

Final Environmental Assessment
for
Greener Skies Over Seattle;
Proposed Arrival Procedures to
Seattle-Tacoma International Airport

Volume 2 – Appendices

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Appendix A ACRONYMS, ABBREVIATIONS AND GLOSSARY OF TERMS

Acronyms and Abbreviations

A	Airbus (when referring to certain aircraft types)
AC	Advisory Circular
ADS-B	Automatic Dependent Surveillance-Broadcast
AEE	FAA Office of Environment and Energy
AEM	Area Equivalent Method
AFE	Above Field Elevation
AGL	Above Ground Level
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ANSI	American National Standards Institute
ARTCC	Air Route Traffic Control Center
ARTS	Automated Radar Terminal System
ASR	Airport Surveillance Radar
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
ATNS	Air Traffic Noise Screening
B	Boeing (when referring to certain aircraft types)
BAC	British Aircraft Corporation
BAE	BAE Systems or British Aerospace
BFI	Boeing Field
CDA	Continuous Descent Approach
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act

CZMA	Coastal Zone Management Area
dB	Decibel
dba	A-Weighted Decibel
DC	Douglas Corporation (became part of McDonnell Douglas)
DEA	Draft Environmental Assessment
DME	Distance Measuring Equipment
DNL	Day-Night Average Sound Level
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency (U.S.)
ESRI	Environmental Systems Research Institute
F	Fokker (when referring to certain aircraft types)
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FEIS	Final Environmental Impact Statement
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
FL	Flight Level
FMS	Flight Management System
GA	General Aviation
GPS	Global Positioning Satellite system
Hg	Chemical Symbol for Mercury
HUD	Department of Housing and Urban Development
Hz	Hertz
IFR	Instrument Flight Rules
ILS	Instrument Landing System

INM	Integrated Noise Model
Kts	Knots
Leq	Equivalent Sound Level
Lmax	Maximum Sound Level
LNAV	Lateral Navigation
LPV	Lateral Precision Performance with Vertical Guidance
MD	McDonnell Douglas (now a part of Boeing)
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NCP	Noise Compatibility Program
NADP	Noise Abatement Departure Procedure
NAVAIDS	Navigational Aids
NDNL	Nighttime (10:00 PM to 7:00 AM) Day-Night Average Sound Level
NEM	Noise Exposure Map
NEPA	National Environmental Policy Act
NextGen	Next Generation Air Transportation System
NIRS	Noise Integrated Routing System
NIST	National Institute of Standards and Technology
NLR	Noise Level Reduction
NMS	Noise Monitoring Site
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOMS	Noise and Operations Monitoring System

NOTAMS	Notices to Airmen
NO_x	Nitrogen Oxides, NO and NO ₂ ; air pollutant by-products of combustion
NM	Nautical Mile
NRHP	National Register of Historic Places
OPD	Optimized Profile Descent
O₃	Ozone
Pb	Lead
PBN	Performance Based Navigation
PFC	Passenger Facility Charge
PRM	Precision Runway Monitor
RNAV	Area Navigation
ROD	Record of Decision
RNP	Required Navigation Performance
SAAAR	Special Aircraft and Aircrew Authorization Required
SEA	Seattle-Tacoma International Airport
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SID	Standard Instrument Departure
SIP	State Implementation Plan
SO₂	Sulfur Dioxide
SOIA	Simultaneous Offset Instrument Approach
SPL	Sound Pressure Level
STAR	Standard Terminal Arrival
TAAM	Total Airport and Airspace Modeler
TACAN	Tactical Air Navigation
TAF	Terminal Area Forecast
TAMIS	Total Airport Management Information System

TARGETS	Terminal Area Route Generation, Evaluation, and Traffic Simulation Tool
TIGER	Topologically Integrated Geographic Encoding and Referencing
TRACON	Terminal Radar Approach Control
USACE	United States Army Corps of Engineers
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
VHF	Very High Frequency
VNAV	Vertical Navigation
VOC	Volatile Organic Compound
VOR	VHF Omnidirectional Radio Range Navigational Aid
VORTAC	Combined VOR and TACAN Navigational Aid

Glossary of Terms

A-Weighted Sound Level – A measure of sound level with weighted frequency characteristics that roughly correspond to a human’s subjective response to noise. Thus, sounds having higher A-weighted Sound Levels are generally judged to be “noisier” than sounds with lower A-weighted Sound Levels. Levels are reported in terms of A-weighted decibels, or dBA.

Acoustics – The science of sound, including the generation, transmission, and effects of sound waves, both audible and inaudible.

Air Carrier – A corporate entity operating aircraft under a Certificate of Public Convenience and Necessity issued by the FAA and authorizing the performance of scheduled air transportation over specified routes, with a limited amount of non-scheduled operations.

Air Pollutant – Any substance in air that could, in high enough concentration, cause harm to people, other animals, vegetation, or materials. Pollutants may include almost any natural or artificial composition of matter capable of being airborne, and can include gasses, particulates, or a combination of the two. Air Pollutants generally fall within two main groups: (1) those emitted directly from identifiable sources, and (2) those produced by the interaction of two or more primary pollutants or by a reaction with normal atmospheric constituents.

Air Taxi – An air carrier certificated in accordance with 14 CFR Part 135 and authorized to provide, on demand, public transportation by aircraft. An Air Taxi generally operates small aircraft for hire and for specific trips.

Air Traffic Control Tower (ATCT) – A facility that uses air-ground communications or visual signaling to provide air traffic control services to aircraft operating in the vicinity of an airport. The ATCT gives weather advisories, identifies the active runway(s) and authorizes aircraft to land and take off at the airport controlled by the tower.

Airspace – The navigable air used by aircraft for purposes of flight.

Altitude – Height above a reference point, usually expressed in feet. Reference points are typically sea level, the ground, or field elevation in which case MSL, AGL, or AFE further describes the altitude, respectively.

Ambient, or Background, Noise Level – The level of noise that is all-encompassing within a given environment and for which a single source cannot be identified. It is usually a composite of sounds from many and varied sources near to and far from the receiver.

Area Navigation (RNAV) – A method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigational signals or within the limits of a self-contained system capability.

Arrival – The act of an aircraft approaching and landing at an airport.

Arrival Procedure – A series of directions from air traffic control, utilizing fixes, altitudes and distances to guide an aircraft from the enroute environment to an airport for the purpose of landing.

Automated Radar Terminal System – Computer-aided radar display subsystem capable of associating alphanumeric data such as aircraft identification, altitude and airspeed with aircraft radar returns.

Census Block – Generally small areas bounded by visible features such as streets, highways, bodies of water, and railroad tracks, and by jurisdictional boundaries such as city and county limits or other property lines. Designated by the U.S. Census Bureau, census blocks are numbered uniquely and used to accumulate demographic information such as numbers of residents, their racial and economic characteristics, housing characteristics and other data pertaining to the population living within the block.

Centroid – The point representing the geographic center of a U.S. Census Bureau census block.

Conformity – A determination that a project conforms with a State Implementation Plan (SIP) whose purpose is to eliminate or reduce the severity and number of violations of the National Ambient Air Quality Standards, and which does not impede the scheduled attainment of such standards.

Criteria Pollutants – The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term, “criteria pollutants” derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

de minimis Levels – *de minimis* is defined as lacking significance or importance, or so minor as to be disregarded. *de minimis* levels are minimum air pollutant levels and vary according to the type of pollutant and severity of the non-attainment area. Unless state minimums are lower than Federal, these levels are consistent for all conformity determinations. The calculation of total project emissions is made and compared to these *de minimis* cutoffs. If the emissions for a pollutant are above *de minimis*, the project requires a conformity determination. All emissions from the project must be analyzed and found to conform, not only those above the *de minimis* levels.

Departure – The act of an aircraft taking flight and leaving an airport.

Day-Night Average Sound Level (DNL) – A measure of noise exposure over a 24-hour day. It is the 24-hour, logarithmic (or energy) average, A-weighted sound level with a 10-decibel penalty applied to the sounds that occur between 10:00 PM and 7:00 AM. At airports, DNL values are typically reported for an annual average day.

Decibel (dB) – A logarithmic quantity reflecting the ratio of the sound pressure of a noise source of interest to a reference sound pressure. This logarithmic conversion of sound pressure to sound pressure level results in a sound pressure level of about 0 dB for the quietest sounds that we can hear and a sound pressure level of about 120 dB for the loudest sounds we can hear without pain. Many sounds in our daily environment have sound pressure levels on the order of 30 to 100 dB. A 6 to 10 decibel increase in sound pressure level anywhere within that range is generally judged to be a doubling of the loudness.

Distance Measuring Equipment (DME) – Usually, the distance, in nautical miles, that an aircraft is located from a particular navigational aid; also, the instrumentation that provides the cockpit indication of the distance.

Energy-Averaged Sound Pressure Level (Leq) – The value or level of a steady, non-fluctuating sound that represents the same sound energy as the actual time-varying sound evaluated over the same time period; for environmental noise studies, Leq is typically evaluated over a one-hour period, and may be denoted as Leq(h).

Environmental Assessment – A concise document used to describe environmental impacts of a proposed Federal action.

Equivalent Sound Level (Leq) – The A-weighted sound level of a constant sound having the same average sound energy as a time-varying sound over a specified period. The interval over which the metric is measured or computed should always be specified; for example, the Leq for a 24-hour day is usually identified as Leq(24); the Leq for an hour is usually identified as the hourly Leq between, say, noon and 1:00 p.m.

Flight Track – The path along the ground followed by an aircraft in flight.

General Aviation (GA) – All civil aviation except passenger and cargo airlines.

Global Positioning System (GPS) – A satellite-based radio positioning and navigation system operated by the Department of Defense. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis to an unlimited number of properly equipped users.

Heading – A compass bearing indicating the direction of travel

Hertz (Hz) – The unit used to designate frequency (or pitch) of a sound; specifically, the number of cycles per second.

Hydrocarbon (HC) – A chemical compound that consists entirely of carbon and hydrogen

Instrument Flight Rules (IFR) – Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

Instrument Meteorological Conditions (IMC) – Weather conditions expressed in terms of visibility, distance from clouds, and cloud ceilings during which all aircraft are required to operate using Instrument Flight Rules (IFR)

Integrated Noise Model (INM) – A computer program developed, updated, and maintained by the FAA to evaluate aircraft noise exposure in the vicinity of airports.

Knots (Kts) – Airspeed measured as the distance in international nautical miles covered in one hour.

Level-off – The process by which an aircraft transitions from a climb or descent to maintain a constant altitude. This is done when an aircraft reaches its cruise altitude, or as a series of steps when an aircraft is climbing to or descending from its cruise altitude so as to guarantee adequate separation from other aircraft.

National Ambient Air Quality Standards (NAAQS) – Standards for criteria pollutants established by the U.S. Environmental Protection Agency that are applicable to outdoor air.

Nautical Mile (NM) – A measure of distance equal to a one-minute arc on the earth's surface (approximately 6,076 feet).

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

Noise – Any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying and unwanted.

Noise Contour – Continuous lines of equal noise level usually drawn around a noise source. Noise contours often are drawn in 5-decibel increments and are generally used in depicting the noise exposure around airports, highways, and industrial plants.

Noise Abatement Procedure – Procedure followed during either aircraft departures or arrivals to minimize the off-airport impacts of aircraft noise.

Noise Exposure – The cumulative sound energy affecting a person over a specified period of time (e.g., a work shift, a 24-hour day, a working life, or a lifetime).

Noise Integrated Routing System – A computer program developed, updated and maintained by the FAA to evaluate aircraft noise exposure and fuel burn for air traffic actions occurring in the broad airspace surrounding an airport.

Non-Attainment Area – Areas with levels that exceed one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Operation – A single aircraft arrival or departure at an airport.

Overflight – An aircraft flight originating and terminating outside the controlling facility's area that transits the airspace without landing.

Receiver – The listener or measuring microphone that detects the sound generated by the source.

Required Navigation Performance (RNP) – A type of Performance-Based Navigation that requires navigation performance monitoring and alerting onboard an aircraft so that the pilot receives feedback on the precision with which the aircraft is following a specified procedure. Precision requirements differ depending on where in the airspace the aircraft is flying. A precision specification of RNP-1 means that the aircraft has the capability of remaining within 1 NM to the left or right of the specified flight procedure 95% of the time and within 2 NM (twice the precision specification) 99.999% of the time.

Closer to an airport, the specifications for RNP precision is considerably narrower -- typically RNP-0.3 or RNP-0.1 (0.1 NM, or approximately ± 600 feet).

Sector – A defined volume of airspace, including both lateral and vertical limits, in which a single air traffic controller is responsible for the safe movement of air traffic. A TRACON's or ARTCC's airspace is comprised of multiple sectors.

Separation – The vertical, horizontal, longitudinal, or visual spacing between aircraft.

Sound Exposure Level (SEL) – A measure, in A-weighted decibels, of the time-integrated A-weighted sound pressure level over a stated time interval or event (such as an aircraft flyover), adjusted to a reference duration of one second. The SEL accounts for both the duration and the loudness of a noise event.

Sound Pressure Level (SPL) - A measure, in decibels, of the magnitude of a sound. Specifically, the sound pressure level is 10 times the logarithm to the base 10 of the ratio of the squared pressure of the sound to a squared reference pressure. The reference pressure is usually taken to be 20 micropascals.

Standard Terminal Arrival (STAR) – A preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic and/or textual form. STAR's provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

Sulfur Dioxide (SO₂) – Sulfur dioxide typically results from combustion processes, refining of petroleum, and other industrial processes.

Tactical Air Navigation aid (TACAN) – An ultra-high frequency electronic air navigation aid which provides equipped aircraft a continuous indication of bearing and distance to the station.

Terminal Radar Approach Control (TRACON) – An FAA ATC facility which uses radar and two way radio communication to provide separation of air traffic within a specified geographic area in the vicinity of one or more large airports.

Turboprop Aircraft – An aircraft whose main propulsive force is provided by a propeller driven by a gas turbine. Additional propulsive force may be provided by gas discharged from the turbine exhaust.

Vector – Heading instructions issued by ATC to provide navigational guidance by radar.

Visual Flight Rules (VFR) – Rules that govern the procedures for conducting flight under visual conditions. The term 'VFR' is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

Volatile Organic Compound (VOC) – Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Very-High-Frequency Omnidirectional Radio Range station (VOR) – A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360° in azimuth, oriented from magnetic North. Distance Measuring Equipment (DME) may be installed. Used as a basis for navigation in the National Airspace System.

VORTAC (Very High Frequency Omni-directional Radio Range combined with Tactical Air Navigation Aid) – A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site. The most common form of radio navigation currently in use.

Waypoint – A geographical position in space specified by its latitude, longitude and Mean Sea Level altitude. Aircraft utilize waypoints for navigation, flying from one to another utilizing information from the Global Positioning Satellite system. Waypoint locations are typically named by a pronounceable combination of four or five letters.