

Environmental Assessment for the Proposed HIO 13R-31L RSA Improvements



Draft EA

Hillsboro Airport (HIO), Hillsboro, Oregon | April 2021

This environmental assessment becomes a Federal document when evaluated, signed, and dated by the Responsible FAA Official.

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ACRONYMS AND ABBREVIATIONS

ACRONYM/ABBREVIATION	DEFINITION
AC	Advisory Circular
AEDT	Aviation Environmental Design Tool
Airport Design AC	FAA's Advisory Circular 150/5300-13A, Change 1, Airport Design (dated February 26, 2014)
ALP	Airport Layout Plan
AOA	Air operations area
APE	Area of potential effect
ATCT	Airport traffic control tower
BMPs	Best management practices
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon monoxide
CWS	Clean Water Services
dB	Decibel
dBA	A-weighted decibel
DEQ	Department of Environmental Quality
DNL	Day-night average sound level
DOT	Department of Transportation
DSL	Department of State Lands
EA	Environmental assessment
EMAS	Engineered Material Arresting System
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GHG	Greenhouse gases
HACA	Hillsboro Airport Community Advisors
HIO	Hillsboro Airport
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MMTCO _{2e}	Million metric tons of carbon dioxide equivalents
MOS	Modification of Airport Design Standards
NAAQS	National Ambient Air Quality Standards
NAVAIDs	Navigational aids
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NRHP	National Register of Historic Places
O ₃	Ozone

ACRONYM/ABBREVIATION	DEFINITION
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
Pb	Lead
PM	Particulate matter
PM ₁₀	Particulate matter with a diameter of less than 10 micrometers
PM _{2.5}	Particulate matter with a diameter of less than 2.5 micrometers
Port	Port of Portland
Project	Environmental Assessment for the Proposed HIO 13R-31L RSA Improvements
RPZ	Runway protection zone
RSA	Runway safety area
SC-FI	Station Community Fair Complex Institutional district
SHPO	State Historic Preservation Office
SO ₂	Sulfur dioxide
U.S.	United States
U.S.C.	United States Code
UGB	Urban growth boundary
USACE	U.S. Army Corps of Engineers
UWR	Upper Willamette River
VOC	Volatile organic compounds

CHAPTER 1. INTRODUCTION

Chapter 1 introduces the project, provides background and locational information, and identifies the different components of the Proposed Action. All figures referenced in this chapter can be found in Appendix A.

1.1. Introduction

The Port of Portland (Port) and Federal Aviation Administration (FAA) are preparing an environmental assessment (EA) for proposed improvements to the northern end of Runway 13R-31L and the associated runway safety area (RSA) at Hillsboro Airport (HIO) in Hillsboro, Oregon, pursuant to the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] 4371). This portion of the runway and its RSA are hereafter referred to as Runway 13R and Runway 13R RSA, respectively. The purpose of the proposed improvements is to meet current FAA airfield design standards for Runway 13R and its RSA. The design standards are listed in FAA's Advisory Circular (AC) 150/5300-13A, Change 1, Airport Design (dated February 26, 2014 and hereafter referred to as "the Airport Design AC") (FAA 2014). The northern portion of Runway 13R and the portion of the RSA northwest of the end of Runway 13R do not fully comply with FAA design standards for longitudinal gradients and for drainage of stormwater (FAA 2014).¹ In some areas, the grades exceed those permitted by the FAA standards or there are slope changes in surface grades that are greater than permitted by the FAA standards.

Runway 13R and the Runway 13R RSA do not fully comply with current FAA design standards, as they deviate from FAA standards in the following ways:

- Runway 13R has a 200-foot vertical curve starting 3,415 feet from the end of Runway 13R and there are several other modest changes in grade in the last quarter of the runway; these are deviations from FAA standards, since these standards do not allow any grade change in the first or last quarter (1,650 feet) of the runway length.
- Longitudinal grades in the Runway 13R RSA range from -11.1 percent to +16.0 percent, which exceed the allowable grade of -5.0 percent to +5.0 percent by as much as 11 percent.
- Runway 13R RSA is bisected by a tributary, Glencoe Swale, and wetlands that impound water year-round; therefore, the RSA deviates from drainage design standards.

1.2. Background

HIO is located in the City of Hillsboro in Washington County, Oregon, approximately 2.25 miles from Hillsboro's city center and 12 miles west of downtown Portland (Figure 1 and Figure 2). The Port owns and operates HIO. HIO is the busiest general aviation airport in Oregon. The FAA's National Plan of Integrated Airport Systems lists HIO as a designated general aviation reliever airport.

HIO consists of approximately 950 acres and includes an FAA airport traffic control tower (ATCT), an instrument landing system, Medium-Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) and other Navigational Aids (NAVAIDs), and three runways: 1) Primary Runway 13R-31L is 6,600 feet long; 2) Crosswind Runway 2-20 is 3,821 feet long; and 3) Runway 13L-31R is 3,600 feet long and accommodates training flights. Operations at HIO include local corporate flights, aircraft charter services for business travel, air ambulance services, TV news helicopters, flight schools, aircraft maintenance and repair operations, a corporate air shuttle service, and a United States (U.S.) Customs

¹ The longitudinal gradient is the grade or slope along the length of the runway and the part of the RSA that extends beyond the end of the runway.

and Border Protection office for international flights. In total, more than 25 businesses are operating on-airport at HIO (Port 2017a).

1.3. Proposed Action

The Proposed Action would adjust the longitudinal grade of Runway 13R and the Runway 13R RSA to meet current FAA design standards. It would accommodate a standard 1,000-foot RSA by conveying the portion of Glencoe Swale that traverses the Runway 13R RSA under the RSA in a concrete box culvert. The RSA (including the existing swale and associated resources) and Runway 13R would be regraded to comply with FAA design standards.

Project construction would take place over one construction season; approximately May 2023 through October 2023. During construction, the runway threshold would be temporarily relocated to the south with pavement markings to shorten the runway from 6,600 feet to 5,500 feet to accommodate construction at the north end of Runway 13R and in the Runway 13R RSA. In addition, intermittent closure of Runway 13R-31L is expected for a total of approximately four weeks throughout the construction season. A breakdown of the different permanent and construction project elements for the Proposed Action is provided in Section 3.4.2.

1.4. Requested Federal Actions

The requested federal actions include:

1. Unconditional approval of the HIO Airport Layout Plan (ALP) (Port 2020a) to depict those portions of the Proposed Action subject to FAA review and approval pursuant to 49 USC § 47107(a)(16)(B)
2. Determination of project eligibility for Airport Improvement Program (AIP) funding in accordance with 49 USC §§ 47101-47144
3. Reconstruction or adjustment of the MALSR
4. Reconstruction of access roads to FAA affected facilities

CHAPTER 2. PURPOSE AND NEED

Chapter 2 outlines the Purpose and Need for the Proposed Action. All figures referenced in this chapter can be found in Appendix A.

2.1. Purpose

The purpose of the project is to meet current FAA airfield design standards for Runway 13R-31L and its RSA.

2.2. Need

The FAA's standards and recommendations in the Airport Design AC support the federal law requiring development and maintenance of a national system of safe, delay-free, and cost-effective public airports and declaring that "it is the policy of the United States that the safe operation of the airport and airway system is the highest aviation priority" (FAA 2014).

The northern portion of Runway 13R and the Runway 13R RSA do not fully comply with the FAA design standards for longitudinal gradients. The location of Runway 13R and the Runway 13R RSA is shown in Figure 2. Runway 13R and the Runway 13R RSA comply with other FAA design standards.

The remainder of this need statement in the subsections below describes the FAA's design standards for runways and RSAs as they relate to Runway 13R and the Runway 13R RSA, describes existing conditions of these facilities, and identifies how they deviate from the relevant FAA design standards.

2.2.1. Runway 13R-31L

Runway 13R has a 200-foot vertical curve starting 315 feet from the approach end of Runway 13R and there are several other modest changes in grade in the first 1,650 feet from the approach end of Runway 13R; these are deviations, since the FAA design standards do not allow any grade change in the first or last quarter (1,650 feet in the case of Runway 13R) of the runway length. This section provides additional detail on the need to correct the runway to meet FAA standards.

The FAA design standards applicable to a particular runway are determined primarily by the characteristics of a "critical design aircraft" (or critical aircraft), which is the type of aircraft or group of aircraft with similar characteristics that are the most demanding aircraft (in terms of runway length, width, pavement strength, and similar characteristics) that make regular use of a runway. Regular use is 500 or more annual operations. The critical aircraft is classified according to its final approach speed, which is represented as Aircraft Approach Category A through Category E, and aircraft dimensions, which are represented as Airplane Design Group I through Airplane Design Group VI. The combined Approach Category and Design Group result in a Runway Design Code. The 2018 HIO Airport Master Plan determined that the Gulfstream 650 is the critical aircraft for Runway 13R-31L, which is designated with Runway Design Code D-III (Port 2018).

Runway surface gradient standards for Aircraft Approach Category D are as follows:

- The maximum longitudinal grade permitted is plus or minus 1.5 percent; however, longitudinal grades may not exceed plus or minus 0.8 percent in the first and last quarter of the runway or the first and last 2,500 feet of the runway length, whichever is less.
- The maximum allowable change in the longitudinal grade is plus or minus 1.5 percent; however, no grade changes are allowed in the first and last quarter of the runway or the first and last 2,500 feet of the runway, whichever is less (FAA 2014).

For Runway 13R-31L, the total runway length is 6,600 feet; one-quarter of the length of the runway is 1,650 feet. Therefore, a maximum longitudinal grade of 0.8 percent is permitted in the first and last 1,650 feet of the runway.² No changes in the longitudinal grade are permitted in the first and last 1,650 feet of the runway. The FAA’s March 2016 Modification of Airport Design Standards (MOS) for HIO notes a 200-foot vertical curve starting 315 feet from the approach end of Runway 13R with a total grade change of 0.19 percent; because no change is permitted in this area, this exceeds the allowable change by 0.19 percent. A copy of the MOS is included in Appendix B. There are several other slight grade changes (bumps or humps) in the first 1,650 feet from the approach end of Runway 13R that were identified in a topographic survey conducted by the Port in December 2018 and January 2019. The standards, existing gradient conditions for Runway 13R, and deviations from the standards are summarized in Table 1 and illustrated in Figure 3.

Under the 2016 MOS, maintaining the existing condition allows the airport to operate Runway 13R-31L within an acceptable level of safety until the project can be completed. The FAA and Port are cooperating to ensure the validity of the MOS beyond March 2021 through the proposed construction period.

Table 1. Application of FAA Design Standards to HIO Runway 13R

DESCRIPTION OF STANDARD	STANDARD	RUNWAY 13R EXISTING CONDITION	DEVIATION FROM STANDARD
Maximum longitudinal grade in first/last 1,650 feet from runway ends	-0.8% to +0.8%	-0.075% to -0.27%	None
Change in longitudinal grade in first/last 1,650 feet from runway ends	No change permitted	200-foot vertical curve with 0.19% change in grade and other minor grade changes	Change in grade is a deviation

Sources:

Standards: FAA AC 150/5300-13A, Change 1, Airport Design, Paragraph 313.b (1) and (2)

Existing conditions: MOS for HIO, FAA Northwest Mountain Region Airport Improvement Program, March 2016 (Appendix B) and topographic survey completed by the Port in December 2018 and January 2019

2.2.2. Runway Safety Area

The RSA for Runway 13R deviates from FAA design standards in two ways. First, longitudinal grades in the Runway 13R RSA range from -11.1 percent to +16.0 percent, which exceed the allowable grade of -5.0 percent to +5.0 percent by as much as 11.0 percent. Secondly, Runway 13R RSA is bisected by a tributary, Glencoe Swale, and wetlands that impound water year-round; therefore, the RSA deviates from drainage design standards. This section provides additional detail on the need to correct the RSA to meet FAA standards.

The RSA is a defined area surrounding the runway that is centered on the runway centerline, as shown in Figure 4. The RSA is intended to provide a measure of safety by reducing the extent of personal injury and aircraft damage in the event an aircraft veers off the runway or overruns the runway pavement. It is an integral part of the runway environment and the dimensions of the RSA are defined based on the Runway Design Code. The RSA dimensional requirements for the D-III aircraft are 500 feet in width for the entire length of the RSA, and 1,000 feet in length beyond the departure end of the runway (departures may occur from either end of Runway 13R-31L), as illustrated in Figure 4 (FAA 2014). The Runway 13R-31L RSA fully meets these dimensional requirements, but portions do not fully comply with FAA design standards.

² For reference, the grades discussed in this document range from 0.19 percent to 5.0 percent which are equivalent to a slope of 0.11 degrees to 9.1 degrees.

FAA design standards require the RSA to be:

- Cleared and graded, with no potentially hazardous ruts, humps, depressions, or other surface variations.
- Drained by grading or storm sewers to prevent water accumulation.
- Capable under dry conditions of supporting snow removal and aircraft rescue and firefighting equipment and of supporting the occasional passage of aircraft without causing major damage to the aircraft.
- Free of objects, except for objects that need to be located in the RSA because of their function, such as approach lights (FAA 2014).

The FAA identifies maximum allowable grades for the RSA beyond each runway end. For the first 200 feet of the RSA beyond the runway ends, the allowable longitudinal grade is between 0 percent and -3.0 percent, with any slope being downward from the runway ends. For the remainder of the RSA beyond the runway ends, FAA design standards identify a maximum allowable grade of -5.0 percent to +5.0 percent. Changes in the longitudinal grade are limited to plus or minus 2.0 percent per 100 feet. These requirements are summarized in Table 2 and Figure 3. The FAA recommends avoiding using the maximum grades if possible because the ability for an overrunning aircraft to stop within the RSA is decreased as the downhill grade increases (FAA 2014).

As part of the 2002 Runway 12-30 RSA Phase II project,³ the Runway 13R RSA was designed and constructed to FAA grading standards, to the extent practicable at the time of that project; however, Runway 13R RSA does not fully comply with FAA’s current gradient and drainage standards. The Runway 13R RSA is, however, in compliance with the requirement to be free of objects except for objects that need to be located in the RSA because of their function, such as approach lights.

The existing grade in the Runway 13R RSA within the first 200 feet beyond the runway end is up to -5.5 percent, which exceeds the allowable grade of up to -3.0 percent by 2.5 percent.

Table 2. Application of FAA Design Standards to Runway 13R RSA

DESCRIPTION OF STANDARD	STANDARD	RUNWAY 13R EXISTING CONDITION	DEVIATION FROM STANDARD
Longitudinal grade in first 200 feet beyond runway ends	0% to -3.0%	Varies: 0.0% to -5.5%	Up to 2.5%
Longitudinal grade beyond first 200 feet from runway ends	-5.0% to +5.0%	Varies: -11.1% to +16.05% ⁱ	Up to 11.0%
Changes in longitudinal grade in RSA	-2.0% to +2.0% per 100 feet	Multiple changes in grade that exceed standard ⁱⁱ	Change in grade that exceeds standard ⁱⁱ

Sources:

Standards: FAA AC 150/5300-13A, Change 1, Airport Design, Paragraph 313.d (1) and (2)

Existing conditions: Topographic survey completed by the Port in December 2018 and January 2019

Notes:

ⁱ The grades are calculated from topographic survey data, so some of the slopes may occur only for a small distance and not be apparent in the field or a drawing. The greatest slopes occur in and adjacent to Glencoe Swale, the location of which is shown in Figure 2 and is indicated by the lowest point shown in Figure 3.

ⁱⁱ There are a number of changes in the grade of the RSA as indicated by the fact that the longitudinal grades vary as shown in the table; however, the overall existing grades are the significant deviations.

³ Runway 12-30 was renumbered to 13-31 in 2011; it was re-designated to 13R-31L with the construction of the parallel runway.

The allowable grade of the RSA beyond the first 200 feet from the runway end is -5.0 percent to +5.0 percent. Starting approximately 325 feet from the end of the runway, the terrain drops off at rates up to -11.1 percent to a low point in Glencoe Swale, a slow-moving urban tributary which bisects the RSA, exceeding the allowable grade by up to -6.1 percent (Figure 2 and Figure 3). Beyond Glencoe Swale, the terrain rises at rates of up to 16.0 percent to the northern edge of the RSA, exceeding the allowable grade by up to 11 percent. The standards, existing gradient conditions, and deviations from the standards are summarized in Table 2 and are illustrated in Figure 3. Figure 2 shows the approximate location of Glencoe Swale in the Runway 13R RSA. A depression containing wetlands and that impounds water year-round abuts Glencoe Swale on both sides. These wet areas deviate from the RSA design standards for surface drainage.

In the Airport Design AC, FAA “recognizes that incremental improvements inside full RSA dimensions can enhance the margin of safety for aircraft” and that, “This is a significant change from an earlier concept where the RSA was deemed to end at the point it was no longer graded and constructed to standards” (FAA 2014). At HIO, that would have been in the vicinity of Glencoe Swale. The Airport Design AC notes that “previously, a modification of standards could be issued if the actual graded and constructed RSA could not meet dimensional standards. Today, modifications of standards no longer apply to RSAs.” Rather, “the airport owner and the FAA must continually analyze a non-standard RSA with respect to operational, environmental, technological changes and revise the determination as appropriate” (FAA 2014).

CHAPTER 3. ALTERNATIVES

Chapter 3 summarizes an alternatives analysis conducted by the FAA and Port that evaluated six potential build alternatives against specific screening criteria and concluded with the identification of the two alternatives assessed in this EA – the No Action Alternative and Proposed Action. Additional information on the alternatives analysis can be found in Appendix C. All figures referenced in this chapter can be found in Appendix A.

3.1. Alternatives

The FAA and Port identified six preliminary build alternatives that would achieve the project purpose and need and would be feasible as a matter of sound engineering principles and existing technology. Alternatives that would achieve the project purpose and need are those alternatives that would resolve the deviations from the FAA design standards for gradients and drainage of stormwater, as described in Chapter 2. The six preliminary build alternatives are described in Table 3 below and are illustrated in Figure 5 through Figure 10. Alternatives that would not achieve the purpose and need and/or would not be feasible were not considered in the analysis of alternatives. As required by NEPA, the No Action Alternative is also studied in the EA, although it would not resolve the deviations from FAA design standards.

3.2. Screening Process

To evaluate the potential build alternatives and identify the Proposed Action, the FAA and Port performed a two-step evaluation (“screening”) process:

- **Screening Level 1:** This screening level evaluated whether each alternative would be compatible with the dimensional requirements for the current and future critical aircraft for Runway 13R-31L. As determined by the 2018 HIO Master Plan Update, the existing 6,600-foot length of Runway 13R-31L is usable by the critical aircraft under most conditions and would suffice for the foreseeable future; therefore, alternatives would have to maintain this runway length to be compatible with current and future critical aircraft (Port 2018). This is a “fatal flaw” step of the evaluation; alternatives that would not provide the needed runway length for critical aircraft did not “pass” Screening Level 1 and were not advanced to Screening Level 2.
- **Screening Level 2:** This screening evaluated alternatives to determine the extent to which they are “practical.” For purposes of the analysis, a practical alternative does not cause safety or operational problems or environmental or social impacts that are not easily resolvable. Alternatives may not completely meet all the criteria of Screening Level 2, so this level of screening identifies and compares alternatives that meet most of the requirements and that do not have any fatal flaws in terms of unique problems or an accumulation of impacts. Alternatives that passed Screening Level 2 were retained for detailed analysis in the EA; alternatives that did not pass were eliminated from further analysis.

Table 3. Description of Preliminary Alternatives Identified

ALTERNATIVE	DESCRIPTION
No Action Alternative	<ul style="list-style-type: none"> No improvements to the RSA and Runway 13R
1: Reduce Runway 13R-31L Length	<ul style="list-style-type: none"> Shift Runway 13R threshold 740 feet to the south to accommodate full RSA south of wetlands, vegetated corridor, and Glencoe Swale Reduces runway length to 5,860 feet Relocates Runway 13R Runway Protection Zone (RPZ), MALSR, and other NAVAIDS
2: Runway 13R Declared Distances	<ul style="list-style-type: none"> Reduce available landing distance by 740 feet on Runway 13R to 5,860 feet to accommodate full RSA south of wetlands, vegetated corridor, and Glencoe Swale Reduces landing distance on Runway 13R to 5,860 feet and maintains 6,600 feet for takeoff on Runway 13R Relocates Runway 13R RPZ, MALSR, and other NAVAIDS
3: Shift Runway 13R-31L South	<ul style="list-style-type: none"> Shifts Runway 13R-31L 740 feet south by removing pavement at north end south of wetlands, vegetated corridor, and Glencoe Swale Maintains existing 6,600-foot runway length Relocates Runway 13R RPZ, MALSR, and other NAVAIDS
4: Install Engineered Material Arresting System (EMAS) ⁱ	<ul style="list-style-type: none"> Constructs EMAS south of wetlands, vegetated corridor, and Glencoe Swale Reduces runway length to 6,100 feet to accommodate EMAS Relocates Runway 13R RPZ, MALSR, and other NAVAIDS
5: Underground Conveyance	<ul style="list-style-type: none"> Conveys Glencoe Swale under the RSA in a pipe or conduit and fills/regrades existing swale, wetlands, and vegetated corridor Maintains existing threshold locations and existing 6,600-foot runway length Removes MALSR and other NAVAIDS from Runway 13R RSA during construction and replaces in same locations
6: Reroute Swale around RSA	<ul style="list-style-type: none"> Relocates Glencoe Swale north around RSA approximately 1,800 feet and twice under service road, some wetlands and vegetated corridor may be able to be relocated; fills/regrades existing swale, wetlands, and vegetated corridor Maintains existing threshold locations and existing 6,600-foot runway length Removes MALSR and other NAVAIDS from Runway 13R RSA during construction and replaces in same locations

Notes:

ⁱAn EMAS is an FAA approved aircraft arresting system that uses porous cellular materials and is intended to stop aircraft that have overshot a runway.

3.3. Screening Results

Two alternatives were retained for detailed analysis in the EA: No Action Alternative and Alternative 5, Underground Conveyance. Five alternatives were eliminated from further analysis, as summarized in Table 4.

Three alternatives were eliminated at Screening Level 1 (Alternatives 1, 2, and 4) because they would not maintain the current runway length and, thus, would not accommodate the critical aircraft. Two others were eliminated at Screening Level 2. Alternative 3 was eliminated because it would cause several safety and operational problems and because it would result in an accumulation of impacts of extraordinary magnitude, without any additional benefit or advantage over Alternative 5 or Alternative 6. Alternative 6 would increase wildlife hazard attractants in conflict with FAA guidance and Port policy and it is unlikely that required water resources permits would be issued for it.

Table 4. Summary Results of Alternatives Screening

ALTERNATIVE	SCREENING RESULT	REASON FOR RESULT
No Action Alternative	Retained for detailed analysis	Requires evaluation of environmental consequences under NEPA
1: Reduce Runway 13R-31L Length	Not retained for detailed analysis	Incompatible with critical aircraft
2: Runway 13R Declared Distances	Not retained for detailed analysis	Incompatible with critical aircraft
3: Shift Runway 13R-31L South	Not retained for detailed analysis	Likely accumulation of impacts that collectively reaches extraordinary magnitudes
4: Install Engineered Material Arresting System (EMAS)	Not retained for detailed analysis	Incompatible with critical aircraft
5: Underground Conveyance	Retained for detailed analysis as the Proposed Action	Passes all criteria
6: Reroute Swale around RSA	Not retained for detailed analysis	Conflicts with FAA guidance and Port policy regarding wildlife hazard attractants and not likely to be approved for required permits due to on-site mitigation

3.4. Alternatives Assessed in the Environmental Assessment

This section summarizes the two alternatives studied in detail in the EA.

3.4.1. No Action Alternative

Under the No Action Alternative, no improvements to the RSA and runway would be constructed. The RSA and runway would continue not to meet current FAA design standards.

3.4.2. Proposed Action

This section summarizes the Sponsor’s Proposed Action (identified as Alternative 5, Underground Conveyance during the alternatives screening process), which would bring the grades on Runway 13R and the Runway 13R RSA, and the other deviations in the Runway 13R RSA, into compliance with current FAA design standards.

The Proposed Action would adjust the longitudinal grade of Runway 13R and the Runway 13R RSA to meet current FAA standards. It would accommodate a standard 1,000-foot RSA by conveying the portion of Glencoe Swale that traverses the Runway 13R RSA under the RSA in a concrete box culvert as shown in

Figure 3 and Figure 11. The RSA (including the existing swale and associated resources) and Runway 13R would be regraded to comply with FAA design standards.

All permanent project elements of the Proposed Action would occur within the existing airport property boundary. These elements are shown in Figure 11 and would include:

- **Runway grade correction:** Milling and asphalt overlay (or just overlay of new pavement) of the northern 513 feet of Runway 13R would correct the runway grade to meet current FAA requirements.
- **Blast pad reconstruction:** The blast pad at the north end of Runway 13R would be removed to the gravel base and reconstructed to meet FAA grade requirements.
- **Taxiway A grade adjustment:** The longitudinal grade of Taxiway A would be adjusted as necessary to meet the grade correction proposed for Runway 13R.
- **Taxiway A1 reconfiguration:** Taxiway A1 would be reconfigured to meet or exceed current FAA geometric requirements including taxiway fillet design criteria and longitudinal and transverse grades. The existing pavement would be adjusted as necessary to meet the grade correction proposed for Runway 13R. This would add approximately 1,950 square feet of additional pavement.
- **Taxiway A2 removal:** Taxiway A2 no longer meets current design standards, so it would either have to be relocated or removed. The Port determined this taxiway is no longer needed operationally, so Taxiway A2 would be removed and replaced with grass. This would remove approximately 41,850 square feet of pavement.
- **RSA grade correction:** The Runway 13R RSA would be regraded to meet current FAA requirements.
- **Compensatory flood storage:** Compensatory storage would be created upstream and downstream of the culvert to offset fill placed in the Glencoe Swale floodplain.
- **Utility adjustments/protection:** There are a variety of existing utilities within the RSA including, water, sewer, power, and communication lines. Some utilities (e.g., stormwater pipe, communication junction box) would be modified as necessary to comply with proposed improvements. Other utilities (e.g., sewer, water, and communication lines) would be protected during the construction phase and remain in place.
- **NAVAIDs improvements:** The MALSR would be removed and reconstructed due to changes in the RSA grading. The existing access road to this equipment would be removed and reconstructed to provide access to the MALSR through the full RSA limits.
- **Glencoe Swale re-alignment and culvert:** Glencoe Swale would be realigned and enclosed in a new 6-foot high by 14-foot wide concrete box culvert that would be approximately 500 feet in length. The culvert would be underground and would be installed perpendicular across the RSA. Hinged gates made of 3-inch by 3-inch metal grating would be installed at both ends of the culvert to prevent wildlife that could affect aviation safety from entering the culvert. The gates could be secured in the open position during the rainy season and closed, blocking wildlife access, during the dry summer months.
- **Stormwater pipe replacement:** Minor pipe replacements would be required where the new culvert would conflict with an existing stormwater pipe. There would also be some minor stormwater pipe replacement activities performed as maintenance during project construction.

- **Water quality filter strips:** Water quality filter strips would be installed to manage water quality from new and modified impervious surfaces. The total area of the water quality filter strips would be approximately 7,410 square feet.

Temporary project elements needed during project construction of the Proposed Action are illustrated in Figure 12. These include:

- **Staging areas:** Two staging areas have been identified for the project. Both are located on NE 25th Avenue, one adjacent to the Hillsboro Fire Station (Staging Area A) and one to the west of the RSA just north of the end of the runway (Staging Area B). These are shown as Staging Areas A and B, respectively, in Figure 12.
- **Haul routes:** The contractor would transport materials from the stockpile areas (described below) to the project area via public roadways. Specifically, the contractor would travel north on NE 30th Avenue to then travel west on NE Evergreen Road and then either use the access point at the north end of the airfield or travel south on NE 25th Avenue to use one of the access points on that roadway.
- **Site access:** The contractor would access the project area from NE 25th Avenue through a gate in Staging Area A, which would provide access to Taxiway A for work on Runway 13R or the taxiways. Alternatively, the contractor would also access the project area from NE 25th Avenue through a gate to Staging Area B or from NE Evergreen Road through a gate that provides access to the MALS access road.
- **Stockpile areas:** There are two existing stockpiles of fill material on the east side of the HIO property that would be used as fill for the RSA grade correction. Materials from these stockpiles would be transported by truck via NE 30th Avenue to the NE Evergreen Road and/or to NE 25th Avenue access locations. Additional fill material would be brought in from a suitable off-site location to be determined by the construction contractor.
- **Temporarily shortened runway:** During construction, the runway threshold would be temporarily relocated to the south with temporary pavement markings to shorten the runway from 6,600 feet to 5,500 feet. Runway end lights would be set at the temporary runway end; existing runway markings would be removed, and temporary runway markings would be placed; runway light lenses would be changed; and barricades would be established along taxiways entering the runway. This temporary reconfiguration is intended to safely accommodate construction at the north end of Runway 13R and in the Runway 13R RSA.
- **Runway closures:** The estimated construction schedule anticipates three distinct closures of Runway 13R-31L:
 - An approximately one-week long closure at the beginning of the project to reconfigure the runway to a 5,500-foot operational length during construction.
 - An approximately two-week closure within the project duration. This period is planned as a 24-hour-per-day 7-day-per-week work schedule for the work necessary on the runway and taxiways.
 - An approximately one-week long closure at the end of project construction to reconfigure the runway back to its full 6,600-foot operational length.

CHAPTER 4. AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION

Chapter 4, Section 4.1 through Section 4.15, describes the affected environment (existing conditions) of each resource, identifies the environmental consequences of the No Action Alternative and the Proposed Action for each resource, and identifies mitigation measures to reduce impacts, as well as any anticipated permits. Section 4.16 assesses whether the project would contribute to cumulative impacts; and Section 4.17 provides a summary table of the environmental consequences identified in Section 4.1 through Section 4.15. All figures referenced in this chapter can be found in Appendix A.

Per FAA Order 5050.4B, 706e, the affected environment section of an EA describes only those resources that the alternatives are likely to affect (FAA 2006). The following resources are not included in the analysis below because they would not be affected by the No Action Alternative or Proposed Action:

- Coastal Resources (not present on or in the vicinity of the airport property)
- Wild and Scenic Rivers (not present on or in the vicinity of the airport property)

4.1. Air Quality

This section describes existing air quality conditions and addresses the potential for impacts to air quality conditions that could result from the No Action Alternative and the Proposed Action. As detailed below, emissions produced during construction of the Proposed Action would be negligible. No direct or indirect impacts to air quality would occur under the Proposed Action as there would be no permanent change in flight operations or airport users resulting from the Proposed Action.

4.1.1. Affected Environment

FAA Order 1050.1F requires that potential effects of the Proposed Action are evaluated against the National Ambient Air Quality Standards (NAAQS), which are expressed in terms of pollutant concentration measured (or averaged) over a defined period of time. The U.S. Environmental Protection Agency (EPA) currently regulates six criteria pollutants: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM), and lead (Pb). PM is divided into two particle size categories: coarse particles with a diameter less than 10 micrometers (PM₁₀) and fine particles with a diameter of less than 2.5 micrometers (PM_{2.5}). If the air quality in a geographic area is equal to or better than the national standard, the EPA typically designates the region as an “attainment area.” An area where air quality does not meet the national standard is typically designated by the EPA as a “non-attainment area.” Currently, HIO is in an airshed that meets all the NAAQS (EPA 2018). Therefore, as of the date of this document, there are no applicable General Conformity requirements.

In addition, the Port is collaborating with other public agencies in the Portland metro region to reduce diesel emissions on construction projects by implementing a standard set of idle reduction and diesel equipment requirements on job sites (“Clean Air Construction Standards”). This program calls for phasing out use of older engines on major public infrastructure projects such as this project.

4.1.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed, and air quality would remain unchanged; therefore, no air quality impacts would occur.

Proposed Action

Potential direct, indirect, and construction impacts to air quality associated with the Proposed Action are discussed in this section.

Direct Impacts

Implementation of the Proposed Action would not result in a change to the number of flights, type of aircraft, or number of airport users beyond expected growth; therefore, no direct impacts to air quality would occur under the Proposed Action.

Indirect Impacts

Implementation of the Proposed Action would not result in a change to the number of flights, type of aircraft, or number of airport users beyond expected growth; therefore, no indirect impacts to air quality would occur under the Proposed Action.

Construction Impacts

Construction of the Proposed Action would result in short-term changes in air emissions from sources such as exhaust from non-road construction equipment and negligible changes in aircraft emissions during construction. Demolition and construction activities associated with the Proposed Action would be expected to begin in May 2023 and be completed by the end of October 2023. The Airport Cooperative Research Program Airport Construction Emissions Inventory Tool model was used to derive construction activity levels. On road emission factors were generated externally using the latest version of the MOVES emission model (MOVES2014b) (ACRP 2013). Nonroad equipment emission factors for the construction year were estimated using the latest version of NONROAD2008a as implemented in MOVES2014b. Total anticipated construction activity-related (i.e., construction equipment, material trips, and commuter trips) emissions of criteria pollutants that would be generated during the construction period for 2023 are summarized in Table 5.

Table 5. Construction Emission Inventory

YEAR	CRITERIA POLLUTANTS (TONS PER YEAR)					
	CO	VOC	NO _x	SO ₂	PM ₁₀	PM _{2.5}
2023	1.9	1.7	1.0	0.009	0.3	0.05

Note:

1. Following standard industry practice, O₃ was evaluated by evaluating emissions of volatile organic compounds (VOC) and nitrogen oxides (NO_x), which are precursors in the formation of O₃.

During construction of the Proposed Action, Runway 13R-31L would be shortened to allow construction activities to occur, as described in Section 3.4.2. While the number and type of flight operations would not change during construction, landing and takeoff emissions would change slightly with the temporary shortening of the runway. The runway length was evaluated in Aviation Environmental Design Tool (AEDT) for both the No Action Alternative and Proposed Action during construction to determine any emission changes. The Proposed Action case assumed a shortened Runway 13R-31L for aircraft operations and did not include emissions from the ground support equipment and auxiliary power units, since those operations would remain unchanged for the Proposed Action. Table 6 presents a comparison of the anticipated emissions generated in 2023 under the No Action Alternative and the Proposed Action, showing that the net change in emissions would be a negligible reduction in emissions associated with the construction of the Proposed Action.

Table 6. Annual Emissions Inventory of the No Action Alternative and During Construction of the Proposed Action

YEAR	CRITERIA POLLUTANTS (TONS PER YEAR)					
	CO	VOC	NO _x	SO ₂	PM ₁₀	PM _{2.5}
2023 No Action Alternative	478.9	5.2	14.9	2.0	0.6	0.6
2023 Proposed Action	478.7	5.2	14.9	2.0	0.6	0.6
Net Change in Emissions	-0.02	-0.0003	-0.007	-0.0006	-0.002	-0.002

Notes:

1. Following standard industry practice, O₃ was evaluated by evaluating emissions of VOC and NO_x, which are precursors in the formation of O₃.
2. Operational emissions denote emissions associated with aircraft operations only.
3. No Action Alternative and Proposed Action assumed default taxi times in AEDT.
4. CO₂ emissions estimated from AEDT and converted to metric tons.

4.1.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to air quality would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to air quality would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

Although there would be no significant impacts from construction of the Proposed Action, and changes in emissions due to construction would be negligible, the following measures would be implemented to reduce emissions during construction:

- Implement the Clean Air Construction Standards.
- Minimize the amount of disturbed soils at any given time during project activities.
- If needed, spray water for dust suppression and prevent fugitive dust from becoming airborne.
- Suspend or adjust intensity of project activities during periods of sustained high wind speeds (e.g., 30 miles per hour and over), as defined by the Occupational Safety and Health Administration.
- Maintain vehicles and equipment in good working condition.
- Decrease vehicle speed limits while at project site to reduce fugitive dust generation and obey posted vehicle speed limits while off-site.
- Load trucks with debris below their maximum hauling capacity.
- Use tarp covers on trucks transporting construction materials and construction debris to and from the site.

Permits

No permits associated with air quality would be required.

4.2. Biological Resources

This section provides an overview of existing biological resources in the HIO vicinity, as well as potential impacts to biological resources that could result from the No Action Alternative and Proposed Action.

Biological resources evaluated in this section include vegetation and habitat, fish and wildlife, and special status species.

This section also includes effects determinations for species listed as threatened or endangered under the Endangered Species Act (ESA) and their habitat as well as an effects determination for essential fish habitat potentially impacted by the Proposed Action. ESA-listed fish species and their habitat are discussed under the special status species section.

As detailed below, no significant adverse direct or construction impacts to biological resources would be expected to occur under the Proposed Action, as all impacts would be mitigated. No indirect impacts from the Proposed Action would be expected. In addition, construction of the Proposed Action would have “no effect” on any ESA listed species and would “not destroy or adversely modify” any designated critical habitat.

4.2.1. Affected Environment

The study area for biological resources encompasses the direct footprint of temporary and proposed ground disturbance resulting from proposed construction activities (51.4 acres) as shown in Figure 13. This study area represents the maximum anticipated extent of potential direct and indirect impacts to biological resources based on the implementation of standard best management practices (BMPs) that would minimize the transport of pollutants in stormwater runoff, thus limiting indirect impacts.

In accordance with ESA regulations, a separate study area (hereafter referred to as “action area”) applies to ESA species and their habitat. The action area for ESA-listed fish species and aquatic habitats includes the direct footprint of temporary and proposed ground disturbance, as well as the portion of Glencoe Swale that extends from NE Evergreen Road to its confluence with McKay Creek, approximately 2.6 miles downstream of the HIO property (Figure 14). The portion of Glencoe Swale extending downstream of the HIO property to McKay Creek is included in the action area to evaluate potential downstream impacts to fish species and aquatic habitats resulting from the Proposed Action.

Vegetation and Habitat

Habitat within the study area is predominantly composed of maintained grassland (34.48 acres; 67.1 percent) interspersed with patches of wetland (6.76 acres; 13.1 percent) and water (0.15 acre; 0.3 percent) habitat. Additionally, a portion of the study area consists of paved runway and other airfield surfaces (10.0 acres; 19.5 percent) which lacks any vegetation or habitat value (Figure 13).

The study area has been significantly altered by past and current agricultural activities, road realignments, and other airport operation and improvement activities, resulting in a prevalence of non-native or weedy herbaceous plant species throughout the entire study area. Upland habitat within the study area consists of non-native grasses and other weedy herbaceous plant species that are regularly mowed as part of airport operations and maintenance. In addition, a portion of the study area is currently farmed for grass seed.

As described in Section 4.15, wetlands within the study area are classified as palustrine emergent wetlands with herbaceous vegetation and consist of non-native grasses that are regularly mowed as part of airport operations and maintenance. The vegetated corridors (i.e., buffers) surrounding the wetlands are in degraded condition according to Clean Water Services (CWS) standards, based on a lack of tree canopy cover and a predominance of non-native vegetation species. CWS is the water resources management utility for the Tualatin River watershed.

Glencoe Swale bisects the study area and flows southwest then south from NE Evergreen Road to NE 25th Avenue (Figure 13). The swale is approximately three feet to five feet wide and is densely vegetated, primarily with non-native reed canarygrass (*Phalaris arundinacea*), and is mowed as part of

routine airport operations and maintenance. The swale has a substrate of fine silts and some sandy gravel. The swale typically ponds during the rainy season and dries up in the summer. Glencoe Swale is an intermittent tributary of McKay Creek, which is located approximately 2.6 miles downstream (west) of the study area. McKay Creek flows to Dairy Creek, which is a tributary to the Tualatin River (Figure 14).

Fish and Wildlife

Wildlife surveys conducted by the Port Airport Wildlife Hazard Management Team indicate that several species of resident and migratory wildlife are known to use habitats in the vicinity of HIO (Port 2020b). Port monitoring data indicate that approximately 61 bird species and 6 mammal species have been observed in the vicinity of HIO. Some of the most commonly observed birds species include red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), gulls (California [*Larus californicus*], glaucous-winged [*Larus glaucescens*], and mew [*Larus canus*]), killdeer (*Charadrius vociferus*), American crows (*Corvus brachyrhynchos*), European starlings (*Sturnus vulgaris*), and swallows (family Hirundinidae). Glencoe Swale provides nesting and loafing opportunities for waterfowl. Commonly observed mammals include nutria (*Myocastor coypus*), coyotes (*Canis latrans*), pocket gophers (family Geomyidae), and gray-tailed voles (*Microtus canicaudus*). An eight-foot high security fence surrounds the entire airfield and keeps larger wildlife species (e.g., blacktailed deer) from entering the study area. Wildlife aircraft strikes pose a risk to safe aircraft operations in the study area, with a total of 118 bird strikes reported between January 2002 and December 2019 (Port 2020b). No mammal strikes have been documented, but mammals have been known to cause property damage and are sometimes targeted for prey-base control actions, since they provide an abundant prey base and attractant for red-tailed hawks and other predatory species (Port 2015).

Coastal cutthroat trout (*Oncorhynchus clarkii*) are mapped by Oregon Department of Fish and Wildlife (ODFW) as occurring within Glencoe Swale year-round (ODFW 2020; StreamNet 2020); however, ODFW's mapping represents their best professional judgement and has not been field verified. Based on review of previously completed surveys and studies, there has been no documentation of fish presence in Glencoe Swale, and the swale does not possess suitable in-stream habitat to support coastal cutthroat trout, such as large woody debris, gravel or cobble substrate, deep pools, and cool flows during the summer months (Anchor QEA 2017; SWCA 2016).

Although there do not appear to be any fish occupancy data for Glencoe Swale, there are data for McKay Creek. Upper Willamette River (UWR) winter run steelhead trout (*Oncorhynchus mykiss*) are mapped as potentially occurring in McKay Creek based on historical records of use and best professional judgement (ORBIC 2019; T. Murtagh, ODFW, personal communication, as cited in Hart Crowser 2020; Hawksworth 1999, as cited in Hart Crowser 2020). Winter run steelhead are federally listed under the ESA and are therefore discussed further under the special status species section.

Other fish species known to occur in McKay Creek include sculpin (*Cottus* spp.); sunfish (*Lepomis* spp.); chislemouth (*Acrocheilus alutaceus*); speckled dace (*Rhinichthys osculus*); redbelt shiner (*Richardsonius balteatus*); cutthroat trout (*Oncorhynchus clarkii*); rainbow trout (*O. mykiss*); and brook lamprey (*Lampetra* spp.) (Leader 2000, as cited in Hart Crowser 2020). Dairy Creek, which is located four miles downstream of the study area, also provides documented habitat for Pacific lamprey (*Entosphenus tridentatus*) (Ward 1995, as cited in Hart Crowser 2020). Although they are not native to the Tualatin Basin, coho salmon (*O. kisutch*) have been observed in the upper portion of McKay Creek above the West Union Road bridge crossing in North Plains (Bio-Surveys, LLC 2013; T. Murtagh, ODFW, personal communication 2019, as cited in Hart Crowser 2020). These data confirm that McKay Creek provides suitable habitat for anadromous salmonids as well as resident fishes.

Special Status Species

Special status species include federally listed threatened, endangered, and candidate species or species of concern; species proposed for federal listing; state-listed threatened, endangered, or sensitive species; species protected under the Bald and Golden Eagle Protection Act; and their species of conservation concern.

Based on review of U.S. Fish and Wildlife Service Information for Planning and Consultation data, Oregon Department of Agriculture plant species within Washington County, and the No Effect memos prepared for the previous runway rehabilitation project (SWCA 2016) and for the Proposed Action (Hart Crowser 2020), there are 15 special status species that could potentially occur within the study area, consisting of seven plant species (Bradshaw's desert-parsley [*Lomatium bradshawii*], water howellia [*Howellia aquatilis*], Kincaid's lupine [*Lupinus sulphureus* ssp. *Kincaidii*], Willamette daisy [*Erigeron decumbens*], Nelson's checkermallow [*Sidalcea nelsoniana*], white rock larkspur [*Delphinium leucophaeum*], and golden paintbrush [*Castilleja levisecta*]), six wildlife species (marbled murrelet [*Brachyramphus marmoratus*], northern spotted owl [*Strix occidentalis caurina*], streaked horned lark [*Eremophila alpestris strigata*], Fender's blue butterfly [*Icaricia icarioides fenderi*], western pond turtle [*Actinemys marmorata*], and bald eagle [*Haliaeetus leucocephalus*]), and two fish species (Pacific lamprey [*Entosphenus tridentatus*] and UWR winter run steelhead trout [*Oncorhynchus mykiss*]).

Of these, 14 species are federally listed (consisting of 7 plant species and 7 animal species), 5 plant species are also state-listed, and 1 species (bald eagle) is protected under the Bald and Golden Eagle Protection Act only.

There is no designated critical habitat within the study area; the closest designated critical habitat is located approximately 3.75 miles southwest of the study area in the Tualatin River (NMFS 2020). Essential fish habitat, as defined in Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act, does not occur within the action area.

None of the federal or state listed species are expected to be present in the study area. The HIO airfield and surrounding properties have been highly modified by human activities. Although the study area does contain some potentially suitable habitat for streaked horned lark, Nelson's checkermallow, white rock larkspur, and western pond turtle, none of these species have been recorded within the study area as part of previously completed surveys; therefore, these species are not expected to occur within the study area. The study area does not provide suitable habitat for the remaining species.

Within the ESA-action area, which extends 2.6 miles downstream to McKay Creek, UWR winter run steelhead is the only federally listed species that could potentially occur. The Tualatin River watershed is not considered occupied nor is it listed as critical habitat for UWR Chinook Salmon (79 FR 20802). Neither McKay Creek nor Glencoe Swale are designated critical habitat for UWR steelhead (70 FR 52630). In addition, there are no records of steelhead trout using Glencoe Swale. McKay Creek is considered by the National Marine Fisheries Service to be an occupied habitat for UWR winter run steelhead trout (federally threatened) based on historical records of use (T. Murtagh, ODFW, personal communication, as cited in Hart Crowser 2020; Hawksworth 1999, as cited in Hart Crowser 2020). However, no steelhead trout were captured during the electrofishing surveys of McKay Creek conducted by the ODFW in the early 2000s nor were they observed during snorkel surveys performed in 2013 (Bio-Surveys 2013; Leader 2000, as cited in Hart Crowser 2020). Oregon Biodiversity Information Center (ORBIC) data also map winter run steelhead as occurring within McKay Creek. It should be noted, however, that inclusion of winter run steelhead represents best professional judgement by the fish and wildlife district biologist and the species is considered undocumented but having the potential of being present (ORBIC 2019, as cited in Hart Crowser 2020).

4.2.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed. There would be no impacts to biological resources beyond existing conditions.

Proposed Action

No federal or state listed species are known to occur within the study area or action area for ESA-listed species, and none are expected to occur due to a lack of suitable habitat and/or a history of site disturbance. No critical habitat is present in the study area, and the closest designated critical habitat is located approximately 3.75 miles southwest of the study area in the Tualatin River. Based on these considerations, it is anticipated that the project would have no direct or indirect effects on federally listed species or their designated critical habitats. In addition, with the implementation of project design and BMPs, long-term and temporary impacts to McKay Creek would be avoided (Hart Crowser 2020). Therefore, construction of the Proposed Action would have “no effect” on any ESA listed species and would “not destroy or adversely modify” any designated critical.

Potential direct, indirect, and construction impacts to other biological resources under the Proposed Action are discussed in this section.

Direct Impacts

Approximately 2.69 acres of wetland habitat and 2,178 square feet (0.05 acre) of Glencoe Swale habitat would be permanently filled and converted to upland grassland habitat as a result of the rerouting and culverting of Glencoe Swale and grading and excavation within wetlands to maintain balanced floodplain storage within the study area. As detailed in Section 4.15, converted wetland and water habitats within the study area would be replaced through in-kind, off-site compensatory mitigation ensuring no net loss of wetland and water habitat at the watershed scale. In addition, there would be a net reduction in the amount of developed/paved surfaces within the study area of approximately 37,700 square feet (0.87 acre). The area subject to pavement removal is located in between the existing paved runway and taxiway areas and would be converted to maintained grassland habitat. Therefore, the total acreage of maintained grassland within the study area would permanently increase by approximately 3.61 acres.

The Proposed Action would not increase the quantity of stormwater flowing from the project area and would not alter floodplain elevations or storage within the study area. The net reduction of developed/paved surfaces within the study area by 0.87 acre, combined with the installation of new water quality filter strips to manage new and modified impervious surfaces would improve the level of on-site stormwater management and treatment above existing conditions which in turn, would likely improve the quality of stormwater flowing from the project area.

The permanent conversion of 2.74 acres of wetland and water habitat to upland maintained grassland habitat within the study area would reduce the amount of available habitat for several avian species, particularly waterfowl species that are currently known to use Glencoe Swale for foraging, nesting, and loafing. Reduced wetland and water habitat availability could, in turn, reduce overall avian use of the study area. However, the total amount of available habitat for avian species at the watershed scale would remain the same as under existing conditions following completion of compensatory wetland mitigation requirements. Reduced avian use of the study area would reduce the potential for avian mortality from aircraft strikes, which would be consistent with wildlife hazard management strategies outlined in the HIO Wildlife Hazard Management Plan to provide a safe aircraft operating environment (Port 2015).

Increasing the acreage of upland grassland habitat in the study area would increase available habitat for upland wildlife species (e.g., small mammals) by a small amount which could, in turn, increase use of the study area by red-tailed hawks and other predatory species. However, given the small size of the increase

in upland habitat (3.61 acres) and given that a portion of this newly added grassland habitat is within the taxiway area (37,700 square feet (0.87 acre)), it is unlikely that noticeable changes in the number of small mammals and/or predatory avian species would occur.

There are no fish species known to be present within Glencoe Swale; therefore, fish species would not be directly impacted by the Proposed Action. The new culvert would be designed to meet ODFW fish passage requirements to accommodate non-listed native fish species within the basin. The new culvert design would result in more natural stream flow conditions and improved habitat quality in the immediate vicinity of the culvert for fish species, should they occur in the future. However, the extent of in-stream habitat improvements would be limited to the roughly 500-foot length of the culvert, which is not expected to result in noticeable changes to local fish populations or their distribution.

The culvert would also be equipped with hinged gates at each end to prevent wildlife from entering the culvert. Gates would be closed to block wildlife access during the dry summer months, which would reduce the potential for wildlife hazards to occur and would minimize the potential for adverse wildlife impacts associated with control methods (e.g., hazing, harassment, or lethal removal).

Indirect Impacts

The Proposed Action would not increase the quantity of stormwater flowing from the development area and would not alter floodplain elevations or storage within the study area. The Proposed Action is not anticipated to cause adverse impacts to streams and riparian habitat in and around the study area. Rather, the Proposed Action would likely improve the quality of stormwater flowing from the project area, thereby reducing the risk of contaminants entering downstream surface waters and potentially improving stream habitat. Therefore, the Proposed Action may result in beneficial indirect impacts due to improved stormwater quality but would have no adverse indirect impact on off-site wetlands, waters, or other sensitive habitats.

Given that there would be minor beneficial impacts to stormwater quality and no increase in stormwater quantity, there would be no indirect adverse impacts to fish species in downstream waters (including McKay Creek) as a result of the Proposed Action. Rather, the Proposed Action would likely reduce the risk of contaminants entering downstream surface waters and associated adverse effects to fish species. In addition, airfield traffic would not increase as a result of the Proposed Action and operational noise levels would be the same as under existing conditions. Therefore, there would be no indirect impacts on wildlife species from increased wildlife hazards or noise levels.

No federal or state listed species are present in the study area and no critical habitat is present in the study area; therefore, there are no indirect impacts to these species.

Construction Impacts

During construction, the majority of habitat within the study area would be subject to ground disturbance due to grading, excavation, construction access, staging of equipment, and stockpiling of fill. Once construction is complete, all habitat areas temporarily disturbed would be reseeded with an appropriate seed mix. Therefore, temporarily disturbed habitats would be returned to their original condition and would not be anticipated to function differently following construction or be adversely affected.

Construction activities could potentially temporarily impact wetland and water habitats through stormwater runoff, erosion, and sedimentation. However, construction-related site disturbances would be limited to the dry summer construction season and impacts would be further minimized through implementation of erosion and sediment control BMPs.

During construction, wildlife species that occur in the study area would be temporarily displaced due to the presence of construction equipment and personnel, and due to the temporary reduction of available

habitat resulting from temporary ground disturbance. Displaced wildlife species would be expected to use surrounding wetland, water, and agricultural habitat during construction, and would be able to return to the study area after construction was complete. Voles and other small rodents might suffer direct mortality during construction due to clearing and grading activities. Ground nesting birds may also suffer direct mortality or disturbance if construction activities occur during the nesting season; however, pre-construction nest surveys would be completed to minimize and avoid potential impacts to ground nesting birds. Increased human activity during construction could also lead to a temporary increase in the amount of trash being stored on-site, which could be an attractant for certain species of wildlife, putting them at risk of direct impacts. However, food scraps or other trash would be collected and placed in covered receptacles to avoid attracting wildlife.

4.2.3. Mitigation and Permits

Mitigation

Direct Impacts

Although there are no significant direct impacts to biological resources from the Proposed Action, the following measures would be implemented:

- Maintain the quality of water discharged to Glencoe Swale in compliance with existing Oregon Department of Environmental Quality (DEQ) issued National Pollutant Discharge Elimination System discharge permits.
- Provide compensatory mitigation for unavoidable impacts to wetland and water habitats and their associated vegetated corridors through the purchase of mitigation bank credits (for wetland and buffer impacts) and stream credits (for Glencoe Swale impacts) at offsite locations. Match or exceed the functions provided by impacted wetlands and waters and their vegetated corridors in the study area with the functions provided by mitigation sites within the same watershed as the study area. Mitigation of impacts to wetlands is discussed further in Section 4.15.

Indirect Impacts

Although there would be no significant indirect impacts to biological resources from the Proposed Action, the following measures would be implemented:

- Implement BMPs to effectively control and manage both stormwater quality and stormwater quantity over the long term. Install water quality filter strips to manage water quality from new and modified impervious surfaces.
- Maintain existing base flood elevations and flood storage volumes within the study area such that potential impacts to upstream and downstream aquatic habitats would be avoided. Compensatory flood storage facilities would meet the CWS Design and Construction Standards (CWS 2019).

Construction Impacts

Although there would be no significant construction impacts to biological resources from construction of the Proposed Action, the following measures would be implemented to reduce the effects of construction on biological resources:

- Implement construction BMPs to avoid or effectively minimize erosion and sedimentation from exposed soils during construction.
- Minimize the construction footprint to the extent possible to reduce the loss of habitat for wildlife species.

- Prior to construction, complete surveys for ground nesting birds throughout the entire footprint of construction, including areas of temporary and permanent ground disturbance.
- Provide trash receptacles equipped with metal, canvas, or plastic covers for collection of food scraps or other trash to avoid attracting wildlife that pose a risk to aviation safety.
- Grade and/or otherwise drain staging areas, stockpile areas, and the work area to prevent environmental pollution and avoid attracting wildlife.
- Reseed temporarily disturbed areas following completion of construction with airfield turf seed mixture designed to minimize its attractiveness to a variety of wildlife, as specified in the HIO Wildlife Hazard Management Plan.
- Repair the existing wildlife exclusion fencing that surrounds the entire airfield as soon as practicable when it must be cut, replaced, relocated, or otherwise impacted. Monitor construction access gates that remain open for any period of time for both security reasons and to discourage a wildlife access to the airfield.
- Prior to mobilization of equipment, stake boundaries of vegetated corridors and place sediment fencing for protection with 25-foot spacing, or closer, as needed to round corners, and include a bright ribbon tied between the stakes. Maintain the stakes and ribbons throughout the duration of project construction.

Permits

No permits associated with biological resources would be required.

4.3. Climate

This section describes existing climate conditions and addresses the potential for impacts to climate conditions that could result from the No Action Alternative and the Proposed Action. No direct or indirect impacts to climate would occur under the Proposed Action as there would be no change in flight operations or airport users from the Proposed Action. The Proposed Action would temporarily increase greenhouse gas (GHG) emissions during construction.

4.3.1. Affected Environment

The Oregon DEQ has prepared GHG inventories to assess the key drivers and recent trends in the State of Oregon's contribution to climate change (DEQ 2020). For 2017, the most recent year of analysis, the State of Oregon produced approximately 64 million metric tons of carbon dioxide equivalents (MMTCO_{2e}). No federal standards have been set for GHG emissions.

4.3.2. Environmental Consequences

Guidance from the FAA Order 1050.1F Desk Reference recommends consideration of: 1) the potential effects of a proposed action or its alternatives on climate change as indicated by its GHG emissions; and 2) the implications of climate change for the environmental effects of a proposed action or alternatives (FAA 2020b).

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed and GHG emissions would remain unchanged; therefore, no climate impacts would occur.

Proposed Action

Potential direct, indirect, and construction impacts to climate under the Proposed Action are discussed in this section.

Direct Impacts

Implementation of the Proposed Action would not result in a change to the number of flights, type of aircraft, or number of airport users beyond expected growth; therefore, no direct impacts to climate would occur under the Proposed Action.

Indirect Impacts

Implementation of the Proposed Action would not result in a change to the number of flights, type of aircraft, or number of airport users beyond expected growth; therefore, no indirect impacts to climate would occur under the Proposed Action.

Construction Impacts

Construction and demolition activities associated with Proposed Action could result in a temporary increase in equipment usage. Research has shown that there is a direct relationship between the amounts of GHG emitted and fuel consumption. A temporary increase in GHG emissions associated with construction and demolition activities would result from gasoline and diesel fuel usage. In addition, there could be a slight decrease in GHG emissions from aircraft operations during construction of the Proposed Action associated with the temporarily reduced runway length.

The temporary increase in GHG emissions from construction of the Proposed Action would not be regionally significant and would comprise a very small fraction of the State of Oregon's most recent GHG inventory emissions of 64 MMTCO₂e, the U.S. based emissions of 6,472 MMTCO₂e, and the 49 gigatons of CO₂e global GHG emissions (EPA 2019; IPCC 2008; DEQ 2020a; City of Portland 2020).

4.3.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to climate would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to climate would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

While a temporary, regionally insignificant increase in GHG emissions associated with construction and demolition activities may occur, this impact would be minimized through the use of measures described in Section 4.1.3.

Permits

No permits associated with climate or GHG emissions would be required.

4.4. Department of Transportation Act: Section 4(f)

This section introduces Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966, explains the determination of "use" of a Section 4(f) property, and addresses the potential for impacts to Section 4(f) and Section 6(f) properties for the No Action Alternative and the Proposed Action. It describes existing Section 4(f) and Section 6(f) properties that may be affected by the No Action Alternative and Proposed Action. As detailed below, no direct, indirect, or construction impacts to Section 4(f) or Section 6(f) properties would occur under the Proposed Action as none are located within the study area or close proximity, no acquisition of these properties would occur, and there would be no change in long-term noise levels from the Proposed Action that would affect use of Section 4(f) or Section 6(f) properties in the vicinity.

Section 4(f) provides for the protection of significant publicly-owned parks, recreation areas, wildlife or waterfowl refuges, and publicly or privately-owned historic sites of federal, state, or local significance eligible for listing on the National Register of Historic Places (NRHP). Section 4(f) protects these properties from “use” unless it is determined that there is no feasible and prudent alternative and a project includes all possible planning to minimize harm.

A Section 4(f) use would occur if the Proposed Action would involve an actual physical taking of Section 4(f) property through purchase of land or a permanent easement, physical occupation of a portion or all of the property, or alteration of structures or facilities on the property. A temporary occupancy of a Section 4(f) property for project construction-related activities does not usually constitute a use under Section 4(f).

A constructive use occurs when the impacts of a project on a Section 4(f) property are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the Section 4(f) property that contribute to its significance or enjoyment are substantially diminished so that the value of the Section 4(f) property, in terms of its prior significance and enjoyment, is substantially reduced or lost.

The Land and Water Conservation Fund Act of 1965 (Public Law 88-578), 16 U.S.C. 601-80 (f)(3), referred to as Section 6(f), protects properties acquired or developed with funds from the Land and Water Conservation Fund from conversion to non-recreational uses.

4.4.1. Affected Environment

The study area for Section 4(f) and Section 6(f) is the same as the noise study area (Section 4.12), which encompasses the day-night average sound level (DNL) 65 A-weighted decibel (dBA) noise contour with and without the Proposed Action; the noise contour during construction would be slightly smaller due to the temporarily relocated runway threshold and temporarily shortened runway length. The study area is large enough to include any areas potentially affected directly or indirectly by either of the alternatives.

Figure 15 identifies the park and recreation areas surrounding HIO. The only park and recreation area within the study area is a small portion of the Washington County Fairgrounds. While the Fairgrounds Sports Complex portion of the Washington Fairgrounds is protected under Section 4(f), that portion of the property is not located within the study area; the rest of the Washington County Fairgrounds do not function primarily as a park or recreation area, and therefore do not qualify for protection under Section 4(f).

There are no wildlife or waterfowl refuges in the study area. Section 4.9 documents the investigation of historic and archaeological sites that could represent Section 4(f) resources; there are no historic or archaeological sites within the study area eligible for protection under Section 4(f).

There are no park and recreation properties developed with funds from the Land and Water Conservation Fund that qualify for protection under Section 6(f) within the study area.

4.4.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed; therefore, there would be no impacts to Section 4(f) or Section 6(f) resources.

Proposed Action

Potential direct, indirect, and construction impacts to Section 4(f) or Section 6(f) resources associated with the Proposed Action are discussed in this section.

Direct Impacts

The Proposed Action would not include acquisition or physical changes to any property protected under Section 4(f) and/or Section 6(f) and would not alter airport operations or result in a significant long-term noise impact; therefore, the Proposed Action would not have a direct impact on any Section 4(f) or Section 6(f) resources.

Indirect Impacts

The Proposed Action would not include acquisition or physical changes to any property protected under Section 4(f) and/or Section 6(f) and would not alter airport operations or result in a significant long-term noise impact; therefore, the Proposed Action would not have an indirect impact on any Section 4(f) or Section 6(f) resources.

Construction Impacts

Construction activities of the Proposed Action and impacts associated with those activities would occur entirely on airport property, with the exception of where the DNL 65 dBA noise contour extends slightly past the HIO property boundary both with and without the Proposed Action, as shown in Figure 15. There would be a temporary minor increase in noise from construction equipment in the immediate area around the construction activities; however, as described in Section 4.4.1, there are no Section 4(f) or Section 6(f) resources located within the study area or close proximity of the construction activities; therefore, construction of the Proposed Action would not affect any Section 4(f) or Section 6(f) resources. Further, construction of the Proposed Action would not require occupancy of any Section 4(f) properties, so there would be no temporary occupancy under Section 4(f).

4.4.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to Section 4(f) or Section 6(f) resources would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to Section 4(f) or Section 6(f) resources would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

No construction impacts to Section 4(f) or Section 6(f) resources would occur under the Proposed Action, so no mitigation is required.

Permits

No permits associated with Section 4(f) or Section 6(f) resources would be required.

4.5. Farmlands

This section addresses the potential for impacts to farmlands, defined as those agricultural areas considered important and protected by federal, state, and local regulations. Farmlands include all pasturelands, croplands, and forests (even if zoned for development) considered to be prime, unique, or of statewide or local importance based on the farmlands inventory maintained by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) (FAA 2020b). FAA Order 1050.1F states that

farmland does not include land already in or committed to urban development. While the airport property would fit the definition of urban development, NRCS's inventory shows that soil types identified as prime farmland and farmland of statewide importance exist on the airport property, and a portion of these areas are currently used for farming activities; therefore, this section addresses potential impacts to farmlands. As discussed below, minor temporary impacts to farmlands would occur under the Proposed Action, but no direct or indirect impacts would occur as no farmlands would be converted to non-agricultural uses.

4.5.1. Affected Environment

Farmlands classified as prime, unique, or of statewide or local importance are subject to regulation under the Farmland Protection Policy Act of 1981. The purpose of the Farmland Protection Policy Act is to regulate federal actions with the potential to convert farmland to non-agricultural uses (FAA 2020b). Farmland classifications are based on soil types, not on actual use; therefore, land may be classified as prime farmland, unique farmland, or farmland of statewide or local importance regardless of whether the land is currently farmed or zoned for agricultural uses.

The NRCS's Web Soil Survey shows that the land north of Runway 13R and south of NE Evergreen Road includes soil types classified as prime farmland, prime farmland if drained, or farmland of statewide importance (USDA 2020), as shown in Figure 16. Within this area, the Port currently leases 8.25 acres of airport property to a private party to farm grass seed. As shown in Figure 16, most of the land currently farmed for grass seed is classified as prime farmland if drained (Amity silt loam soils), and a small portion of it is classified as prime farmland (Woodburn silt loam, 3 percent to 7 percent slopes).

4.5.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed; therefore, no disruption to existing farming practices would occur, and no farmlands classified as prime, unique, or of statewide or local importance or lands actively used for farming would be converted to non-agricultural uses.

Proposed Action

Potential direct, indirect, and construction impacts to farmland are discussed in this section.

Direct Impacts

No direct impacts to farmlands would occur under the Proposed Action. Although the segment of Glencoe Swale in the study area is classified as farmland of statewide importance and the Proposed Action would reroute the portion of Glencoe Swale that traverses the Runway 13R RSA in a concrete box culvert, this area has already been converted to a non-agricultural use; therefore, development of the culvert would not result in the permanent conversion of farmlands to non-agricultural uses.

Indirect Impacts

Operation of the Proposed Action would not indirectly impact farmlands by limiting or negating access to farmable land, change the noise exposure to nearby agricultural and livestock operations, or restrict any agricultural practices; therefore, no indirect impacts would occur.

Construction Impacts

Construction of the Proposed Action would temporarily disrupt the existing farming practices on the land leased for farming north of Runway 13R. As shown in Figure 11 and Figure 12, one of the designated construction staging areas would be temporarily located on a portion of the farmed area adjacent to NE 25th Avenue, and NAVAIDs improvements would be constructed between the two areas of farmed

land north of Runway 13R. During construction, portions of the 8.25 acres would be unavailable for farming; roughly 4.5 acres of the farmland is located in the project limits and may be disturbed by construction activities required for regrading the RSA. Construction site access would occur at existing access points off of NE Evergreen Road and NE 25th Avenue near the farmland, but access to the farmland outside of the project limits would be maintained. While construction staging activities would disrupt farming activities on portions of this land, this impact would be temporary for approximately six months while construction occurs. The farmland outside of the project limits could continue to be farmed during construction. All farmland disturbed during construction would be restored following completion of project construction.

4.5.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to farmlands would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to farmlands would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

The following measures would be implemented to avoid, minimize, or mitigate construction impacts to the farmlands:

- Coordinate with the private party that holds the farming lease on airport property prior to construction and continue communication throughout the duration of project construction.
- Maintain access to farmland beyond project limits throughout construction.
- Restore farmland to pre-construction conditions.

Permits

No permits associated with farmland would be required.

4.6. Floodplains and Hydrology

This section describes the existing floodplain and hydrologic conditions, as well as potential impacts to these resources that could result from the No Action Alternative and Proposed Action. As discussed below, construction impacts to floodplains and hydrology would be minimal under the Proposed Action. Direct and indirect impacts to floodplains and hydrology are expected, as required fill placement would be offset with compensatory storage and the Proposed Action would result in an overall reduction in impervious surface area.

Floodplains and hydrology in the study area are regulated by:

- Procedure for Floodplain and Wetland Reviews (10 CFR 1022.11 through 10 CFR 1022.17)
- Federal Executive Order 11988 (Floodplain Management)
- CWS Design and Construction Standards
- City of Hillsboro Regulatory Floodplain Overlay (City of Hillsboro Community Development Code 12.27.100) and 2018 Design and Construction Standards

4.6.1. Affected Environment

Glencoe Swale enters the study area east of NE Sewell Avenue, northeast of the HIO property. Once it enters the HIO property, the swale passes through an eight-foot-wide by four-foot-high concrete box culvert underneath NE Evergreen Road. Within the HIO property, Glencoe Swale is shallow and gently sloped with a flat bottom and contiguous emergent wetlands along the length of the swale (see Section 4.15 for a discussion on wetlands and surface water). It flows westerly through the study area and exits the HIO property passing through a pair of culverts under NE 25th Avenue (Figure 17). It continues flowing off-site to the southwest for approximately 2.5 miles before entering McKay Creek. McKay Creek flows to Dairy Creek, which is a tributary to the Tualatin River (Figure 14).



Looking north, Glencoe Swale passing under NE Evergreen Road



Looking southwest, Glencoe Swale passing under NE 25th Avenue

Glencoe Swale receives stormwater runoff from existing impervious surface areas within the study area including the paved runway, blast pad, taxiways, and access roads, as well as other impervious surfaces beyond the study area. The swale is typically shallowly ponded during the rainy season; however, it is subject to flooding during large storm events when backwater conditions cause accumulation of surface flows behind the culverts on NE 25th Avenue. Flow rates in Glencoe Swale are intermittent and decrease during the summer months, and although flow can be present during the summer months, it is typically dry through the summer.

Glencoe Swale is covered by a Federal Emergency Management Agency (FEMA) floodplain study and hydraulic analysis which became effective (adopted by FEMA as the official model) in 2019 and has an established floodway (Otak 2018).

4.6.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed. There would be no impacts to floodplains or hydrology.

Proposed Action

Floodplain and hydrology impacts would result from the realignment of Glencoe Swale, grading the RSA, and changes to impervious surfaces, as described in the following sections. The FAA and Port have coordinated with regulatory agencies, including FEMA, CWS, and the City of Hillsboro on proposed changes to these resources.

Direct Impacts

The project would modify the existing 100-year floodway associated with Glencoe Swale. Modifications would occur within the realigned reaches of the stream channel. The overall floodway width would be maintained and realigned to match the new stream channel. The additional fill within the RSA would

result in the loss of approximately 52,471 cubic feet of flood storage area; however, this would be offset by an equivalent amount with compensatory storage (52,471 cubic feet in total) created upstream and downstream of the new culvert (the proposed location of the compensatory storage is shown in purple in Figure 11). Following realignment of Glencoe Swale, the velocity (speed) of water flowing through the swale in the study area would be similar to existing conditions.

Based on the proposed grading plan, with the fill and compensatory floodplain storage, a hydraulic model review was completed to assess the existing and proposed extent of surface area inundation (ponding) when Glencoe Swale has the highest water levels because of concerns about creation of open water that would attract waterfowl. The estimated total area of ponding would be reduced from 35,300 square feet under existing conditions to 24,400 square feet under the Proposed Action during periods when the flow in Glencoe Swale is highest. The decrease in ponding area should reduce the likelihood that Glencoe Swale would attract waterfowl compared to existing conditions.

The project would result in an overall net reduction in paved/gravel surfaces of 37,700 square feet. There would be 4,150 square feet of new impervious surface, while 41,850 square feet of pavement would be removed, as illustrated in Figure 18. Based on the CWS definitions for new and modified pavement, the area requiring hydromodification is 69,300 square feet.⁴ According to the CWS Hydromodification Risk Map, the site is identified as low risk. CWS Design and Construction Standards Section 1.06 allows for alternative methods to satisfy stormwater requirements based on the consideration that a project's actual overall impervious surfaces would be significantly reduced and, therefore, be of low risk for hydromodification. Since the project would result in an overall reduction in peak flows leaving the HIO property as a result of the removal of 41,850 square feet of impervious surfaces, CWS hydromodification requirements would be met either using a fee-in-lieu option (if allowed) or onsite consistent with CWS Design and Construction Standards .

Water quality filter strips, as shown in Figure 11, would be installed to manage water quality of stormwater generated by new and modified impervious surfaces, as shown in Figure 18. Once treated by the water quality filter strips, the water would then be collected in a swale or pipe system or flow naturally downslope, ultimately directed to Glencoe Swale.

Minor storm piping replacement would be required as part of the improvements, as shown in Figure 11, because the proposed culvert would conflict with an existing storm pipe, which would be filled and abandoned and the replacement storm pipe would be installed to convey flow to a different dispersed outfall location outside the 100-year floodplain of Glencoe Swale. The new discharge location would include riprap outfall protection. Flow exiting the outfall would be dispersed along a 100-foot dispersion path through the grass before reaching Glencoe Swale. Additionally, there would be some minor storm piping replacement within the RSA performed as maintenance during project construction.

Indirect Impacts

Modifications to the floodplain associated with Glencoe Swale, including creation of compensatory storage, would be constructed entirely within the HIO boundary, and the base flood elevation would not be increased by the project. The velocity (speed) of flow in Glencoe Swale leaving the new culvert would be similar to the existing velocity, and modeling indicates no change to these velocities downstream of the Proposed Action. Therefore, no indirect impacts to the floodplain upstream or downstream of the HIO property are anticipated.

The Proposed Action would result in an overall net reduction of impervious surface on the HIO property; therefore, the changes in hydrology are not anticipated to result in any increase in stormwater runoff

⁴ Hydromodification is the alteration of land that results in changes to the timing and volume of stormwater runoff (CWS 2018).

rates. Any reductions to stormwater runoff would be minimal and would not result in impacts upstream or downstream of the HIO property.

Construction Impacts

During construction, the floodplain associated with Glencoe Swale would be disrupted while the swale is being rerouted and the compensatory flood storage areas are being excavated; however, flood storage is not anticipated to be needed during summer months when construction would occur as rainfall is lower and Glencoe Swale has minimal or no flow. By fall, when rain becomes more frequent, construction would be completed. During construction, Glencoe Swale would be temporarily diverted into a pipe and pumped around the construction area.

Construction activities would include grading and removal of surfaces through activities such as pavement removal, excavation, and placement of fill, which could temporarily alter stormwater runoff. Erosion control measures would be implemented to minimize construction runoff, erosion, and sedimentation.

4.6.3. Mitigation and Permits

Mitigation

Direct Impacts

The following measures would be implemented to avoid, minimize, or mitigate direct impacts to the floodplain and hydrology:

- Maintain overall floodway and create no net increase in the floodway water surface elevation at upstream and downstream HIO property boundaries.
- Create compensatory storage areas upstream and downstream of the new box culvert equivalent to the loss of storage resulting from fill in the RSA to maintain floodplain storage volumes within the 100-year floodplain on the HIO property.
- Maintain flow velocities and depths for Glencoe Swale similar to existing conditions in a 100-year flood event.
- Install water quality filter strips to manage water quality of stormwater from new and modified impervious surfaces.
- Pay fee in-lieu for CWS hydromodification requirements if permitted by CWS; if not, address CWS hydromodification requirements as outlined in the CWS Design and Construction Standards.

Indirect Impacts

No indirect impacts are anticipated; therefore, no mitigation for indirect impacts is proposed.

Construction Impacts

The following measures would be implemented to avoid, minimize, or mitigate construction impacts to the floodplain and hydrology:

- Implement erosion control BMPs during construction such as silt fencing, temporary seeding, slope drains, inlet protection, and dedicated construction entrances to minimize tracking of sediment.
- Pump flows in Glencoe Swale around the construction area via a temporary pipe system to maintain flows during construction.

Permits

The following permits would be required for or triggered by changes to the floodplain and hydrology under the Proposed Action:

- FEMA Letter of Map Revision (to be completed post-construction)
- City of Hillsboro Floodplain Activity Permit
- City of Hillsboro and CWS review and approval of stormwater design plans

4.7. Groundwater

This section describes the existing groundwater conditions, as well as potential impacts to these resources. As discussed below, no direct, indirect, or construction impacts to groundwater would occur under the Proposed Action.

Water that does not evaporate, run off, or transpire, filters through the soil and subsurface and becomes groundwater. Groundwater percolates through the soil into the saturation zone; the top of this zone is called the water table.

Groundwater in the study area is regulated by:

- Safe Water Drinking Act (Title XIV of Public Health Service Act)
- Oregon Groundwater Quality Protection Act of 1989
- CWS Design and Construction Standards

4.7.1. Affected Environment

The study area for groundwater includes all areas where the ground could be disturbed by construction of the Proposed Action, where impervious surfaces could change rates of groundwater infiltration, where airport operations could increase spills or leaks, and where construction vehicles and other equipment could potentially impact groundwater due to staging, machinery, storage, and spills.

The study area falls within a region where many sources of groundwater are isolated in volcanic rock. Oregon DEQ designates Groundwater Management Areas where there are elevated levels of contaminants from a nonpoint source. The study area is not located in a Groundwater Management Area and is not classified as a critical groundwater area. The EPA keeps a database of groundwater sources that serve as the sole source of drinking water for a population. The study area is also not within a Sole Source Aquifer for Drinking Water. The City of Hillsboro Water System Master Plan shows that the City's municipal water system is solely dependent on surface water and does not use groundwater. The City has conducted feasibility studies to see if groundwater withdrawal should be considered for drinking water purposes but found this was not a viable option in the near future (City of Hillsboro 2019).

The following files and databases were reviewed:

- EPA Sole Source Aquifer for Drinking Water Database and Mapping Tool
- Oregon Water Resources Department Groundwater Information System Mapping Tool
- Oregon Critical Groundwater Areas Database

HIO currently uses a variety of hazardous or potentially toxic materials that could impact groundwater, such as vehicle and aviation fuels and solvents, which could be released to the environment in the event of a spill, airplane crash, or ground support equipment accident. HIO has coverage under the 1200-Z

NPDES industrial stormwater permit which regulates these activities. The Port implements a Stormwater Pollution Control Plan to manage stormwater as required by the 1200-Z permit. Required BMPs include proper storage and handling of hazardous materials, spill response procedures, and BMPs for maintenance activities (Port 2017b; Port 2010).

4.7.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed. There would be no impacts to groundwater.

Proposed Action

Potential direct, indirect, and construction impacts to groundwater under the Proposed Action are discussed in this section.

Direct Impacts

The Proposed Action would result in a net reduction in 37,700 square feet of impervious surface, which would increase the surface area available for water infiltration into the soil. This would lead to greater groundwater recharge rates on the HIO property. Airfield turf would be planted where pavement is removed and would help filter out potential contaminants. The Proposed Action would not result in withdrawal of groundwater, create any new wells supplying water to facilities, or cause any reduction in groundwater levels that could impact other groundwater users in surrounding locations. Airport operations would not change under the Proposed Action, so the likelihood of groundwater contamination from a spill, airplane crash, or ground support equipment accident would not change.

Indirect Impacts

The Proposed Action would not result in withdrawal of groundwater, create any new wells supplying water to facilities, or cause any reduction in groundwater levels that could impact other groundwater users in surrounding locations; therefore, no indirect impacts would occur.

Construction Impacts

The Proposed Action is not anticipated to result in any construction impacts to groundwater. Contractors would follow BMPs during construction to avoid spills, leaks, and other harmful materials from seeping into the ground and potentially impacting groundwater. Areas that are temporarily disturbed during excavation would be revegetated to minimize potential impacts to surface water resources and to groundwater.

4.7.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to groundwater would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to groundwater would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

Although there would be no significant impacts to groundwater from construction of the Proposed Action, the following measures would be implemented to avoid groundwater impacts during construction:

- Compliance with the Pollution Control BMPs of the CWS Erosion Prevention and Sediment Control Manual.

- Compliance with the Port’s Spill Prevention, Control, and Countermeasures Plan for HIO. The plan identifies spill response measures, annual tank inspections, routine equipment inspection, loading/unloading tank protocols, and fueling equipment protocols. These steps collectively would prevent and reduce materials from seeping into the ground and polluting groundwater.

Permits

No permits associated with groundwater would be required.

4.8. Hazardous Materials, Solid Waste, and Pollution Prevention

This section defines hazardous materials and addresses the potential for impacts to hazardous material sites as well as the project’s generation of solid waste material and pollution prevention. As detailed below, no direct, indirect, or construction impacts to hazardous waste, solid waste, or pollution would occur under the Proposed Action, as no hazardous sites are located in the study area, pollution would be controlled by existing Port BMP programs, waste generated during construction would be minimal, and the Proposed Action would not result in a change to the amount of solid waste currently generated for operating HIO or how that waste is disposed.

A hazardous material is any substance or material that has been determined to be capable of posing an unreasonable risk to human health, safety, and property when transported in commerce (49 CFR 172 Table 172.101). These materials include hazardous wastes as described in 40 CFR 261 and hazardous substances which are identified as any element, compound, mixture, solution, or substance once released into the environment, may pose substantial harm to human health or the environment as well as those defined as a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and listed in 40 CFR 261 (FAA 1050.1F).

Solid waste can be defined as garbage, refuse, sludges, wastes, and other discarded materials resulting from residential and non-industrial operations and activities. Applicable federal regulations controlling the use, storage, handling, and disposal of solid waste and hazardous materials include the following:

- CERCLA
- Resource Conservation and Recovery Act
- Toxic Substances Control Act
- Superfund Amendments and Reauthorization Act
- 40 CFR, Part 258.10, Solid Wastes-Airport Safety
- FAA AC 150/5200-33C, Hazardous Wildlife Attractants on or near Airports (FAA 2020a)

Hazardous substances are defined by Oregon DEQ rules (Oregon Administrative Rule [OAR] Chapter 340, Division 101) as substances defined as hazardous substances in Section 101(14) of CERCLA and oil, including gasoline, fuel oil, diesel, lubricating oil, or other petroleum products.

The State of Oregon has classified additional materials as hazardous waste that may not be classified as hazardous waste under federal regulations. These constituents are identified in OAR 340-101-033 as state-only hazardous wastes. In addition, Oregon has more stringent regulations for solid waste classification and disposal, including provisions for wastes requiring special management, as identified in OAR 340-093-0190.

According to FAA Order 1050.1F, federal agencies are to comply with applicable pollution control standards in prevention, control, and abatement of environmental pollution.

Executive Order 12088, Federal Compliance with Pollution Control Standards, directs federal agencies to “comply with applicable pollution control standards in the prevention, control and abatement of environmental pollution; and consult with the EPA, state, interstate and local agencies concerning the best techniques and methods available for prevention, control and abatement of environmental pollution.”

4.8.1. Affected Environment

The primary study area for hazardous materials reflects the boundaries of lands that would be disturbed by construction of the Proposed Action (project limits are identified in Figure 11 and Figure 12). The environmental review in this area focused on properties that may contain contaminated soil or groundwater. A larger area was also reviewed within an approximately one-half mile radius of the construction disturbance area. The one-half mile area was investigated to identify contaminated groundwater plumes that have been documented in the records reviewed for this project and that could be affected by construction activities such as dewatering.

A search of available environmental records was conducted on October 14, 2020. No sampling or subsurface testing of environmental media (i.e., soils, surface or ground water) was conducted as part of this investigation. According to federal, state, regional, and local agency databases searched in October 2020, 14 reported release sites and permitted businesses generate, store, or dispose of hazardous materials located within an approximately one-half mile radius around the project (EDR 2020).⁵ However, none of these sites are located within the areas that would be affected by the Proposed Action.

A review of environmental files and databases indicated that there were no sites listed on EPA’s National Priorities List and no Resource Conservation and Recovery Act Solid Waste Management Units found within the area that would be disturbed by construction activity associated with the Proposed Action.

The following files and databases were reviewed:

- Environmental Data Report for HIO by Environmental Data Resources, Inc.
- Historical aerial photographs
- Certified Sanborn® map report
- Environmental reports provided by the Port

The Port’s operations and solid waste management program and pollution prevention program at HIO was evaluated to identify potential affects that the Proposed Action could impose on those activities. This review was based on project design information, standard Port BMPs and disposal methods, as well as standard Port maintenance activities. The airport currently uses a variety of hazardous or potentially toxic materials, such as vehicle and aviation fuels and solvents, which could be released to the environment in the event of a spill, airplane crash, or ground support equipment accident. The Port addresses pollution prevention through its Stormwater Pollution Control Plan, Spill Response Plan and monitoring and control of air emissions. In addition, the Port tracks solid waste generated for all capital projects as well as materials able to be recycled to ensure compliance with the Port’s Waste Management and Minimization Plan.

⁵ A search of available environmental records was conducted on October 14, 2020. No sampling or subsurface testing of environmental media (i.e., soils, surface or ground water) was conducted as part of this investigation.

4.8.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed; therefore, there would be no impacts to hazardous materials, solid waste, or pollution prevention.

Proposed Action

Potential direct, indirect, and construction impacts to hazardous materials, solid waste, and pollution under the Proposed Action are discussed in this section.

Direct Impacts

As no hazardous sites are located in the study area; pollution would be controlled by existing Port BMP programs; and the Proposed Action would not result in a change to the amount of solid waste currently generated for operating HIO or how it is disposed, no direct impacts would occur to hazardous materials, solid waste, and pollution under the Proposed Action.

Indirect Impacts

As no hazardous sites are located in the study area; pollution would be controlled by existing Port BMP programs; and the Proposed Action would not result in a change to the amount of solid waste currently generated for operating HIO or how it is disposed, no indirect impacts would occur to hazardous materials, solid waste, and pollution under the Proposed Action.

Construction Impacts

The Proposed Action would not impact any known hazardous material sites during construction since none are located within the study area. A temporary increase of solid waste generation would occur related to construction activities associated with the Proposed Action; however, this increase would be temporary and would likely be a small volume. Solid waste generated from the construction activities is not anticipated to exceed 400 cubic yards of material, so the Proposed Action would not result in a noticeable change to the amount of solid waste generated HIO in day to day operations. This estimated volume is well within the capacities of the local disposal facilities (Waste Management 2019). Any waste generated by construction activities would be handled accordingly based on the Port's solid waste management program and pollution prevention program.

4.8.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to hazardous materials, solid waste, and pollution prevention would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to hazardous materials, solid waste, and pollution prevention would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

Although there would be no significant impacts from construction of the Proposed Action to hazardous materials, solid waste, and pollution prevention during construction, the following measures would be implemented to reduce the effects of construction:

- Implement hazardous materials handling, solid waste disposal, and pollution prevention BMPs during construction of the Proposed Action.

- Monitor solid waste generated and materials that are able to be recycled in accordance with the Port's Waste Management and Minimization Plan.

Permits

No permits associated with hazardous materials, solid waste, or pollution prevention would be required.

4.9. Historical, Architectural, Archaeological, and Cultural Resources

This section provides the results of the cultural resources investigations that were conducted in July and August 2020 within the Area of Potential Effect (APE). The APE is defined as the area where project activities would occur at or below the existing ground surface (Figure 19).⁶ The Final Cultural Resource Technical Report, which provides the project's Section 106 documentation, is included in Appendix D.

Historic properties are defined as buildings, sites, districts, structures, and objects significant in American history, archaeology, architecture, engineering, or culture, and meet one of the criteria for NRHP eligibility. Historical built resources are standing buildings or other structures that are at least 50 years old. Archaeological resources are the material remains of past human life or activities; these resources may include artifacts (individual items such as complete or broken arrowheads or bottles at least 50 years old) and features (e.g., fire hearths, foundations) that may co-occur at locations identified as archaeological sites. As detailed below, no direct, indirect, or construction impacts to historical, architectural, archeological, or cultural resources are expected to occur under the Proposed Action as none of these resources have been identified in the study area.

4.9.1. Affected Environment

A cultural resources and historic properties review was performed using the Oregon Archaeological Records Remote Access system provided by the Oregon State Historic Preservation Office (SHPO). Historic background research of the area was also performed using Nationwide Environmental Title Research historic aerials, Bureau of Land Management General Land Office historic maps, previously conducted surveys, and online resources to discern the development of structures within the APE. The APE was designated low risk of discovery for archaeological resources due to the type and age of the existing geologic sediments as well as the lack of presence of previously recorded sites within the APE. In July 2020 a pedestrian survey was conducted, and subsurface shovel testing performed within the unpaved surfaces within the APE that were designated for ground disturbing activities. No precontact or historic archaeological isolates, features, or sites were found during the pedestrian survey or the subsurface shovel test. Additionally, no built resources at least 50 years in age were identified. The survey concluded that there are no historic properties present in the APE.

4.9.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed. There would be no impacts to historical, architectural, archaeological, or cultural resources.

Proposed Action

Potential direct, indirect, and construction impacts to historical, architectural, archaeological, and cultural resources under the Proposed Action are discussed in this section. Documentation of coordination between the FAA, the Oregon SHPO, and the affected tribes can be found in Chapter 5.

⁶ The Oregon SHPO concurred with the project's APE for above-ground and archaeological resources in February 2020.

Direct Impacts

Based on the results of the cultural resources and historic records search, pedestrian survey, and subsurface investigation, no historical, architectural, archeological, or cultural resources have been identified in the APE; therefore, no direct impacts would occur under the Proposed Action.

Indirect Impacts

No indirect impacts to historical, architectural, archeological, or cultural resources would occur under the Proposed Action as none of these resources have been identified in the APE.

Construction Impacts

No construction impacts to historical, architectural, archeological, or cultural resources would occur under the Proposed Action as none of these resources have been identified in the APE.

4.9.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to historical, architectural, archaeological, or cultural resources would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to historical, architectural, archaeological, or cultural resources would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

Although there would be no significant impacts from the Proposed Action to historical, architectural, archaeological, or cultural resources during construction, the following measure would be implemented to reduce the potential effects of construction on unidentified archaeological resources:

- Develop an Inadvertent Discovery Plan prior to beginning project construction work to outline actions to be taken if cultural resources are discovered during project construction activities.

Permits

No permits associated with historical, architectural, archaeological, or cultural resources would be required.

4.10. Land Use

This section provides an overview of the existing zoning and development near HIO, as well as planned land uses within the areas adjacent to the Port property. As detailed below, no direct, indirect, or construction impacts to airport vicinity zones or land uses are expected to occur under the Proposed Action, as all project work would occur on HIO property.

4.10.1. Affected Environment

HIO is located in north Hillsboro, adjacent to large industrial and institutional districts, some commercial zones, and some residential development. HIO is directly south of the Portland metropolitan area's urban growth boundary (UGB), and, as such, the land north and northwest of the airport is generally undeveloped and includes farmland, roads, and some low-density residential uses. Industrial zones act as a buffer between the airport and medium-density residential areas to the west. To the south, the airport property directly abuts commercial zoning as well as a designated planning area for institutional uses (Station Community Fair Complex Institutional [SC-FI] district) that is currently under-developed.

Established residential communities exist further south. East of the airport includes large, mostly undeveloped industrial and commercial zoned parcels.

The City of Hillsboro has planned for gradual expansion of its industrial footprint, expanding the UGB along the U.S. Highway 26 corridor north and northeast of the airport and rezoning land for industrial uses. The Hillsboro Technology Park is a planned 700-acre tract of land for industrial development within the Hillsboro Industrial Complex, located less than one-quarter mile east of the airport (City of Hillsboro 2020b). In addition, located approximately one-quarter mile north of Runway 13R is the southern border of the future Jackson East planning area; a roughly 550-acre site bounded by NE Evergreen Road to the south, Jackson School Road to the west, U.S. Highway 26 to the north, and the Hillsboro Technology Park to the east (City of Hillsboro 2020b). (See Section 4.16 for more information regarding these future developments.)

Established residential and commercial areas lie south of the airport, along with the SC-FI planning area located between the MAX Light Rail Blue Line and the southern boundaries of HIO property. Currently, the SC-FI parcels nearest to the HIO property consist of open fields, a park-and-ride facility, and parks, as well as some commercial uses. However, future development within this planning area is expected. Generally, the SC-FI zone may contain a mix of commercial and institutional land uses while residential uses are not permitted (City of Hillsboro 2020a). The City of Hillsboro and Port are currently working on establishing an overlay zone near HIO to ensure airport-compatible land uses in the vicinity of the airport. While this overlay zone and associated restrictions are still under development, in the interim, most proposed land uses near HIO are reviewed for compatibility with aviation uses by City of Hillsboro and Port staff to ensure hazards are avoided and impacts to residents and businesses are minimized.

In addition, areas of residential low density – defined as 3 units/net acre to 7 units/net acre – pockets of residential medium density (8 units/net acre to 16 units/net acre) and residential high density (12 units/net acre to 23 units/net acre) are zoned near the airport, including multi-family residential near commercial centers and intersections. Some infill development may occur as the residential communities west and south of the airport have sprawled to both the city limits and UGB.

The rural areas directly north of the airport but within the UGB remain mostly undeveloped. According to the Washington County Comprehensive Plan (as rural lands are outside of Hillsboro municipal limits in unincorporated areas), rural land uses are limited to agriculture and forestry, with minimum lot sizes of 40 acres for any residential development (Washington County 2019). However, as mentioned, rezoning of land south and west of U.S. Highway 26 is planned to support future industrial uses.

4.10.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed; therefore, no impacts to land uses would occur.

Proposed Action

Land use impacts generally result from acquisition of property, conversion of land to a different use, or noise impacts associated with airport operations. Potential direct, indirect, and construction impacts to land uses under the Proposed Action are discussed in this section.

Direct Impacts

The proposed improvements would occur entirely on airport property and the Proposed Action would not require any property acquisitions or land use conversions; therefore, no direct impacts to land uses would occur under the Proposed Action.

Indirect Impacts

Noise impacts associated with the Proposed Action are addressed in Section 4.12. All proposed improvements are planned on airport property, and adjacent land uses are expected to be compatible with noise and proximity to the airport. As mentioned, the Port and City of Hillsboro are currently working on establishing an overlay zone near HIO to ensure airport-compatible land uses in the vicinity of airport. As such, no indirect impacts to land uses would occur under the Proposed Action.

Construction Impacts

As the proposed improvements would occur entirely on airport property, no construction impacts to land uses would occur from the Proposed Action.

4.10.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to land uses would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to land uses would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

No construction impacts to land uses would occur under the Proposed Action, so no mitigation is required.

Permits

No permits associated with land uses, other than the Floodplain Activity Permit discussed in Section 4.6.3, would be required.

4.11. Natural Resources and Energy Supply

This section describes the existing natural resources and energy supply at the airport as well as potential impacts of the Proposed Action on natural resources and energy. As detailed below, no significant construction impacts to natural resources and energy supply are expected to occur under the Proposed Action. No direct or indirect impacts would occur, as no changes to airport operations requiring additional energy or natural resources would be necessary under the Proposed Action.

The operation of aircraft and airport facilities requires the use of energy in the form of electricity, natural gas, aviation fuel, diesel fuel, and gasoline. In addition, construction of new facilities requires consumption of additional energy and natural resources. FAA Order 1050.1F Desk Reference identifies the following statutes and executive orders related to natural resources and energy supply (FAA 2020b):

- Energy Independence and Security Act (42 U.S.C. 17001 et seq.)
- Energy Policy Act (42 U.S.C. 15801 et seq.)
- Executive Order 13834, Efficient Federal Operations, 83 Federal Register 23771

Further, FAA Order 1050.1F notes that “It is the policy of the FAA... consistent with NEPA and the CEQ [U.S. Council on Environmental Quality] regulations, to encourage the development of FAA facilities that exemplify the highest standards of design including sustainability principles. All elements of the transportation system should be designed with a view to conservation of energy and other resources, pollution prevention, harmonization with the community environment, and sensitivity to the concerns of the traveling public” (FAA 2020b).

4.11.1. Affected Environment

Power, water, and sewer on the airport property are connected to municipal systems. Portland General Electric provides electrical power to HIO and the surrounding area. The City of Hillsboro provides water and sanitary sewer services. The stormwater system on HIO is maintained by the Port, and off-airport, by Washington County and CWS. Building supplies are readily available from local sources.

4.11.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed, so no energy or natural resources would be expended. Further, the No Action Alternative would not change airport operations, so there would be no change in use of energy or natural resources to operate HIO.

Proposed Action

Potential direct, indirect, and construction and construction impacts to natural resources and energy under the Proposed Action are discussed in this section.

Direct Impacts

As no changes to airport operations requiring additional energy or natural resources would be necessary under the Proposed Action, no direct impacts would occur.

Indirect Impacts

As no changes to airport operations requiring additional energy or natural resources would be necessary under the Proposed Action, no indirect impacts would occur.

Construction Impacts

Building materials would be used during construction of the Proposed Action. Material from existing stockpiles on the airport property would be used as a source of fill in the RSA. In addition, topsoil would be brought onto the site. Construction activities would also use other typical building materials such as asphalt, aggregate, drainage pipe, and electrical wiring. All of these materials are readily available in the region, so the Proposed Action would not consume any materials that are in short supply.

Construction of the Proposed Action would generate construction waste. The Port minimizes construction waste by recycling construction materials when it is possible to do so. As described in Section 4.8, solid waste generated during construction of the Proposed Action would be reused and recycled as appropriate. As part of its sustainability practices, the Port continues to examine ways to reduce waste generation through its waste management program, which includes waste segregation, recycling, and energy recapture programs.

Construction of the Proposed Action would also require the use of energy and water for construction activities, generating additional output into the sanitary sewer system. All of the municipal systems have adequate supply of these resources, and BMPs would be implemented to conserve water and power during construction to the extent possible. Construction would be limited to the dry summer season, which would reduce the energy output for operating equipment lighting and decrease stormwater to the system due to lower rainfall.

4.11.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to natural resources and energy would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to natural resources and energy would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

Although there would be no significant construction impacts to natural resources and energy supply from construction of the Proposed Action, the following measures would be implemented to reduce the effects of construction on natural resources and energy:

- Implement BMPs to minimize energy and water use during construction.
- Follow procedures outlined in the Port's Waste Management and Minimization Plan to reduce waste generation during construction.
- Use fill materials from existing stockpiles on HIO to the extent possible to reduce use of additional fill material and energy required for its transportation.

Permits

No permits associated with natural resources and energy would be required.

4.12. Noise and Noise-Compatible Land Use

This section describes existing noise conditions, noise-sensitive land uses near HIO and the potential for impacts to noise-sensitive land uses (also referred to as noise-sensitive receptors) from the No Action Alternative and Proposed Action. As discussed below, elevated noise levels during construction would not be significant to nearby noise-sensitive receptors. No direct or indirect impacts to noise-sensitive land uses would occur under the Proposed Action, as no changes to the use or aircraft operations at HIO would result from the Proposed Action.

4.12.1. Affected Environment

Noise associated with aircraft and airport operations can adversely impact surrounding land uses that are noise sensitive. The FAA defines a noise-sensitive area as an area where noise interferes with normal activities associated with its use. These can be located indoors or outdoors and may include residences, educational and healthcare facilities, places of worship, parks and recreational areas, and cultural and historical sites.

Figure 20 displays noise-sensitive land uses identified in the vicinity of HIO. Areas southwest of HIO are comprised of mostly residential land use as well as parks (Glencoe Creek Park, Tyson Recreation Center, and Griffin Oaks Park), Roots & Wings Montessori School, the Corridor Baptist Church, and Comfort Inn. Northeast of HIO includes scattered residences, Hillsboro Brookwood Library, and two educational facilities (KLA School of Hillsboro and Hillsboro KinderCare). Other land uses located near the study area include commercial, manufacturing, and agricultural facilities. These land uses are not considered noise-sensitive and were not analyzed for noise impacts.

In general, existing noise conditions within the study area are dominated by transportation facilities. Areas at and around HIO are primarily influenced by aircraft operations (takeoffs and landings). Roadway

noise is generated by vehicles traveling on major and minor arterials surrounding the study area, including but not limited to NE Evergreen Road, NE Cornell Road, NE Brookwood Parkway, NE 25th Avenue, and NE 15th Avenue.

4.12.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed and airport operations would remain unchanged; therefore, there would be no noise impacts.

Proposed Action

Potential direct, indirect, and construction impacts to noise under the Proposed Action are discussed in this section.

Direct Impacts

As runway conditions and use would be the same before and after the Proposed Action is constructed, with no change in aircraft operations, no direct impacts would occur from the Proposed Action.

Indirect Impacts

As runway conditions and use would be the same before and after the Proposed Action is constructed, with no change in aircraft operations, no indirect impacts would occur from the Proposed Action.

Construction Impacts

Construction of the Proposed Action would occur in phases from May 2023 to October 2023. FHWA's Roadway Construction Noise Model was used to predict noise from on-site construction activities. Construction of the Proposed Action would result in temporary elevated noise levels from on-site construction equipment, personal vehicles used by construction employees to access parking areas, and delivery/haul trucks used for equipment and material delivery and haul trips. During construction, the Runway 13R runway end would be temporarily relocated to the south, potentially changing aircraft noise patterns.

Proposed haul routes would be located along NE 25th Avenue and NE Evergreen Road. Surrounding roadways would experience an increase in traffic during certain periods of the day. Traffic is not predicted to double in volume, which is the minimum amount to be noticeable to average human hearing. Increases in traffic would be temporary in nature and would not result in significant impacts to receptors adjacent to the haul routes or surrounding roadways. An overview of construction activity analysis locations and work areas is depicted in Figure 21.

The loudest noise levels are predicted to occur at receptors closest to the construction work area and with direct line of site to construction activities (shown as Receiver Group R1 and Receiver Group R6 on Figure 21). The analysis conservatively predicts the loudest noise levels that can be expected using the shortest distance between receptors and construction activities. The analysis does not account for shielding effects from buildings or other features that may be present between receptors and the work area.

The City of Hillsboro exempts construction noise between 6:00 am and 9:00 pm, and therefore, no significant impacts would be expected to occur during this period. However, if work should be required during non-exempt hours (9:00 pm to 6:00 am), construction activities would be subject to the sound level limits of 60 dBA within the City of Hillsboro's Municipal Code, and a noise variance would need to be obtained since sound levels are predicted to exceed those limits. Sound levels for construction noise are summarized in Table 7.

Table 7. Summary of Construction Activity Noise Analysis Results

PROJECT COMPONENT	RECEIVER GROUP	LAND USE	RANGE OF PROJECT-RELATED SOUND LEVELS, dBA L _{MAX} ⁱ
RSA	R1	Residential	47-78
	R2	Residential, Park ⁱⁱ	43-68
	R3	Residential, School, Church, Park ⁱⁱ	42-68
	R4	Hotel	39-59
	R5	Library, Schools ⁱⁱ	38-64
	R6	Residential	46-75
Taxiways	R1	Residential	47-78
	R2	Residential, Park ⁱⁱ	43-68
	R3	Residential, School, Church, Park ⁱⁱ	42-68
	R4	Hotel	39-59
	R5	Library, Schools ⁱⁱ	38-64
	R6	Residential	46-75
Site Work	R1	Residential	67-77
	R2	Residential, Park ⁱⁱ	63-67
	R3	Residential, School, Church, Park ⁱⁱ	62-67
	R4	Hotel	58-58
	R5	Library, Schools ⁱⁱ	57-63
	R6	Residential	66-75
Airfield Lighting	R1	Residential	50-77
	R2	Residential, Park ⁱⁱ	47-67
	R3	Residential, School, Church, Park ⁱⁱ	45-67
	R4	Hotel	42-58
	R5	Library, Schools ⁱⁱ	41-63
	R6	Residential	49-75
Access Road	R1	Residential	47-78
	R2	Residential, Park ⁱⁱ	43-68
	R3	Residential, School, Church, Park ⁱⁱ	42-68
	R4	Hotel	39-59
	R5	Library, Schools ⁱⁱ	38-64
	R6	Residential	46-75

Notes:

ⁱ L_{max} noise level represents noisiest piece of equipment to be used during each construction phase.

ⁱⁱ Typical use of non-residential land uses, such as schools, places of worship, parks, and libraries, is during daytime hours and would not be considered sensitive during overnight hours.

The construction sound levels that would be experienced from the Proposed Action are illustrated in Table 7 and range from 38 dBA to 78 dBA. For comparison, a light rain generates a sound level of approximately 40 dBA, a quiet suburb typically has a sound level of 50 dBA, and a sound level of 80 dBA is similar to a noisy restaurant or to the noise experienced 50 feet away from a diesel truck traveling at 40 mph. The loudest noise levels are predicted at receptors nearest the work area and include residences southwest of HIO, along NE Beacon Court and NE 15th Avenue (Receiver Group R1) and residences along NW 273rd Avenue (Receiver Group R6), north of HIO (Figure 21). Typical use of parks, schools, and libraries occurs during daytime hours and would, therefore, not be considered sensitive during overnight periods. No significant impact would occur as a result of construction activities associated with the Proposed Action, because these impacts would be relatively short term and temporary, with a total duration of construction for all the components listed in Table 7 of approximately six months and shorter durations for the individual components.

Although the Runway 13R runway end would be temporarily relocated to the south during construction, the Runway 31L end would remain in the same location. FAA's AEDT was used to identify changes in aircraft noise that could occur as a result of the temporary reduction in length of Runway 13R-31L. Aircraft noise contours were developed for the existing conditions (same as contours for the No Action Alternative) and the Proposed Action's construction period with the shortened runway, as shown in Figure 22. The criteria for significant impact require a 1.5 dB increase in noise levels between the Proposed Action as compared to No Action Alternative at a noise-sensitive location with a DNL 65 dBA or greater. The majority of the area located within the DNL 65 dBA contours for both existing and construction conditions are located within the airport property boundary. Noise-sensitive land use within the DNL 65 dBA contour that is located outside of the airport property includes a hotel to the south of the airport. As a result of the Proposed Action, there would be only negligible changes in aircraft sound levels of less than 1 dB at the hotel; therefore, the temporary impact that would occur as a result of construction is not considered significant.

4.12.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to noise-sensitive areas would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to noise-sensitive areas would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

Although there would be no significant construction noise impacts from construction of the Proposed Action, the following measures would be implemented to reduce the effects of construction noise on noise-sensitive areas:

- Provide appropriate manufacturer's noise reduction devices, including, but not limited to a manufacturer's muffler (or equivalently rated material) that is free of rust, holes, and exhaust leaks on construction equipment operating on site.
- Ensure that the engine housing doors are kept closed on construction devices with internal combustion engines.

- Cover equipment, such as compressors, generators, pumps, and other such devices with noise-insulating fabric as well as operate the device at lower engine speeds during work to the maximum extent possible.
- Use operational controls, such as limiting vehicle engine idling on-site and time-of-day restrictions for certain activities.
- Use quieter or ambient-sensitive back-up alarms on construction equipment whenever practical.
- Strategically position construction vehicles so as to minimize operation near receptors and direct construction haul vehicles away from receptors when traveling to and from the work site.
- Use noise pathway controls, including noise barriers and enclosures free from gaps and holes, placed as close as possible to construction areas.
- Keep the public informed about construction activities and efforts to minimize noise in the community.
- Use complaint response procedures for prompt response and corrective action to noise complaints during construction.

Permits

No permits associated with noise and noise-compatible land use would be required. A noise variance from the City of Hillsboro would be required should construction activities occur overnight during non-exempt hours (9:00 pm to 6:00 am).

4.13. Socioeconomics, Environmental Justice, and Children’s Environmental Health and Safety Risks

This section addresses the potential for impacts to socioeconomic conditions, environmental justice communities, and children’s environmental health and safety risks for the No Action Alternative and the Proposed Action. As detailed below, the project work would occur entirely on airport property, no land acquisition or relocation is required, access to services would be maintained, and the Proposed Action would not result in the release of significant air pollutants or other environmental contaminants, so there would be no direct, indirect, or construction impacts under the Proposed Action to socioeconomic conditions, environmental justice communities, or the health and safety of children.

4.13.1. Affected Environment

The study area for the analyses of these resources included three Census Tract Block Groups (410670326031, 410670326081, and 410670326091) within one-half mile of the Proposed Action (Figure 23). The study area is almost entirely in the City of Hillsboro and is entirely in Washington County. The data used to analyze the existing conditions surrounding HIO originated from the Portland Metropolitan Organization (“Metro”), the U.S. Census Bureau American Community Survey, and the EPA’s EJSCREEN tool. Table 8 presents the socioeconomic conditions of the City of Hillsboro and Washington County.

Table 8. Socioeconomic Conditions – City of Hillsboro/Washington County

INDICATOR	CITY OF HILLSBORO	WASHINGTON COUNTY
Population	104,370	581,821
Projected Population 2040	128,901	712,160
% of Population White	77.4%	80.9%
% of Population Black or African American	3.7%	3.1%
% of Population Asian	14.3%	12.8%
% of Population Hispanic or Latino	23.4%	16.5%
% of Population Below Poverty	10.0%	9.6%
% of Population Below 18	24.8%	23.6%
% of Population Below 18 Below Poverty	13.8%	12.3%
Median Household Income (\$)	\$78,144	\$78,010
Median Housing Value (\$)	\$315,400	\$360,400

Sources:

1. Projected Population 2040 (Metro 2016)
2. All other data (ACS 2018)

Socioeconomics

According to FAA Order 1050.1F, a significance threshold for socioeconomics has not been established by the FAA; however, the FAA has identified factors to consider when evaluating the context and intensity of potential environmental impacts for socioeconomics (FAA 2020b). These factors include situations in which the action would have a potential to:

- Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area)
- Disrupt or divide the physical arrangement of an established community
- Cause extensive relocation when sufficient replacement housing is unavailable
- Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities
- Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities
- Produce a substantial change in the community tax base (FAA 2020b)

No businesses, residences, or other properties are located within the immediate project area. Because the Proposed Action is confined to the northwest portion of the airport property, there are only two roadway facilities near the site. On the west side, the airport is accessible by NE 25th Avenue. On the north side, NE Evergreen Road provides access. Access to freeways is somewhat distant from the airport and would not be impacted. There are two bus stops near the northwest portion of the airport. Both are on the west side of the airport: 1) at the intersection of NE 25th Avenue and NE Kathryn Street, and 2) at the intersection of NE 15th Avenue and NE Edgefield Street.

Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, directs federal agencies to identify and address disproportionately high and adverse effects of projects on the health or environment of minority and low-income populations (FAA 2020b). U.S. DOT Order 5610.2, § Appendix 1(g)) defines a disproportionately high and adverse impact on minority and low-income populations as an adverse effect that:

1. Is predominately borne by a minority population and/or a low-income population; or
2. Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse impact that will be suffered by the nonminority population and/or non-low-income population (U.S. DOT 2012).

Currently, there are approximately 314 residents within one-half mile radius of the Proposed Action. Of these residents reporting one race, 226 (72 percent) are white and 51 (16 percent) are Asian. There are 14 people (4 percent) of the population in the area that identify as some other race. Of the 107 households in the area, 81 percent have a household income of at least \$50,000 annually. There are 13 households (12 percent) that earn between \$25,000 and \$50,000 annually and there are 7 households (7 percent) that earn less than \$25,000 annually (EPA 2020). Based on the median household income and minority populations in the City of Hillsboro and surrounding areas, these statistics within the one-half mile radius are very similar.

Children's Environmental Health and Safety Risks

The FAA has not established a significance threshold for impacts to children's environmental health and safety; however, the FAA has identified the following factor for consideration when evaluating potential impacts to children's health and safety:

- An action would have the potential to lead to a disproportionate health or safety risk to children (FAA 2020b).

Within a one-half mile radius of the proposed improvements, there are approximately 81 children under the age of 18 residing in the area, or 26 percent of the total population in the area (EPA 2020). Currently, there are no schools or daycares within a one-half mile radius of the proposed improvements. The closest school (Roots and Wings Montessori School) is located a little over one-half mile from the proposed improvements. The closest daycare (Hillsboro Kindercare) is located roughly 1.5 miles from the proposed improvements (Figure 20).

4.13.2. Environmental Consequences

No Action

The No Action Alternative would not involve any development, land acquisition, or construction. Therefore, the No Action Alternative would not have any temporary or long-term impacts and would not affect any socioeconomic conditions, would not produce any environmental effects on environmental justice communities, and would not affect the environmental health and safety of children.

Proposed Action

Potential direct, indirect, and construction impacts to socioeconomics, environmental justice, and children's environmental health and safety under the Proposed Action are discussed in this section.

Direct Impacts

The Proposed Action would not change the number of flights, type of aircraft, or number airport users at the airport; therefore, operation of the Proposed Action would not result in an increase in air pollutant emissions, release in environmental contaminants, or an increase in noise. The Proposed Action would not involve land acquisition, relocation of any children or other individuals, or result in the disruption of any existing communities. The project would have minor, temporary economic benefits from additional construction jobs, but no substantial economic growth in the area would occur as a result of the Proposed Action. The project would be located entirely on airport property and would not disrupt or divide the community. The Proposed Action is not expected to significantly affect environmental

resources of the airport or create any substances which could be harmful to children if ingested or come in contact with, such as air, food, drinking water, recreational area, or soil.

Given the nature of the project, no adverse impacts would be borne on any environmental justice populations and there are not significant numbers of environmental justice populations in the one-half mile radius. Public outreach for the project is ongoing and will continue to be conducted as the project progresses to ensure that the community is informed and has an opportunity to provide feedback.

Therefore, the Proposed Action would not have any direct impacts that would negatively impact the socioeconomics of the area, environmental justice populations, or the environmental health and safety of children.

Indirect Impacts

For the same reasons discussed in Direct Impacts above, the Proposed Action would not have any indirect impacts that would negatively impact the socioeconomics of the area, environmental justice populations, or the environmental health and safety of children.

Construction Impacts

Construction activities from the Proposed Action would be conducted entirely on airport property. Construction of the Proposed Action would not result in a significant increase in air pollutant emissions or a release in environmental contaminants or significant noise impacts (Section 4.1 and Section 4.12). Floodplain and hydrology and wetland and surface water impacts would be contained on the airport and would be mitigated, so communities surrounding HIO would not experience changes in flooding or water quality during construction (Section 4.6 and Section 4.15). Although some traffic would be generated by construction activities, no changes would occur to existing traffic patterns. The Proposed Action would have short-term economic benefits related to construction employment; however, this employment would not be permanent.

4.13.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts to socioeconomic conditions, environmental justice communities, or health and safety of children would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts to socioeconomic conditions, environmental justice communities, or health and safety of children would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

No construction impacts to socioeconomic conditions, environmental justice communities, or health and safety of children would occur under the Proposed Action, so no mitigation is required.

Permits

No permits associated with socioeconomic conditions, environmental justice communities, or the health and safety of children would be required.

4.14. Visual Effects

This section describes the existing conditions and potential impacts from changes in light emissions and potential impacts to visual resources and visual character surrounding HIO. As discussed below, no direct or indirect impacts are anticipated from the Proposed Action. The Proposed Action would result in no net increase of light emissions and would not create any impacts to visual character or visual resources.

Changes in light emissions during construction would be minimal and would not impact visual character and visual resources.

4.14.1. Affected Environment

Changes in light emissions and visual resources and visual character can potentially impact surrounding areas and other environmental resources. The FAA has not established a significance threshold for visual effects; however, it has identified factors to consider when evaluating potential visual effects:

- The degree to which any lighting or glare associated with the Proposed Action would create annoyance for people in the vicinity and/or interfere with their normal activities.
- The extent the Proposed Action would have the potential to affect the visual character of the area, contrast with the visual resources, and block or obstruct views of visual resources.

Historic resources, biological resources, parks, Wild and Scenic Rivers, and other scenic areas, roadways etc. are resources that should also be considered in visual effects because they can be sensitive to light emissions and contribute to the visual character of the area. Some of these resources are not present in the vicinity of HIO, but those that are were considered as part of the study area for visual effects.

4.14.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed. There would be no impacts from light emissions or to visual resources and visual character.

Proposed Action

Potential direct, indirect, and construction impacts from light emissions or to visual character and visual resources under the Proposed Action are discussed in this section.

Direct Impacts

The Proposed Action would replace a portion of the MALSR. The current length of the MALSR is 2,400 feet; the Proposed Action would replace 1,000 feet of this system, including replacement of six light stations in the same locations that operate in the same manner and serve in the same capacity. The light intensity and color of the replaced segment would be the same as the old segment. The Proposed Action would not add any new light fixtures or systems and would not change the visual sight of aircraft or aircraft lights from HIO operations; therefore, no direct impacts would occur under the Proposed Action.

Indirect Impacts

The Proposed Action would not affect the nature of the visual character of the area or contrast or obstruct any visual resources; therefore, no indirect impacts would occur under the Proposed Action.

Construction Impacts

Construction activities associated with the Proposed Action are not anticipated to cause impacts from light emissions or to visual resources and/or visual character of the area surrounding HIO. All construction activities and staging would occur on HIO property. Construction activities are expected to occur primarily during daylight hours and any lighting during darkness from the Proposed Action would be negligible. Temporary security lighting may be added to the staging and work areas, and nighttime paving may occur requiring lighting on the paver, but this lighting would be minimal, directed inward, and located entirely on HIO property. Any vehicles or construction equipment operating within the air operations area (AOA) would be equipped with standard and flashing dome-type lights typical in a developed, urban area, such as around HIO. This lighting would be minimal and would not impact light emissions or visual resources in

the area. No temporary lighting system would be added along the runway when a portion of the MALSRS is being replaced.

4.14.3. Mitigation and Permits

Mitigation

Direct Impacts

No direct impacts from light emissions or to visual resources and visual character would occur under the Proposed Action, so no mitigation is required.

Indirect Impacts

No indirect impacts from light emissions or to visual resources and visual character would occur under the Proposed Action, so no mitigation is required.

Construction Impacts

Although there would be no direct or indirect impacts from the Proposed Action from light emissions or to visual resources and visual character, the following measures would be implemented to avoid effects from construction:

- To the extent possible, conduct construction activities during daylight hours.
- Use construction barriers/screens as appropriate around construction activities.

Permits

No permits associated with visual effects would be required.

4.15. Wetlands and Surface Water

This section describes the existing wetland and surface water conditions and addresses the potential for impacts to wetlands and surface water that could result from the No Action Alternative and the Proposed Action. As detailed below, mitigation would be provided for all construction and direct impacts to wetlands and surface waters. No unmitigated impacts to wetlands and waters would occur under the Proposed Action, and functions and values of the impacted resources would be replaced on a local watershed level through off-site mitigation and purchase of mitigation bank credits. No indirect impacts to wetlands and surface water from the Proposed Action are expected.

4.15.1. Affected Environment

Wetlands and surface waters in the study area were previously evaluated in multiple wetland delineation reports prepared for the HIO property. The existing conditions information below was compiled from the previously prepared wetland delineation reports.

The study area for this analysis includes the area in which impacts from ground disturbance for the Proposed Action would occur (Figure 24). The ground disturbance area includes both permanent impact areas where grading and placement of fill material would occur as well as temporary impact areas due to construction access and staging. The study area also includes areas of existing soil stockpiles that would be used as a source of fill material.

Wetlands and surface waters in the study area are regulated by the Oregon Department of State Lands (DSL), the U.S. Army Corps of Engineers (USACE), and Oregon DEQ. In addition, CWS regulates vegetated corridors (buffer areas) adjacent to wetlands and streams. The existing wetlands, waters, and vegetated corridors in the study area are shown in Figure 24.

Glencoe Swale

Glencoe Swale enters the study area through a culvert underneath NE Evergreen Road and flows westerly through the study area. Glencoe Swale is approximately three feet to five feet wide and is a shallow feature that is vegetated predominately with non-native reed canarygrass (*Phalaris arundinacea*). The vegetation in Glencoe Swale is mowed as part of routine airport operations and maintenance in accordance with the HIO Wildlife Hazard Management Plan (Port 2015). No woody vegetation is present adjacent to Glencoe Swale on the HIO property. Glencoe Swale exits the HIO property through a pair of culverts under NE 25th Avenue. Glencoe Swale continues flowing off-site to the southwest for approximately 2.5 miles before entering McKay Creek. McKay Creek flows to Dairy Creek, which is a tributary to the Tualatin River (Figure 14).

Wetlands

Wetlands are located in slightly lower elevation areas and subtle depressions within the study area. A total of 6.77 acres of wetlands are present in the study area, with several of the wetlands associated with Glencoe Swale. There are four wetlands (Wetlands A2, D, H, and I) that are not hydrologically connected to Glencoe Swale (Figure 24). Wetland vegetation is very similar among all of the wetlands and consists of non-native grasses and forbs. Wetland vegetation in the study area is managed by regular mowing as part of airport operations and occasional seeding with an airfield approved grass mix. Since wetlands in the study area are necessarily managed for safety in accordance with the HIO Wildlife Hazard Management Plan, they provide low to moderate functions.



Glencoe Swale at NE 25th Avenue under low flow conditions



Glencoe Swale and stream-associated wetlands during moderate flow conditions

Vegetated Corridors

CWS vegetated corridors ranging from 25 feet to 50 feet are required adjacent to Glencoe Swale and wetlands on the HIO property as shown in Figure 24. All vegetated corridors in the study area are in degraded condition according to CWS standards based on a lack of tree canopy cover and a predominance of non-native vegetation species.

4.15.2. Environmental Consequences

No Action

Under the No Action Alternative, no improvements to Runway 13R and the Runway 13R RSA would be constructed. There would be no impacts to wetlands and surface waters.

Proposed Action

Glencoe Swale and adjacent wetlands are located within the Runway 13R RSA. These resources would be impacted to construct the RSA improvements that are necessary to meet FAA design standards. The Proposed Action includes grading the Runway 13R RSA to remove potentially hazardous ruts, humps, depressions, or other surface variations. Glencoe Swale would be rerouted through a culvert across the Runway 13R RSA, and all wetlands within the RSA at the north end of the runway would be filled to provide a level surface, that would be graded to drain and meet FAA's longitudinal slope requirements for the RSA. Temporary and permanent impacts to wetlands and waters that would result from the Proposed Action are shown in Figure 25 and are described in the following sections. The FAA and Port have coordinated with regulatory agencies, including USACE, DSL, CWS, and the City of Hillsboro on changes to these resources.

Direct Impacts

Direct impacts from the Proposed Action would result from rerouting a section of Glencoe Swale into the new box culvert and grading impacts to Glencoe Swale associated wetlands. The placement of fill material into wetlands would be necessary to correct the deficiencies in the Runway 13R RSA for longitudinal gradients and for drainage of stormwater. The Proposed Action would result in 2,180 square feet (0.05 acre) of direct and permanent waters impact along the section of Glencoe Swale that would be filled (flows to be rerouted and culverted) in the Runway 13R RSA. Direct impacts would also include 2.69 acres of permanent fill to be placed into Glencoe Swale associated wetlands in the Runway 13R RSA. The filling of Glencoe Swale and associated wetlands would also result in the loss of 1.90 acres of vegetated corridor adjacent to these resources.

Indirect Impacts

The Proposed Action is not anticipated to result in any indirect impacts to the remaining wetlands on the HIO property, to wetlands upstream and downstream of the HIO property, or to Glencoe Swale upstream or downstream of the new culvert. The Proposed Action would not result in any change to the hydrologic capacity of Glencoe Swale or to the hydrologic characteristics of the wetlands to remain upstream or downstream of the study area. The proposed 14-foot-wide box culvert's hydraulic capacity and design would allow water from storm events to flow at current velocities and would prevent any increase in the floodplain elevation for a 100-year event. The Proposed Action is not anticipated to result in any change to the conditions or functions provided by Glencoe Swale and associated wetlands upstream or downstream of the study area.

Construction Impacts

The majority of construction impacts to Glencoe Swale and its associated wetlands would be the result of grading and excavation necessary to provide balanced floodplain cut and fill to meet the flood storage requirements of the City of Hillsboro and FEMA no-rise requirements for the floodway. Grading and excavation would also be necessary to ensure proper flow of hydrology in Glencoe Swale on the HIO property from upstream of the Runway 13R RSA, through the new culvert that would be installed in the Runway 13R RSA and extending downstream of the Runway 13R RSA. These activities would result in excavation of native soil from 4,360 square feet in Glencoe Swale and excavation of native soil from 2.83 acres of Glencoe Swale associated wetlands. These impacts would be temporary as the regraded areas would be restored in place by reseeding with an airfield approved grass seed mix after grading is complete, and the wetlands and Glencoe Swale are not anticipated to function differently following completion of grading and reseeding.

Portions of the vegetated corridors adjacent to the temporarily impacted wetlands and Glencoe Swale would also be temporarily disturbed due to grading, and these areas would be restored in place by

reseeded with an airfield approved grass seed mix after grading is complete. The vegetated corridor area that would be temporarily disturbed by grading totals 40,080 square feet.

There would be an approximately 50-foot wide area between the grading boundary and the limits of construction where construction access would potentially occur. The vegetation in wetlands and vegetated corridors located within this area may be temporarily disturbed due to the presence of construction equipment. The potential temporary wetland disturbance due to construction access totals 6,970 square feet, and the potential temporary vegetated corridor disturbance due to construction access totals 1.48 acres. No grading would occur in these areas. There would be no temporary construction access impacts to Glencoe Swale.

4.15.3. Mitigation and Permits

Mitigation

The mitigation measures below would reduce impacts of the Proposed Action below a level of significance.

Direct Impacts

The following measures would be implemented to avoid, minimize, or mitigate direct impacts to wetlands and surface waters:

- Design the proposed culvert for Glencoe Swale to maintain flow velocities similar to existing conditions.
- Design the proposed culvert for Glencoe Swale to meet Oregon Department of Fish and Wildlife fish passage requirements.
- Use the Port's existing 1.67 wetland mitigation bank credits at the Bobcat Marsh Mitigation Bank at Jackson Bottom Wetlands Preserve to compensate for the majority of the wetland impacts.
- Purchase additional wetland mitigation bank credits from another mitigation bank to meet the remaining wetland mitigation requirement. The mitigation banks meet the requirements of the FAA wetland mitigation banking strategy (FAA 1996).
- Purchase stream mitigation credits from the Half Mile Lane in-lieu fee site or another mitigation site that may have stream credits available during permitting.
- Provide off-site vegetated corridor mitigation to compensate for permanent vegetated corridor impacts and CWS vegetated corridor enhancement requirements.

The FAA and Port have coordinated with regulatory agencies, including USACE, DSL, and CWS regarding the conceptual off-site mitigation strategy for impacts to wetland and water resources. The Port conducted a pre-application meeting and a site visit with the USACE to discuss the conceptual approach to meeting the wetland and water mitigation requirements for the proposed action. The Port also coordinated with DSL via email regarding the conceptual wetland and water mitigation approach for the Proposed Action. Use of wetland mitigation bank credits was discussed with both agencies and confirmed to be appropriate. The USACE also stated that the wetland impacts could be mitigated with credits from two different mitigation banks, which would allow the Port to use their remaining wetland credits at the Bobcat Marsh Mitigation Bank at Jackson Bottom Wetlands Preserve and purchase the remaining credits needed from a separate mitigation bank in the service area.

USACE and DSL require in-kind wetland mitigation, which means that the wetland mitigation bank credits purchased must be of the same habitat type as the wetlands that are being impacted. There are currently

two wetland mitigation banks in the service area with wetland habitat types that match the wetland types proposed to be impacted. The wetland functions provided by the mitigation banks exceed the functions provided by the wetlands to be impacted; therefore, the purchase of mitigation bank credits would more than replace the wetland functions that would be lost due to the Proposed Action.

Both the USACE and DSL consider Glencoe Swale to be a water rather than a wetland and have stated that it would be appropriate to purchase stream credits from DSL's Half Mile Lane in-lieu fee site for impacts to Glencoe Swale. The functions provided by the Half Mile Lane site exceed the existing functions provided by the Glencoe Swale area to be impacted. Therefore, the purchase of stream credits would provide functional replacement as required by USACE and DSL. The Port has also coordinated with CWS regarding a proposed off-site mitigation location and enhancement plan for meeting the vegetated corridor mitigation requirement for the proposed action. CWS stated that the off-site mitigation concept plan had no fatal flaws, and it appears likely that use of the off-site vegetated corridor mitigation location would be approved.

Indirect Impacts

The following measures would be implemented to avoid, minimize, or mitigate indirect impacts to wetlands and surface waters:

- Provide balanced floodplain cut and fill to meet the flood storage requirements of the City and to meet the FEMA no-rise requirements for the floodway to avoid potential future indirect impacts.

Construction Impacts

Construction access and staging areas were revised during project design to locate them further away from wetlands to minimize temporary construction impacts. In addition, the following measures would be implemented to avoid, minimize, or mitigate construction impacts to wetlands and surface waters:

- Implement an erosion control plan/BMPs prior to construction to avoid potential water quality impacts to downstream waters and wetlands, which may include the following measures:
 - Installation of a sediment fence around the work area perimeter
 - Protection of existing vegetation and a wetland buffer zone with construction fencing
 - Construction would occur in the dry season
 - Installation of inlet protection measures and check dams
 - Use of designated construction entrances
- Following completion of construction, restore and seed with an airfield approved grass seed mix all temporarily disturbed areas of Glencoe Swale, adjacent wetlands and vegetated corridors.
- Rake areas to be seeded to remove stones larger than two inches in diameter and any sticks, stumps and other debris that might interfere with sowing or seed or reestablishment of vegetation.
- Loosen areas to be seeded to a depth of not less than five inches, prior to seeding with an airfield approved grass seed mix appropriate to habitat conditions (wetland or upland).

Permits

The following permits would be required for impacts to wetlands, vegetated corridors, and surface waters under the Proposed Action:

- USACE Section 404 Clean Water Act permit

- DSL Removal-Fill permit
- DEQ Section 401 Water Quality Certification
- CWS Service Provider Letter

4.16. Cumulative Impacts

This section describes the methodology used to assess cumulative impacts and analyzes how the Proposed Action could contribute to cumulative impacts in specific environmental resource categories. CEQ regulations for implementing NEPA define cumulative as “...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR §1508.7). The No Action Alternative serves as the reference point for which cumulative impacts are measured. The Proposed Action would result in impacts to wetlands, surface water, floodplains, and hydrology and these resources were analyzed with other projects occurring within the past, present, and reasonably foreseeable future (five years) to determine whether the cumulative effects would cause any significant environmental effect. The list of past, present, and reasonably foreseeable future actions is derived from the HIO Master Plan, City of Hillsboro planning documents, Washington County planning documents, and plans for several private commercial and industrial developments. All projects are within a five-mile radius of the Proposed Action. Projects that occur outside of a five-mile radius would not be considered within close proximity to contribute to potential cumulative impacts in combination with the Proposed Action.

4.16.1. Past, Present, and Reasonably Foreseeable Actions

The following sections identify past, present, and reasonably foreseeable future actions in the region that could adversely impact environmental resources in combination with the Proposed Action. The analyses documented in Section 4.1 through Section 4.15 show that the effects of the Proposed Action would occur mostly on airport property, and would not change the operations of the airport. The Proposed Action would not require any land acquisition. Since the Proposed Action would not have direct impacts on any resources other than biological, floodplains and hydrology, and wetlands and surface water, no cumulative impacts are anticipated for any other resources. Biological resources, floodplains and hydrology, and wetlands and surface water were analyzed in further detail to see which additional airport projects and other regional projects could potentially contribute to cumulative impacts in combination with the Proposed Action.

Past Actions and Projects

The following guidance is given by CEQ for the consideration of past projects or actions: “...the availability of data often determines how far back past effects are determined. Although certain types of data (e.g., forest cover) may be available for extensive periods of the past (i.e., decades), other data (e.g., water quality data) may be available for much shorter periods. Because the data describing past conditions are usually scarce, the analysis of past effects is often qualitative” (CEQ 1997).

There are several past projects that were analyzed to see how they have impacted the surrounding environment. Most of these past projects included the addition of impervious surfaces and additions to the built environment. There were three projects carried out by Washington County and City of Hillsboro within the immediate vicinity of HIO:

- City of Hillsboro Public Works Facility and NE 30th Avenue Extension – a new public works facility was constructed in 2016/2017. The project also extended NE 30th Avenue several hundred feet to create new access to the facility.

- Starr Boulevard Improvements – these improvements were conducted by City of Hillsboro and were completed in 2016 north of NE Evergreen Road.
- Jackson School Road Roundabout Project – Washington County completed a roundabout in 2017 that created a more enhanced and safer connection between NW Meek Road, NW Scotch Church Road, and NW Jackson School Road.

The following projects were completed at HIO within the last five years:

- New Hangar and Apron and Addition of Taxiway L
- Construct East Access Road – addition of impervious surfaces
- Runway 13R-31L Reconstruction

Present Actions and Projects

Other projects currently underway in the vicinity of HIO considered in the analysis of cumulative impacts include the following:

- The Jackson School Road Project is being led by the City of Hillsboro and includes adding bicycle and pedestrian facilities as well as some roadway improvements. A contract was awarded in February 2020. This project will include the addition of impervious pavement and will, therefore, result in added runoff to the area. The project would be expected to mitigate for this additional runoff so that it will not impact streams, wetlands, or water quality in combination with other projects.
- The Glencoe Swale Habitat Restoration Project is currently removing invasive species and revegetating 65 acres of land surrounding the Glencoe Swale just downstream from the airport to the Jackson School Woods Nature Reserve. This phase of the project is underway and is anticipated to be completed in 2022. The project will help water quality and water storage, as well as provide better habitat for wildlife. This project will help offset other development in the area and will lessen the impacts that occur to Glencoe Swale. Tree For All is the lead organization for this project and is partnering with Friends of Glencoe Swale, Tualatin Soil and Water Conservation District, City of Hillsboro, and CWS to complete the project (Tree For All 2020).
- The Port is undertaking the Taxiway A Rehabilitation, which is a direct airport-related project involving impervious surfaces.

Future Actions and Projects

There are numerous roadway-related projects that are planned in the short-term for Washington County and the City of Hillsboro. Most of these roadway projects include resurfacing, widening, or the addition of pedestrian or bicycle facilities, which would increase the amount of impervious surface surrounding the airport and would further add to the built environment. Both the City of Hillsboro and Washington County follow standard water quality and flood prevention methods and would be required to demonstrate compliance with applicable environmental regulations and requirements for each individual project to ensure that impacts are lessened and would not contribute to cumulative impacts with other projects such as the Proposed Action. The location of reasonably foreseeable future projects as shown in Figure 26, which include the following:

- The Hillsboro Technology Park is a planned 700-acre tract of land for industrial development within the Hillsboro Industrial Complex, which is located less than one-quarter mile north of the airport. The Technology Park would bring more parcels of land to help other businesses develop

and grow (City of Hillsboro 2020b). With this development of 700 additional acres, there would be impacts to wetlands and streams and water quality. The project would be regulated and permitted by CWS, City of Hillsboro, and FEMA and would comply with water quality guidelines, which dictate design standards, erosion control practices, BMPs, and stormwater management requirements set forth by CWS' Design and Construction Standards. Following these standards would ensure that impacts to these resources are avoided and minimized to the extent practicable.

- The Glencoe Swale Habitat Restoration Project has planned additional parts of the Glencoe Swale to be revegetated with native plant species in an effort to increase wildlife habitat and promote more flood storage area and increased water quality. The future portions of the project would occur to the east of the airport around the Glencoe Swale segment downstream around Jackson School Road and further downstream past Jackson School Woods Nature Reserve. This project would help lessen environmental impacts to the Glencoe Swale area and surrounding area by adding natural buffer space between the swale and the built environment.
- The Majestic Brookwood Business Park is a planned 73-acre development that would be located north of the Hillsboro Industrial Complex just south of U.S. Highway 26 (Majestic 2018). This planned development would bring additional impervious surfaces to the area and would increase run-off into Glencoe Swale. The project would be regulated and permitted by CWS and would comply with current CWS Design and Construction Standards, thus ensuring that the impact to these resources is avoided and minimized to the extent practicable.
- The southern border of the future Jackson East planning area is located approximately one-quarter mile north of Runway 13R. The planning area is a roughly 550-acre site bounded by NE Evergreen Road to the south, NW Jackson School Road to the west, U.S. Highway 26 to the north, and the Hillsboro Technology Park to the east. The site is located within the City of Hillsboro and Washington County and uses currently include farming and farm sales, small businesses, and rural residences. City of Hillsboro staff have finalized a master plan and implementation strategy for the area and recommended that the entire site be designated for industrial uses due to the community's lack of long-term industrial land supply (City of Hillsboro 2020c). The Hillsboro Planning Commission recommended designating the area south of Waible Creek for industrial uses while not designating the area north of Waible Creek for industrial uses due to the existing residences. As of March 2020, the Jackson East project has been on pause due to the COVID-19 pandemic and the beginning of infrastructure construction to support the area is unknown (City of Hillsboro 2020d).

Eight other projects have been identified in the HIO Master Plan Update that are programmed within a five-year timeframe (Figure 26). The first six projects will be driven by development, airport needs, and funding potential. They are included in the short-term planning period, but there is a possibility that they will be completed outside the 5-year timeframe (Port 2018). These projects are considered to be reasonably foreseeable future projects and include:

- Widening NE 30th Avenue
- Widening and extending NE Springer Street
- Intersection improvements at NE 30th Avenue and NE Evergreen Road
- Industrial development and enabling infrastructure both north and south of NE Springer Street
- Infill around the south hangar (additional hangars)

- Redevelop hotel
- Constructing Crossfield Taxiway and removing the existing Taxiways A3 and D2
- Taxiway F Rehabilitation and East Perimeter Road Rubber Chip Seal

These future HIO projects are not anticipated to have significant impacts to biological resources, floodplains and hydrology, or wetlands and surface water, but would likely have construction impacts, and would increase the amount of impervious surface on the airport property and surrounding areas. CWS has set forth guidelines for low-impact development, erosion prevention and control, and Design and Construction Standards (CWS 2019). The projects would be regulated and permitted by CWS and would comply with current CWS Design and Construction Standards, thus ensuring that the impact to these resources is avoided and minimized to the extent practicable.

As population and employment in the area surrounding HIO grows both within the City of Hillsboro limits, and outside the city limits (within unincorporated Washington County), the quantity of impervious surfaces is expected to increase. Projects to support future population and employment growth would not be associated with the airport. These projects would be regulated and permitted by CWS, City of Hillsboro, USACE, and FEMA, thus ensuring that the impact to these resources is avoided and minimized to the extent practicable.

4.16.2. Project Contribution to Cumulative Impacts

Biological Resources

The Proposed Action is not anticipated to contribute to significant cumulative impacts to biological resources when considered in combination with other past, present, and reasonably foreseeable projects. During construction of the Proposed Action, ground disturbance would occur and would temporarily impact upland wildlife habitat for this project and other projects. Permanent habitat impacts would reduce wetland habitat but would cause a net increase in non-native grassland habitat. The decrease in wetland habitat would reduce the use by waterfowl species, however nearby wetland habitat would be able to be utilized by these species due to compensatory offsite wetland mitigation for the Proposed Action. There are no federal or state listed species present in the study area and because HIO property has been heavily modified, it is not suitable habitat for listed species. In summary, no indirect or cumulative impacts would occur to protected species or to habitat critical to the survival of protected species.

Floodplains and Hydrology

The Proposed Action is not anticipated to significantly impact floodplains and hydrology, and therefore is not anticipated to contribute to significant cumulative impacts on these resources in combination with other past, present, and reasonably foreseeable projects. While the Proposed Action would cause a decrease of 52,471 cubic feet of water storage directly within the Glencoe Swale area of airport property, the loss of storage would be mitigated upstream and downstream of the proposed culvert so that there would be 52,471 cubic feet of new storage space to replace what was filled. The areas for water to pond on airport property would decrease from the current 35,300 square feet to 24,400 square feet, which would be a net reduction of 10,900 square feet of ponding area. The Proposed Action would modify the existing 100-year floodway associated with Glencoe Swale. Modifications would occur within the realigned reaches of the stream channel; however, the overall floodway width would be maintained and would be realigned to match the new stream channel. Following realignment of Glencoe Swale, the speed of water flowing through the swale in the study area would be similar to existing conditions. Additionally, there would be a net decrease of 37,700 square feet of impervious surfaces because the Proposed Action would remove concrete and asphalt from the study area. There are no indirect impacts anticipated to

floodplains and hydrology from the Proposed Action. Floodplain cut and fill requirements would reshape the floodplain boundary but would ensure that flood storage requirements are maintained and would result in no cumulative impacts. This water storage space that would be mitigated is discussed in further detail in Section 4.6.

The past, present, and reasonably foreseeable future projects are not anticipated to result in direct impacts on delineated floodplains; however, they would likely increase the amount of impervious surface in areas surrounding the airport. All projects at HIO have conformed and would continue to conform to stormwater permit requirements and comply with the City of Hillsboro Regulatory Floodplain Overlay and 2018 Design and Construction standards, CWS Design and Construction Standards, Federal Executive Order 11988, and CFR Procedures for Floodplain and Wetland Reviews. Continued compliance with stormwater permit requirements would ensure that these projects would not contribute to significant floodplains and hydrology impacts when considered with the Proposed Action. Future development surrounding HIO would depend upon the actions of the City of Hillsboro, Washington County, other regional partners, and numerous private developers. Although future development in the Hillsboro Technology Park and Jackson East planning area and elsewhere in the HIO environs would increase impervious surface, and some projects might encroach into delineated floodplains, the timing, pattern, and consequences of this development cannot be reasonably foreseen at this time. However, these projects would be regulated and permitted by CWS, FEMA, and the City of Hillsboro.

Wetlands and Surface Water

The Proposed Action is not anticipated to contribute to significant cumulative impacts to wetlands and surface waters when considered in combination with other past, present, and reasonably foreseeable projects due to impervious surface reduction with the Proposed Action and wetland and stream revegetation that is occurring around Glencoe Swale outside the project area. In addition, all new development occurring around the airport is required to follow CWS Design and Construction guidelines that help protect the integrity of the surface waters and wetlands. The Proposed Action would result in 2.69 acres of wetland fill and 2,180 square feet (0.05 acre) of fill in Glencoe Swale as well as 2.83 acres and 4,360 square feet (0.10 acre) of temporary impacts to wetlands and Glencoe Swale, respectively. All wetland areas that would be impacted by the Proposed Action have been previously disturbed and are considered low quality wetlands. As part of HIO maintenance operations, all wetlands are already seeded with an airfield approved grass seed mix that is mowed regularly and is not native to the region. Because of this, the wetlands are not high quality. To adhere to stormwater mitigation guidelines, 7,410 square feet of water quality filter strips would be installed adjacent to the new HIO pavement in an effort to filter water before entering Glencoe Swale and improve water quality. Mitigation of impacts to wetlands is discussed further in Section 4.15. The Proposed Action would also reduce impervious surfaces on airport property by 37,700 square feet and would, therefore, reduce the amount of runoff into surface water and wetland areas. Following construction and regrading of the area, the functionality would not be changed, and the flow rate of Glencoe Swale would be maintained.

4.17. Summary of Anticipated Impacts

Direct, indirect, construction, and cumulative impacts for each resource are assessed in Section 4.1 through Section 4.16. As demonstrated in those sections, with the implementation of mitigation measures and BMPs, as well as compliance with federal, state, and local standards and permits requirements, the Proposed Action would result in no significant impacts to environmental resources. Direct and construction impacts that would result from the Proposed Action are summarized in Table 9. The Proposed Action would have no indirect and cumulative impacts, so indirect and cumulative impacts are not included in Table 9.

The No Action Alternative would have no direct, indirect, construction, or cumulative impacts to environmental resources, so it is not included in Table 9.

Table 9. Summary of Anticipated Direct Impacts and Construction Impacts from the Proposed Action

RESOURCE	DIRECT IMPACTS	CONSTRUCTION IMPACTS
Air Quality	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant impacts • Increase in air emissions from operating construction equipment • Negligible decrease in air emissions associated with airplane landing/takeoff from the shortened runway
Biological Resources	<ul style="list-style-type: none"> • No significant impacts • 2.69 acres of wetland habitat and 2,180 square feet (0.05 acre) of Glencoe Swale habitat permanently filled and converted to upland grassland habitat • 37,700 square feet (0.87 acre) net reduction of impervious surfaces • 3.61 acres increase of upland habitat • Potential for reduction of avian use, particularly waterfowl species, in the study area due to reduction in wetland and swale habitat • Potential for increase of predatory species as increase in upland habitat provides additional habitat for small mammals 	<ul style="list-style-type: none"> • No significant impacts • Potential to impact habitats through stormwater runoff, erosion, and sedimentation • Wildlife species displaced in the study area from ground disturbance of habitats and presence of humans/equipment • Potential for mortality of small rodents and nesting birds due to clearing and grading
Climate	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant impacts • Increase in GHG emissions from construction and demolition activities • Decrease in GHG emissions associated with airplane landing/takeoff from the shortened runway • Net change in GHG emissions estimated to be -1 CO₂e
DOT Act: Section 4(f)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Farmlands	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant impacts • Portions of leased farming area on HIO unavailable for farming during construction

RESOURCE	DIRECT IMPACTS	CONSTRUCTION IMPACTS
Floodplains and Hydrology	<ul style="list-style-type: none"> • No significant impacts, as all impacts would be mitigated • Initial reduction of approximately 52,471 cubic feet of flood storage area (proposed to be offset 1:1 upstream/downstream of culvert) • Changes in the floodplain would reduce the total area of ponding by 10,900 square feet (0.25 acre) • 37,700 square feet (0.87 acre) net reduction in impervious surface area 	<ul style="list-style-type: none"> • No significant impacts, as all impacts would be mitigated • Floodplain disruption while the stream is rerouted, and compensatory storage areas are excavated • Potential alteration to stormwater runoff from construction activities
Groundwater	<ul style="list-style-type: none"> • No significant impacts • Increased area available for water infiltration into the soil from 37,700 square feet (0.87 acre) net reduction in impervious surface area 	<ul style="list-style-type: none"> • None
Hazardous Materials, Solid Waste, and Pollution Prevention	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Historical, Architectural, Archaeological, and Cultural Resources	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Land Use	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Natural Resources and Energy Supply	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant impacts • Energy and water consumption from construction activities
Noise and Noise-Compatible Land Use	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant impacts • Construction noise is exempt from City of Hillsboro sound limits from 6:00 am to 9:00 pm; if noise levels would exceed the 60 dBA sound level limits for overnight construction (9:00 pm to 6:00 am), a City of Hillsboro noise variance would be required should overnight construction occur
Socioeconomics, Environmental Justice, Children's Environmental Health and Safety Risks	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant impacts • Minor economic benefits related to construction employment
Visual Effects	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant impacts • Nighttime paving and staging and work areas may require temporary lighting

RESOURCE	DIRECT IMPACTS	CONSTRUCTION IMPACTS
Wetlands and Surface Water	<ul style="list-style-type: none"> • No significant impacts, as all impacts would be mitigated • 2.69 acres of wetland fill and 2,180 square feet (0.05 acre) of fill in Glencoe Swale (compensated by purchasing wetland mitigation bank credits) • 1.90 acres of vegetated corridor habitat loss (compensated by off-site vegetated corridor enhancement) 	<ul style="list-style-type: none"> • No significant impacts, as all impacts would be mitigated • 2.83 acres temporary wetland impacts • 4,360 square feet (0.10 acre) temporary impacts to Glencoe Swale • 40,080 square feet (0.92 acre) temporary impacts to the vegetated corridors • Potential 6,970 square feet (0.16 acre) of temporary wetland impact and 1.48 acres of temporary impacts to the vegetated corridors from construction access

CHAPTER 5. PUBLIC OUTREACH, AGENCY COORDINATION, AND TRIBAL CONSULTATION

Chapter 5 summarizes the public outreach, agency, and tribal coordination undertaken for the project during the EA process.

5.1. Public Outreach

The public outreach efforts for the HIO Runway 13R--31L RSA improvements commenced on March 14, 2019 with a public information meeting at the Hillsboro Public Library. The meeting served to inform the public about the project, its purpose and need, and the alternatives analysis process. Project staff have also attended various community events to discuss the project and to ensure that there is a widespread understanding of the project purpose. Community events included meetings with airport tenants, Friends of Glencoe Swale (“FRoGS”), CWS, and the Tualatin Soil and Water Conservation District, as well as hosting an information table at the HIO Air Fair in 2019. Port staff have also provided updates at Hillsboro Airport Community Advisors (HACA) committee meetings since summer 2019. In total, approximately 200 people have been engaged about the project through the various events and meetings to-date. The Port also maintains a website that is used to relay information about the project and upcoming meetings (<https://www.portofportland.com/HIO/environmentalassessment>).

Due to the COVID-19 pandemic, instead of a second public information meeting, two webinars were offered on January 26, 2021 and January 28, 2021. The webinars provided an update on efforts since the first public information meeting, including information on current design for the Proposed Action, project timeline, and notification to the public about the anticipated release of the Draft EA. The public comment period for the Draft EA is April 22 to June 4, 2021, with a public hearing to be held on May 25, 2021.

Table 10 provides a description of each outreach event and activity.

Table 10. Public Outreach Events and Activities

DATE	EVENT	LOCATION	DESCRIPTION
March 14, 2019	Public Information Meeting	Hillsboro Public Library	This public meeting, with 21 people in attendance, served as a kickoff to the public outreach for the project and offered a time for the public to interact with staff and ask questions.
May 16, 2019	Friends of Glencoe Swale Meeting	Jackson School Neighborhood Meeting Hall	Port staff were invited to attend a Glencoe Swale Restoration meeting led by CWS that discussed habitat restoration projects underway. Port staff were asked to give input and let people know about the Proposed Action.
June 25, 2019	HACA Meeting #1	Brookwood Library	At this initial committee meeting, Port staff mentioned the Project in the list of near-term projects planned for HIO. Eight committee members were in attendance.
October 20, 2019	Hillsboro Air Fair	HIO	HIO hosted an Air Fair and set up a tent to discuss current and future HIO projects. Port staff talked to approximately 100 people about the Proposed Action and handed out 30 documents about the project.
October 22, 2019	HACA Meeting #2	HIO Upstairs Terminal Room	Port staff provided an in-depth update on the Project at this meeting. Seven committee members were in attendance.

DATE	EVENT	LOCATION	DESCRIPTION
June 23, 2020	HACA Meeting #4	Virtual – Zoom	Port staff provided a minor update on the project at this meeting. Seven committee members were in attendance.
October 27, 2020	HACA Meeting #5	Virtual – Zoom	Port staff announced the future webinar sessions at this meeting. Nine committee members were in attendance.
January 11, 2021 (launch date)	New Project Information Site	Online www.hio-ea.com and www.hio-ea-esp.com	This new project information site provided an update on the project schedule and design of the Proposed Action and allowed the public to review the materials at their leisure. The site was available in both English and Spanish.
January 26, 2021	Webinar 1	Virtual – Zoom	This was the first of two virtual events that provided the public an opportunity to attend a live webinar where Port staff provided an update on the project schedule and Proposed Action design and answered questions. A Spanish interpreter was available during this webinar. Ten individuals attended this webinar.
January 28, 2021	Webinar 2	Virtual – Zoom	This was the second of two virtual events that provided the public an opportunity to attend a live webinar where Port staff provided an update on the project schedule and Proposed Action design and answered questions. A Spanish interpreter was available during this webinar. Four individuals attended this webinar.
March 23, 2021	HACA Meeting #6	Virtual – Zoom	Port staff provided a project update and announced the upcoming publication of the Draft EA.
April 22 to June 4, 2021	Draft EA Public Comment Period	Online www.hio-ea.com and www.hio-ea-esp.com	Upon publication of the Draft EA, a formal public comment period will begin. The comment period will start at least 30 days in advance of the public hearing and extend 10 days after the public hearing. During this time, public comments may be submitted via online comment form, email, mail, phone, or verbally at the online public hearing.
May 25, 2021	Draft EA Public Hearing	Virtual – Zoom	Online virtual hearing will be held during the public comment period. Port staff will provide an overview of the proposed improvements, as well as a summary of impacts and benefits. Attendees will be able to ask clarifying questions and/or provide formal comments.

5.2. Agency Coordination

Under the NEPA regulations at 40 CFR 1501.5, federal agencies are required to involve environmental agencies, applicants, and the public, to the extent practicable, in preparing EAs. The FAA and Port have conducted early coordination meetings with several federal, state, and local agencies and will continue to work with agency partners through completion of NEPA. Table 11 summarizes agency coordination that has occurred to-date.

The FAA and Port have conducted multiple meetings with the USACE, FEMA, City of Hillsboro, and CWS to discuss potential impacts to the Glencoe Swale and adjacent floodplains. As discussed in Chapter 4, permits from the USACE, FEMA, DSL, DEQ, and CWS would be required prior to construction. The FAA and Port will continue to work with these regulatory agencies to obtain the appropriate permits prior to construction.

Table 11. Agency Coordination

DATE	AGENCY	COORDINATION TOPICS
June 2019	USACE	Pre-application meeting held with USACE and the Port
July 2019	CWS	Pre-design meeting held with CWS and the Port
September 2019	USACE	Site visit with USACE and the Port
September 2019	City of Hillsboro	Utility coordination meeting held with City of Hillsboro and the Port
February 2020	Oregon DEQ	Site visit with Oregon DEQ and the Port
February 2020	Oregon SHPO	APE boundary concurrence from Oregon SHPO
March 2020	FEMA and City of Hillsboro	Preliminary Conditional Letter of Map Revision/Letter of Map Revision meeting with FEMA, City of Hillsboro, and the Port
April 2020	Oregon SHPO	Section 106 requirements meeting with Oregon SHPO, FAA, and the Port
May 2020	City of Hillsboro	Floodplain permitting meeting held with City of Hillsboro and the Port
June 2020	CWS	Pre-design meeting held with CWS, FAA, and the Port
August 2020	City of Hillsboro	Pre-application meeting with City of Hillsboro and the Port
September 2020	FEMA and City of Hillsboro	Floodplain model meeting with FEMA, City of Hillsboro, FAA, and the Port
November 2020	CWS and City of Hillsboro	Vegetated corridors and stormwater commitment letter meeting with CWS, City of Hillsboro, and the Port

Section 106 of the National Historic Preservation Act (NHPA) requires that the FAA consult with Oregon SHPO on the Proposed Action. The FAA initiated consultation with Oregon SHPO on January 21, 2020. Oregon SHPO responded on February 12, 2020 and February 18, 2020 and concurred with the project's APE for above-ground and archaeological resources, respectively. The Final Cultural Resources Technical Report (Appendix D) was provided to the Oregon SHPO by the FAA on March 9, 2021, for review and concurrence with the Section 106 findings.

5.3. Tribal Consultation

Under Section 106 of the NHPA, 36 CFR Part 800, Executive Order 13175, and FAA Order 1210.20, the lead federal agency must provide an opportunity for the Oregon SHPO, affected tribes, and other stakeholders to comment on a federal undertaking.

There were four tribes invited to participate in this project:

- Confederated Tribes of the Grand Ronde Community of Oregon
- Confederated Tribes of Siletz Indians
- Confederated Tribes of the Warm Springs Reservation of Oregon
- Confederated Tribes and Bands of the Yakama Nation

The FAA initiated consultation with each tribe listed above on January 24, 2020. The Confederated Tribes of the Warm Springs Reservation of Oregon responded on February 18, 2020 and requested to be included in the project's consultation. The FAA provided the Final Cultural Resource Technical Report to each tribe identified above on March 9, 2021, requesting their review. The Confederated Tribes of the Grand Ronde Community of Oregon responded on March 26, 2021 and had no comments on the report. The Confederated Tribes of the Warm Springs Reservation of Oregon responded on April 2, 2021 and concurred with the report findings and recommendations. The FAA will also provide the Draft EA to the tribes for review and comment when it is published.

CHAPTER 6. LIST OF PREPARERS

Chapter 6 provides a list of the names and the qualifications of individuals who contributed to the preparation of the EA and supporting documentation. Table 12 includes FAA, Port, and consultant staff.

Table 12. List of Preparers

NAME	YEARS OF EXPERIENCE	EDUCATION	AREA OF RESPONSIBILITY
AGENCY STAFF			
FAA			
Ilon Logan	21	MMA, Environmental Policy	NEPA
Janell Barrilleaux	35	MS, Geology/Earth Science	NEPA
Patrick Walsh	32	BS, Environmental Engineering	NEPA, Waste Management, Asbestos Management
Port of Portland			
Aaron Ray, AICP	10	MCRP; BA, Community Development	Aviation Planning
Chris Blair	21	BS, Aviation Operations	Noise
Danelle Peterson	16	MURP; BS, Environmental Science	Stormwater
David Breen	33	MS, Geosciences; BS, Geology	Air Quality; Climate
Ian Whitlock	15	JD, MSc, BA	Legal
Jamey Berg	11	MS, Environmental Science and Regional Planning; BA, Biology	Environmental Planning
Jayson Shanafelt	5	BS, Business Admin: Marketing	Community Affairs
Marla Harrison	30	MS, Environmental Engineering and Science; BS, Civil Engineering; AS, Nuclear Medicine Technology	NEPA Program Manager and Sr. Manager of Environmental Planning and Operations
Maureen Minister	15	MS, Water Resources Science; BS, Environmental Science	NEPA Project Manager; Natural Resources and Cultural Resources
Nathan Grimes	25	BA in Psychology	General Aviation Operations and Maintenance
Nick Atwell	20	AS, Natural Resources; BS, Wildlife Biology	Sr. Natural Resources and Wildlife Manager Biological Resources
Robin McCaffrey	11	MS, Civil Engineering; BS, Civil Engineering and Operations Research	Engineering Project Manager
Roger Anderson	35	BS, Civil Engineering Technology	Engineering
Stan Jones	33	BS, Geology; BA, General Sciences	Land Quality
Steve Bloomquist	10	BS, Geography and Earth Science	Land Use Planning / Floodplains
Steve Nagy	25	BS, General Engineering	General Aviation / Operations
Terri Burk	26	BA, Biology	Deputy Project Sponsor

NAME	YEARS OF EXPERIENCE	EDUCATION	AREA OF RESPONSIBILITY
CONSULTANT TEAM			
WSP			
Alice Lovegrove	32	MS, Environmental and Waste Management; BE, Engineering Science	Air Quality and Climate QC
April Ryckman	5	BS, Environmental Science	Hazardous Materials, Solid Water, Pollution Prevention
Bridget Wojtala	7	BS, Natural Resources Management	Environmental Scientist
Cole Bales, PE	12	BS, Civil Engineering	Geotechnical Engineer
Dale Mueller, PE	43	BS, Civil Engineering	Civil Engineer/Construction Safety and Phasing
David Williams, PE	26	MBA; BS, Civil Engineering	Engineering Task Lead
Gael Le Bris, CM, PE	10	MS, Airport Development and Management; ENAC, France; MS, Aviation Engineering and Economics	Alternatives Analysis
Geoff Gibson, AICP	7	MURP; BA, Geography/GIS	GIS
Hart Evans	3	BA, Environmental Science and Political Science	Socioeconomic and Environmental Justice, Groundwater, Visual, and Cumulative Technical Lead
James Ellis, PE	7	BS, Civil and Environmental Engineering	Floodplain and Hydrology Modeling
Jennifer Rabby, AICP	18	MCRP; BA, Biology and Environmental Studies	Deputy Project Manager, Section 4(f), Floodplains and Hydrology, Natural Resources and Energy
Jessie Jones	19	AAS, Graphic Design and Illustration	Graphic Design
John Horne, PE	34	PhD, MS, BS, Civil Engineering; BS, Mechanical Engineering	Geotechnical Engineer Lead
Jonathan Braun	2	MCRP; BA, Political Science	Land Use Technical Lead
Larissa Maynard	4	BS, Civil Engineering	Airfield Civil Engineer
Mark Kuttrus, AICP	33	BS, Aviation Management	Alternatives Analysis
Marla Engel, AICP	34	MRP; BA, Political Science/Urban Planning	Environmental Task Lead
Mike Giseburt, PE	36	BS, Civil Engineering	Floodplain and Hydrology Lead
Muruganandam Mohanamurthy, PE	10	MS, Civil Engineering (Structures); BS, Civil Engineering (Structures)	Structural Engineer
Patrick Romero, INCE, ENV SP	22	MS, Environmental Policy and Management; BS, Environmental Science	Hazardous Materials, Solid Waste, Pollution Prevention QC
Sam Roberts, AICP	6	MURP; BA, Urban and Regional Planning	Lead EA Author, Farmlands Technical Lead
Scott Polzin, PMP	25	MCRP; BS, Finance	Project Manager

NAME	YEARS OF EXPERIENCE	EDUCATION	AREA OF RESPONSIBILITY
Elcon Associates			
Dean Ralphs, PE	28	BS, Electrical Engineering	Electrical Engineer
HMMH			
Phil DeVita	30	MS, Environmental Studies; BS, Meteorology	Air Quality and Climate Technical Lead
Scott McIntosh	5	BS, Physics	Noise, Vibration, and Air Quality Technical Support
Scott Noel	21	BA, Geography and Environmental Planning	HMMH Project Manager, Noise and Vibration Technical Lead, Air Quality Technical Support
Tara Cruz	5	BS, Meteorology	Noise, Vibration, and Air Quality Technical Support
ICF			
Jessica Gabriel	14	MA, Cultural Geography; BA, Anthropology	Cultural Resources and Historic Properties
Mathew Sisneros	6	BS, Anthropology	Cultural Resources and Historic Properties
Tait Elder	16	MA, Anthropology; BA, Anthropology	Cultural Resources and Historic Properties
SWCA			
Brittany Sahatjian	9	MS, Environmental Management; BS, Environmental Science and Resource Management	Biological Resources Technical Lead
Rhiannon Held	14	MA, Anthropology, Archaeology focus; BA, Anthropology, Archaeology focus	Biological Resources Technical Editor
Sara Twitchell	15	MS, Environmental Science; BS, Ecology and Evolutionary Biology	Biological Resources QC
WSNW			
Stacy Benjamin	24	MS, Ecology; BA, Biology	Wetland Scientist

CHAPTER 7. REFERENCES

Chapter 7 identifies the reference materials utilized to write the EA and correspond with the in-text reference citations throughout the document.

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CHAPTER 8. GLOSSARY

Chapter 8 provides a glossary of important terms used throughout the EA that help describe NEPA and FAA regulations and standards, environmental features, and components of the Proposed Action and mitigation strategies.

TERM	DEFINITION
Air Operations Area (AOA)	The area of the airport bounded by a fence of to which access is otherwise restricted and which is primarily used or intended to be used for landing, takeoff, or surface maneuvering of aircraft, and related activities.
Airport Layout Plan (ALP)	The plan of an airport showing the layout of existing and proposed airport facilities.
Airport operations	The total number of movements in landings (arrivals) and take-offs (departures) from an airport.
Airport sponsor	The entity that is legally, financially, and otherwise able to assume and carry out the certifications, representations, warranties, assurances, covenants and other obligations required of sponsors.
Alternatives analysis	The process that evaluates potential alternatives to be studied in the subsequent environmental review process. Alternatives that do not meet a project's Purpose and Need and/or are infeasible (cannot realistically be built) are not retained and analyzed in the Environmental Assessment (EA) or Environmental Impact Statement (EIS).
Area of potential effect (APE)	The geographic area within which the project may directly or indirectly cause alterations in the character or use of historic properties and cultural and archaeological resources. This is a term that specifically applies to Section 106 of the National Historic Preservation Act (NHPA).
Best management practices (BMPs)	Physical, structural, and/or managerial practices that, when used singly or in combination, prevent or reduce pollutant discharge.
Compensatory flood storage	During the placement of fill within a floodplain, compensatory flood storage preserves the ability of a floodplain to store water by providing an equal volume of flood storage in the floodplain to replace what was lost.
Criteria pollutants	A group of six common air pollutants for which the Environmental Protection Agency (EPA) has set National Ambient Air Quality Standards (NAAQS): ozone (O ₃), with a diameter less than 10 micrometers and fine particles with a diameter of less than 2.5 micrometers (PM ₁₀ and PM _{2.5}), carbon monoxide (CO), nitrogen oxides (NO _x), sulfur dioxide (SO ₂), and lead (Pb).
Critical aircraft	The most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use (500 or more annual operations) of a runway.
Cumulative effect (impact)	The effect on the environment, which results from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or entity undertakes such other actions. Cumulative effects result from individually minor but collectively significant actions taking place over a period of time.
Day-night average sound level (DNL)	The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of 10 decibels to sound levels for the periods between midnight and 7:00 am and between 10:00 pm and midnight, local time, as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

TERM	DEFINITION
Engineered Material Arresting System (EMAS)	An FAA-approved aircraft arresting system that uses porous cellular materials and is intended to stop aircraft that have overshoot a runway. It is primarily feasible when there is insufficient distance for the standard 1,000-foot runway safety area (RSA) dimension.
Environmental justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from governmental or private operations or policies. Meaningful involvement means that people have an opportunity to participate in decisions about activities that may affect their environment and/or health; the public's contribution can influence the regulatory agency's decision; community concerns will be considered in the decision-making process; and decision makers will seek out and facilitate the involvement of those potentially affected.
Floodplain (100-year)	An area with a 1.0 percent chance of being flooded in any given year.
Floodplain (500-year)	An area with a 0.2 percent chance of being flooded in any given year.
Greenhouse gases (GHG)	Gases that trap heat in the atmosphere. These include carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF ₆).
Impervious surface area	A hard surface area that either prevents or retards the entry of water into the soil mantle as occurs under natural conditions (prior to development) and from which water runs off at an increased rate of flow or in increased volumes.
Indirect effect (impact)	Indirect effects are caused by the Proposed Action or other alternative and are later in time or farther removed in distance, but still reasonably foreseeable.
Jurisdictional waters	Waters under the jurisdiction of the U.S. Army Corps of Engineers (USACE), as granted under the Clean Water Act. These waters typically include waterways and their associated wetlands.
Land use compatibility	The coexistence of land uses surrounding the airport with airport-related activities.
Longitudinal gradient	The grade or slope along the length of the runway and the portion of the RSA that extends beyond the runway.
Medium approach light system with runway alignment indicator lights (MALSR)	Lighting provided along a runway that is used by pilots during instrument landing approach to align the aircraft with the centerline of the runway.
Mitigation	Measures that could be taken to lessen the negative effects predicted for each resource. These measures may include reducing or minimizing a specific negative effect, avoiding it completely, or rectifying or compensating for the negative effect.
Modification of Airport Design Standards (MOS)	Any deviation from, or addition to standards, applicable to airport design, material, and construction standards, or equipment projects resulting in an acceptable level of safety, useful life, lower costs, greater efficiency, or the need to accommodate an unusual local condition on a specific project through approval on a case-by-case basis.
Navigational aids (NAVAIDs)	Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight.

TERM	DEFINITION
No Action Alternative	The alternative under which the proposed project would not be built. The No Action Alternative is carried through the National Environmental Policy Act (NEPA) process and analyzed for effects as a way to formally compare the effects of the Proposed Action with what is likely to happen if the Proposed Action is not constructed.
Noise contours	Lines drawn on a map that connect points of equal noise exposure values.
Non-attainment area	Areas that exceeded National Ambient Air Quality Standards (NAAQS) for any of the six criteria pollutants.
Primary surface	A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway.
Proposed Action	The alternative proposed for construction. The Proposed Action for this Environmental Assessment (EA) would adjust the longitudinal grade of Runway 13R and the Runway 13R RSA to meet current FAA standards while conveying a portion of Glencoe Swale that traverses Runway 13R RSA under the RSA in a concrete box culvert.
Purpose and Need	A formal statement of the objective(s) of the proposed project (Purpose) and the problem(s) that construction of the project is intended to solve (Need). The Purpose and Need statement is developed early in the project planning stage and serves as a guideline for future project efforts. For example, in evaluating alternatives, any alternative that does not meet the project's purpose and need will be dropped from consideration.
Runway protection zone (RPZ)	A trapezoidal-shaped area at the end of a runway, the function of which is to enhance the protection of people and property on the ground through airport owner control of the land. The RPZ usually begins at the end of each primary surface and is centered upon the extended runway centerline.
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, overrun, or excursion from the runway. The RSA dimensional requirements for HIO is 500 feet in width for the entire length of the RSA, and 1,000 feet in length beyond the departure ends of the runway.
Section 106 of the National Historic Preservation Act (NHPA) of 1966	Section 106 of the NHPA applies to undertakings by any federal agency, undertakings receiving federal assistance, and undertakings requiring the issuance of a license from any federal agency. In the event of any of the above undertakings, the head of the acting, assisting, or licensing federal agency must "take into account" the possible effects the undertaking will have on any district, site, building, structure or object that is included in or is eligible for inclusion in the National Register of Historic Places (NRHP) prior to the approval of expenditure of federal funds or issuance of a license.
Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966	Section 4(f) states that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly-owned land of a public park, recreation area, wildlife and waterfowl refuge of national, State, or local significance, land of an historic site of national, State, or local significance only if there is no "prudent and feasible alternative" to the use of that land, and the program or project includes all possible planning to minimize harm to the public land involved.
Section 404 of the Clean Water Act of 1972	Section 404 of the Clean Water Act established a program to regulate and require permits for development activities in waters of the U.S., including wetlands.

TERM	DEFINITION
Stormwater	The portion of precipitation (rainwater or snowmelt) that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body or a constructed infiltration facility.
Taxiway	A defined path, from one part of an airport to another, selected or prepared for the taxiing of aircraft.
Underground conveyance	The channeling of surface water into a pipe or culvert below ground.
Vegetated corridor	A buffer adjacent to a wetland or waterway that is preserved and maintained to protect the water quality functions of the wetland or waterway. Vegetated corridors are regulated by Clean Water Services (CWS).
Water quality filter strips	Gently sloped vegetative areas adjacent to impervious surfaces that are designed to filter and reduce the velocity of stormwater runoff.
Wetland	Land on which water covers the soil or is present either at or near the surface of the soil or within the root zone, all year or for varying periods of time during the year. Wetlands provide a variety of functions and can be regulated by local, state, and Federal laws. Normally, wetlands are attractive to various types of wildlife, many of which are hazardous to aircraft.
Wetland mitigation banking	The creation or restoration of wetlands in order to provide mitigation credits that can be used to offset permitted wetland losses. Mitigation banking benefits wetland resources by providing advance replacement for permitted wetland losses; consolidating small projects into larger, better-designed and managed units; and encouraging integration of wetland mitigation projects with watershed planning.

Environmental Assessment for the
Proposed HIO 13R-31L RSA Improvements

Draft EA

Hillsboro Airport (HIO), Hillsboro, Oregon
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