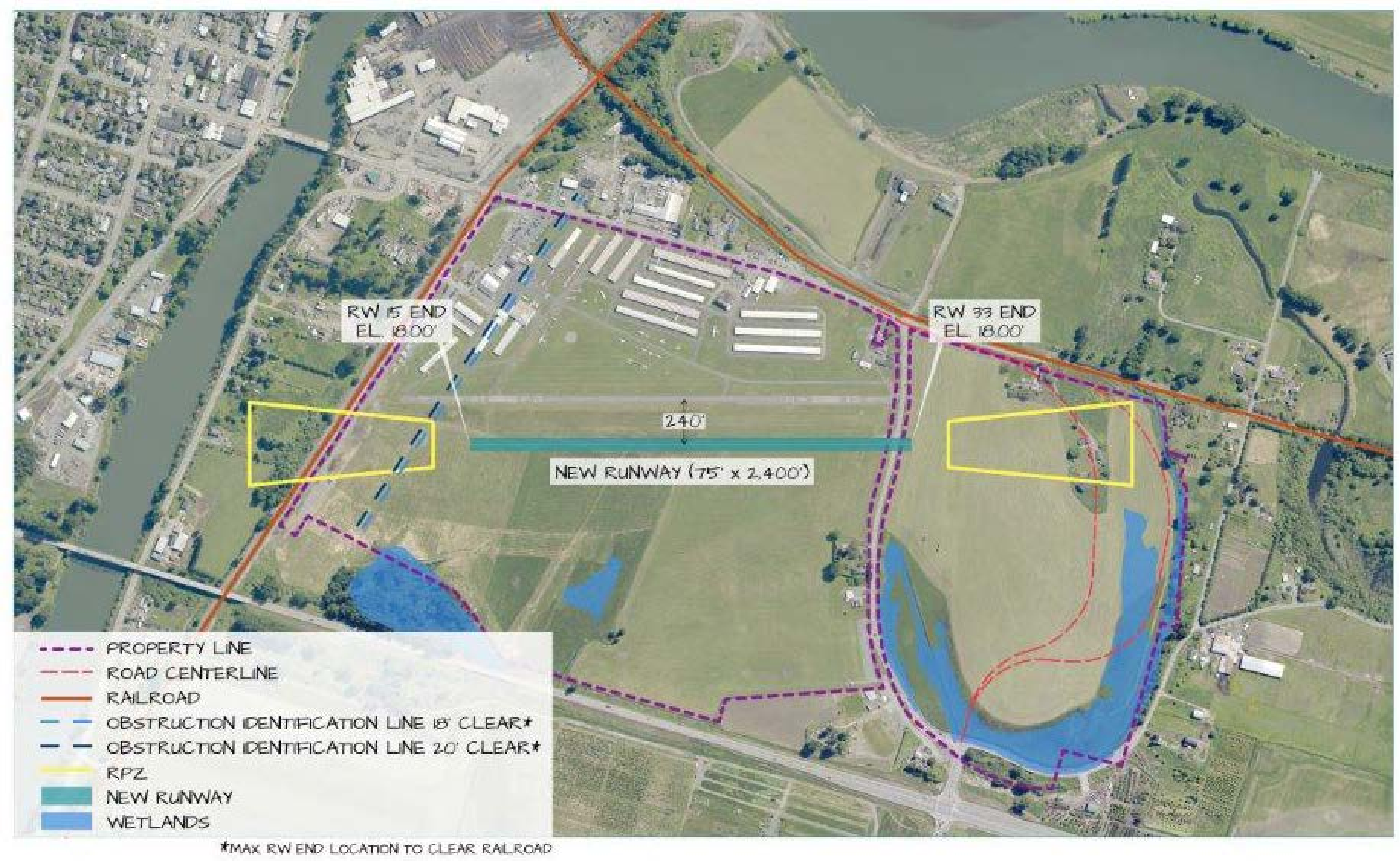
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Alternative 1A: New 2,850 Runway Using Existing Runway as Taxiway



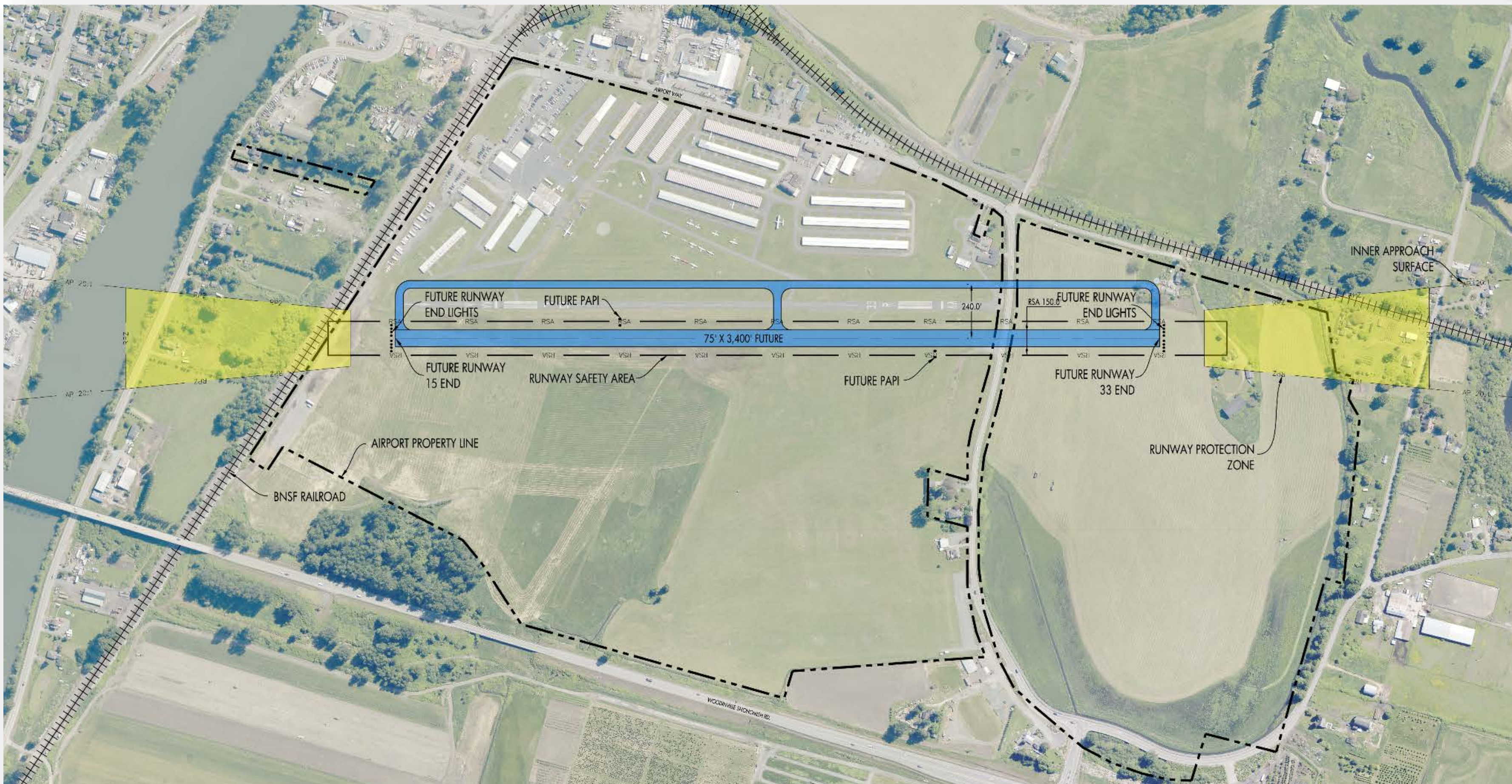
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Alternative 1B: New 2,400-foot Runway Using Existing Runway as Taxiway



HARVEY FIELD AIRPORT
SNOHOMISH, WA

Alternative 2: New 3,400-foot Runway and Taxiway



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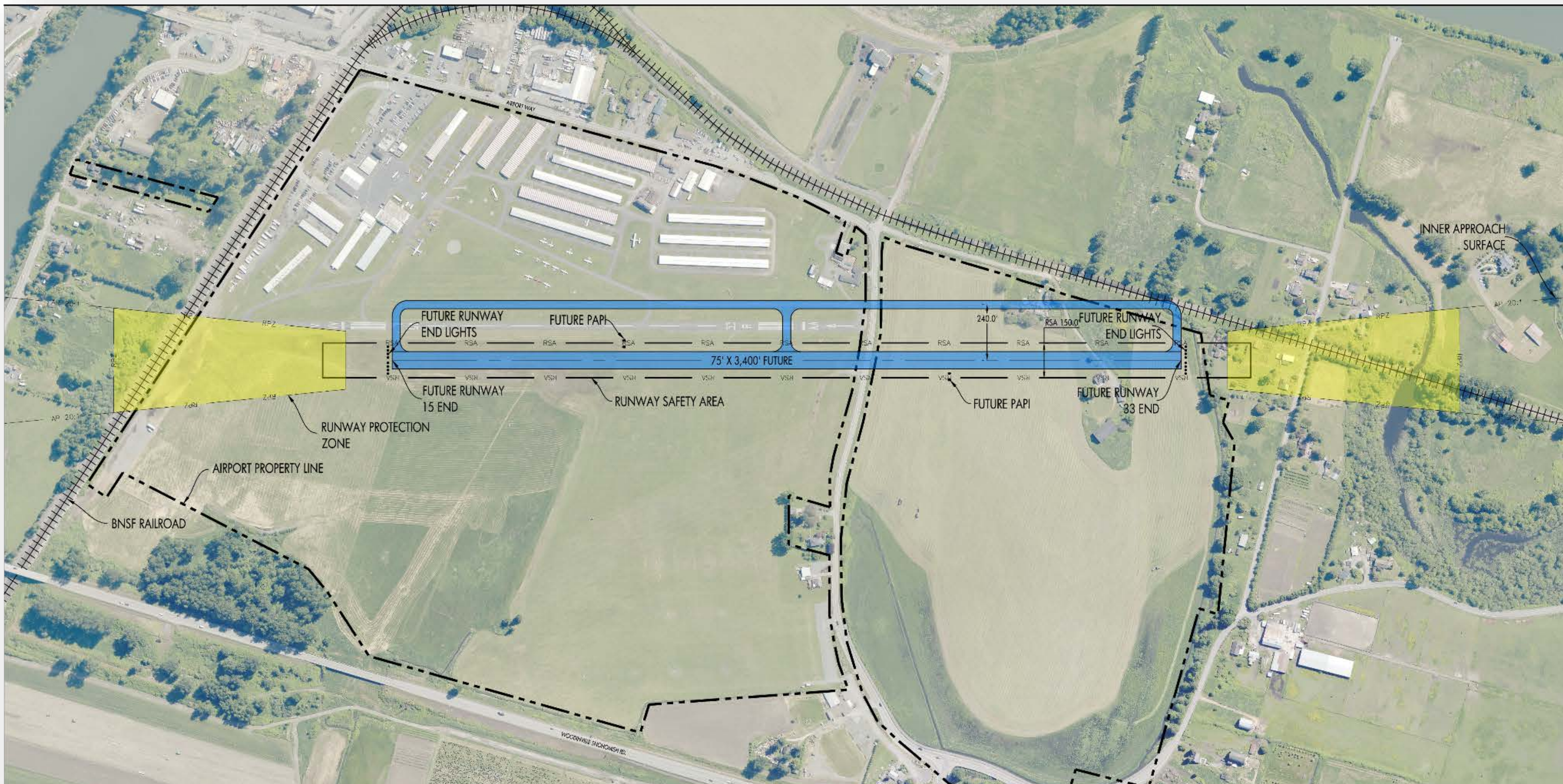
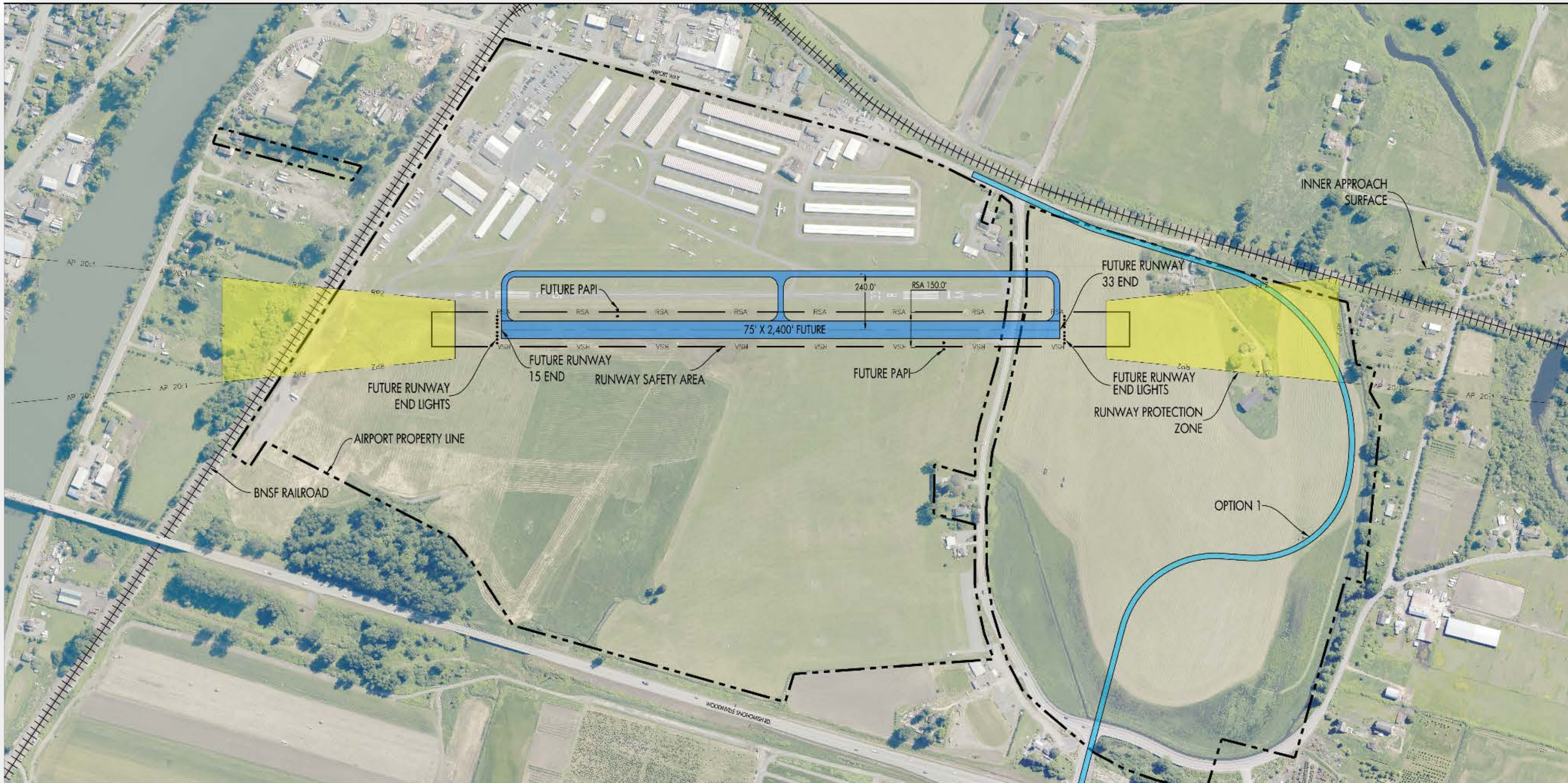
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Alternative 3: New 3,400-foot Runway and Move Airport Way South

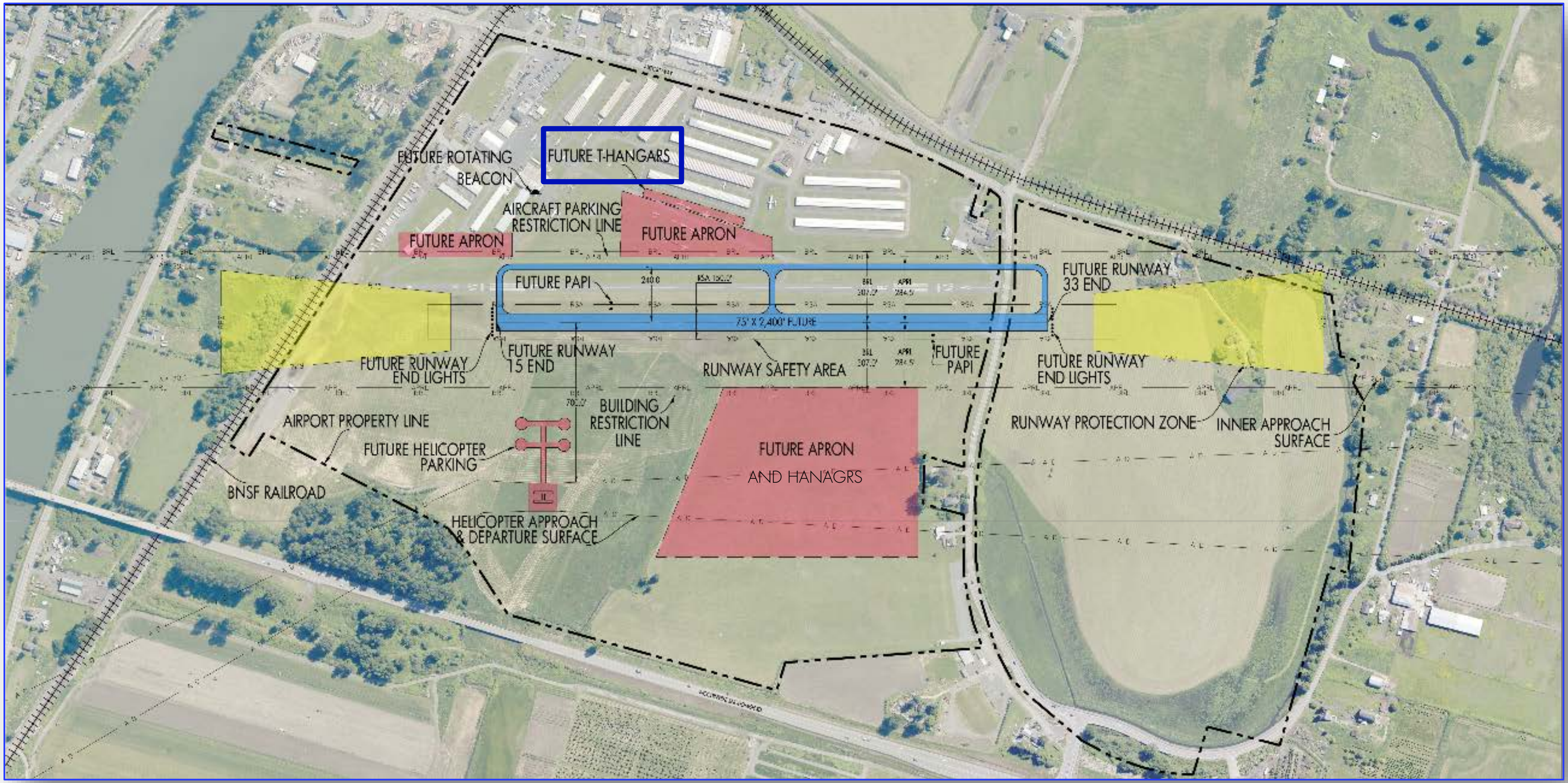


Alternative 4: New 2,400-foot Runway and Move Airport Way South



HARVEY FIELD AIRPORT
SNOHOMISH, WA

Conceptual Development Plan



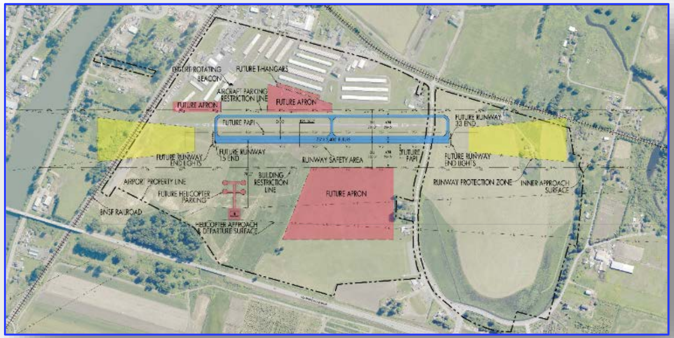
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Summary of Runway Alternatives

Option	No Action	Alternative 1: New 3,400-ft Rwy & Use Existing Rwy as Twy	Alternative 2: New 3,400-ft Rwy & New Twy	Alternative 3: New 3,400-ft Rwy & Move Airport Way South	Alternative 4: New 2,400-ft Rwy & Move Airport Way South
Description	Existing runway remains	New 3,400-ft Rwy 15/33 240' west of existing Rwy15L/33R	New 3,400-ft Rwy 15/33 240' west of existing partial parallel twy	New 3,400-ft Rwy 15/33 660' south of BNSF & relocated Airport Way	New 2,400-ft Rwy 15/33 & relocated Airport Way
Advantages	– No cost – Meets density fringe requirements	– Meets runway length requirements for design category fleet – Re-uses existing runway as parallel taxiway	– Meets runway length requirements for design category fleet	– Meets runway length requirements for design category fleet	– Meets runway length requirements for existing and forecast aircraft – Meets FAA design standards – Meets SCC Density Fringe requirements – Flood water storage capacity impact less than 0.00'. Flow blockage less than 15% limit. *
Disadvantages	Does not meet key FAA runway design standards (displaced threshold on both ends, obstructions)	Exceeds SCC limits for fill in Density Fringe.	Exceeds SSC limits for fill in Density Fringe	– Exceeds SCC limits for fill in Density Fringe – Does not allow for relocated Airport Way on County ROW/Harvey property	Does not re-use existing runway pavement as parallel taxiway
Feasibility	Displaced thresholds remain	Unlikely to receive permits from Snohomish County.	Unlikely to receive permits from Snohomish County	Unlikely to receive permits from Snohomish County.	SCC Density Fringe Fill permit feasible

Recommendation

- ***Alternative 4*** (2,400 Runway) with Option 1 for Airport Way South
  - Airport Way
    - ✓ Build on Airport Property
    - ✓ Build at safe distance from Runway
    - ✓ Meet Density Fringe requirements
    - ✓ Meet Snohomish County Road Standards
    - ✓ Improve substandard curves and shoulder widths
    - ✓ Minimizes wetlands impact
  - Runway
    - ✓ Serve same aircraft as now
    - ✓ Build at safe distance from Airport Way
    - ✓ Meet Density Fringe requirements
    - ✓ Clear approach over BNSF and Airport Way



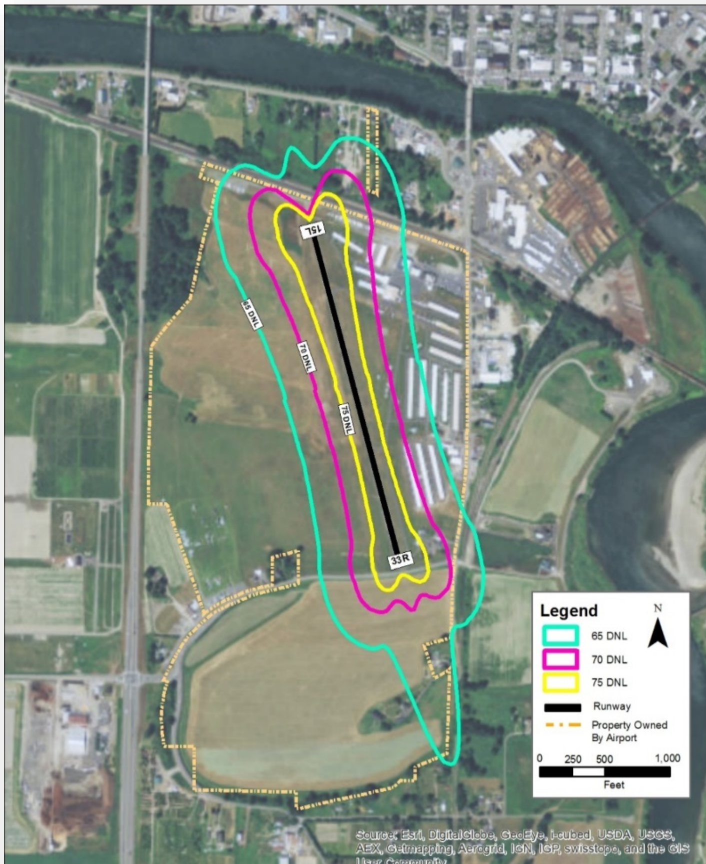
Runway

- **Current Runway Length, Width, & Orientation**
  - 15L/33R - 2,671 feet x 36 feet
  - Displaced Thresholds:
    - Runway 15 – 452’ to south
    - Runway 33 – 241’ to north
- **Recommended Alternative 4: Runway Length, Width, & Orientation**
  - 15L/33R - 2,400 feet x 75 feet
  - Clear approaches

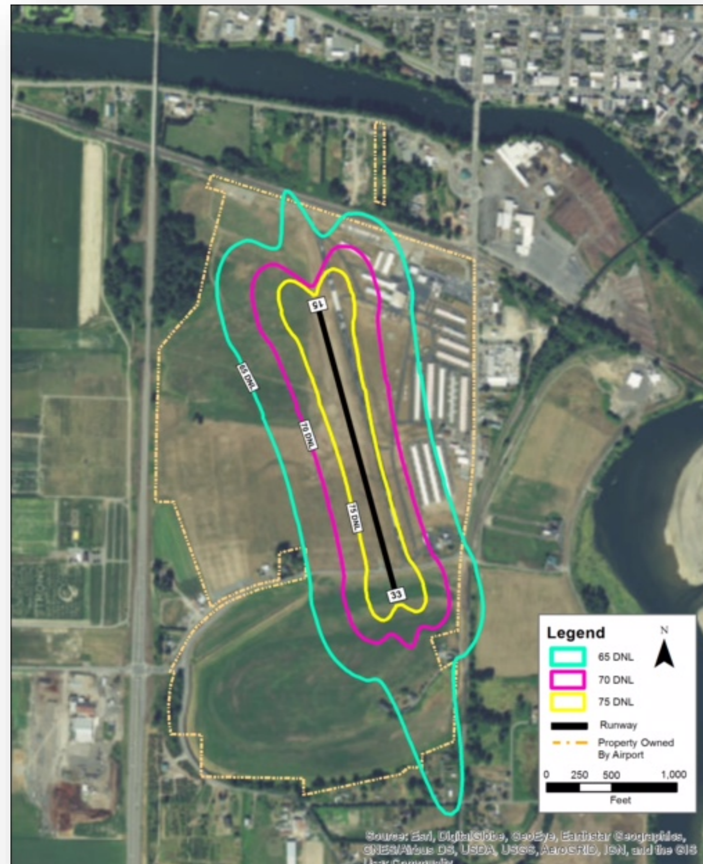
HARVEY FIELD AIRPORT
SNOHOMISH, WA

Noise Contour Comparison

- Current Contours



- Alternative 4 Contours



Per FAA guidance, residences within the 65 dnl are eligible for noise mitigation

JVIATION

Schedule & Next Steps

Next Steps

- Complete Implementation Plan
- Finalize Airport Layout Plan
- Submit documentation for County and FAA approval process

Potential Project Funding Sources

- **FAA Grants** – provide 90% of the total cost of an eligible capital project
  - FAA Airport Improvement Program grants come from Aviation Trust Fund- funded by aviation system user fees

Questions, Comments?

Chapters are on website (www.harveyfield.com)

Thank You!

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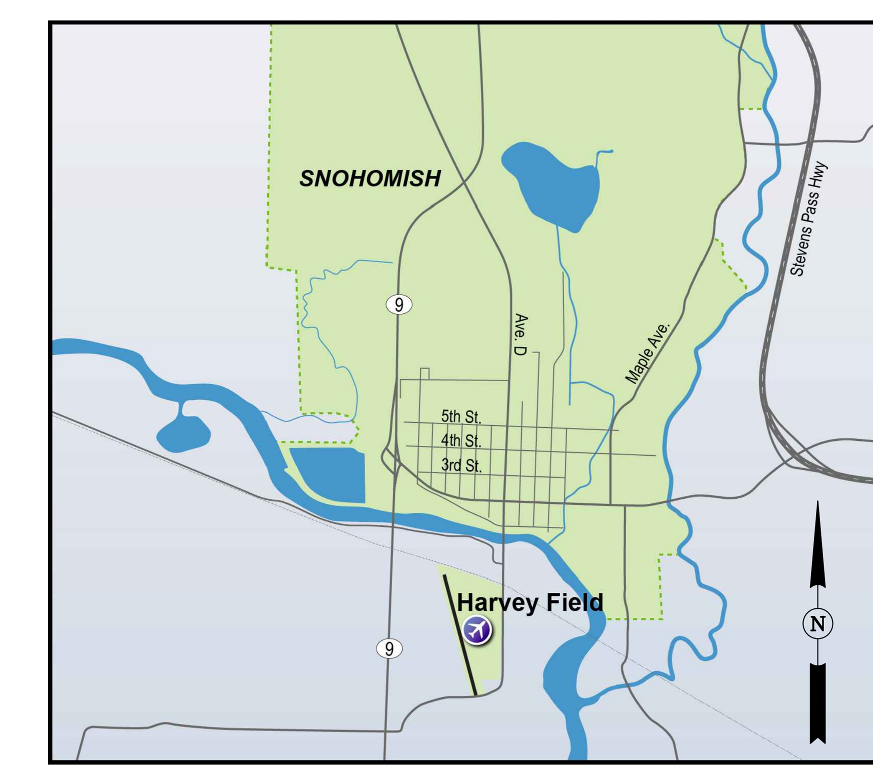
APPENDIX K AIRPORT PROPERTY MAP

HARVEY FIELD AIRPORT
SNOHOMISH, WASHINGTON

AIRPORT LAYOUT PLAN DRAWING SET
SEPTEMBER 2018

INDEX OF DRAWINGS

LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

HARVEY FIELD
SINCE 1945

SPONSOR APPROVAL

ACCEPTED: HARVEY FIELD AIRPORT

DATE

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION

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AIRPORT
LAYOUT PLAN

TITLE SHEET

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.543.01
DATE: SEPTEMBER 2018

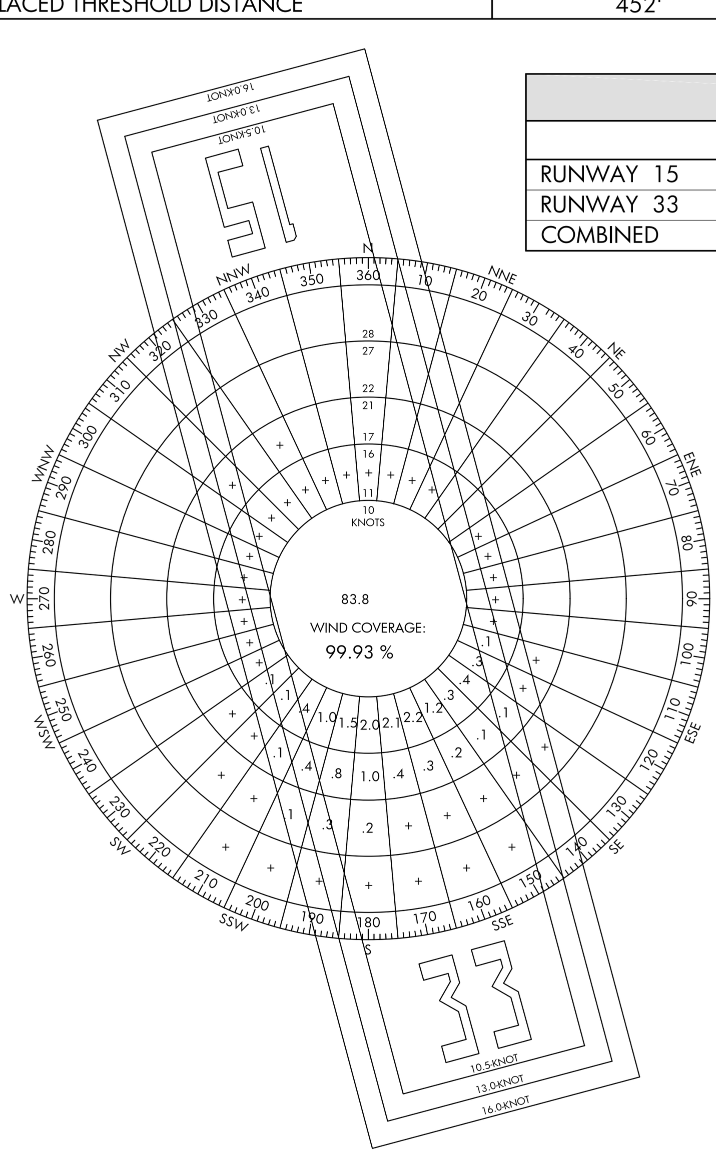
SHEET NO.

RUNWAY DATA TABLE

	RUNWAY 15L/33R			RUNWAY 15R/33L			RUNWAY 15/33			
	EXISTING		FUTURE	EXISTING		FUTURE	FUTURE		ULTIMATE	
RUNWAY IDENTIFIER	15L	33R	15L/33R	15R	33L	15R/33L	15	33	15	33
RUNWAY DESIGN CODE (RDC)	B-II-SMALL-5000	B-II-SMALL-5000	RUNWAY TO BE CLOSED	B-II-SMALL-5000	B-II-SMALL-5000	RUNWAY TO BE CLOSED	B-II-SMALL-5000	B-II-SMALL-5000	SAME	SAME
RUNWAY WIDTH AND LENGTH	36' X 2,672'	36' X 2,672'		100' X 2,430'	100' X 2,430'		75' X 2,400'	75' X 2,400'	SAME	SAME
RUNWAY SURFACE COMPOSITION	ASPHALT	ASPHALT		TURF	TURF		ASPHALT	ASPHALT	SAME	SAME
PAVEMENT DESIGN STRENGTH (LBS)										
SINGLE WHEEL GEAR (SWG)	10,000 (UTILITY)	10,000 (UTILITY)		N/A (UTILITY)	N/A (UTILITY)		12,500 (UTILITY)	12,500 (UTILITY)	SAME	SAME
DUAL WHEEL GEAR (DWG)	N/A	N/A		N/A	N/A		N/A	N/A	N/A	N/A
PERCENT EFFECTIVE GRADIENT	+0.2%	-0.2%		N/A	N/A		N/A	N/A	N/A	N/A
PCN	N/A	N/A		N/A	N/A		N/A	N/A	N/A	N/A
PERCENT WIND COVERAGE										
10.5 KNOT ALL WEATHER	98.70%			SAME	SAME		SAME	SAME	SAME	SAME
13 KNOT ALL WEATHER	99.62%			SAME	SAME		SAME	SAME	SAME	SAME
16 KNOT ALL WEATHER	99.93%			SAME	SAME		SAME	SAME	SAME	SAME
RUNWAY SAFETY AREA (RSA)										
WIDTH	150'	150'		150'	150'		150'	150'	SAME	SAME
LENGTH BEYOND RUNWAY END	300'	300'		300'	300'		300'	300'	SAME	SAME
RUNWAY OBJECT FREE AREA (ROFA)										
WIDTH	500'	500'		500'	500'		500'	500'	SAME	SAME
LENGTH BEYOND RUNWAY END	300'	300'		300'	300'		300'	300'	SAME	SAME
RUNWAY OBJECT FREE ZONE (ROFZ)										
WIDTH	250'	250'		250'	250'		250'	250'	SAME	SAME
LENGTH BEYOND RUNWAY END	200'	200'		200'	200'		200'	200'	SAME	SAME
APPROACH RUNWAY PROTECTION ZONE (RPZ)										
INNER WIDTH	250'	250'		250'	250'		250'	250'	SAME	SAME
LENGTH	1,000'	1,000'		1,000'	1,000'		1,000'	1,000'	SAME	SAME
OUTER WIDTH	450'	450'		450'	450'		450'	450'	SAME	SAME
DEPARTURE RUNWAY PROTECTION ZONE (RPZ)										
INNER WIDTH	250'	250'		250'	250'		250'	250'	SAME	SAME
LENGTH	1,000'	1,000'		1,000'	1,000'		1,000'	1,000'	SAME	SAME
OUTER WIDTH	450'	450'		450'	450'		450'	450'	SAME	SAME
RUNWAY MARKING	BASIC NUMBERS ONLY	BASIC NUMBERS ONLY		N/A	N/A		VISUAL	VISUAL	NIP	NIP
APPROACH CATEGORY	20:1	20:1		20:1	20:1		20:1	20:1	34:1	34:1
APPROACH TYPE	VISUAL (CIRCLE-TO-LAND PROCEDURE)	VISUAL (CIRCLE-TO-LAND PROCEDURE)		VISUAL	VISUAL		VISUAL (CIRCLE-TO-LAND PROCEDURE)	VISUAL (CIRCLE-TO-LAND PROCEDURE)	NON-PRECISION WITH VERTICAL GUIDANCE	NON-PRECISION WITH VERTICAL GUIDANCE
VISIBILITY MINIMUMS	≥ 1 1/4 MILE	≥ 1 1/4 MILE		VISUAL	VISUAL		≥ 1 MILE	≥ 1 MILE	SAME	SAME
TYPE OF AERONAUTICAL SURVEY FOR APPROACH	NON-VERTICAL	NON-VERTICAL		NON-VERTICAL	NON-VERTICAL		NON-VERTICAL	NON-VERTICAL	VERTICAL	VERTICAL
THRESHOLD SITING SURFACE (TSS)	TYPE 3	TYPE 3		TYPE 3	TYPE 3		TYPE 3	TYPE 3	TYPE 4	TYPE 4
TERPS CIRCLING VISUAL AREA	N/A	N/A		N/A	N/A		400' X 10,000' X 3,160'	400' X 10,000' X 3,160'	SAME	SAME
RUNWAY DEPARTURE SURFACE	YES	YES		NONE	NONE		YES	YES	SAME	SAME
RUNWAY LIGHTING	LIRL	LIRL		NONE	NONE		MIRL	MIRL	SAME	SAME
TOUCHDOWN ZONE ELEVATION (TDZE)	21.48'	21.45'		22.35'	SAME		27.34'	SAME	SAME	SAME
VISUAL AND INSTRUMENT NAVAIDS	NONE	NONE		NONE	NONE		PAPI	PAPI	SAME	SAME

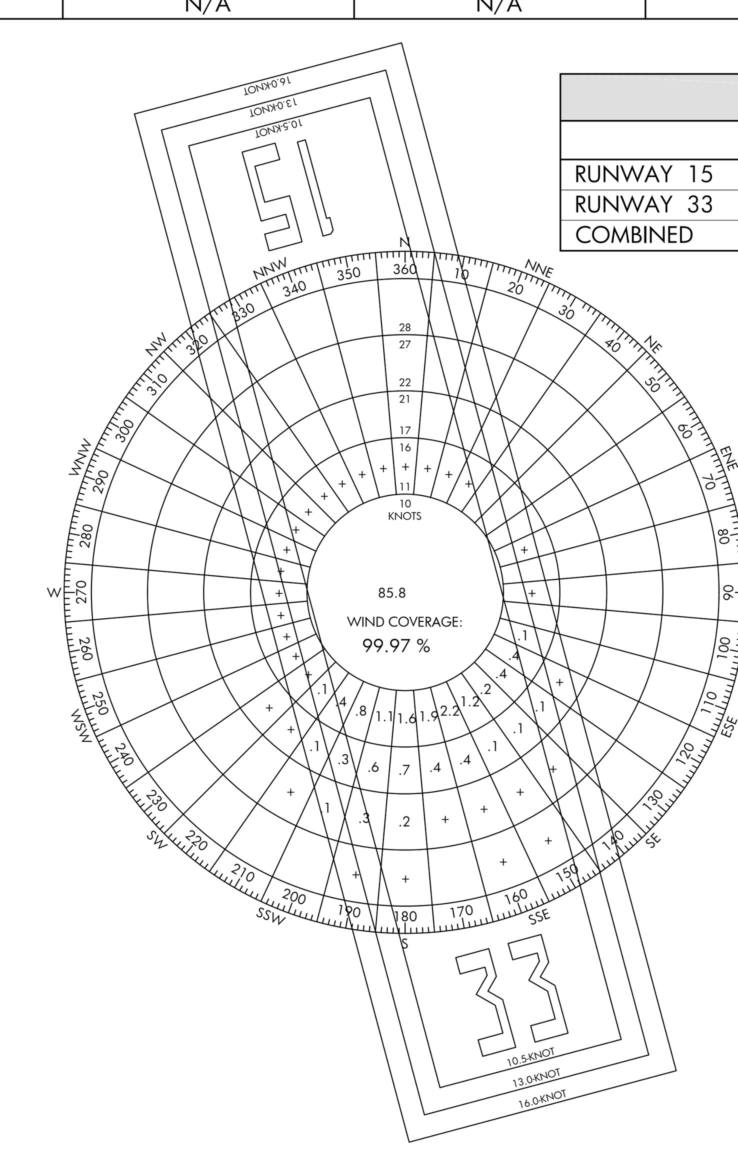
RUNWAY END DATA

	RUNWAY 15L/33R			RUNWAY 15R/33L			RUNWAY 15/33	
	EXISTING		FUTURE	EXISTING		FUTURE	FUTURE	
RUNWAY IDENTIFIER	15L	33R	15L/33R	15R	33L	15L/33R	15	33
RUNWAY END ELEVATIONS	15.30'	22.57'	N/A	15.38'	22.35'	N/A	20.00'	27.34'
RUNWAY END COORDINATES (NAD83)	LAT: 47°54'29.98" N LON: 122°06'13.19" W	LAT: 47°54'04.51" N LON: 122°06'03.07" W	N/A	LAT: 47°54'29.41" N LON: 122°06'16.41" W	LAT: 47°54'06.24" N LON: 122°06'07.21" W	N/A	LAT: 47°54'24.76" N LON: 122°06'13.39" W	LAT: 47°54'01.88" N LON: 122°06'04.30" W
DISPLACED THRESHOLD ELEVATION	16.75'	21.45'	N/A	N/A	N/A	N/A	N/A	N/A
DISPLACED THRESHOLD COORDINATES	LAT: 47°54'25.68" N LON: 122°06'03.98" W	LAT: 47°54'06.81" N LON: 122°06'16.41" W	N/A	N/A	N/A	N/A	N/A	N/A
DISPLACED THRESHOLD DISTANCE	452'	242'	N/A	N/A	N/A	N/A	N/A	N/A



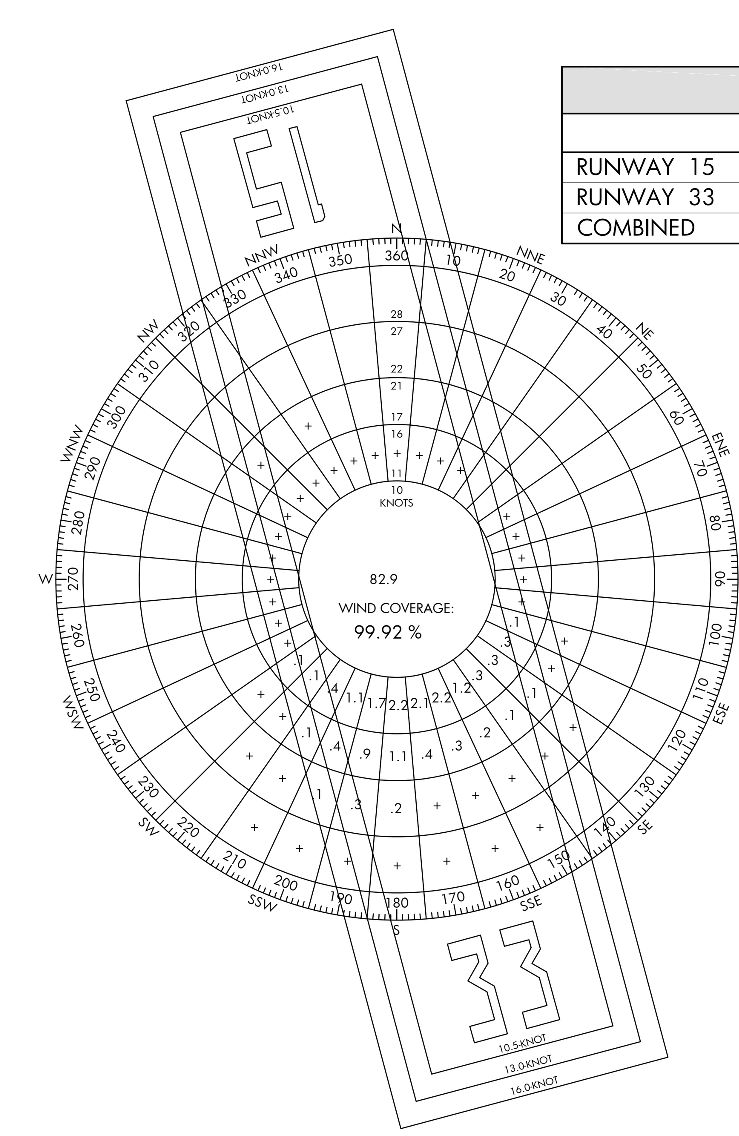
ALL WEATHER

	10.5 KNOTS	13.0 KNOTS	16.0 KNOTS
RUNWAY 15	66.91%	67.81%	68.10%
RUNWAY 33	48.81%	48.83%	48.85%
COMBINED	98.70%	99.62%	99.93%



IFR

	10.5 KNOTS	13.0 KNOTS	16.0 KNOTS
RUNWAY 15	67.15%	67.95%	68.17%
RUNWAY 33	50.41%	50.44%	50.46%
COMBINED	98.90%	99.72%	99.97%



VFR

	10.5 KNOTS	13.0 KNOTS	16.0 KNOTS
RUNWAY 15	67.10%	68.03%	68.35%
RUNWAY 33	47.91%	47.93%	47.94%
COMBINED	98.64%	99.59%	99.92%

AIRPORT DATA TABLE

	EXISTING	FUTURE
AIRPORT REFERENCE CODE (ARC)	B-II-SMALL	SAME
MEAN MAX. TEMP. - HOTTEST MONTH	73.3° - AUGUST	SAME
AIRPORT ELEVATION (MSL)	22.8'	SAME
AIRPORT & TERMINAL NAVAIDS	WINDCONE	WINDCONE, PAPI, BEACON
MISCELLANEOUS FACILITIES	NONE	SAME
AIRPORT REFERENCE POINT (ARP)	LAT: 47°54'17.10" N LON: 122°06'08.50" W	LAT: 47°54'13.32" N LON: 122°06'08.85" W
CRITICAL AIRCRAFT	CESSNA CARAVAN 208B	SAME
WINGSPAN	52.17'	SAME
TAIL HEIGHT	14.83'	SAME
MAX. T.O. WEIGHT	8,000 LBS	SAME
APPROACH SPEED	98 KNOTS	SAME
MAGNETIC VARIATION	15.81°E ± 0.37° CHANGING BY 0.14° W PER YEAR	SAME
NPIAS SERVICE LEVEL	REGIONAL	SAME
NPIAS STATE EQUIVALENT SERVICE ROLE	GA RELIEVER	SAME

DECLARED DISTANCES

RUNWAY	TAKEOFF RUN AVAILABLE (TORA)		TAKEOFF DIST. AVAILABLE (TODA)		ACCELERATE STOP DIST. AVAILABLE (ASDA)		LANDING DIST. AVAILABLE (LDA)	
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
15L	2,422'	N/A	2,422'	N/A	2,422'	N/A	1,963'	N/A
33R	2,536'	N/A	2,536'	N/A	2,536'	N/A	2,294'	N/A
15R	2,430'	N/A	2,430'	N/A	2,430'	N/A	2,430'	N/A
33L	2,430'	N/A	2,430'	N/A	2,430'	N/A	2,430'	N/A
15	N/A	2,400'	N/A	2,400'	N/A	2,400'	N/A	2,400'
33	N/A	2,400'	N/A	2,400'	N/A	2,400'	N/A	2,400'

MODIFICATION TO STANDARDS

APPROVAL DATE	AIRSPACE CASE NO.	STANDARD TO BE MODIFIED	DESCRIPTION
-	-	-	-

TAXIWAY DATA TABLE

	EXISTING		FUTURE	
TAXIWAY ID	ALPHA	BRAVO	ALPHA	ALPHA 1,2,3
WIDTH	25'	SAME	SAME	SAME
SAFETY AREA WIDTH (TSA)	49'	SAME	SAME	SAME
OBJECT FREE AREA WIDTH (TOFA)	89'	SAME	SAME	SAME
TAXIWAY EDGE SAFETY MARGIN (TESM)	5'	SAME	SAME	SAME
TAXIWAY SHOULDER WIDTH	10'	SAME	SAME	SAME
SEPARATION DISTANCE (CENTERLINE TO FIXED/MOVEABLE OBJECT)	44.5'	SAME	SAME	SAME
OBJECTS WITHIN TAXIWAY SAFETY AREA	N/A	SAME	SAME	SAME
LIGHTING	REFLECTORS	SAME	SAME	SAME
TAXILANE WIDTH	25'	SAME	SAME	SAME
TAXILANE OBJECT FREE AREA	79'	SAME	SAME	SAME

NOTES AND SOURCES

1. WIND DATA - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, STATION 72793, SNOHOMISH COUNTY AIRPORT PAINE FIELD, WA, PERIOD RECORD 2008-2017
2. MAGNETIC VARIATION- NATIONAL CENTER FOR ENVIRONMENTAL INFORMATION (NCEI), 9/2017
3. ALL HORIZONTAL COORDINATES - NAD 83/ 2011
   ALL VERTICAL COORDINATES - NAVD88
4. RUNWAYS MEET LINE OF SIGHT REQUIREMENTS

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02-S43-ALP-DATA.dwg
Sep 21, 2018 - 2:11pm
Sean.Jarvis

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

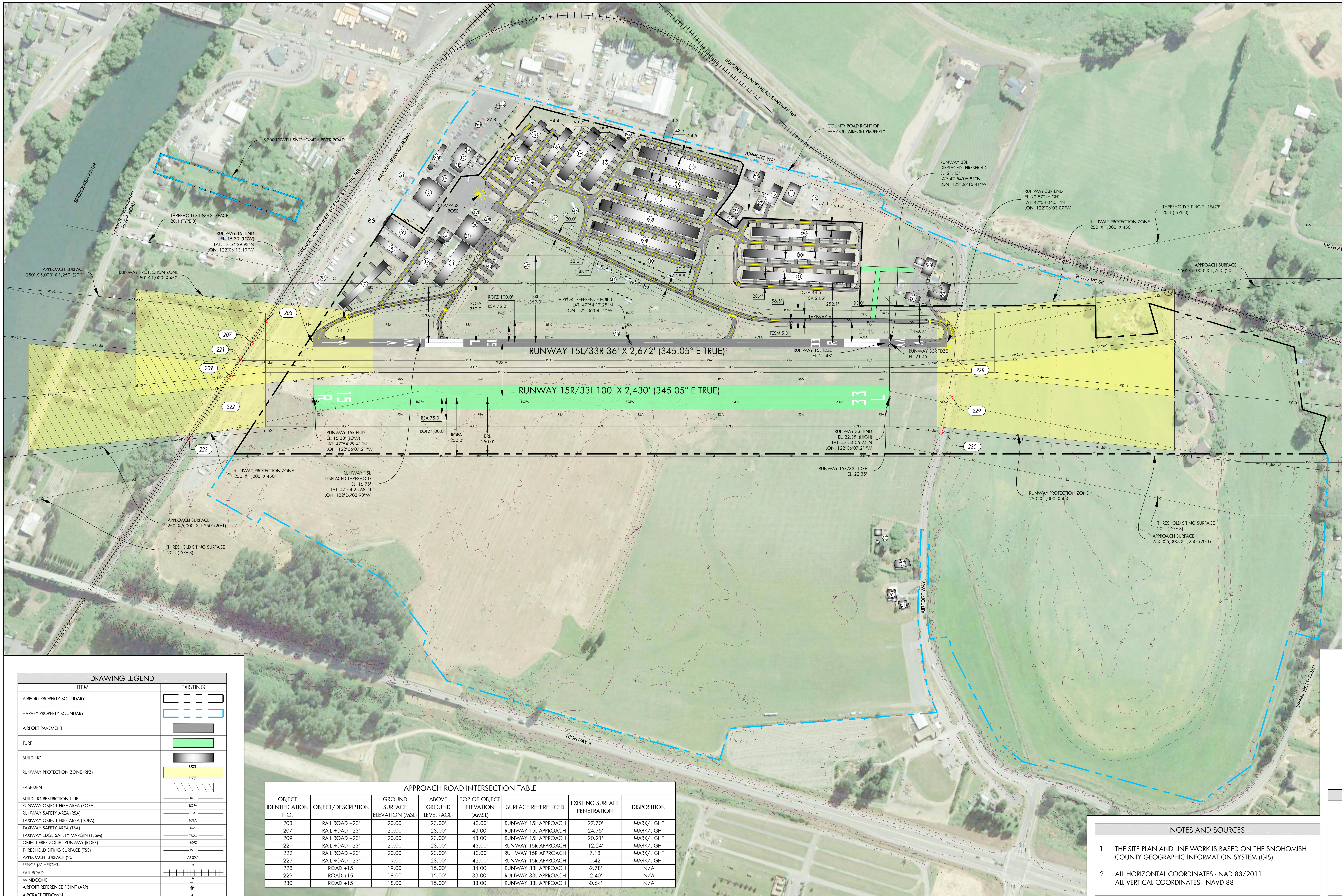
ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

DATA SHEET

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO.



AIRPORT FACILITY LIST

EXISTING ID	ITEM
1A	RESTAURANT
1B	AIRPORT OFFICE
1C	FLIGHT SCHOOL
2	AIRPORT OPERATIONS MAINTENANCE BASE 2, PARACHUTE RIGGING CENTER, CONSTRUCTION COMPANY OFFICES, COMMON HANGAR & STUDENT DORMS (3 UNITS SINGLE OCCUPANCY
3	SKYDIVING SCHOOL
4	T-HANGAR
5	T-HANGAR
6	T-HANGAR
7	T-HANGAR
8	RV STORAGE - 13 UNITS
9	SHADE HANGAR
10	T-HANGAR & UPHOLSTERY SHOP
11	SHADE HANGAR
12	SKYDIVING SCHOOL ANNEX, T-HANGAR & EXPERIMENTAL AIRCRAFT ASSOCIATION
13	BADGETT AIRCRAFT RESTORATION, SNS INDUSTRIES & MACHINE SHOP
14	WELDING SHOP
15	PUBLIC EVENT FACILITY
16	SHADE HANGAR
17	SHADE HANGAR
18	SHADE HANGAR
19	SHADE HANGAR
20	FBO AIRCRAFT MAINTENANCE FACILITY
21	FBO AIRCRAFT MAINTENANCE FACILITY
22	SHADE HANGAR
23	INSURANCE BROKER, IT AND COMPUTER NETWORK SERVICES & STUDENT DORMS (3 UNITS DOUBLE OCCUPANCY)
24	EQUIPMENT STORAGE - BARN
25	RECORDS STORAGE - BARN ANNEX
26	STUDENT DORMS (5 UNITS DOUBLE OCCUPANCY)
27	AIRPORT OPERATIONS MAINTENANCE BASE 1
28	T-HANGAR
29	T-HANGAR
30	T-HANGAR
31	T-HANGAR
32	ESPRESSO COFFEE SHOP
33	NUMBER RESERVED FOR FACILITY ADDS
34	NUMBER RESERVED FOR FACILITY ADDS
35	NUMBER RESERVED FOR FACILITY ADDS
36	NUMBER RESERVED FOR FACILITY ADDS
37	NUMBER RESERVED FOR FACILITY ADDS
38	NUMBER RESERVED FOR FACILITY ADDS
39	NUMBER RESERVED FOR FACILITY ADDS
40	TAXIWAY ALPHA TRANSIENT TIE DOWN EAST
41	TAXIWAY ALPHA TRANSIENT TIE DOWN WEST
42	TAXIWAY BRAVO NORTHEAST TIE DOWN
43	TAXIWAY BRAVO SOUTHWEST TIE DOWN
44	HELIPADS
45	WIND CONE/SOCK
46	SELF-SERVE JET FUEL
47	SELF-SERVE AVGAS
48	LINE SERVICE OFFICE+FUEL TRUCKS
49	SKYDIVING DROPZONE
50	PUBLIC PARKING (MAIN ENTRY)
51	EMPLOYEE PARKING
52	SKYDIVING CENTER PARKING
53	RV PARKING
54	PUBLIC PARKING
55	PUBLIC PARKING
56	RESIDENCE 10424 AIRPORT WAY
57	RESIDENCE 10508 AIRPORT WAY
58	RESIDENCE 10420 AIRPORT WAY
59	RESIDENCE 10520 AIRPORT WAY
60	OUTBUILDING 10520 AIRPORT WAY
61	RESIDENCE 10530 AIRPORT WAY
62	OUTBUILDING 10530 AIRPORT WAY

DRAWING LEGEND

ITEM	EXISTING
AIRPORT PROPERTY BOUNDARY	
HARVEY PROPERTY BOUNDARY	
AIRPORT PAVEMENT	
TURF	
BUILDING	
RUNWAY PROTECTION ZONE (RPZ)	RPZ(E)
EASEMENT	
BUILDING RESTRICTION LINE	BRL
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
RUNWAY SAFETY AREA (RSA)	RSA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
TAXIWAY SAFETY AREA (TSA)	TSA
TAXIWAY EDGE SAFETY MARGIN (TESM)	TESM
OBJECT FREE ZONE - RUNWAY (ROFZ)	ROFZ
THRESHOLD SITING SURFACE (TSS)	TSS
APPROACH SURFACE (20:1)	AP 20:1
FENCE (8' HEIGHT)	X
RAIL ROAD	
WINDCONE	
AIRPORT REFERENCE POINT (ARP)	
AIRCRAFT TIEDOWN	

APPROACH ROAD INTERSECTION TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
203	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	27.70'	MARK/LIGHT
207	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	24.75'	MARK/LIGHT
209	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	20.21'	MARK/LIGHT
221	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15R APPROACH	12.24'	MARK/LIGHT
222	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15R APPROACH	7.18'	MARK/LIGHT
223	RAIL ROAD +23'	19.00'	23.00'	42.00'	RUNWAY 15R APPROACH	0.42'	MARK/LIGHT
228	ROAD +15'	19.00'	15.00'	34.00'	RUNWAY 33L APPROACH	-2.78'	N/A
229	ROAD +15'	18.00'	15.00'	33.00'	RUNWAY 33L APPROACH	-2.40'	N/A
230	ROAD +15'	18.00'	15.00'	33.00'	RUNWAY 33L APPROACH	-0.64'	N/A

NOTES AND SOURCES

1. THE SITE PLAN AND LINE WORK IS BASED ON THE SNOHOMISH COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS)
2. ALL HORIZONTAL COORDINATES - NAD 83/2011
   ALL VERTICAL COORDINATES - NAVD 88

FAA APPROVAL

SUBJECT TO LETTER DATED: ____________

FEDERAL AVIATION ADMINISTRATION

DATED: ____________

CASE NO: ____________

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Sep 21, 2018 - 2:11pm
Sean.Jarvis

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION

THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER TITLE 49 U.S.C., SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS AIRPORT LAYOUT PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR WOULD HAVE JUSTIFICATION IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

AIRPORT LAYOUT PLAN

AIRPORT LAYOUT PLAN - EXISTING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO. 03 of 20

AIRPORT FACILITY LIST

EXISTING ID	ITEM	FUTURE ID
1A	RESTAURANT	
1B	AIRPORT OFFICE	
1C	FLIGHT SCHOOL	
2	AIRPORT OPERATIONS MAINTENANCE BASE 2, PARACHUTE RIGGING CENTER, CONSTRUCTION COMPANY OFFICES, COMMON HANGAR & STUDENT DORMS (3 UNITS SINGLE OCCUPANCY	
3	SKYDIVING SCHOOL	
4	T-HANGAR	
5	T-HANGAR	
6	T-HANGAR	
7	T-HANGAR	
8	RV STORAGE - 13 UNITS (TO BE REMOVED)	
9	SHADE HANGAR (TO BE REMOVED)	
10	T-HANGAR & UPHOLSTERY SHOP	
11	SHADE HANGAR	
12	SKYDIVING SCHOOL ANNEX, T-HANGAR & EXPERIMENTAL AIRCRAFT ASSOCIATION	
13	BADGETT AIRCRAFT RESTORATION, SNS INDUSTRIES & MACHINE SHOP	
14	WELDING SHOP	
15	PUBLIC EVENT FACILITY	
16	SHADE HANGAR	
17	SHADE HANGAR	
18	SHADE HANGAR	
19	SHADE HANGAR	
20	FBO AIRCRAFT MAINTENANCE FACILITY	
21	FBO AIRCRAFT MAINTENANCE FACILITY	
22	SHADE HANGAR	
23	INSURANCE BROKER, IT AND COMPUTER NETWORK SERVICES & STUDENT DORMS (3 UNITS DOUBLE OCCUPANCY)	
24	EQUIPMENT STORAGE - BARN	
25	RECORDS STORAGE - BARN ANNEX	
26	STUDENT DORMS (5 UNITS DOUBLE OCCUPANCY)	
27	AIRPORT OPERATIONS MAINTENANCE BASE 1	
28	T-HANGAR	
29	T-HANGAR	
30	T-HANGAR	
31	T-HANGAR	
32	ESPRESSO COFFEE SHOP	
33	NUMBER RESERVED FOR FACILITY ADDS	
34	NUMBER RESERVED FOR FACILITY ADDS	
35	NUMBER RESERVED FOR FACILITY ADDS	
36	NUMBER RESERVED FOR FACILITY ADDS	
37	NUMBER RESERVED FOR FACILITY ADDS	
38	NUMBER RESERVED FOR FACILITY ADDS	
39	NUMBER RESERVED FOR FACILITY ADDS	
42	TAXIWAY BRAVO NORTHEAST TIE DOWN	
43	TAXIWAY BRAVO SOUTHWEST TIE DOWN	
44	HELIPADS	
45	WIND CONE/SOCK	
46	SELF-SERVE JET FUEL	
47	SELF-SERVE AVGAS	
48	LINE SERVICE OFFICE+FUEL TRUCKS	
49	SKYDIVING DROPZONE	
50	PUBLIC PARKING (MAIN ENTRY)	
51	EMPLOYEE PARKING	
52	SKYDIVING CENTER PARKING	
53	RV PARKING	
54	PUBLIC PARKING	
55	PUBLIC PARKING	
56	RESIDENCE 10424 AIRPORT WAY	
57	RESIDENCE 10508 AIRPORT WAY	
58	RESIDENCE 10420 AIRPORT WAY	
59	RESIDENCE 10520 AIRPORT WAY	
60	OUTBUILDING 10520 AIRPORT WAY	
61	RESIDENCE 10530 AIRPORT WAY	
62	OUTBUILDING 10530 AIRPORT WAY	
	PAPI	63
	T-HANGARS	64
	HELIPORT OFFICE	65
	BEACON	66

DRAWING LEGEND

ITEM	EXISTING	FUTURE
AIRPORT PROPERTY BOUNDARY		
HARVEY PROPERTY BOUNDARY		
AIRPORT PAVEMENT		
ROAD		
TURF TAXIWAY		
REMOVAL		
BUILDING		
RUNWAY PROTECTION ZONE (RPZ)		
EASEMENT		
BUILDING RESTRICTION LINE		BRL 35'(F)
RUNWAY OBJECT FREE AREA (ROFA)		ROFA(F)
RUNWAY SAFETY AREA (RSA)		TSA(F)
TAXIWAY OBJECT FREE AREA (TOFA)		TSA(F)
TAXIWAY SAFETY AREA (TSA)		TSA(F)
TAXIWAY EDGE SAFETY MARGIN (TESM)		ROFZ(F)
OBJECT FREE ZONE - RUNWAY (ROFZ)		ROFZ(F)
APPROACH SURFACE (20:1)		AP 20:1(F)
THRESHOLD SITING SURFACE		TSS(F)
TERPS CIRCLING VISUAL AREA (TERPS)		TERPS(F)
FENCE (8' HEIGHT)	x	
RAIL ROAD		
WINDCONE		
AIRPORT REFERENCE POINT (ARP)		
BEACON		
PAPI		

APPROACH ROAD INTERSECTION TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
245	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15 APPROACH	-4.45'	N/A
246	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15 APPROACH	-10.28'	N/A
247	RAIL ROAD +23'	19.00'	23.00'	42.00'	RUNWAY 15 APPROACH	-17.97'	N/A
248	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 33 APPROACH	-21.90'	N/A
249	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 33 APPROACH	-32.73'	N/A
250	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 33 APPROACH	-39.90'	N/A

NOTES AND SOURCES

1. THE SITE PLAN AND LINE WORK IS BASED ON THE SNOHOMISH COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS)
2. ALL HORIZONTAL COORDINATES - NAD 83/2011
ALL VERTICAL COORDINATES - NAVD 88

FAA APPROVAL

SUBJECT TO LETTER DATED: ____________

FEDERAL AVIATION ADMINISTRATION

DATED: ____________

CASE NO: ____________

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04-543-ALP-FUTURE.dwg
Sep 21, 2018 - 2:12pm
Sean.Jarvis

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

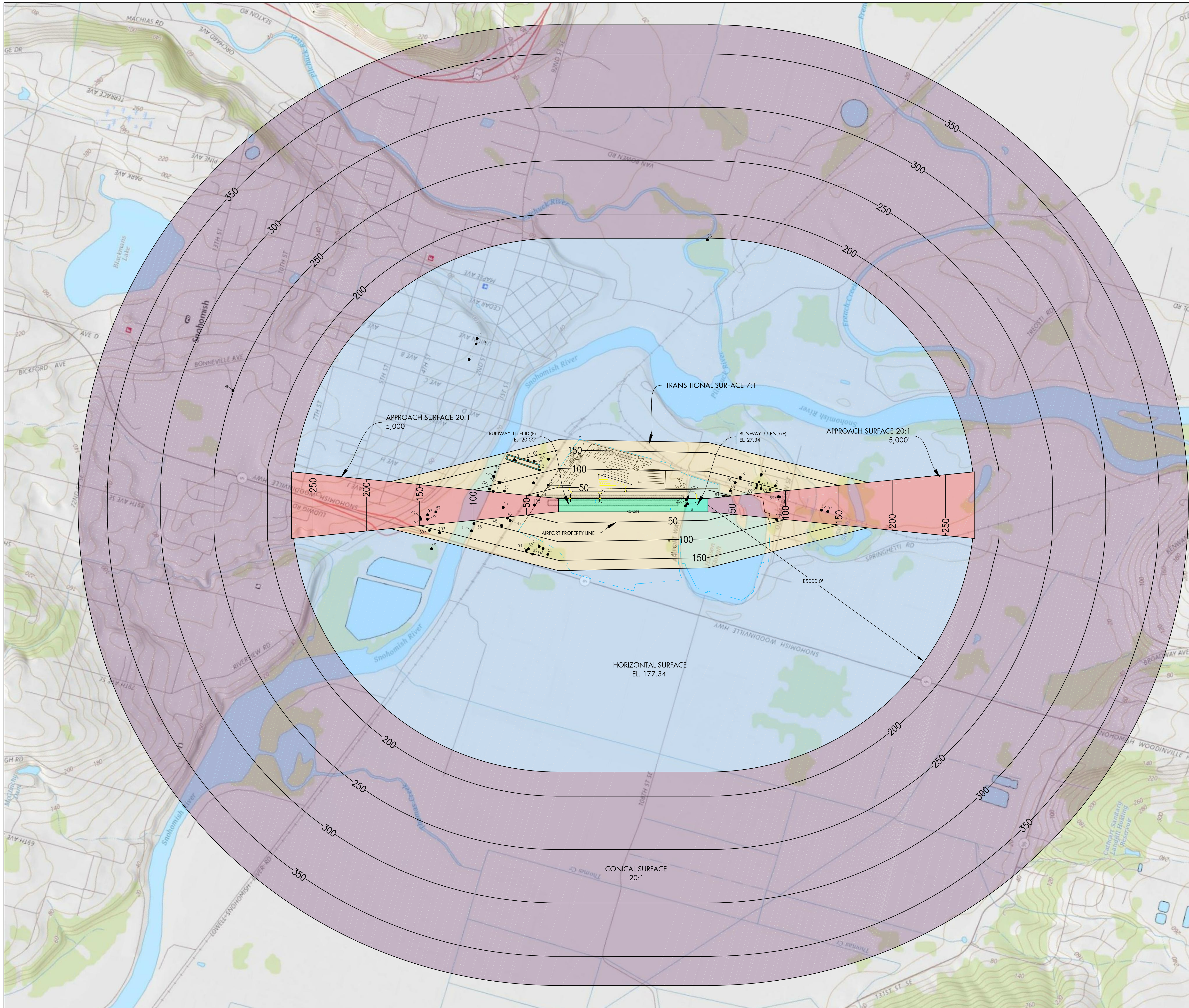
AIRPORT LAYOUT PLAN - FUTURE

AIP PROJ. NO.
3-53-0070-003-2014

JVIATION PROJ. NO.
2014.S43.01

DATE:
SEPTEMBER 2018

SHEET NO.



NOTES AND SOURCES

1. ALL HORIZONTAL COORDINATES - NAD 83/2011
   ALL VERTICAL COORDINATES - NAVD 88
2. OBSTRUCTION DATA FROM AGIS SURVEY PRODUCED BY WSP (6/30/2016)
3. AIRSPACE BASED ON FUTURE RUNWAY 15/33

15.81°E
MAGNETIC
TRUE

GRAPHIC SCALE
0 500 1000 2000
(IN FEET)

DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

LEGEND

- APPROACH SURFACE
- CONICAL SURFACE
- HORIZONTAL SURFACE
- PRIMARY SURFACE
- TRANSITIONAL SURFACE

OVERALL TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
1	POLE	22.60'	12.14'	34.74'	PRIMARY	8.46'	MARK/LIGHT
4	POLE	14.45'	28.79'	43.24'	TRANSITIONAL	0.13'	MARK/LIGHT
12	TREE	15.62'	126.00'	141.62'	TRANSITIONAL	32.76'	REMOVE
13	POLE	15.22'	49.28'	64.50'	TRANSITIONAL	1.67'	MARK/LIGHT
15	TREE	21.97'	72.19'	94.16'	TRANSITIONAL	15.69'	REMOVE
19	SIGN	23.84'	9.68'	33.52'	PRIMARY	7.29'	MARK/LIGHT
21	TREE	16.77'	97.61'	114.38'	TRANSITIONAL	8.10'	REMOVE
22	TREE	114.53'	86.44'	200.97'	HORIZONTAL	23.63'	REMOVE
23	TREE	123.90'	110.52'	234.42'	HORIZONTAL	57.08'	REMOVE
24	TREE	129.95'	84.31'	214.26'	HORIZONTAL	36.92'	REMOVE
29	TREE	15.92'	142.69'	158.62'	TRANSITIONAL	5.44'	REMOVE
35	TREE	21.79'	66.33'	88.12'	TRANSITIONAL	5.50'	REMOVE
37	TREE	20.69'	65.10'	85.79'	TRANSITIONAL	9.65'	REMOVE
38	TREE	20.80'	109.70'	130.50'	TRANSITIONAL	27.39'	REMOVE
39	TREE	19.93'	92.77'	112.70'	TRANSITIONAL	11.61'	REMOVE
43	TREE	19.59'	62.05'	81.63'	RUNWAY 15 APPROACH	9.91'	REMOVE
46	TREE	12.97'	93.13'	106.10'	TRANSITIONAL	35.11'	REMOVE
47	TREE	18.11'	62.49'	80.60'	TRANSITIONAL	4.75'	REMOVE
48	TREE	13.19'	103.25'	116.44'	TRANSITIONAL	21.49'	REMOVE
49	TREE	17.79'	160.09'	177.88'	HORIZONTAL	0.54'	REMOVE
52	TREE	14.45'	133.39'	147.84'	TRANSITIONAL	8.66'	REMOVE
53	TREE	9.97'	145.75'	155.73'	TRANSITIONAL	29.85'	REMOVE
54	TREE	9.67'	141.28'	150.95'	TRANSITIONAL	21.97'	REMOVE
55	TREE	11.41'	149.83'	161.24'	TRANSITIONAL	20.64'	REMOVE
56	TREE	21.49'	128.45'	149.94'	RUNWAY 33 APPROACH	16.39'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33 APPROACH	21.99'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33 APPROACH	24.21'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33 APPROACH	29.57'	REMOVE
60	TREE	17.67'	127.25'	144.92'	TRANSITIONAL	52.66'	REMOVE
64	TREE	20.13'	41.50'	61.63'	TRANSITIONAL	17.42'	REMOVE
65	TREE	22.15'	50.85'	73.00'	TRANSITIONAL	9.82'	REMOVE
66	TREE	21.24'	100.86'	122.10'	TRANSITIONAL	34.37'	REMOVE
68	TREE	18.42'	124.32'	142.73'	TRANSITIONAL	37.74'	REMOVE
69	TREE	16.73'	109.69'	126.42'	TRANSITIONAL	38.77'	REMOVE
70	TREE	15.54'	93.41'	108.95'	TRANSITIONAL	19.78'	REMOVE
71	TREE	14.77'	129.95'	144.72'	TRANSITIONAL	39.11'	REMOVE
73	TREE	17.10'	110.91'	128.01'	TRANSITIONAL	1.01'	REMOVE
75	TREE	22.93'	69.59'	92.52'	TRANSITIONAL	0.99'	REMOVE
76	TREE	19.10'	118.67'	137.77'	TRANSITIONAL	15.79'	REMOVE
77	TREE	8.83'	130.89'	139.72'	TRANSITIONAL	6.27'	REMOVE
85	TREE	20.16'	115.29'	135.46'	TRANSITIONAL	27.36'	REMOVE
86	TREE	25.86'	113.71'	139.57'	TRANSITIONAL	10.59'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15 APPROACH	18.82'	REMOVE
89	TREE	21.03'	157.04'	178.07'	TRANSITIONAL	21.90'	REMOVE
90	TREE	15.91'	154.47'	170.39'	RUNWAY 15 APPROACH	27.64'	REMOVE
91	TREE	12.67'	145.42'	158.09'	RUNWAY 15 APPROACH	9.22'	REMOVE
92	TREE	14.12'	149.55'	163.66'	RUNWAY 15 APPROACH	14.00'	REMOVE
93	TREE	15.77'	159.19'	174.96'	RUNWAY 15 APPROACH	32.44'	REMOVE
94	TREE	14.31'	135.68'	150.00'	TRANSITIONAL	4.43'	REMOVE
95	TREE	13.01'	146.57'	159.58'	TRANSITIONAL	9.28'	REMOVE
96	TREE	25.35'	159.00'	184.35'	HORIZONTAL	7.01'	REMOVE
97	TREE	20.42'	130.44'	150.86'	TRANSITIONAL	19.05'	REMOVE
98	TREE	20.52'	146.83'	167.35'	TRANSITIONAL	31.13'	REMOVE
99	ANTENNA	96.48'	204.62'	301.10'	CONICAL	50.53'	MARK/LIGHT
100	TREE	19.97'	144.38'	164.35'	TRANSITIONAL	22.68'	REMOVE
102	TREE	20.73'	110.88'	131.61'	TRANSITIONAL	37.45'	REMOVE
103	TREE	22.53'	155.92'	178.45'	TRANSITIONAL	23.04'	REMOVE
104	TREE	16.19'	149.33'	165.52'	TRANSITIONAL	69.89'	REMOVE
108	UTILITY POLE	14.28'	37.80'	52.08'	RUNWAY 15 APPROACH	9.78'	MARK/LIGHT

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

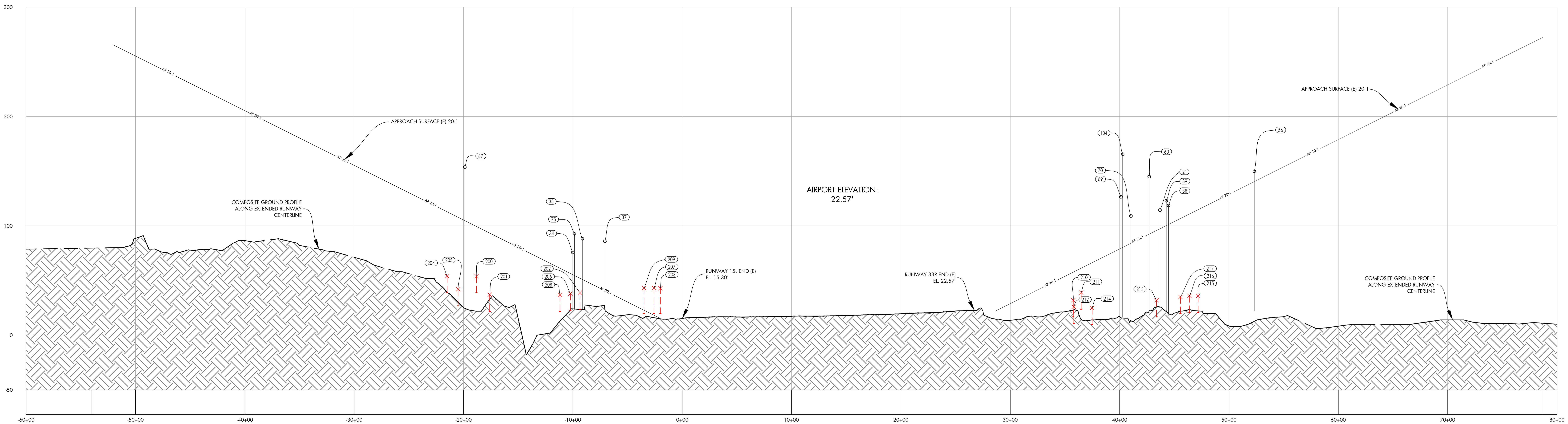
DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT LAYOUT PLAN

AIRPORT AIRSPACE DRAWING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018



RUNWAY 15L/33R PROFILE

PROFILE
HORIZ: 1" = 500'
VERT: 1" = 50'

RUNWAY 15L/33R APPROACH OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT TYPE	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
21	TREE	16.77'	97.61'	114.38'	RUNWAY 33R APPROACH	16.95'	REMOVE
34	TREE	22.75'	52.85'	75.60'	RUNWAY 15L APPROACH	20.25'	REMOVE
35	TREE	21.79'	66.33'	88.12'	RUNWAY 15L APPROACH	37.15'	REMOVE
37	TREE	20.69'	65.10'	85.79'	RUNWAY 15L APPROACH	45.11'	REMOVE
56	TREE	21.49'	128.45'	149.94'	RUNWAY 33R APPROACH	9.36'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33R APPROACH	14.95'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33R APPROACH	17.17'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33R APPROACH	22.53'	REMOVE
60	TREE	17.67'	127.25'	144.92'	RUNWAY 33R APPROACH	52.41'	REMOVE
69	TREE	16.73'	109.69'	126.42'	RUNWAY 33R APPROACH	46.87'	REMOVE
70	TREE	15.54'	93.41'	108.95'	RUNWAY 33R APPROACH	24.84'	REMOVE
75	TREE	22.93'	69.59'	92.52'	RUNWAY 15L APPROACH	37.91'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15L APPROACH	48.94'	REMOVE
104	TREE	16.19'	149.33'	165.52'	RUNWAY 33R APPROACH	85.17'	REMOVE

RUNWAY 15L/33R APPROACH ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
200	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15L APPROACH	-45.36'	N/A
201	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15L APPROACH	-56.36'	N/A
202	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15L APPROACH	-13.06'	N/A
203	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	27.70'	MARK/LIGHT
204	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15L APPROACH	-58.80'	N/A
205	ROAD +15'	27.00'	15.00'	42.00'	RUNWAY 15L APPROACH	-65.80'	N/A
206	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15L APPROACH	-18.46'	N/A
207	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	24.75'	MARK/LIGHT
208	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15L APPROACH	-24.22'	N/A
209	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	20.21'	MARK/LIGHT
210	ROAD +15'	17.00'	15.00'	32.00'	RUNWAY 33R APPROACH	-25.77'	N/A
211	RAIL ROAD +23'	16.00'	23.00'	39.00'	RUNWAY 33R APPROACH	-22.40'	N/A
212	ROAD +15'	11.00'	15.00'	26.00'	RUNWAY 33R APPROACH	-32.02'	N/A
213	RAIL ROAD +23'	9.00'	23.00'	32.00'	RUNWAY 33R APPROACH	-63.89'	N/A
214	ROAD +15'	10.00'	15.00'	25.00'	RUNWAY 33R APPROACH	-41.40'	N/A
215	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33R APPROACH	-78.89'	N/A
216	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33R APPROACH	-74.89'	N/A
217	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33R APPROACH	-71.78'	N/A

NOTES AND SOURCES

1. OBSTRUCTION DATA FROM AGIS SURVEY PRODUCED BY WSP (6/30/2016)
2. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

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Sep 21, 2018 - 2:13pm
Sean.Jarvis

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

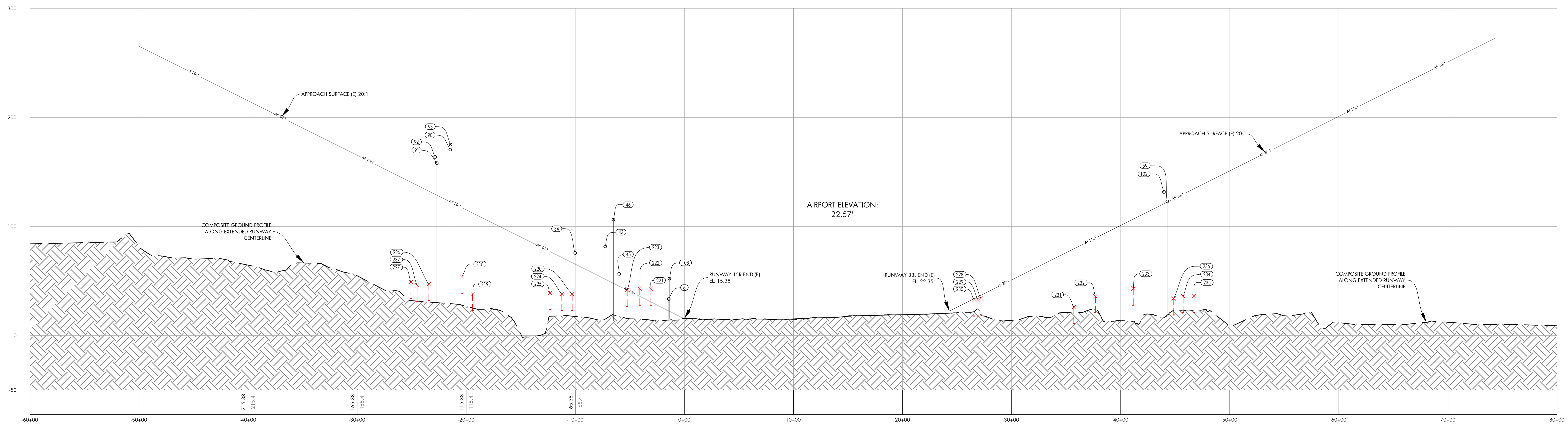
THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER TITLE 49 U.S.C., SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS AIRPORT LAYOUT PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR WOULD HAVE JUSTIFICATION IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

AIRPORT LAYOUT PLAN

RUNWAY 15L/33R AIRPORT AIRSPACE PROFILE

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO.



RUNWAY 15R/33L PROFILE

PROFILE
HORIZ: 1" = 500'
VERT: 1" = 50'

RUNWAY 15L/33R APPROACH OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT TYPE	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
21	TREE	16.77'	97.61'	114.38'	RUNWAY 33R APPROACH	16.95'	REMOVE
34	TREE	22.75'	52.85'	75.60'	RUNWAY 15L APPROACH	20.25'	REMOVE
35	TREE	21.79'	66.33'	88.12'	RUNWAY 15L APPROACH	37.15'	REMOVE
37	TREE	20.69'	65.10'	85.79'	RUNWAY 15L APPROACH	45.11'	REMOVE
56	TREE	21.49'	128.45'	149.94'	RUNWAY 33R APPROACH	9.36'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33R APPROACH	14.95'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33R APPROACH	17.17'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33R APPROACH	22.53'	REMOVE
60	TREE	17.67'	127.25'	144.92'	RUNWAY 33R APPROACH	52.41'	REMOVE
69	TREE	16.73'	109.69'	126.42'	RUNWAY 33R APPROACH	46.87'	REMOVE
70	TREE	15.54'	93.41'	108.95'	RUNWAY 33R APPROACH	24.84'	REMOVE
104	TREE	16.19'	149.33'	165.52'	RUNWAY 33R APPROACH	85.17'	REMOVE

RUNWAY 15R/33L APPROACH ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
218	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15R APPROACH	-63.32'	N/A
219	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15R APPROACH	-74.46'	N/A
220	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15R APPROACH	-28.81'	N/A
221	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15R APPROACH	12.24'	MARK/LIGHT
222	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15R APPROACH	7.18'	MARK/LIGHT
223	RAIL ROAD +23'	19.00'	23.00'	42.00'	RUNWAY 15R APPROACH	0.42'	MARK/LIGHT
224	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15R APPROACH	-33.59'	N/A
225	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15R APPROACH	-38.03'	N/A
226	ROAD +15'	32.00'	15.00'	47.00'	RUNWAY 15R APPROACH	-85.52'	N/A
227	ROAD +15'	34.00'	15.00'	49.00'	RUNWAY 15R APPROACH	-91.75'	N/A
228	ROAD +15'	19.00'	15.00'	34.00'	RUNWAY 33L APPROACH	-2.78'	N/A
229	ROAD +15'	18.00'	15.00'	33.00'	RUNWAY 33L APPROACH	-2.40'	N/A
230	ROAD +15'	18.00'	15.00'	33.00'	RUNWAY 33L APPROACH	-0.64'	N/A
231	ROAD +15'	11.00'	15.00'	26.00'	RUNWAY 33L APPROACH	-53.34'	N/A
232	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33L APPROACH	-53.23'	N/A
233	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 33L APPROACH	-63.62'	N/A
234	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33L APPROACH	-93.50'	N/A
235	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33L APPROACH	-98.41'	N/A
236	ROAD +15'	19.00'	15.00'	34.00'	RUNWAY 33L APPROACH	-91.14'	N/A
237	ROAD +15'	31.00'	15.00'	46.00'	RUNWAY 15R APPROACH	-91.88'	N/A

NOTES AND SOURCES

1. OBSTRUCTION DATA FROM AGIS SURVEY PRODUCED BY WSP (6/30/2016)
2. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

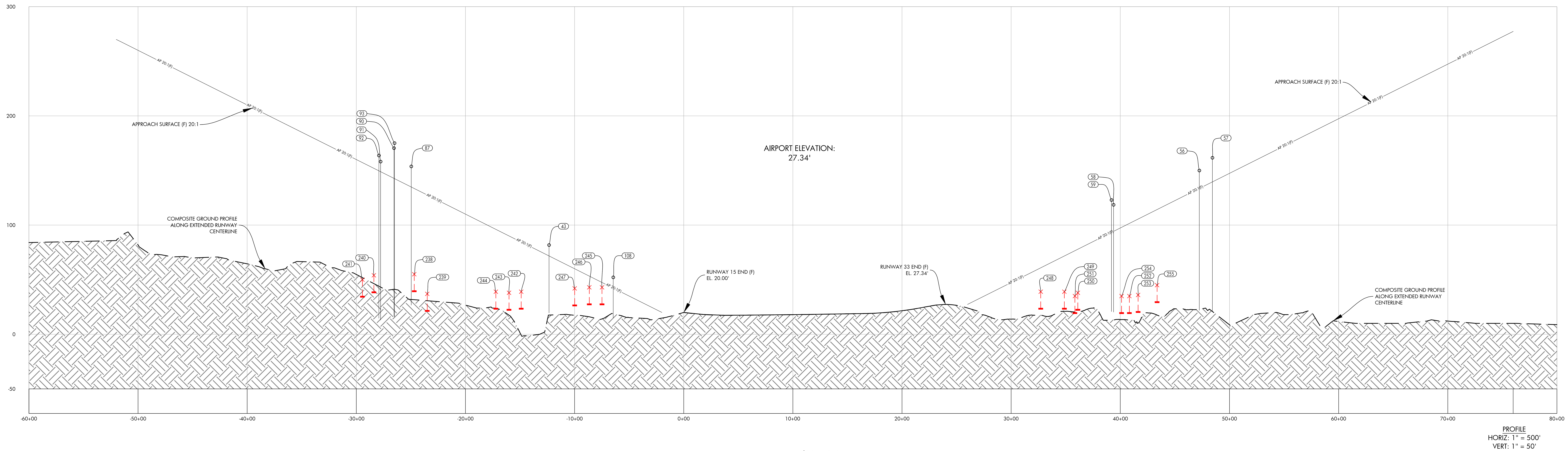
DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 15R/33L AIRPORT
AIRSPACE PROFILE

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018



RUNWAY 15/33 PROFILE

RUNWAY 15/33 APPROACH OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
43	TREE	19.59'	62.05'	81.63'	RUNWAY 15 APPROACH	9.91'	REMOVE
56	TREE	21.49'	128.45'	149.94'	RUNWAY 33 APPROACH	16.39'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33 APPROACH	21.99'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33 APPROACH	24.21'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33 APPROACH	29.57'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15 APPROACH	18.82'	REMOVE
90	TREE	15.91'	154.47'	170.39'	RUNWAY 15 APPROACH	27.64'	REMOVE
91	TREE	12.67'	145.42'	158.09'	RUNWAY 15 APPROACH	9.22'	REMOVE
92	TREE	14.12'	149.55'	163.66'	RUNWAY 15 APPROACH	14.00'	REMOVE
93	TREE	15.77'	159.19'	174.96'	RUNWAY 15 APPROACH	32.44'	REMOVE
108	UTILITY POLE	14.28'	37.80'	52.08'	RUNWAY 15 APPROACH	9.78'	MARK/LIGHT

RUNWAY 15/33 APPROACH ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
238	ROAD +15'	40.00'	15.00'	55.00'	RUNWAY 15 APPROACH	-78.46'	N/A
239	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15 APPROACH	-90.49'	N/A
240	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15 APPROACH	-97.96'	N/A
241	ROAD +15'	35.00'	15.00'	50.00'	RUNWAY 15 APPROACH	-107.22'	N/A
242	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15 APPROACH	-45.46'	N/A
243	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15 APPROACH	-52.06'	N/A
244	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15 APPROACH	-57.10'	N/A
245	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15 APPROACH	-4.45'	N/A
246	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15 APPROACH	-10.28'	N/A
247	RAIL ROAD +23'	19.00'	23.00'	42.00'	RUNWAY 15 APPROACH	-17.97'	N/A
248	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 33 APPROACH	-21.90'	N/A
249	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 33 APPROACH	-32.73'	N/A
250	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 33 APPROACH	-39.90'	N/A
251	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33 APPROACH	-41.55'	N/A
252	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33 APPROACH	-66.50'	N/A
253	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33 APPROACH	-69.52'	N/A
254	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33 APPROACH	-62.93'	N/A
255	RAIL ROAD +23'	22.00'	23.00'	45.00'	RUNWAY 33 APPROACH	-69.20'	N/A

NOTES AND SOURCES

1. OBSTRUCTION DATA FROM AGIS SURVEY PRODUCED BY WSP (6/30/2016)
2. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 15/33 AIRPORT
AIRSPACE PROFILE

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

15.81°E
MAGNETIC
TRUE

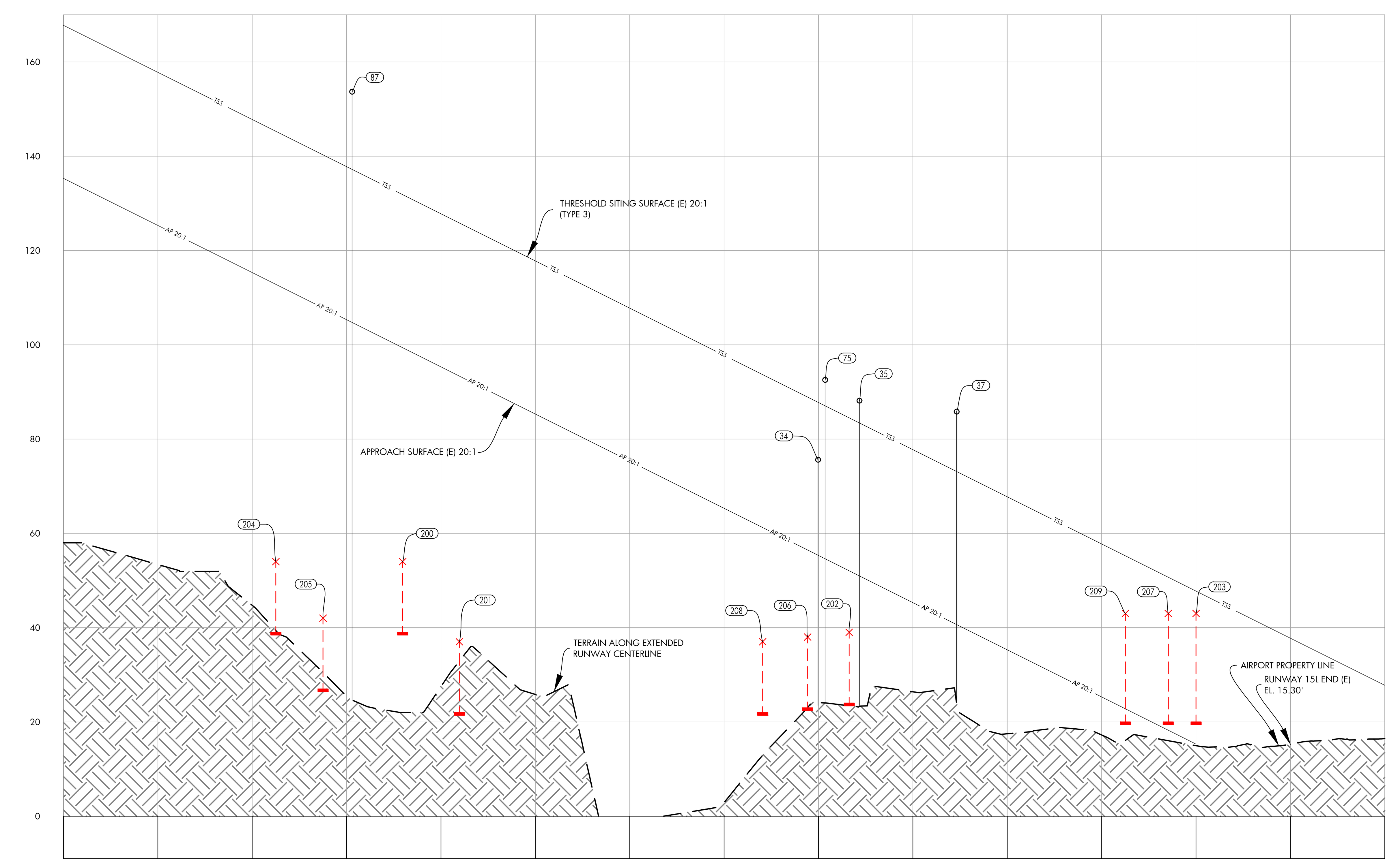
GRAPHIC SCALE
0 100 200 400
(IN FEET)

DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

PROFILE
HORIZ: 1" = 200'
VERT: 1" = 20'

RUNWAY 15L INNER APPROACH OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT TYPE	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
34	TREE	22.75'	52.85'	75.60'	RUNWAY 15L APPROACH	20.25'	REMOVE
35	TREE	21.79'	66.33'	88.12'	RUNWAY 15L APPROACH	37.15'	REMOVE
37	TREE	20.69'	65.10'	85.79'	RUNWAY 15L APPROACH	45.11'	REMOVE
75	TREE	22.93'	69.59'	92.52'	RUNWAY 15L APPROACH	37.91'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15L APPROACH	48.94'	REMOVE

RUNWAY 15L INNER APPROACH ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
200	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15L APPROACH	-45.36'	N/A
201	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15L APPROACH	-56.36'	N/A
202	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15L APPROACH	-13.06'	N/A
203	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	27.70'	MARK/LIGHT
204	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15L APPROACH	-58.80'	N/A
205	ROAD +15'	27.00'	15.00'	42.00'	RUNWAY 15L APPROACH	-65.80'	N/A
206	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15L APPROACH	-18.46'	N/A
207	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	24.75'	MARK/LIGHT
208	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15L APPROACH	-24.22'	N/A
209	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15L APPROACH	20.21'	MARK/LIGHT



NOTES AND SOURCES

1. THE SITE PLAN AND LINE WORK IS BASED ON THE SNOHOMISH COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS)
2. OBSTRUCTION DATA FROM AGIS SURVEY PRODUCED BY WSP (6/30/2016)
3. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

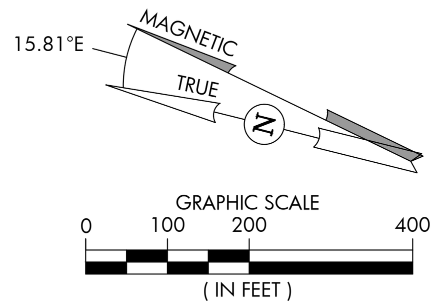
DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 15L INNER APPROACH
SURFACE DRAWING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018



DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

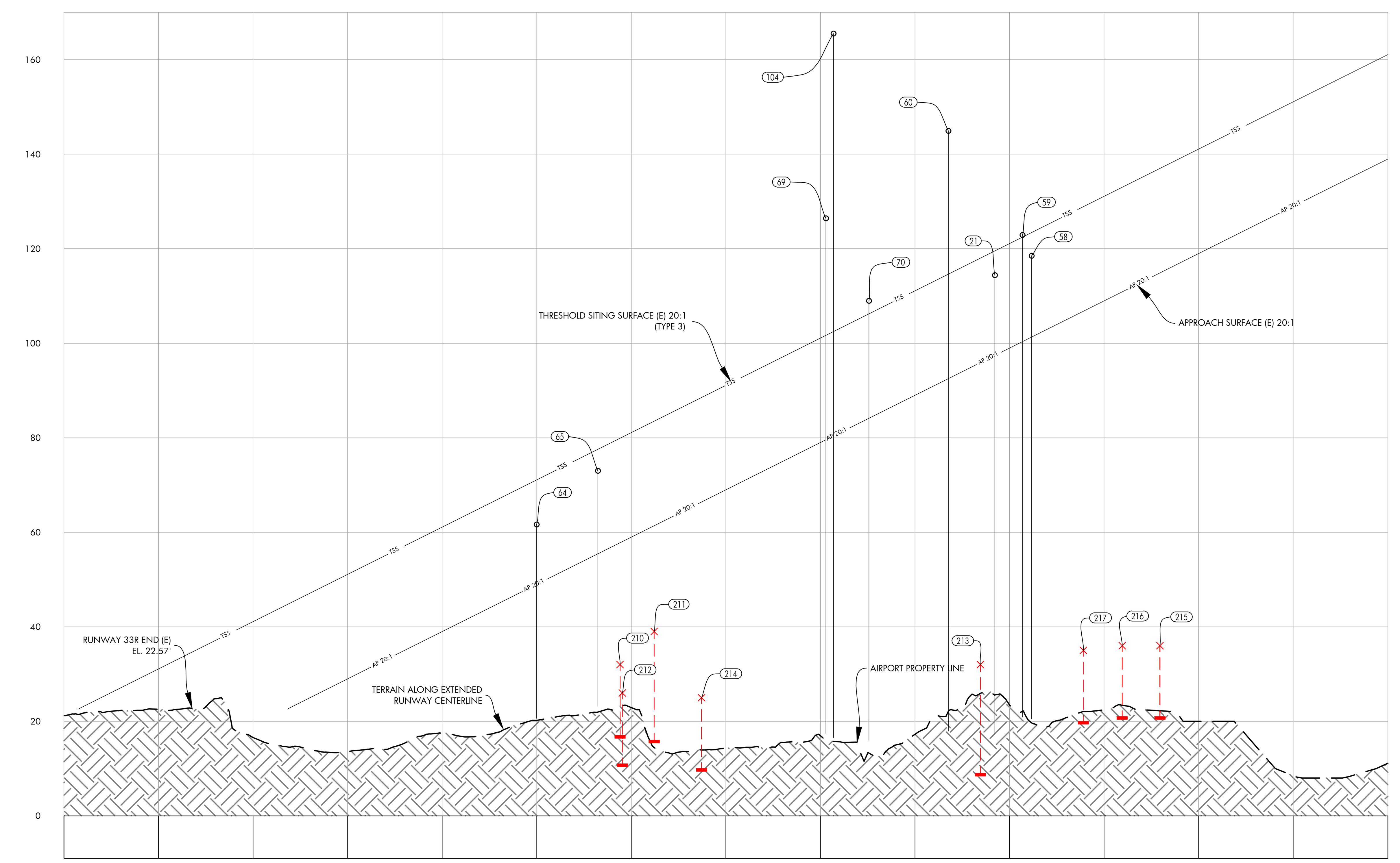
PROFILE
HORIZ: 1" = 200'
VERT: 1" = 20'

RUNWAY 33R INNER APPROACH OBSTACLE TABLE

OBJECT IDENTIFICATION NO.	OBJECT TYPE	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
21	TREE	16.77'	97.61'	114.38'	RUNWAY 33R APPROACH	16.95'	REMOVE
56	TREE	21.49'	128.45'	149.94'	RUNWAY 33R APPROACH	9.36'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33R APPROACH	14.95'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33R APPROACH	17.17'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33R APPROACH	22.53'	REMOVE
60	TREE	17.67'	127.25'	144.92'	RUNWAY 33R APPROACH	52.41'	REMOVE
64	TREE	20.13'	41.50'	61.63'	RUNWAY 33R APPROACH	12.66'	REMOVE
65	TREE	22.15'	50.85'	73.00'	RUNWAY 33R APPROACH	17.55'	REMOVE
69	TREE	16.73'	109.69'	126.42'	RUNWAY 33R APPROACH	46.87'	REMOVE
70	TREE	15.54'	93.41'	108.95'	RUNWAY 33R APPROACH	24.84'	REMOVE
104	TREE	16.19'	149.33'	165.52'	RUNWAY 33R APPROACH	85.17'	REMOVE

RUNWAY 33R INNER APPROACH ROAD INTERSECTION TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
210	ROAD +15'	17.00'	15.00'	32.00'	RUNWAY 33R APPROACH	-25.77'	N/A
211	RAIL ROAD +23'	16.00'	23.00'	39.00'	RUNWAY 33R APPROACH	-22.40'	N/A
212	ROAD +15'	11.00'	15.00'	26.00'	RUNWAY 33R APPROACH	-32.02'	N/A
213	RAIL ROAD +23'	9.00'	23.00'	32.00'	RUNWAY 33R APPROACH	-63.89'	N/A
214	ROAD +15'	10.00'	15.00'	25.00'	RUNWAY 33R APPROACH	-41.40'	N/A
215	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33R APPROACH	-78.89'	N/A
216	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33R APPROACH	-74.89'	N/A
217	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33R APPROACH	-71.78'	N/A



NOTES AND SOURCES

1. THE SITE PLAN AND LINE WORK IS BASED ON THE SNOHOMISH COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS)
2. OBSTRUCTION DATA FROM AGIS SURVEY PRODUCED BY WSP (6/30/2016)
3. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

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09-10-S43-IASD-RUNWAY 15L-33R.dwg
Sep 21, 2018 - 2:14pm
Sean.Jarvis

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

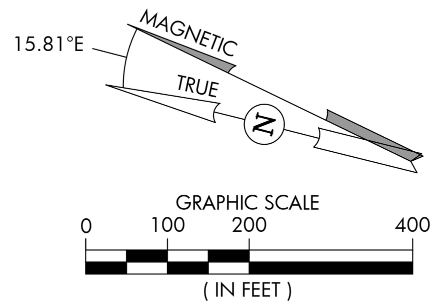
DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 33R INNER APPROACH SURFACE DRAWING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

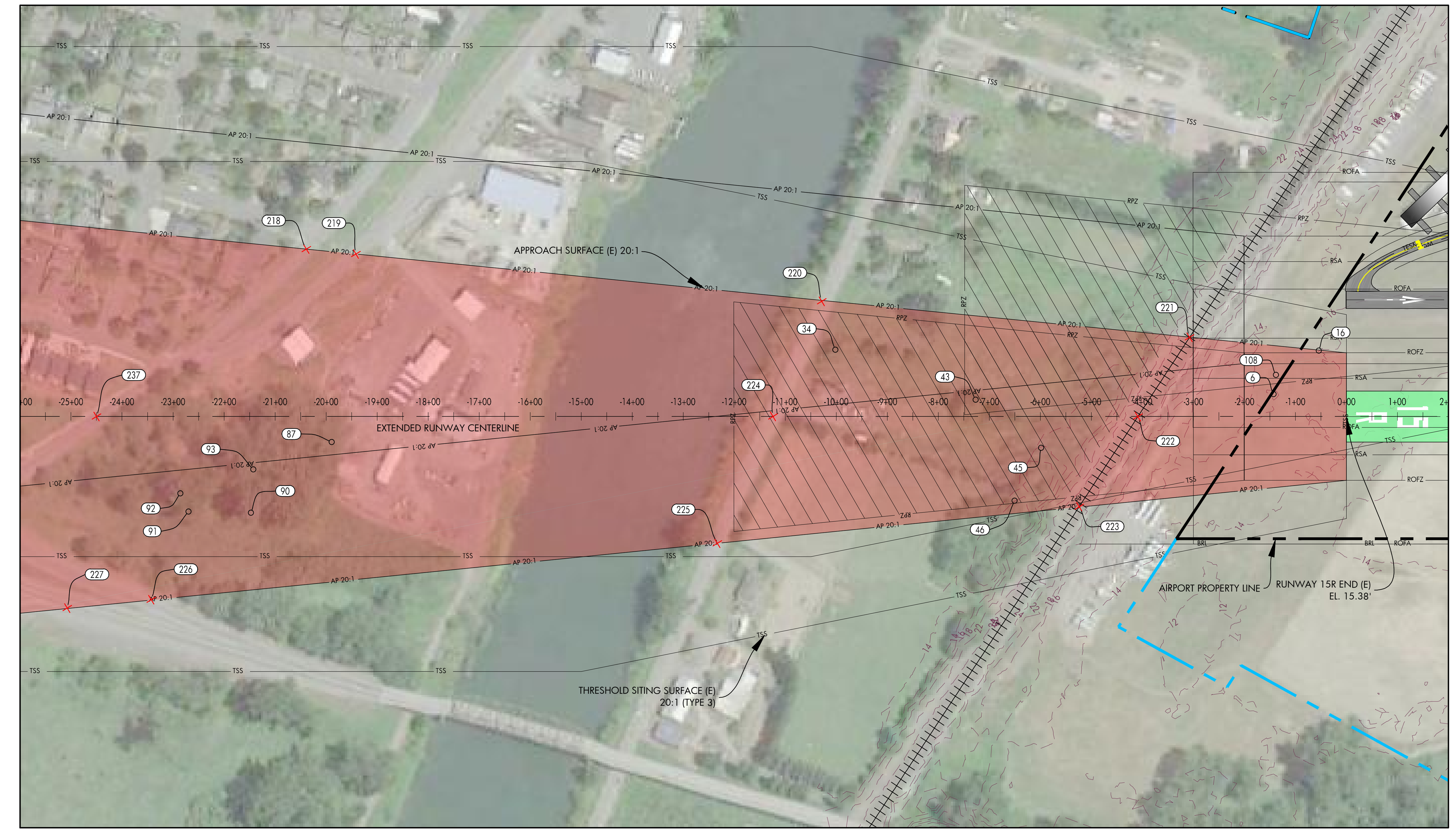


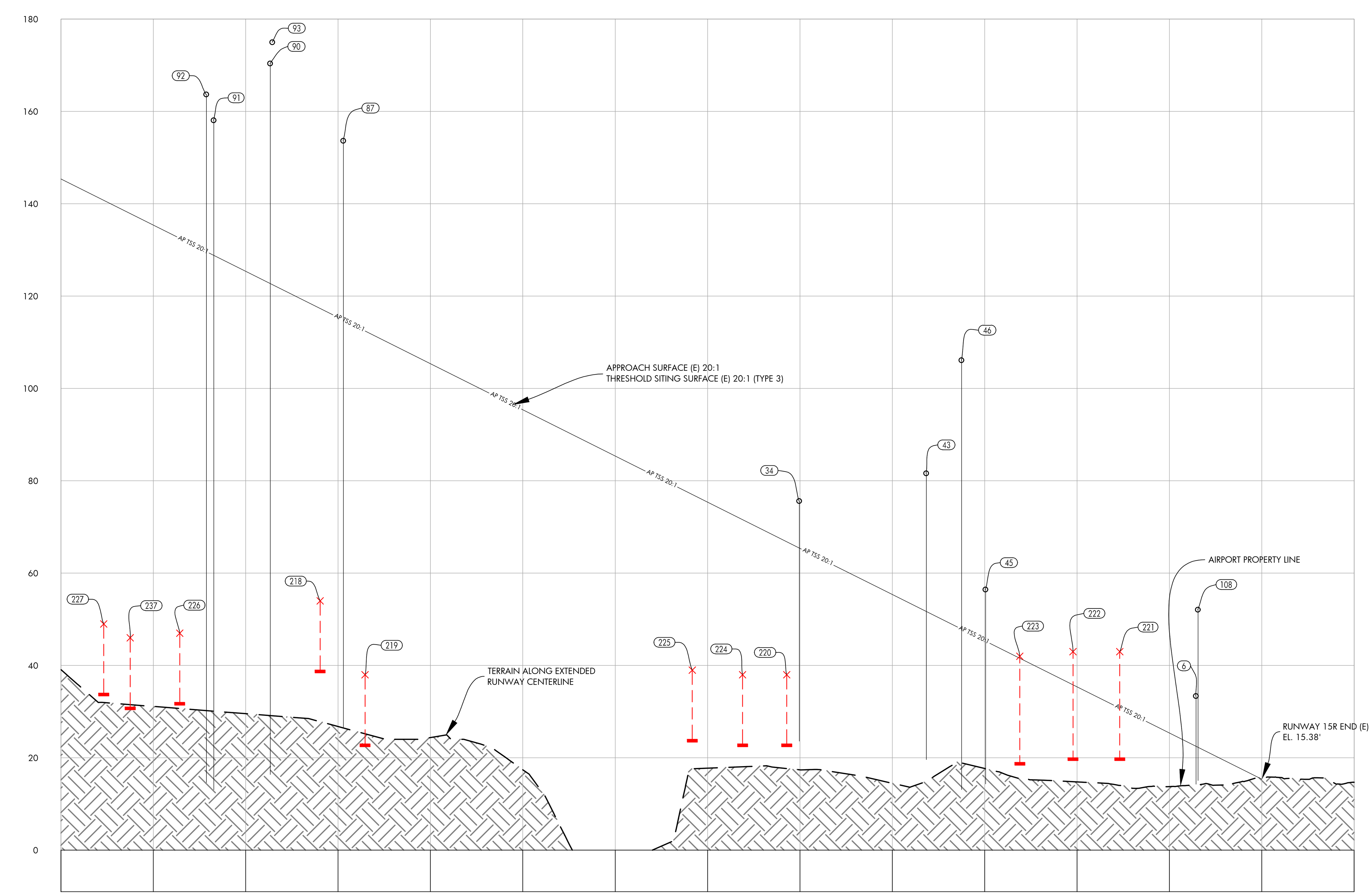
DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

PROFILE
HORIZ: 1" = 200'
VERT: 1" = 20'

RUNWAY 15R INNER APPROACH OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT TYPE	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
6	POLE	13.65'	19.72'	33.38'	RUNWAY 15R APPROACH	10.84'	MARK/LIGHT
34	TREE	22.75'	52.85'	75.60'	RUNWAY 15R APPROACH	10.13'	REMOVE
43	TREE	19.59'	62.05'	81.63'	RUNWAY 15R APPROACH	29.90'	REMOVE
45	TREE	13.62'	42.83'	56.44'	RUNWAY 15R APPROACH	11.13'	REMOVE
46	TREE	12.97'	93.13'	106.10'	RUNWAY 15R APPROACH	58.19'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15R APPROACH	38.82'	REMOVE
90	TREE	15.91'	154.47'	170.39'	RUNWAY 15R APPROACH	47.64'	REMOVE
91	TREE	12.67'	145.42'	158.09'	RUNWAY 15R APPROACH	29.22'	REMOVE
92	TREE	14.12'	149.55'	163.66'	RUNWAY 15R APPROACH	34.00'	REMOVE
93	TREE	15.77'	159.19'	174.96'	RUNWAY 15R APPROACH	52.44'	REMOVE
108	UTILITY POLE	14.28'	37.80'	52.08'	RUNWAY 15R APPROACH	29.77'	MARK/LIGHT

RUNWAY 15R INNER APPROACH ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
218	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15R APPROACH	-63.32'	N/A
219	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15R APPROACH	-74.46'	N/A
220	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15R APPROACH	-28.81'	N/A
221	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15R APPROACH	12.24'	MARK/LIGHT
222	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15R APPROACH	7.18'	MARK/LIGHT
223	RAIL ROAD +23'	19.00'	23.00'	42.00'	RUNWAY 15R APPROACH	0.42'	MARK/LIGHT
224	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15R APPROACH	-33.59'	N/A
225	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15R APPROACH	-38.03'	N/A
226	ROAD +15'	32.00'	15.00'	47.00'	RUNWAY 15R APPROACH	-85.52'	N/A
227	ROAD +15'	34.00'	15.00'	49.00'	RUNWAY 15R APPROACH	-91.75'	N/A
237	ROAD +15'	31.00'	15.00'	46.00'	RUNWAY 15R APPROACH	-91.88'	N/A





NOTES AND SOURCES

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2. OBSTRUCTION DATA FROM AGIS SURVEY PRODUCED BY WSP (6/30/2016)
3. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

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AIRPORT LAYOUT PLAN

RUNWAY 15R INNER APPROACH SURFACE DRAWING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO.

15.81°E
MAGNETIC
TRUE

GRAPHIC SCALE
0 100 200 400
(IN FEET)

DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

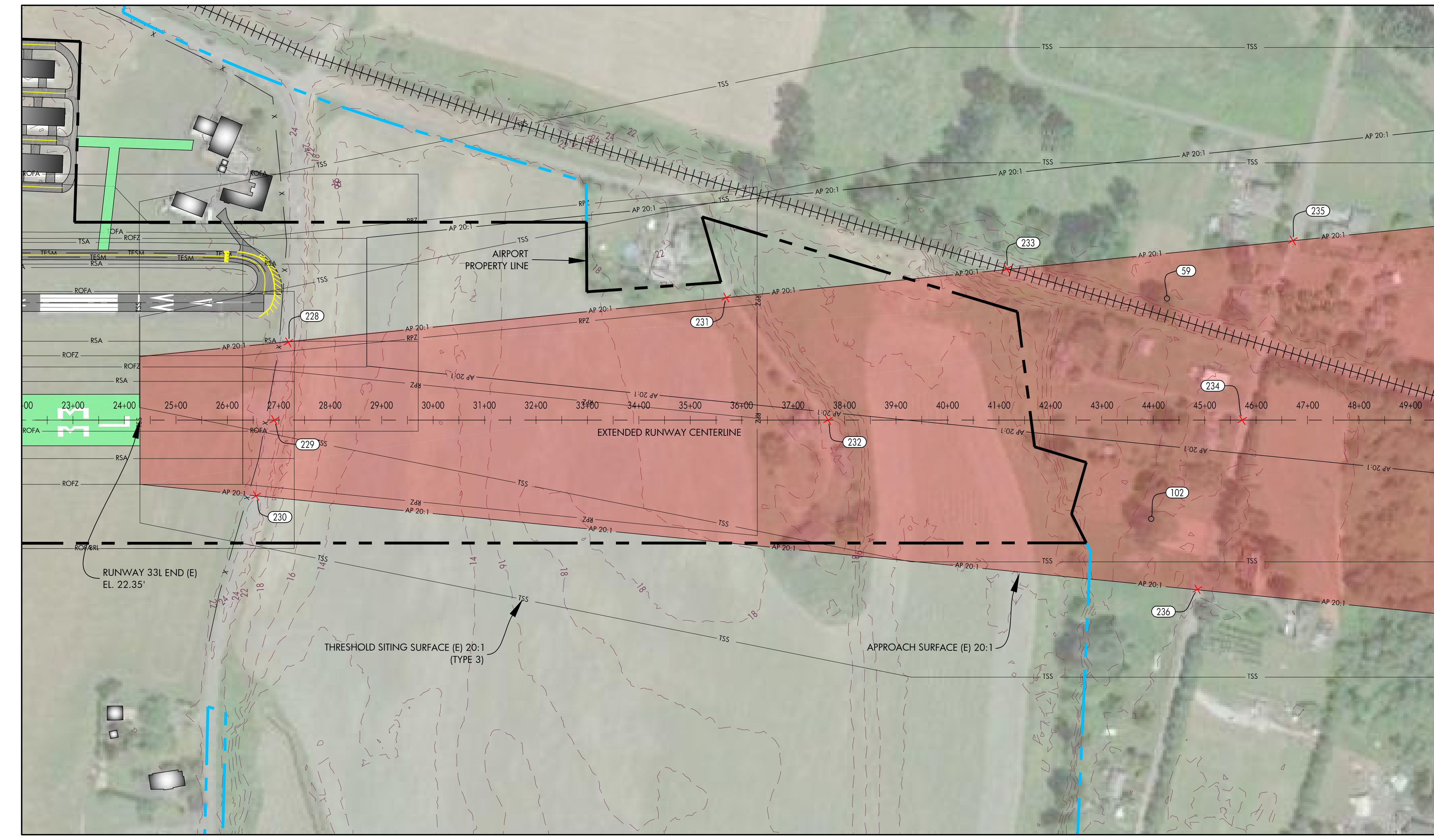
PROFILE
HORIZ: 1" = 200'
VERT: 1" = 20'

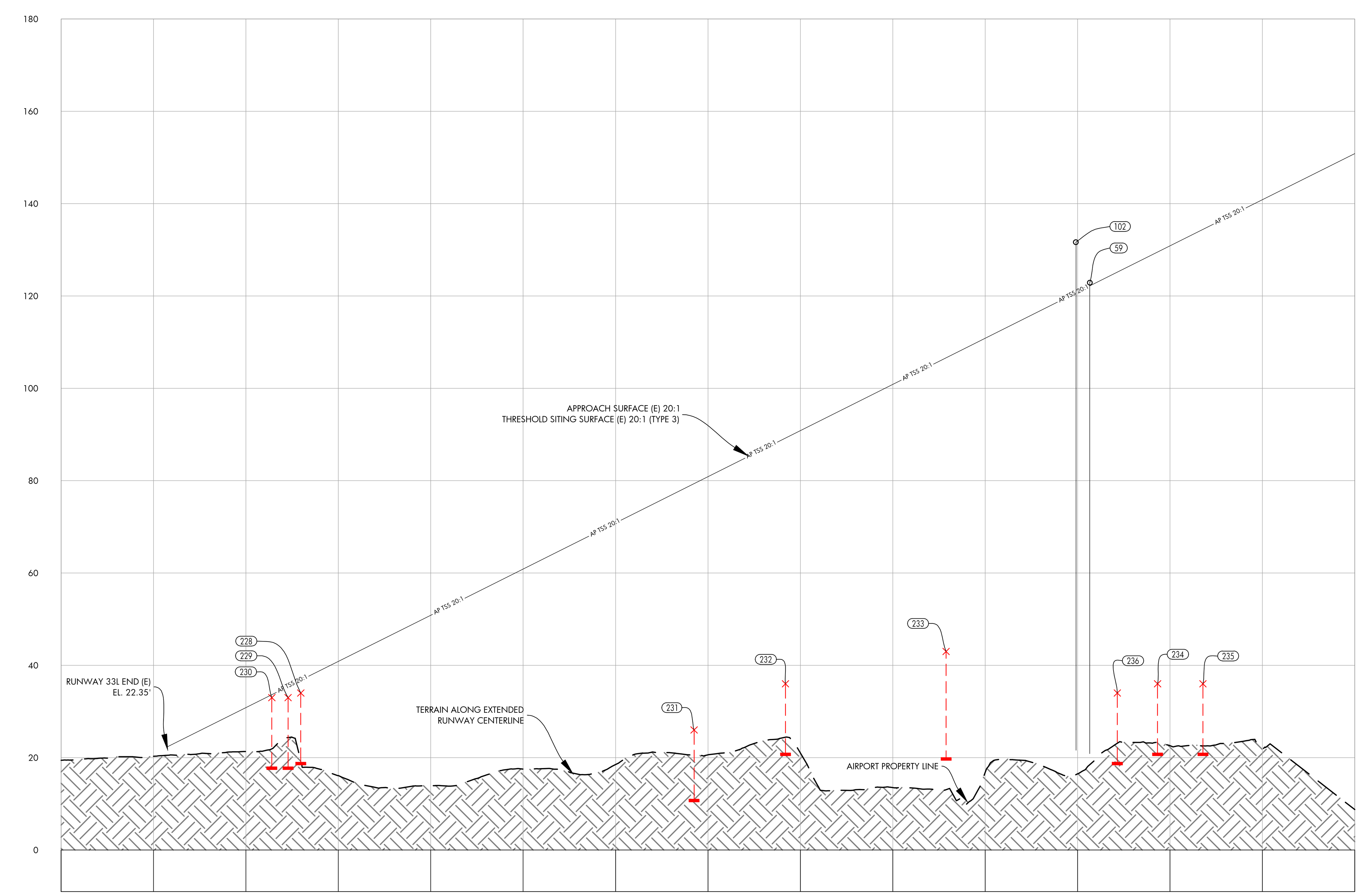
RUNWAY 33L APPROACH OBSTACLE TABLE

OBJECT IDENTIFICATION NO.	OBJECT TYPE	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33L APPROACH	0.71'	REMOVE
102	TREE	20.73'	110.88'	131.61'	RUNWAY 33L APPROACH	10.97'	REMOVE

RUNWAY 33L INNER APPROACH ROAD INTERSECTION TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
228	ROAD +15'	19.00'	15.00'	34.00'	RUNWAY 33L APPROACH	-2.78'	N/A
229	ROAD +15'	18.00'	15.00'	33.00'	RUNWAY 33L APPROACH	-2.40'	N/A
230	ROAD +15'	18.00'	15.00'	33.00'	RUNWAY 33L APPROACH	-0.64'	N/A
231	ROAD +15'	11.00'	15.00'	26.00'	RUNWAY 33L APPROACH	-53.34'	N/A
232	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33L APPROACH	-53.23'	N/A
233	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 33L APPROACH	-63.62'	N/A
234	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33L APPROACH	-93.50'	N/A
235	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33L APPROACH	-98.41'	N/A
236	ROAD +15'	19.00'	15.00'	34.00'	RUNWAY 33L APPROACH	-91.14'	N/A





NOTES AND SOURCES

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3. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

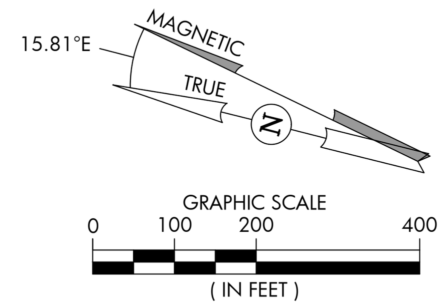
ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 33L INNER APPROACH SURFACE DRAWING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO.

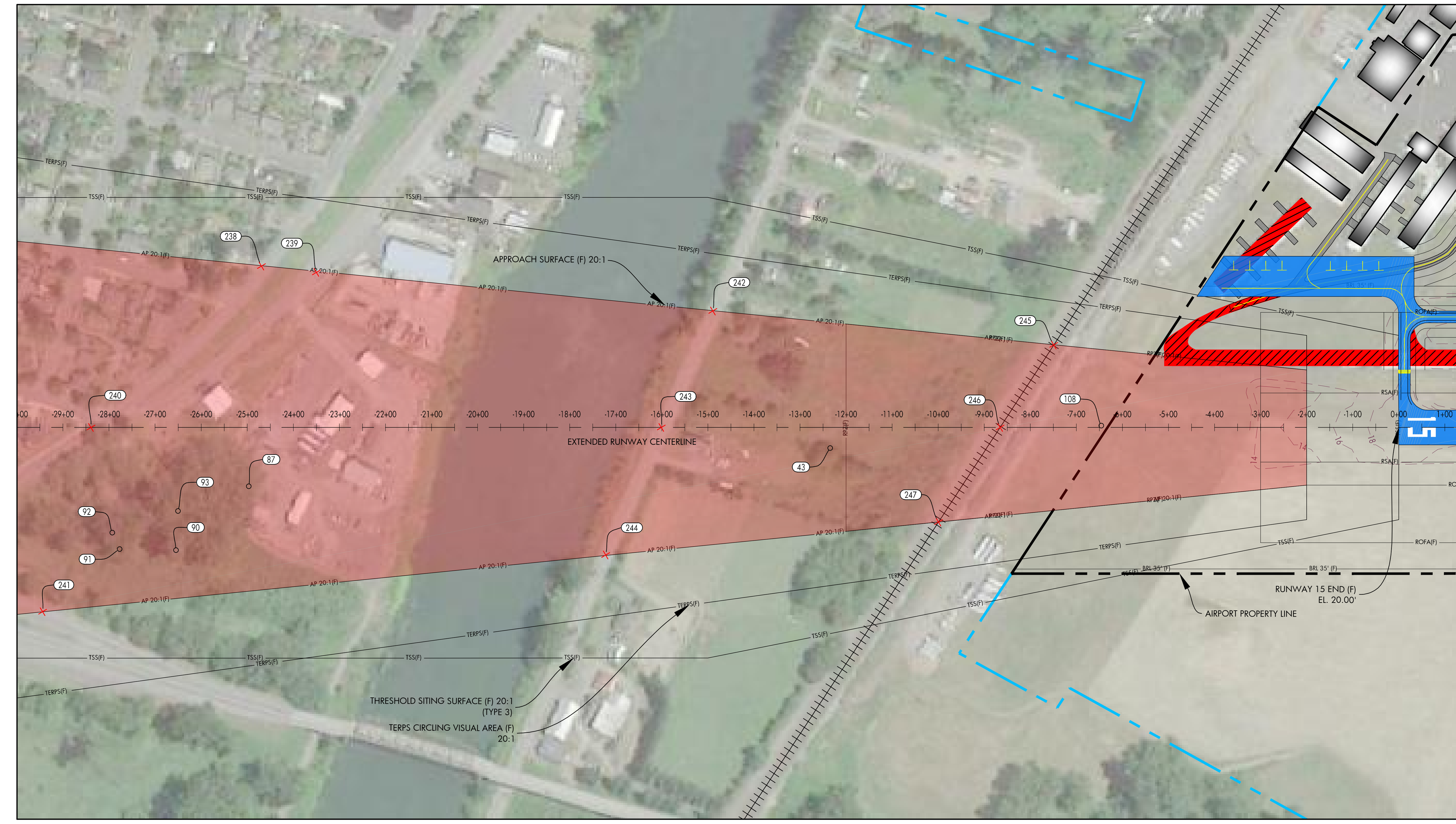


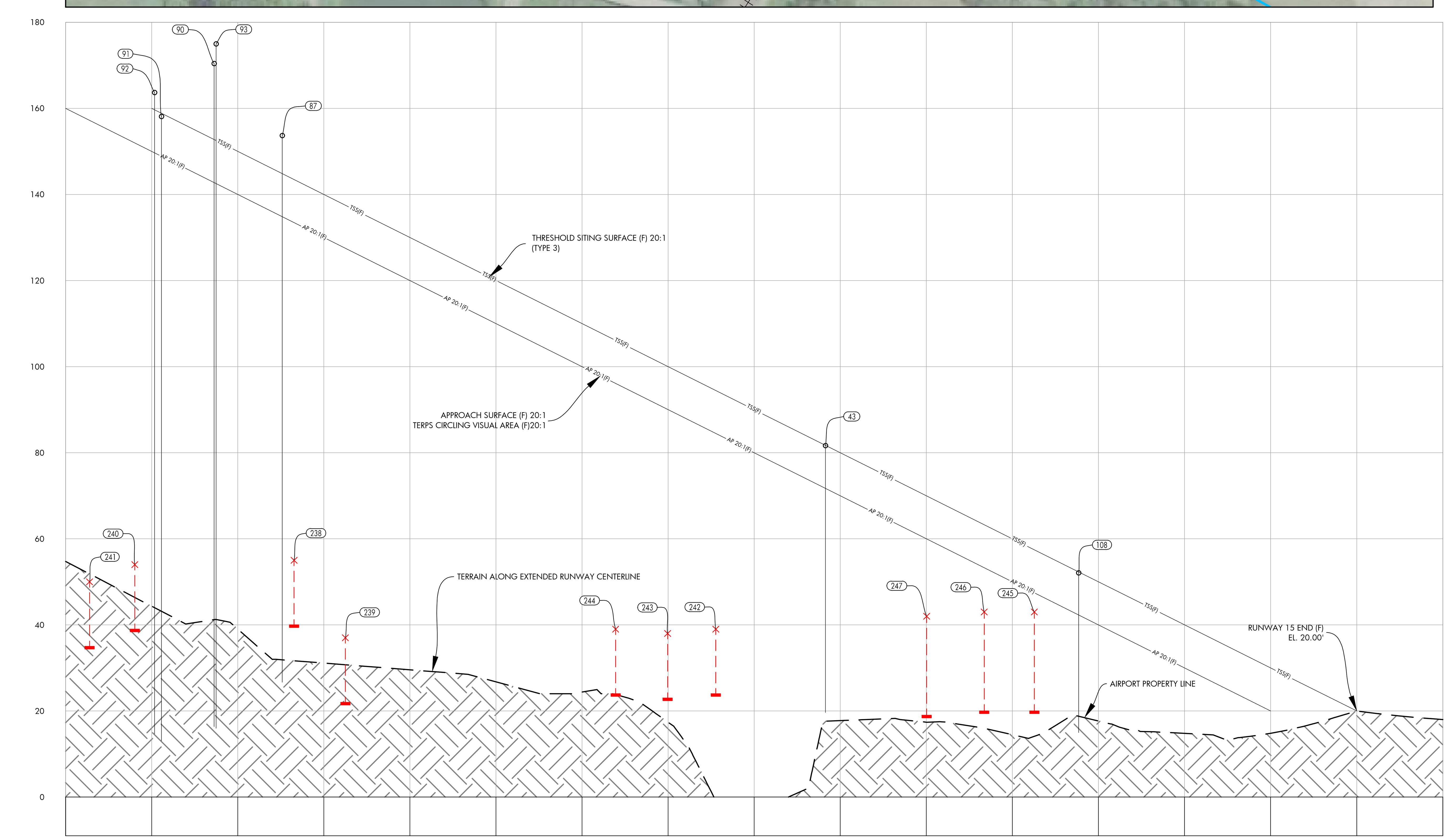
DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

PROFILE
HORIZ: 1" = 200'
VERT: 1" = 20'

RUNWAY 15 INNER APPROACH OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
43	TREE	19.59'	62.05'	81.63'	RUNWAY 15 APPROACH	9.91'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15 APPROACH	18.82'	REMOVE
90	TREE	15.91'	154.47'	170.39'	RUNWAY 15 APPROACH	27.64'	REMOVE
91	TREE	12.67'	145.42'	158.09'	RUNWAY 15 APPROACH	9.22'	REMOVE
92	TREE	14.12'	149.55'	163.66'	RUNWAY 15 APPROACH	14.00'	REMOVE
93	TREE	15.77'	159.19'	174.96'	RUNWAY 15 APPROACH	32.44'	REMOVE
108	UTILITY POLE	14.28'	37.80'	52.08'	RUNWAY 15 APPROACH	9.78'	MARK/LIGHT

RUNWAY 15 INNER APPROACH ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
238	ROAD +15'	40.00'	15.00'	55.00'	RUNWAY 15 APPROACH	-78.46'	N/A
239	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15 APPROACH	-90.49'	N/A
240	ROAD +15'	39.00'	15.00'	54.00'	RUNWAY 15 APPROACH	-97.96'	N/A
241	ROAD +15'	35.00'	15.00'	50.00'	RUNWAY 15 APPROACH	-107.22'	N/A
242	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15 APPROACH	-45.46'	N/A
243	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 15 APPROACH	-52.06'	N/A
244	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15 APPROACH	-57.10'	N/A
245	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15 APPROACH	-4.45'	N/A
246	RAIL ROAD +23'	20.00'	23.00'	43.00'	RUNWAY 15 APPROACH	-10.28'	N/A
247	RAIL ROAD +23'	19.00'	23.00'	42.00'	RUNWAY 15 APPROACH	-17.97'	N/A





NOTES AND SOURCES

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Sean.Jarvis

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HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

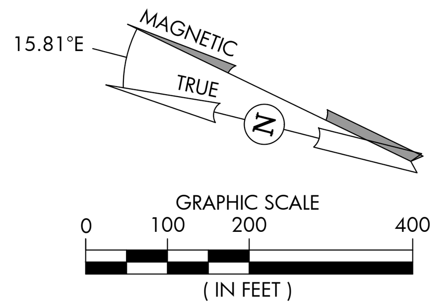
DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT LAYOUT PLAN

RUNWAY 15 INNER APPROACH SURFACE DRAWING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018



DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

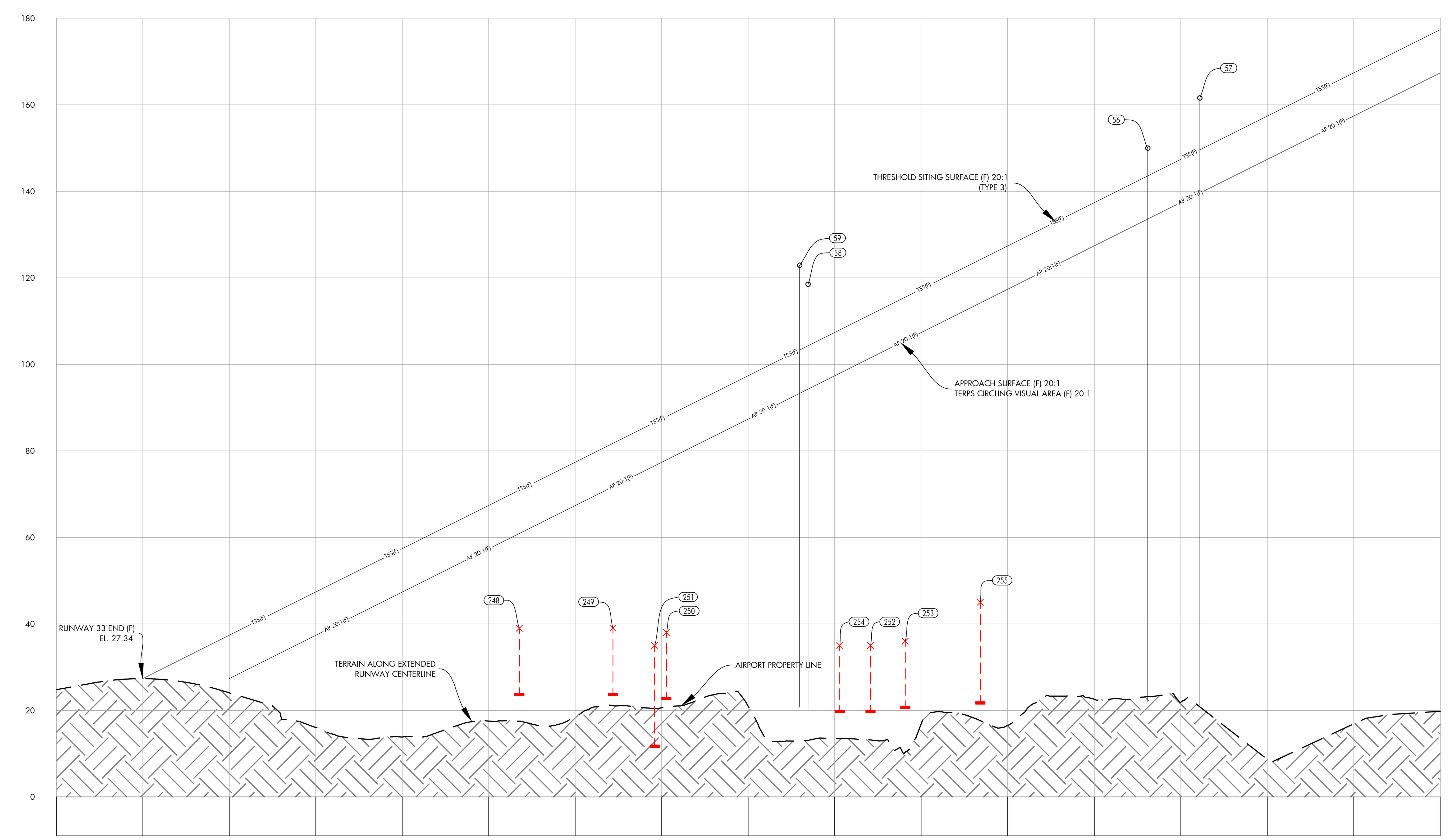
PROFILE
HORIZ: 1" = 200'
VERT: 1" = 20'

RUNWAY 33 APPROACH OBSTACLE TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
56	TREE	21.49'	128.45'	149.94'	RUNWAY 33 APPROACH	16.39'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33 APPROACH	21.99'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33 APPROACH	24.21'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33 APPROACH	29.57'	REMOVE

RUNWAY 33 INNER APPROACH ROAD INTERSECTION TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
248	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 33 APPROACH	-21.90'	N/A
249	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 33 APPROACH	-32.73'	N/A
250	ROAD +15'	23.00'	15.00'	38.00'	RUNWAY 33 APPROACH	-39.90'	N/A
251	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33 APPROACH	-41.55'	N/A
252	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33 APPROACH	-66.50'	N/A
253	ROAD +15'	21.00'	15.00'	36.00'	RUNWAY 33 APPROACH	-69.52'	N/A
254	ROAD +15'	20.00'	15.00'	35.00'	RUNWAY 33 APPROACH	-62.93'	N/A
255	RAIL ROAD +23'	22.00'	23.00'	45.00'	RUNWAY 33 APPROACH	-69.20'	N/A



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HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 33 INNER APPROACH SURFACE DRAWING

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO.

15.81°E
MAGNETIC
TRUE
N

GRAPHIC SCALE
0 500 1000 2000
(IN FEET)

DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

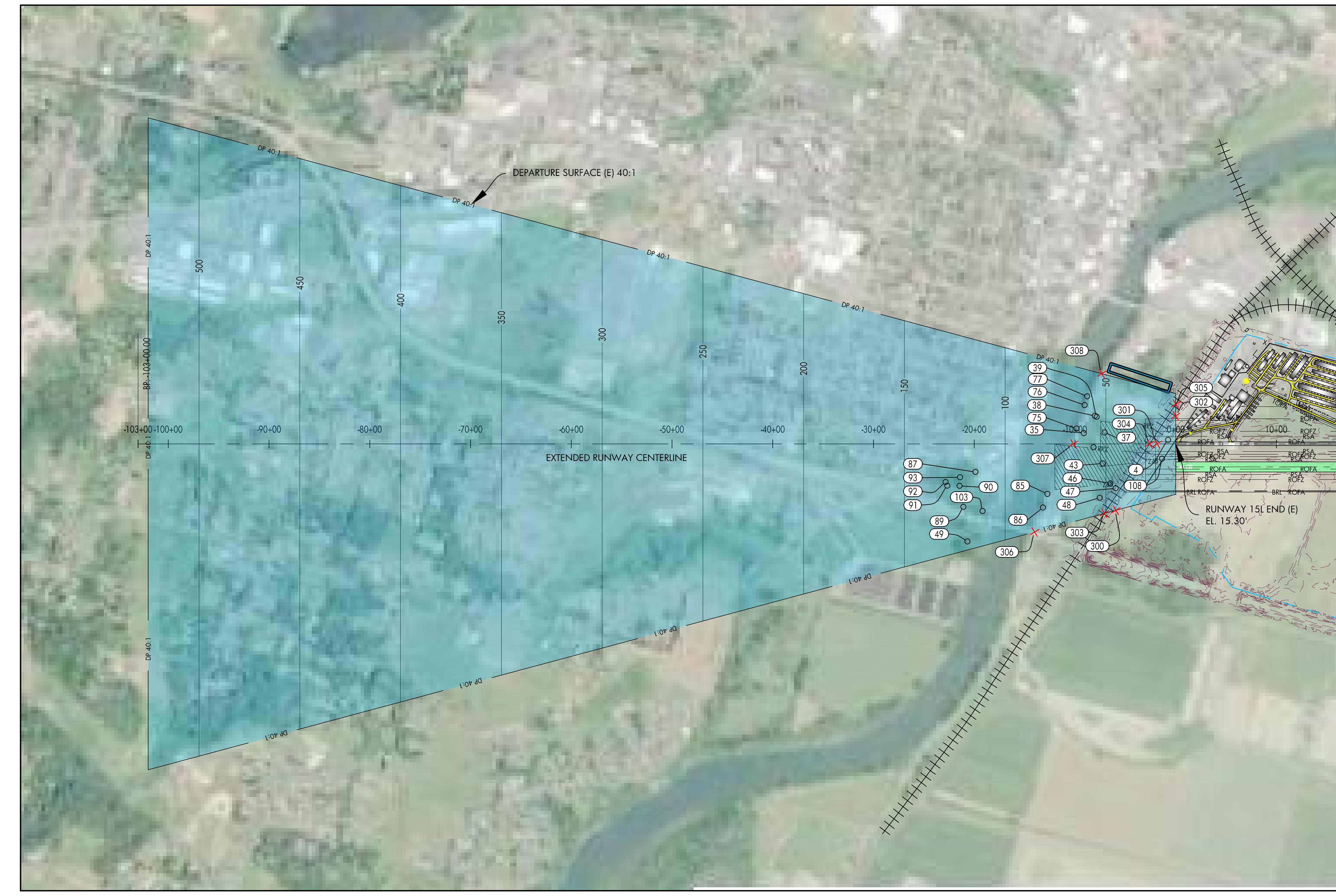
PROFILE
HORIZ: 1" = 1,000'
VERT: 1" = 100'

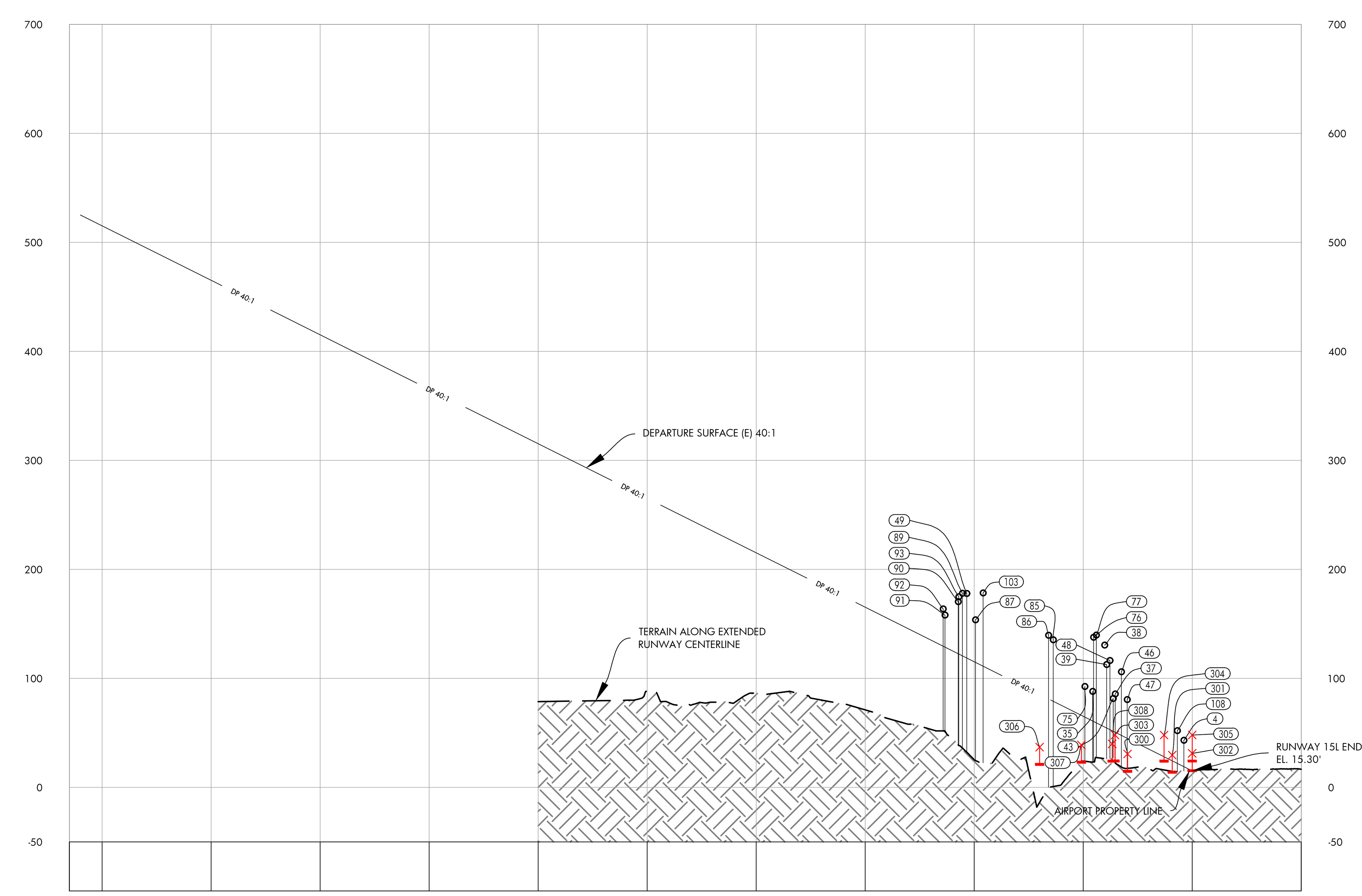
RUNWAY 15L DEPARTURE SURFACE OBSTACLE TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
4	POLE	14.45'	28.79'	43.24'	RUNWAY 15L DEPARTURE	24.08'	MARK/LIGHT
35	TREE	21.79'	66.33'	88.12'	RUNWAY 15L DEPARTURE	27.15'	REMOVE
37	TREE	20.69'	65.10'	85.79'	RUNWAY 15L DEPARTURE	35.11'	REMOVE
38	TREE	20.80'	109.70'	130.50'	RUNWAY 15L DEPARTURE	75.03'	REMOVE
39	TREE	19.93'	92.77'	112.70'	RUNWAY 15L DEPARTURE	58.12'	REMOVE
43	TREE	19.59'	62.05'	81.63'	RUNWAY 15L DEPARTURE	30.02'	REMOVE
46	TREE	12.97'	93.13'	106.10'	RUNWAY 15L DEPARTURE	58.31'	REMOVE
47	TREE	18.11'	62.49'	80.60'	RUNWAY 15L DEPARTURE	35.43'	REMOVE
48	TREE	13.19'	103.25'	116.44'	RUNWAY 15L DEPARTURE	63.35'	REMOVE
49	TREE	17.79'	160.09'	177.88'	RUNWAY 15L DEPARTURE	59.17'	REMOVE
75	TREE	22.93'	69.59'	92.52'	RUNWAY 15L DEPARTURE	27.91'	REMOVE
76	TREE	19.10'	118.67'	137.77'	RUNWAY 15L DEPARTURE	77.23'	REMOVE
77	TREE	8.83'	130.89'	139.72'	RUNWAY 15L DEPARTURE	80.41'	REMOVE
85	TREE	20.16'	115.29'	135.46'	RUNWAY 15L DEPARTURE	56.36'	REMOVE
86	TREE	25.86'	113.71'	139.57'	RUNWAY 15L DEPARTURE	58.35'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15L DEPARTURE	38.94'	REMOVE
89	TREE	21.03'	157.04'	178.07'	RUNWAY 15L DEPARTURE	57.34'	REMOVE
90	TREE	15.91'	154.47'	170.39'	RUNWAY 15L DEPARTURE	47.76'	REMOVE
91	TREE	12.67'	145.42'	158.09'	RUNWAY 15L DEPARTURE	29.34'	REMOVE
92	TREE	14.12'	149.55'	163.66'	RUNWAY 15L DEPARTURE	34.12'	REMOVE
93	TREE	15.77'	159.19'	174.96'	RUNWAY 15L DEPARTURE	52.56'	REMOVE
103	TREE	22.53'	155.92'	178.45'	RUNWAY 15L DEPARTURE	67.23'	REMOVE
108	UTILITY POLE	14.28'	37.80'	52.08'	RUNWAY 15L DEPARTURE	29.89'	MARK/LIGHT

RUNWAY 15L DEPARTURE SURFACE ROAD INTERSECTION TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
300	ROAD +15'	15.72'	15.00'	30.72'	RUNWAY 15L DEPARTURE	-14.28'	N/A
301	ROAD +15'	14.75'	15.00'	29.75'	RUNWAY 15L DEPARTURE	5.26'	MARK/LIGHT
302	ROAD +15'	16.32'	15.00'	31.32'	RUNWAY 15L DEPARTURE	15.95'	MARK/LIGHT
303	RAILROAD +23'	25.18'	23.00'	48.18'	RUNWAY 15L DEPARTURE	-2.54'	N/A
304	RAILROAD +23'	25.05'	23.00'	48.05'	RUNWAY 15L DEPARTURE	19.80'	MARK/LIGHT
305	RAILROAD +23'	25.15'	23.00'	48.15'	RUNWAY 15L DEPARTURE	32.84'	MARK/LIGHT
306	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15L DEPARTURE	-48.32'	N/A
307	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15L DEPARTURE	-27.13'	N/A
308	ROAD +15'	25.00'	15.00'	40.00'	RUNWAY 15L DEPARTURE	-12.02'	N/A





NOTES AND SOURCES

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3. ALL HORIZONTAL COORDINATES - NAD 83/2011 ALL VERTICAL COORDINATES - NAVD 88

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD

NO.	BY	DATE	DESCRIPTION

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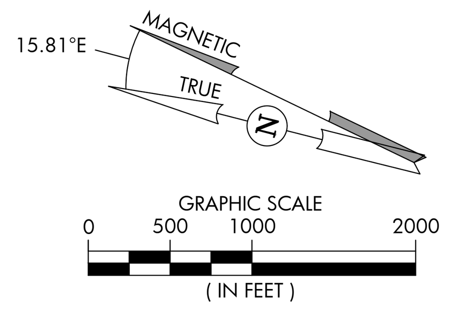
AIRPORT
LAYOUT PLAN

RUNWAY 15L DEPARTURE SURFACE

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO.
15 of 20

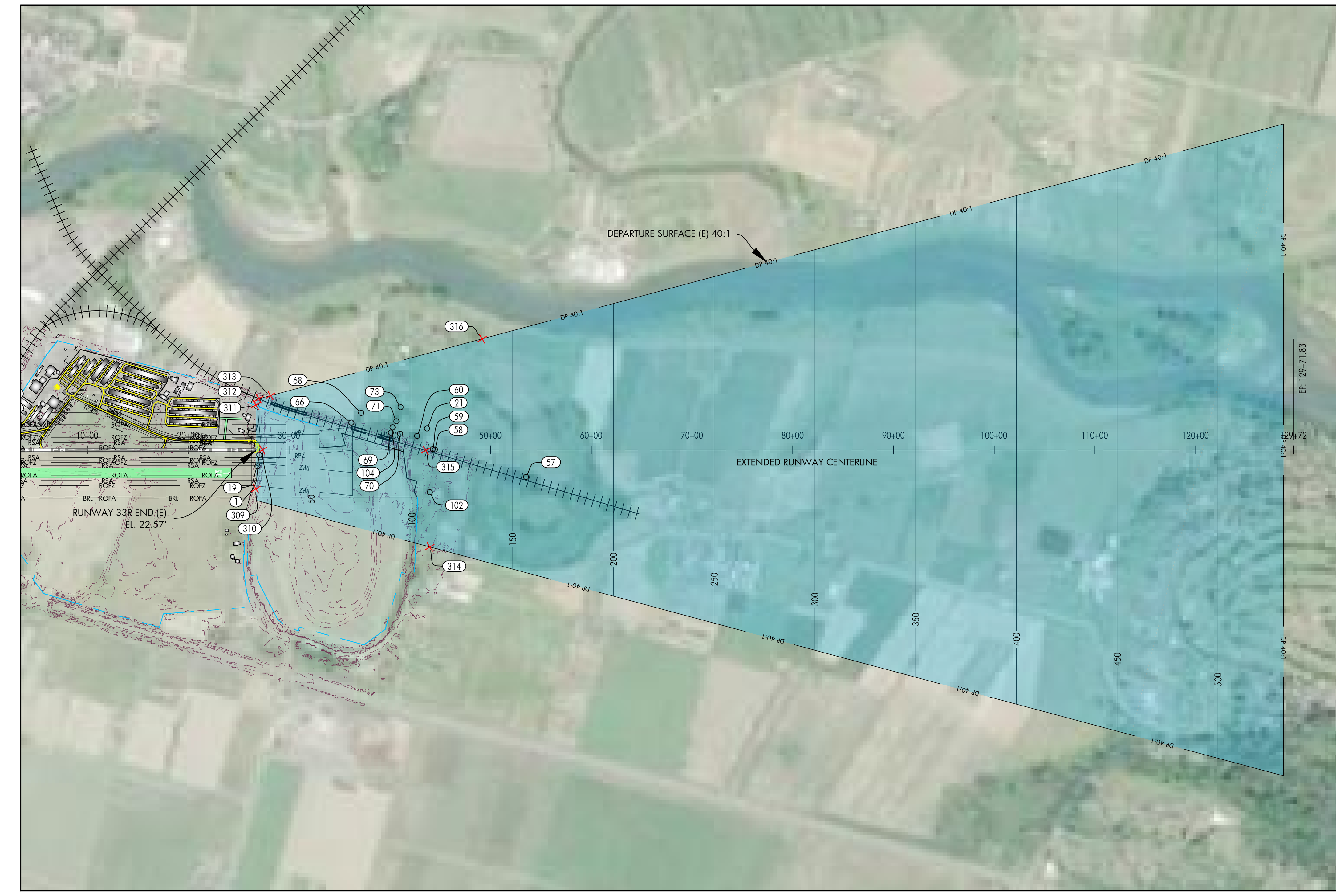


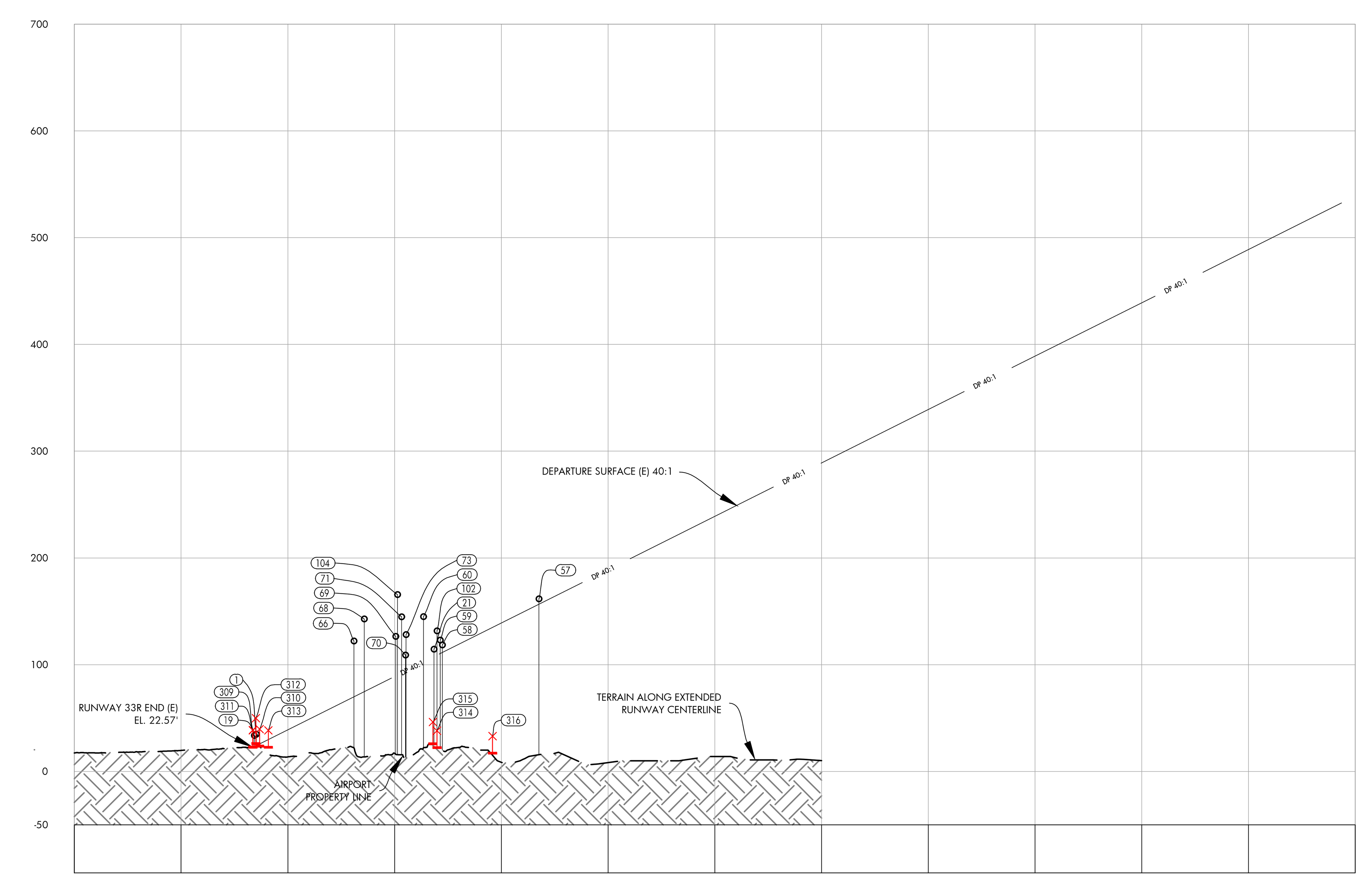
DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

PROFILE
HORIZ: 1" = 1,000'
VERT: 1" = 100'

RUNWAY 33R DEPARTURE SURFACE OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
1	POLE	22.60'	12.14'	34.74'	RUNWAY 33R DEPARTURE	10.54'	MARK/LIGHT
19	SIGN	23.84'	9.68'	33.52'	RUNWAY 33R DEPARTURE	10.26'	MARK/LIGHT
21	TREE	16.77'	97.61'	114.38'	RUNWAY 33R DEPARTURE	6.95'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33R DEPARTURE	4.95'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33R DEPARTURE	7.17'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33R DEPARTURE	12.53'	REMOVE
60	TREE	17.67'	127.25'	144.92'	RUNWAY 33R DEPARTURE	42.41'	REMOVE
66	TREE	21.24'	100.86'	122.10'	RUNWAY 33R DEPARTURE	52.19'	REMOVE
68	TREE	18.42'	124.32'	142.73'	RUNWAY 33R DEPARTURE	68.00'	REMOVE
69	TREE	16.73'	109.69'	126.42'	RUNWAY 33R DEPARTURE	36.87'	REMOVE
70	TREE	15.54'	93.41'	108.95'	RUNWAY 33R DEPARTURE	14.84'	REMOVE
71	TREE	14.77'	129.95'	144.72'	RUNWAY 33R DEPARTURE	52.43'	REMOVE
73	TREE	17.10'	110.91'	128.01'	RUNWAY 33R DEPARTURE	33.63'	REMOVE
102	TREE	20.73'	110.88'	131.61'	RUNWAY 33R DEPARTURE	22.79'	REMOVE
104	TREE	16.19'	149.33'	165.52'	RUNWAY 33R DEPARTURE	75.17'	REMOVE

RUNWAY 33R DEPARTURE SURFACE ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
309	ROAD +15'	23.76'	15.00'	38.76'	RUNWAY 33R DEPARTURE	16.16'	MARK/LIGHT
310	RAILROAD +23'	16.54'	23.00'	39.54'	RUNWAY 33R DEPARTURE	13.77'	MARK/LIGHT
311	ROAD +15'	23.44'	15.00'	38.44'	RUNWAY 33R DEPARTURE	15.86'	MARK/LIGHT
312	ROAD +15'	26.87'	15.00'	41.87'	RUNWAY 33R DEPARTURE	17.85'	MARK/LIGHT
313	ROAD +15'	23.44'	15.00'	38.44'	RUNWAY 33R DEPARTURE	8.58'	MARK/LIGHT
314	ROAD +15'	23.11'	15.00'	38.11'	RUNWAY 33R DEPARTURE	-70.76'	N/A
315	RAILROAD +23'	15.28'	23.00'	38.28'	RUNWAY 33R DEPARTURE	-82.94'	N/A
316	ROAD +15'	18.00'	15.00'	33.00'	RUNWAY 33R DEPARTURE	-101.87'	N/A





NOTES AND SOURCES

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SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

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AIRPORT
LAYOUT PLAN

RUNWAY 33R DEPARTURE SURFACE

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018

SHEET NO.
16 of 20

15.81°E
MAGNETIC
TRUE

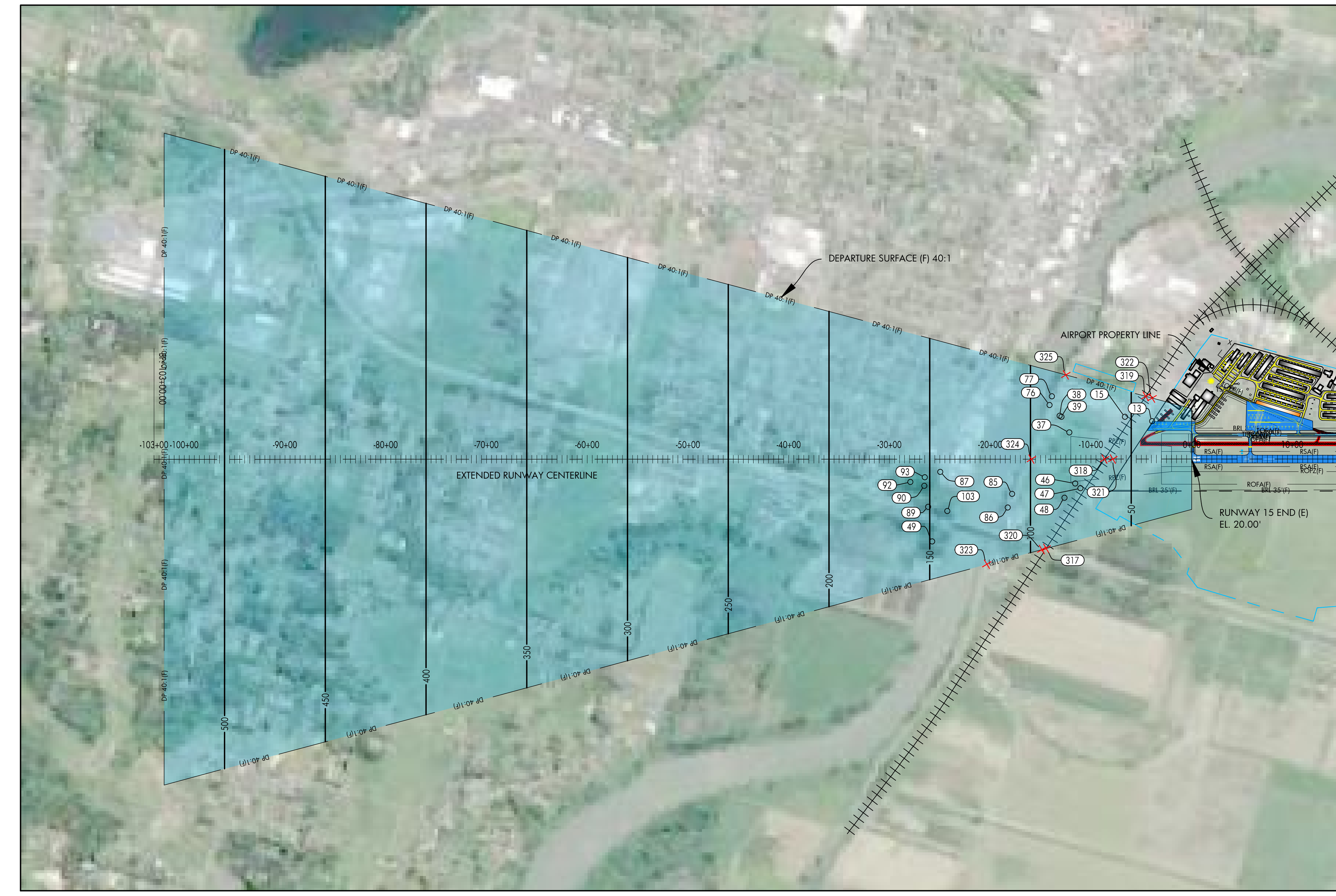
GRAPHIC SCALE
0 500 1000 2000
(IN FEET)

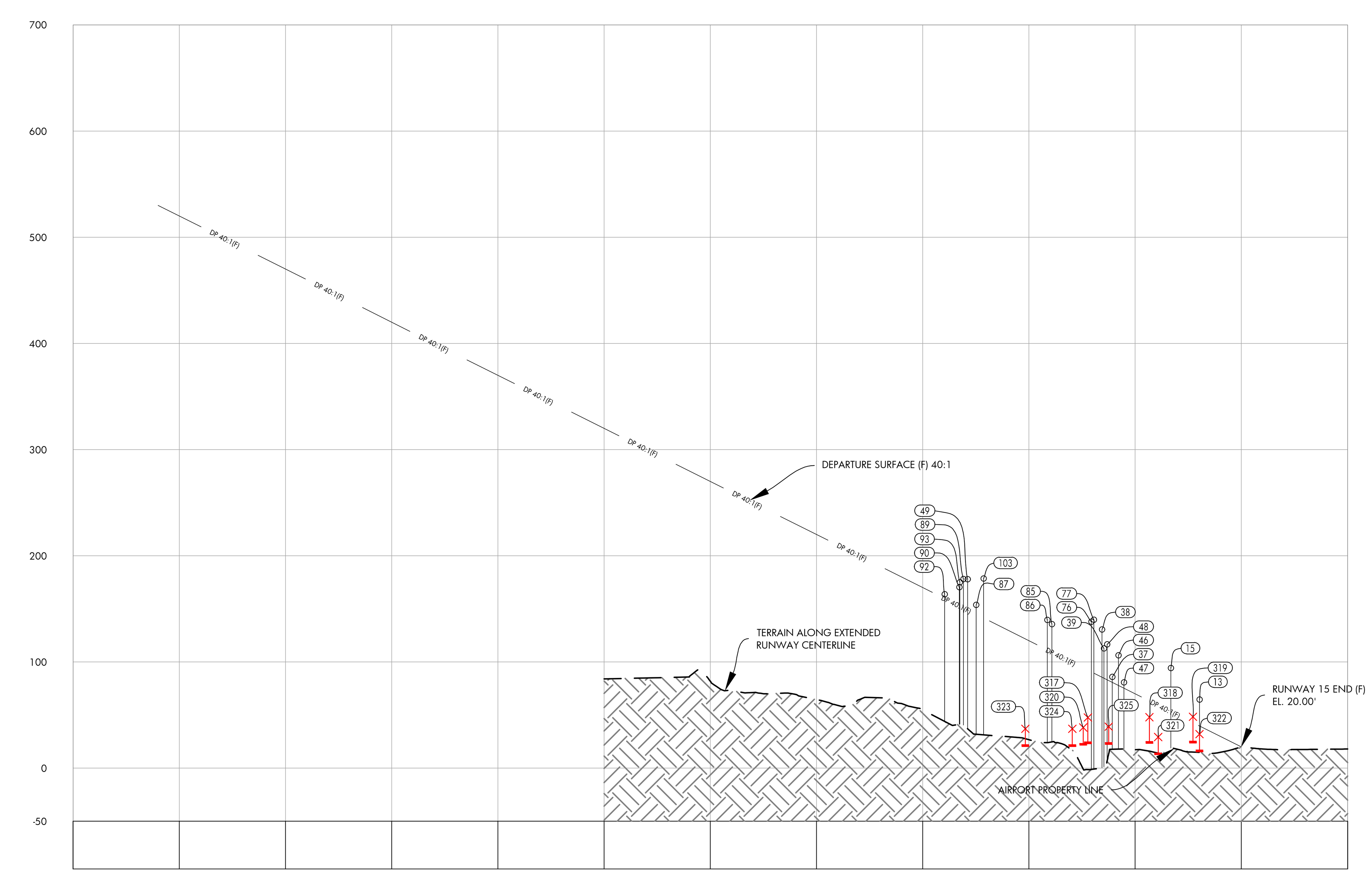
DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

PROFILE
HORIZ: 1" = 1,000'
VERT: 1" = 100'

RUNWAY 15 DEPARTURE SURFACE OBSTACLE TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
13	POLE	15.22'	49.28'	64.50'	RUNWAY 15 DEPARTURE	24.80'	MARK/LIGHT
15	TREE	21.97'	72.19'	94.16'	RUNWAY 15 DEPARTURE	40.93'	REMOVE
37	TREE	20.69'	65.10'	85.79'	RUNWAY 15 DEPARTURE	4.99'	REMOVE
38	TREE	20.80'	109.70'	130.50'	RUNWAY 15 DEPARTURE	44.91'	REMOVE
39	TREE	19.93'	92.77'	112.70'	RUNWAY 15 DEPARTURE	28.01'	REMOVE
46	TREE	12.97'	93.13'	106.10'	RUNWAY 15 DEPARTURE	28.20'	REMOVE
47	TREE	18.11'	62.49'	80.60'	RUNWAY 15 DEPARTURE	5.31'	REMOVE
48	TREE	13.19'	103.25'	116.44'	RUNWAY 15 DEPARTURE	33.23'	REMOVE
49	TREE	17.79'	160.09'	177.88'	RUNWAY 15 DEPARTURE	29.06'	REMOVE
76	TREE	19.10'	118.67'	137.77'	RUNWAY 15 DEPARTURE	47.11'	REMOVE
77	TREE	8.83'	130.89'	139.72'	RUNWAY 15 DEPARTURE	50.29'	REMOVE
85	TREE	20.16'	115.29'	135.46'	RUNWAY 15 DEPARTURE	26.24'	REMOVE
86	TREE	25.86'	113.71'	139.57'	RUNWAY 15 DEPARTURE	28.23'	REMOVE
87	TREE	26.38'	127.28'	153.66'	RUNWAY 15 DEPARTURE	8.82'	REMOVE
89	TREE	21.03'	157.04'	178.07'	RUNWAY 15 DEPARTURE	27.22'	REMOVE
90	TREE	15.91'	154.47'	170.39'	RUNWAY 15 DEPARTURE	17.64'	REMOVE
92	TREE	14.12'	149.55'	163.66'	RUNWAY 15 DEPARTURE	4.00'	REMOVE
93	TREE	15.77'	159.19'	174.96'	RUNWAY 15 DEPARTURE	22.44'	REMOVE
103	TREE	22.53'	155.92'	178.45'	RUNWAY 15 DEPARTURE	37.11'	REMOVE

RUNWAY 15 DEPARTURE SURFACE ROAD INTERSECTION TABLE							
OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
317	RAILROAD +23'	24.70'	23.00'	47.70'	RUNWAY 15 DEPARTURE	-44.53'	N/A
318	RAILROAD +23'	24.93'	23.00'	47.93'	RUNWAY 15 DEPARTURE	-15.35'	N/A
319	RAILROAD +23'	25.35'	23.00'	48.35'	RUNWAY 15 DEPARTURE	5.56'	MARK/LIGHT
320	ROAD +15'	23.24'	15.00'	38.24'	RUNWAY 15 DEPARTURE	-56.18'	N/A
321	ROAD +15'	14.24'	15.00'	29.24'	RUNWAY 15 DEPARTURE	-29.91'	N/A
322	ROAD +15'	17.03'	15.00'	32.03'	RUNWAY 15 DEPARTURE	-7.66'	N/A
323	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15 DEPARTURE	-84.69'	N/A
324	ROAD +15'	22.00'	15.00'	37.00'	RUNWAY 15 DEPARTURE	-62.58'	N/A
325	ROAD +15'	24.00'	15.00'	39.00'	RUNWAY 15 DEPARTURE	-43.48'	N/A





NOTES AND SOURCES

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HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 15 DEPARTURE SURFACE

AIP PROJ. NO.
3-53-0070-003-2014

JVIATION PROJ. NO.
2014.S43.01

DATE:
SEPTEMBER 2018

SHEET NO.

15.81°E

MAGNETIC

TRUE

GRAPHIC SCALE

0 500 1000 2000

(IN FEET)

DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

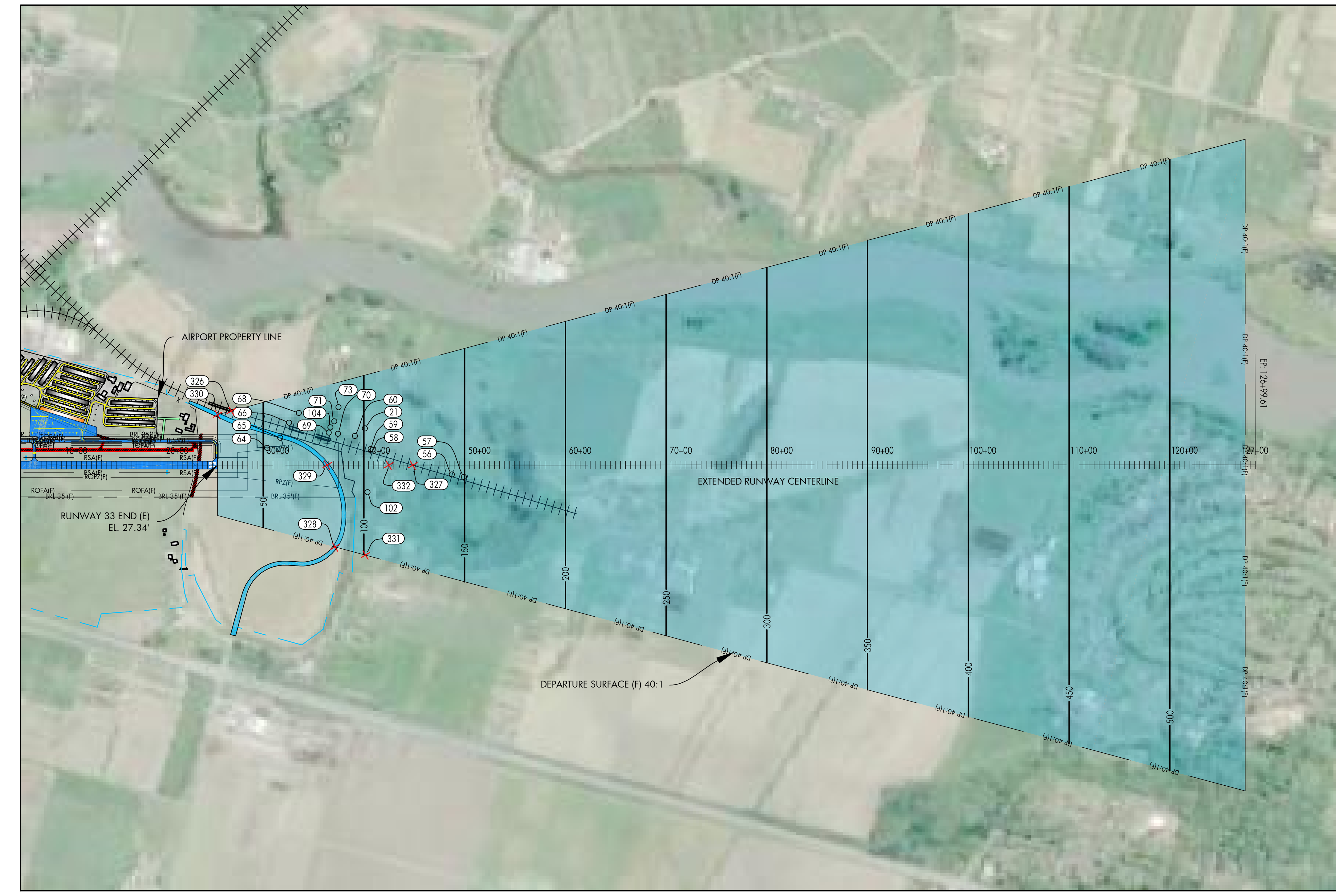
PROFILE
HORIZ: 1" = 1,000'
VERT: 1" = 100'

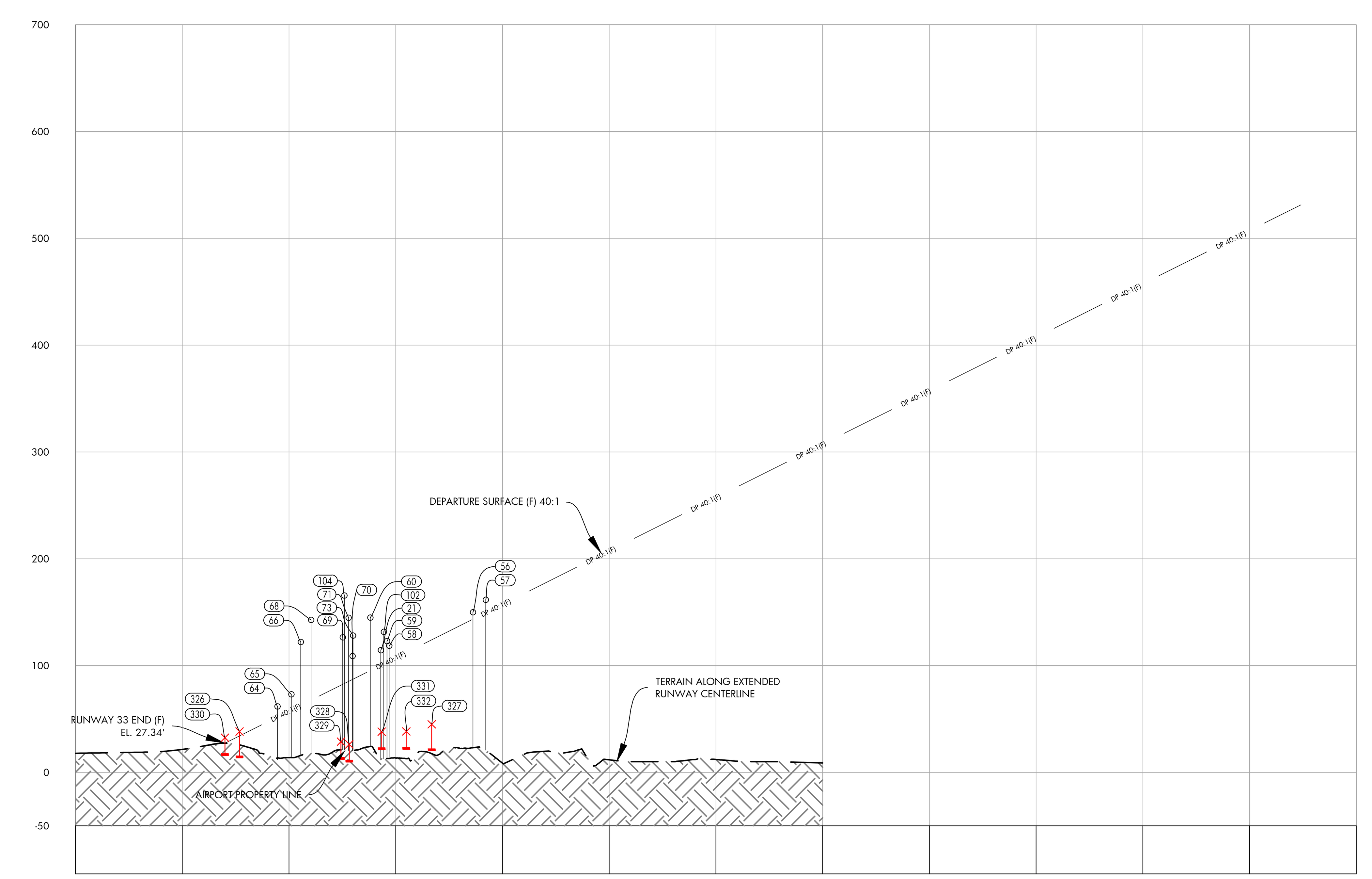
RUNWAY 33 DEPARTURE SURFACE OBSTACLE TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
21	TREE	16.77'	97.61'	114.38'	RUNWAY 33 DEPARTURE	6.95'	REMOVE
56	TREE	21.49'	128.45'	149.94'	RUNWAY 33 DEPARTURE	6.39'	REMOVE
57	TREE	20.47'	141.08'	161.55'	RUNWAY 33 DEPARTURE	11.99'	REMOVE
58	TREE	20.27'	98.21'	118.48'	RUNWAY 33 DEPARTURE	14.21'	REMOVE
59	TREE	20.73'	102.15'	122.88'	RUNWAY 33 DEPARTURE	19.57'	REMOVE
60	TREE	17.67'	127.25'	144.92'	RUNWAY 33 DEPARTURE	49.44'	REMOVE
64	TREE	20.13'	41.50'	61.63'	RUNWAY 33 DEPARTURE	9.70'	REMOVE
65	TREE	22.15'	50.85'	73.00'	RUNWAY 33 DEPARTURE	14.59'	REMOVE
66	TREE	21.24'	100.86'	122.10'	RUNWAY 33 DEPARTURE	59.23'	REMOVE
68	TREE	18.42'	124.32'	142.73'	RUNWAY 33 DEPARTURE	75.04'	REMOVE
69	TREE	16.73'	109.69'	126.42'	RUNWAY 33 DEPARTURE	43.91'	REMOVE
70	TREE	15.54'	93.41'	108.95'	RUNWAY 33 DEPARTURE	21.88'	REMOVE
71	TREE	14.77'	129.95'	144.72'	RUNWAY 33 DEPARTURE	59.46'	REMOVE
73	TREE	17.10'	110.91'	128.01'	RUNWAY 33 DEPARTURE	40.67'	REMOVE
102	TREE	20.73'	110.88'	131.61'	RUNWAY 33 DEPARTURE	29.83'	REMOVE
104	TREE	16.19'	149.33'	165.52'	RUNWAY 33 DEPARTURE	82.20'	REMOVE

RUNWAY 33 DEPARTURE SURFACE ROAD INTERSECTION TABLE

OBJECT IDENTIFICATION NO.	OBJECT/DESCRIPTION	GROUND SURFACE ELEVATION (MSL)	ABOVE GROUND LEVEL (AGL)	TOP OF OBJECT ELEVATION (AMSL)	SURFACE REFERENCED	EXISTING SURFACE PENETRATION	DISPOSITION
326	RAILROAD +23'	15.31'	23.00'	38.31'	RUNWAY 15 DEPARTURE	4.13'	MARK/LIGHT
327	RAILROAD +23'	22.00'	23.00'	45.00'	RUNWAY 15 DEPARTURE	-79.24'	N/A
328	ROAD +15'	11.31'	15.00'	26.31'	RUNWAY 15 DEPARTURE	-59.33'	N/A
329	ROAD +15'	13.82'	15.00'	28.82'	RUNWAY 15 DEPARTURE	-52.87'	N/A
330	ROAD +15'	17.52'	15.00'	32.52'	RUNWAY 15 DEPARTURE	5.17'	MARK/LIGHT
331	ROAD +15'	23.11'	15.00'	38.11'	RUNWAY 15 DEPARTURE	-62.70'	N/A
332	ROAD +15'	23.40'	15.00'	38.40'	RUNWAY 15 DEPARTURE	-73.91'	N/A





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HARVEY FIELD
SNOHOMISH, WASHINGTON

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

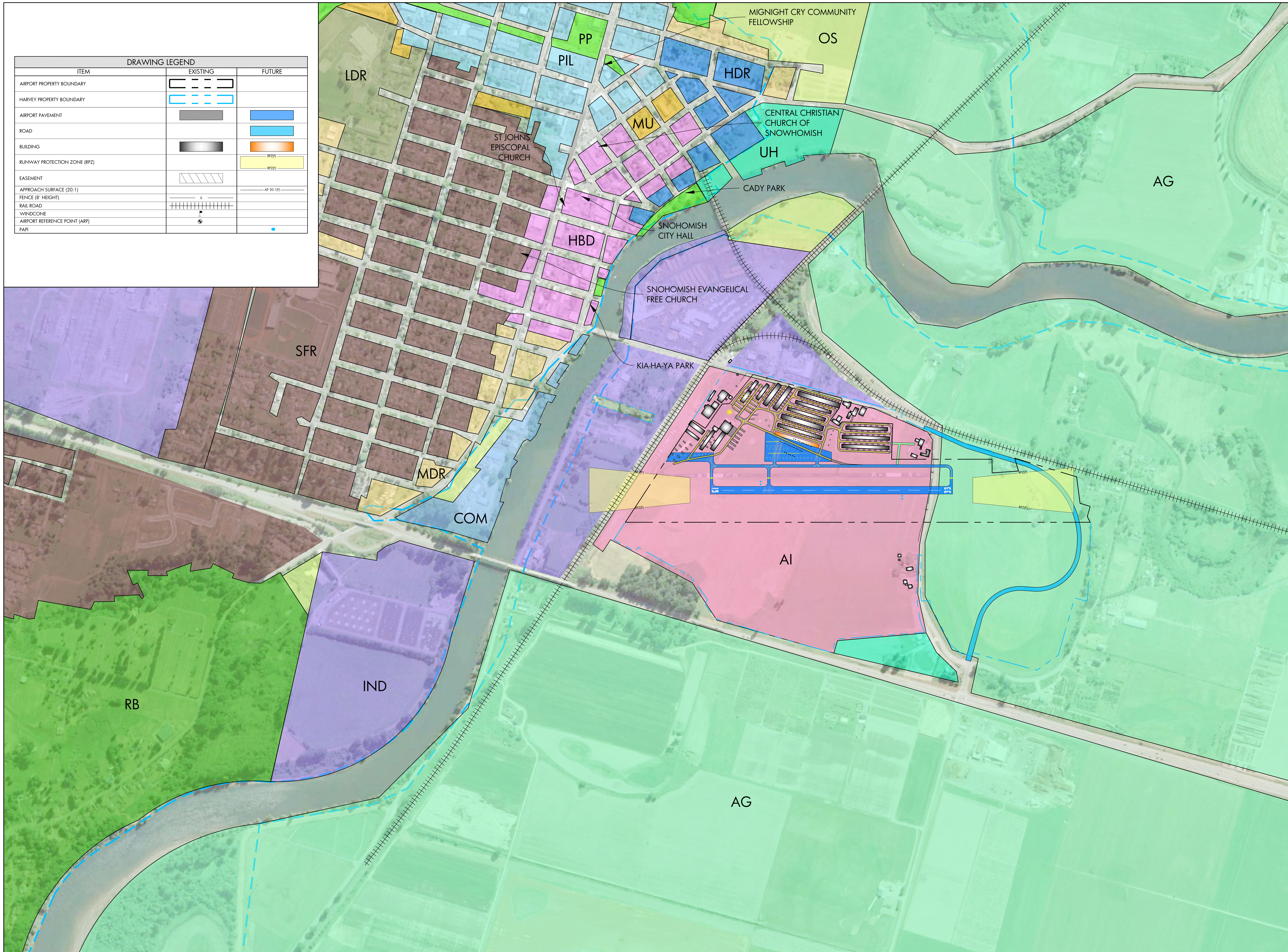
ISSUE RECORD

NO.	BY	DATE	DESCRIPTION

AIRPORT
LAYOUT PLAN

RUNWAY 33 DEPARTURE SURFACE

AIP PROJ. NO. 3-53-0070-003-2014
JVIATION PROJ. NO. 2014.S43.01
DATE: SEPTEMBER 2018



DRAWING LEGEND		
ITEM	EXISTING	FUTURE
AIRPORT PROPERTY BOUNDARY		
HARVEY PROPERTY BOUNDARY		
AIRPORT PAVEMENT		
ROAD		
BUILDING		
RUNWAY PROTECTION ZONE (RPZ)		RPZ(F) RPZ(F)
EASEMENT		
APPROACH SURFACE (20:1)		AP 20:1(F)
FENCE (8' HEIGHT)	X	
RAIL ROAD		
WINDCONE		
AIRPORT REFERENCE POINT (ARP)		
PAPI		

LAND USE LEGEND

SFR	SINGLE FAMILY
LDR	LOW-DENSITY RESIDENTIAL
MDR	MEDIUM-DENSITY RESIDENTIAL
HDR	HIGH-DENSITY RESIDENTIAL
PIL	PILCHUCK DISTRICT
COM	COMMERCIAL
HBD	HISTORIC BUSINESS
MU	MIX USE
IND	INDUSTRIAL
AI	AIRPORT INDUSTRY
UH	URBAN HORTICULTURE
PP	PARKS
OS	OPEN SPACE
RB	RURAL BUSINESS
AG	AGRICULTURAL
	100 YEAR FLOOD PLANE

15.81°E
MAGNETIC
TRUE
N

GRAPHIC SCALE
0 250 500 1000
(IN FEET)

DATE: JULY, 2017
ANNUAL RATE OF CHANGE: 0.14°W
SOURCE: U.S. NCEI

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3. LAND USE INFORMATION COMPILED FROM ARCGIS WEBSITE HTTPS://WWW.ARCGIS.COM/HOME/WEBMAP/VIEWER.HTML LAST MODIFIED AUGUST 29, 2018

L:\5543\ALP-2017\PLANS\
19--543--LAND USE.dwg
Sep 21, 2018 -- 2:17pm

JVIATION®

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SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

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AIRPORT
LAYOUT PLAN

LAND USE PLAN

AIP PROJ. NO. 3-53-0070-003-2014

JVIATION PROJ. NO. 2014.S43.01

DATE: SEPTEMBER 2018

DRAWING LEGEND

ITEM	EXISTING	FUTURE
AIRPORT PROPERTY BOUNDARY		
HARVEY PROPERTY BOUNDARY		
AIRPORT PAVEMENT		
ROAD		
TURF TAXIWAY		
BUILDING		
RUNWAY PROTECTION ZONE (RPZ)		RPZ(F)
EASEMENT		
BUILDING RESTRICTION LINE		BRL 35'(F)
RUNWAY OBJECT FREE AREA (ROFA)		ROFA(F)
RUNWAY SAFETY AREA (RSA)		RSA(F)
TAXIWAY OBJECT FREE AREA (TOFA)		TOFA(F)
TAXIWAY SAFETY AREA (TSA)		TSA(F)
TAXIWAY EDGE SAFETY MARGIN (TESM)		TESM(F)
OBJECT FREE ZONE - RUNWAY (ROFZ)		ROFZ(F)
APPROACH SURFACE (20:1)		AP 20:1(F)
FENCE (8' HEIGHT)	x	
RAIL ROAD		
WINDCONE		
AIRPORT REFERENCE POINT (ARP)		
PAPI		

AIRPORT PROPERTY TABLE

TRACT/PARCEL	CURRENT PROPERTY OWNER	DESCRIPTION OF ACQUISITION	ACREAGE	PROPERTY INTEREST	DATE ACQUIRED	FEDERAL PROJECT NO.
EXISTING AIRPORT PROPERTY ACQUISITION						
TRACT 1	HARVEY FIELD	FEE SIMPLE OWNERSHIP	145	OWNER	1859	NONE
TRACT 2	HARVEY FIELD	FEE SIMPLE OWNERSHIP	72	OWNER	2002	NONE
FUTURE AIRPORT PROPERTY ACQUISITION						
TRACT U1	N/A	EASEMENT	4.65	OWNER	N/A	N/A
TRACT U2	N/A	EASEMENT	0.21	OWNER	N/A	N/A

LEGEND

1 TRACT ID

PRESCRIPTIVE ROAD EASEMENT

DEEDED COUNTY ROAD

NOTES AND SOURCES

1. THE SITE PLAN AND LINE WORK IS BASED ON THE SNOHOMISH COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS)
2. ALL HORIZONTAL COORDINATES - NAD 83/2011
   ALL VERTICAL COORDINATES - NAVD 88

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Sep 21, 2018 - 2:18pm
Sean.Jarvis

JVIATION®

HARVEY FIELD
SNOHOMISH, WASHINGTON

HARVEY FIELD HF SINCE 1945

DES: R.L.B.
DR: R.L.B.
CH: S.V.B.
APP: M.C.L.

ISSUE RECORD			
NO.	BY	DATE	DESCRIPTION

THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER TITLE 49 U.S.C., SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS AIRPORT LAYOUT PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR WOULD HAVE JUSTIFICATION IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

AIRPORT LAYOUT PLAN

AIRPORT PROPERTY MAP

AIP PROJ. NO. 3-53-0070-003-2014

JVIATION PROJ. NO. 2014.S43.01

DATE: SEPTEMBER 2018

APPENDIX L

FAA's RTTF Policy

Federal Aviation Administration

Memorandum

Date: July 16, 2013

To: ACO-100, Regional and Airports District Office Managers and Compliance Specialists

From: Randall S. Fiertz, Director, Airport Compliance and Management Analysis

Subject: Compliance Guidance Letter 2013-01 – FAA Review of Existing and Proposed Residential Through-the-Fence Access Agreements

I. SUMMARY AND DEFINITIONS: This Compliance Guidance Letter (CGL) replaces and supersedes the guidance issued on March 21, 2011 (Compliance Guidance Letter 2011-1 - FAA Implementation of Interim Policy Regarding Access to Airports From Residential Property and Review of Access Arrangements[1]). The purpose of this CGL is to provide guidance to FAA's Airports personnel responsible for reviewing existing and proposed residential through-the-fence access agreements.

On February 14, 2012, the FAA Modernization and Reform Act of 2012 was signed into law (P.L. 112-95). Section 136 of this law states:

> ...a sponsor of a general aviation airport shall not be considered to be in violation of this subtitle, or to be in violation of a grant assurance made under this section or under any other provisions of law as a condition for the receipt of Federal financial assistance for airport development, solely because the sponsor enters into an agreement that grants to a person that owns residential real property adjacent to or near the airport access to the airfield of the airport for the following:
> (A) Aircraft of the person.
> (B) Aircraft authorized by the person.

In addition, this law outlines specific conditions and limitations that must be in the access agreement. Beginning on October 1, 2014, an airport sponsor with an existing residential through-the-fence access arrangement will be required to demonstrate evidence of compliance with this law. Specifically, these airport sponsors are required to update their airport layout plans to depict points of residential through-the-fence access and provide a copy or copies of their access agreements to demonstrate the sponsor's compliance with the law.

[1] Compliance Guidance Letter 2011-1 is no longer in use and is not currently available on the FAA's Web site. To obtain a copy of this guidance, contact ACO-100 at (202) 267-3085.

For the purposes of this CGL, the following definitions apply:

- Airport Property – All real property identified on the airport sponsor's most recent Exhibit A, on file with FAA for the airport.

- Access – An access point for taxiing aircraft across the airport boundary; or the right of the owner of a particular off-airport residential property to use an airport access point to taxi an aircraft between the airport and that property.

- Access Agreement – A written agreement between an airport sponsor and a residential property owner or an association representing residential property owners that prescribes the rights, responsibilities, charges, duration, and other terms the airport sponsor determines are necessary to establish and manage the airport sponsor's relationship with the residential property owner.

- Commercial Service Airport – A public airport in a State that the Secretary determines has at least 2,500 passenger boardings in each year and is receiving scheduled passenger aircraft service.

- Existing Access – Any residential through-the-fence access arrangement certified to the FAA in response to CGL 2011-1.

- Extend an Access – An airport sponsor's consent to renew or extend an existing right to access the airport from residential property or property zoned for residential use.

- General Aviation Airport – A general aviation airport as defined at 49 U.S.C., § 47102(8) as a public airport in a State that does not have commercial service or has scheduled service with less than 2,500 passenger boardings each year. This definition excludes privately-owned reliever airports.

- New Access – Any residential through-the-fence access arrangement executed on or after February 14, 2012.

- Privately-Owned Reliever Airport – A privately-owned airport the Secretary designates to relieve congestion at a commercial service airport and to provide more general aviation access to the overall community.

- Residential Property – A piece of real property used for single- or multi-family dwellings; duplexes; apartments; primary or secondary residences even when co-located with a hangar; hangars that incorporate living quarters for permanent or long-term use; and time-share hangars with living quarters for variable occupancy of any term.

- Transfer of Access – Sale or transfer of a residential property or property zoned for residential use with existing through-the-fence access; or subdivision, development or sale as individual lots of a residential property or property zoned for residential use with existing through-the-fence access.

- Triggering Event – An action that requires the airport sponsor to update its residential through-the-fence access plan or resubmit an access agreement review sheet prior to the expiration of the accepted access plan/agreement. (See section IV.A.3)

  The following actions are triggering events at commercial service airports:
  1. Development of an airport master plan or an update to an existing master plan.
  2. Significant revisions to an airport layout plan, such as changes to a runway's length, width or pavement strength; revised taxiway(s); change in design aircraft; change in runway approach procedures; land acquisition; new or modified aircraft hangar/parking areas; etc.
  3. Requests for Federal participation in land acquisition.
  4. Identification of a safety concern.
  5. Substantial changes to the access agreement.

  The following action is a triggering event at general aviation airports:
  1. Substantial changes to the access agreement.

II. BACKGROUND: On March 14, 2011, FAA amended Grant Assurance 5, *Preserving Rights and Powers*, to prohibit new residential through-the-fence access arrangements and published an interim policy to address existing residential through-the-fence access.[2] The interim policy required all AIP grant-eligible airport sponsors to certify their status. Those sponsors with existing access agreements were directed to depict their residential through-the-fence access points on their airport layout plan (ALP) and develop access plans to address:

- General Authority for Control of Airport Land and Access;
- Safety of Airport Operations;
- Recovery of Costs of Operating the Airport;
- Protection of Airport Airspace; and
- Compatible Land Uses Around the Airport.

The self-certification process identified 121 existing residential-through-fence agreements. This chart identifies the number of existing residential through-the-fence agreements by type of airport in each region.

FAA Region	Number of Existing Residential Through-the-Fence Access Agreements		
	GA Airports	Commercial Service Airports	Total
Alaska	4	1	5
Central	7	0	7
Eastern	13	0	13
Great Lakes	23	1	24
New England	6	0	6
Northwest Mountain	31	2	33
Southern	12	0	12
Southwest	12	0	12
Western Pacific	9	0	9
Total	117	4	121

[2] See 76 Fed. Reg. 15028 (March 18, 2011).

On February 14, 2012, the FAA Modernization and Reform Act of 2012 was signed into law (P.L. 112-95). Section 136 of this law permits general aviation airport sponsors, as defined in the statute, to enter into residential through-the-fence agreements with property owners or associations representing property owners. This must be a written agreement that requires the property owner to:

- Pay access charges that the sponsor determines to be comparable to those fees charged to tenants and operators on-airport making similar use of the airport;
- Bear the cost of building and maintaining the infrastructure the airport sponsor determines is necessary to provide access to the airfield from property located adjacent to or near the airport;
- Maintain the property for residential, noncommercial use for the duration of the agreement;
- Prohibit access to the airport from other properties through the property of the property owner; and
- Prohibit any aircraft refueling from occurring on the property.

In order to implement this law, FAA issued an amendment to the sponsor assurances on April 10, 2012.[3] Grant Assurance 5(g) now states:

> Sponsors of commercial service airports will not permit or enter into any arrangement that results in permission for the owner or tenant of a property used as a residence, or zoned for residential use, to taxi an aircraft between that property and any location on airport. Sponsors of general aviation airports entering into any arrangement that results in permission for the owner of residential real property adjacent to or near the airport must comply with the requirements of Sec. 136 of Public Law 112-95 and the sponsor assurances.

Grant Assurance 29, *Airport Layout Plan*, has been amended to require all proposed and existing access points used to taxi aircraft across the airport property boundary be depicted on the ALP.

On July 30, 2012, FAA published a notice in the Federal Register proposing to rescind the interim policy on residential through-the-fence access to federally-obligated airports for general aviation airports and proposing to finalize the interim policy for the four commercial service airports with existing access.[4] This notice also explained how FAA proposes to implement section 136. The FAA accepted comments on its interpretation of the law and the proposed policy. On July 16, 2013, FAA published a notice in the Federal Register responding to the comments, explaining its interpretation of the law, and finalizing its policy with regard to commercial service airports.[5]

III. PROPOSED INTERPRETATION OF THE LAW:

A. <u>Enforcement</u>: The FAA interprets the inclusion of specific terms and conditions as Congress' intent for the FAA to enforce section 136 of P.L. 112-95 accordingly. In

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[3] See 77 Fed. Reg. 22376 (April 13, 2012).
[4] See 77 Fed. Reg. 44515 (July 30, 2012).
[5] See 78 Fed. Reg. 42419 (July 16, 2013).

its implementation, FAA will ask airport sponsors to demonstrate their compliance with the law. Airport sponsors with existing access must provide evidence of compliance no later than October 1, 2014. Airport sponsors of general aviation airports proposing to establish new access agreements must provide evidence of compliance prior to establishing an access point. The FAA acknowledges that its approach to sponsors with existing access will be different than the posture taken with sponsors of general aviation airports proposing to establish new agreements. This is because airport sponsors with existing agreements may have ceded important rights and powers through the execution of these existing agreements, and their ability to comply with the terms and conditions of the law may be severely hampered. The FAA intends to address such situations on a case-by-case basis. General aviation airports proposing to establish new agreements must comply with the terms and conditions contained in section 136 of P.L. 112-95; the FAA will not waive these terms and conditions for new agreements.

B. Applicability: The definition of "general aviation airport" included in the statute excludes privately-owned reliever airports. The FAA has identified seven privately-owned reliever airports with existing residential through-the-fence access agreements. In implementing section 136 of P.L. 112-95, FAA will grandfather these airports and treat them in a manner similar to publically-owned general aviation airports. However, going forward, FAA will apply the statutory prohibition on privately-owned general aviation airports and disallow these airports from entering into new residential through-the-fence agreements.

C. Commercial Activities: Section 136 of P.L. 112-95 states that residential property owners must maintain their property for residential, noncommercial use for the duration of the agreement. The FAA interprets this as a prohibition on commercial aeronautical services offered by residential through-the-fence users or any third parties that might compete with on-airport aeronautical service providers. In implementing this provision, FAA will limit the scope of this condition to commercial aeronautical activities only. The FAA will not concern itself with unrelated commercial activities that may be permitted by local regulation.

D. Existing Mixed-Use Properties: The FAA is aware of some existing residential through-the-fence agreements that permit the co-location of homes and aeronautical businesses (mixed-use properties). In these cases, FAA will require airport sponsors to execute two separate agreements with the homeowner. One agreement must address the duration, rights, and limitations of the homeowner's residential through-the-fence access, and the second agreement must be consistent with FAA's current policies on commercial through-the-fence activities and ensure the off-airport business does not result in unjust economic discrimination for on-airport aeronautical service providers. The FAA encourages sponsors with mixed-use properties to adopt long-term plans to relocate the off-airport commercial aeronautical activity onto the airport when feasible and practicable to do so. Going forward, airport sponsors proposing to establish a residential through-the-fence arrangement must meet the statutory terms and conditions, including the prohibition on using the residential property for commercial aeronautical use. New agreements proposing to co-locate or mix residential and commercial aeronautical activities would not be consistent with the law.

E. Authorized Access: Section 136 of P.L. 112-95 states that residential property owners must prohibit access to the airport from other properties through the property of the property owner. The FAA interprets this as a prohibition on unauthorized access to the airport; this condition does not necessarily prescribe a scenario in which all residential through-the-fence users must have their own dedicated access point to enter the airport. Compliance with this condition will require access agreements stipulate that residential through-the-fence access agreement holders are prohibited from permitting unauthorized users (any individual not a party to an access agreement with the airport sponsor) to pass through or "piggy back" on their access in order to enter the airport. The FAA expects airport sponsors to establish their own policies, restrictions, and/or requirements to be imposed on fly-in guests who taxi from the airport to visit off-airport residents. Going forward, FAA will encourage sponsors of general aviation airports proposing to establish new residential through-the-fence agreements to limit the number of access points in a manner that is consistent with airport planning practices.

F. Fueling: Section 136 of P.L. 112-95 states that residential property owners must prohibit any aircraft refueling from occurring on the property. The FAA interprets this as a prohibition on the sale of fuel from residential property. The FAA will not concern itself with self-fueling activities which may be permitted by local regulation.

G. Duration of Agreements: Section 136 of P.L. 112-95 does not specify or limit the duration of agreements for residential through-the-fence access. Therefore, FAA will not require these agreements contain any specific limitation on the duration.

IV. PROPOSED IMPLEMENTATION: For the purposes of this CGL, state block grant program participants must implement the same actions as an FAA Airport District Office (ADO). The tools referenced below are listed in Appendix A; the internal toolkit is located at Q:\National\ACO-100\RTTF Toolkit and the external toolkit is located at http://www.faa.gov/airports/airport_compliance/residential_through_the_fence/.

A. Existing Access:

1. Notification: ADOs are required to notify airport sponsors with existing access about the statutory requirements contained in P.L. 112-95, the revised guidance for the review of access agreements, and the timeline for compliance with the law. Notification must occur by August 30, 2013. A sample notification letter is in the internal electronic toolkit. (See Appendix A)

2. Airport Layout Plan: The sponsor assurances require all proposed and existing access points used to taxi aircraft across the airport property boundary to be depicted on the ALP. Sponsors with existing access are required to update their airport layout plan (ALP) to identify the locations on the airport boundary that

serve as points of access for off-airport residents. A temporary designation through a pen and ink change[6] is acceptable until an ALP is updated.

3. FAA Review of Access Agreements and Acceptance of Access Plans:

   a. General Aviation Airports and Privately-Owned Reliever Airports: Access agreements submitted by sponsors of general aviation airports and privately-owned reliever airports with existing access will be reviewed by ADOs and Regional Offices. Regional Offices will determine if access agreements submitted by sponsors of general aviation airports and privately-owned reliever airports effectively address the terms and conditions contained in P.L. 112-95. This is discussed further in section V below.

   b. Commercial Service Airports: Access plans submitted by sponsors of commercial service airports with existing access will be reviewed by ADOs, Regional Offices, and ACO-100. ACO-100 will accept access plans submitted by sponsors of commercial service airports with existing access which effectively address the terms and conditions contained in P.L. 112-95 and are consistent with the sponsor assurances. This is discussed further in section V below.

   The FAA's review of an access agreement and its acceptance of an access plan is valid for a period not to exceed 20 years or until a triggering event occurs.[7]

4. Evidence of Compliance: Airport sponsors with existing residential through-the-fence agreements must provide evidence of compliance no later than October 1, 2014. Although the terms and conditions outlined in Sec. 136 of P.L. 112-95 became effective on February 14, 2012, FAA recognizes that airport sponsors may need time to amend existing residential through-the-fence agreements to reflect these requirements.

   In most cases, FAA will define evidence of compliance as the airport sponsor's submission of documentation as outlined in Appendix C and E. ADOs have the flexibility to apply their knowledge of the airport sponsor's particular situation when recommending to the Regional Office or ACO-100 a finding that the sponsor has demonstrated evidence of compliance. To ensure efficient review and approval, ADOs should encourage airport sponsors with existing residential through-the-fence access agreements to complete and submit their documentation 180 days before it is due.

   Failure to establish evidence of compliance may result in further compliance action.

[6] When the FAA receives an ALP depicting existing residential through-the-fence access points, the FAA will accept those access points as "pen and ink changes" to the ALP. No environmental analysis is required.

[7] This does not prevent sponsors of general aviation airports from contemplating or executing residential through-the-fence agreements for a term which exceeds 20 years. This simply states FAA's desire to review these arrangements every 20 years or when a triggering event occurs.

5. Monitoring: ADOs are responsible for tracking the submission of access agreements and access plans by airport sponsors covered in their jurisdiction. ADOs are strongly encouraged to utilize the sample letters contained in the internal electronic toolkit to remind sponsors of their due date. Regional Offices and ACO-100 will track the FAA's acceptance of access plans. ACO-100 has created a spreadsheet to monitor this activity. The spreadsheet is in the internal electronic toolkit. ADOs or Regional Offices must update the spreadsheet on a periodic basis as information is sent to and received from airport sponsors. Regional offices are required to update the spreadsheet and notify ACO-100 each time a residential through-the-fence agreement is accepted. Regional offices are also required to scan and save a copy of all correspondence related to the review in their regional folder in the internal toolkit.[8]

6. Triggering Events: If the ADO becomes aware of a triggering event, the ADO must notify the airport sponsor of the need to resubmit its access agreement or update its access plan. AIP grants issued to sponsors of commercial service airports with existing access for development of an airport master plan or master plan update should include a special condition requiring the airport sponsor to update its access plan as part of its planning process. AIP grants for projects that will result in a significant change to the airport such as changes to the runway's length, width or pavement strength; revised taxiway(s); change in design aircraft; change in runway approach procedures; new or modified aircraft parking area(s) etc. or land acquisition must not be issued prior to FAA review of an updated access plan.

B. New Access: Prior to establishing a new access point, sponsors of general aviation airports must submit an updated ALP for FAA review, and a copy of the (draft) access agreement and access agreement review sheet. The FAA will review the (draft) access agreement as part of the ALP review. However, ADOs may not sign an updated ALP depicting a new residential through-the-fence access point before the FAA has confirmed that the (draft) access agreement will comply with the law.

Before unconditionally approving an ALP depicting a new residential through-the-fence access point, the ADO must comply with the National Environmental Policy Act (NEPA) and any applicable Federal environmental laws, regulations and/or orders. ADOs should discuss the proposed ALP changes with the sponsor and determine the environmental review required.

In accordance with Grant Assurance 5(g) sponsors of commercial service airports may not enter into new residential through-the-fence agreements. Privately-owned reliever airports are also prohibited from establishing new residential through-the-fence access agreements.

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[8] This includes the access agreement(s), access agreement review sheet(s), access plans if required, the ADO's memo to the Regional Office, and associated memos/correspondence sent by the Regional Office. Regional offices are not required to save ALPs as part of an airport sponsor's residential through-the-fence access package. Each package should be saved and named with the airport's location identifier and the date it was accepted by the Region (e.g., ABC 10-1-13).

ADOs are responsible for tracking the submission of requests to establish new residential through-the-fence access agreements by airport sponsors covered in their jurisdiction. ADOs are strongly encouraged to utilize the sample letters contained in the internal electronic toolkit. Regional Offices and ACO-100 will track the FAA's acceptance of ALPs proposing new residential through-the-fence access arrangements. ACO-100 has created a spreadsheet to monitor this activity. The spreadsheet is in the internal electronic toolkit. ADOs or Regional Offices must update the spreadsheet on a periodic basis as information is sent to and received from airport sponsors. Regional offices are required to update the spreadsheet and notify ACO-100 each time an ALP depicting a new residential through-the-fence access arrangement is accepted. Regional offices are also required to scan and save a copy of all correspondence related to the review in their regional folder in the internal toolkit.[9]

C. Oversight: ACO-100 will conduct periodic program audits to ensure FAA staff complies with the review process outlined in this CGL.

V. CONTENT AND FAA REVIEW OF ACCESS AGREEMENTS AND ACCESS PLANS: The law places specific terms and conditions on residential through-the-fence access agreements. All access agreements and access plans must effectively address these terms and conditions; the FAA cannot waive or modify these terms. The FAA's planned process for implementing the law and reviewing access plans in the future is graphically depicted in Appendix B.

A. General Aviation Airports and Privately-Owned Reliever Airports with Existing Access: General aviation airports and privately-owned reliever airports with existing residential through-the-fence access agreements must submit a copy or copies of their access agreements and complete the access agreement review sheet contained in Appendix C. If the airport sponsor has entered into identical agreements with numerous residential through-the-fence users, only one copy of that agreement and one access review sheet must be submitted. If the airport sponsor has entered into different agreements with residential through-the-fence users, the airport sponsor must submit a copy of each different agreement with a separate access agreement review sheet.

Although general aviation airports and privately-owned reliever airports are not required to develop mitigation measures to ensure consistency with their sponsor assurances, FAA strongly encourages airport sponsors to thoroughly evaluate how these agreements may impact the sponsor's ability to meet its Federal obligations. The FAA is not precluded from investigating a potential grant assurance violation associated with or resulting from an airport sponsor's residential through-the-fence arrangement.

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[9] This includes the access agreement(s), access agreement review sheet(s), the ADO's memo to the Regional Office, and associated memos/correspondence sent by the Regional Office. Regional offices are not required to save ALPs as part of an airport sponsor's residential through-the-fence access package. Each package should be saved and named with the airport's location identifier and the date it was accepted by the Region (e.g., ABC 10-1-13).

ADOs will review access agreements submitted by general aviation airports and privately-owned reliever airports with existing access. The ADO will conduct its review of the plan using the checklist contained in Appendix D of this CGL. Complete and acceptable submissions should be reviewed within 60 days of receipt. The ADO may request an airport sponsor provide more detailed information or amend its agreement if the access agreement does not meet the requirements of the law. Once the ADO has completed its review, the ADO will forward the access plan to the Region under a cover memo.

A second review will be conducted by the Regional Office. The Regional Office will conduct its review of the plan using the checklist contained in Appendix D of this CGL. Complete and acceptable submissions should be reviewed within 60 days of receipt. The Regional Office may request an airport sponsor provide more detailed information or amend its agreement if the access agreement does not meet the requirements of the law. If the Regional Office finds the access agreement does not effectively address the statutory requirements contained in the law, the Regional Office will forward the access agreement to ACO-100 under a cover memo.

ACO-100 will only review access agreements for general aviation airports with existing access when a Regional Office cannot verify that the agreement complies with the statutory requirements contained in the law. Should this occur, ACO-100 will work with the airport sponsor to identify alternative methods of compliance, on a case-by-case basis, and report these issues to interested Congressional Committees. If ACO-100 and the airport sponsor cannot identify any actions to effectively address the statutory requirements contained in the law, ACO-100 may review the matter for further compliance action. ACO-100 will notify the airport sponsor, the Regional Office, and the ADO of its action.

Access agreements which effectively address the statutory requirements contained in the law will be accepted by the Regional Office. The Regional Office will notify the airport sponsor, the ADO, and ACO-100 of its action. The internal electronic toolkit contains a sample cover memo and sample letters. (See Appendix A)

B. <u>Commercial Service Airports with Existing Access</u>: Access plans developed by sponsors of commercial service airports with existing residential through-the-fence access agreements must address the statutory requirements contained in the law and ensure consistency with their grant assurances as described in Appendix E. Sponsors of commercial service airports with existing access must demonstrate that the access arrangement does not impede the airport sponsor's current or future compliance with its sponsor assurances. In some cases, the airport sponsor may propose mitigation measures intended to address the potential for noncompliance in the future. The FAA can work with airport sponsors to identify appropriate mitigation measures to address concerns related to current and future consistency with the sponsor assurances. However, FAA is not precluded from investigating a potential grant assurance violation associated with or resulting from an airport sponsor's residential through-the-fence arrangement.

ADOs will review access plans submitted by commercial service airports with existing access. The ADO will conduct its review of the plan using the checklist contained in Appendix F of this CGL. Complete and acceptable access plans should be reviewed within 60 days of receipt. The ADO may request an airport sponsor provide more detailed information or propose more effective mitigation measures if the access plan does not meet the requirements of the law or is inconsistent with the sponsor's grant assurances. Once the ADO has completed its review, the ADO will forward the access plan to the Region under a cover memo.

A second review will be conducted by the Regional Office. The Regional Office will conduct its review of the plan using the checklist contained Appendix F of this CGL. Complete and acceptable access plans should be reviewed within 60 days of receipt. The Regional Office may request an airport sponsor provide more detailed information or propose more effective mitigation measures if the access plan does not meet the requirements of the law or is inconsistent with the sponsor's grant assurances. Once the Regional Office has completed its review, the Regional Office will forward the plan to ACO-100 under a cover memo.

ACO-100 will review access plans forwarded by Regional Offices using the checklist contained in Appendix F of this CGL. ACO-100 may request an airport sponsor provide more detailed information or propose more effective mitigation measures if the access plan does not meet the requirements of the law or is inconsistent with the sponsor's grant assurances. Only ACO-100 can accept an access plan submitted by a commercial service airport with existing access. If ACO-100 finds the access plan does not effectively address the statutory requirements contained in the law or is inconsistent with the airport sponsor's assurances, ACO-100 may review the matter for further compliance action. ACO-100 will notify the airport sponsor, the Regional Office, and the ADO of its action.

C. General Aviation Airports Proposing New Access: General aviation airports proposing to establish new residential through-the-fence access agreements must submit the following:

1. An updated ALP depicting the proposed access point(s);
2. A copy of the (draft) access agreement(s); and
3. Access agreement review sheet(s) contained in Appendix C.

Although these sponsors are not required to develop mitigation measures to ensure consistency with their sponsor assurances, FAA strongly encourages airport sponsors to thoroughly evaluate how these agreements may impact the sponsor's ability to meet its Federal obligations. The FAA is not precluded from investigating a potential grant assurance violation associated with or resulting from an airport sponsor's residential through-the-fence arrangement. Airport sponsors proposing to establish new residential through-the-fence access agreements must have an ALP signed by FAA prior to establishing the access point(s).

ADOs must review the ALP changes and (draft) access agreements submitted by general aviation airports proposing new access. The ADO must review the ALP in accordance with the FAA's guidance for ALP review.[10] The ADO must review the (draft) access agreement using the checklist contained in Appendix D of this CGL. FAA approval of ALP updates and (draft) access agreements for new residential through-the-fence access must be based on the scope, detail, and quality of each submission. The ADO may request an airport sponsor provide more detailed information or amend its agreement if the (draft) access agreement does not meet the requirements of the law. ADOs should work with airport sponsors to ensure the proposed residential through-the-fence arrangement is consistent with the sponsor's future airport development as proposed on the ALP. Once the ADO has completed its review, the ADO will forward the proposal to the Region under a cover memo. The cover memo must also discuss the sponsor's future plans for the airport, based on the ADO's review of the proposed ALP.

A second review will be conducted by the Regional Office. Complete and acceptable ALP changes and (draft) access agreements should be reviewed within 90 days of receipt. The Regional Office will conduct its review of the draft access agreement using the checklist contained in Appendix D of this CGL. The Regional Office will verify that the proposed residential through-the-fence arrangement is consistent with the sponsor's future airport development as proposed on the ALP. The Regional Office may request an airport sponsor provide more detailed information or amend its agreement if the (draft) access agreement does not meet the requirements of the law. The Regional Office may reject the proposal to establish new residential through-the-fence access if:

1. The (draft) access agreement does not effectively address the statutory requirements contained in the law; or
2. The proposed arrangement is not consistent with the sponsor's future plans for the airport.

Airport sponsors may request headquarters review of a proposal rejected by a Regional Office. This request shall be made, in writing, to ACO-100. ACO-100 will coordinate the headquarters review. APP-400, AAS-100, AAS-300, and ACO-100 will participate in this review. ACO-100 will notify the airport sponsor, the Regional Office, and the ADO of headquarters' action.

The Regional Office will accept (draft) access agreements which effectively address the statutory requirements contained in the law and are verified as consistent with the sponsor's future plans for the airport. The Regional Office will notify the ADO and ACO-100 of its action, and the ADO will approve the ALP pursuant to Chapter Two of FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airports Actions*. The approved ALP must contain a special

[10] ALPs submitted in accordance with the FAA's Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans (ALPs), should be reviewed as described in that SOP. If the ALP submitted does not meet current standards or was developed using other guidance, ADOs may use Appendix H to review the residential through-the-fence component of the ALP.

condition stipulating FAA will not pay to relocate, soundproof, or mitigate noise at any homes with residential through-the-fence access. The ADO will notify the airport sponsor of these actions. The internal electronic toolkit contains a sample cover memo and sample letters. (See Appendix A)

D. Commercial Service Airports Proposing to Extend/Renew Existing Access: Sponsors of commercial service airports proposing to extend or renew existing residential through-the-fence access agreements must also address supplemental standards for compliance as described in Appendix I. The supplemental standards require the airport sponsor to fully comply with the law and ensure that continuation of the residential through-the-fence arrangement will be consistent with their grant obligations. However, FAA is not precluded from investigating a potential grant assurance violation associated with or resulting from an airport sponsor's residential through-the-fence arrangement.

ADOs will review the revised access plans submitted by commercial service airports proposing to extend or renew existing access. The ADO will conduct its review of the plan using the checklist contained in Appendix J of this CGL. Complete and acceptable access plans should be reviewed within 60 days of receipt. The ADO may request an airport sponsor provide more detailed information or propose more effective mitigation measures if the revised access plan does not meet the requirements of the law, is inconsistent with the sponsor's grant assurances, or does not meet the supplemental standards. Once the ADO has completed its review, the ADO will forward the access plan to the Region under a cover memo.

A second review will be conducted by the Regional Office. The Regional Office will conduct its review of the plan using the checklist contained in Appendix J of this CGL. Complete and acceptable access plans should be reviewed within 60 days of receipt. The Regional Office may request an airport sponsor provide more detailed information or propose more effective mitigation measures if the access plan does not meet the requirements of the law, is inconsistent with the sponsor's grant assurances, or does not meet the supplemental standards. Once the Regional Office has completed its review, the Regional Office will forward the plan to ACO-100 under a cover memo.

ACO-100 will review the revised access plans forwarded by Regional Offices using the checklist contained in Appendix J of this CGL. ACO-100 may request an airport sponsor provide more detailed information or propose more effective mitigation measures if the access plan does not meet the requirements of the law, is inconsistent with the sponsor's grant assurances, or does not meet the supplemental standards. Only ACO-100 can accept a revised access plan submitted by a commercial service airport proposing to extend or renew existing access. If ACO-100 finds the access plan does not effectively address the statutory requirements contained in the law, is inconsistent with the airport sponsor's assurances, or does not meet the supplemental standards, ACO-100 may review the matter for further compliance action. ACO-100 will notify the airport sponsor, the Regional Office, and the ADO of its action.

VI. PROPOSED EXTENSIONS/RENEWALS/TRANSFERS OF ACCESS AGREEMENTS: Airport sponsors secure their rights and powers by negotiating agreements which preserve their flexibility to plan for the airport's future. Therefore, FAA encourages airport sponsors negotiating residential through-the-fence agreements to consider short terms which can be renewed or extended at the sponsor's option.

The extension or renewal of a residential through-the-fence access agreement at a general aviation airport or a privately-owned reliever airport is not considered a triggering event that requires submission of a revised access agreement to FAA if the length of extension or renewal does not exceed the term of the FAA's acceptance of the original (or any subsequently updated) access agreements. However, should the airport sponsor make other changes to the terms of the agreement, FAA will need to review an updated access agreement. For example, if FAA accepted a sponsor's access agreement on October 1, 2014 and the sponsor uses two-year access agreement terms with its residential users, FAA would not need to review that sponsor's access agreement again in 2016 simply because the sponsor renewed agreements (previously reviewed by FAA) with its residential users for another two years.

In situations when the transfer of residential through-the-fence access from one residential property owner to another requires the airport sponsor's concurrence, FAA may treat the access as an extension or renewal. This occurs when a homeowner who is a party to a residential through-the-fence access agreement sells their property to another individual who must then execute a residential through-the-fence access agreement with the airport sponsor in order to utilize an existing access point. If the airport sponsor limits the term of the access agreement with the new property owner to a timeframe covered by its FAA-accepted access agreement or plan and the agreement is substantially similar to those agreements already reviewed by FAA, the airport sponsor does not need to submit a revised access agreement or plan. However, if the airport sponsor incorporates terms which are substantially different than those previously reviewed by FAA or permits a term of access which exceeds its accepted access agreement or plan, the sponsor is strongly encouraged to submit a draft access agreement and review sheet prior to executing the agreement with the new residential user.

In situations when residential through-the-fence access can be legally transferred from one residential property owner to another without the airport sponsor's review and/or consent, the FAA will treat the access as existing. For example, this may occur when a homeowner sells a property with deeded, perpetual access. Airport sponsors are not required to notify the FAA of these transactions unless the residential through-the-fence access agreement is substantially modified.

Commercial service airports that seek to extend or renew their existing agreements are required to meet supplemental standards outlined in the FAA's *Policy on Existing Through-the-Fence Access to Commercial Service Airports from A Residential Property*. The supplemental standards are also outlined in Appendix I.

VII. PROPOSED AIRPORT SPONSOR ELIGIBILITY FOR AIP GRANTS IN FY13 and FY14:

A. Airport Sponsors Currently in Compliance:

   1. AIP Grants Issued in Accordance with 49 U.S.C., § 47114

All airport sponsors that are currently in compliance with their grant assurances remain eligible for AIP grants issued in accordance with 49 U.S.C., § 47114 in fiscal years 2013 and 2014. Beginning on October 1, 2014, airport sponsors with existing residential through-the-fence access agreements must demonstrate evidence of compliance.

Note that AIP investments must be related to general public demand at the airport. Costs associated with on-airport infrastructure and facilities used exclusively or primarily for accommodation of residential through-the-fence users are considered private-use and are ineligible for AIP funding.

2. AIP Grants Issued in Accordance with 49 U.S.C., § 47115
   ADOs and Regional Offices may decline to invest AIP grants issued in accordance with 49 U.S.C., §47115 at airports with existing residential through-the-fence access prior to verifying the sponsor's compliance with the law.

B. Airport Sponsors Currently in Noncompliance: Noncompliant airport sponsors are ineligible to receive AIP grants. Airport sponsors that are currently in noncompliance due to grant assurance violations associated with residential through-the-fence agreements must submit a corrective action plan that includes a residential through-the-fence access agreement and/or access plan.

VIII. PROPOSED AIP ELIGIBILITY OF COSTS ASSOCIATED WITH ACCESS PLANS

A. Immediate ALP Update Depicting Existing Access: Grant Assurance 29 requires airport sponsors with or proposing residential through-the-fence agreements to depict access points on the ALP. A temporary designation through a pen and ink change[11] is acceptable until an ALP is updated as part of a master plan. Costs associated with this ALP revision are not AIP eligible; FAA Order 5100.38C, *Airport Improvement Program Handbook*, at paragraph 300.c. states that AIP grants may be used to fund ALPs when they are part of master planning or indirect costs associated with other airport development funded with an AIP grant.

B. Existing Residential Through-the-Fence Access Agreements and Plans: Costs associated with existing residential through-the-fence access agreements and plans are not AIP-eligible.

C. ALP Updates and Access Agreements Proposing New Access: ALP updates proposing new access are allowable costs for AIP funding only if included as an incidental cost associated with an AIP-funded master plan and ALP update. However, costs associated with the development of a draft access agreement are not AIP-eligible.

[11] When the FAA receives an ALP depicting existing residential through-the-fence access points, the FAA will accept those access points as "pen and ink changes" to the ALP. No environmental analysis is required.

Issues related to AIP-eligibility must be coordinated with APP-520.

IX. PROPOSED SPECIAL CONDITION IN FUTURE GRANTS AT COMMERCIAL SERVICE AIRPORTS WITH EXISTING ACCESS: Once FAA accepts a commercial service airport sponsor's residential through-the-fence access plan, all future AIP grants will be conditioned upon the inclusion of the following special grant condition:

> Update Accepted Residential Through-the-Fence Access Plan: The Sponsor agrees that it will enforce/implement the Residential Through-the-Fence Access Plan, accepted by the FAA on [INSERT DATE]. It is further agreed that any changes required to the Residential Through-the-Fence Access Plan that result from this grant project will be incorporated into the Residential Through-the-Fence Access Plan, which the Sponsor will update and submit to FAA prior to grant closeout.

X. PROPOSED DETERMINATION OF COMPLIANCE STATUS: FAA Order 5190.6B, *FAA Airport Compliance Manual*, at paragraph 2.9 states that the ADO must make a determination regarding the airport sponsor's compliance with its Federal obligations prior to issuing an AIP grant.

A. Compliance Determinations at Airports with Existing Access: The law precludes FAA from making a finding of noncompliance at a general aviation airport solely because an airport sponsor enters into an agreement granting residential through-the-fence access. However, the law does not exempt these sponsors from complying with their grant assurance obligations, and the law establishes specific terms and conditions that must be reflected in the residential through-the-fence arrangement. In Fiscal Years 2013 and 2014, the FAA will refrain from initiating investigations at airports with existing access. This will provide airport sponsors with existing access ample time to develop an access agreement or plan that effectively addresses the terms and conditions included in the law. However, this does not preclude the FAA from initiating a compliance action if there is reason to believe a compliance issue exists that is beyond merely granting a residential through-the-fence arrangement.

   Beginning on October 1, 2014, an airport sponsor's failure to submit evidence of compliance with the law may be reviewed for further compliance action.

B. Compliance Determinations at General Aviation Airports with Access Agreements: The FAA's acceptance of an airport's (draft) access agreement represents an agency finding that the airport sponsor has met the requirements of the law. However, the FAA is not precluded from altering or revoking its acceptance of an airport sponsor's access agreement if either of the following occurs:

   1. The airport sponsor fails to enforce its access agreement; or

   2. A Director's Determination or Final Agency Decision, resulting from an investigation under 14 CFR, part 16, requires the airport sponsor to take corrective action(s).

The FAA's acceptance of an airport sponsor's access agreement does not preclude FAA from initiating a compliance action if there is reason to believe a compliance issue exists which is beyond merely granting a residential through-the-fence arrangement.

C. Compliance Determinations at Privately-Owned Reliever Airports and Commercial Service Airports: While the law is explicit in its permission for publically-owned general aviation airports to enter into residential through-the-fence agreements, it is silent with regard to commercial service airports and privately-owned reliever airports. The FAA has interpreted this silence to continue the prohibition on the establishment of new residential through-the-fence agreements at these airports. Grant Assurance 5(g) reflects this prohibition. Violations of Grant Assurance 5(g) may result in enforcement action under 14 CFR, part 16.

D. Compliance Determinations at General Aviation Airports which Establish New Access Points without FAA Approval of an Updated ALP: Prior to establishing an access point for residential through-the-fence access, general aviation airports are required to depict the proposed access point(s) on the ALP and requested to submit a (draft) access agreement(s) which complies with the law for FAA review. Establishing a new access point not depicted on an FAA-approved ALP may result in a violation of Grant Assurance 29, *Airport Layout Plan*. General aviation airports that establish new access points prior to FAA's approval of a revised ALP may be reviewed for further compliance action. General aviation airports that execute new access agreements prior to demonstrating evidence of compliance do so at their own risk. FAA employees may not approve an ALP establishing a new access point if the (draft) access agreement does not comply with the terms and conditions of the law.

XI. PROPOSED ACTION IF AIRPORT IS UNABLE TO COMPLY: The FAA recognizes that some airports with existing residential through-the-fence access agreements may not be able to comply with the terms and conditions contained in the law and/or their sponsor assurances due to the type of arrangement previously negotiated. In these cases, FAA will determine if the airport still substantially serves its intended function in the National Plan of Integrated Airport Systems. These determinations will be made by Airport's Planning and Environmental Division (APP-400) in accordance with FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, or subsequent pertinent guidance that may be developed by the FAA.

A. Airports Continuing to Serve a Function in the NPIAS: In cases where the airport still substantially serves its intended function in the NPIAS, FAA will consider a reduced level of future AIP investments at the airport. ACO-100, APP-400, and APP-520 will analyze these airports on a case-by-case basis and provide more specific guidance to the ADO.

B. Airports No Longer Serving a Function in the NPIAS: Airports which no longer serve their intended function in the NPIAS will be removed from the NPIAS. ACO-100, APP-400, and APP-520 will analyze these airports on a case-by-case basis and provide more specific guidance to the ADO.

References and Resources

P.L. 112-95, Sec. 136
Airport Improvement Program (AIP): Policy Regarding Access to Airports From Residential Property (76 Fed. Reg. 44515; July 30, 2012)
FAA Grant Assurances
FAA Order 5190.6B, *FAA Airport Compliance Manual*
FAA Order 5100.38C, *Airport Improvement Program Handbook*
FAA Order 5300.1F, *Modifications to Agency Airport Design, Construction, and Equipment Standards*
FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*
M. Daniel Carey and Cliff Davenport v. Afton-Lincoln County Municipal Airport Joint Powers Board, FAA Docket No. 16-06-06, (January 19, 2007) (Director's Determination)
FAA's Residential Through-the-Fence Electronic Toolkit (internal) at Q:\National\ACO-100\RTTF Toolkit
FAA's Residential Through-the-Fence Electronic Toolkit (external) at:
http://www.faa.gov/airports/airport_compliance/residential_through_the_fence/

APPENDIX A

The internal electronic toolkit is available at Q:\National\ACO-100\RTTF Toolkit. The following documents are available:

Internal Toolkit

Tool	Target Date for Use of Tool	Available for use by
Monitoring Spreadsheet (to track status of interim policy implementation)	On-going	ADO Region ACO-100
Sample Notification Letter Advising Sponsors with Existing RTTF of Change in Law	By August 30, 2013	ADO Region
Sample Letter to Sponsor Acknowledging Receipt of RTTF documentation	Upon receipt of RTTF documentation	ADO Region ACO-100
Sample Request for More Information from Sponsors	During review of RTTF documentation	ADO Region ACO-100
Sample Letter to Sponsors Identifying Noncompliance with the Law and/or Need for More Mitigation Measures	During review of RTTF documentation	ADO Region ACO-100
Sample Letter to Sponsor Stating RTTF Documentation Has Been Forwarded to Region/ACO-100	Upon completion of ADO/Regional review	ADO Region
Cover Memo to Transmit RTTF Documentation to Regional Office/ACO-100	Upon completion of ADO/Regional review	ADO Region
Sample Letter to Sponsors with Existing Access that Have Not Submitted an Access Agreement(s) and/or Access Plan	No later than June 2, 2014	ADO Region
Sample Letter Accepting a GA Sponsor's (Draft) Access Agreement	Ongoing	Region
Sample Letter to Sponsors Who Express Interest in Establishing New RTTF	On-going	ADO Region ACO-100

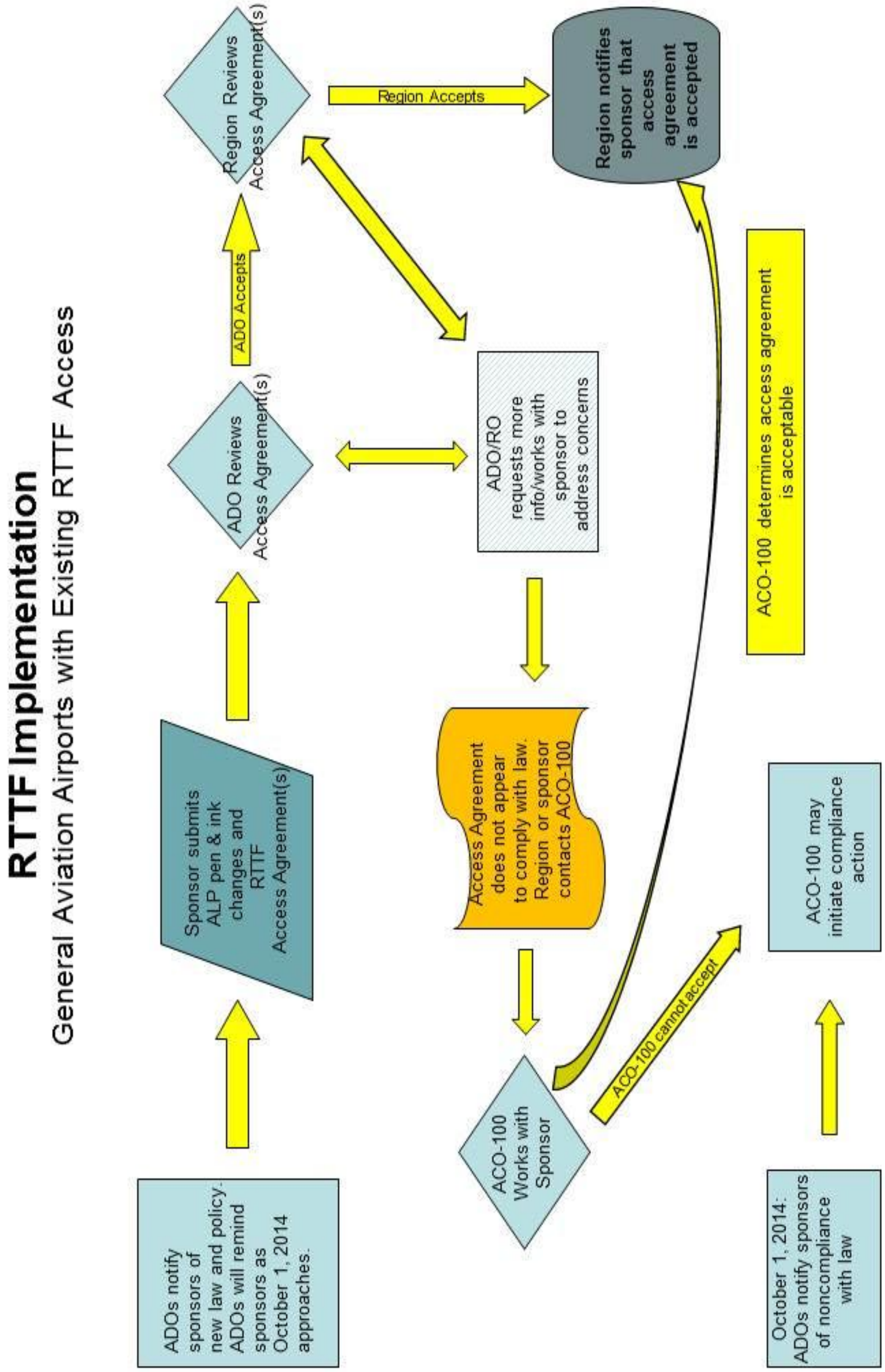
Special Condition for AIP Grants	Grants issued to sponsors with accepted RTTF access plans in FY15 and beyond	ADO Region ACO-100
Special Condition for ALP Approval	Upon approval of an ALP depicting new RTTF at a general aviation airport	ADO/Region
Sample Easements	On-going	ADO Region ACO-100

The external electronic toolkit is available at:
http://www.faa.gov/airports/airport_compliance/residential_through_the_fence/.
The following documents are available:

External Toolkit

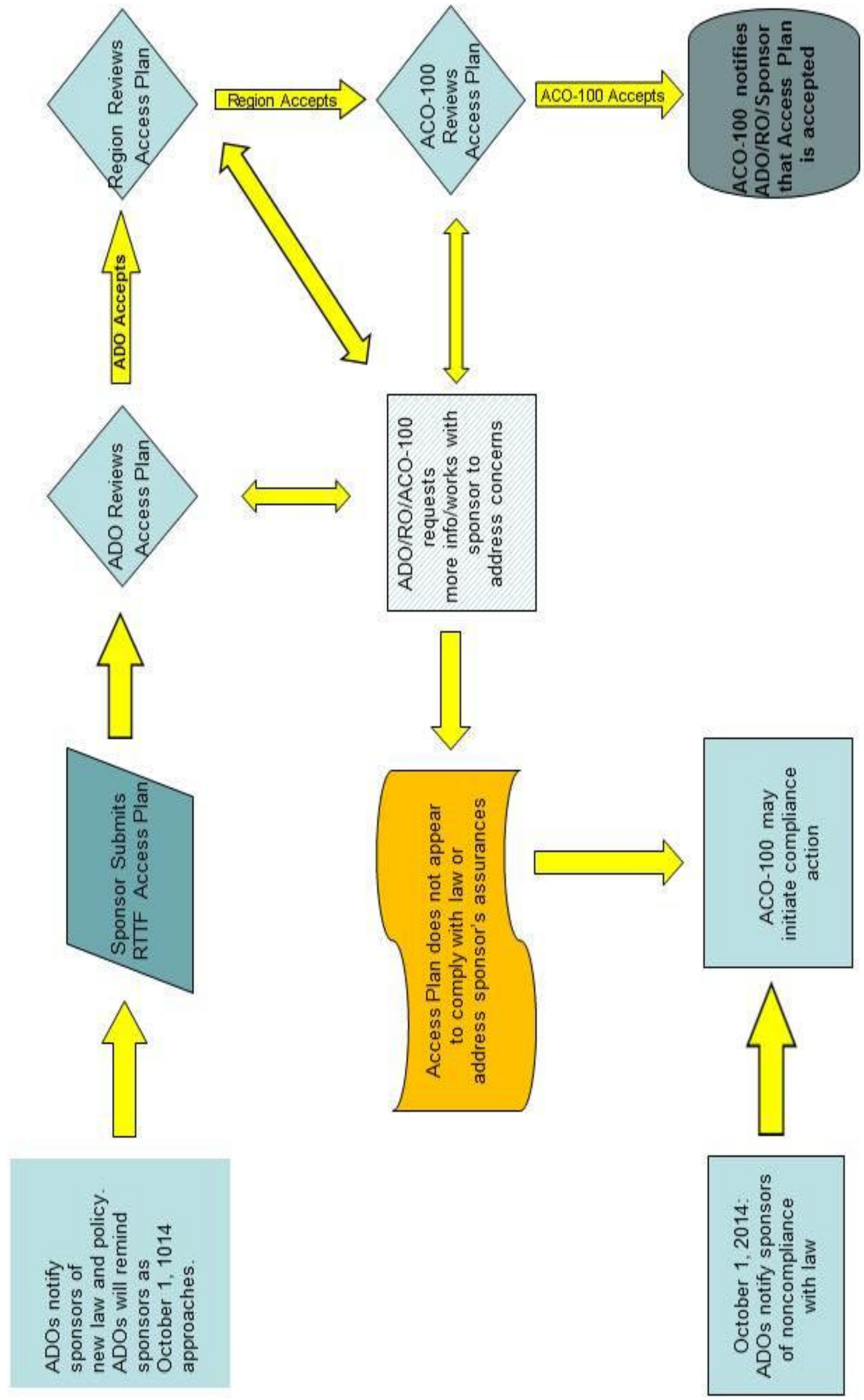
Tool	Target Date for Use of Tool
FAA's Interpretation of the FMRA's Section 136	Ongoing
FAA Recommendations for Airport Sponsors Considering Residential Through-the-Fence Access Agreements	Ongoing
Access Agreement Review Sheet for Airport Sponsors with Existing Access (Appendix C)	Prior to October 1, 2014
Access Agreement Review Sheet for Airport Sponsors Proposing New Access (Appendix G)	Ongoing
Sample Access Agreement and Review Sheet	Ongoing
Final Policy on Existing Through-the-Fence Access to Commercial Service Airports from a Residential Property	Ongoing
Sample Access Plan	Ongoing
Sample Sponsor Certification	Ongoing
Supplemental Standards for Commercial Service Airports Proposing to Extend/Renew Existing Access (Appendix I)	Ongoing
Special Condition for AIP Grants	Grants issued to sponsors with accepted RTTF access plans in FY15 and beyond
Special Condition for ALP Approval	Ongoing
Sample RTTF Summary Table	Ongoing
Examples of Rate-Setting Methodologies	Ongoing

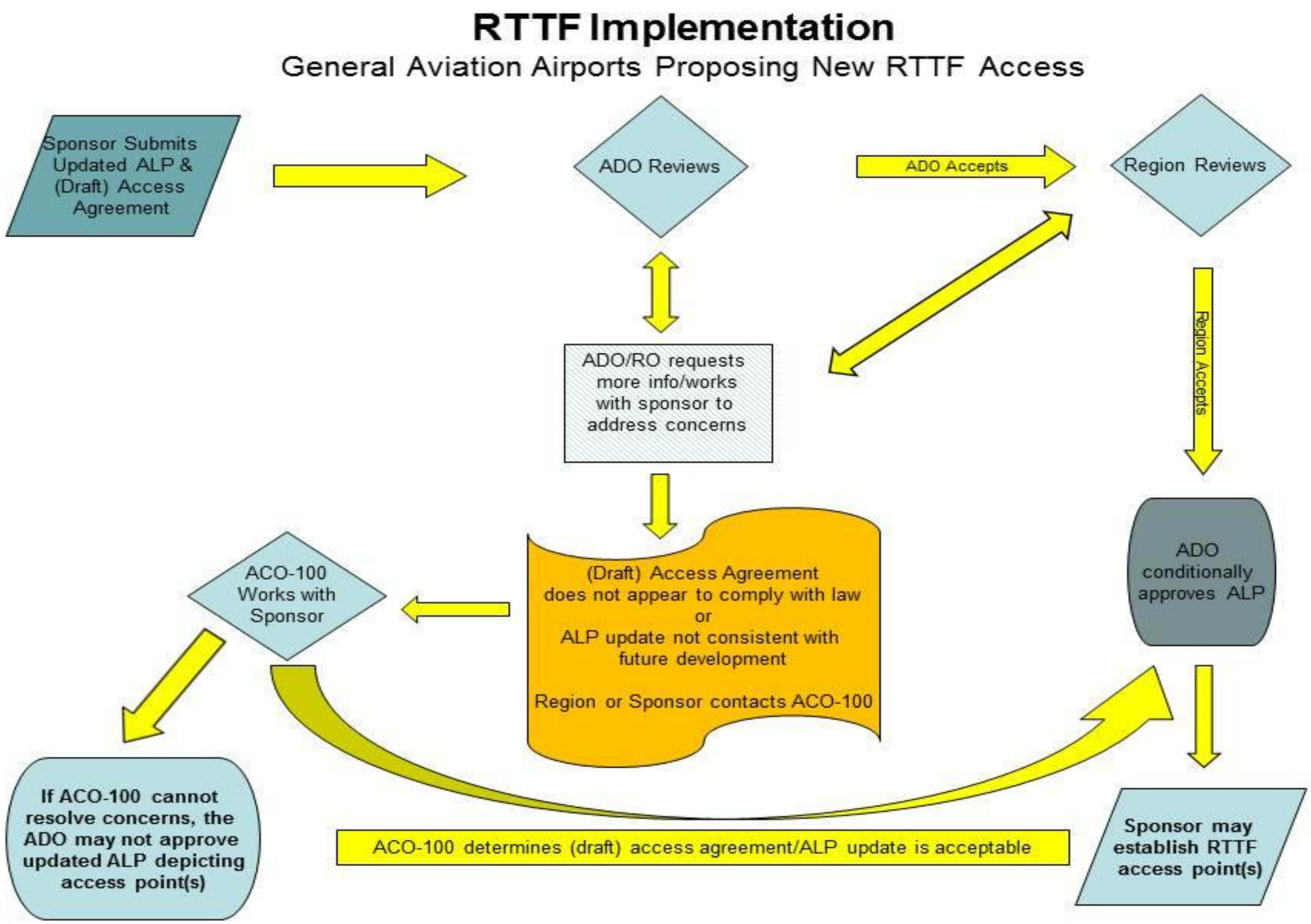
APPENDIX B


RTTF Implementation
General Aviation Airports with Existing RTTF Access
ADOs notify sponsors of new law and policy. ADOs will remind sponsors as October 1, 2014 approaches.
Sponsor submits ALP pen & ink changes and RTTF Access Agreement(s)
ADO Reviews Access Agreement(s)
ADO Accepts
Region Reviews Access Agreement(s)
Region Accepts
Region notifies sponsor that access agreement is accepted
ADO/RO requests more info/works with sponsor to address concerns
Access Agreement does not appear to comply with law. Region or sponsor contacts ACO-100
ACO-100 Works with Sponsor
ACO-100 determines access agreement is acceptable
ACO-100 cannot accept
ACO-100 may initiate compliance action
October 1, 2014: ADOs notify sponsors of noncompliance with law

RTTF Implementation

Commercial Service Airports with Existing RTTF Access




RTTF Implementation
General Aviation Airports Proposing New RTTF Access
Sponsor Submits Updated ALP & (Draft) Access Agreement
ADO Reviews
ADO Accepts
Region Reviews
ADO/RO requests more info/works with sponsor to address concerns
Region Accepts
(Draft) Access Agreement does not appear to comply with law or ALP update not consistent with future development
Region or Sponsor contacts ACO-100
ACO-100 Works with Sponsor
ADO conditionally approves ALP
If ACO-100 cannot resolve concerns, the ADO may not approve updated ALP depicting access point(s)
ACO-100 determines (draft) access agreement/ALP update is acceptable
Sponsor may establish RTTF access point(s)

APPENDIX C

Access Agreement Review Sheet

Documentation:
Provide copies of the written access agreement(s) between the sponsor and residential through-the-fence user(s) or association(s) representing residential through-the-fence users. Sponsors who have entered into a residential through-the-fence agreement with an association may need to provide additional documentation such as covenants, conditions, and restrictions (CC&Rs). If the same agreement is used with multiple residents, the sponsor is only required to submit one copy of the agreement with an explanation noting the number of residences to which it pertains. Identify the document (if more than one type of document is submitted), page number, or paragraph which verifies the following:

1. The residential through-the-fence user pays airport access charges that are comparable to tenants and operators on-airport making similar use of the airport.
   Document: ______________________________
   Page number or paragraph: __________________

   If this page or paragraph does not define tenants and operators on-airport making similar use of the airport, explain how the airport sponsor defines this term and the fee/rate structure charged to these tenants.

   ____
   ____
   ____

   If this page or paragraph does not include an escalation clause, explain if the fees/rates charged to the residential through-the-fence user increase on the same schedule as the fees/rates for tenants and operators on-airport making similar use of the airport.

   ____
   ____
   ____

   If the two fee schedules do not transparently appear to be equivalent, explain the rationale used by the airport sponsor to make such determination.

   ____
   ____
   ____

2. Residential through-the-fence users bear the cost of building and maintaining the infrastructure the airport sponsor determines is necessary to provide aircraft located on the adjacent property to or near the airport access to the airfield of the airport.
   Document: ________________________________
   Page number or paragraph: ___________________

3. The residential through-the-fence user is prohibited from using their property, or permitting any third party from using their property, for any commercial aeronautical purpose for the duration of the access agreement.
   Document: ________________________________
   Page number or paragraph: ___________________

4. Access to the airport from unauthorized users, through the property of the residential through-the-fence access agreement holder, is prohibited.
   Document: ________________________________
   Page number or paragraph: ___________________

5. The residential through-the-fence user is prohibited from selling aviation fuel on their property.
   Document: ________________________________
   Page number or paragraph: ___________________

This agreement has been executed with (insert number) residential through-the-fence (user(s) or homeowners association(s)).

APPENDIX D

FAA Review and Action on Access Agreements submitted by General Aviation Airports and Privately-Owned Reliever Airports with Existing Access

Terms and Conditions Required by Statute:

- ☐ Is the sponsor comparing residential through-the-fence users to similarly-situated on airport tenants and users? Comparing residential through-the-fence users to itinerant users is not consistent with the law.

- ☐ Is the access fee paid by residential through-the-fence users higher than or equivalent to the fees paid by similarly situated on-airport users and tenants?

- ☐ Does the airport sponsor require residential through-the-fence users to bear the cost of building and maintaining the infrastructure the airport sponsor determines necessary to provide access to the airfield?

- ☐ Does the airport sponsor prohibit commercial aeronautical uses, whether provided by the property owner or a third party, on the property of the residential through-the-fence users? Commercial aeronautical activities on property owned by individuals with residential through-the-fence access are prohibited by law. Therefore, homeowners may not co-locate any type of commercial aeronautical activity on their residential property or permit a third party to offer any commercial aeronautical services.

- ☐ Does the airport sponsor prohibit access to the airport from unauthorized users through the property of the residential through-the-fence users?

- ☐ Does the airport sponsor prohibit the sale of aviation fuels on the property of the residential through-the-fence users?

- ☐ Review the access agreement(s). Are the terms consistent with answers provided to the questions above? If the terms of the agreement expressly permit any activities prohibited by the law, the airport sponsor lacks an effective mechanism to address its legal requirements. Does the access agreement clearly outline the terms and duration of access?

Action:

ADOs should summarize their answers to the questions above in the forwarding memorandum. If the airport sponsor fails to address any statutorily required terms and conditions the ADO should not forward the plan to the Region.

Regional Offices should compare the ADO's assessment of the access agreement(s) to the information provided on the review sheet. If the ADO's assessment lacks sufficient detail or does not accurately describe the access agreement(s), the Regional Office should not accept the access agreement(s). If the access agreement(s) effectively addresses the legal requirements associated with residential through-the-fence access, the Regional Office may accept the access agreement(s). If the access agreement(s) presents inherent conflicts with the law, the Regional Office must contact ACO-100.

APPENDIX E

Access Plans: Required Documentation and Narrative from Commercial Service Airport Sponsors with Existing Access

A. Access Agreement Review Sheet

Provide copies of the written access agreement(s) between the sponsor and residential through-the-fence user(s) or association(s) representing residential through-the-fence users. Sponsors who have entered into a residential through-the-fence agreement with an association may need to provide additional documentation such as covenants, conditions, and restrictions (CC&Rs). If the same agreement is used with multiple residents, the sponsor is only required to submit one copy of the agreement with an explanation noting the number of residences to which it pertains. Identify the page number or paragraph which documents the following:

1. The residential through-the-fence user pays airport access charges that are comparable to tenants and operators on-airport making similar use of the airport.
Document: ________________________________
Page number or paragraph: ___________________

If this page or paragraph does not define tenants and operators on-airport making similar use of the airport, explain how the airport sponsor defines this term and the fee/rate structure charged to these tenants.

____
____
____

If this page or paragraph does not include an escalation clause, explain if the fees/rates charged to the residential through-the-fence user increase on the same schedule as the fees/rates for tenants and operators on-airport making similar use of the airport.

____
____
____

If the two fee schedules do not transparently appear to be equivalent, explain the rationale used by the airport sponsor to make such determination.

____
____
____

2. Residential through-the-fence users bear the cost of building and maintaining the infrastructure the airport sponsor determines is necessary to provide aircraft located on the adjacent property to or near the airport access to the airfield of the airport.
Document: ______________________________
Page number or paragraph: __________________

3. The residential through-the-fence user is prohibited from using their property, or permitting any third party from using their property, for any commercial aeronautical purpose for the duration of the access agreement.
Document: _____________________________
Page number or paragraph: __________________

4. Access to the airport from unauthorized users, through the property of the residential through-the-fence access agreement holder, is prohibited.
Document: ______________________________
Page number or paragraph: __________________

5. The residential through-the-fence user is prohibited from selling aviation fuel on their property.
Document: _____________________________
Page number or paragraph: __________________

This agreement has been executed with (insert number) residential through-the-fence (user(s) or homeowners association(s)).

B. Airport and Access Drawing, Summary Table, & Narrative
Required Documentation:
1. Provide an airport and access drawing (scale 1”=200’ to 1”=600’) which clearly depicts all existing and proposed:
   - Airport and residential through-the-fence parcels;
   - Runways (length, width, orientation, thresholds, hold lines);
   - Runway Safety Areas, Object Free Areas, Precision Obstacle Free Areas (if applicable), and Runway Protection Zones;
   - Taxiways;
   - Navigational aids;
   - On-airport structures (hangars, buildings, fuel facilities, ramps, roads, etc.)
   - Off-airport structures adjacent to the airport’s property boundary, include all residential through-the-fence lots (identify lots by number or letter);
   - Fences and gates;
   - All existing and proposed residential through-the-fence access points; and
   - Municipal boundaries.

2. Provide a summary table which describes the following as associated with each residential through-the-fence parcel:
   - Access point utilized as referenced on the airport and access drawing sheet;
   - Development name (if the residence is part of a community, platted subdivision, etc.)

- Lot;
- Owner;
- Number of residential improvements proposed;
- Number of residential improvements constructed;
- Type of residential improvement (single family home, apartment, undeveloped parcel, etc.);
- Enabling instrument (access agreement, lease, deed, easement, etc.);
- Date of execution or recording;
- Term of agreement;
- Number of access points granted;
- Number of access points currently utilized;
- Zoning designation and the entity controlling zoning for that parcel;
- The access fee collected annually;
- Number of aircraft associated with each residence; and
- If there are any restrictions in the enabling instrument restricting the sale, assignment, or subleasing of the property.

3. Provide a description of the airport that identifies the number of aircraft based on the airport and the estimated or actual number of annual local and itinerant operations.

4. Provide a description of the hangar/tie-down space available on the airport property as identified on the airport and access drawing. This description must include the total number of hangars/tie-downs on airport property, the number of hangars/tie-downs currently rented, and the number available for rent. If all on-airport hangars/tie-downs are currently rented, the description must include what steps the sponsor is taking or plans to take to develop additional hangar/tie-down space.

C. General Authority for Control of Airport Land and Access: Grant Assurance 5, Preserving Rights and Powers, prohibits airport sponsors from taking any action which would operate to deprive it of any of the rights and powers necessary to perform any or all of the terms, conditions, and assurances in the grant agreement without the written approval of the Secretary. This includes maintaining sufficient control of access points and operations across airport boundaries to maintain safe operations, and to make changes in airport land use to meet future needs.

Required Documentation:

1. Provide a detailed description of the nature, structure, duration, and terms associated with each residential through-the-fence access arrangement.
2. Provide copies of access agreements and/or governing documents (i.e., agreements, easements, deeds, Covenants, Conditions, and Restrictions or CC&Rs, etc).
3. Provide copies of any avigation easements the sponsor might hold.
4. Describe how the access agreements/governing documents are subordinate to the airport sponsor's grant assurances. If they are not, explain how the sponsor can invoke changes to the agreement to ensure ongoing compliance with its grant obligations.
5. Describe the airport sponsor's legal ability to impact zoning changes around the airport. Describe the current zoning for and around the airport. Describe any steps the airport sponsor has taken to limit new residential zoning around the airport.

6. Describe any access controls that residential through-the-fence users must utilize when taxiing onto airport property. If there is no fence, describe the signage or markings used to delineate airport property from private property.
7. Describe the process utilized to educate your local community and residential through-the-fence users about your Federal obligations as an airport sponsor.
8. If the airport sponsor has established any short-term or long-term plans for eliminating residential through-the-fence access, describe those plans.

D. <u>Safety of Airport Operations</u>: Grant Assurance 19, Operation and Maintenance, requires the airport sponsor to ensure the airport and all facilities which are necessary to serve the aeronautical users of the airport are operated at all times in a safe and serviceable condition.

Required Documentation:

1. Provide a copy of any specific rules/requirements that apply only to residential through-the-fence users (if established). Explain how residential through-the-fence users are subject to the same rules and regulations as on-airport users.
2. Describe any process the sponsor has developed to sanction residential through-the-fence users who violate the airport's rules and regulations.
3. Describe any restrictions or special requirements imposed on fly-in guests who taxi from the airport's property to visit off-airport residents. Describe how those restrictions or special requirements are communicated to the residential through-the-fence users and their guests. Describe how the sponsor monitors this practice.
4. Describe the mechanism used to separate aircraft and vehicular traffic.
5. Describe the mechanism used to prevent residential/domestic activities (i.e., dog walking, sports, etc.) from occurring on airport property, and particularly within the air operations area associated with runway safety areas, runway protection zones, runway object free zones, taxiway safety areas, obstacle free areas, object free areas and primary surface properties. Describe how this is monitored and enforced.
6. Describe the mechanism used to prevent through-the-fence residents from establishing potential wildlife attractants (i.e., water detention ponds, gardens, composting lots, etc.) near the airport. If wildlife attractants have been established, describe how the airport requires through-the-fence residents to mitigate.
7. Describe how aircraft access each runway threshold from the RTTF access points. Identify any residential through-the-fence taxi routes that preclude the sponsor from meeting any FAA design standards. Describe any plans the airport sponsor may have to meet the FAA design standards in the future. If proposing a modification to standards, a Safety Assessment Screening must be completed and the requirements contained in FAA Order 5300.1F, *Modifications to Agency Airport Design, Construction, and Equipment Standards* must be addressed.

E. <u>Rates and Charges</u>: Grant Assurance 24, Fee and Rental Structure, requires an airport sponsor to maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible under the circumstances existing at the particular airport. Residential through-the-fence users are not protected by Grant Assurance 22, Economic Nondiscrimination, and the FAA will not entertain allegations of unreasonableness for residential through-the-fence access.

Required Documentation:

1. A description of how the airport sponsor collects access fees from residential through-the-fence users and their guests who taxi from the airport to an off-airport residence.

F. Protection of Airport Airspace: Grant Assurance 20, Hazard Removal and Mitigation, requires airport sponsors to take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.

Two of FAA's prime objectives are to promote air safety and the efficient use of the navigable airspace. Title 14 CFR, part 77, "Objects affecting the navigable airspace," establishes standards and notification requirements for objects affecting navigable airspace. Notification of an off-airport project under FAA Form 7460-1, Notice of Proposed Construction or Alteration, prompts FAA to conduct an aeronautical study based on information provided by its proponent to identify potential aeronautical hazards in advance to prevent or minimize the adverse impacts to the safe and efficient use of navigable airspace. The FAA's authority to promote the safe and efficient use of the navigable airspace, whether concerning existing or proposed structures, is predominantly derived from title 49 U.S.C., § 44718; § 44718 does not provide specific authority for FAA to regulate or control how land (i.e., real property) may be used in regard to structures that may penetrate navigable airspace. In addition, the Federal Government lacks the authority to regulate local land use. Therefore, it is critical that airport sponsors identify tools they can use to protect the airport's airspace both on and off the airport.

Required Documentation:

1. A description of the mechanism used by the airport sponsor to ensure that homes, hangars, other structures, and off-airport taxiways do not penetrate the airport's protected surfaces. If available, provide verification that airspace studies were conducted for residential through-the-fence homes, hangars, other structures, and off-airport taxiways.
2. A description of the mechanism used to require residential through-the-fence users to complete FAA Form 7460-1, Notice of Proposed Construction or Alteration, when they propose to erect and/or alter structures on their property.
3. A description of the mechanism used to require residents to trim/remove trees and/or any other potential obstructions.
4. A description of any legal powers and/or authorities the airport sponsor might have to prohibit new construction determined to be a hazard to air navigation.

G. Compatible Land Uses Around the Airport: Grant Assurance 21, Compatible Land Use, requires airport sponsors to take appropriate action, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations.

Required Documentation:

1. A description of the mechanism used by the airport sponsor to monitor proposed and actual zoning changes/designations in land use surrounding the airport. Describe how the sponsor plans to avoid residential encroachment or other noncompatible land uses.

2. A description of any actions the airport sponsor may be taking to educate the local zoning/land use authority about the sponsor's obligations as a federally-obligated airport.
3. A description of any plans the airport sponsor may have with regard to the acquisition of avigation easements.
4. Does the residential use conflict with any current or planned aviation uses at the airport? If it does, describe the airport sponsor's plans to address this conflict.
5. A description of any local or state requirements or limitations with regard to the proximity of homes and aeronautical activities. Do any off-airport structures conflict with the current or future establishment of fueling activities, aircraft maintenance, flight training, aircraft charter, banner towing, crop dusting, parachuting, aircraft storage, etc.?
6. A description of the airport sponsor's mechanism for receiving and tracking noise complaints. Please also note how this program is promoted to the local community.

H. <u>Sponsor Certification</u>: Airport sponsors may certify their access plan with the sample certification form, by passing a local resolution, or submitting a signed affidavit. A sample certification form is in the external electronic toolkit at:

http://www.faa.gov/airports/airport_compliance/residential_through_the_fence/

APPENDIX F

FAA Review and Action on Access Plans submitted by Commercial Service Airports with Existing Access

A. Terms and Conditions Required by Statute

Review:
- ☐ Is the sponsor comparing residential through-the-fence users to similarly-situated on airport tenants and users? Comparing residential through-the-fence users to itinerant users is not consistent with the law.
- ☐ Is the access fee paid by residential through-the-fence users higher than or equivalent to the fees paid by similarly situated on-airport users and tenants?
- ☐ Does the sponsor require residential through-the-fence users to bear the cost of building and maintaining the infrastructure the airport sponsor determines necessary to provide access to the airfield?
- ☐ Does the sponsor prohibit commercial aeronautical uses on the property, whether provided by the property owner or a third party, of the residential through-the-fence users? Commercial aeronautical activities on property owned by individuals with residential through-the-fence access are prohibited by law. Therefore, homeowners may not co-locate any type of commercial aeronautical activity on their residential property, or permit a third party to offer any commercial aeronautical services.
- ☐ Does the sponsor prohibit access to the airport from unauthorized users through the property of the residential through-the-fence users?
- ☐ Does the sponsor prohibit the sale of aviation fuels on the property of the residential through-the-fence users?
- ☐ Review the access agreement(s). Are the terms consistent with the answers provided to the questions above? If the terms of the agreement expressly permit any activities prohibited by the law, the sponsor lacks an effective mechanism to address its legal requirements. Does the access agreement clearly outline the terms and duration of access?

Action:
ADOs should summarize their answers to the questions above in section II of the forwarding memorandum. If the sponsor fails to address any statutorily required terms and conditions the ADO should not forward the plan to the Region.

Regional Offices should compare the ADO’s assessment of the access plan to the access agreement(s) itself. If the ADO’s assessment lacks sufficient detail or does not accurately describe the access agreement(s), the Regional Office should not accept the access plan. If the access agreement(s) presents inherent conflicts with the law, the Regional Office must note this in its forwarding memo to ACO-100.

ACO-100 should summarize their answers to the questions above in the letter of findings to the sponsor.

B. Airport and Access Drawing, Summary Table, & Narrative

Review:
- ☐ Has the ADO/RO compared the airport and access drawing submitted with the access plan to the ALP and Exhibit A on file with the FAA?
- ☐ Do any access points conflict with planned future development at the airport?
- ☐ Is land available for future aeronautical development on the airport?
- ☐ Has the sponsor identified any nearby land for future acquisition?

Action:
ADOs should summarize their answers to the questions above in section III of the forwarding memorandum.

Regional Offices should compare the ADO's assessment of the access plan to the plan itself. If the ADO's assessment lacks sufficient detail or does not accurately describe the access plan, the Regional Office should supplement the answers provided.

ACO-100 should summarize their answers to the questions above in the letter of findings to the sponsor.

C. General Authority for Control of Airport Land and Access: An airport sponsor is required to demonstrate it has sufficient control of access points and operations across airport boundaries to maintain safe operations, and to make changes in airport land use to meet future needs.

Review:
- ☐ Verify all required documentation is included.
- ☐ Are the access agreements(s)/governing documents subordinate to the sponsor's grant assurances? If not, how does the sponsor ensure compliance with Grant Assurance 5?
- ☐ Do the access agreement(s)/governing documents contain any noise restrictions not approved by the FAA in a part 150 or part 161 study? Does the airport's 5010 data sheet or the Airport Facilities Directory note any mandatory noise restrictions?
- ☐ Does the sponsor have good title to all of the property depicted on its property map?
- ☐ Should the sponsor conduct a title search to verify ownership of any particular parcels?
- ☐ Is the sponsor taking steps to ensure that undeveloped land around the airport is zoned for airport-compatible purposes?
- ☐ Is the sponsor taking steps to identify and protect its real property?
- ☐ Is the sponsor taking steps to educate its local community and residential through-the-fence users about the grant assurances?
- ☐ Does the sponsor propose any short-term or long-term plans for eliminating the residential through-the-fence access?

Action:
ADOs should review all materials submitted by the sponsor and complete the review checklist. Any areas of concern should be noted to ACO-100 in section IV of the forwarding memorandum.

Regional Offices should compare the ADO's assessment of the access plan to the plan itself. If the ADO's assessment lacks sufficient detail or does not accurately describe the access plan, the Regional Office should supplement the answers provided.

ACO-100 should review all materials submitted by the sponsor to determine if the sponsor has sufficient authority for control of airport land and access. ACO-100 should note any practices or stipulations that could impact the sponsor's ability to meet its grant assurance obligations.

D. Safety of Airport Operations: An airport sponsor is required to demonstrate that its residential through-the-fence arrangement does not impede its safe operation of the airport.

Review:

- ☐ Is the sponsor taking steps to ensure that residential through-the-fence users and their guests are subject to requirements at least as stringent as those that on-airport tenants must follow?
- ☐ Are private-use taxiways noted on the airport's 5010 data sheet or the Airport Facilities Directory?
- ☐ Is the sponsor taking sufficient steps to ensure aircraft and vehicular traffic are separated?
- ☐ Is the sponsor taking sufficient steps to prevent residential/domestic activities from occurring on the airport's property?
- ☐ Is the sponsor taking sufficient steps to prevent and/or mitigate wildlife attractants on residential through-the-fence properties?
- ☐ Do any residential through-the-fence access points require airport users to utilize higher-risk procedures or maneuvers such as back-taxiing, direct access to the runway, entering the runway from a nonperpendicular taxiway, or crossing public roads to enter the airport? Verify that any modifications to standards have been processed in accordance with the requirements contained in FAA Order 5300.1F, *Modifications to Agency Airport Design, Construction, and Equipment Standards*.
- ☐ Is the sponsor proposing to consolidate or relocate any access points? Will this impact any projects proposed in the sponsor's capital improvement plan?

Action:

ADOs should review all materials submitted by the sponsor and complete the review checklist. Any areas of concern should be noted to ACO-100 in section V of the forwarding memorandum.

Regional Offices should compare the ADO's assessment of the access plan to the plan itself. If the ADO's assessment lacks sufficient detail or does not accurately describe the access plan, the Regional Office should supplement the answers provided.

ACO-100 should review all materials submitted by the sponsor, and in consultation with AAS, determine if the sponsor has sufficiently addressed the safety of airport operations. ACO-100 should note any practices that impact safety at the airport and make any necessary recommendations.

E. Rates and Charges: An airport sponsor is required to demonstrate it can and does collect fees from residential through-the-fence users comparable to those charged to airport tenants. The rates and charges paid by residential through-the-fence users cannot result in unjust discrimination against on-airport tenants. The schedule of rates and charges should promote the goal of financial self-sustainability for the airport.

Review:

- ☐ Does the sponsor have an effective program in place to collect the access fees and verify that all residential through-the-fence users are paying their access fee?
- ☐ Does the schedule of rates and charges impede the sponsor's ability to pursue the goal of self-sustainability for the airport?

Action:

ADOs should review all materials submitted by the sponsor and complete the review checklist. Any areas of concern should be noted to ACO-100 under section VI of the forwarding memorandum.

Regional Offices should compare the ADO's assessment of the access plan to the plan itself. If the ADO's assessment lacks sufficient detail or does not accurately describe the access plan, the Regional Office should supplement the answers provided.

ACO-100 should review all materials submitted by the sponsor to determine if the schedule of rates and charges is consistent with Grant Assurances 22 and 24. ACO-100 should summarize their answers to the questions above in the letter of findings to the airport sponsor.

F. Protection of Airport Airspace: Grant Assurance 20, Hazard Removal and Mitigation, requires airport sponsors to take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.

Two of FAA's prime objectives are to promote air safety and the efficient use of the navigable airspace. Title 14 CFR part 77, "Objects affecting the navigable airspace," establishes standards and notification requirements for objects affecting navigable airspace. Notification of an off-airport project under FAA Form 7460-1, Notice of Proposed Construction or Alteration, prompts FAA to conduct an aeronautical study based on information provided by its proponent to identify potential aeronautical hazards in advance to prevent or minimize the adverse impacts to the safe and efficient use of navigable airspace. The FAA's authority to promote the safe and efficient use of the navigable airspace, whether concerning existing or proposed structures, is predominantly derived from title 49 U.S.C., § 44718; § 44718 does not provide specific authority for FAA to regulate or control how land (i.e., real property) may be used in regard to structures that may penetrate navigable airspace. In addition, the Federal Government lacks the authority to regulate local land use. Therefore, it is critical that airport sponsors identify tools they can use to protect the airport's airspace both on and off the airport.

Review:

- ☐ Does the sponsor currently have an effective mechanism to protect the airport's airspace?
- ☐ Was construction of the existing homes, hangars, other structures, and off-airport taxiways properly studied by the FAA?

Action:
ADOs should summarize their answers to the questions above in section VII of the forwarding memorandum. Any areas of concern should be noted to ACO-100.

Regional Offices should compare the ADO's assessment of the access plan to the plan itself. If the ADO's assessment lacks sufficient detail or does not accurately describe the access plan, the Regional Office should supplement the answers provided.

ACO-100 should summarize their answers to the questions above in the letter of findings to the sponsor.

G. Compatible Land Uses Around the Airport: An airport sponsor is required to demonstrate the potential for noncompatible land use adjacent to the airport boundary is minimized consistent with Grant Assurance 21, Compatible Land Use.

Review:
- ☐ Does the sponsor currently have an effective mechanism to monitor zoning/land use changes around the airport?
- ☐ Does the sponsor appear to understand its obligations with regard to Grant Assurance 21, Compatible Land Use?
- ☐ Does the sponsor propose any short-term or long-term plans for acquiring avigation easements that should be incorporated into the sponsor's capital improvement plan?
- ☐ If the residential use conflicts with current or proposed aeronautical development, does the sponsor have a satisfactory plan to address this conflict?
- ☐ Do any state or local requirements or limitations associated with the proximity of homes and aeronautical activities impede current or proposed future aeronautical development?
- ☐ Does the sponsor currently have an effective mechanism for receiving, tracking, and responding to noise complaints? Is this program promoted to the community?

Action:
ADOs should summarize their answers to the questions above in section VIII of the forwarding memorandum. Any areas of concern should be noted to ACO-100.

Regional Offices should compare the ADO's assessment of the access plan to the plan itself. If the ADO's assessment lacks sufficient detail or does not accurately describe the access plan, the Regional Office should supplement the answers provided.

ACO-100 should summarize their answers to the questions above in the letter of findings to the sponsor.

H. Sponsor Certification: Airport sponsors may certify their access plan with the sample certification form, by passing a local resolution, or submitting a signed affidavit. A sample certification form is in the external electronic toolkit at:
http://www.faa.gov/airports/airport_compliance/residential_through_the_fence/.

Review:

- ☐ Verify the sponsor has certified its access plan by including the sample certification form, by passing a local resolution, or by submitting a signed affidavit.

APPENDIX G

Required Documentation from General Aviation Airport Sponsors Proposing New Access

Required Documentation:
1. Updated ALP
2. (Draft) Access Agreement(s)
3. Access Agreement Review Sheet(s)

Revised ALP
Prior to submitting an ALP proposing a new access point(s), the sponsor must review their ALP to ensure:

- The proposed access point(s) do not conflict with current or planned development.
- The location of the proposed home(s) does not conflict with current or planned development.
- Adequate areas to accommodate forecasted growth are identified.

Access Agreement Review Sheet

Documentation:
Provide copies of the (draft) written access agreement(s) between the sponsor and residential through-the-fence user(s) or association(s) representing residential through-the-fence users. If the same agreement will be used with multiple residents, the sponsor is only required to submit one copy of the (draft) agreement with an explanation noting the number of residences to which it will apply. Identify the page number or paragraph which documents the following:

1. The residential through-the-fence user pays airport access charges that are comparable to tenants and operators on-airport making similar use of the airport.
Page number or paragraph: ___________________

If this page or paragraph does not define tenants and operators on-airport making similar use of the airport, explain how the airport sponsor defines this term and the fee/rate structure charged to these tenants.

____
____
____

If this page or paragraph does not include an escalation clause, explain if the fees/rates charged to the residential through-the-fence user increase on the same schedule as the fees/rates for tenants and operators on-airport making similar use of the airport.

____
____
____

If the two fee schedules do not transparently appear to be equivalent, explain the rationale used by the airport sponsor to make such determination.

____
____
____

2. Residential through-the-fence users bear the cost of building and maintaining the infrastructure the airport sponsor determines is necessary to provide aircraft located on the adjacent property to or near the airport access to the airfield of the airport.
Page number or paragraph: __________________

3. The residential through-the-fence user is prohibited from using their property, or permitting any third party, for any commercial aeronautical purpose for the duration of the access agreement.
Page number or paragraph: __________________

4. Access to the airport from other properties through the property of the residential through-the-fence access agreement holder is prohibited.
Page number or paragraph: __________________

5. The agreement prohibits the sale of aviation fuels from the property of the residential through-the-fence user.
Page number or paragraph: __________________

This (draft agreement or agreement) (will be or has been) executed with (insert number) residential through-the-fence (user(s) or homeowners association(s)).

FAA Recommendations for Draft Residential Through-the-Fence Agreements:

- A subordination clause which acknowledges the residential through-the-fence agreement is subordinate to the airport sponsor's current and future Federal obligations.
- A legal indemnification clause requiring residential through-the-fence user(s) to acknowledge that their property will be affected by aircraft noise and emissions and waiving any right to bring an action against the airport sponsor for operations at the airport.
- A hazard removal clause to ensure the sponsor maintains a mechanism for mitigating (removal, tree trimming, marking, lighting, etc.) potential airport hazards and for stopping construction or establishment of airport hazards. Residential through-the-fence user(s) must be directed to complete and file FAA Form 7460-1, Notice of Proposed Construction or Alteration, and obtain a "no hazard" determination prior to erecting and/or altering any structures on their property.
- A defined term which does not exceed a reasonable airport planning horizon.
- A mechanism which allows the airport sponsor to impose and enforce the safety requirements and airport operating rules on residential through-the-fence user(s).
- Access fees/charges that are comparable to the rates charged to tenants and operators on the airport making similar use of the airport and a mechanism to increase the access fee/charges on the same schedule used for tenants and operators on the airport making similar use of the airport.

- A provision which prohibits any commercial aeronautical uses, whether offered by the property owner or a third party.
- Avigation easements that permit unobstructed flight through the airspace necessary for takeoff and landing at the airport.

APPENDIX H

FAA Review and Action on Access Agreements and ALPs Proposing New Access at General Aviation Airports

Updated ALP

***This checklist should only be used if the ALP submitted was not prepared in accordance with the FAA's Standard Operating Procedure for FAA Review and Approval of Airport Layout and includes a residential through-the-fence access point(s).

- ☐ Are the taxiway/taxilane dimensions for the residential access taxiway(s) depicted from the airport boundary to existing infrastructure?
- ☐ Are all safety dimensions depicted?
- ☐ Are all obstruction surfaces (14 CFR part 77, threshold siting, all design surfaces contained in Advisory Circular 150-5300-13, *Airport Design*, etc.) clear?
- ☐ Do all the proposed structures associated with the residential use (houses, hangars, garages, etc.) include elevations? Do any of these structures penetrate any clear zone?
- ☐ Do any proposed structures associated with the residential component (houses, hangars, garages, etc.) impact existing or planned navigational aids or other equipment?
- ☐ Does the sponsor maintain control of all Runway Protection Areas and Runway Protection Zones? If not, how does the sponsor ensure no residential activities are permitted in these areas?
- ☐ If the sponsor has an air traffic control tower, does the tower have a clear line of sight to view the access point?
- ☐ If the sponsor does not utilize physical access controls, such as fencing and gates, can the sponsor adequately separate residential activities from the airport property?

Access Agreement Review Sheet

Use Appendix D to review the (draft) access agreement(s).

Special Conditions

The approved ALP must contain a special condition stipulating the FAA will not pay to relocate, soundproof, or mitigate noise at any homes with residential through-the-fence access.

APPENDIX I

Revised Access Plans: Required Documentation and Supplemental Standards for Commercial Service Airport Sponsors Proposing to Extend/Renew Existing Access

Required Documentation:

1. Copies of draft access agreement(s) and/or governing documents (i.e. agreements; easements; deeds; Covenants, Conditions, and Restrictions, etc.) developed to meet the standard of compliance for existing residential through-the-fence agreements and reflecting the supplemental standards listed below.
2. A current (developed or revised within the last five years) airport master plan.
3. An updated ALP. All access points should be depicted and proposed for FAA's unconditional approval.
4. A revised residential through-the-fence access plan developed to meet the standard of compliance for existing residential through-the-fence access at commercial airports (see Appendix E) and reflecting the supplemental standards listed below.

The following supplemental standards must be addressed in the revised access plan:

- The new access agreement fully complies with the terms and conditions contained in section 136 of P.L. 112-95.
- The term of access does not exceed 20 years.
- Explains how one of the following applies:
  - a) The airport's current master plan (developed or revised within the last five years) identifies adequate areas for growth that are unaffected by the current residential through-the-fence access; or
  - b) The airport sponsor has the legal right to terminate the through-the-fence access agreement to accommodate airport development; or
  - c) The airport sponsor can require its residential through-the-fence user(s) to relocate their access points, at the expense of the user(s), to improve safety on or off the airport to accommodate growth on the airport.
- The revised access agreement allows the airport sponsor to impose and enforce safety requirements and airport operating rules on residential through-the-fence user(s) identical to those imposed on airport tenants and transient users.
- The airport sponsor obtains avigation easements from residential through-the-fence user(s) for overflight, including unobstructed flight through the airspace necessary for takeoff and landing at the airport.
- The access plan explains how residential through-the-fence user(s) acknowledge that their property will be affected by aircraft noise and emissions and that aircraft noise and emissions may change over time.
- The revised access agreement contains a provision in which residential through-the-fence user(s) acknowledge that their property will be affected by aircraft noise and emissions and waives any right to bring an action against the airport sponsor for operations at the airport.
- The revised access agreement requires residential through-the-fence user(s) to complete and file FAA Form 7460-1, Notice of Proposed Construction or Alteration, and obtain a "no hazard" determination prior to erecting and/or altering any structures on their property.

- The revised access agreement contains a provision addressing the sponsor's mechanism for mitigating (removal, tree trimming, marking, lighting, etc.) existing airport hazards, and for stopping construction or establishment of future airport hazards, including wildlife attractants.
- The airport sponsor or local zoning authority has adopted measures to limit future use and ownership of the residential through-the-fence properties to aviation-related uses (in this case, hangar homes) or development the FAA generally considers as compatible with airport operations (if available under state law).
- Any restrictions or provisions adopted by a homeowners association(s) or other entity representing the residential through-the-fence users are enforceable by the airport sponsor and may not be cancelled without cause.
- The access agreement is subordinate to the airport sponsor's current and all future federal obligations.
- The access plan describes the airport sponsor's ongoing program to counsel residential through-the-fence users about their rights and responsibilities under the access agreement as well as the airport sponsor's federal obligations.

APPENDIX J

FAA Review and Action on Revised Access Plans submitted by Commercial Service Airport Sponsors Proposing to Extend/Renew Existing Access

Review:

- ☐ Verify all required documentation is included.
- ☐ Verify completion of the environmental review needed to unconditionally approve any access points on the updated ALP.
- ☐ Review the revised residential through-the-fence access plan as required under Appendix F applying the following supplement standards:
  - ☐ Does the plan fully comply with the terms and conditions required by statute?
  - ☐ Is the access agreement subordinate to the sponsor's obligations?
  - ☐ Does the revised access plan address the sponsor's ability to accommodate future growth?
  - ☐ Has the sponsor or local zoning authority adopted measures to limit future use and ownership of the residential through-the-fence property to aviation-related uses such as hangar homes or development the FAA generally considers as compatible with airport operations (if available under state law)?
  - ☐ Does the sponsor have an ongoing program to counsel residential through-the-fence users about their rights and responsibilities under the access agreement as well as the sponsor's Federal obligations?
  - ☐ Are any restrictions or provisions adopted by a homeowners association(s) or other entity representing the residential through-the-fence users enforceable by the sponsor? Can they be cancelled without cause?
- ☐ Review the revised residential through-the fence access agreement.
  - ☐ Is the term of access limited to 20 years or less?
  - ☐ Does the revised access agreement require residential through-the-fence user(s) to acknowledge that their property will be affected by aircraft noise and emissions and that aircraft noise and emissions may change over time?
  - ☐ Does the revised access agreement contain a provision in which residential through-the-fence user(s) acknowledge that their property will be affected by aircraft noise and emissions and waive any right to bring an action against the sponsor for operations at the airport?
  - ☐ Does the revised access agreement allow the sponsor to impose and enforce safety requirements and operating rules on residential through-the-fence user(s) identical to those imposed on airport tenants and transient users?
  - ☐ Does the revised access agreement contain a provision addressing the sponsor's mechanism for mitigating (removal, tree trimming, marking, lighting, etc.) existing airport hazards, and for stopping construction or establishment of future airport hazards, including wildlife attractants?
  - ☐ Does the revised access agreement require residential through-the-fence user(s) to complete and file FAA Form 7460-1, Notice of Proposed Construction or Alteration, and obtain a "no hazard" determination prior to erecting and/or altering any structures on their property?

- ☐ Has the sponsor obtained avigation easements from residential through-the-fence user(s) for overflight, including unobstructed flight through the airspace necessary for takeoff and landing at the airport?

Action:
ADOs/Regional Offices should review all materials submitted by the sponsor and complete the review checklists. Any areas of concern should be noted to ACO-100 in the corresponding section of the forwarding memorandum. Specific concerns related to previous FAA recommendations or the sponsor's ability to address the supplemental standards should be noted.

ACO-100 should review all materials submitted by the sponsor to determine if the airport sponsor meets all standards of compliance for existing residential through-the-fence access agreements, as well as the supplemental standards. ACO-100 may recommend changes to the revised access agreement and/or plan needed to address these standards. Final FAA acceptance authorizes the sponsor to extend or renew the existing access agreement.

Special Conditions
The approved ALP must contain a special condition stipulating the FAA will not pay to relocate, soundproof, or mitigate noise at any homes with residential through-the-fence access.

APPENDIX M

COST ESTIMATES

JVIATION

Harvey Field

Preliminary Cost Estimate

CONSTRUCT AIRPORT WAY

Item Description	Unit	Unit Price	CONSTRUCT AIRPORT WAY Quantity	Total
MOBILIZATION				
15% Mobilization	LS	Varies	1	$ 394,300.00
PAVEMENT REMOVAL				
Pavement removal - Complete	SY	$ 10.00	30,000	$ 300,000.00
EXCAVATION AND EMBANKMENT				
Unclassified Excavation	CY	$ 10.00	50,000	$ 500,000.00
Over Excavation	CY	$ 15.00	15,000	$ 225,000.00
Subgrade Preparation	SY	$ 5.00	21,000	$ 105,000.00
SUBBASE COURSE				
Aggregate Subbase Course (18")	CY	$ 30.00	10,000	$ 300,000.00
EROSION CONTROL				
Erosion Control	LS	$ 10,000.00	1	$ 10,000.00
CRUSHED AGGREGATE BASE COURSE				
Crushed Aggregate Base Course (12")	CY	$ 40.00	7,000	$ 280,000.00
SOIL STERILIZATION				
Soil Sterilization	SY	$ 0.20	21,000	$ 4,200.00
PLANT MIX BITUMINOUS PAVEMENTS				
Bituminous Surface Course (4")	TON	$ 120.00	4,500	$ 540,000.00
BITUMINOUS TACK COAT				
Bituminous Tack Coat	GAL	$ 1.50	3,500	$ 5,250.00
ROADWAY PAINTING				
Temporary Pavement Markings	SF	$ 1.00	8,400	$ 8,400.00
Permanent Pavement Markings	SF	$ 1.00	8,400	$ 8,400.00
REINFORCED CONCRETE PIPE				
Install 36" RCP	LF	$ 95.00	1,440	$ 136,800.00
Install 48" RCP	LF	$ 125.00	120	$ 15,000.00
TOPSOIL				
Strip, Stockpile, and Spread Topsoil	AC	$ 1,000.00	20	$ 20,000.00
SEEDING				
Seeding and Hydromulch	AC	$ 1,000.00	20	$ 20,000.00
UTILITY MODIFICATIONS				
Relocate OH Electrical	LF	$ 150.00	1,000	$ 150,000.00
		Item Total		**$ 3,022,350.00**
		20% Contingency		$ 604,470.00
		Engineering Design Fees (Est.)		$ 302,235.00
		Construction Management Fees (Est.)		$ 302,235.00
		Total		**$ 4,231,290.00**

NOTES:

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Roadway on embankment extended to south portion of depressed floodplain area.
Roadway Section: (2) 12' lanes with 8' shoulders and 3:1 sideslopes
36" RCP: 120' long pipes placed every 200 feet in depressed floodplain area (12 pipes).
48" RCP: Pipe for slough under road near Marsh Rd
Silt Fence: Placed along upstream side of perimeter slough

JVIATION

Harvey Field

Preliminary Cost Estimate

CONSTRUCT NORTHEAST APRON (100' X 500')

Item	Item Description	Unit	Unit Price	CONSTRUCT NORTHEAST APRON Quantity	CONSTRUCT NORTHEAST APRON Total
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 43,100.00
P-140	**PAVEMENT REMOVAL**				
P-140b	Pavement removal - Complete	SY	$ 10.00	0	$ -
P-152	**EXCAVATION AND EMBANKMENT**				
P-152a	Unclassified Excavation	CY	$ 10.00	3,200	$ 32,000.00
P-152b	Over Excavation	CY	$ 20.00	852	$ 17,049.60
P-152c	Subgrade Preparation	SY	$ 5.00	6,400	$ 32,000.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 25,000.00	1	$ 25,000.00
P-209	**CRUSHED AGGREGATE BASE COURSE**				
P-209a	Crushed Aggregate Base Course (9")	CY	$ 50.00	1,600	$ 80,000.00
P-222	**SOIL STERILIZATION**				
P-222	Soil Sterilization	SY	$ 0.20	6,400	$ 1,280.00
P-310	**GEOSYNTHETIC PRODUCTS**				
P-310a	Stabilization Fabric	SY	$ 2.00	6,400	$ 12,800.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	1,600	$ 104,000.00
P-401b	Modified Bituminous Material	TON	$ 650.00	104	$ 67,600.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	1,100	$ 1,650.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	2,600	$ 2,600.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	2,600	$ 2,600.00
D-701	**REINFORCED CONCRETE PIPE**				
D-701b	Install 18" RCP, CLASS V	LF	$ 82.00	200	$ 16,400.00
D-705	**PIPE UNDERDRAINS FOR AIRPORTS**				
D-705a	Install 6" Perforated Polyethylene Pipe	LF	$ 25.00	800	$ 20,000.00
D-751	**MANHOLES & INSPECTION HOLES**				
D-751a	Install Underdrain Inspection Pit	EA	$ 4,000.00	2	$ 8,000.00
D-751b	Install Underdrain Cleanouts	EA	$ 1,500.00	2	$ 3,000.00
T-901	**SEEDING**				
L-108a	Seeding and Hydromulch	AC	$ 5,000.00	1	$ 5,000.00
			Item Total		**$ 474,079.60**
			20% Contingency		$ 94,815.92
			Engineering Design Fees (Est.)		$ 47,407.96
			Construction Management Fees (Est.)		$ 47,407.96
			Total		**$ 663,711.44**

NOTES:

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JVIATION

Harvey Field

Preliminary Cost Estimate

CONSTRUCT EAST APRON (180' X 670')

				CONSTRUCT EAST APRON	
Item	**Item Description**	**Unit**	**Unit Price**	**Quantity**	**Total**
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 108,800.00
P-140	**PAVEMENT REMOVAL**				
P-140b	Pavement removal - Complete	SY	$ 10.00	0	$ -
P-152	**EXCAVATION AND EMBANKMENT**				
P-152a	Unclassified Excavation	CY	$ 10.00	8,550	$ 85,500.00
P-152b	Over Excavation	CY	$ 20.00	2,278	$ 45,554.40
P-152c	Subgrade Preparation	SY	$ 5.00	17,100	$ 85,500.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 25,000.00	1	$ 25,000.00
P-209	**CRUSHED AGGREGATE BASE COURSE**				
P-209a	Crushed Aggregate Base Course (9")	CY	$ 50.00	4,275	$ 213,750.00
P-222	**SOIL STERILIZATION**				
P-222	Soil Sterilization	SY	$ 0.20	17,100	$ 3,420.00
P-310	**GEOSYNTHETIC PRODUCTS**				
P-310a	Stabilization Fabric	SY	$ 2.00	17,100	$ 34,200.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	4,700	$ 305,500.00
P-401b	Modified Bituminous Material	TON	$ 650.00	306	$ 198,575.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	2,900	$ 4,350.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	6,800	$ 6,800.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	6,800	$ 6,800.00
D-701	**REINFORCED CONCRETE PIPE**				
D-701b	Install 18" RCP, CLASS V	LF	$ 82.00	200	$ 16,400.00
D-705	**PIPE UNDERDRAINS FOR AIRPORTS**				
D-705a	Install 6" Perforated Polyethylene Pipe	LF	$ 25.00	1,300	$ 32,500.00
D-751	**MANHOLES & INSPECTION HOLES**				
D-751a	Install Underdrain Inspection Pit	EA	$ 4,000.00	2	$ 8,000.00
D-751b	Install Underdrain Cleanouts	EA	$ 1,500.00	4	$ 6,000.00
T-901	**SEEDING**				
L-108a	Seeding and Hydromulch	AC	$ 5,000.00	2	$ 10,000.00
			Item Total		**$ 1,196,649.40**
			20% Contingency		$ 239,329.88
			Engineering Design Fees (Est.)		$ 119,664.94
			Construction Management Fees (Est.)		$ 119,664.94
			Total		**$ 1,675,309.16**

NOTES:
Cost estimates are preliminary conceptual estimates for planning purposes only. Costs do not represent detailed engineering costs and analysis.

JVIATION

Harvey Field

Preliminary Cost Estimate

CONSTRUCT WEST APRON (740' X 1,140')

Item	Item Description	Unit	Unit Price	Quantity	Total
				CONSTRUCT WEST APRON	
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 316,700.00
P-140	**PAVEMENT REMOVAL**				
P-140b	Pavement removal - Complete	SY	$ 10.00	0	$ -
P-152	**EXCAVATION AND EMBANKMENT**				
P-152a	Unclassified Excavation	CY	$ 10.00	44,800	$ 448,000.00
P-152b	Over Excavation	CY	$ 20.00	11,935	$ 238,694.40
P-152c	Subgrade Preparation	SY	$ 5.00	89,600	$ 448,000.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 35,000.00	1	$ 35,000.00
P-209	**CRUSHED AGGREGATE BASE COURSE**				
P-209a	Crushed Aggregate Base Course (9")	CY	$ 50.00	22,400	$ 1,120,000.00
P-222	**SOIL STERILIZATION**				
P-222	Soil Sterilization	SY	$ 0.20	89,600	$ 17,920.00
P-310	**GEOSYNTHETIC PRODUCTS**				
P-310a	Stabilization Fabric	SY	$ 2.00	89,600	$ 179,200.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	4,700	$ 305,500.00
P-401b	Modified Bituminous Material	TON	$ 650.00	306	$ 198,575.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	14,800	$ 22,200.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	35,500	$ 35,500.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	35,500	$ 35,500.00
D-701	**REINFORCED CONCRETE PIPE**				
D-701b	Install 18" RCP, CLASS V	LF	$ 82.00	200	$ 16,400.00
D-705	**PIPE UNDERDRAINS FOR AIRPORTS**				
D-705a	Install 6" Perforated Polyethylene Pipe	LF	$ 25.00	1,300	$ 32,500.00
D-751	**MANHOLES & INSPECTION HOLES**				
D-751a	Install Underdrain Inspection Pit	EA	$ 4,000.00	2	$ 8,000.00
D-751b	Install Underdrain Cleanouts	EA	$ 1,500.00	4	$ 6,000.00
T-901	**SEEDING**				
L-108a	Seeding and Hydromulch	AC	$ 5,000.00	4	$ 20,000.00
			Item Total		**$ 3,483,689.40**
			20% Contingency		$ 696,737.88
			Engineering Design Fees (Est.)		$ 348,368.94
			Construction Management Fees (Est.)		$ 348,368.94
			Total		**$ 4,877,165.16**

NOTES:

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Harvey Field

Preliminary Cost Estimate
CONSTRUCT HELIPAD

Item	Item Description	Unit	Unit Price	Quantity	Total
				CONSTRUCT HELIPAD	
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 35,000.00
P-140	**PAVEMENT REMOVAL**				
P-140b	Pavement removal - Complete	SY	$ 10.00	0	$ -
P-152	**EXCAVATION AND EMBANKMENT**				
P-152a	Unclassified Excavation	CY	$ 10.00	2,500	$ 25,000.00
P-152b	Over Excavation	CY	$ 20.00	667	$ 13,333.33
P-152c	Subgrade Preparation	SY	$ 5.00	5,000	$ 25,000.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 10,000.00	1	$ 10,000.00
P-209	**CRUSHED AGGREGATE BASE COURSE**				
P-209a	Crushed Aggregate Base Course (6")	CY	$ 50.00	833	$ 41,666.67
P-222	**SOIL STERILIZATION**				
P-222	Soil Sterilization	SY	$ 0.20	5,000	$ 1,000.00
P-310	**GEOSYNTHETIC PRODUCTS**				
P-310a	Stabilization Fabric	SY	$ 2.00	5,000	$ 10,000.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	1,400	$ 91,000.00
P-401b	Modified Bituminous Material	TON	$ 650.00	91	$ 59,150.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	900	$ 1,350.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	2,000	$ 2,000.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	2,000	$ 2,000.00
D-701	**REINFORCED CONCRETE PIPE**				
D-701b	Install 18" RCP, CLASS V	LF	$ 82.00	200	$ 16,400.00
D-705	**PIPE UNDERDRAINS FOR AIRPORTS**				
D-705a	Install 6" Perforated Polyethylene Pipe	LF	$ 25.00	1,000	$ 25,000.00
D-751	**MANHOLES & INSPECTION HOLES**				
D-751a	Install Underdrain Inspection Pit	EA	$ 4,000.00	2	$ 8,000.00
D-751b	Install Underdrain Cleanouts	EA	$ 1,500.00	6	$ 9,000.00
T-901	**SEEDING**				
L-108a	Seeding and Hydromulch	AC	$ 5,000.00	2	$ 10,000.00
			Item Total		**$ 384,900.00**
			20% Contingency		$ 76,980.00
			Engineering Design Fees (Est.)		$ 38,490.00
			Construction Management Fees (Est.)		$ 38,490.00
			Total		**$ 538,860.00**

NOTES:
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JVIATION

Harvey Field

Preliminary Cost Estimate

Seal Coat Runway 15/33

Item	Item Description	Unit	Unit Price	Quantity	Total
				SEAL COAT RUNWAY	
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 19,700.00
P-101	**CRACK SEAL**				
P-101a	Minor Crack Repair	LF	$ 2.50	15,000	$ 37,500.00
P-608	**FOG SEAL**				
P-608a	Fog Seal with Sand	SY	$ 2.00	22,000	$ 44,000.00
P-620	**PAVEMENT MARKINGS**				
P-620a	Obliterate Existing Markings	SF	$ 2.00	23,000	$ 46,000.00
P-620b	Temporary Pavement Markings	SF	$ 1.50	23,000	$ 34,500.00
P-620c	Permanent Pavement Markings	SF	$ 1.50	23,000	$ 34,500.00
			Item Total		**$ 216,200.00**
			20% Contingency		$ 43,240.00
			Engineering Design Fees (Est.)		$ 21,620.00
			Construction Management Fees (Est.)		$ 21,620.00
			Total		**$ 302,680.00**

NOTES:

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JVIATION

Harvey Field

Preliminary Cost Estimate

Seal Coat Taxiway

Item	Item Description	Unit	Unit Price	Quantity	Total
				SEAL COAT TAXIWAY	
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 5,600.00
P-101	**CRACK SEAL**				
P-101a	Minor Crack Repair	LF	$ 2.50	7,500	$ 18,750.00
P-608	**FOG SEAL**				
P-608a	Fog Seal without Sand	SY	$ 1.75	9,800	$ 17,150.00
P-620	**PAVEMENT MARKINGS**				
P-620a	Obliterate Existing Markings	SF	$ 2.00	3,900	$ 7,800.00
P-620b	Temporary Pavement Markings	SF	$ 1.50	3,900	$ 5,850.00
P-620c	Permanent Pavement Markings	SF	$ 1.50	3,900	$ 5,850.00
			Item Total		**$ 61,000.00**
			20% Contingency		$ 12,200.00
			Engineering Design Fees (Est.)		$ 6,100.00
			Construction Management Fees (Est.)		$ 6,100.00
			Total		**$ 85,400.00**

NOTES:

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JVIATION

Harvey Field

Preliminary Cost Estimate

Seal Coat Aprons and Helipad

Item	Item Description	Unit	Unit Price	SEAL COAT APRONS AND HELIPAD	
				Quantity	Total
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 48,600.00
P-101	**CRACK SEAL**				
P-101a	Minor Crack Repair	LF	$ 2.00	25,000	$ 50,000.00
P-608	**FOG SEAL**				
P-608a	Fog Seal without Sand	SY	$ 1.70	118,100	$ 200,770.00
P-620	**PAVEMENT MARKINGS**				
P-620a	Obliterate Existing Markings	SF	$ 2.00	46,900	$ 93,800.00
P-620b	Temporary Pavement Markings	SF	$ 1.50	46,900	$ 70,350.00
P-620c	Permanent Pavement Markings	SF	$ 1.50	46,900	$ 70,350.00
			Item Total		**$ 533,870.00**
			20% Contingency		$ 106,774.00
			Engineering Design Fees (Est.)		$ 53,387.00
			Construction Management Fees (Est.)		$ 53,387.00
			Total		**$ 747,418.00**

NOTES:

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JVIATION

Harvey Field

Preliminary Cost Estimate
Rehabilitate Runway 15/33

Item	Item Description	Unit	Unit Price	Quantity	Total
				REHABILITATE RUNWAY	
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 66,000.00
P-140	**PAVEMENT REMOVAL**				
P-140a	Pavement removal - Partial	SY	$ 3.00	23,200	$ 69,600.00
P-101	**CRACK SEAL**				
P-101a	Minor Crack Repair	LF	$ 2.50	25,000	$ 62,500.00
P-101a	Major Crack Repair	LF	$ 25.00	6,000	$ 150,000.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 15,000.00	1	$ 15,000.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	2,900	$ 188,500.00
P-401b	Modified Bituminous Material	TON	$ 650.00	189	$ 122,525.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	3,900	$ 5,850.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	23,000	$ 23,000.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	23,000	$ 23,000.00
			Item Total		**$ 725,975.00**
			20% Contingency		$ 145,195.00
			Engineering Design Fees (Est.)		$ 72,597.50
			Construction Management Fees (Est.)		$ 72,597.50
			Total		**$ 1,016,365.00**

NOTES:
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JVIATION

Harvey Field

Preliminary Cost Estimate

Rehabilitate Taxiway

				REHABILITATE TAXIWAY	
Item	**Item Description**	**Unit**	**Unit Price**	**Quantity**	**Total**
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 27,700.00
P-140	**PAVEMENT REMOVAL**				
P-140a	Pavement removal - Partial	SY	$ 3.00	9,800	$ 29,400.00
P-101	**CRACK SEAL**				
P-101a	Minor Crack Repair	LF	$ 2.50	10,000	$ 25,000.00
P-101a	Major Crack Repair	LF	$ 25.00	2,500	$ 62,500.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 10,000.00	1	$ 10,000.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	1,300	$ 84,500.00
P-401b	Modified Bituminous Material	TON	$ 650.00	85	$ 54,925.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	1,700	$ 2,550.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	3,900	$ 3,900.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	3,900	$ 3,900.00
			Item Total		**$ 304,375.00**
			20% Contingency		$ 60,875.00
			Engineering Design Fees (Est.)		$ 30,437.50
			Construction Management Fees (Est.)		$ 30,437.50
			Total		**$ 426,125.00**

NOTES:

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JVIATION

Harvey Field

Preliminary Cost Estimate

Rehabilitate Aprons

Item	Item Description	Unit	Unit Price	Quantity	Total
				REHABILITATE APRONS	
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 243,900.00
P-140	**PAVEMENT REMOVAL**				
P-140a	Pavement removal - Partial	SY	$ 3.00	118,100	$ 354,300.00
P-101	**CRACK SEAL**				
P-101a	Minor Crack Repair	LF	$ 2.50	50,000	$ 125,000.00
P-101a	Major Crack Repair	LF	$ 25.00	10,000	$ 250,000.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 10,000.00	1	$ 10,000.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	14,700	$ 955,500.00
P-401b	Modified Bituminous Material	TON	$ 650.00	956	$ 621,075.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	19,500	$ 29,250.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	46,900	$ 46,900.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	46,900	$ 46,900.00
			Item Total		**$ 2,682,825.00**
			20% Contingency		$ 536,565.00
			Engineering Design Fees (Est.)		$ 268,282.50
			Construction Management Fees (Est.)		$ 268,282.50
			Total		**$ 3,755,955.00**

NOTES:

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JVIATION

Harvey Field

Preliminary Cost Estimate
Construct Runway 15/33

				CONSTRUCT RUNWAY	
Item	**Item Description**	**Unit**	**Unit Price**	**Quantity**	**Total**
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 270,100.00
P-140	**PAVEMENT REMOVAL**				
P-140a	Pavement removal - Complete	SY	$ 10.00	16,700	$ 167,000.00
P-152	**EXCAVATION AND EMBANKMENT**				
P-152a	Embankment	CY	$ 10.00	40,000	$ 400,000.00
P-152b	Over Excavation	CY	$ 20.00	5,150	$ 103,008.00
P-152c	Subgrade Preparation	SY	$ 5.00	23,200	$ 116,000.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 40,000.00	1	$ 40,000.00
P-209	**CRUSHED AGGREGATE BASE COURSE**				
P-209a	Crushed Aggregate Base Course (9")	CY	$ 50.00	5,800	$ 290,000.00
P-222	**SOIL STERILIZATION**				
P-222	Soil Sterilization	SY	$ 0.20	23,200	$ 4,640.00
P-310	**GEOSYNTHETIC PRODUCTS**				
P-310a	Stabilization Fabric	SY	$ 2.00	23,200	$ 46,400.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	6,400	$ 416,000.00
P-401b	Modified Bituminous Material	TON	$ 650.00	416	$ 270,400.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	3,900	$ 5,850.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	23,000	$ 23,000.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	23,000	$ 23,000.00
D-701	**REINFORCED CONCRETE PIPE**				
D-701a	Install 36" RCP, CLASS V	LF	$ 150.00	1,750	$ 262,500.00
D-701b	Install 18" RCP, CLASS V	LF	$ 82.00	400	$ 32,800.00
D-705	**PIPE UNDERDRAINS FOR AIRPORTS**				
D-705a	Install 6" Perforated Polyethylene Pipe	LF	$ 25.00	5,000	$ 125,000.00
D-751	**MANHOLES & INSPECTION HOLES**				
D-751a	Install Underdrain Inspection Pit	EA	$ 4,000.00	6	$ 24,000.00
D-751b	Install Underdrain Cleanouts	EA	$ 1,500.00	20	$ 30,000.00
T-901	**SEEDING**				
L-108a	Seeding and Hydromulch	AC	$ 5,000.00	10	$ 50,000.00
L-108	**INSTALLATION OF UNDERGROUND CABLE FOR AIRPORTS**				
L-108a	L-824C #8 AWG 5000V Cable	LF	$ 3.00	8,000	$ 24,000.00
L-108b	#6 AWG Bare Counterpoise Wire	LF	$ 2.25	8,000	$ 18,000.00
L-109	**AIRPORT ELECTRICAL EQUIPMENT BUILDING**				
L-109a	Install New Regulator	EA	$ 30,000.00	1	$ 30,000.00

JVIATION

Harvey Field

Preliminary Cost Estimate
Construct Runway 15/33

Item	Item Description	Unit	Unit Price	Quantity	Total
				CONSTRUCT RUNWAY	
L-110	**AIRPORT UNDERGROUND ELECTRICAL DUCT**				
L-110a	1-2" SCH. 40 PVC Conduit (DEB)	LF	$ 10.00	7,000	$ 70,000.00
L-110b	1-2" SCH. 40 PVC Conduit (CE)	LF	$ 25.00	500	$ 12,500.00
L-125	**INSTALLATION OF AIRPORT LIGHTING SYSTEMS**				
L-125b	Remove and Install New Runway Edge lights	EA	$ 1,500.00	50	$ 75,000.00
L-125d	L-858 Guidance Sign, 2 Module	EA	$ 4,000.00	4	$ 16,000.00
L-125e	Install REIL	LS	$ 20,000.00	1	$ 20,000.00
L-806	**Wind Cone**				
L-806	Relocate Wind Cone	LS	$ 5,000.00	1	$ 5,000.00
			Item Total		**$ 2,970,198.00**
			20% Contingency		$ 594,039.60
			Engineering Design Fees (Est.)		$ 297,019.80
			Construction Management Fees (Est.)		$ 297,019.80
			Total		**$ 4,158,277.20**

NOTES:
Cost estimates are preliminary conceptual estimates for planning purposes only. Costs do not represent detailed engineering costs and analysis.

JVIATION

Harvey Field

Preliminary Cost Estimate
CONSTRUCT TAXIWAY

				CONSTRUCT TAXIWAY	
Item	**Item Description**	**Unit**	**Unit Price**	**Quantity**	**Total**
GP-105	**MOBILIZATION**				
GP-105a	**10% Mobilization**	LS	Varies	1	$ 156,100.00
P-140	**PAVEMENT REMOVAL**				
P-140a	Pavement removal - Complete	SY	$ 10.00	5,500	$ 55,000.00
P-152	**EXCAVATION AND EMBANKMENT**				
P-152a	Unclassified Excavation	CY	$ 10.00	50,000	$ 500,000.00
P-152b	Over Excavation	CY	$ 20.00	2,173	$ 43,468.49
P-152c	Subgrade Preparation	SY	$ 5.00	9,800	$ 49,000.00
P-156	**EROSION CONTROL**				
P-156a	Erosion Control	LS	$ 25,000.00	1	$ 25,000.00
P-209	**CRUSHED AGGREGATE BASE COURSE**				
P-209a	Crushed Aggregate Base Course (9")	CY	$ 50.00	2,450	$ 122,500.00
P-222	**SOIL STERILIZATION**				
P-222	Soil Sterilization	SY	$ 0.20	9,800	$ 1,960.00
P-310	**GEOSYNTHETIC PRODUCTS**				
P-310a	Stabilization Fabric	SY	$ 2.00	9,800	$ 19,600.00
P-401	**PLANT MIX BITUMINOUS PAVEMENTS**				
P-401a	Bituminous Surface Course (4")	TON	$ 65.00	2,100	$ 136,500.00
P-401b	Modified Bituminous Material	TON	$ 650.00	137	$ 88,725.00
P-603	**BITUMINOUS TACK COAT**				
P-603a	Bituminous Tack Coat	GAL	$ 1.50	1,700	$ 2,550.00
P-620	**RUNWAY AND TAXIWAY PAINTING**				
P-620a	Temporary Pavement Markings	SF	$ 1.00	3,900	$ 3,900.00
P-620b	Permanent Pavement Markings	SF	$ 1.00	3,900	$ 3,900.00
D-701	**REINFORCED CONCRETE PIPE**				
D-701a	Install 36" RCP, CLASS V	LF	$ 150.00	1,050	$ 157,500.00
D-701b	Install 18" RCP, CLASS V	LF	$ 82.00	100	$ 8,200.00
D-705	**PIPE UNDERDRAINS FOR AIRPORTS**				
D-705a	Install 6" Perforated Polyethylene Pipe	LF	$ 25.00	6,000	$ 150,000.00
D-751	**MANHOLES & INSPECTION HOLES**				
D-751a	Install Underdrain Inspection Pit	EA	$ 4,000.00	6	$ 24,000.00
D-751b	Install Underdrain Cleanouts	EA	$ 1,500.00	20	$ 30,000.00
T-901	**SEEDING**				
L-108a	Seeding and Hydromulch	AC	$ 5,000.00	11	$ 55,000.00
L-125	**INSTALLATION OF AIRPORT LIGHTING SYSTEMS**				
L-125a	Taxiway Edge Reflective Markers	EA	$ 350.00	60	$ 21,000.00
L-125d	L-858 Guidance Sign, 2 Module- Unlighted	EA	$ 3,200.00	4	$ 12,800.00
L-880	**PRECISION APPROACH PATH INDICATOR**				
L-880	Install PAPI	LS	$ 50,000.00	1	$ 50,000.00
			Item Total		**$ 1,716,703.49**
			20% Contingency		$ 343,340.70
			Engineering Design Fees (Est.)		$ 171,670.35
			Construction Management Fees (Est.)		$ 171,670.35
			Total		**$ 2,403,384.88**

NOTES:
Cost estimates are preliminary conceptual estimates for planning purposes only. Costs do not represent detailed engineering costs and analysis.

APPENDIX N

SNOHOMISH COUNTY LETTER

Snohomish County
Executive Office

Dave Somers
County Executive
3000 Rockefeller Avenue
Everett, WA 98201
(425) 388-3411

September 6, 2016

Kandace Harvey
9900 Airport Way
Snohomish, WA 98290

Subject: Proposed Harvey Airfield Fill

Dear Ms. Harvey

Snohomish County Planning and Development Services (PDS) has concluded a preliminary review of your runway/taxiway expansion at Harvey Field. Preliminary PDS review indicates your proposal can meet Snohomish County Code (SCC) requirements for fill in the Flood Hazard Density Fringe pursuant to SCC 30.65.270. PDS review included your proposal to relocate Airport Way from its' current alignment to a new alignment on Harvey Field property. If final PDS approval is granted, Snohomish County will require the proposed right-of-way to be dedicated to Snohomish County through approval of Snohomish County Department of Public Works.

Please understand compliance is based on preliminary review of documents provided. Final approval cannot be granted until review of permit applications and construction documents show compliance with all applicable regulations.

I look forward to working with you through the County permitting processes. If you have questions please feel free to contact Randy Sleight at 425-388-3311, extension 2014, or myself at 425-388-3030.

Sincerely,

Tom Rowe

Tom Rowe
Special Project Director
Executive's Office, Snohomish County
425-388-3030
Tom.Rowe@snoco.org

APPENDIX O

SNOHOMISH COUNTY CODE DENSITY FRINGE REQUIREMENTS

Snohomish County Code Density Fringe Requirements

- Density Fringe requirements are found in Snohomish County Code (SCC) Chapter 30.
- SCC has different requirements for each of the two proposed fill projects:
  - Runway/Taxiway
    - 1) 30.65.250 **Density fringe area: maximum allowable density… "2%"**
    - 2) 30.65.255 **Density fringe area: maximum allowable obstruction… "15%"**
  - Relocating Airport Way
    - 3) 30.65.260 **Density fringe area: exceptions to maximum allowable density and obstruction limitations… "BFE impact"**

JVIATION®

SCC RE: RUNWAY/TAXIWAY:

First, Limit fill footprint to 2% or less

30.65.250 DENSITY FRINGE AREA: MAXIMUM ALLOWABLE DENSITY.

The land area occupied by any use or development permitted by this chapter located in the density fringe area that will displace floodwaters shall not exceed two percent of the land area of that portion of the lot. The limitations of this section shall not apply to those uses listed in SCC 30.65.260.

- *"..land area occupied…that will displace floodwaters…"*
  - The fill limitations apply to sites located beneath the 100-yr flood elevation i.e. 23' (NGVD29) or 26.63' (NAVD88) @ Harvey Field
  - Virtually all of Harvey Field is lower than 26.63'…so SCC applies everywhere.
  - Cut cannot be used to "offset" fill impacts, so….1 acre fill minus .25 acres cut ≠ 0.75 acres of fill
  - Earthwork volume does not matter, only the footprint or 2D area.

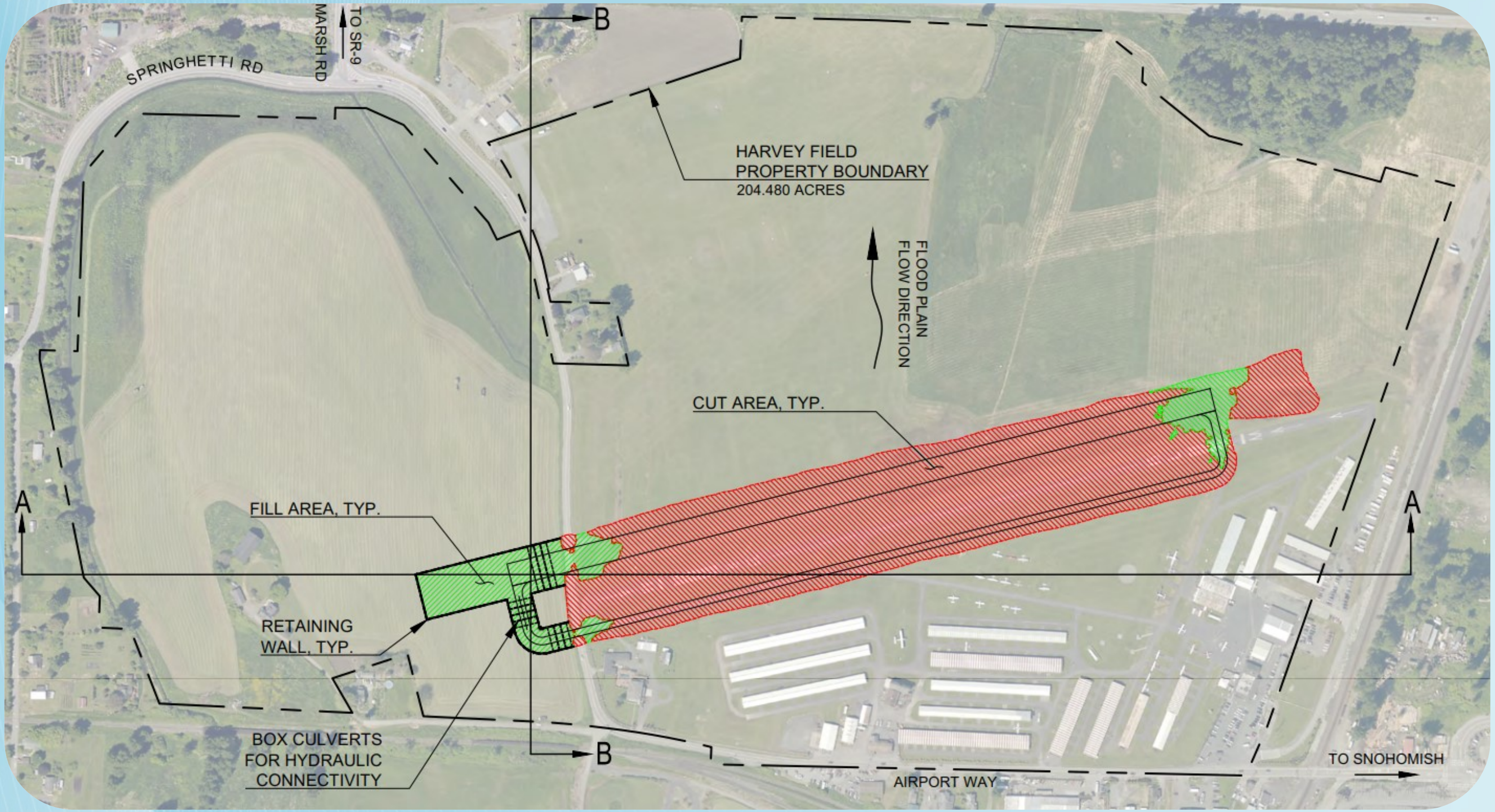
- "…shall not exceed two percent of the land area of that portion of the lot":
  - Fill Footprint / Total Airport Land Area = 2% of total property area or less
  - Harvey Field Property = 204.48 acres
  - 2% of 204.48 = 4.090 acres

- "The limitations of this section shall not apply to those uses listed in SCC 30.65.260.
  - 2% Area limit does NOT apply to public uses, such as roads, specifically, Airport Way.

JVIATION

SCC RE: RUNWAY/TAXIWAY:

Fill & Cut Area Calculations



Green = Fill Area

Red = Cut Area

CUT/FILL AREAS			
FEATURE	AREA (AC.)	% OF PROPERTY AREA	VOLUME (CU. YD.)
HARVEY FIELD PROPERTY	204.480	–	–
NEW FILL	3.927	1.92%	33,940
NEW CUT	18.872	9.23%	57,760
CULVERT OPENINGS	0.448	0.22%	2,890
FILL – CULVERTS	3.479	1.70%	31,050

JVIATION®

SCC RE: RUNWAY/TAXIWAY:

Second, Limit how much fill blocks the flow of floodwater to 15% or less

30.65.255 DENSITY FRINGE AREA: MAXIMUM ALLOWABLE OBSTRUCTION.

The maximum width (sum of widths) of all new construction, substantial improvements or other development shall not exceed 15 percent of the length of a line drawn perpendicular to the known floodwater flow direction at the point where the development(s) is located. The length of said line shall not extend beyond the property boundary or the edge of the density fringe area, whichever is less. The limitations of this section shall not apply to those uses listed in SCC 30.65.260.

- *"a line drawn perpendicular to the known floodwater flow direction at the point where the development(s) is located. … length … shall not extend beyond the property boundary or the edge of the density fringe area, whichever is less."*
  - All of Harvey Field property is within the Density Fringe
  - Determine the general floodplain flow direction
  - Draw a line perpendicular to the flow direction
  - Draw the line where it intersects the largest width of new construction as a percentage of property width.
- *"The maximum width (sum of widths) of all new construction, substantial improvements or other development…"*
  - New construction is Fill - Anything that diverts or blocks Flood flows
- *"…shall not exceed 15 percent of the length …"*
  - Sum of Fill widths / Total property width = 15% or less

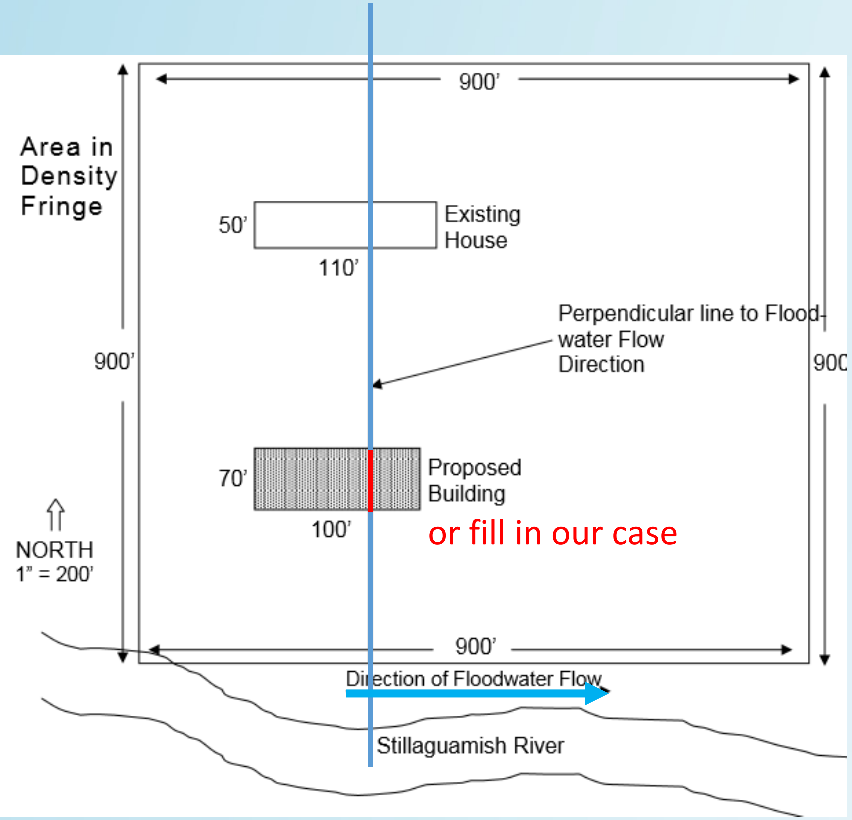
SCC RE: RUNWAY/TAXIWAY:

Flow Obstruction/Blockage Calculations

30.65.255 ***DENSITY FRINGE AREA: MAXIMUM ALLOWABLE OBSTRUCTION.***

Example from County Flood Permit Application

- Determine the general floodplain flow direction
- Draw a line perpendicular to the flow direction
- Draw the line where it intersects the largest width of new construction as a percentage of property width.
- Sum of Fill widths/Total property width must be less than 15%



900’ property width

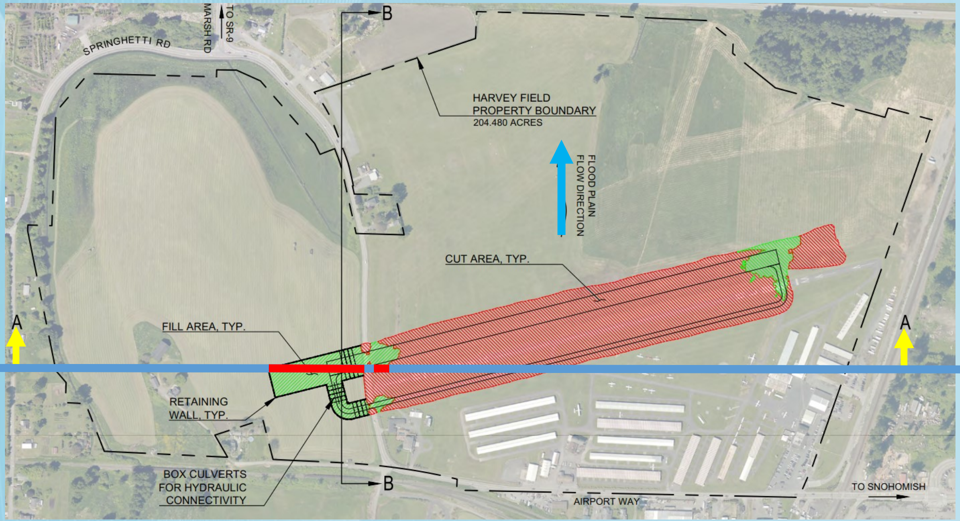
70’ new obstruction width

70’/900’ = 7.8% < 15 %

JVIATION®

SCC RE: RUNWAY/TAXIWAY:

Flow Obstruction/Blockage Calculations

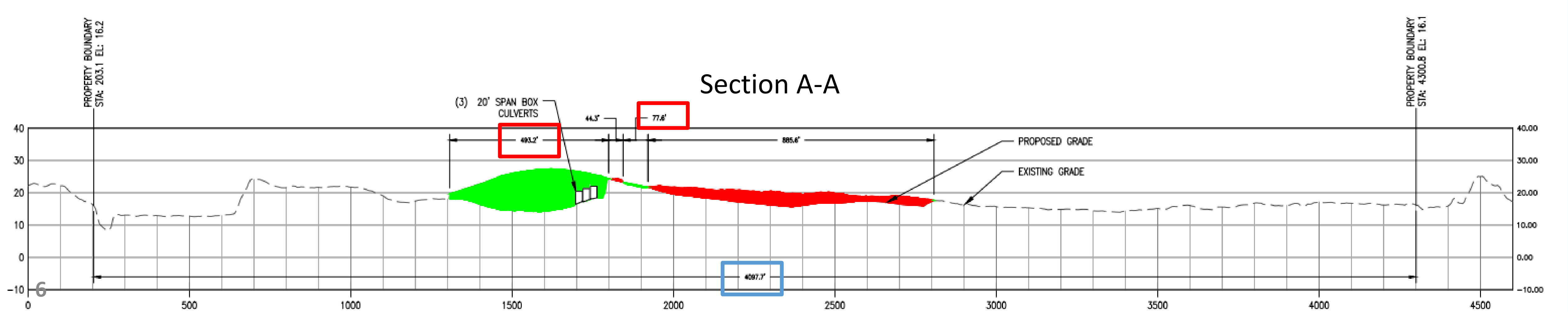


SECTION A-A		
FEATURE	WIDTH	% OF PROPERTY WIDTH
PROPERTY WIDTH	4097.7'	-
NEW FILL	570.8'	13.9%
NEW CUT	929.9'	22.7%
CULVERT OPENINGS	60.0'	1.5%
FILL - CULVERTS	510.8'	12.5%

4098' property width

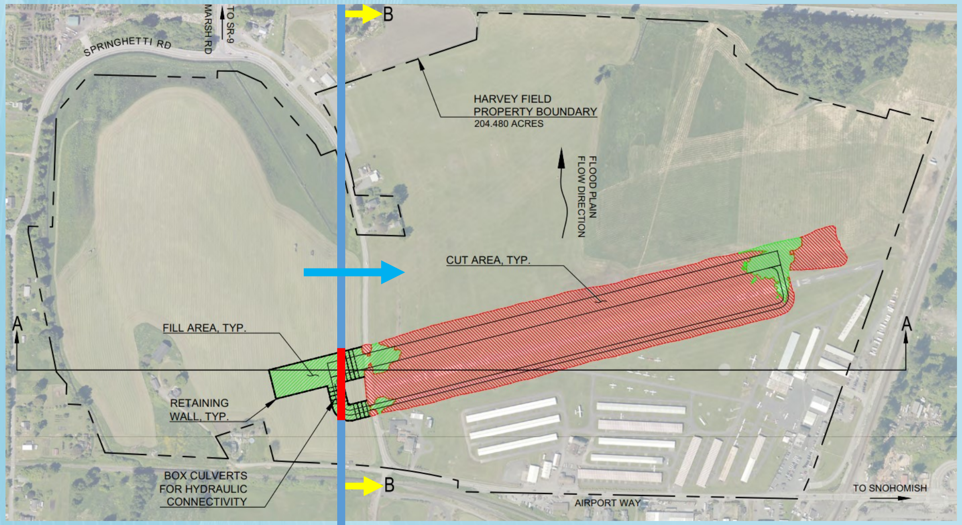
571' new obstruction width

571'/4098' = 13.9% < 15 %



SCC RE: RUNWAY/TAXIWAY:

Flow Obstruction/Blockage Calculations



SECTION B-B		
FEATURE	WIDTH	% OF PROPERTY WIDTH
PROPERTY WIDTH	1844.3'	-
NEW FILL	347.6'	18.8%
NEW CUT	0.0'	0.0%
CULVERT OPENINGS	80.0'	4.3%
FILL - CULVERTS	267.6'	14.5%

1844’ property width

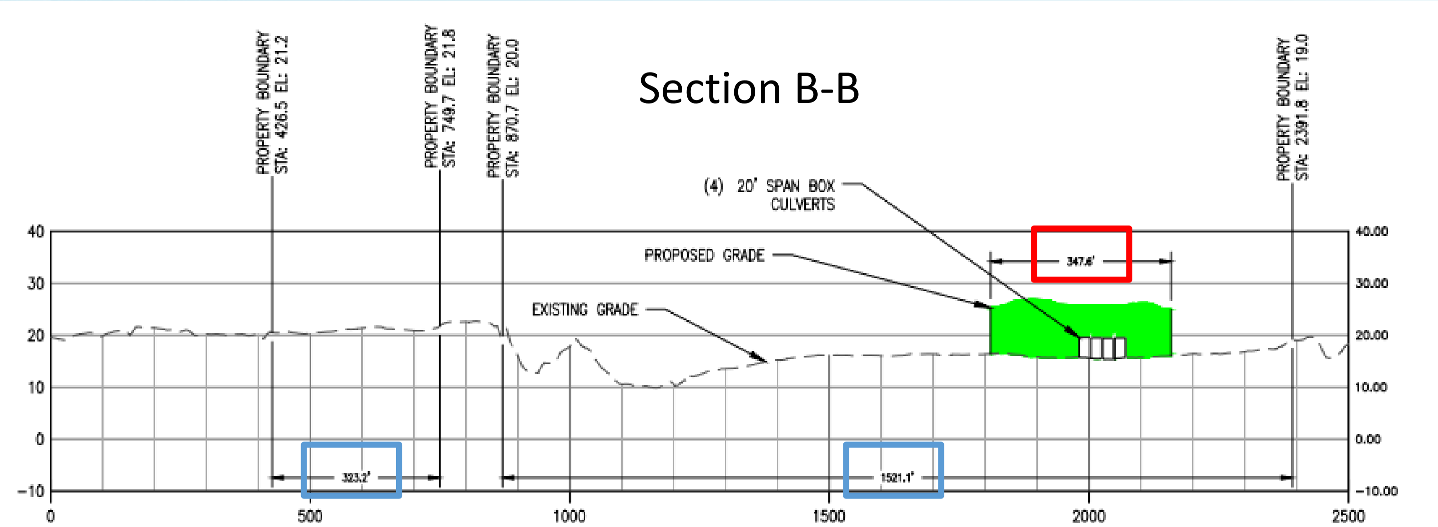
348’ new obstruction width

348’/1844’ = 18.8% > 15%

Doesn’t meet 15%, But if we deduct culvert opening areas from new obstruction width:

348’-80’ = 268’

268’/1844’ = 14.5% < 15%



SCC RE: AIRPORT WAY RELOCATION:

Road cannot increase Base Flood Elevation more than 1'

30.65.260 DENSITY FRINGE AREA: EXCEPTIONS TO MAXIMUM ALLOWABLE DENSITY AND OBSTRUCTION LIMITATIONS.

The following uses shall ***be exempt*** *from the maximum allowable density and obstruction limitations of SCC 30.65.250 and 30.65.255:*

(1) Water-dependent utilities; (2) Dikes; (3) Utility facilities; and (4) ***Public works****,*

when the project proponent demonstrates that the floodwater displacement effects of the proposal when considered together with the maximum potential floodwater displacement allowed by SCC 30.65.250 and 30.65.255 shall not cause a cumulative increase in the base flood elevation of more than one foot. Floodwater displacement information shall be obtained and certified by a professional engineer.

Snohomish County confirmed *"Public Works"* includes public roads, including Airport Way.

SCC RE: AIRPORT WAY RELOCATION:

Base Flood Elevation Impact Calculation

30.65.260 DENSITY FRINGE AREA: EXCEPTIONS TO MAXIMUM ALLOWABLE DENSITY AND OBSTRUCTION LIMITATIONS.

- *"...demonstrates that the floodwater displacement effects of the proposal when considered together with the maximum potential floodwater displacement allowed by SCC 30.65.250 and 30.65.255"*
  - Base Flood = the 100-year flood elevation, as shown on the current FEMA Flood Insurance Rate Maps (FIRMs)
  - Floodwater displacement means that for every piece of material placed in construction of the road will take up some space that was previously available for water storage or conveyance during a flood.
  - Road relocation floodwater displacement calculation assumes that the maximum 2% area and 15% blockages will eventually occur on all properties located in the floodplain.
- *"Floodwater displacement information shall be obtained and certified by a professional engineer.*
  - Ray Walton of WEST Consultants created the original FEMA floodplain model in this area.
  - WEST Consultants ran the same model including all of the proposed improvements (Runway, Taxiway, and Airport Way). (*See Technical Memorandum, transmitted with SnoCo submittal*)
  - SCC only requires BFE modeling Public Works projects, i.e. Airport Way. Our approach is more comprehensive, and included road, runway, and taxiway improvements.
  - The model shows an 0.00' rise in the base flood elevation.

JVIATION®