WORKING PAPER 3

INVENTORY & FACILITY REQUIREMENTS

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Prepared by RS&H for the
Chisholm Hibbing Airport Authority

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INVENTORY AND FACILITY REQUIREMENTS

2.1 INTRODUCTION

Future airport facility requirements, including the type, size, and quantity, are dependent on the future aviation activity levels projected in the aviation activity forecasts discussed in Chapter 1. The need for new or expanded facilities is often driven by capacity shortfalls that leave an airport unable to accommodate the forecasted growth using existing facilities. However, the requirements for new or improved facilities can also be driven by other circumstances, such as, updated standards adopted by the FAA or another regulatory agency, an evolving strategic vision for the airport, the replacement of outdated or inefficient facilities that are prohibitively costly to maintain or modernize, or the desire to introduce new services and facilities. These various circumstances can have a significant impact on future needs, and all have been considered in this analysis which presents an inventory of Range Regional Airport (HIB or Airport) facilities and infrastructure as well as their ability to accommodate forecast future demand. In this chapter, a list of specific requirements, recommendations, and best practices are made to inform development of facility alternatives that meet user needs throughout the 20-year planning horizon.

A Master Plan cannot be comprehensive without integrating sustainable thinking, and therefore, this plan incorporates four principles of airport sustainability (EONS):

- Economic viability
- Operational efficiency
- Natural resource conservation
- Social responsibility

Consideration of these airport sustainability principles is critical to the development of facility alternatives analysis and the EONS principles will be described in more detail in **Section 2.3, *Sustainability***.

Facility requirement determinations are quantitative and objectively determined by way of regulatory standards, modern industry guidance, and industry best practices. Most of this chapter is devoted to need assessments in the following functional areas of Range Regional Airport:

- Airport Setting and Role
- Sustainability
- Inventory of Key Financial Data
- Planning Activity Levels
- Meteorological Conditions
- Airfield Design and Capacity
- Airspace Analysis
- Navigational Aids, Lighting, Signage, and Markings
- Passenger Terminal and Landside Facilities
- Aircraft Parking and Storage
- Deicing and Stormwater Management
- Utilities

This chapter concludes with a section summarizing the key findings of the facility requirement assessments, which will be used to guide identification and evaluation of future development alternatives.

2.2 AIRPORT SETTING AND ROLE

This section describes the following details about Range Regional Airport:

» Location in the region
» History
» Classification and role within the National Plan of Integrated Airport Systems (NPIAS)
» Hierarchy of ownership and control
» Property and zoning
» Facilities overview

2.2.1 Airport Location

Range Regional Airport is located in northern Minnesota within St. Louis County and the city of Hibbing. It is one of nine airports[1] in the state of Minnesota to be served by airlines. Its location is approximately 70 miles from the city of Duluth, 200 miles from the city of Minneapolis, and 120 miles from International Falls, along the US-Canada border. The Airport is a part of the Duluth, MN-WI Metropolitan Statistical Area, that includes the Carlton County, Minnesota; St. Louis County, Minnesota; and Douglas County, Wisconsin.

Range Regional Airport is a critical component providing access into the Mesabi Iron Range region.[2] Of the three ranges making up the 175-mile-wide region, only the Mesabi Iron Range contains active mines. The Mesabi Iron Range has six active mines, including the Hull Rust Mahoning Mine, also in the city of Hibbing. This 5,000-acre mine is open year-round and has shipped over 800 million tons of iron-ore[3]. Minnesota's iron range has been truly valuable to the United States as a natural resource. Most notably, the mines of Minnesota's Iron Range played a vital role in the United States' ability to prevail in World Wars I and II with the mined ore being used in munitions and equipment.[4] Today, beyond the value of the iron-ore extracted from the mines, the mines attract a significant number of visitors to Hibbing, Chisholm, and other communities in the region.[5]

Figure 2-1 shows the location of Range Regional Airport and the Mesabi Iron Range.

[1] The other commercial passenger service airports in Minnesota include Bemidji Regional Airport (BJI), Brainerd Lakes Regional Airport (BRD), Duluth International Airport (DLH), International Falls Airport (INL), Minneapolis/St. Paul International Airport (MSP), St. Cloud Regional Airport (STC), Thief River Falls Regional Airport (TVF), and Rochester International Airport (RST). Minnesota Department of Transportation – Aeronautics and Aviation (2021) https://www.dot.state.mn.us/aero/airlineserviceairports.html

[2] The Mesabi Range is made up of the communities of Hibbing, Chisholm, Mountain Iron, Virginia, Eveleth, Gilbert, Biwabik, Aurora, and Hoyt Lakes, Minnesota. (2021) https://ironrange.org/iron-range-faqs/

[3] Hull Rust Mine View Quick Facts (2021), https://hibbingmineview.org/hull-rust-mine-view/

[4] Hibbing Tourist Senior Center (2021), https://hibbingmineview.org/hull-rust-mine-view/

[5] In 2019, the Hull Rust Mahoning Mine drew over 25,000 visitors. Hibbing Tourist Senior Center (2021) https://hibbingmineview.org/hull-rust-mine-view/

FIGURE 2-1
AIRPORT LOCATION MAP

Source: Esri; MnDOT; University of Minnesota Duluth NRRI; Prepared by RS&H, 2021

2.2.1 Airport History

The following chronological list of events provides a brief history of the Airport's beginning and growth to its current state.[6]

- **1927** - Professor R.F. "Shorty Davis" purchased a Waco biplane in 1927 and, after taking a course in flying in Minneapolis, started a flying school in Hibbing in 1928, utilizing the Fair Grounds as a runway. Mr. Davis, who was an automotive instructor at Hibbing Junior College, is credited with the idea for the Airport.

- **1928** - Realizing the time would come for a municipal field in the village, Mr. Davis sought out other locations and bought a 160-acre tract at the current Airport site. He soon organized the Minnesota Flying Service, which in addition to providing flight training, offered short sightseeing tours and long-distance charter trips.

- **1931** - July 4th, the day the Hibbing Municipal Airport was dedicated after the Department of Commerce listed the Minnesota Flying Service as its first choice for a municipal field, the Hibbing Village Council purchased the tract and began making improvements. The Hibbing Daily Tribune reported that over 25,000 people, "the biggest crowd to ever participate in a local celebration, helped dedicate the municipal landing field."

- **1940** - During the years of the Great Depression, the Works Progress Administration constructed the first permanent Airport structure, a large storage hangar.

- **1948** - The economy of the Iron Range was greatly enhanced by the arrival of air service provided by Wisconsin Central Airlines. This service was made available through the combined efforts of Hibbing and Chisholm city officials and supporters. The first three aircraft serviced a 150-mile radius around Hibbing with mail and passenger service. Wisconsin Airlines later changed its name to North Central in 1952 and then to Republic Airlines when its routes went nationwide in the '70s. In the '80s, Northwest Airlines purchased the airline. Most recently, the airline was merged with Delta Air Lines in 2008.

- **1958** - An agreement was reached between the village of Hibbing and the city of Chisholm to establish a joint governing body, consisting of six commissioners (three from each city) to manage the Airport.

- **1994** - State legislature approved the current governing body entitled the Chisholm-Hibbing Airport Authority (CHAA). The Airport has benefitted from multi-million-dollar grant projects, enhancing the field with a 6,758' x 150' primary runway, a 3,075' x 75' crosswind runway, and an instrument landing system (ILS) serving both landing directions on Runway 13-31.

- **2010** - The Airport Authority changed the Airport's name from the Chisholm-Hibbing Airport to the Range Regional Airport to recognize the regional market the Airport has been serving for many years.

- **2015** - The new commercial terminal was dedicated on December 10th. The building was designed with materials that tell the story of the Iron Range to all who travel to and from the Airport.

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[6] Range Regional Airport (2020) https://www.rangeregionalairport.com/our-history

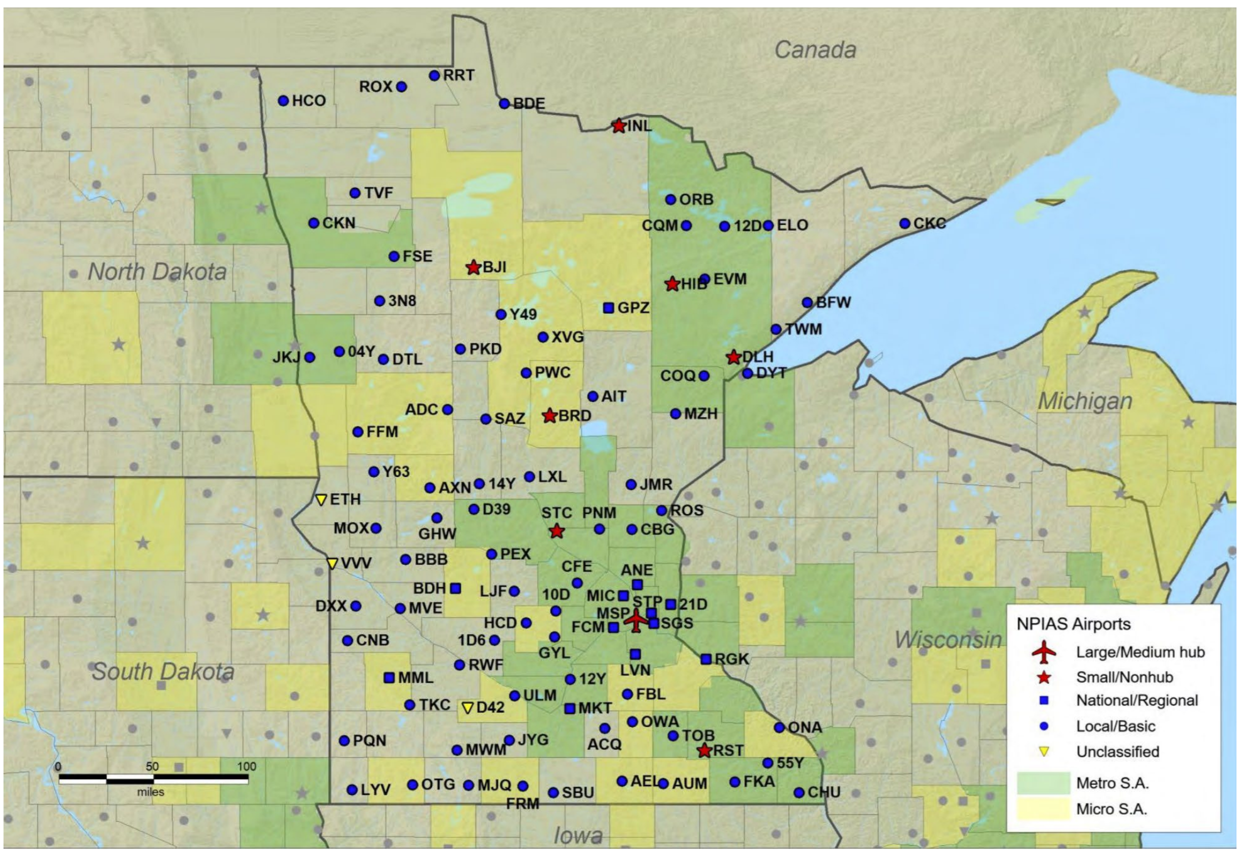
2.2.2 Airport Classification and Role

The following sections describe the Airport's Federal Aviation Administration (FAA) classification, its role within the state of Minnesota, and the role of the Essential Air Service (EAS) program at the Airport.

2.2.2.1 NPIAS Role

The National Plan of Integrated Airport Systems (NPIAS)[7] identifies nearly 3,310 existing and proposed airports included in the national airport system, the roles they currently serve, and the amounts and types of airport development eligible for Federal funding under the Airport Improvement Program (AIP) over the next 5 years. An airport's designated role is determined by its share of US annual enplanements. In the current NPIAS (FY 2021-2025), HIB is identified as a primary service airport with more than 10,000 annual enplanements[8]. Because its share of the US total annual enplanement is less than 0.05 percent, it is also labeled as a nonhub airport. **Figure 2-2** shows NPIAS airports in the state of Minnesota.

FIGURE 2-2
NPIAS AIRPORTS IN MINNESOTA



Source: FAA NPIAS FY 2021-2025

[7] Information retrieved April 9, 2021 from, https://www.faa.gov/airports/planning_capacity/npias/

[8] The COVID-19 global pandemic resulted in dramatic annual enplanement decreases at all US commercial service airports in 2020. At HIB, this resulted in 2020 passenger enplanements decreasing below the required 10,000 passengers required to be categorized as a primary nonhub airport, to 8,432 passenger enplanements (not including non-revenue passengers.) FAA acknowledged the critical funding impacts and issued a waiver to HIB enabling CHAA to receive AIP entitlement funding at primary nonhub eligibility status.

2.2.2.2 State Role

The 2019 Minnesota State Aviation System Plan (SASP) classifies each of its 133 state funded airports based on their size and function. Range Regional Airport is classified as a Key Commercial Service Airport. A Key Commercial Service Airport has a primary runway that is paved and lighted extending 4,900 feet or longer. A Key Commercial Service Airport provides scheduled air service and can accommodate all single-engine aircraft, larger multi-engine aircraft, and most business jets.[9] As of 2019, the Minnesota SASP identified 8 Key Commercial Service Airports in addition to HIB.

2.2.2.3 Essential Air Service Role

The Airline Deregulation Act of 1978 enabled air carriers a great degree of autonomy in selecting their domestic markets and fares. With an understanding of the potential impacts on air service availability to smaller, more isolated communities, the Essential Air Service (EAS) program was initiated by legislators to guarantee that small communities, such as those of the Mesabi Iron Range that were served by certificated air carriers before airline deregulation, could still maintain a minimum level of scheduled air service. The United States Department of Transportation is mandated to provide eligible EAS communities with access to the National Air Transportation System. This is generally accomplished by subsidizing two round trips per day with 30- to 50-seat aircraft, or additional frequencies with aircraft having 9-seats or fewer, usually to a large- or medium-hub airport.[10] Today, HIB maintains EAS status with SkyWest Airlines, which operates two 50-seat aircraft to Minneapolis-St Paul International Airport (MSP) daily.

2.2.3 Airport Ownership and Control

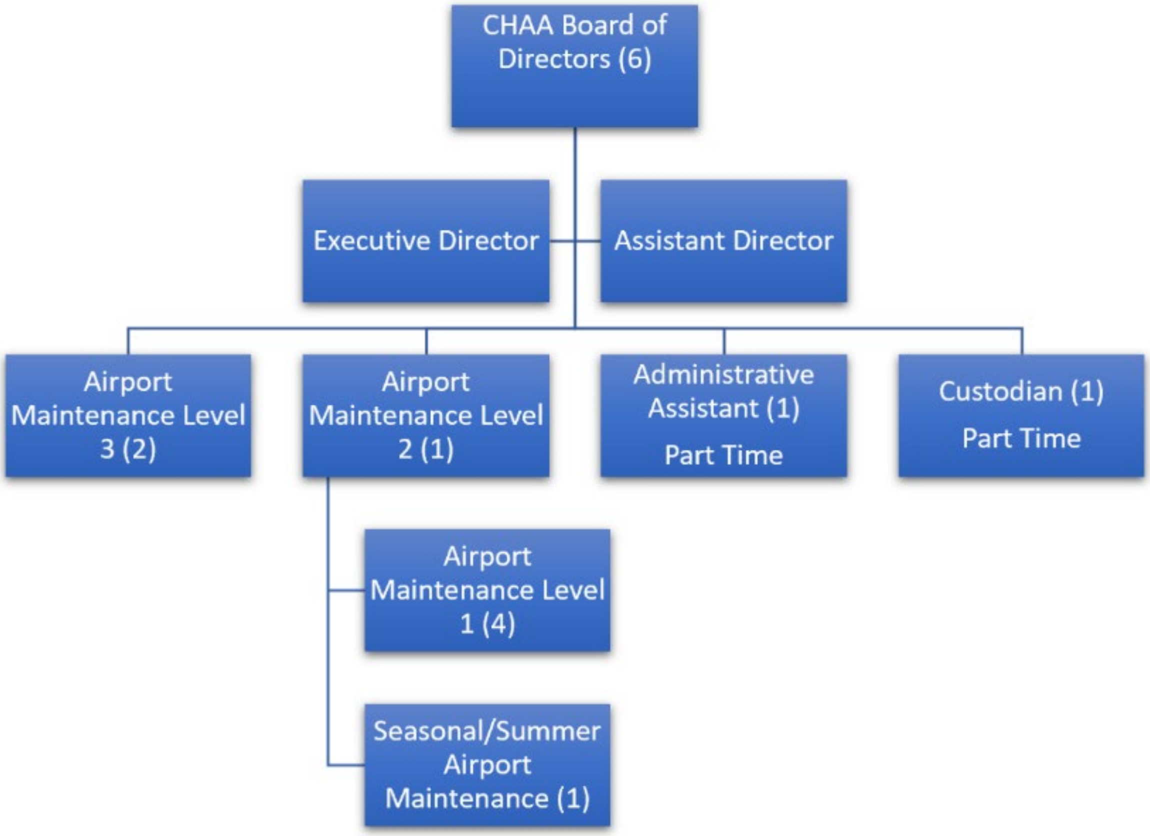
In 1994, the Minnesota legislature authorized the Chisholm-Hibbing Airport Authority (CHAA or Authority) to govern Range Regional Airport. The Authority consists of a six-member board of directors, made up of residents from the City of Hibbing or Chisholm, which are appointed to a 3-year term. The CHAA primarily manages and administers the Airport's facilities, staff, resources, and budget. Through the establishment, and updating of, its annual Capital Improvement Program (CIP) the CHAA strategically prepares for future development and maintenance of Airport equipment and facilities. The CHAA provides field maintenance and snow removal services for the airfield, as well as owning and operating the Airport's only fixed-based operator (FBO). The FBO provides fueling, deicing, and other general services to aviation customers.[11] **Figure 2-3** shows the CHAA organizational chart.

[9] Minnesota Department of Transportation State Aviation System Plan Phase I Draft (2019).

[10] US Department of Transportation, (2017) https://www.transportation.gov/policy/aviation-policy/small-community-rural-air-service/essential-air-service

[11] At the same time, the CHAA also runs a second facility, the Carey Lake Seaplane Base, located three miles north of the Airport. (July 2019) https://businessviewmagazine.com/range-regional-airport-serving-minnesotas-iron-range-region/

FIGURE 2-3
CHISHOLM-HIBBING AIRPORT AUTHORITY ORGANIZATIONAL CHART



Source: Airport Records, 2020

2.2.1 Airport Property

The Airport Reference Point (ARP), as defined within FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, is the geometric center of all usable runways at the airport. FAA uses the ARP as the official horizontal geographic location of the airport. Range Regional Airport's reference point is at N 47° 23' 11.715" latitude and W 92° 50' 20.391" longitude. The Airport elevation is 1,353.7 feet above mean sea level.[12] The Airport terrain is fairly consistent, with the greatest elevations on the property being in the northwest, and the lowest in the southeast. The lowest elevation on the Airport's property is near Dempsey Creek which is a meandering stream running in a southwest direction from E Wegener Rd to Town Line Rd. A second stream, Barber Creek, is in the northwest vicinity of the Airport's property west of Runway 13. In general, there is significant tree cover on the outer edges of the property as well as some wetlands in an open area on the east side of the Airport, just west of S Hughes Rd.

[12] FAA ADIP, 2021 https://adip.faa.gov/agis/public/#/airportData/HIB

As of April 2021, the Airport's property consists of approximately 1,383 acres.[13] The airport operations area (AOA) is fully enclosed with a 10-foot barbed wire topped fence. Visual assessment of the fence indicates it is nearing the end of its useful life in many locations. Wildlife intrusions to the airfield are also a common issue because, in certain areas, the fence is difficult to fully bury in the ground due to clay soils in the area. Overall Airport safety would benefit from burying the bottom portion of the entire fence line to prevent some wildlife from skirting the fence and intruding on the airfield, thereby creating operational safety concerns.

The Airport has four easements (as of April 2021[14]):

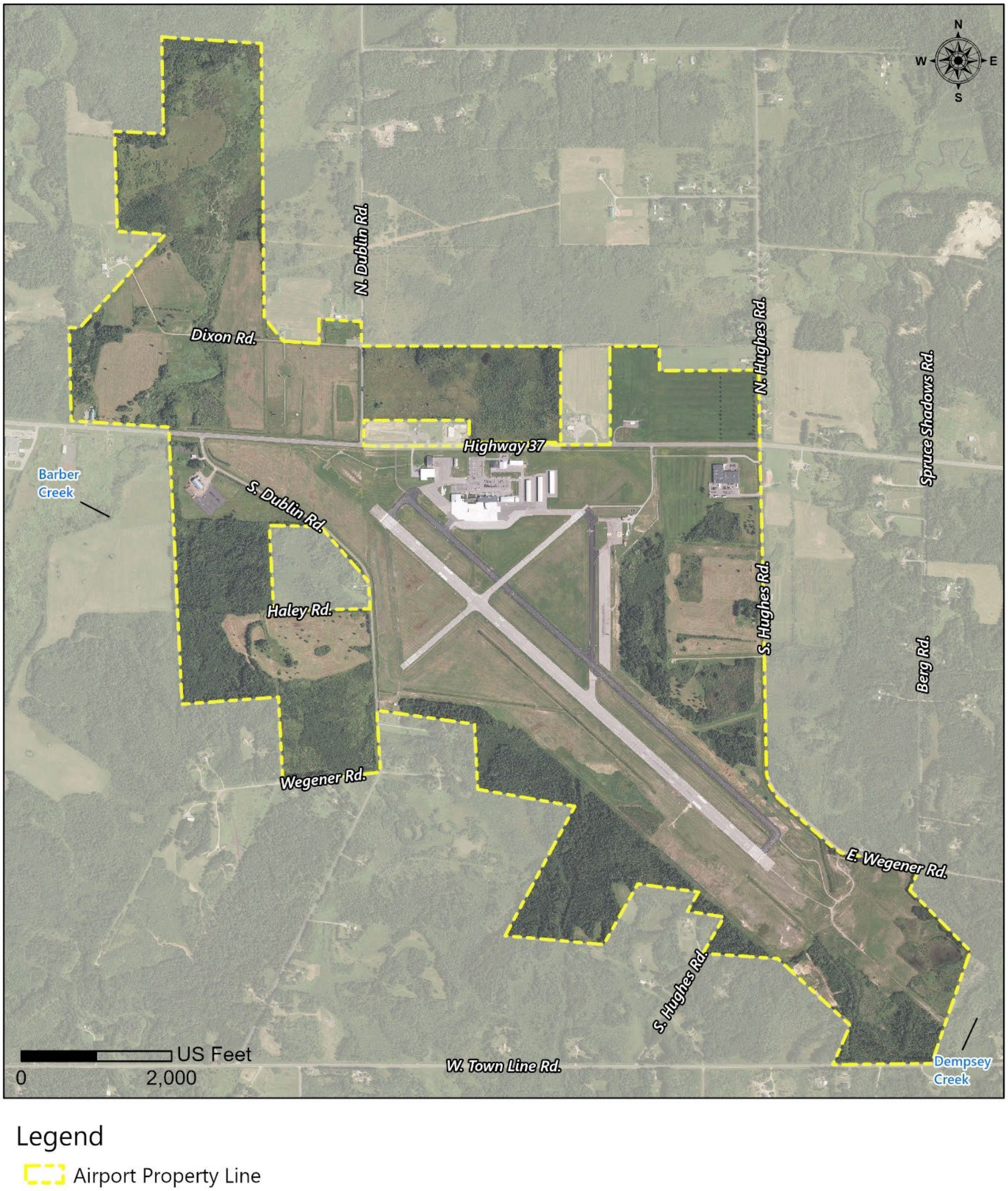
- Easement A - Avigation easement approximately 37.5 acres in area located from the end of Runway 13 and across Highway 37.
- Easement B - Drainage easement approximately 0.6 acres in area located south of Runway 31 along the north side of Town Line Rd.
- Easement C - Electrical easement approximately 0.04 acres in area located across Highway 37 to support the navigational aids (NAVAIDS) on Runway 13.
- Easement D - Aviation easement approximately 2.0 acres in area located adjacent to the south end of Runway 4.

Figure 2-4 shows the Airport property as of April 2021.

[13] Airport acreage estimation calculated using Esri GIS software.

[14] Refer to most current Exhibit 'A' document for more detailed property information.

FIGURE 2-4
AIRPORT PROPERTY BOUNDARY



Source: Airport Records; Prepared by RS&H, 2021

2.2.2 Airport Zoning

Examining and understanding surrounding community land use plans is essential to ensuring planned airport development is compatible with community growth. The city of Hibbing's Comprehensive Plan is composed of goals, recommendations, strategies, and actions that meet high-level aspirations and a defined community vision. Since the Range Regional Airport is owned and operated by the CHAA, the City's Comprehensive Plan is integral to defining how the Airport fits in to the future vision of the community. Hibbing's goals for the Airport are described at a high-level in the City's Comprehensive Plan.

The Airport anchors the east end of the Minnesota State Highway 37 (MN-37) Corridor. This corridor runs from County Rd 5 to the intersection of US-169 and, according to the City's Comprehensive Plan, it is emerging as a major transportation corridor in the city of Hibbing. This corridor is evolving as a mixed-use area with increasing commercial and industrial uses.

Airport ingress/egress is also located on MN-37 along an area of the road experiencing recent commercial development. MN-37 connects Hibbing to US-53, a predominant four-lane route that connects the Iron Range to the region's major city, Duluth. The Hibbing Comprehensive Plan identifies intent to bolster the regional transportation network and further spur economic development through investment in Range Regional Airport. This includes the zoned Airport Multiple Use Park District (AMU-P)[15].

The AMU-P District was established to encourage industrial and commercial development in and around the Airport and ensure compatibility between on-airport property development and off-airport land uses. The city of Hibbing Zoning Ordinance outlines the extent of airport related development. In addition, the Airport is also within the Agricultural-Rural Residential District (A-R), which is intended to provide a gradual density transition from Forestry and Agricultural land uses to more urban-like zones. Beyond the Airport's property line the land is zoned as A-R. The A-R zoning is sustained to the north and east. To the south of the Airport, the A-R District transitions to an Agricultural District (A-1), specifically in the area south of W Town Line Rd. To the west, the A-R District transitions to a Rural-Rural District (R-R) in an area west of S Dublin Rd.

The FAA states in Chapter 20 of FAA Order 5190.6B, *Airport Compliance Manual*, that,

> "Compatibility of land use is attained when the use of adjacent property neither adversely affects flight operations from the airport nor is itself adversely affected by such flight operations. In most cases, the adverse effect of flight operations on adjacent land results from exposure of noise sensitive development, such as residential areas, to aircraft noise and vibration. Land use that adversely affects flight operations is that which creates or contributes to a flight hazard."[16]

Therefore, it is recommended that the Airport acquire all property within the immediate airport vicinity with the potential to be negatively impacted by noise created by lower altitude aircraft flights. This will help the CHAA promote safety for property owners adjacent to the Airport as well as safe airport

[15] Hibbing Ordinance 11.40 – AMU-P Airport Multiple Use Park District, https://www.ci.hibbing.mn.us/city-administration/city-ordinances

[16] FAA Order 5190.6B, *Airport Compliance Manual.* (2009), https://www.faa.gov/airports/resources/publications/orders/compliance_5190_6/

operations. The first area of land recommended as a focus for future land acquisition efforts is unowned parcels immediately within the departure end of Runway 13.

Under Minnesota Statute 360.063 *Airport Zoning*[17], the CHAA is obligated to protect vulnerable populations and enable compatible development near airports. This statute defines authority and procedure for implementation of airport zoning. Additionally, Minnesota Administrative Rule 8800.2400, *Airport Zoning Standards*[18], defines minimum standards for zoning of public airports as to airspace, land use safety, and noise sensitivity. Range Regional Airport has implemented land use policies under city ordinance 11.39, *Chisholm-Hibbing Airport Zoning Ordinance*, that conform to both the statute and administrative rule by designating property near the Airport as belonging to three Safety Zones, designated as Safety Zones A, B, and C. These zones restrict land uses that may be hazardous to the operational safety of aircraft using the airport and protect the safety and property of people on the ground in the area near the airport. Safety Zone A extends outward from the end of the primary surface a distance equal to two-thirds the runway length and restricts structures within the zone. Safety Zone B extends outward from Safety Zone A a distance equal to one-third the runway length and includes density restrictions, acceptable land uses, and permitted structures. Safety Zone C includes general restrictions on light and radio interference and height within the horizontal zone[19] not included in Safety Zone A or Safety Zone B.

The Minnesota Airport Zoning statute outlines four zones restricting development adjacent to airports:

- *Clear Zone*: Airport must control property in the Runway Protection Zone (RPZ) associated with the approach to the runway.
- *Zone A*: There shall be no buildings in the approach zone adjacent to the RPZ.
- *Zone B*: No land use of less than 3 acres should be found in an approach zone that extends outward from Zone A to a distance equal to one-third of the runway length.
- *Zone C*: All land within the horizonal zone, subject to uses that do not interfere with airport electronic facilities.

East of the Airport, within the St. Louis County Zoning District, a portion of Safety Zone C encompasses Multi-Use and Sensitive Area zoning districts. The general low-density development and small-town characteristics of the community preclude many of the kinds of development that typically challenge pilots in the airport environment, such as those causing glares, inability to distinguish airport lights, or impairments to visibility. Hibbing Zoning districts are shown in **Figure 2-5**.

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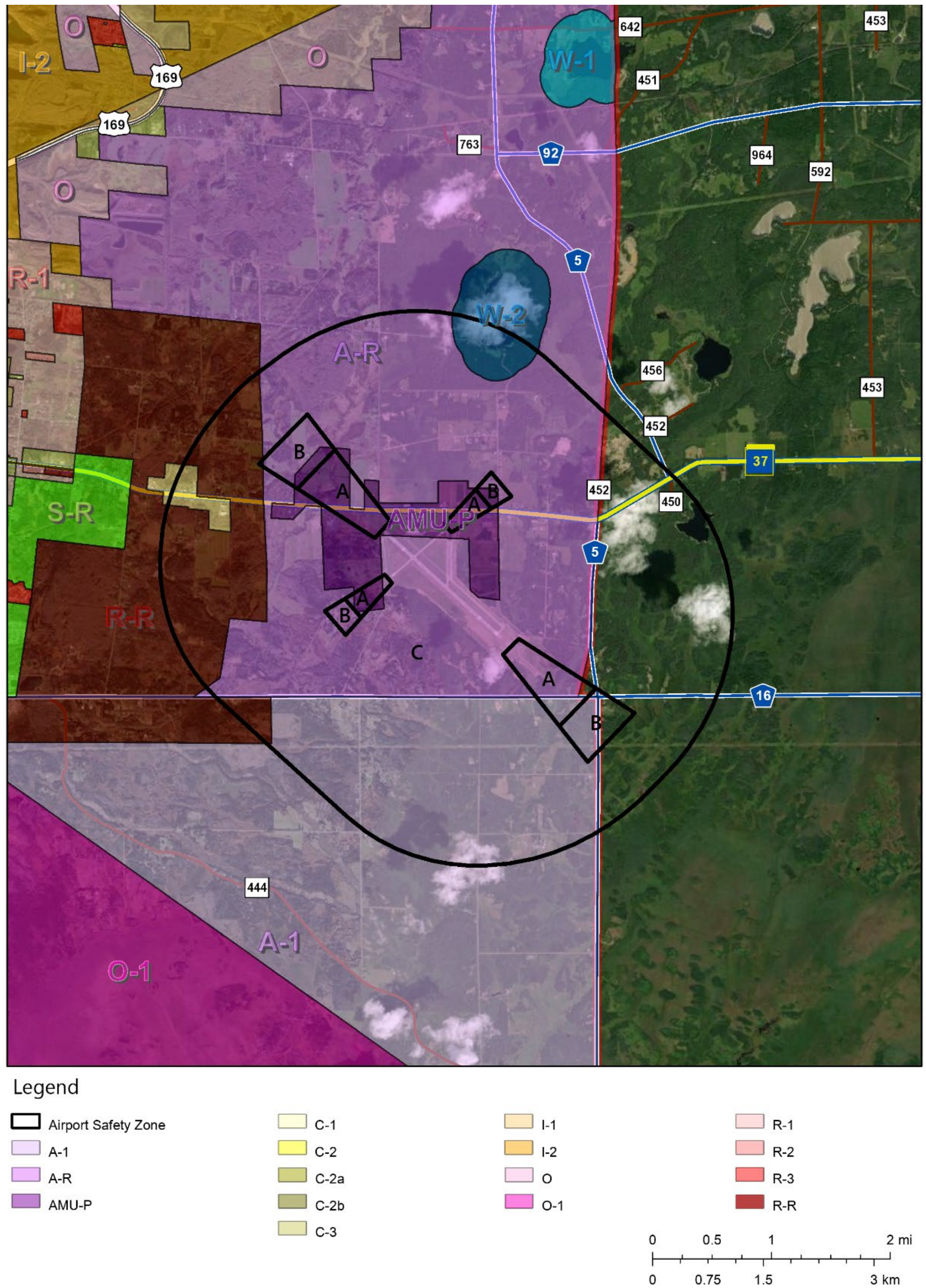
[17] Minnesota Statute 360.063, *Airport Zoning*, https://www.revisor.mn.gov/statutes/cite/360.063

[18] Minnesota Administrative Rule 8800.2400, *Airport Zoning Standards*, https://www.revisor.mn.gov/rules/8800.2400/

[19] Horizontal zone dimensions defined in Minnesota Administrative Rule 8800.1200, *Criteria for Determining Air Navigation Obstructions*, https://www.revisor.mn.gov/rules/8800.1200/

FIGURE 2-5
AIRPORT ZONES AND HIBBING ZONING



Source: Hibbing Web Mapping Retrieved May 7, 2021; Earthstar Geographics; Prepared by RS&H, 2021
Notes: Hibbing Land Use Code Section 11.04 defines zones including: A-1 (Agricultural), A-R (Agricultural-Rural Residential), AMU-P (Airport Multiple Use Park), C-1 (Neighborhood Convenience Commercial), C-2/a/b (General Commercial), C-3 (Highway Service Commercial), I-1 (Light Industry), I-2 (General Industry), O/O-1 (Open Space), R-1 (Single Family Residence), R-2 (One to Four Family Residence), R-3 (Multiple Family Residence), R-R (Rural Residential)

2.2.1 Airport Facilities Overview

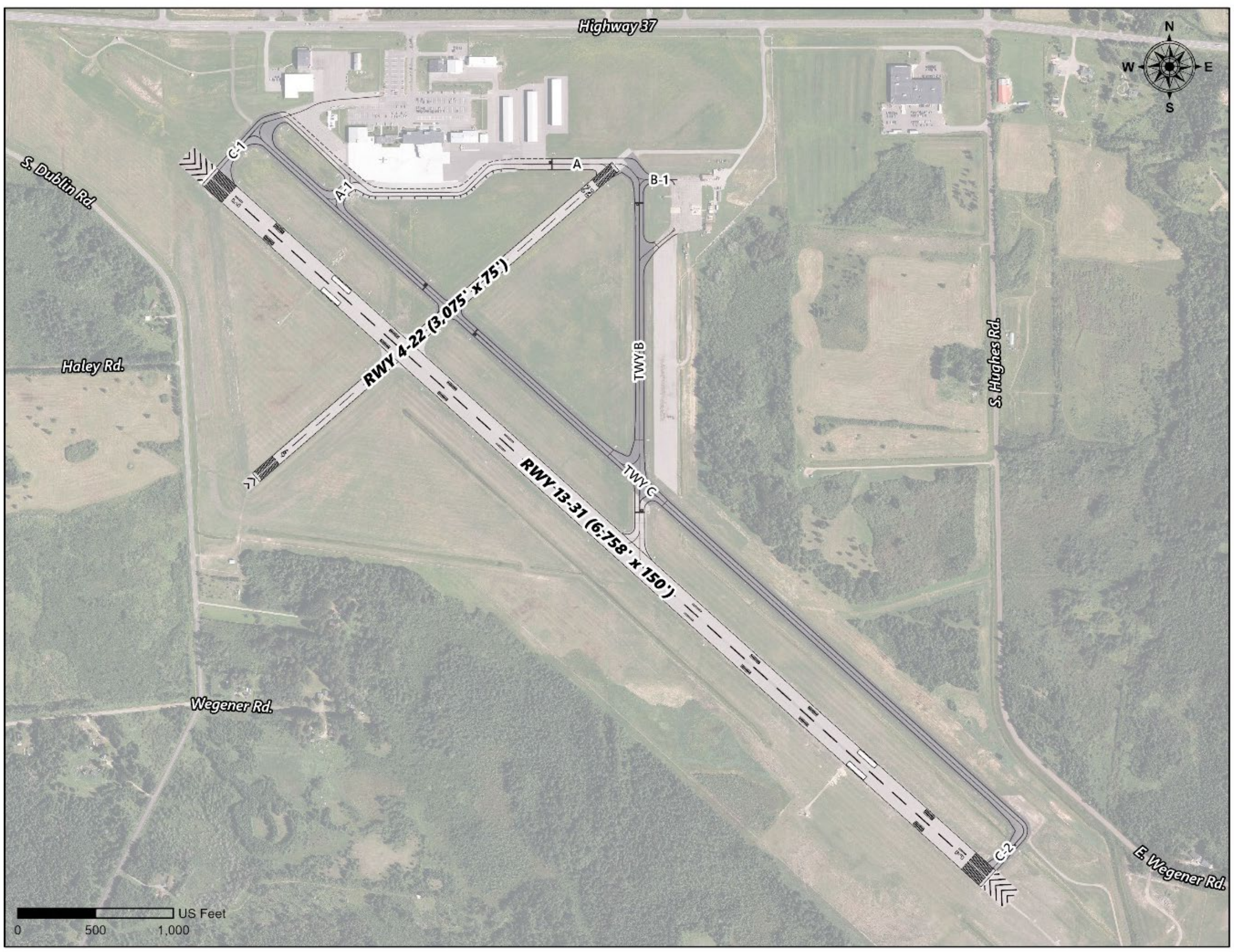
This section spatially references the main airfield facilities and Airport buildings with their alpha-numeric identifier.

2.2.1.1 Airfield

Figure 2-6 shows an overview of the airfield at Range Regional Airport.

- Runway 13-31
- Runway 4-22
- Taxiway A
- Taxiway A-1
- Taxiway B
- Taxiway B-1
- Taxiway C
- Taxiway C-1
- Taxiway C-2

FIGURE 2-6
AIRFIELD OVERVIEW



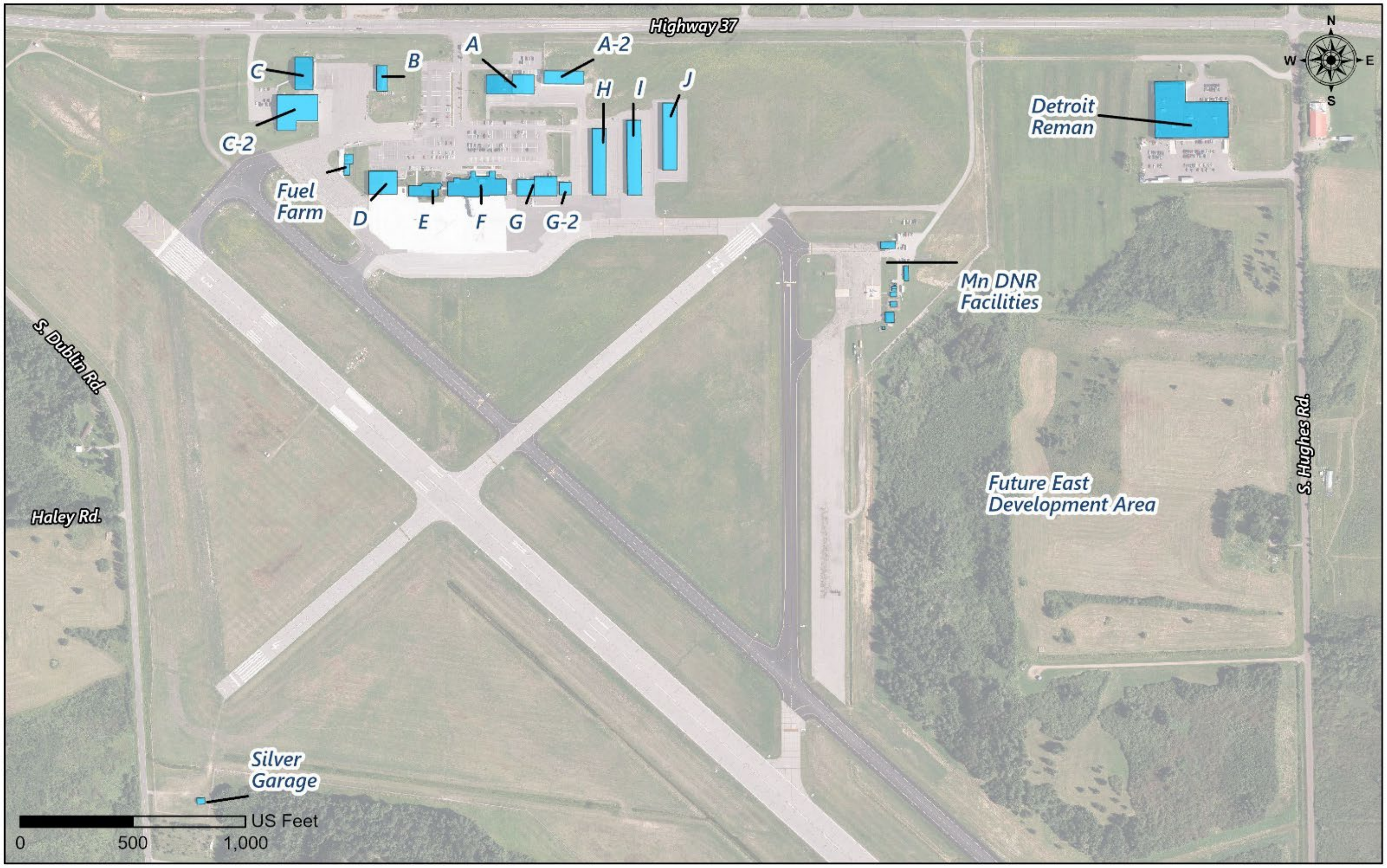
Source: RS&H, 2021

2.2.1.2 Buildings and Other Airport Facilities

- Airport Administration / Field Maintenance / Snow Removal Equipment Facility – Building C-2
- Airport Field Maintenance Cold Storage – Silver Garage
- Hangars
  - Conventional Hangar (Aircraft Painting) – Building A
  - Conventional Hangar (Private) – Building A-2
  - Conventional Hangar (Private) – Building B
  - Conventional Hangar (Private) – Building C
  - Conventional Hangar (Aircraft Maintenance) – Building D
- Fixed Based Operator (FBO) – Building E
- Terminal – Building F
- Aircraft Rescue and Firefighting (ARFF) – Building G
- T-Hangars
  - West T-Hangar – Building H
  - Middle T-Hangar – Building I
  - East T-Hangar – Building J
- Fuel Farm
- Minnesota Department of Natural Resources (MnDNR) Facilities
  - MnDNR Administration Building
  - MnDNR Pilots Building
  - MnDNR Tanks
  - MnDNR Other Facilities
- Detroit Diesel Remanufacturing (Detroit Reman) Facility – Nonaeronautical
- Future East Development Area is a large tract of open land on the east side of the Airport that could be considered the most optimal location for future aeronautical development.

Figure 2-7 shows an overview of buildings and other airport facilities at Range Regional Airport.

FIGURE 2-7
AIRPORT FACILITIES OVERVIEW



A - Aircraft Painting
A-2 - Hangar
B - Hangar
C-2 - Airport Administration and SRE/Maintenance Building
D - Aircraft Maintenance Hangar
E - Fixed Based Operator
- Fuel Farm
F - Terminal
G - Aircraft Rescue and Fire Fighting
G-2 - Hangar
H - West T-Hangar
I - Middle T-Hangar
J - East T-Hangar
- MN DNR Facilities
- Silver Garage
- East Development Area

Source: RS&H, 2021

2.3 SUSTAINABILITY

The US Environmental Protection Agency (EPA) describes sustainability as the basis of one guiding principle: "Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can [co]exist in productive harmony to support present and future generations." Unfortunately for industrial land uses such as airports, sustainability is often misinterpreted and over-simplified as an inflexible protection of the natural environment at any cost. Sustainable development under real-world conditions requires a more comprehensive approach with consideration to many factors. The complex nature of securing a sustainable future is why government agencies across the globe, including the FAA, are supporting airport planning initiatives that incorporate sustainable approaches. To this effect, this Master Plan is constructed with the intent of incorporating sustainable planning elements at all stages of planning. It is recommended that a focused Airport Sustainability Plan be developed for Range Regional Airport to prescribe in depth sustainable focus areas, organize Airport sustainability goals, provide metrics by which to measure outcomes, and establish initiatives to work toward or meet those Airport sustainability goals.

For the purposes of this Master Plan, sustainability aspects will concentrate on four categories identified by Airports Council International – North America (ACI-NA) known as the "EONS approach for sustainable airport development". Using the more universal Triple Bottom Line approach to sustainability as a starting point, ACI-NA evolved the concept into "a holistic approach to managing an airport so as to ensure the integrity of Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility (EONS) of the airport." The EONS approach is being integrated into the framework of this Airport Master Plan and is critical to its success. Development alternatives identified within this Master Plan are evaluated with consideration given to a more complete picture of the true project costs. A true project cost incorporates both tangible and intangible costs and/or benefits by assigning and measuring the resulting value. In the case of this Master Plan, intangible project costs cannot be quantified, but consideration will be given to the scale of impact or degree of benefit provided by intangible factors.

According to FAA guidance reported in the December 17, 2012, *Report on the Sustainable Master Plan Pilot Program and Lessons Learned*, "Small airports should prioritize the economic pillar of sustainability more than larger airports that have more resources to pursue sustainability initiatives." This is especially true of Essential Air Service (EAS) commercial airports which rely more on Airport Improvement Program (AIP) grants than Passenger Facility Charges (PFCs) to maintain facilities. Small non-hub airports receiving federal funds are obligated to meet FAA Grant Assurance 24 which mandates that an airport "maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible." For all these reasons, economic viability will be of substantial consideration throughout the master planning process.

2.3.1 Economic Viability

Range Regional Airport is an integral part of the larger northern Minnesota regional economy, supporting commerce and industry throughout the area. The Airport's financial health is of utmost importance to securing its long-term sustainability within the region. Airports are mandated under FAA Grant

Assurances[20] to be "as self-sustaining as possible under circumstances existing at the particular airport." By using federal AIP funds for capital projects, the Airport is contractually obligated to meet FAA grant assurances as mandated through federal statute Title 49 US Code §47107[21]. As stated by the 2015 *Airport Cooperative Research Program Report Synthesis 66 – Lessons Learned from Airport Sustainability Plans*, "Unless an airport can ensure its economic viability, either through its own resources or through its governing body, the airport will cease to exist." Range Regional Airport, while providing services and facilities for the public, must maintain a financial structure that optimizes revenue generation, minimizes overall costs, and provides funding suitable to cover necessary operating and capital costs. For these reasons, the Range Regional Airport Master Plan will focus on generating sustainable development solutions that place emphasis ensuring economic viability without sacrificing the other facets of EONS sustainability. This Master Plan develops a baseline inventory of the conditions and facilities which influence or impact the economic viability of Range Regional Airport. Economic viability is also a key evaluation criterion for development alternatives considered within this Master Plan.

2.3.2 Operational Efficiency

Operational efficiency and maximizing the usefulness of all resources and facilities are vital to the success of Range Regional Airport. Airfield runways and taxiways are determined based on aircraft performance requirements with design and implementation triggers dictated by FAA design standards and capacity driven implementation decisions. All remaining airport facility location and design decisions are driven by varying degrees of FAA instruction and mandate, Airport leadership planning decisions, local politics, and private sector investments. To create sustainable, operationally efficient airport facilities at HIB, leadership must have a long-term land use vision that is reviewed and updated intermittently to account for changing circumstances. This Master Plan will establish that land use vision and a preferred 20-year development plan with operational efficiency as one of the key evaluation criteria.

2.3.3 Natural Resources

When not managed and maintained responsibly, natural resources can be exhausted. As owners and operators of a public service facility, the CHAA understands it has a duty to promote policies which seek to protect and conserve natural resources to every reasonable degree. Acting on this duty occurs through policies and development which limit/reduce greenhouse gas emissions and any contaminating discharge into water systems, provide opportunities for development of energy efficient facilities, promote environmental stewardship practices, protect wildlife by humanely discouraging its presence on the airfield, and support industry transitions to renewable energy sources. This Master Plan will develop a baseline inventory of the conditions and facilities which influence or impact the natural resource conservation efforts by Range Regional Airport. Environmental impacts are also considered as a key evaluation criterion for development alternatives within this Master Plan.

2.3.4 Social Responsibility

As a public facility in the Iron Range region of northern Minnesota, Range Regional Airport recognizes it has an obligation to the surrounding communities to act in a socially responsible manner. In action, this translates into the following:

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[20] More information regarding FAA grant assurances can be found at https://www.faa.gov/airports/aip/grant_assurances/

[21] Title 49 US Code §47107 can be found at https://www.law.cornell.edu/uscode/text/49/47107

- Abide by all federal, state, and local regulations and meet contractual FAA grant assurances
- Maintain competitive rate and fee structure to support operating and capital expenses
- Act ethically in all business and development decisions
- Remain transparent with community stakeholders about airport related decisions
- Make efforts to provide business and employment opportunities to the region
- Ensure equal treatment of all persons and remain intolerant of discrimination in any form
- Use the Airport's standing within the community to support and advance positive community goals and values

This Master Plan will take into consideration these aspects of the Airport's role in being socially responsible during development and evaluation of all facility alternatives.

2.4 ENVIRONMENTAL CONDITIONS

The purpose of considering environmental factors in airport master planning is to help the Airport Sponsor thoroughly evaluate airport development alternatives and to provide information that will help expedite subsequent environmental processing. For a comprehensive description of the existing environmental conditions at the Airport, environmental resource categories outlined in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures,* were used as a guide that help identify potential environmental effects during the planning process.

FAA Order 1050.1F and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, require the evaluation of airport development projects as they relate to specific environmental resource categories by outlining impacts and thresholds at which the impacts are considered significant. For some environmental resource categories, this determination can be made through calculations, measurements, or observations. However, other environmental resource categories require that the determination be established through correspondence with appropriate federal, state, and/or local agencies. A complete evaluation of the environmental resource categories identified in FAA Orders 1050.1F and 5050.4B is required during a categorical exclusion, environmental assessment, or environmental impact statement.

Future development plans at the Airport take into consideration environmental resources that are known to exist in the vicinity of the Airport. Early identification of these environmental resources helps avoid impeding development plans in the future.

This section provides an overview of resource categories defined in FAA Order 1050.1F, Chapter 4, as it applies to the environs at, and surrounding, the Airport. **Table 2-1** provides a summary of the environmental resource categories studied for the Master Plan Update.

TABLE 2-1
SUMMARY OF ENVIRONMENTAL RESOURCE CATEGORIES STUDIED

Environmental Resource	Description
Air Quality	The Airport is in attainment for all National Ambient Air Quality Standards (NAAQS). See **Section 2.4.1** for details.
Biological Resources	There are federal- and state-threatened and –endangered species, and migratory birds in the Airport area. There is no critical habitat at the Airport. See **Section 2.4.2** for details.
Climate	There are greenhouse gas (GHG) emissions produced at the Airport. See **Section 2.4.3** for details.
Coastal Resources	The Airport is not within Minnesota's Coastal Zone Management Program and there are no Coastal Barrier Resource System (CBRS) segments within Airport property. See **Section 2.4.4** for details.
Department of Transportation Act, Section 4(f)	There are no Section 4(f) properties on Airport property. See **Section 2.4.5** for details.
Farmlands	The Airport contains prime farmland and farmland of statewide importance. See **Section 2.4.6** for details.
Hazardous Materials, Solid Waste and Pollution Prevention	There are eight RCRA Hazardous Waste Generators on Airport property. Solid waste generated at the Airport is disposed of at the St Louis County Landfill. The Airport's Minnesota Pollution Control Agency (MPCA) Industrial Stormwater Permit (MPCA Permit Number: MNR05386T) was issued on April 1, 2020 and expires on March 31, 2025. The Airport's Spill Prevention and Countermeasure Plan (SPCC) was prepared in March 2015. See **Section 2.4.7** for details.
Historical, Architectural, Archaeological and Cultural Resources	There are no properties listed on the National Register of Historic Places at the Airport. See **Section 2.4.8** for details.
Land Use	Current land uses surrounding the Airport include rural residential and agricultural. See **Section 2.4.9** for details.
Natural Resources and Energy Supply	Electricity is supplied to the Airport by Minnesota Power, natural gas and water are supplied to the Airport by the Hibbing Public Utilities Commission. See **Section 2.4.10** for details.

Noise and Noise-Compatible Land Use	The Airport is zoned to promote industrial and commercial development in and around the Airport to and ensure compatibility between on-airport property development and off-airport noise-sensitive land uses. See **Section 2.4.11** for details.
Socioeconomics, Environmental Justice, Children's Environmental Health and Safety Risks	The Airport is located within St. Louis County, Census Tract 121, Block Group 5. See **Section 2.4.12** for details.
Visual Effects	Light emissions at the Airport currently result from airfield, building, access roadway, parking, and apron area lighting fixtures required for the safe and secure movement of people, vehicles, and aircraft. The visual resources and visual character of the Airport currently includes the terminal building, fixed base operators, hangars, and maintenance buildings. See **Section 2.4.13.2** for all Visual Effects details.
Water Resources	The Airport property contains wetlands. The Airport property contains floodplains. The Airport property contains surface waters. The Airport property is within the Barber Creek and Dempsey Creek watersheds. The Airport property does not contain any wild and scenic rivers. See **Section 2.4.14** for all Water Resources details.

Prepared by: RS&H, 2021

2.4.1 Air Quality

The U.S. Environmental Protection Agency (USEPA) sets National Ambient Air Quality Standards (NAAQS) for certain air pollutants to protect public health and welfare through Section 109 of the Clean Air Act (CAA). The USEPA has identified the following six criteria air pollutants and has set NAAQS for them: Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO_2), 8-Hour Ozone (O_3), Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2).

Areas found to be in violation of one or more NAAQS of these pollutants are classified as "nonattainment areas." States with nonattainment areas must develop a State Implementation Plan (SIP) demonstrating how the areas will be brought back into attainment of the NAAQS within designated timeframes. Areas where concentrations of the criteria pollutants are below (i.e., within) these threshold levels are classified as "attainment areas." Areas with prior nonattainment status that have since transitioned to attainment are known as "maintenance areas."

According to the United States Environmental Protection Agency (USEPA) the Airport, located in St. Louis County, is in attainment for all NAAQS.[22]

2.4.2 Biological Resources

Biological resources include terrestrial and aquatic plant and animal species; game and non-game species; special status species; and environmentally sensitive or critical habitats. The following are relevant federal laws, regulations, Executive Orders (EOs), and guidance[23] that protect biotic communities:

- Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544);
- Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668 et seq.);
- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.);
- Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d);
- Executive Order (EO) 13112, *Invasive Species* (64 FR 6183);
- Marine Mammal Protection Act (16 U.S.C. § 1361 et seq.);
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703 et seq.);
- EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (66 FR 3853);
- Council on Environmental Quality (CEQ) Guidance on Incorporating Biodiversity Considerations into Environmental Impact Analysis under NEPA; and
- Memorandum of Understanding to Foster the Ecosystem Approach.

Although the Endangered Species Act does not protect state-protected species or habitats, NEPA documentation ensures that environmental analysis prepared for airport actions addresses the potential effects to state-protected resources. **Table 2-2** lists the three federally-threatened or -endangered species that have the potential to be found at the Airport.[24] There are 149 state-threatened and -endangered species with the potential to occur in St. Louis County.[25] According to the U.S. Fish and Wildlife Service (USFWS), there is no designated critical habitat at the Airport.[26]

[22] U.S. Environmental Protection Agency, Air Quality Green Book, Minnesota. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=Range+REgional+Airport%2C+Hibbing+MN, May 2021.
[23] Due to the number of federal laws and EOs applicable to the future development plans, this section presents only the legal citations or references for those requirements in lieu of summarizing their requirements. See FAA's 1050.1F Desk Reference for more information.
[24] U.S. Fish and Wildlife Service, Information for Planning and Conservation (IPaC), Range Regional Airport. Accessed: https://ecos.fws.gov/ipac/location/B5DLBBMEWZGZVCLUYGNL542XWM/resources, May 2021.
[25] Minnesota Department of Natural Resources, Rare Species Guide, St. Louis County. Accessed: https://www.dnr.state.mn.us/rsg/filter_search.html?action=doFilterSearch&allspecies=Y&stateendangered=Y&statethreatened=Y&statespecial_concern=Y&county_query=69&69=St.+Louis, May 2021.
[26] U.S. Fish and Wildlife Service, Information for Planning and Conservation (IPaC), Range Regional Airport. Accessed: https://ecos.fws.gov/ipac/location/B5DLBBMEWZGZVCLUYGNL542XWM/resources, May 2021.

TABLE 2-2
FEDERALLY LISTED SPECIES

Species Common Name	Species Scientific Name	Listing Status
Canada Lynx	*Lynx canadensis*	Federally Threatened
Northern Long-eared Bat	*Myotis septentrionalis*	Federally Threatened
Piping Plover	*Charadrius melodus*	Federally Endangered

Sources: USFWS, 2021; Prepared by RS&H, 2021

The Migratory Bird Treaty Act (MBTA) prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations, and does not require intent to be proven. A USFWS wildlife depredation permit was signed April 1, 2021 specifying the quantity of each species which can be legally taken. **Table 2-3** lists the four migratory bird species that have the potential to be found at the Airport.[27]

TABLE 2-3
POTENTIAL MIGRATORY BIRDS IN AIRPORT AREA

Species Common Name	Species Scientific Name
Bald Eagle	*Haliaeetus leucocephalus*
Black-Billed Cuckoo	*Coccyzus erythropthalmus*
Bobolink	*Dolichonyx oryzivorus*
Golden-winged Warbler	*Vermivora chrysoptera*

Sources: USFWS, 2021; Prepared by RS&H, 2021

Essential Fish Habitat (EFH) are those waters and substrate necessary for fish spawning, breeding, feeding, and growth to maturity as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA also requires federal agencies to consult with NOAA Fisheries about actions that could damage EFH. There are no fish species currently protected under the MSA in St. Louis County.[28]

A Wildlife Hazard Assessment (WHA) was completed by the Airport in 2011. The Airport continues to consult with the United States Department of Agriculture (USDA) Wildlife Services on a regular basis in order to reduce wildlife hazards. During the 2011 WHA, 23 bird species and nine mammal species were observed in and around the Airport. As a result of the WHA, a Wildlife Hazard Management Plan (WHMP) was prepared in October 2011. The WHMP prescribes wildlife management techniques for preventing and reducing wildlife hazards at the Airport.

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[27] Ibid.

[28] National Marine Fisheries Service, Essential Fish Habitat Mapper. Accessed: https://www.habitat.noaa.gov/protection/efh/efhmapper/, May 2021.

2.4.3 Climate

Relevant federal laws, regulations, and EOs that relate to climate include:

- CAA (42 U.S.C. §§ 7408, 7521, 7571, 7661 et seq.);
- EO 13514, *Federal Leadership in Environment Energy and Economic Performance* (74 FR 52117);
- EO 13653, *Preparing the United States for the Impacts of Climate Change* (78 FR 66817); and
- EO 13693, *Planning for Federal Sustainability* (80 FR 15869).

Greenhouse gases (GHG) are gases that trap heat in the earth's atmosphere. Both naturally occurring and man-made GHGs primarily include water vapor, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Activities that require fuel or power are the primary stationary sources of GHGs at airports. Aircraft and ground access vehicles that are not under the control of an airport, typically generate more GHG emissions than airport-controlled sources.

Research has shown there is a direct correlation between fuel combustion and GHG emissions. In terms of U.S. contributions, the Government Accountability Office (GAO) reports that "domestic aviation contributes about three percent of total carbon dioxide emissions, according to EPA data, "compared with other industrial sources, including the remainder of the transportation sector (20 percent) and power generation (41 percent). The International Civil Aviation Organization (ICAO) estimates that GHG emissions from aircraft account for roughly three percent of all anthropogenic GHG emissions globally.[29]

2.4.4 Coastal Resources

The primary statutes, regulations, and EOs that protect coastal resources include:

- Coastal Barrier Resources Act (16 U.S.C. § 3501 et seq.);
- Coastal Zone Management Act (CZMA) (16 U.S.C. § 1451-1466);
- National Marine Sanctuaries Act (16 U.S.C. §1431 et seq.);
- EO 13089, *Coral Reef Protection* (63 FR 32701); and
- EO 13547, *Stewardship of the Ocean, Our Coasts, and the Great Lakes* (75 FR 43021-43027).

Minnesota does have a coastal zone management program managed through the Department of Natural Resources. However, the Airport is not located with the coastal zone management program.[30] Additionally, there are no Coastal Barrier Resource System (CBRS) segments within Airport property.[31] The closest CBRS segment is over 55 miles southeast of the Airport.

[29] Melrose, Alan, *European ATM and Climate Adaptation: A Scoping Study*, ICAO Environmental Report, 2010. Accessed: http://www.icao.int/environmental-protection/Documents/EnvironmentReport-2010/ICAO_EnvReport10-Ch6_en.pdf, May 2021.
[30] Minnesota Department of Natural Resources, Map of Coastal Boundary in Minnesota. Accessed: https://files.dnr.state.mn.us/waters/lakesuperior/feis/figures/fig5.pdf, May 2021.
[31] U.S. Fish and Wildlife Service, Coastal Barrier Resources System Mapper. Accessed: https://www.fws.gov/cbra/Maps/Mapper.html, May 2021.

2.4.5 Department of Transportation, Section 4(f)

Relevant federal laws, regulations, and EOs that protect Section 4(f) resources include:

- U.S. Department of Transportation (USDOT) Act, Section 4(f) (49 U.S.C. § 303.);
- Land and Water Conservation Fund Act of 1965 (16 U.S.C. §§ 4601-4604 et seq.);
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) – Section 6009 (49 U.S.C. § 303.); and
- U.S. Department of Defense Reauthorization (Public Law (P.L.) 105-185, Division A, Title X, Section 1079, November 18, 1997, 111 Stat. 1916).

The USDOT Act, Section 4(f) provides that no project that requires the use of any land from a public park or recreational area, wildlife and waterfowl refuge, or historic site be approved by the Secretary of Transportation unless there is no viable alternative and provisions to minimize any possible harm are included in the planning. Similarly, the Land and Water Conservation Fund (LWCF) Act prevents the conversion of lands purchased or developed with Land and Water Conservation funds to non-recreation uses, unless the Secretary of the Interior, through the National Park Service, approves the conversion. Conversion may only be approved if it is consistent with the comprehensive statewide outdoor recreation plan when the approval occurs. Additionally, the converted property must be replaced with other recreation property of reasonably equivalent usefulness and location, and at least equal fair market value. SAFETEA-LU "amended Section 4(f) to simplify the process and approval of projects that have only de minimis impacts on 4(f) properties"[32], while the U.S. Department of Defense Reauthorization "exempts military flight operations and designation of airspace for such operations from Section 4(f)."[33]

The closest Section 4(f) property to the Airport is Carey Lake Park, located 1.5 miles northeast of the Airport.[34] The CHAA has an agreement with the City of Hibbing that allows the Airport to operate the Carey Lake Seaplane Base allowing floatplanes to operate from Carey Lake. The closest LWCF site to the Airport is the Carey Lake Recreation Area, located about 1.5 miles northeast of the Airport, which was funded in 1975 with about $85,000 in LWCF funds.[35]

2.4.6 Farmlands

The following statutes, regulations, and guidance pertain to farmlands:

- Farmland Protection Policy Act (FPPA) (7 U.S.C. §§ 4201-4209); and
- CEQ Memorandum on the Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act (45 FR 59189).

The FPPA of 1981 regulates federal actions that have the potential to convert farmland to non-agricultural uses. The FAA requires consideration of "important farmlands," which it defines to include "all

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[32] Federal Aviation Administration, *1050.1F Desk Reference*, February 2020. Accessed April 2022.

[33] Federal Aviation Administration, *1050.1F Desk Reference*, February 2020. Accessed April 2022.

[34] City of Hibbing, Parks and Fields, Hibbing City Parks Map. Accessed: https://www.ci.hibbing.mn.us/home/showpublisheddocument?id=5096, April 2021.

[35] Land Water Conservation Fund, Minnesota. Accessed: https://lwcf.tplgis.org/mappast/, May 2021.

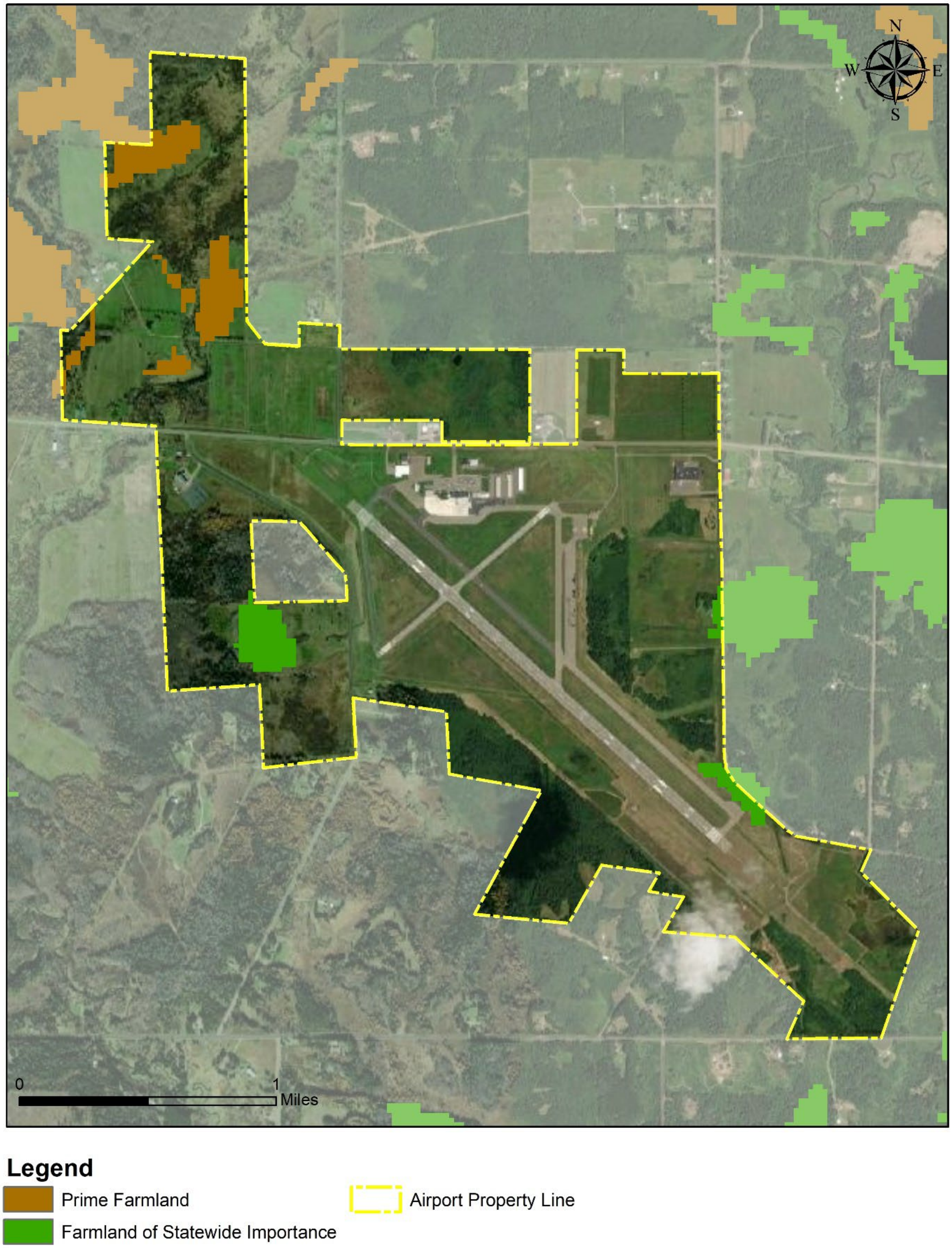
pasturelands, croplands, and forests (even if zoned for development) considered to be prime, unique, or statewide or local important lands."[36]

According to the Natural Resource Conservation Service (NRCS), portions of Airport property contain prime farmland and farmland of statewide importance, as defined above (see **Figure 2-8**).[37] Additionally, there is active farming activities that occur on the Airport, although there are no formal farm lease agreements.

[36] Federal Aviation Administration, *1050.1F Desk Reference*, February 2020. Accessed: May 2021.

[37] Natural Resources Conservation Service, Web Soil Survey. Accessed: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, May 2021.

FIGURE 2-8
FARMLANDS AT THE AIRPORT



Source: Esri; Natural Resource Conservation Service; RS&H Analysis, 2021

2.4.7 Hazardous Materials, Solid Waste, and Pollution Prevention

Federal laws, regulations, and EOs that relate to hazardous materials, solid waste, and pollution prevention include:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. §§ 9601-9765);
- Emergency Planning and Community Right to Know Act (42 U.S.C. §§ 11001-11050);
- Federal Facilities Compliance Act (42 U.S.C. § 6961);
- Hazardous Materials Transportation Act (49 U.S.C. §§ 5101-5128);
- Oil Pollution Prevention Act of 1990 (33 U.S.C. §§ 2701-2762);
- Pollution Prevention Act (42 U.S.C. §§ 13101-13109);
- Toxic Substances Control Act (TSCA) (15 U.S.C. §§ 2601-2697);
- Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §§ 6901-6992k);
- EO 12088, *Federal Compliance with Pollution Control Standards* (43 FR 47707);
- EO 12580, *Superfund Implementation* (52 FR 2923), (63 CFR 45871), and (68 CFR 37691);
- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (72 FR 3919); and
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (74 FR 52117).

2.4.7.1 Hazardous Materials

In a regulatory context, the terms "hazardous wastes," "hazardous substances," and "hazardous materials" have very precise and technical meanings:

Hazardous Wastes. Subpart C of the RCRA defines hazardous wastes (sometimes called characteristic wastes) as solid wastes that are ignitable, corrosive, reactive, or toxic. Examples include waste oil, mercury, lead, or battery acid. In addition, Subpart D of the RCRA contains a list of specific types of solid wastes that the USEPA has deemed hazardous (sometimes called listed wastes). Examples include degreasing solvents, petroleum refining waste, or pharmaceutical waste.

Hazardous Substances. Section 101(14) of the CERCLA defines hazardous substances broadly and includes hazardous wastes, hazardous air pollutants, or hazardous substances designated as such under the Clean Water Act and TSCA and elements, compounds, mixtures, solutions, or substances listed in 40 CFR Part 302 that pose substantial harm to human health or environmental resources. Pursuant to the CERCLA, hazardous substances do not include any petroleum or natural gas substances and materials. Examples include ammonia, bromine, chlorine, per- and polyfluoroalkyl substances (PFAS), or sodium cyanide.

Hazardous Materials. According to 49 CFR Part 172, hazardous materials are any substances commercially transported that pose unreasonable risk to public health, safety, and property. These substances include hazardous wastes and hazardous substances, as well as petroleum and natural gas substances and materials. As a result, hazardous materials represent hazardous wastes and substances. Examples include household batteries, gasoline, or fertilizers.

Aircraft fuel constitutes the largest quantity of hazardous substances stored and consumed at the Airport. Fuel is stored at the FBO fuel farm on Airport property in storage tanks and fuel trucks are used to fuel aircraft. **Section 2.14.3.1, *Fuel Farm*** describes the fuel type and quantity within the fuel farm.

The USEPA identifies the following RCRA hazardous waste generators on Airport property:[38]

- Cirrus Design Paint Facility (Handler ID: MNR000055434);
- Detroit Reman (Handler ID: MNS000199844);
- Life Link 6 (Handler ID: MNS000194662);
- Northern Mining Services Inc (Handler ID: MNS000129775);
- Range (Midwest) Aircraft Refinishing (Handler ID: MND985761634);
- TSA AT Chisholm-Hibbing Airport (Handler ID: MNS000105841).

There are no CERCLA superfund sites on Airport property. The closest superfund site to Airport property, Arrowhead Refinery Co. (Site EPA ID: MND980823975), is located over 45 miles southeast of the Airport.[39]

2.4.7.2 Solid Waste

Solid waste generated at the Airport is disposed of at the St. Louis County Landfill, located six miles west of the Airport.[40]

2.4.7.3 Pollution Prevention

The Airport has a Minnesota Pollution Control Agency (MPCA) Industrial Stormwater Permit (MPCA Permit Number: MNR05386T). This permit was issued on April 1, 2020 and expires on March 31, 2025. The Airport does not have a National Pollutant Discharge Elimination System (NPDES) general permit, rather contractors are required to obtain these permits, when applicable, before the start of a construction project.

The Airport's Spill Prevention and Countermeasure Plan (SPCC) was prepared in March 2015. The SPCC is required to satisfy the federal requirements for facilities that have above ground oil storage tanks with a capacity greater than 1,320 gallons.

2.4.8 Historical, Architectural, Archaeological, and Cultural Resources

The National Historic Preservation Act (NHPA) (54 U.S.C. §§300101 et seq.) establishes the Advisory Council on Historic Preservation (ACHP). The ACHP oversees federal agency compliance with the NHPA. The NHPA also established the National Register of Historic Places (NRHP) that the National Park Service (NPS) oversees. Other applicable statues and EOs include:

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[38] U.S. Environmental Protection Agency, Envirofacts, RCRA Info. Accessed: https://www3.epa.gov/enviro/facts/rcrainfo/search.html, May 2021.

[39] U.S. Environmental Protection Agency, Superfund, National Priorities List, Minnesota. Accessed: https://www.epa.gov/superfund/search-superfund-sites-where-you-live#map, May 2021.

[40] City of Hibbing, Garbage and Recyling, Appliance Disposal, Construction Debris & Bulk Waste. Accessed: https://www.ci.hibbing.mn.us/services/garbage-and-recycling/appliance-disposal-construction-debris-bulk-waste, May 2021.

- American Indian Religious Freedom Act (42 U.S.C. § 1996);
- Antiquities Act of 1906 (54 U.S.C. §§320301-320303);
- Archeological and Historic Preservation Act (54 U.S.C. §§ 312501-312508);
- Archeological Resources Act (16 U.S.C. §§ 470aa-470mm);
- USDOT Act, Section 4(f) (49 U.S.C. § 303);
- Historic Sites Act of 1935 (16 U.S.C. §§ 461-467);
- Native American Graves Protection and Repatriation Act (25 U.S.C. §§ 3001-3013);
- Public Building Cooperative Use Act (40 U.S.C. §§ 601a, 601a1, 606, 611c, and 612a4);
- EO 11593, *Protection and Enhancement of the Cultural Environment* (36 FR 8921);
- EO 13006, *Locating Federal Facilities on Historic Properties in Our Nation's Central Cities* (61 FR 26071);
- EO 13007, *Indian Sacred Sites* (61 FR 26771);
- EO 13175, *Consultation and Coordination with Indian Tribal Governments* (65 FR 67249);
- Executive Memorandum, Government-to-Government Relations with Native American Tribal Governments (April 29, 1994);
- Executive Memorandum on Tribal Consultation (Nov. 5, 2009) (65 FR 67249); and
- USDOT Order 5650.1, *Protection and Enhancement of the Cultural Environment.*

There are no historic resources at the Airport. The closest National Register of Historic Places (NRHP)-listed historic site is the Hibbing High School, located over five miles northwest of the Airport.[41]

2.4.9 Land Use

Various statutes, regulations, and EOs relevant to land use include:

- The Airport and Airway Improvement Act of 1982, and subsequent amendments (49 U.S.C. 47107(a)(10));
- The Airport Improvement Program (49 U.S.C. 47106(a)(1);
- The Airport Safety, Protection of Environment, Criteria for Municipal Solid Waste Landfills (40 CFR § 258.10); and
- State and local regulations

The Airport is located in the City of Hibbing in St. Louis County. Land uses within the immediate vicinity of the Airport include rural residential and agricultural.[42] Additionally, there is some industrial and commercial development along MN-37 just north of the Airport terminal. The Airport designated three Safety Zones in accordance with Minnesota Statute 360.063 *Airport Zoning,*[43] Minnesota Administrative

[41] U.S. National Park Service, National Register of Historic Places. Accessed: https://npgallery.nps.gov/nrhp, accessed April 2021.

[42] City of Hibbing, Comprehensive Plan, December 19, 2018. Accessed: https://www.ci.hibbing.mn.us/home/showpublisheddocument?id=8868, May 2021.

[43] Minnesota Statute 360.063, *Airport Zoning.* Accessed: https://www.revisor.mn.gov/statutes/cite/360.063, May 2021.

Rule 8800.2400, *Airport Zoning Standards*,[44] and the City of Hibbing ordinance 11.39, *Chisholm-Hibbing Airport Zoning Ordinance* (see **Section 2.2.2, *Airport Zoning*** and **Figure 2-5** for more details). Additionally, the Airport was zoned as an Airport Multiple Use Park District (AMU-P) to promote industrial and commercial development in and around the Airport to and ensure compatibility between on-airport property development and off-airport land uses.

2.4.10 Natural Resources and Energy Supply

Statutes and EOs that are relevant to natural resources and energy supply include:

- Energy Independence and Security Act (42 U.S.C. § 17001 et seq.);
- Energy Policy Act (42 U.S.C. § 15801 et seq.);
- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (72 FR 3919); and
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (74 FR 52117).

Natural resources (e.g., water, asphalt, aggregate, etc.) and energy use (e.g., fuel, electricity, etc.) at an airport is a function of the needs of aircraft, support vehicles, airport facilities, support structures, and terminal facilities.

Water is the primary natural resource used at the Airport on a daily basis and is provided by Hibbing Public Utilities Commission (HPUC) (see **Section 2.17*, Utilities*** for further details). Asphalt, aggregate, and other natural resources have also been used in various construction projects at the Airport. None of the natural resources that the Airport uses, or has used, are in rare or short supply. Energy use at the Airport is primarily in the form of electricity required for the operation of Airport-related facilities (e.g., terminal building, hangars, airfield lighting) and fuel for aircraft, aircraft support vehicles/equipment, and Airport maintenance vehicles/equipment. Minnesota Power supplies electricity and HPUC supplies natural gas to the Airport (see **Section 2.17.4*, Electricity*** for more details).

2.4.11 Noise and Noise-Compatible Land Use

Statutes and EOs relevant to noise and noise-compatible land use include:

- The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968 (49 U.S.C. § 44715);
- The Noise Control Act of 1972 (42 U.S.C. §§ 4901-4918);
- Aviation Safety and Noise Abatement Act of 1979 (49 U.S.C. § 47501 et seq.);
- Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47101 et seq.);
- Airport Noise and Capacity Act of 1990 (49 U.S.C. §§ 47521-47534, §§ 106(g);
- Section 506 of the FAA Modernization and Reform Act of 2012, *Prohibition on Operating Certain Aircraft Weighting 75,000 Pounds of Less Not Complying with Stage 3 Noise Levels* (49 U.S.C. §§ 47534); and
- State and local noise laws and ordinances.

[44] Minnesota Administrative Rule 8800.2400, *Airport Zoning Standards.* Accessed: https://www.revisor.mn.gov/rules/8800.2400/, May 2021.

Day-Night Sound Level (DNL) is based on sound levels measures in relative intensity of sound, (decibels or dB) on the "A-weighted scale" or dBA over a time-weighted average normalized to a 24-hour period.[45] DNL has been widely accepted as the best available method to describe aircraft noise exposure. The USEPA identifies the DNL as the principal metric for airport noise analysis. The FAA requires DNL as the noise descriptor for use in aircraft noise exposure analysis and noise compatibility planning. DNL levels are commonly shown as lines of equal noise exposure, similar to terrain contour maps, referred to noise contours. All residential areas are considered compatible with cumulative noise level below DNL 65 dB.

As **Section 2.4.9, *Land Use*** describes, there are a few rural residential land uses near the Airport. These areas are sensitive to aircraft noise associated with the Airport. However, most of the development around the Airport is industrial and commercial. The Airport is zoned as AMU-P to promote industrial and commercial development in and around the Airport to and ensure compatibility between on-airport property development and off-airport noise-sensitive land uses.

2.4.12 Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety Risks

The primary considerations of socioeconomics analysis are the economic activity, employment, income, population, housing, public services, and social conditions of the area. The Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970 (42 U.S.C. § 61 et seq.), implemented by 49 CFR Part 24, is the primary statute related to socioeconomic impacts. Statutes, EOs, memorandums, and guidance that are relevant to environmental justice and children's environmental health and safety risks include:

- Title VI of the Civil Rights Act, as amended (42 U.S.C. §§ 2000d-2000d-7);
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 FR 7629);
- Memorandum of Understanding on Environmental Justice and EO 12898;
- USDOT Order 5610.2(a), Environmental Justice in Minority and Low-Income Populations (77 FR 27534);
- CEQ Guidance: *Environmental Justice: Guidance Under the National Environmental Policy Act*;
- Revised USDOT Environmental Justice Strategy (77 FR 18879); and
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (62 FR 19885).

The Airport is located entirely within St. Louis County, Census Tract 121, Block Group 5. This census tract was used to describe the socioeconomic and environmental justice characteristics in the Airport Area compared to the City of Hibbing, and St. Louis County (see **Table 2-4**). Census data was obtained from the U.S. Census Bureau 2019 American Community Survey 5-Year Estimates.

[45] Federal Aviation Administration, *Technical Support for Day/Night Average Sound Level (DNL) Replacement Metric Research, Final Report*, June 14, 2011. Accessed: May 2021.

TABLE 2-4
SOCIOECONOMIC AND ENVIRONMENTAL JUSTICE CHARACTERISTICS

Characteristic	Census Tract 121, Block Group 5	City of Hibbing	St. Louis County
Total Population	1,143	16,014	199,759
Percent Minority	19.7%	8.7%	7.9%
Percent Living Below the Poverty Level	0.87%	14.9%	14.1%
Percent of the population below 18 Years of Age	12.6%	25.5%	19.1%
Total Housing Units	564	6,755	104,654
Persons per Household	2.03	2.32	2.22

Sources: U.S. Census Bureau, 2019 ACS 5-Year Estimates; Prepared by RS&H, 2021

With regard to children's environmental health and safety risks, the closest school to the Airport is Lincoln Elementary School, located over five miles northwest of the Airport.[46] The school serves students in third through sixth grade. The closest child friendly recreational area is the Carey Lake Park, located 1.5 miles northeast of the Airport.

2.4.13 Visual Effects

There is no federal statutory or regulatory requirement for adverse effects resulting from light emissions or visual impacts. FAA Order 1050.1F describes factors to consider within light emissions and visual resources/visual character. Potential impacts from light emissions include the annoyance or interference with normal activities, as well as effects to the visual character of the area due to light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.

2.4.13.1 Light Emissions

Various lighting features currently illuminate Airport facilities, such as the airfield (e.g., runways and taxiways), buildings, access roadways, automobile parking areas, and apron areas for the safe and secure movement of people and vehicles (e.g., aircraft, passenger cars, etc.).

2.4.13.2 Visual Resources and Visual Character

Structures at the Airport include, but are not limited to, the terminal building, fixed base operators, hangars, and maintenance buildings. As previously mentioned, the Airport is zoned as AMU-P and is developed with visual character that is consistent with this zoning. Land uses within the immediate vicinity of the Airport include rural residential and agricultural. Some rural residential properties in the vicinity of the Airport have line of site to Airport property, however this line of site is generally partially obscured by vegetation.

[46] U.S. Environmental Protection Agency, NEPAssist, Schools. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=Range+REgional+Airport%2C+Hibbing+MN, May 2021.

2.4.14 Water Resources

Water resources include wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers. These resources typically function as a single, integrated natural system that are important in providing drinking water in supporting recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems.

2.4.14.1 Wetlands

Statutes and EOs that are relevant to wetlands at the Airport include:

- EO 11990, *Protection of Wetlands* (42 FR 26961);
- Clean Water Act (33 U.S.C. §§ 1251-1387);
- Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d);
- USDOT Order 6660.1A, *Preservation of the Nation's Wetlands*; and
- Minnesota Wetland Conservation Act.

The Clean Water Act defines wetlands as "…those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." [47] Wetlands have three necessary characteristics:

- Water: presence of water at or near the ground surface for a part of the year;
- Hydrophytic Plants: a preponderance of plants adapted to wet conditions; and
- Hydric Soils: soil developed under wet conditions.

According to the USFWS National Wetland Inventory (NWI) there are wetlands throughout Airport property (see **Figure 2-9**).[48]

2.4.14.2 Floodplains

Statues and EOs that are relevant to floodplains include:

- EO 11988, *Floodplain Management* (42 FR 26951);
- National Flood Insurance Act (42 U.S.C. § 4001 et seq.); and
- U.S. Department of Transportation (USDOT) Order 5650.2, *Floodplain Management and Protection*.

Floodplains are "…lowland areas adjoining inland and coastal water which are periodically inundated by flood waters, including flood-prone area of offshore islands." Floodplains are often referred to in terms of the 100-year floodplain, rather, the one percent chance of a flood occurring in any given year. The USDOT Order 5650.2 outlines the policies and procedures for ensuring that proper consideration is given to the avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs, and

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[47] U.S. Environmental Protection Agency, Section 404 of the Clean Water Act. Accessed: https://www.epa.gov/cwa-404/section-404-clean-water-act-how-wetlands-are-defined-and-identified, May 2021.

[48] U.S. Fish and Wildlife Services, National Wetlands Inventory. Accessed: https://www.fws.gov/wetlands/data/mapper.HTML, May 2021.

budget requests. Therefore, the objective is to avoid, to the extent practicable, any impacts within the 100-year floodplain.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) encompassing the Airport, there are floodplains on Airport property (see **Figure 2-10**).[49]

2.4.14.3 Surface Waters

Statues that are relevant to surface water include:

- Clean Water Act (33 U.S.C. §§ 1251-1387);
- Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d); and
- Rivers and Harbors Act (33 U.S.C. § 401 and 403).

Surface waters include areas where water collects on the surface of the ground, such as streams, rivers, lakes, ponds, estuaries, and oceans. There are surface waters present on Airport property (see **Figure 2-11**).[50] Both Barber and Dempsey Creeks are included in the Minnesota Shoreland Program and are subject to a 300-foot buffer and development in this buffer area is subject to permitting (see **Figure 2-11**.)[51]

2.4.14.4 Groundwater

Statues relevant to groundwater include:

- Safe Drinking Water Act (42 U.S.C. §§ 300(f)-300j-26).

Groundwater is described as the "subsurface water that occupies the space between sand, clay, and rock formations."[52] The Airport is located within the Barber Creek water shed (HUC 12 ID: 040102010602) and Dempsey Creek water shed (HUD 12 ID: 040102010608).[53]

2.4.14.5 Wild and Scenic Rivers

Statues relevant to wild and scenic rivers include:

- Wild and Scenic Rivers Act (16 U.S.C. §§ 1271-1278).

Wild and scenic rivers are defined as "outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations."[54] There are no wild and scenic

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[49] Federal Emergency Management Agency, Flood Map Service Center, Flood Insurance Rate Map 2705770070A (effective September 27, 1991), 2705770110A (effective September 27, 1991). Accessed: https://msc.fema.gov/portal/search#searchresultsanchor, May 2021.

[50] U.S. Environmental Protection Agency, NEPAssist, Water Features, Streams. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=Range+Regional+Airport%2C+Hibbing+MN, May 2021.

[51] Minnesota Department of Natural Resources, Public Waters Inventory Lists. Accessed: https://files.dnr.state.mn.us/waters/watermgmt_section/pwi/STLO_PWILIST.PDF, April 2022.

[52] Federal Aviation Administration, *1050.1F Desk Reference*, Section 14.4 Groundwater.

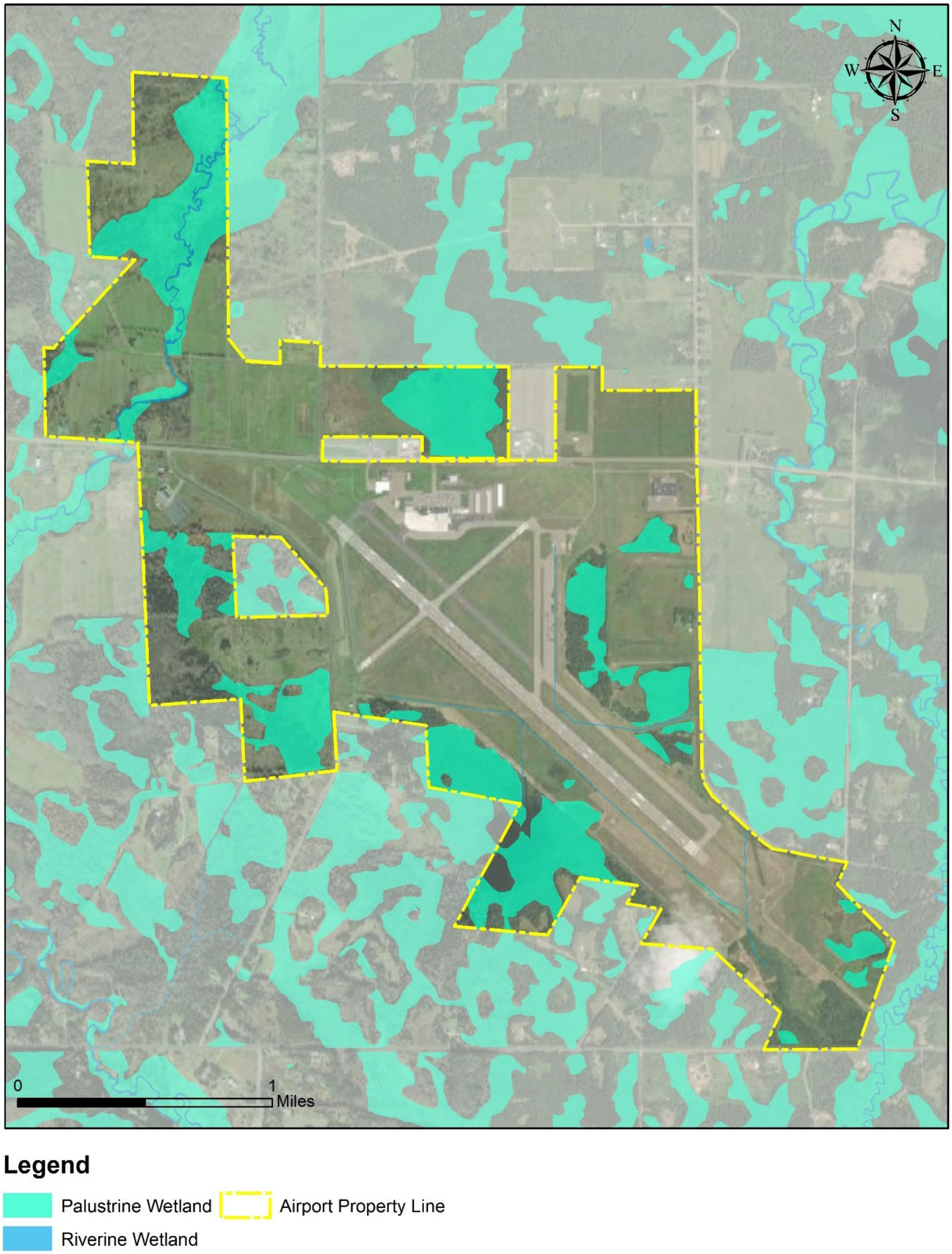
[53] U.S. Environmental Protection Agency, NEPAssist, Water Features, Watersheds (HUC 12). Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=Range+Regional+Airport%2C+Hibbing+MN, May 2021.

[54] National Wild and Scenic Rivers System, About the WSR Act. Accessed: https://www.rivers.gov/wsr-act.php, May 2021.

rivers or river segments within Airport property.[55] The closest wild and scenic river, the St. Croix Wild and Scenic River, is over 85 miles southeast of the Airport. The closest river on the Nationwide River Inventory (NRI) is the Dark River located over 25 miles northeast of the Airport.[56]

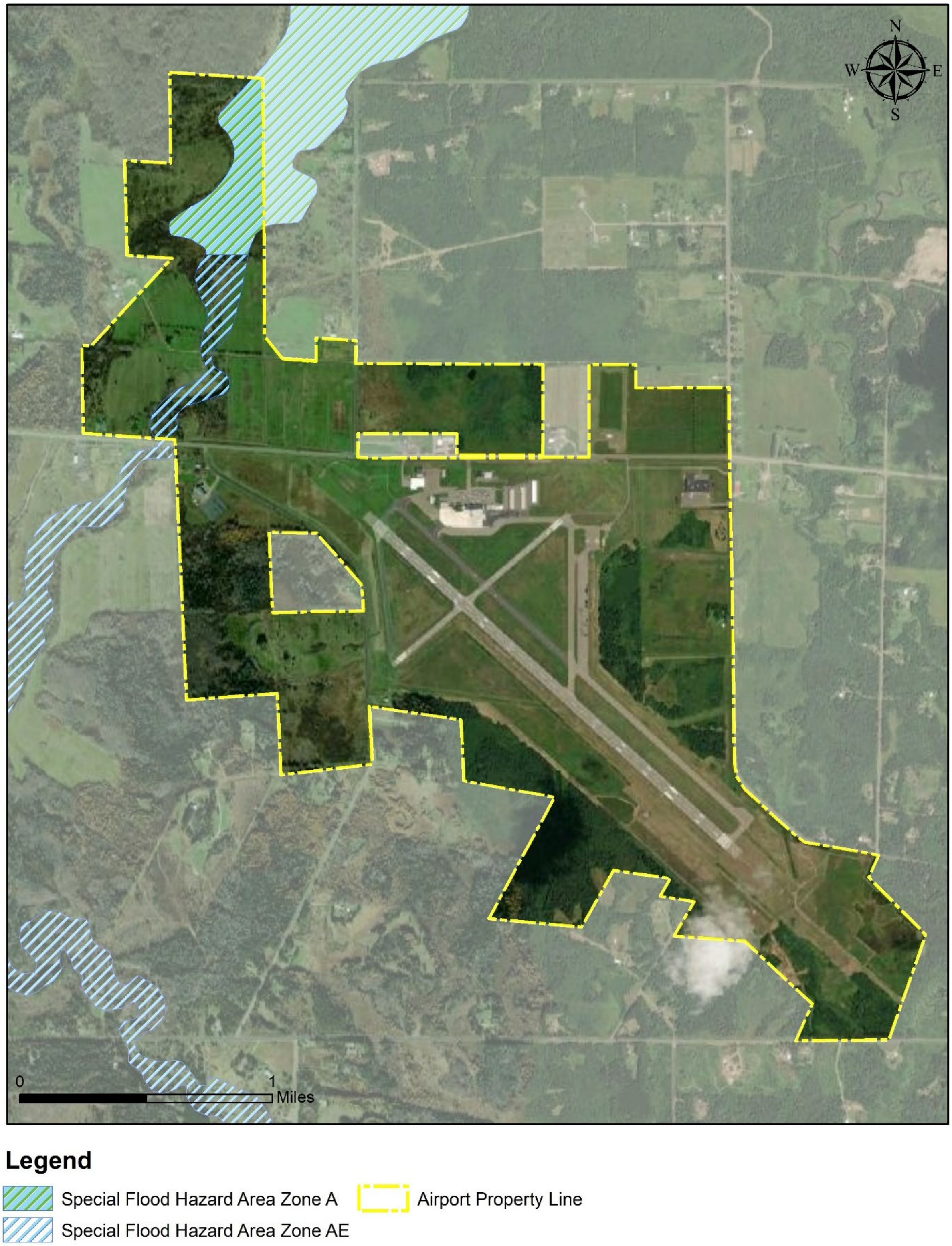
[55] U.S. Environmental Protection Agency, NEPAssist, Water Features, Wild and Scenic Rivers. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=Range+Regional+Airport%2C+Hibbing+MN, May 2021.
[56] U.S. National Park Service, Interactive Map of Nationwide River Inventory. Accessed: https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977, May 2021.

FIGURE 2-9
WETLANDS AT THE AIRPORT



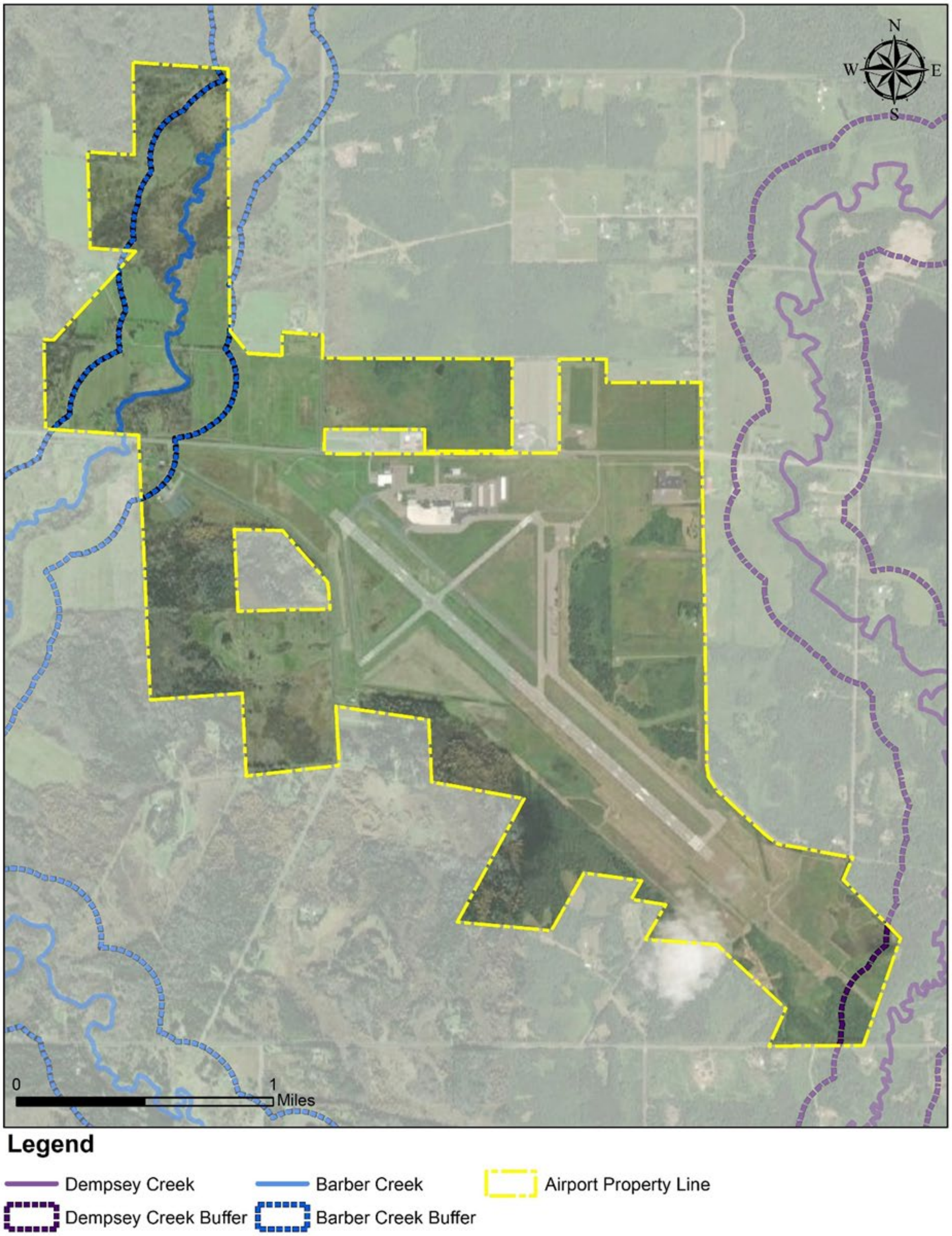
Source: USFWS National Wetland Inventory, Prepared by RS&H, 2021

FIGURE 2-10
FLOODPLAINS AT THE AIRPORT



Source: FEMA, FIRM FIRMs 2705770070A (eff. Sept 27, 1991), 2705770110A (eff. Sept 27, 1991); Prepared by RS&H, 2021

FIGURE 2-11
SURFACE WATERS AT THE AIRPORT



Source: Esri, Prepared by RS&H, 2021

2.5 SUMMARY OF KEY FINANCIAL DATA

This section provides an overview of key financial performance for the CHAA. Historical financial data is used to help project anticipated finances during implementation planning for preferred development alternatives, as defined later in this Master Plan. The preferred development implementation plan is phased by specific projects which are summarized in the Airport Capital Improvement Program (CIP). All data in this financial overview is reported in fiscal years (FY) according to the CHAA fiscal calendar which aligns with the calendar year.

2.5.1 Airport Revenues

Airport revenues are generated from a variety of sources, including the operation of the airport, non-operating sources, contributions from grants from the federal and state governments to be used for development of capital projects, and the financing of long-term debt.

Table 2-5 shows the airport revenues and capital contributions at HIB from FY 2015 through FY 2019.

TABLE 2-5
HISTORICAL AIRPORT REVENUES AND CAPITAL CONTRIBUTIONS (FY 2015-FY 2019)

Source	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Operating revenues					
User fees	$38,328	$38,729	$28,588	$26,275	$26,810
Rental	$401,657	$455,646	$549,977	$606,467	$706,147
Other	$45,758	$131,496	$46,010	$58,246	$30,159
Fuel sales	$809,716	$693,193	$545,657	$687,016	$769,346
Total operating revenues	**$1,295,459**	**$1,319,064**	**$1,170,232**	**$1,378,004**	**$1,532,462**
Percent of total revenues	*12.4%*	*19.6%*	*35.8%*	*16.5%*	*34.7%*
Nonoperating revenues (expenses)					
Property taxes and related credits	$552,544	$689,714	$694,665	$733,992	$771,976
State maintenance grant	$47,195	$202,050	$101,025	$101,025	$103,739
Other grants	$1,280	$35,051	$22,876	$43,608	$63,721
Inter-governmental aids	$5,267	$3,799	$4,605	$5,126	$3,106
Interest income	$3,148	$2,369	$3,134	$4,998	$3,915
Interest expense	$0	$0	$0	($136,435)	($134,421)
Passenger facility charges	$42,028	$44,904	$53,057	$65,891	$69,125
Gain on disposal of assets	$0	$0	$15,658	$0	$29,420
Total nonoperating revenues	**$651,462**	**$977,887**	**$895,020**	**$818,205**	**$910,581**
Percent of total revenues	*6.3%*	*14.5%*	*27.4%*	*9.8%*	*20.6%*
Capital grants					
Capital grants	$8,472,846	$4,434,055	$1,205,037	$6,140,756	$1,973,841
Total capital grants	**$8,472,846**	**$4,434,055**	**$1,205,037**	**$6,140,756**	**$1,973,841**
Percent of total revenues	*81.3%*	*65.9%*	*36.8%*	*73.7%*	*44.7%*
Total Revenues	**$10,419,767**	**$6,731,006**	**$3,270,289**	**$8,336,965**	**$4,416,884**

Source: CHAA Financial Statements FY 2015 – FY 2019

2.5.1.1 Operating Revenues

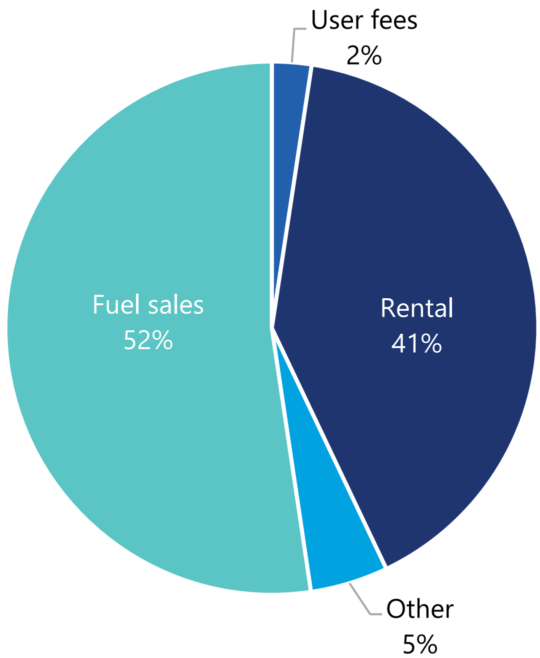
Operating revenues at HIB, which totaled $1.5 million in FY 2019, are divided into four categories including:

- User fees (such as landing or fuel flowage fees)
- Rental
- Fuel sales
- Other

For FY 2019, the largest sources of rental revenue were Building F and the Industrial Park. Items classified as “other” includes revenue sources such as interest income and vending commissions.

Figure 2-12 shows each revenue category as an average percentage of operating revenue from FY 2015 through FY 2019. Fuel sales are the largest source of operating revenue averaging 52 percent of total operating revenue during the period. From FY 2015 through FY 2019, overall operating revenue accounted for an average of 24 percent of total revenues at the Airport.

FIGURE 2-12
AVERAGE OPERATING REVENUE AS PERCENTAGE OF TOTAL REVENUE (FY 2015-FY 2019)



Source: CHAA Financial Statements FY 2015 – FY 2019; RS&H Analysis, 2021

2.5.1.2 Nonoperating Revenues

Nonoperating revenues are generated outside the operation of the Airport. These include revenues such as taxes levied, interest on investments, passenger facility charges (PFCs), and some grants. In FY 2019 operating revenue totaled $910,581. The largest source of nonoperating revenues for the CHAA is a local property tax levied by the Airport ensure the operating budget is met and to assist with meeting local match requirements for AIP funded projects. State Maintenance Grants, provided by Minnesota Department of Transportation (MnDOT)[57], are the second largest source of nonoperating revenues. Through this grant program MnDOT provides funding, up to a set amount, to offset costs for routine maintenance expenses such as day-to-day labor, material, equipment, and utility expenses of maintaining airport pavements, airport grounds, lighting systems, buildings, and maintenance equipment. FY 2019 saw $4.9 million distributed by MnDOT under this program statewide and, from FY 2015 through FY 2019, HIB has received an average of $111,007 annually.

[57] State maintenance grants are awarded through the State Airport Maintenance and Operation Grant Program.

The Passenger Facility Charge (PFC) Program is available to fund qualified[58] capital development projects at publicly controlled commercial passenger service airports. PFCs are capped at a maximum of $4.50 per flight segment with a maximum of two PFCs charged on a one-way trip, or four PFCs charged on a round trip, for a maximum total of $18.00. PFCs are collected by air carriers when tickets are sold and are then later remitted to the airport, less a handling fee of typically $0.11 per collected PFC. Eligible projects include those which enhance safety, security, or capacity; reduce noise; or increase air carrier competition.

Between 2015 and 2019, HIB collected in $275,005 in PFC funding to be used to fund various projects. **Table 2-6** shows the annual enplanements, the effective PFC collection rate (the PFC amount collected per enplanement), and the total PFC funding collected for 2015 through 2019.

TABLE 2-6
PFC COLLECTIONS (FY 2015-2019)

FY	Enplanements	Effective PFC Rate	PFC Totals
2015	12,271	$3.42	$42,028
2016	12,700	$3.54	$44,904
2017	14,293	$3.71	$53,057
2018	16,634	$3.96	$65,891
2019	17,753	$3.89	$69,125
Total	**73,651**	**$3.73**	**$275,005**

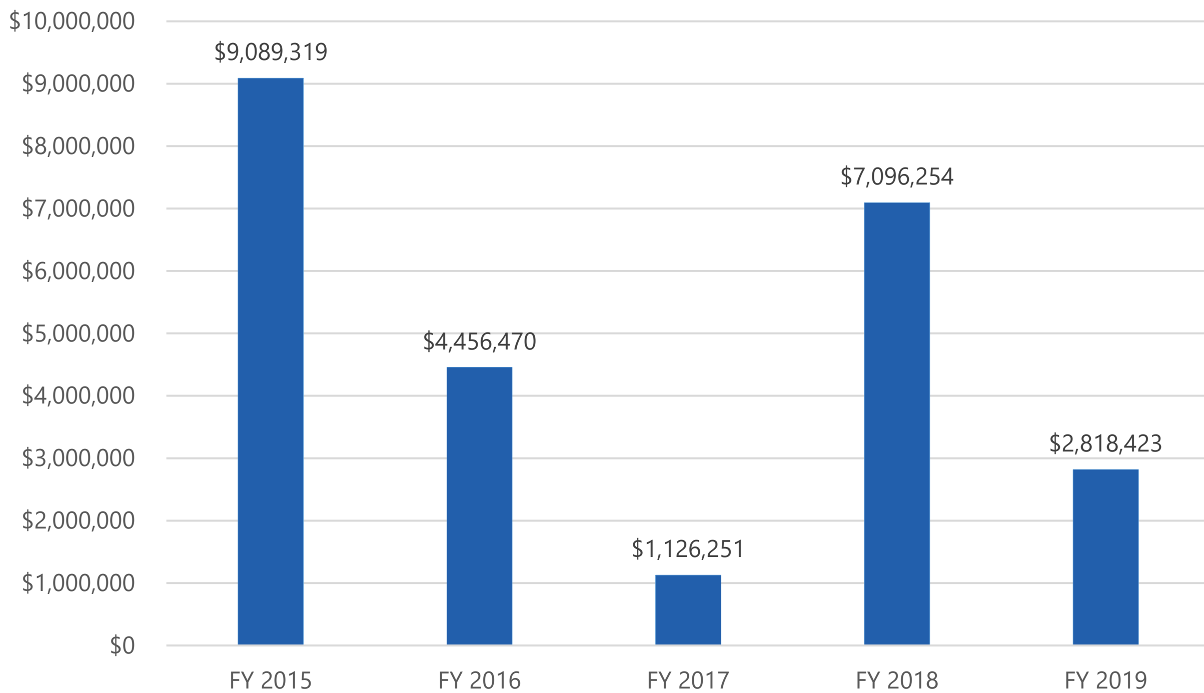
Source: FAA CATS Form 127 for FY 2015-FY 2019

2.5.1.3 Airport Capital Expenditures

Capital expenditures are primarily funded by federal and state capital contributions and by the issuance of revenue bonds. Additional match requirements are met by the Airport through local funds. **Figure 2-13** shows historic total Airport capital expenditures between FY 2015 and FY 2019 by fiscal year. Capital projects with large expenditures during this period include terminal construction, airfield rehabilitation and improvement, and hangar construction.

[58] FAA reviews and approved PFC applications allowing airport to collect passenger fees for defined purpose over defined time. See https://www.faa.gov/airports/pfc/ for more information about the FAA PFC Program. PFC application (FAA Form 5500-1) can be found here: https://www.faa.gov/forms/index.cfm/go/document.information/documentID/185477

FIGURE 2-13
HISTORIC AIRPORT CAPITAL EXPENDITURES (FY 2015-2019)



Source: FAA CATS Form 127 for FY 2015-FY 2019; Prepared by RS&H, 2021

2.5.1.4 Federal and State Grants

The Airport receives grants primarily for the planning, design, and construction of capital projects. The largest source of grants for all capital projects historically has been the federal government through the FAA AIP. Capital projects meeting eligibility requirements are funded at 90 percent by FAA grants, with the remaining 10 percent funded locally with airport funds and sometimes supplemented with grants from MnDOT.

State airport funds are available through MnDOT which uses revenues generated from aircraft registration tax, aviation fuel tax, aircraft sales tax, airline flight property tax, and other miscellaneous sources to fund airport capital improvement projects. State airport funds are provided to match up to 5 percent of NPIAS match and up to between 70 to 100 percent of non-NPIAS projects, dependent upon project type and priority. State funding rates buy project type for HIB are shown in **Table 2-7**. Airport grant programs assisting CHAA include the State Airport Maintenance and Operation Grant Program, discussed in **Section 2.5.1.2, *Nonoperating Revenues*** and the Airport Construction Grant Program.

The Airport Construction Grant Program is a used to fund capital improvement projects at HIB as well as other airports throughout the state. In total, $11.8 million was distributed to state airports in FY 2019.[59] The Airport CIP includes Airport Construction Grant Program funds for planning and engineering projects that focus on airport facility development.

[59] Minnesota House of Representatives Research Department

TABLE 2-7
MNDOT FUNDING RATES (STATE FY 2021)

Project Type	Sponsor Population Over 5,000
Construction, Planning, Zoning, Environmental, Land, Navigation Systems, and AWOS	75%
Air Service Marketing	70%
Maintenance and Operations	75%
Maintenance and Operations Utilities in Use by Non-Federal Navigation Aids	100%
Fuel Systems and Fuel Trucks	70%
Equipment (requires justification)	75%

Source: MnDOT *Addendum to Funding Rates Letter*, State FY 2021, May 31, 2020; Prepared by RS&H, 2021

Table 2-8 summarizes federal and state capital project funding received at HIB over the five-year period from 2015 through 2019.

TABLE 2-8
FEDERAL AND STATE ENCUMBRANCES (FY 2015-2019)

Fiscal Year	Description of Work	Federal Capital Project Funding	State Capital Project Funding
2015	Terminal Building (1)	$0	$5,000,000
2015	Rehabilitate Apron, Crack Seal Runway 13-31 & Partial Taxiway C	$2,950,659	$351,942
2016	Design Taxiway Shift	$12,776	$0
2016	Terminal Expansion Final Design	$258,894	$35,116
2016	Lighting Design	$121,714	$6,762
2017	Multi-Aircraft Hangar Design	$0	$180,000
2017	Utility Vehicle	$0	$11,987
2017	Multi-Aircraft Hangar Site Prep	$0	$335,246
2017	Airfield Lighting Upgrade & Taxiway B, C, & D Improvements	$5,268,809	$200,000
2018	Emergency Roof Repair for Buildings A & C	$0	$103,616
2018	Crack Seal	$0	$87,778
2018	Parking Lot Expansion - Phase 1	$991,357	$55,075
2019	2019 Tyler TAD 110 Trailer Mounted De-Icer w/ 50-Foot Broom	$0	$52,035
2019	Parking Lot Expansion - Phase 2	$1,010,792	$56,155
	Total	**$10,615,001**	**$6,475,712**

Note: (1) Bonding Agreement with State of Minnesota
Source: MnDOT Office of Aeronautics Encumbrances for Airports with Commercial Service, 2021; Prepared by RS&H, 2021

2.5.1.5 Airport Capital Long-Term Debt

CHAA is presently carrying long-term debt issued on three HIB capital projects, including the construction of an industrial non-aeronautical building financed through the Department of Iron Range Resources & Rehabilitation Board (IRRRB) and two hangars financed through the State of Minnesota Hangar Loan Revolving Account Program.

The IRRRB is an economic development agency within the State of Minnesota which reinvests taxes from local taconite production into the Iron Range through grants, low or no interest loans, and loan guarantees. The stated mission of the IRRRB is to "invest resources to foster vibrant growth and economic prosperity in northeastern Minnesota." In FY 2007, CHAA secured a $1.6 million IRRRB promissory note with an interest rate of 1.5 percent to fund the construction of an industrial non-aeronautical building. Upon leasing of this space by Detroit Diesel Remanufacturing, the note was amended in FY 2013 to a total value of $9.3 million to enable building expansion to meet tenant needs. The maturity date of this note is 8/1/2035, 21 years after tenant occupancy commenced, at which time the $5.4 million balance will be due.

MnDOT offers the Hangar Loan Revolving Account Program to state airports, which provides 80 percent interest-free loans for hangar site preparation and construction. The Authority has financed two loans through this program. In FY 2011, a loan was secured for hangar construction in the amount of $500,855 with a maturity date of December 2021. In FY 2019, $1.1 million was secured for an expansion to existing A2 hangar with a maturity date of June 2039.

In total, as of end of FY 2019, $10.1 million in long-term debt exists. **Figure 2-14** shows historical long-term debt for the Authority since FY 2010.

FIGURE 2-14
HISTORIC AIRPORT LONG-TERM DEBT (FY 2015-2019)

Source: FAA CATS Form 127 for FY 2010-FY 2019; RS&H, 2021

2.5.2 Airport Expenses

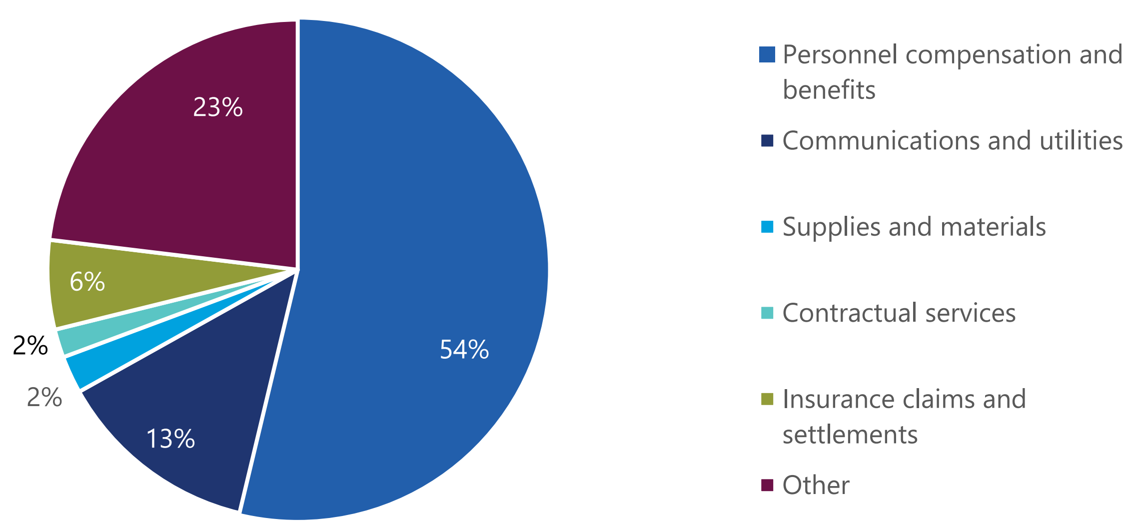
As is common at airports, depreciation of assets accounts for the highest annual expense at HIB. Total operating expenses of $3.0 million occurred in FY 2019. Depreciation makes up 52 percent of the FY 2019 total operating expenses and labor costs are the second highest single expense at 26 percent of the FY 2019 total. **Table 2-9** shows a historical breakdown of operation and maintenance expenses at HIB. **Figure 2-15** shows the percentage of each expense category, when excluding depreciation, for FY 2019.

TABLE 2-9
HISTORIC AIRPORT OPERATING EXPENSES (FY 2015-2019)

Source	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Operating expenses					
Personnel compensation and benefits	$630,987	$618,545	$630,636	$712,052	$779,282
Communications and utilities	$146,970	$161,631	$177,095	$194,037	$190,783
Supplies and materials	$31,734	$27,831	$25,384	$34,261	$35,091
Contractual services	$48,456	$45,557	$51,835	$65,525	$26,576
Insurance claims and settlements	$94,392	$97,889	$97,718	$87,814	$83,654
Other	$782,079	$730,243	$588,475	$705,474	$334,769
Depreciation	$1,254,338	$1,524,080	$1,642,999	$1,577,533	$1,568,276
Total operating expenses	**$2,988,956**	**$3,205,776**	**$3,214,142**	**$3,376,696**	**$3,018,431**

Source: FAA CATS Form 127 for FY 2019

FIGURE 2-15
OPERATING EXPENSES EXCLUDING DEPRECIATION (FY 2015-2019)



Source: FAA CATS Form 127 for FY 2019; RS&H, 2021

Table 2-10 shows the Airport's historic debt coverage ratio (DCR). The DCR measures the ratio between available cash and debt service payments, and it is used as an element of determining creditworthiness by financial lenders. Throughout the five-year period either no debt service was reported, or the DCR was 1.20, indicating a positive cash flow and creditworthiness because it was above the typical minimum lending institution threshold of 1.0.

TABLE 2-10
HISTORIC AIRPORT DEBT COVERAGE (FY 2015-2019)

Debt Coverage	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Revenues					
Operating revenues	$1,295,459	$1,319,064	$1,170,232	$1,378,004	$1,532,462
Nonoperating revenues	$651,462	$977,887	$895,020	$818,205	$910,581
Total revenues	**$1,946,921**	**$2,296,951**	**$2,065,252**	**$2,196,209**	**$2,443,043**
Expenses					
Total expenses, less depreciation and interest expenses	$1,726,525	$1,707,607	$1,519,765	$1,781,785	$1,900,654
Net Revenues	$220,396	$589,344	$545,487	$414,424	$542,389
Annual Debt Service	$0	$0	$0	$0	$453,574
Debt Coverage Ratio	**-**	**-**	**-**	**-**	**1.20**

Source: FAA CATS Form 127 for FY 15-FY 19

Table 2-11 shows the annual requirements to amortize long-term debt held by the CHAA as of end of FY 2019. Annual requirements remain at or above $414,948 through FY 2039.

TABLE 2-11
LONG-TERM DEBT AMORTIZIATION (FY 2019)

Fiscal Year(s)	Principal	Interest	Total
2020	$407,775	$17,573	$425,348
2021	$445,288	$12,715	$458,003
2022	$407,479	$7,469	$414,948
2023	$342,578	$72,370	$414,948
2024	$80,327	$334,621	$414,948
2025-2029	$1,950,138	$124,602	$2,074,740
2030-2034	$1,073,962	$1,000,779	$2,074,741
2035-2039	$5,268,714	$210,000	$5,478,714

Source: CHAA Financial Statements FY 2015 – FY 2019

TABLE 2-12
EXISTING AIRPORT CIP PROJECTS BY CATEGORY (FY 2019-2029)

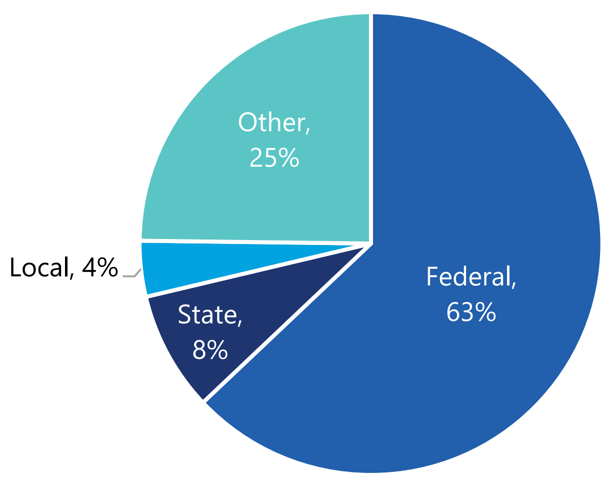
Project Description	Federal Funding	State Funding	Local Funding	Other Funding	Total Funding
Airfield					
DNR Bituminous Ramp Rehabilitation	$0	$0	$0	$800,000	$800,000
ILS and Glideslope Fiber Optic Installation	$0	$52,500	$22,500	$0	$75,000
Runway Safety Area (RSA) Improvements	$2,700,000	$150,000	$150,000	$0	$3,000,000
TWY A Rehabilitation	$1,750,000	$87,500	$87,500	$0	$1,925,000
RWY 13-31 Rehabilitation	$9,000,000	$700,000	$300,000	$0	$10,000,000
Extend RWY 13-31 to 7,500'	$990,000	$77,000	$33,000	$0	$1,100,000
Extend TWY C	$1,080,000	$84,000	$36,000	$0	$1,200,000
Crack Seal - 3 units	$0	$381,000	$129,000	$0	$510,000
Airfield Total	**$15,520,000**	**$1,532,000**	**$758,000**	**$800,000**	**$18,610,000**
Equipment					
ARFF Truck	$720,000	$40,000	$40,000	$0	$800,000
Loader	$0	$177,672	$76,145	$0	$253,817
Mower, Zero Turn	$0	$9,599	$3,200	$0	$12,799
Truck/Sweepers - 2 units	$1,350,000	$89,000	$61,000	$0	$1,500,000
Truck/Snow Blowers - 2 units	$1,440,000	$112,000	$48,000	$0	$1,600,000
Truck/Plow/Spreader - 2 units	$135,000	$105,000	$45,000	$1,215,000	$1,500,000
Fuel Trucks - 2 units	$0	$370,000	$130,000	$0	$500,000
Tractor/Mower	$0	$200,000	$50,000	$0	$250,000
Equipment Total	**$3,645,000**	**$1,103,271**	**$453,345**	**$1,215,000**	**$6,416,616**
General Aviation					
Hangar Construction	$0	$0	$0	$1,700,000	$1,700,000
Hangar Site Prep	$0	$490,000	$210,000	$0	$700,000
T-Hangar(s) TLN Rehabilitation	$0	$0	$0	$1,200,000	$1,200,000
North Ramp Rehabilitation	$720,000	$56,000	$24,000	$0	$800,000
ARFF Bldg./Multi-Plane Hangar	$0	$0	$0	$8,000,000	$8,000,000
Airpark TWY Construction	$3,150,000	$245,000	$105,000	$0	$3,500,000
FBO/GA Apron Construction	$1,350,000	$105,000	$45,000	$0	$1,500,000
GA Arrivals/Departure Building	$4,500,000	$350,000	$150,000	$0	$5,000,000
Multi-Plane Hangar	$1,350,000	$105,000	$45,000	$0	$1,500,000
General Aviation Total	**$11,070,000**	**$1,351,000**	**$579,000**	**$10,900,000**	**$23,900,000**
Planning and Environmental					
Runway Safety Area (RSA) Study	$108,000	$6,000	$6,000	$0	$120,000
Zoning Ordinance	$0	$70,000	$30,000	$0	$100,000
Extend RW 13-31 – Environmental Assess.	$315,000	$24,500	$10,500	$0	$350,000
Airpark Taxiway Design	$450,000	$35,000	$15,000	$0	$500,000
Extend RWY 13-31 & Taxiway C Design	$450,000	$35,000	$15,000	$0	$500,000
Planning and Environmental Total	**$1,323,000**	**$170,500**	**$76,500**	**$0**	**$1,570,000**
Other					
Wildlife Perimeter Fence	$0	$111,672	$113,000	$0	$224,672
RWY 13 Transition Surface - Easement E	$90,000	$0	$10,000	$0	$100,000
Extend RWY 13-31 - Land Acquisition	$45,000	$0	$5,000	$0	$50,000
North Perimeter Road	$1,080,000	$84,000	$36,000	$0	$1,200,000
Other Total	**$1,215,000**	**$195,672**	**$164,000**	**$0**	**$1,574,672**
Total	**$32,773,000**	**$4,352,443**	**$2,030,845**	**$12,915,000**	**$52,071,288**

Source: RS&H, 2020

2.5.3 Existing Capital Improvement Program FY 2020 - FY 2029

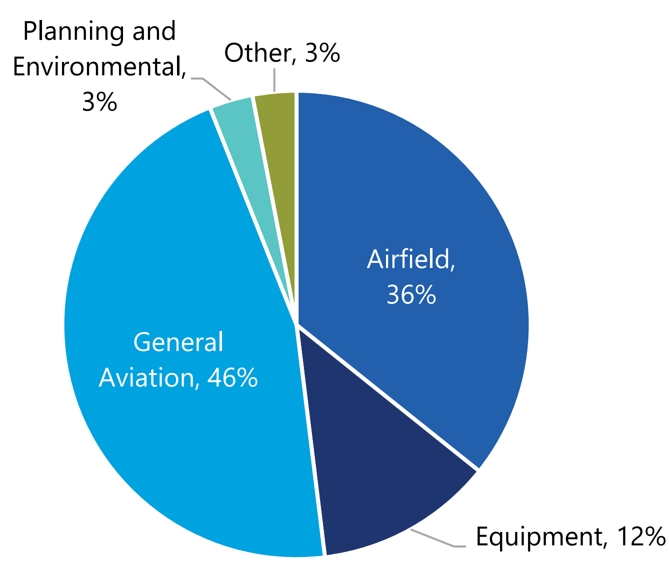
HIB develops an ACIP every year with the goal of meeting airport capital project needs. Total anticipated capital project funding over the FY 2020 to FY 2029 period is slightly over $52.1 million. **Figure 2-16** shows projected funding sources and **Figure 2-17** shows areas of investment allocations. **Table 2-12** depicts the CIP for FY 2020 through FY 2029. Subsequent chapters within this Master Plan develop projects, implementation strategies, and financial feasibility for an updated CIP.

FIGURE 2-16
AIRPORT PROJECTED CAPITAL FUNDING BY SOURCE (FY 2020-2029)



Source: Airport Records; RS&H Analysis, 2020

FIGURE 2-17
AIRPORT PROJECTED CAPITAL INVESTMENT BY CATEGORY (FY 2020-2029)



Source: Airport Records; RS&H Analysis, 2020

2.5.4 FY 2020 & FY 2021 Budget

Operating budgets have been prepared for expenses and revenues at HIB for FY 2020 and 2021. FY 2020 budgeted revenue and expenses total $2.3 million, an increase of 4.8 percent over FY 2019. Despite the impacts of COVID-19 pandemic, FY 2021 operating revenues are forecast to increase 13.8 percent over FY 2020 levels to $2.7 million. Flight landing fees and other commercial aviation revenues are expected to decline due to COVID-19 impacts on air carrier enplanements. FBO and rental increases over FY 2019 and 2020 are anticipated to drive overall FY 2021 growth.

2.6 EMERGING TRENDS

In planning for the future of Range Regional Airport, it is important to consider the emerging trends of both growing commercial passenger service and general aviation activity, especially those with significant and direct impacts to HIB. The aviation industry is always evolving, and history demonstrates that technological innovations often precede industry transformations. The rapid pace of development in aviation is anticipated to continue and airports will be expected to adapt quickly to demands created by the latest trends and innovations. There is substantial benefit in surveying the industry landscape to understand and project for probable changes among pilots, aircraft types, new technologies, and airport management policies.

From the commercial passenger service perspective, one of the most impactful trends among regional carriers involves the up-gauging of smaller regional jets having 50-seats or less, to larger aircraft with greater seat capacities and slightly higher load factors. In the case of Range Regional Airport, up-gauging aircraft increases the peak passenger demand of the Airport's terminal and landside facilities, however, daily frequency would not be anticipated to change due to the EAS status.

From the general aviation recreational flyer and student pilot perspective, there has been, and will likely continue to be, a measurable change in pilot demographics. Over the past decade, a decline in the number of pilots in the 40 to 60-year-old range has occurred. Historically, this was an age group involved in recreational flying. Statistics show an ongoing decline in recreational flying for that age range. Simultaneously, there has been, up until the onset of the COVID-19 global pandemic, a sharp increase in the amount of flight training. This trend has been associated with both regulatory changes and a strong demand for commercial airline pilots. The COVID-19 pandemic has now cast uncertainty into both the future demand for commercial pilots and the willingness of students to pursue the field. As of October 2020, Boeing, publisher of the *Pilot and Technician Outlook 2020-2039*, has reduced employment forecast numbers for pilots by 5 percent, maintenance technicians by 3.9 percent, and cabin crew positions by 12 percent[60] [61]. While these numbers demonstrate less anticipated opportunity in the field, the report notes that "retirements and over vacancies should leave openings that need to be filled by furloughed and new aviators and that airplanes being brought out of storage will require thousands of labor hours to ensure proper maintenance.[61]

[60] Boeing, *Pilot and Technician Outlook 2020-2039*, October 2020 update. Available here: https://www.boeing.com/resources/boeingdotcom/market/assets/downloads/2020_PTO_PDF_Download.pdf

[61] AOPA, *Boeing's 20-Year Job Predictions Lowered*, Retrieved April 12, 2021 from https://www.aopa.org/news-and-media/all-news/2020/october/15/boeings-20-year-job-predictions-lowered

From the general aviation based aircraft perspective, the number of single engine piston aircraft is declining nationwide, and this is forecast to continue over the next 20-years. Range Regional Airport has experienced declining small aircraft operations, as indicted by declining AvGas sales and fluctuation in based single engine aircraft counts, larger multi-engine and jet aircraft are projected to increase. Equally as important to the category of aircraft at HIB is that the anticipated types of general aviation aircraft flying have also been changing. Flights by aircraft over 20 years old has declined over the past five years. New types of general aviation aircraft are being driven by a shift from recreational and leisure flying to more business flying. This shift is driving increases in business type aircraft such as Bombardier Challengers, Gulfstreams, and Cessna Citation jets.

Other high-level trends occurring in the aviation industry include:

- Demand for small aircraft is decreasing due to the decreasing number of people pursuing pilot certificates for recreational purposes.
- Instructional flying was increasing due to high demand for commercial pilots and changes in regulations that increased necessary flight hours for entry into sought after commercial pilot positions. The impact of the COVID-19 global pandemic on future commercial pilot employment opportunity has not yet resolved into a clear trend at this time, however, the near-term decline in student activity has begun to stabilize as of February 2021.[62]
- The cost of flying has sharply increased. This is especially true with relation to cost of retail aviation gasoline, which has more than quadrupled in the last 20 years.
- Operations by jets are increasing as a share of total operations, which results in greater demand for additional, stronger pavement and Jet A fuel availability at airports.
- Communities are establishing community resiliency plans related to disaster response and recovery, in which airports play a key role.

Aviation trends like electric aircraft development, environmental stewardship, and new aircraft designs will influence airport facility requirements. Electric aircraft have the potential to usurp traditional fossil fuel aircraft currently used in flight training and recreational flying. Electric aircraft engines, currently being tested for certification, would simultaneously reduce operational costs, noise, and carbon dioxide emissions, making small aircraft operations more affordable and environmentally friendly. This shift effects airport facilities by requiring improvements like electric charging ports and it could affect airport capacity and storage needs if small aircraft operations increase. Necessary upgrades or extension of electrical lines serving HIB should be considered as well as strategic locations for electric aircraft battery charging stations, timing to implement improvements, and adjustments to financial policies which recapture operating revenues lost by decreasing fuel sales.

One opportunity that can be leveraged by the CHAA is the introduction of redundancy into the utility system through the implementation of sustainable energy generated from clean, renewable sources such as solar energy systems. Furthermore, airports are beginning to integrate renewable energy systems into airport-wide microgrids to establish Airport energy independence, thereby promoting financial self-sufficiency and protecting the airport's central role in community resiliency during disaster recovery.

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[62] Pilot Career News, *FlightLogger Sees Pilot Training at Turning Point*, Retrieved April 12, 2021 from https://www.pilotcareernews.com/flightlogger-sees-pilot-training-at-turning-point/

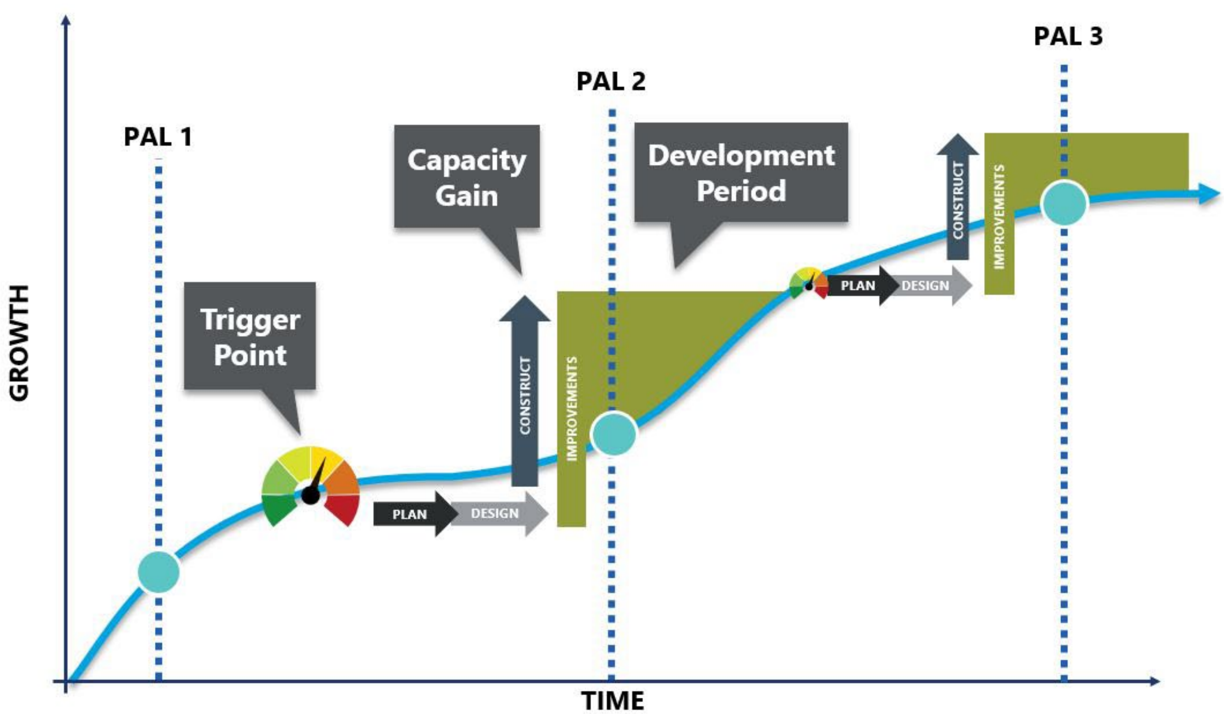
2.7 PLANNING ACTIVITY LEVELS

Airport facility requirements, including the type, size, and quantity, are in large part dependent upon the future aviation activity levels projected in the aviation demand forecasts discussed in **Chapter 1, *Aviation Forecasts***. Necessary addition, upgrading, expansion, or sometimes even elimination of facilities can be driven by many factors including capacity constraints, updates to regulatory standards, or adjustments in HIB's strategic vision. Replacement of outdated or inefficient facilities that are cost prohibitive to maintain or modernize also inform facility needs.

The Range Regional Airport aviation demand forecast used demographic, economic, and geographic statistical analysis to derive a preferred forecast scenario that ultimately supports scenario-based growth. Although the forecast defines aviation activity milestones for the years 2025, 2030, and 2040, it is important to understand that facility requirements at Range Regional Airport are driven by levels of aircraft activity metrics or metrics such as enplanements, operations, or based aircraft, which may or may not coincide with those specific years. Therefore, to eliminate associations between demand levels and specific years, the levels of demand triggering facility improvements will be referred to from this point forward as Planning Activity Levels (PALs). PALs correlate with operational levels in each respective forecast year and, subsequently, are divided into three activity levels: PAL 1, PAL 2, and PAL 3.

Figure 2-18 diagrams how and when PALs trigger the need for project planning, design, and implementation at certain demand levels, and the effect on overall facility capacity to meet user needs.

FIGURE 2-18
PLANNING LEVEL TRIGGER POINTS



Source: RS&H, 2021

2.8 METEOROLOGICAL CONDITIONS

Weather plays a significant role in influencing airport facility needs and design requirements. Ambient temperature, precipitation, wind, visibility, cloud ceiling, and atmospheric pressure are all climate factors that affect operational parameters and future facility needs.

An analysis of ten years of monthly weather station data from the National Oceanographic and Atmospheric Administration (NOAA) showed that July was the warmest month at Range Regional Airport with an average high temperature of 79.1 degrees Fahrenheit between 2011 and 2020. During that time, the month of July averaged one day of air temperatures exceeding 90 degrees.[63]

Comparatively, the coldest month on average was January, with an average low temperature of -2.4 degrees Fahrenheit. From 2011-2020, the month of January averaged 16 days with air temperatures at or below zero degrees. During many of these colder months of the year (November-April), it is not uncommon for the Airport to experience snow totals exceeding 20 inches.[64] Because temperatures typically stay below freezing during winter months it is not uncommon for large piles of snow to accumulate and remain for extended periods of time.

2.8.1 Runway Orientation and Wind Analysis

Runway wind coverage analysis was conducted using the FAA's Airports GIS Wind Analysis Tool and considers 10 years of meteorological data (January 2011 through December 2020). Data for this tool is supplied by the National Climatic Data Center through the weather reporting station located at Range Regional Airport. The wind coverage analysis examines all-weather conditions, visual meteorological conditions (VMC), and instrument meteorological conditions (IMC).

The primary factor in determining runway orientation is the direction of prevailing winds. As stated in FAA AC 150/5300-13A, *Airport Design*, the primary runway should be orientated in the direction of the prevailing winds barring other considerations. FAA runway design standards recommend a runway with a runway design code (RDC) of C-II for existing conditions and C-III (Runway 13-31 current and ultimate condition) provide a minimum of 95 percent wind coverage at a 16-knot crosswind, and slightly smaller runways (such as Runway 4-22), with a RDC of B-II provide a minimum of 95 percent wind coverage at a 13-knot crosswind. With a C-II and C-III RDC, Runway 13-31 alone meets the 95 percent threshold for VMC, IMC, and all-weather conditions at 16 knots. As a runway system, Runway 13-31 and Runway 4-22 also meet the 13 knot crosswind requirements for VMC, IMC, and all-weather conditions.[65]

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[63] NOAA, Global Summary of Month Station Details (2021). https://www.ncdc.noaa.gov/cdo-web/datasets/GSOM/stations/GHCND:USW00094931/detail

[64] NOAA monthly snowfall totals were limited to the years of 2012 and 2013. During the months of March and April 2013, the Airport had 21.4 inches and 33.6 inches of snow, respectively.

[65] Runway 4-22 does not meet the crosswind requirements of a B-II RDC as a single runway, but it does as a part of the Airport's combined runway system. Runway 4-22 is not currently eligible for FAA AIP entitlement funding because Runway 13-31 alone meets 95% wind coverage requirement and capacity is not currently a constraining factor.

Table 2-13 shows the runway wind coverage percentages in VMC conditions. **Table 2-14** shows the runway wind coverage percentages in IMC conditions. **Table 2-15** shows the runway wind coverage percentages in all-weather conditions at HIB.

TABLE 2-13
RUNWAY WIND COVERAGE - VISUAL METEOROLOGICAL CONDITIONS

VMC WIND DATA			
Runway	**Crosswind Component**		
	10.5 Knots	**13 Knots**	**16 Knots**
Runway 4-22	85.73%	91.13%	N/A
Runway 13-31	98.21%	99.32%	99.92%
Combined	99.54%	99.95%	N/A

Source: NOAA National Climatic Data Center
VMC Weather Observations: 89,559
Station: 727455 Data Range: 2011-2020

TABLE 2-14
RUNWAY WIND COVERAGE - INSTRUMENT METEOROLOGICAL CONDITIONS

IMC WIND DATA			
Runway	**Crosswind Component**		
	10.5 Knots	**13 Knots**	**16 Knots**
Runway 4-22	62.81%	64.92%	N/A
Runway 13-31	98.11%	99.22%	99.83%
Combined	99.30%	99.84%	N/A

Source: NOAA National Climatic Data Center
IMC Weather Observations: 39,011
Station: 727455
Data Range: 2011-2020

TABLE 2-15
RUNWAY WIND COVERAGE – ALL WEATHER CONDITIONS

ALL-WEATHER CONDITIONS WIND DATA			
Runway	**Crosswind Component**		
	10.5 Knots	**13 Knots**	**16 Knots**
Runway 4-22	86.80%	91.63%	N/A
Runway 13-31	98.18%	99.29%	99.89%
Combined	99.51%	99.94%	N/A

Source: NOAA National Climatic Data Center
All-Weather Observations: 127,186
Station: 727455
Data Range: 2011-2020

2.9 AIRFIELD CAPACITY

Capacity, or throughput capacity, is defined as a measure of the maximum number of aircraft operations that can be accommodated on the airport in an hour. To determine airfield capacity and associated aircraft delays at a planning level, the methodology of FAA AC 150/5060-5, *Airport Capacity and Delay* is generally used. HIB is a two-runway system comparable to configuration number 9 depicted in FAA AC 150/5060-5, *Airport Capacity and Delay*.

FAA uses the Annual Service Volume (ASV) as a reasonable estimate of an airport's annual operations capacity. **Table 2-16** shows a comparison of forecast aircraft operations and the estimated ASV ratio of the existing airfield. Calculation of the ASV includes considerations of factors such as runway configuration, weather, the percentage of large and heavy aircraft operations compared to total annual operations as the fleet mix, and the number of touch-and-go operations. The ASV of the existing runway configuration is estimated at 200,000 operations and significantly exceeds forecast operations levels therefore, at forecast activity levels, no additional runway capacity will be necessary within the planning period. Assuming both runways are adequately serving the overall airport fleet mix of the future, planning for additional runway capacity should begin when the ASV ratio reaches 60 percent (120,000 operations).

TABLE 2-16
COMPARISON OF FORECAST OPERATIONS AND ANNUAL AIRFIELD CAPACITY

	Existing 2020	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Forecast Operations	13,000	15,400	16,300	18,100
Existing ASV	200,000	200,000	200,000	200,000
ASV Ratio	7%	8%	8%	9%

Source: RS&H Analysis, 2021

2.10 AIRFIELD DESIGN

This section analyzes various elements of the airfield, determines if FAA design standards are met, and quantifies the ability (or lack of ability) to accommodate forecast demand.

2.10.1 Airfield Configuration

The airfield configuration consists of two runways and seven taxiways. **Figure 2-19** shows the FAA airport diagram. The Airport's primary runway – Runway 13-31 – is 6,758 feet long and 150 feet wide. It is separated from the centerline of parallel Taxiway C by 400 feet. The secondary runway – Runway 4-22 – is 3,075 feet long by 75 feet wide and intersects Runway 13-31.

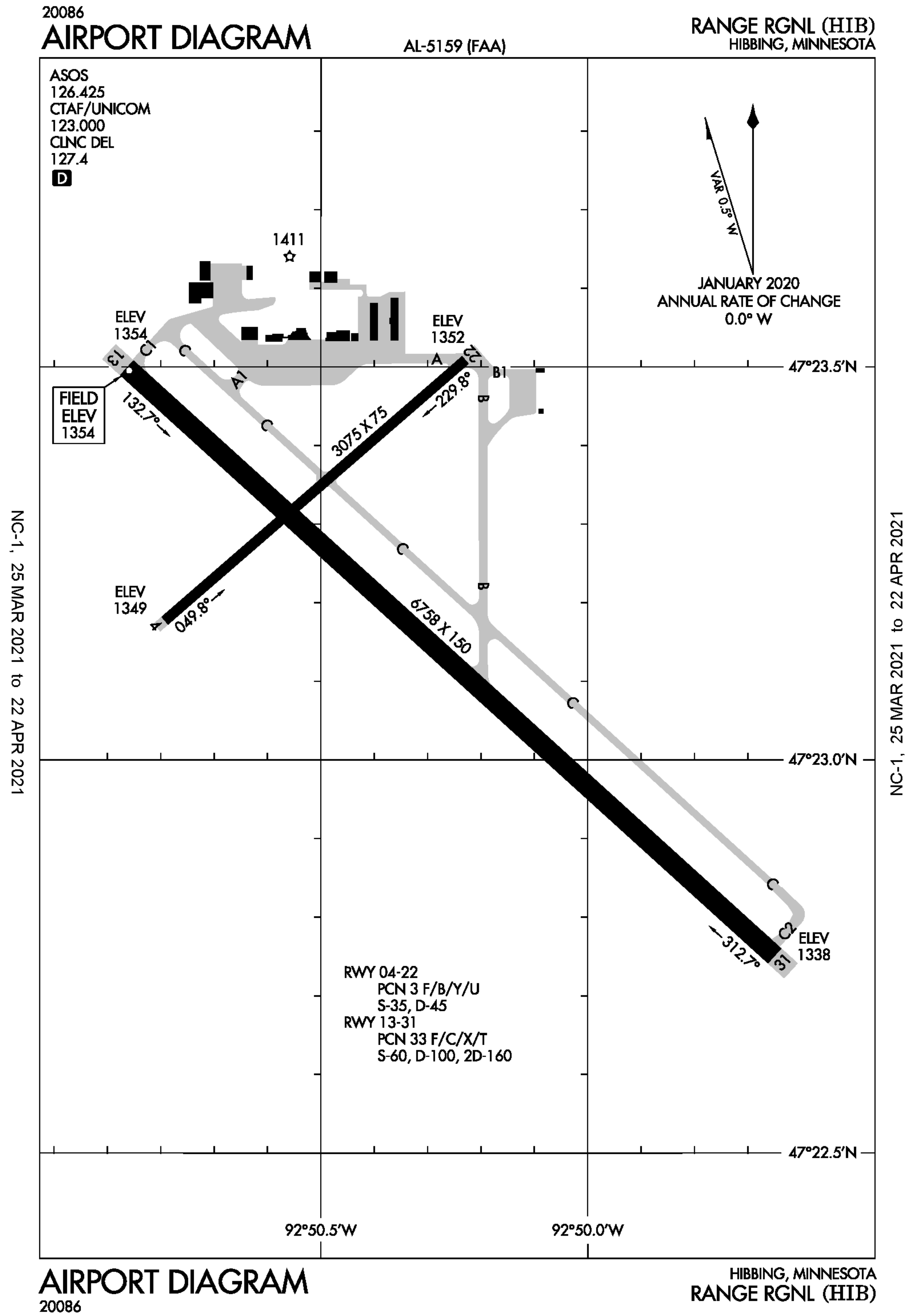
The purpose of a taxiway system is to provide safe and efficient movement of aircraft to and from the ramps and runways. The taxiway system at HIB consists of the following elements:

- Taxiway A is a connector taxiway that extends east from the apron south of the T-hangars to the threshold of Runway 22, it runs an east-west orientation.

- Taxiway A-1 is a connector taxiway that extends southwest from the terminal air carrier apron to Taxiway C.
- Taxiway B is oriented in a north-south direction providing access to Taxiway B-1, and ultimately the threshold of Runway 22, from the southeast portion of the airfield intersecting Taxiway C and Runway 13-31.
- Taxiway B-1 is a connector taxiway providing access to MnDNR facilities/apron from Taxiway B and the threshold of Runway 22.
- Taxiway C is a full parallel taxiway on the east side of Runway 13-31 providing full access to the runway. Taxiway C extends in a northwest-southeast orientation and intersects Runway 4-22.
- Taxiway C-1 is a connector taxiway with access to the north end of Taxiway C from Runway 13.
- Taxiway C-2 is a connector taxiway providing access to Runway 31 at the south end of Taxiway C.

All Airport taxiways allow for the efficient movement of aircraft. FAA design standards and non-standard conditions for HIB taxiways will be analyzed in **Section 2.10.4*, Taxiway Design***, of this chapter.

FIGURE 2-19
FAA AIRPORT DIAGRAM OF RANGE REGIONAL AIRPORT



Source: FAA Airport Diagram current March 25, 2021 to April 22, 2021

2.10.2 Airport Design Criteria

As is true of all federally obligated airports, FAA airfield design standards are designated by FAA approved critical aircraft[66]. These design standards include geometric standards as well as dimensional requirements, such as the distance between taxiways and runways, and the size of certain areas protecting the safety of aircraft operations and passengers, all designed to accommodate specific critical aircraft.

The FAA establishes guidance for airport design standards in FAA AC 150/5300-13A, *Airport Design*. This AC outlines design criteria for certain groups of aircraft depending on the Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). Engineering airfield surfaces to FAA design criteria is critical to maintaining an airfield environment that can safely accommodate the Airport's critical aircraft. The AAC and ADG parameters equate to an Airport Reference Code (ARC) of C-III. Historically, C-III design criteria has guided airfield design at HIB. This has enabled the Airport to meet design standards for the Bombardier CRJ200 (existing C-II critical aircraft) which operates a minimum of two daily arrivals and departures or, four total daily operations, for EAS. As identified in **Chapter 1, *Aviation Forecasts***, it is anticipated that Range Regional Airport will return to a C-III critical aircraft designation within the 20-year planning horizon, therefore, design standards for the future critical aircraft (Embraer 175) are used to assess facility requirements within this Master Plan.

Taxiway design guidance is driven by the critical aircraft undercarriage dimensions including overall main gear width and cockpit to main gear distance. The forecast critical aircraft for HIB is a TDG-3. The airfield configuration at HIB necessitates that Runway 13-31 and the entire taxiway system be evaluated based on their ability to accommodate C-III and TDG-3 design standards. However, Runway 4-22 is designed to B-II standards.

The following sections discuss runway design requirements and taxiway design requirements.

2.10.3 Runway Design

Analysis of HIB runways evaluates their ability to meet design standards and forecast demand. At a minimum, runways must have adequate length, width, and strength to meet FAA design standards for the critical aircraft. This section analyzes these specific runway criteria and makes recommendations based on forecasted need. Elements to be examined in this section include runway design group, designation, length, width, strength, and runway protection zones.

2.10.3.1 Runway Design Requirements

The Runway Design Code (RDC) of a runway is used by the FAA to determine the standards that apply to a specific runway and parallel taxiway to allow unrestricted operations by the design aircraft under desired meteorological conditions.[67]

[66] The most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is a minimum of 500 annual operations, excluding touch-and-go operations. An operation is a takeoff or landing. AC 150/5000-17, *Critical Aircraft and Regular Use Determination* provides FAA guidance on defining critical aircraft at an airport. (FAA, 2017)

[67] FAA AC 150/5300-13A, *Airport Design* (2014)

Runway 13-31 is the only HIB runway serving precision approaches, with an instrument landing system (ILS) used for approaches at both ends of the runway. **Table 2-17** shows FAA instrument approach visibility minimums and equivalent runway visual range definitions. Based on existing ½ mile visibility minimums at HIB, the RDC for Runway 13-31 is C-III-2400. As the secondary runway, Runway 4-22 primarily accommodates general aviation operations by smaller piston and turboprop aircraft, but it is also capable of accommodating some smaller corporate jets. Runway 4-22 has an RNAV (GPS) approach on each end with 1 mile visibility minimums, making it an RDC of B-II-5000.

TABLE 2-17
INSTRUMENT APPROACH VISIBILITY MINIMUMS

Runway Visual Range (RVR)	Instrument Flight Visibility Category (Statute Miles)
5000	Not lower than 1 mile
4000	Lower than 1 mile but not lower than 3/4 mile
2400	Lower than 3/4 mile but not lower than 1/2 mile
1600	Lower than 1/2 mile but not lower than 1/4 mile
1200	Lower than 1/4 mile

Note: RVR values are not exact equivalents.

Source: FAA AC 150/5300-13A, *Airport Design* (2014)

2.10.3.2 Runway Designation

Every runway has two associated directional headings. A true heading, or the direction toward which it is physically oriented that will not change unless the runway is realigned, and a magnetic heading, which is determined by the runway's orientation relative to magnetic north. A runway's magnetic heading is important because navigation equipment and instrument approaches are designed with respect to magnetic heading rather than a true heading. Due to the slow drift of the magnetic poles on the Earth's surface, the magnetic bearing of a runway changes over time and runway designations must occasionally be updated. It is industry standard that a runway designation be considered when the runway magnetic heading shifts more than 5° from the existing runway designation.

The rate of magnetic variance at HIB is 0.30° W +0.26° W as of February 2021. The current rate of change is 0° 2' W per year. As shown in **Table 2-18**, Runway 13-31 is not projected to require a runway designation revision during the planning period. However, Runway 4-22 exceeds the 5° standard for revising the runway marking designation and should be updated to Runway 5-23 whenever pavement rehabilitation or resurfacing occurs, or as soon as otherwise practical.

Table 2-18, shows the Airport's runway designations and anticipated changes throughout the planning period.

TABLE 2-18
RUNWAY DESIGNATION

Existing				Future (2039)		
Runway Designation	Runway Heading	True Bearing	Magnetic Bearing	Magnetic Heading	Runway Heading	Runway Designation
Runway 13	130°	132° 13' 0.07"	132° 43' 0.07"	133° 23' 0.07"	130°	Runway 13
Runway 31	310°	312° 13' 54.29"	312° 43' 54.29"	313° 23' 54.29"	310°	Runway 31
Runway 4	050°	49° 20' 26.40"	49° 50' 26.40"	49° 90' 26.40"	050°	Runway 5
Runway 22	230°	229° 20' 51.35"	229° 50' 51.35"	229° 90' 51.35"	230°	Runway 23

Source: NOAA – National Centers for Environmental Information; RS&H Analysis, 2021

2.10.3.3 Runway Length Requirements

Runway length is determined by the greater requirement of the takeoff or landing performance characteristics of the existing and future design aircraft, or the composite family of airplanes as represented by the design aircraft. The takeoff length, including takeoff run, takeoff distance, and accelerate-stop distance, is typically the more demanding of the runway length requirements.

As described below, there are two primary means for determining the Airport's recommended runway lengths:

Guidance A FAA Recommended Runway Length: This analysis provides a general estimated runway length guidance based on FAA computer modeling software and Advisory Circular performance graphs for composite aircraft groups, as adjusted for HIB mean maximum temperature, field elevation, difference in runway centerline elevations, and aircraft flight range of greater than 500 nautical miles.

Guidance B Critical Aircraft Planning Manuals (Performance Curves): This analysis determines runway length required for specific aircraft models and engines based on data from the aircraft manufacturer, operator requirements, aircraft operating (payload) weights, flight range, historical environmental conditions, and field elevation.

This Master Plan uses Monte Carlo simulation and statistical analysis methods to determine the required length for Runway 13-31. That analysis and resulting runway facility requirements are described in **Appendix B** of this Master Plan.

2.10.3.4 Runway Widths

Runway 13-31 is 150 feet wide, and Runway 4-22 is 75 feet wide. Neither runway has paved shoulders, but the Airport does currently mow its shoulders and stabilizes turf on the sides of both runways. FAA design standards recommended or require runway shoulders dependent upon the ADG of aircraft using the runway to provide resistance to blast erosion and accommodate passage of maintenance and emergency equipment as well as the occasional aircraft veering from the runway. Per AC 150/5300-13A, *Airport Design*, paved shoulders on runways are not required for ADG-I, ADG-II, or ADG-III runways. In their place, guidance suggests using turf, aggregate-turf, soil cement, lime, or bituminous stabilized soil. However, the

AC does state that when the critical aircraft of a runway becomes ADG–III, paved shoulders are recommended. For this reason, it is recommended that the shoulders of Runway 13-31 are paved when ADG-III aircraft operations exceed 500 operations annually.

Table 2-19 shows the widths of Runway 13-31 and 4-22 both meet current FAA standards. As is true of all facility requirement tables within this chapter, facilities meeting FAA design standards are shown with a checkmark "✓" and unmet design standards are denoted by a bold "**X**".

TABLE 2-19
RUNWAY WIDTH REQUIREMENTS

Runway	Design Group	Width	Shoulder	Meets Requirements (✓)
13-31	ADG-III	150′	0′	✓[1]
4-22	ADG-II	75′	0′	✓

Note: 1) Shoulders are not required for Runway 13-31 until ADG-III aircraft operations reach 500 operations annually. Runway 13-31 meets existing critical aircraft C-II requirements because it is already designed to C-III standards.
Source: AC 150/5300-13A, *Airport Design*; RS&H Analysis, 2021

2.10.3.5 Runway Strength

Runway 13-31 is designed with a pavement strength that satisfies requirements for the majority of aircraft operating at HIB over the past 10 years at Maximum Takeoff Weight (MTOW).[68] While the Boeing 737-800 has an MTOW of 174,200 pounds which exceeds the listed pavement strength of 160,000 pounds it operates infrequently enough that, by using FAA FAARFIELD[69] airfield pavement strength software, civil engineers can verify the runway pavement strength is still safe for operations. Should the Boeing 737-800 perform more than 65 departures annually (or 130 total annual operations) over the planning period, the Runway 13-31 pavement would need to be reconstructed to increase its weight bearing capacity.

Runway 4-22 has a pavement strength capacity of 45,000 pounds This strength is adequate to accommodate its primary users, smaller general aviation aircraft.

Table 2-20 shows that runway pavement strength currently meets facility requirements for the Airport.

[68] Based on FAA TFMSC records from 2010-2019

[69] FAARFIELD 1.42 FAARFIELD 1.42 is the standard thickness design software accompanying AC 150/5320-6F *Airport Pavement Design and Evaluation*. FAARFIELD 1.42 replaces all previous versions of FAARFIELD.

TABLE 2-20
PAVEMENT STRENGTH REQUIREMENTS

Pavement Area	Existing Pavement Strength (Gear Type)	Recommended Pavement Strength	Meets Requirements
Runway 13-31	60,000 lbs (SWG) 100,000 lbs (DWG) 160,000 lbs (DTW)	60,000 lbs (SWG) 100,000 lbs (DWG) 174,200 lbs (DTW)	✓ ✓ ✓[2]
Runway 4-22	35,000 lbs (SWG) 45,000 lbs (DWG)	35,000 lbs (SWG) 45,000 lbs (DWG)	✓ ✓

Note: 1) SWG – Single Wheel Gear; DWG – Double Wheel Gear; DTW – Double Tandem Wheel. 2) When the Boeing 737-800 performs 65 or more departures annually the pavement strength will no longer meet requirements.
Source: FAA 5010 Master Record; RS&H Analysis, 2021

2.10.3.6 Runway Protection Zones

FAA defines Runway Protection Zones (RPZs) off runway ends to enhance the protection of people and property on the ground. The size of these zones varies according to design aircraft characteristics, visual approaches, and the lowest instrument approach visibility minimum defined for each runway. It is most desirable to have these areas clear and owned by the Airport.

There are two RPZs for each runway end – a departure and an approach RPZ. HIB has instrument approaches for all runway ends and therefore each runway end has an approach RPZ, the larger and more limiting of the two. There are no declared distances at HIB so all RPZs begin at 200 feet from the end of the useable pavement on each runway.

Table 2-21 lists dimensions and acreage of the most demanding RPZ (approach RPZ) for each runway end, and amount of acreage not owned by the Airport.

TABLE 2-21
RUNWAY PROTECTION ZONE REQUIREMENTS

RPZ Measure	Runway					
	13	31	4 B-II	4 B-II Small	22 B-II	22 B-II Small
Length	1,000'	1,000'	500'	250'	500'	250'
Inner Width	2,500'	2,500'	1,000'	1,000'	1,000'	1,000'
Outer Width	1,750'	1,750'	700'	450'	700'	450'
Total Acreage	78.91	78.91	13.77	8.04	13.77	8.04
Airport Control[1] (✓)	**X (0.1 Acres)**	✓	**X (0.2 Acres)**	✓	✓	✓

Source: AC 150/5300-13A, *Airport Design*; RS&H Analysis, 2021
Note: (1) Airport control of land use is achieved through both fee simple ownership and perpetual avigation easement.

As recommended, the existing RPZs are fully owned by the Airport on Runway 31 and Runway 22. The approach RPZ for Runway 31 contains approximately 0.1 acre of off-Airport property and a small segment of State Highway Mn-37. Runway 4 includes approximately 0.2 acres of off-Airport property. There is an avigation easement in place at this location.

According to FAA AC 150/5300-13B[70], the following new land uses within the limits of the RPZ are permissible without further evaluation:

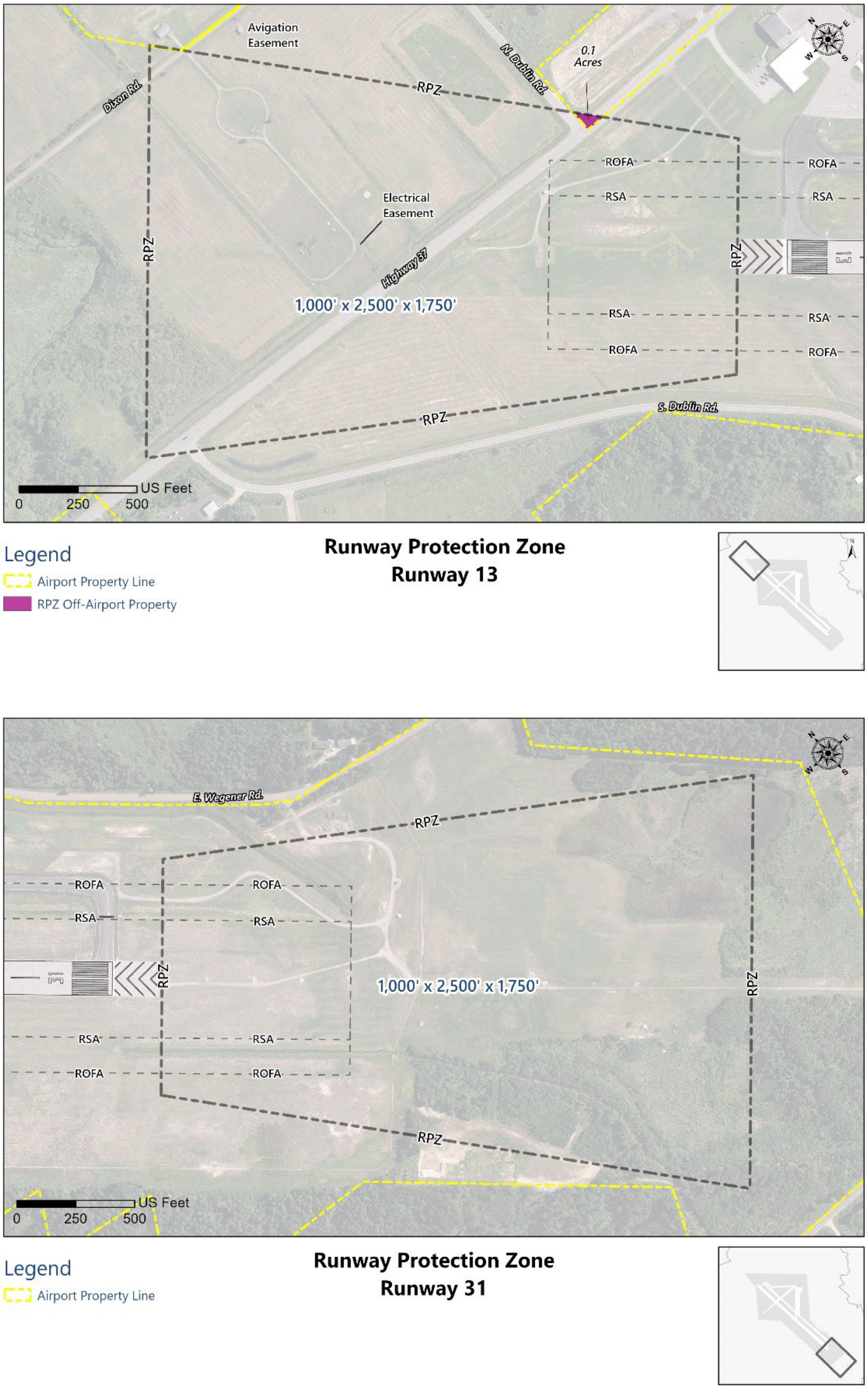
- Farming activities meeting airport design clearance standards
- Irrigation channels meeting the standards of AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and FAA/USDA Manual, *Wildlife Hazard Management at Airports*
- Airport service roads, as long as they are not public roads and are under direct control of the airport operator
- Underground facilities, as long as they meet other design criteria, such as RSA standards, as applicable
- NAVAIDs and aviation facilities, such as equipment for airport facilities considered fixed-by-function in regard to the RPZ
- Above-ground fuel tanks associated with back-up generators for unstaffed NAVAIDS

In FAA RPZ guidance, transportation facilities not limited to, but including public roads/highways were identified as examples of land uses in an RPZ that are incompatible. The intention of this guidance is to address the introduction of new or modified land uses, meaning that while the uses are defined as incompatible, mitigation is not immediately required for previously existing infrastructure. However, FAA does not support expansion of incompatible uses with the RPZs. The Airport should continue to regularly assess overall risk presented by the road and maintain communication with the FAA Regional Office and Airports District Office (ADO).

The approach RPZs for each runway end are shown in **Figure 2-20** and **Figure 2-21**. Portions of the RPZs outside the airport property boundary are highlighted in red along with the respective amount of acreage not owned or under airport control. While this is not an immediate concern, the Airport should monitor the properties and attempt to acquire the remaining unowned land within each RPZ when practical. This includes 0.1 acres for Runway 13 and 0.2 acres for Runway 4. All land in these two areas are zoned Agricultural – Rural Residential.

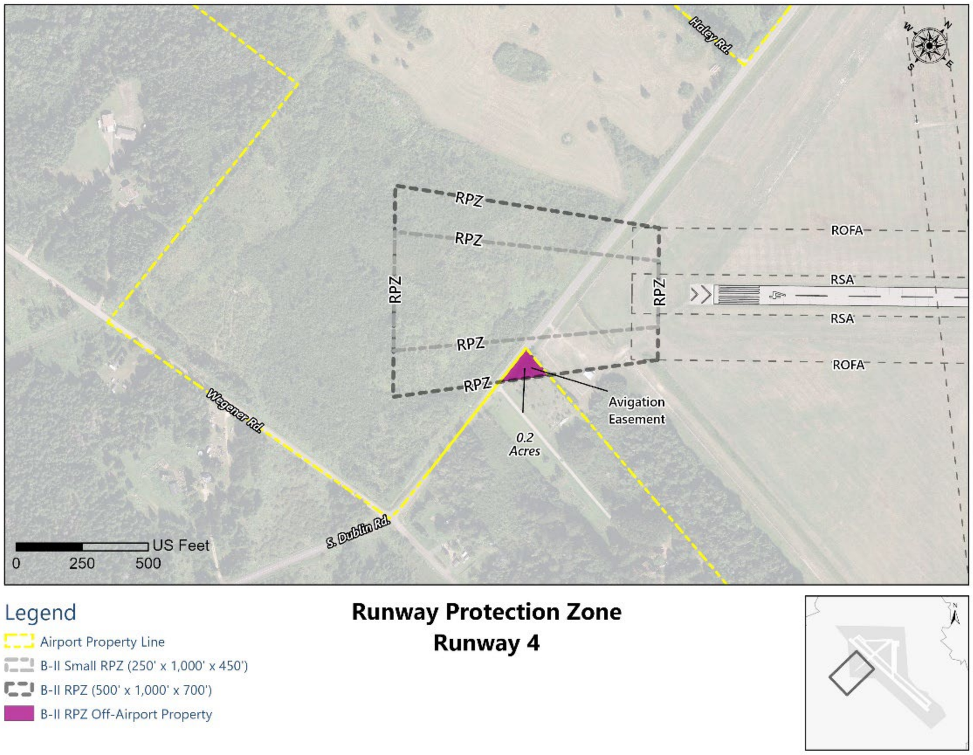
[70] AC 150/5300-13B was published by FAA on March 22, 2022 after completion of HIB study but was referenced during revisions addressing FAA review comments.

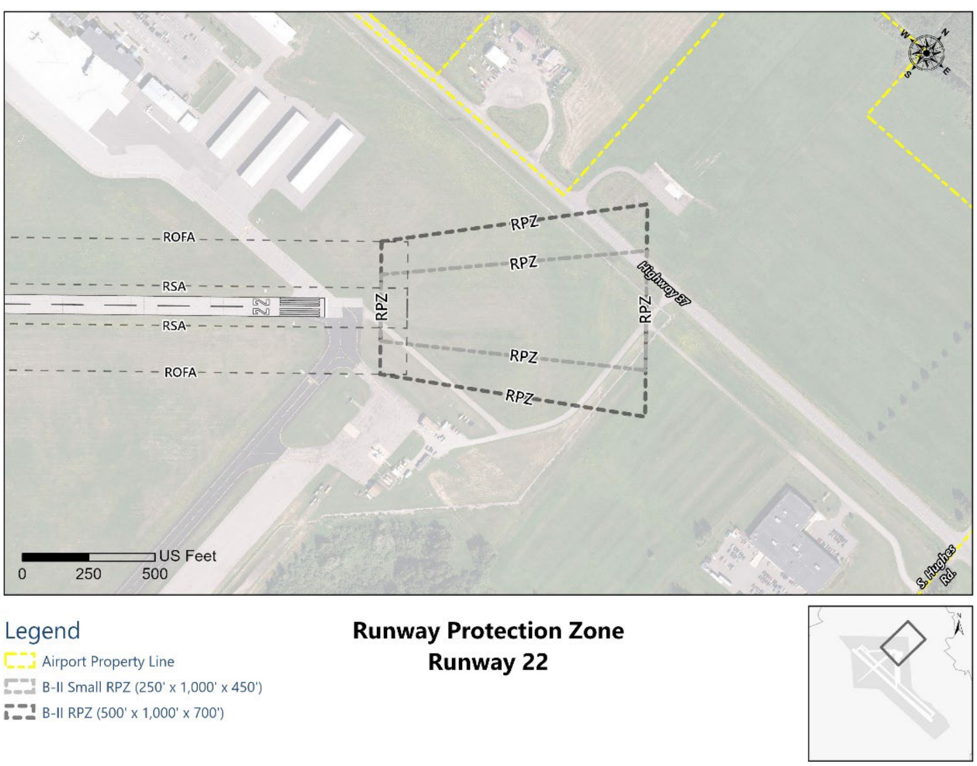
FIGURE 2-20
RUNWAY 13-31 RPZ EVALUATION



Source: RS&H Analysis, 2021

FIGURE 2-21
RUNWAY 4-22 RPZ EVALUATION





Source: RS&H Analysis, 2021

2.10.3.7 Runway Geometric and Separation Standards

This section analyzes the existing runway geometric and separation distances against the dimensional standards that arise from the critical aircraft category designated for each runway. Compliance with FAA airport geometric and separation standards is intended to meet a minimum level of airport operational safety and efficiency.

Runway 13-31 was evaluated for geometric and separation deficiencies using C-II and C-III runway design criteria (C-III shown in **Table 2-22**). The blast pad width and length for each end of the runway meet C-II criteria but not C-III. The RDC is currently a C-II so the C-III requirement would not need to be met until the critical aircraft increases to an ADG-III. Additionally, an approximately 0.13 acres of the ROFA contains **Table 2-22** compares current FAA C-II (see footnotes) and C-III design standards to existing conditions.

TABLE 2-22
RUNWAY 13-31 DESIGN STANDARDS

Airfield Components	C-III Requirement	Existing	Meets C-III Requirement
Blast Pad Design			
Runway blast pad width	200'	150'	X[1]
Runway blast pad length	200'	187'-198'	X[1]
Runway Separation			
Runway centerline to:			
Holding position	250'	264'	✓
Parallel taxiway/taxilane centerline	400'	400'	✓
Aircraft Parking Area	500'	700'	✓
Safety Areas			
Runway Safety Area (RSA)			
Length beyond departure end	1,000'	1,000'	✓
Length prior to threshold	600'	600'	✓
Width	500'	500'	✓
Runway Object Free Area (ROFA)			
Length beyond runway end	1,000'	1,000'	X[2]
Length prior to threshold	600'	600'	X[2]
Width	800'	800'	X[2]
Runway Obstacle Free Zone			
Length	200'	200'	✓
Width	400'	400'	✓
Precision OFZ			
Length	200'	200'	✓
Width	800'	800'	✓

Note: (1) The current blast dimensions of Runway 13-31 meet the minimum C-II requirements of 120 feet wide by 150 feet long.
(2) Runway 13-31 ROFA extends slightly beyond airport property fencing an approx. total of 0.13 acres including approx. 300 square feet of MN-37 right-of-way. This impact is reviewed further in Chapter 6, FAA Project Coordination.
Source: AC 150/5300-13A, *Airport Design*; RS&H Analysis, 2021

Table 2-23 compares FAA airport design standards to existing conditions for Runway 4-22 using B-II runway design criteria. FAA guidance recommends that additional blast pad pavement is necessary to meet current standards, so it is recommended the blast pads increase in size as soon as it is practical.

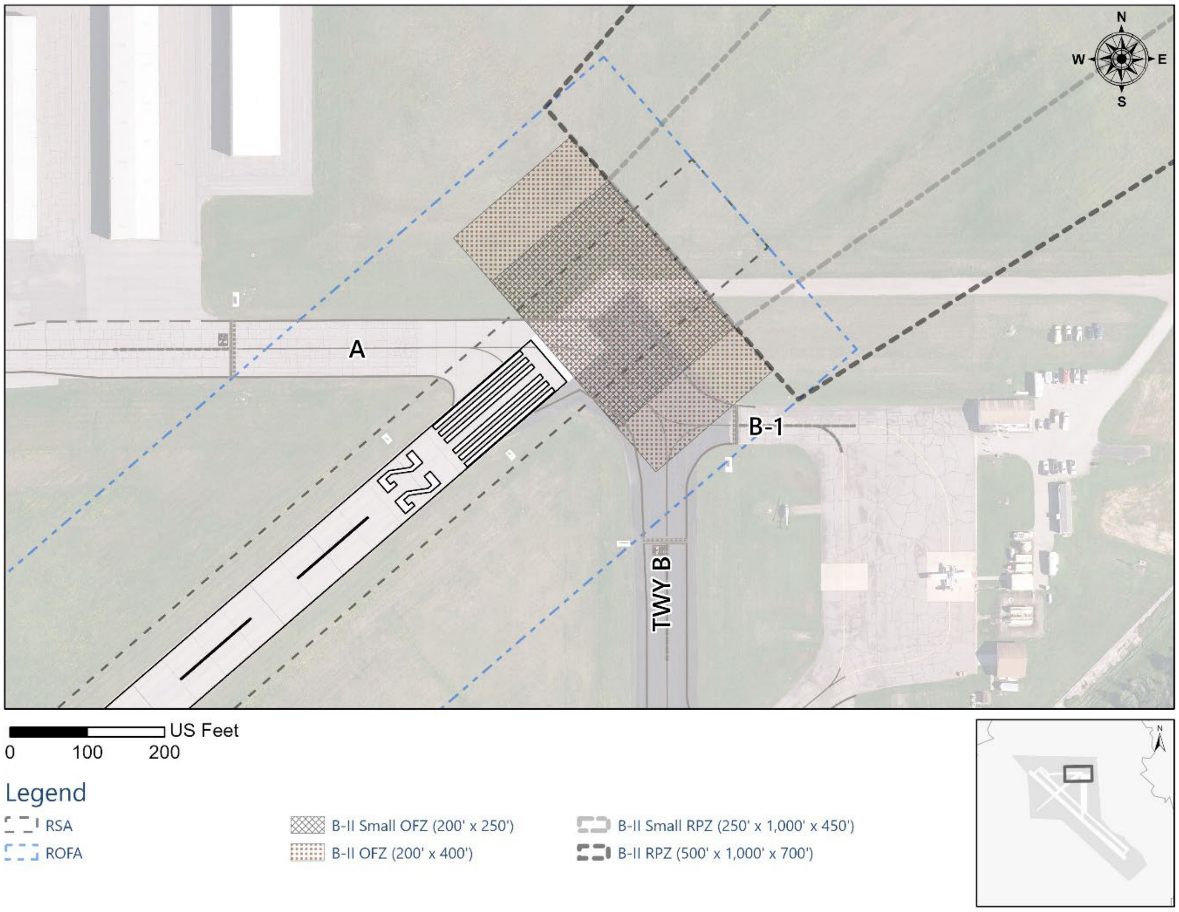
TABLE 2-23
RUNWAY 4-22 DESIGN STANDARDS

Airfield Components	B-II Small Requirement	B-II Requirement	Existing	Meets B-II Requirement
Blast Pad Design				
Runway blast pad width	95'	95'	75'	**X**
Runway blast pad length	150'	150'	80'	**X**
Runway Separation				
Runway centerline to:				
Holding position	125'	200'	200'	✓
Parallel Taxiway/Taxilane Centerline	240'	240'	250'	✓
Aircraft Parking Area	250'	250'	350'	✓
Safety Areas				
Runway Safety Area (RSA)				
Length beyond departure end	300'	300'	300'	✓
Length prior to threshold	300'	300'	300'	✓
Width	150'	150'	150'	✓
Runway Object Free Area (ROFA)				
Length beyond runway end	300'	300'	300'	✓
Length prior to threshold	300'	300'	300'	✓
Width	500'	500'	500'	✓
Runway Obstacle Free Zone (ROFZ)				✓
Length	200'	200'	200'	✓
Width	250'	400'	400'	✓

Source: AC 150/5300-13A, *Airport Design*; RS&H Analysis, 2021

Additionally, the Runway Obstacle Free Zone (ROFZ) on the approach of end of Runway 22, has penetrations from a vehicle service road (VSR) and the intersections of Taxiway A and Taxiway B. Given the infrequent usage of this segment of VSR as well as identifying hold line markings and signage on the taxiways, it is recommended that Airport staff coordinate with the FAA Part 139 inspector to determine the adequacy of signage as a remedy to prevent accidental intrusion. Due to the low potential for incident occurrence, signage should be sufficient to prevent any aircraft or airport vehicles from entering into the ROFZ during aircraft operations. FAA coordination would be required to determine proper placement of identifying signage on the taxiways and roads outside of the RSA, ROFA, and RPZ. **Figure 2-22** shows the ROFZ of Runway 22.

FIGURE 2-22
RUNWAY 22 OBSTACLE FREE ZONE



Source: RS&H, 2021

2.10.4 Taxiway Design

This taxiway analysis addresses specific requirements relative to FAA design criteria and the ability of the existing taxiways to accommodate the current and projected demand. At a minimum, taxiways must provide efficient circulation, be constructed to the proper strength, and meet FAA design standards to safely accommodate the design aircraft. Airport runways need to be supported by a system of taxiways that provide access between the runways and the aircraft parking and hangar areas. Taxiways are classified[71] in the following way:

- Parallel Taxiway[72] - Facilitate the movement of aircraft to and from the runway.
- Exit Taxiway – Provide a means of entering and exiting the runway (does not include those taxiways designated as connector, parallel, or apron edge taxiway).

[71] Only parallel and connector taxiways exist at HIB.

[72] A parallel taxiway is only required on precision instrument runways with less than ¾ mile visibility, therefore, Runway 4-22 does not require a parallel taxiway.

- Crossover or Traverse Taxiway – Provide increased taxiway flexibility between two parallel taxiways.
- Apron Taxiway or Connector- Provide primary aircraft access in an aircraft parking apron.

Classifications for HIB taxiways are shown in **Table 2-24**.

TABLE 2-24
TAXIWAY CLASSIFICATIONS

Taxiway Designation	Taxiway Classification
TWY A	Apron Taxiway
TWY A-1	Apron Taxiway
TWY B	Connector Taxiway
TWY B-1	Apron Taxiway
TWY C	Full Parallel Taxiway
TWY C-1	Connector Taxiway
TWY C-2	Connector Taxiway

Source: AC 150/5300-13A, *Airport Design*; RS&H Analysis, 2021

The goal of an effective taxiway system is to maintain traffic flow and optimize operational efficiency for the different users, using taxi routing with a minimum number of points requiring a change in the airplane's taxiing speed. At HIB, there are seven taxiways in total, including taxiway connectors. Because the Airport has such a flexible configuration, its users are enabled to optimize their routes to preferred runways for their operations.

Taxiway C is the Airport's longest taxiway and serves as the parallel taxiway for Runway 13-31. Taxiway C has two defined connector taxiways that connect to each end of Runway 13-31. Taxiway B serves as a connector taxiway providing access from near the approach end of Runway 22 and the MnDNR facilities to Runway 13- 31. Taxiway B also provides an accessway to the Future East Development Area and likely will increase in usage when that area becomes developed. Taxiway A primarily serves the T-hangar area providing access to Runway 22. Taxiways A-1, B-1, C-1, and C-2 are all short connector taxiways linking various segments of the airfield.

The Airport's design aircraft determines taxiway design standards and dimensional criteria. Taxiway pavement width is determined by the TDG of the design aircraft. Separation standards are determined by the ADG of the design aircraft. To accommodate the HIB design aircraft, it is recommended that all taxiways be designed and built to ADG-III/TDG-3 standards[73]. These are evaluated in **Table 2-25**.

[73] Further analysis of taxiways primarily serving B-II-2 aircraft is provided within Chapter 6, *FAA Project Coordination*. The approved ALP incorporates preferred taxiway design groups for specific areas primarily serving Runway 4-22.

TABLE 2-25
TAXIWAY REQUIREMENTS

Taxiway Components	ADG-III/TDG 3							
	Requirement	TWY A	TWY A-1	TWY B	TWY B-1	TWY C	TWY C-1	TWY C-2
Taxiway Width	50'	✓	✓	✓	✓	✓	✓	✓
Taxiway Shoulder Width[1]	20'	-	✓	✓	-	✓	✓	✓
Taxiway Safety Area Width	118'	✓	✓	✓	✓	✓	✓	✓
Taxiway Object Free Area Width	186'	✓	✓	✓	✓	✓	✓	✓
CL to Parallel Taxiway	152'	-	-	-	-	-	-	-
CL to Fixed or Movable Object	93'	✓	✓	✓	✓	✓	✓	✓
Taxiway Fillet Design	[2]	X	X	X	X	X	✓	✓

Note: 1) Taxiway shoulders are not required for ADG-III or smaller, however, they are recommended by FAA.
2) See section 406, paragraph (b) in FAA Advisory Circular 150/5300-13A for fillet design dimensions.
Source: AC 150/5300-13A, *Airport Design*; RS&H Analysis, 2021

One non-movement area was evaluated as ADG-III/TDG-3 taxilanes. Taxilane A extends west from Taxiway A, along the southern edge of the air carrier and transient aprons. In addition to connecting to Taxiway A, it also intersects Taxiway A-1 and Taxiway C-1. **Table 2-26** shows the requirements for Taxilane A as an ADG-III/TDG-3 non-movement area.

TABLE 2-26
NON-MOVEMENT AREA REQUIREMENTS ADG-III/TDG-3

Taxilane Components	ADG-III/TDG-3	
	Requirement	Taxilane A
Taxiway Width	50'	✓
Taxiway Shoulder Width[1]	20'	(0'-20')
Taxiway Safety Area Width	118'	✓
Taxiway Object Free Area Width	186'	✓
CL to Parallel Taxiway	140'	-
CL to Fixed or Movable Object	81'	✓
Taxiway Fillet Design	[2]	✓

Note: 1) Taxiway shoulders are not required for ADG-III or smaller, however, they are recommended by FAA.
2) See section 406, paragraph (b) in FAA Advisory Circular 150/5300-13A for fillet design dimensions.
Source: AC 150/5300-13A, *Airport Design*; RS&H Analysis, 2021

Additionally, there are six other non-movement areas recognized as ADG-I/TDG-1B taxilanes that were evaluated. For the purposes of identification in this study, they are labeled as the MnDNR Apron and Taxilanes #1-5. The MnDNR Apron connects to Taxiway B-1 and Taxiway B; Taxilane-1 is located between buildings H and I; Taxilane-2 is located between buildings I and J; Taxilane 3 is located west of building H and extends north to the aircraft painting hangar and building A-2 (private hangar); Taxilane-4 is located east of building J; and Taxilane-5 provides access to the tie-downs west and north of the fuel farm. (For visual reference refer to **Figure 2-7**.)

Table 2-27 shows the requirements for other non-movement areas identified as an ADG-I/TDG-1A non-movement area.

TABLE 2-27
NON-MOVEMENT AREA REQUIREMENTS ADG-I/TDG-1A

Taxilane Components	ADG-I/TDG-1B						
	Requirement	MnDNR Apron	TL 1	TL 2	TL 3	TL 4	TL 5
Taxiway Width	25'	✓	✓	✓	✓	✓	✓
Taxiway Shoulder Width[1]	10'	-	-	-	-	-	-
Taxiway Safety Area Width	49'	✓	✓	✓	✓	✓	✓
Taxilane Object Free Area Width	79'	✓	✓	✓	✓	✓	✓
CL to Parallel Taxilane	64'	✓	-	-	-	-	-
CL to Fixed or Movable Object	39.5'	✓	✓	✓	✓	✓	✓
Taxiway Fillet Design	2	-	-	-	-	-	-

Note: 1) Taxiway shoulders are not required for ADG-III or smaller, however, they are recommended by FAA.
2) See section 406, paragraph (b) in FAA Advisory Circular 150/5300-13A for fillet design dimensions.
Source: Advisory Circular 150/5300-13A, *Airport Design*; RS&H Analysis, 2021

The existing taxiways and associated connectors were compared to the design standards set forth in AC 150/5300-13A, *Airport Design*, to identify deficiencies. FAA design standards recommend that taxiway shoulders be paved for all taxiways that serve ADG III aircraft. Therefore, it is recommended that Taxiway A and B-1 all have 20-foot paved shoulders constructed.

In 2012, the FAA revised the criteria for taxiway design dimensions and appropriate pavement fillet design. The previous standard used the ADG, which is based on the aircraft wingspan and tail height, to determine appropriate taxiway dimensions and fillet design. Current standards now require the taxiway dimensions be designed to meet TDGs, which are based upon the undercarriage dimensions, specifically the main gear width (MGW) and the cockpit to main gear (CMG) dimension. There are four taxiways that do not have fillets constructed to TDG-3 standards. These non-standard taxiway fillet locations include.

- Taxiway A at the 45/135-degree intersection of Runway 4-22
- Taxiway B
  - 90-degree intersection with Taxiway B-1
  - 45/135-degree intersection with MnDNR Apron
  - 45/135-degree intersection at the intersection of Runway 13-31
- Taxiway B-1 at the 90-degree intersection with the MnDNR Apron.
- Taxiway C
  - 90-degree intersection with Taxiway C-1
  - 90-degree intersection with Taxiway A-1
  - 90-degree intersection with Runway 4-22
  - 45/135-degree intersection with Taxiway B

2.10.5 Pavement Condition

An evaluation of the airfield pavement was based on the MnDOT Pavement Condition Report published in December 2017.[74] The report noted that much of the airfield at Range Regional Airport was in good to excellent condition, with some areas listed as fair to poor based on pavement condition index (PCI) ratings. Since that time, Taxiway B and Taxiway C southeast of Taxiway B were rehabilitated. Segments of Taxiway B and C TWY C received a mill and overlay in 2018, and a GSB-88 Sealcoat in 2019. As stated in **Section 2.10.3.5, *Runway Strength***, the Boeing 737-800 currently operates out of Range Regional Airport at a low enough frequency that the associated taxiway system pavement strength is adequate, but if the Boeing 737-800 performs more than 65 departures annually over the planning period, the pavement strength would need to be increased. The air carrier and transient aprons received a full depth replacement of both concrete and asphalt in 2016. Runway 13-31, Runway 4-22, and parts of Taxiway C received a crack seal treatment in 2018.

Based on these treatments and rehabilitations Taxilane-1, the MnDNR Apron, and Taxiway A are assumed to still have a poor PCI rating and are recommended to be rehabilitated or treated as soon as practical. **Figure 2-23** shows the Airport's PCI ratings from December 2017.

FIGURE 2-23
2017 AIRPORT PAVEMENT CONDITION REPORT

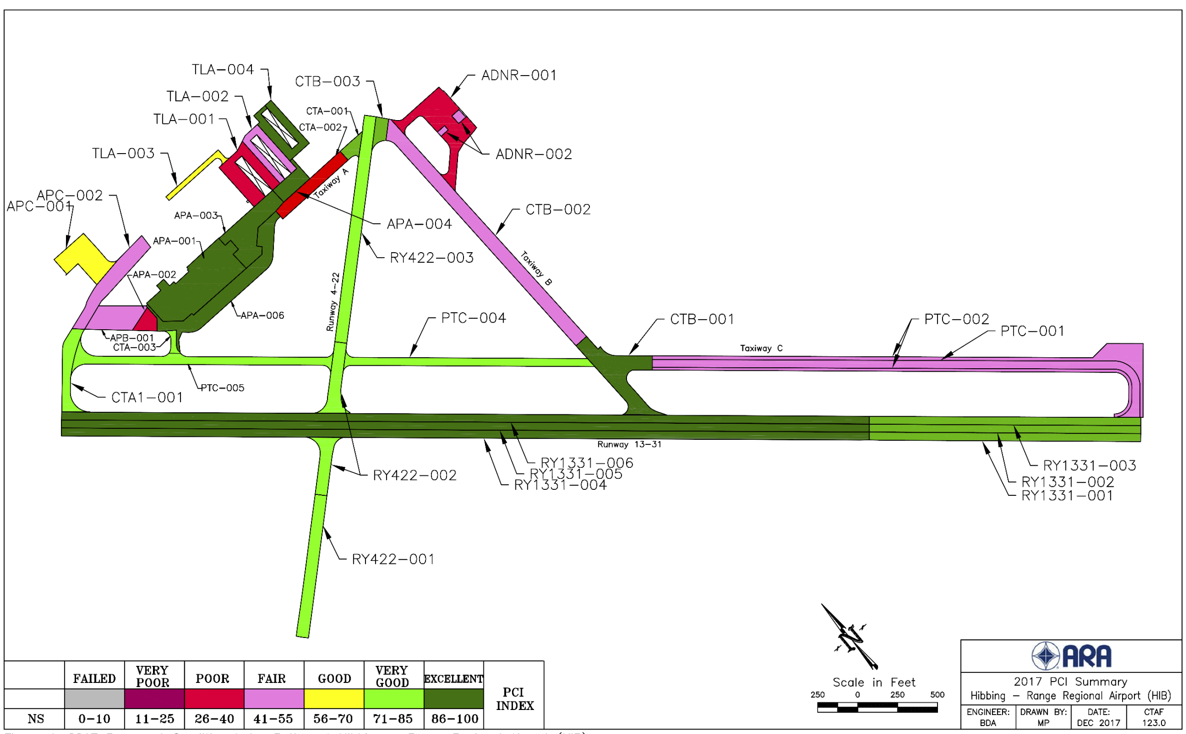


Figure 4. 2017 Pavement Condition Index Rating at Hibbing – Range Regional Airport (HIB)

Source: HIB Pavement Condition Report PCI Rating, 2017

[74] Range Regional Airport Pavement Condition Report (December 2017). https://www.dot.state.mn.us/aero/airportdevelopment/documents/pavementmanagementreports/2017pavementmanagement/HIB_Range%20Regional%20Airport_2017.pdf

2.10.5.1 Taxiway Deficiencies Summary

Analysis of the taxiways was conducted to determine if airfield deficiencies existed compared to current FAA design standards. The deficiencies found are described in this section. Most deficiencies relate to the recommendations from FAA Engineering Brief 75, *Incorporation of Runway Incursion Prevention into Taxiway and Apron Design*, which has been incorporated into AC 150/5300-13A. Other deficiencies, such as taxiway fillets, affect multiple taxiway intersections at HIB because they relate to changes in FAA design guidance since time of construction. Some deficiencies are critical to safe operations and should be focused on during the planning period. Other deficiencies are less safety-critical and therefore are better candidates for deferral when they could be addressed in conjunction with major rehabilitation projects as appropriate. It is important to note again that deviations from FAA standards stem from updated FAA standards and the differences are known to FAA. The FAA typically takes the position that these taxiway deficiencies are best corrected as pavement reaches the end of its useful like and reconstruction is necessary.

» **Taxiway A** does not meet the design standards for a 45/135-degree fillet and should be corrected. However, given the proximity to the runway end, and the acute intersection versus the recommended 90-degree intersection, it is recommended the taxiway and intersection undergo a redesign at the intersection of Runway 22. The taxiway also has a poor PCI rating per the 2017 MnDOT assessment and is recommended for reconstruction.

» **Taxiway B** has no taxiway lighting north of Taxiway C. It has 45/135-degree fillets at the intersection of Runway 13-31 that do not meet the TDG-3 design standards and should be corrected. Additionally, the taxiway intersecting the runway at an acute angle is required to be corrected.

» **Taxiway B-1** lacks taxiway shoulders, and while they are not required, it is recommended that they be constructed for improved safety. Additionally, the connector taxiway should be modified to meet the TDG-3 90-degree fillet standards. The pavement of Taxiway B-1 also had a poor PCI rating per the 2017 MnDOT assessment and is recommended for reconstruction.

» **Taxiway C** does not meet the TDG-3 90-degree fillet design standards at the intersections of Taxiway C-1, A-1, or Runway 4-22, or the TDG-3 45/135-degree fillet design standards at the intersection of Taxiway B and must be corrected.

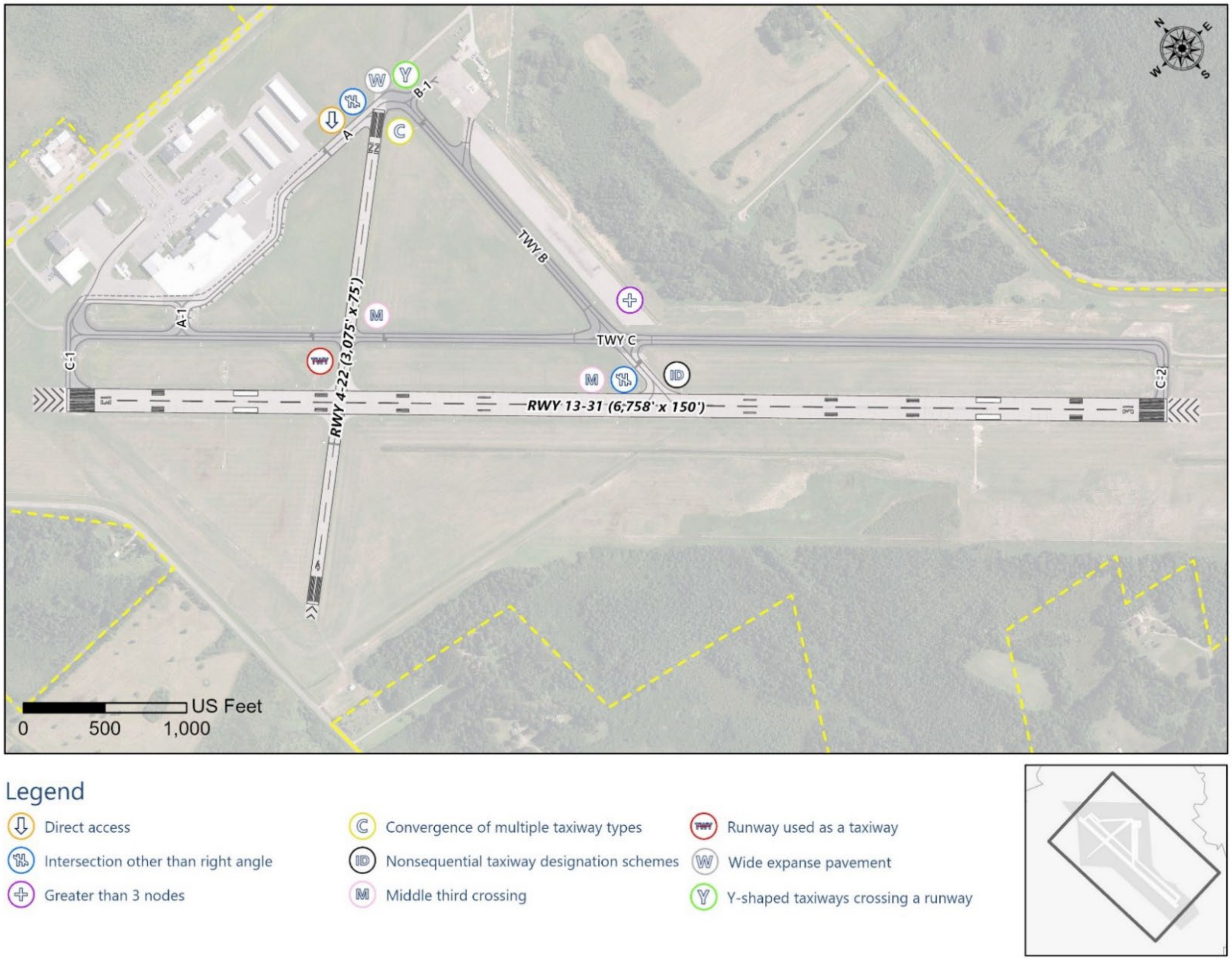
» **Taxiway C-1** meets all ADG-III/TDG-3 design standards.

» **Taxiway C-2** meets all ADG -III/TDG-3 design standards.

» **Non-movement areas** meet ADG-I/TDG-1A standards, but the pavement of the western portion of Taxilane A, the MnDNR Apron, and Taxilane 1 have poor PCI ratings and are recommended to be treated or reconstructed.

In summary, a portion of the items identified are not deficiencies requiring immediate action due to any critical safety risk. Rather, many are the result of FAA design guidance updates occurring after the development of certain areas of the airfield. The following chapter, **Chapter 3, *Development Alternatives***, will address the design recommendations previously mentioned. All airfield items are represented graphically in **Figure 2-24**.

FIGURE 2-24
TAXIWAY DEFICIENCIES



Note: Middle third crossing not an issue unless west side movement surfaces constructed.

Source: RS&H Analysis, 2021

2.10.6 Runway Incursion Mitigation

In 2015, the FAA initiated a pilot program to improve runway safety at airports. The Runway Incursion Mitigation (RIM) program identified areas of increased risk of runway incursions at specific airfield intersections at an airport. The FAA has evaluated runway incursion data and has compiled a list of locations that have a higher-than-average frequency of runway incursions. Locations where three or more incursions occurred in a given year, or locations where more than 10 incursions occurred over the evaluation period[75] were identified and published on the RIM Inventory List. HIB has no RIM locations at this time.

The FAA has also defined specific locations at airports as hot spots to help alert airport users of the locations of the airfield that may be confusing to pilots and lead to a higher risk of incursions. Hot spots and RIM locations are similar but not the same. Hot spots are identified based on local stakeholders and the user's perception of a location on the airfield whereas RIM locations are determined based on set standards established by the FAA. HIB does not have any identified hot spots at this time.

Through the RIM program, the FAA has established geometry code keys, also referred to as "Geocodes", to catalog specific geometry conditions that may contribute to an increase in runway incursions. There is a total of 19 Geocodes. Each one describes a specific issue related to non-standard geometry. The analysis examined the Geocodes in relation to the HIB airfield. The following Geocodes are associated with each location as well as a description of how these issues increase the risk of runway incursions. Some of the associated Geocodes are design deficiencies previously stated in **Section 2.10.5.1*, Taxiway Deficiencies Summary***.

Airfield

- Geocode 17 – Using a runway as a taxiway. It is assumed that based on the placement of the connector taxiways from Runway 13-31 to Taxiway C, the Runway 4-22 may be used as a connector taxiway with Runway 13-31.

Taxiway A

- Geocode 1 – Y-shaped taxiways crossing a runway. The intersection of Taxiway A, Taxiway B, and Taxiway B-1 cross Runway 22.
- Geocode 8 – Direct taxiing access to runways from ramp areas. The design increases the risk of a pilot inadvertently taxiing onto the runway by mistake because no decision-making process, in the form of directional input, is required by the pilot before entering the runway.
- Geocode 13 – Taxiway intersects runway at other than a right angle. Taxiway A intersection of Runway 4-22.

[75] At the time of this writing, the evaluation period is from federal fiscal year 2008 to calendar year 2019.

Taxiway B

- Geocode 1 – Y-shaped taxiways crossing a runway. The intersection of Taxiway A, Taxiway B, and Taxiway B-1 cross Runway 22.
- Geocode 3 – Wide expanses of taxi pavements entering or along a runway.
- Geocode 4 – Convergence of numerous taxiway types entering a runway.
- Geocode 11 – Greater than three-node taxiway intersection. The design of multiple taxiway centerline markings diverging from a single point can lead to confusion and decrease the situational awareness for users. The intersection of Taxiway B and Taxiway C.
- Geocode 13 - Taxiway intersects runway at other than a right angle. Taxiway B intersection of Runway 13-31.
- Geocode 99 – Miscellaneous - Nonsequential taxiway designation schemes. Taxiway B should be renamed as Taxiway C-2, and Taxiway C-2 should be renamed Taxiway C-3.
- Geocode 99 – Miscellaneous - Taxiway Intersection (Taxiway B) along the middle third of a runway.

Taxiway B-1

- Geocode 1 – Y-shaped taxiways crossing a runway. The intersection of Taxiway A, Taxiway B, and Taxiway B-1 cross Runway 22.
- Geocode 3 – Wide expanses of taxi pavements entering or along a runway.
- Geocode 4 – Convergence of numerous taxiway types entering a runway.

Taxiway C

- Geocode 11 – Greater than three-node taxiway intersection. The design of multiple taxiway centerline markings diverging from a single point can lead to confusion and decrease the situational awareness for users. The intersection of Taxiway B and Taxiway C.

Taxiway C-2

- Geocode 99 – Miscellaneous - Nonsequential taxiway designation schemes. Taxiway B should be renamed as Taxiway C-2, and Taxiway C-2 should be renamed Taxiway C-3.

It is unrealistic to expect that all Geocodes at all these locations could be addressed. Associated facilities, such as the runways, taxiways, and apron environment are relatively fixed, and addressing every listed Geocode would entail significant capital investment to the degree it may be impractical. Instead, less costly, and more practical measures, such as education, signage, and marking enhancements may be more viable options to address those concerns. The following chapter, **Chapter 3, *Development Alternatives***, will describe potential solutions for addressing the Geocodes at each location.

2.11 AIRSPACE, NAVIGATIONAL AIDS, LIGHTING, SIGNAGE, AND MARKINGS

Navigational aids (NAVAIDs), lighting, signage, and pavement markings provide critical guidance to pilots as they operate aircraft in the air and on the ground. As a part of being a Part 139 certificated airport, the FAA inspects these systems and their associated facilities for compliance annually. As a result, this inventory assumes that all NAVAIDs, lighting, signage, and pavement markings meet FAA standards unless otherwise noted.

2.11.1 Airspace

Range Regional airport is a non-towered facility located in class E airspace. The Airport has a unique relationship with the Duluth Tower/Approach Control facility whereby Duluth Approach Control is available to provide approach vectors and monitors NAVAID status. Duluth Tower/Approach Control also provides departure clearances either through radio contact or through calling the clearance delivery service directly. Within that airspace, which includes the Eveleth-Virginia Airport (EVM/KEVM), DLH Approach control provides air traffic services from ground to 8,000ft. Above that altitude, or outside of the cross hatched area, primary air traffic responsibility generally rests with Minneapolis Center (ZMP). Additional information regarding airspace at and around HIB is provided in **Appendix B**.

2.11.2 NAVAIDS

NAVAIDs consist of equipment to help pilots locate the Airport. They can provide information to pilots about the aircraft's horizontal alignment, height above the ground, location of airport facilities, and the aircraft's position on the airfield. HIB features all three types of navigational aids (visual, electronic, and metrological). Additional information regarding navigational aids at HIB is provided in **Appendix B**.

Ownership and maintenance of some NAVAIDs are not always provided by the FAA. Instead, they (also known as non-Federal systems) may be a part of the non-Federal program meaning that they are owned and maintained by the state department of transportation (DOT).[76] As a result, the MnDOT Office of Aeronautic Services establishes, operates, and maintains electronic navigation aids to augment the federal system in Minnesota. They install, maintain, and upgrade radio navigational aids such as Very High Frequency Omnidirectional Radio Range (VOR) systems, Distance Measuring Equipment (DME), Non-Directional Beacons, and Instrument Landing Systems (ILS). This division of MnDOT provides technical, planning, and financial assistance to publicly owned airports for airport electrical systems. In 2020, the state of Minnesota had 233 state-maintained navigation systems that were considered part of the non-Federal program. This was greater than any other state, with Texas coming in second at 172.[77]

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[76] Some non-federal systems include: (AWOS) Automated Weather Observing Systems, (ASOS) Automated Surface Observing Systems, (DME) Distance Measuring Equipment, (GBAS) Ground Based Augmentation Systems, (GS) Glide Slopes, (LOC) Localizers, (NDB) Non-Directional Beacons, (OM) Outer Marker Beacons, as well as Middle & Inner Markers, (RT) Remote Tower Systems, (RVR) Runway Visual Ranges, (ILS) Instrument Landing Systems, (VOR) VHF Omni-Directional Ranges. (FAA, 2020) https://www.faa.gov/airports/planning_capacity/non_federal/systems/

[77] Center for Transportation Studies at the University of Minnesota (2020) http://airtap.umn.edu/publications/briefings/2020/documents/Briefings_fall20_FINAL.pdf

2.11.2.1 Visual Aids and Electronic Aids

Visual aids at Range Regional Airport include those specific to each runway and those that serve the entire Airport. Electronic aids include devices and equipment used for aircraft instrument approaches.

The airfield lighting at Range Regional Airport is limited to Runway 13-31 which has high-intensity runway lighting (HIRL) and Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) equipment on each runway end, but it does not have touchdown zone lighting. Runway 4-22 does not have any lighting.

While runways are not required to have lighting, this Master Plan recommends that the Airport pursues touchdown zone lighting on Runway 13-31 when it is practical to do so. This would greatly improve the safety during inclement weather such as heavy fog or snow.

Except for Taxiway B and B-1, the Airport's taxiway system meets the FAA standard with medium-intensity taxiway lighting (MITL). As a result, it is recommended that the Airport add MITL to Taxiway B incrementally when it is practical to do so. This would help improve operational efficiency and safety, enabling the entire taxiway system to be used at all hours of the day and during all weather conditions.

Analysis of the other HIB navigational aids found the Airport does have a lit wind cone; however, it does not have a segmented circle as is recommended for non-towered airports. It is recommended that the Airport install a segmented circle to provide added operational safety.

The Airport's electronic aids include an instrument landing system (ILS) equipped with a localizer and glideslope on each end of Runway 13-31, as well as a four-light PAPI at each end of Runway 13-31. The Airport also has distance measuring equipment (DME) on Runway 13 approaches and an airport beacon.

Visual and electronic aids, and their ownership status at HIB, are listed in **Table 2-28**. An "X" denotes a facility that the Airport does not have, and is recommended based on FAA Airport Design criteria, while the dashes indicate the NAVAIDs the Airport does not currently have. An analysis of NAVAID ownership and recommendations is provided in **Appendix B**.

TABLE 2-28
VISUAL AND ELECTRONIC NAVIGATIONAL AIDS

NAVAID	Runway		Runway		Ownership
	13	31	4	22	
Visual Aids					
Approach Lighting	MALSR	MALSR	-	-	Non-Federal Program
Lighting System	HIRL	HIRL	-	-	FAA
Runway Markings	PIR	PIR	NPI[1]	V[1]	FAA
Runway Wind Cone	✓	✓	-	-	FAA
Touchdown Zone Lighting	**X**	**X**	-	-	FAA
Runway Visual Ranges	-	-	-	-	Non-Federal Program
Visual Slope Indicator	PAPI (P4L)	PAPI (P4L)	-	-	FAA
Rotating Beacon	✓	✓	✓	✓	FAA
Segmented Circle[2]	**X**				FAA
Electronic Aids (Approaches)					
Glideslope	✓	✓	-	-	Non-Federal Program
DME	✓	-	-	-	Non-Federal Program
LOC	✓	✓	-	-	Non-Federal Program
VOR	-	-	-	-	Non-Federal Program
RNAV (GPS)	✓	✓	✓	✓	Non-Federal Program

Note: 1) Aiming point not required because runway length is less than 4,200 feet. 2) A segmented circle is used by all runways.
Abbreviations: PAPI=Precision Approach Path Indicator; P4L=PAPI 4 Light; MALSR=Medium Approach Light System with Runway Alignment Indicator Lights; HIRL=High Intensity Runway Lighting; PIR=Precision Instrument Runway; NPI=Non-precision Instrument Runway; V=Visual Runway
Source: FAA Chart Supplements, 2021; FAA 5010 Form, 2021; RS&H Analysis, 2021

2.11.2.1 Meteorological Aids

HIB has an Automated Surface Observing System (ASOS). Discussions with the Airport indicated that when the ASOS fails, there is no backup or battery redundancy which can disrupt operations and create major delays since it requires a technical repairman to come and service the equipment. Because HIB does not have a certified weather observer on hand to issue weather reports during these occurrences, which have been increasing in frequency as the equipment ages, the Airport lacks accurate weather reporting for its users during ASOS downtime. It is recommended that the Airport acquire a backup generator to support the ASOS and/or purchase a new ASOS as soon as possible.

2.11.3 Airfield Signage

The Airport's most recent Part 139 inspection indicated that the taxiway and runway signage meets FAA requirements. The Runway 22 entrance location signs at Taxiway A and Taxiway B sign are currently unlit. However, because commercial airline operations occur at HIB and may require the use of the full taxiway system, it is recommended that electrical lines are run to light the signs as soon as practical.

2.11.4 Pavement Markings

Runway pavement markings are a direct function of the approach category each runway threshold serves and the existence of displaced thresholds, stopways, blast pads, or extra-wide shoulders. To this effect, runways are categorized as either precision, non-precision, or visual. The pavement on Runway 13-31 is marked as for precision approaches on both ends. Runway 4 is marked for non-precision approaches and Runway 22 is marked for visual approaches.

A discrepancy in the Part 139 certification inspection showed that the threshold bars on each runway end were not at the standard distance from the threshold. Per FAA AC 150/5340-1M, *Standards for Airport Markings,* "A runway threshold marking commencing 20 feet (6 m) from the actual start point of runway threshold, closely identifies the actual beginning point of the runway threshold used for landings." To mitigate this deficiency, the Airport is removing the current markings, and remarking the thresholds, and all other markings on the runway, 10 feet closer to the threshold of each runway end.

Secondly, the blast pad on Runway 22 is inadequately marked due to the intersection of the taxiway that crosses over it. Per FAA AC 150/5340-1M, *Standards for Airport Markings,* chevron markings should be installed on blast pads. Therefore, it is recommended that the taxiway be reconfigured to allow proper blast pad chevron markings and to ensure traversing the taxiway is not misconstrued as passing over a blast pad.

2.11.5 Vehicle Service Road

The Airport does not currently have a vehicle service road (VSR) or a perimeter road that allows Airport vehicles to circulate the airfield without having to cross runways. Therefore, it is recommended that the Airport construct a proper VSR to be used by airport operations and maintenance staff. This could be phased by initially constructing a VSR in the northern and eastern areas of the Airport, before ultimately circling the entire airfield. Creating dedicated roads for airport staff to remain on airport property without requiring travel on Mn-37 and S Dublin Rd (public roads) enhances airport operational safety by eliminating the potential incidents/accidents on public right-of-way. Having a VSR that meets standards also promotes operational safety by greatly reducing the need for vehicular runway crossings, providing safer accessibility to NAVAIDs, and enabling the Airport to better monitor wildlife hazards.

2.12 PASSENGER TERMINAL

Passenger terminals are the interface between the public space and commercial aircraft. The passenger terminal connects landside facilities (e.g., public-access airport roads) and the airport sterile airside (e.g., aircraft apron and airfield). Understanding how this space and interface operate is key to evaluating the effectiveness of the existing terminal facility. The terminal provides space for ground transportation functions, ticketing and check-in, passenger and baggage screening, baggage claim, and passenger gate holdrooms. This section describes the existing conditions and facility requirements for the passenger terminal facility.

The terminal building programmatic requirements are estimated based upon airport terminal planning best practices and recommended methodologies, which are derived from various industry resources. Two reputable industry resources, the International Air Transportation Association (IATA) and the Airport Cooperative Research Program (ACRP), have developed rating systems that discuss methodologies and recommendations for determining level of service (LOS). The methodologies and best practices used for this analysis can be found within the following resources:

- *Airport Passenger Terminal Planning and Design* – ACRP Report 25, Volumes 1 and 2, 2010

- *Resource Manual for Airport In-Terminal Concessions*, ACRP Report 54, 2011
- *IATA Airport Development Reference Manual*, 10th Edition, 2015
- FAA, AC 150/5360-13A, *Planning and Design Guidelines for Airport Terminal Facilities*, 2018

Analyses of each functional terminal area has been performed to assess facility space needs to meet existing and forecast demand throughout the planning period. Analyses showed that many passenger terminal functional areas are sufficient as a result of the HIB terminal expansion completed in 2015, however, there are areas of deficiency to address in the planning period. The following sections describe that analysis.

2.12.1 Facilities

The passenger terminal building is approximately 21,000 square-feet. The building underwent a significant expansion, renovation, and upgrade in 2015. At that time, the holdroom was expanded to provide 96 seats capable of accommodating increasing passenger loads associated with the introduction of Bombardier CRJ200 flights. The functional area size allocations and descriptions of the terminal building and apron areas are outlined in **Table 2-29**.

TABLE 2-29
TERMINAL BUILDING FUNCTIONAL AREAS

Terminal Building Functional Areas	Existing Square Feet
Total Terminal Area	20,920
Airline - Ticketing, Outbound Baggage, and Administration	
Ticket Counter Area	460
Ticket Counter Queuing	490
Outbound Baggage Area	670
Inbound Baggage	2,180
Gate Holdrooms	2,230
Boarding	670
Total Airline Space	6,700
Transportation Security Administration	
Passenger Screening	1,470
TSA Administration Offices	720
Total TSA Space	2,190
Concession	
Vending	50
Café	410
Rental Car Office and Counter	220
Total Concessions Space	680
Public	
Vestibules	730
Public Circulation	1,910
Lobby	1,850
Meet and Greet	540
Restrooms	390
Bag Claim Lobby	2,600
Restrooms	240
Total Public Space	8,260
Airport Administrative, Storage, and Miscellaneous	
Total Airport Administrative, Storage, and Miscellaneous Space	420
Building Systems	
Total Mechanical, Electrical, and Telecom Space	2,670

Note: Numbers are rounded.
Source: RS&H Analysis, 2021

This analysis determined the capacity of the existing terminal and identified additional areas required to meet the long-term forecast demand described in **Chapter 1, *Aviation Forecast***. The following three scenarios were examined:

- Scenario 1 – Existing conditions using today's CRJ-200 operations
- Scenario 2 – High growth using an Embraer 175
- Scenario 3 – Ultra low-cost carrier (ULCC) using a Boeing 737-800

Scheduled passenger service is provided by SkyWest Airlines, operating as Delta Connection, using 50-seat Bombardier CRJ200 aircraft. Therefore, the Base Case scenario used the Bombardier CRJ200 aircraft and for long range planning purposes.

With the understanding that CRJ200 aircraft are slowly being phased out of service by airlines across the industry in favor of slightly larger seating capacity regional jets like the Embraer 175 (E175), the E175 was selected as the most likely candidate to replace the CRJ200 at HIB. Furthermore, discussions with SkyWest indicated that this is a potential scenario for the airline within the planning horizon as the CRJ200 fleet ages without an equivalent replacement being manufactured. Therefore, the impacts of introducing the E175 are evaluated in the High Growth Scenario.

For the ULCC scenario, the Boeing 737-800 aircraft is evaluated to plan for capacity constraints in a situation where ULCC service starts up at HIB.

Table 2-30 compares the projected number of enplaned passengers during the peak hour for each forecast scenario at a 90 percent load factor. Peak hour enplaned passengers will be used to assess space requirements for each terminal functional area.

TABLE 2-30
EXISTING TERMINAL SCENARIO SIZING AND CAPABILITY

Scenario	Aircraft Type	Seats	Peak Hour Enplaned	Load Factor
Baseline	CRJ200	50	45	90%
High Growth	E175	76	68	90%
ULCC	B737-800	183	165	90%

Source: RS&H Analysis, 2021

2.12.1.1 Ticketing/Baggage Handling

Airline ticketing is located on the non-secure side where passengers check-in, obtain boarding documentation, and check bags. This space includes airline ticket counters, self-service kiosks, queue area, and airline ticket offices. This analysis validated and updated the ticketing requirements using the forecast peak hour enplanements and deplanements.

The planning factors and assumptions used in the analysis methodology area as follows:

- Ticket agent counter length – 7 feet long

- Kiosk dimensions – 4.5 feet long and 3 feet deep
- Ticket counter queuing – 25 feet deep
- Airline ticket office area – 30 feet deep and length matches total counter length

The ticket counter queuing area is in front of the ticket counter (i.e., the side on which the passengers are processed) and represents the area in which passengers congregate while waiting to check bags or perform a transaction at the ticket counter or kiosk. The ticket counter active area includes the space in front of the counter where passengers are being checked in. The airline ticket office area is the administrative and support area used by airline ticket agents, located behind the ticket counters. Airline ticketing area space is sufficient to accommodate forecast demand through the near- and mid-term. Additional ticketing space will be required to accommodate demand by PAL 3 in the ULCC scenario. **Table 2-31** outlines the airline ticketing requirements.

TABLE 2-31
AIRLINE TICKETING REQUIREMENTS

Airline Ticketing	Existing	Base Case	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Self-Serve Kiosks	2	1	1	1
Ticket Counters	3	2	3	7
Total Ticket Counter Area (sf)	240	170	240	520
Total Ticket Counter Active Area (sf)	240	170	240	520
Total Ticket Counter Queueing Area (sf)	600	425	600	1,300
Total Airline Ticket Office (sf)	720	510	720	1,560
Total Ticket Counter Area (sf)	**1,800**	**1,275**	**1,800**	**3,900**
Total Ticketing Area Surplus (Deficit) (sf)	**-**	**525**	**0**	**(2,100)**

Note: sf=square feet
Source: RS&H Analysis, 2021

The outbound baggage handling functional area is composed of two components – outbound bag screening and outbound bag make up. Outbound bag screening is where the Transportation Security Administration (TSA) officials screen checked bags prior to the bags being loaded onto aircraft. The outbound bag make-up area is the area where bags are segregated into different areas based on outbound flight. In addition, the make-up area is where airline personnel collect checked bags to be loaded onto outbound flights.

The analysis for outbound baggage make-up area is based on ACRP Report 25 methodology. This methodology uses the Equivalent Aircraft (EQA) Index, which is calculated by determining the gates in use during the peak departure period. The concept of EQA is one way to look at the capacity of a gate. The EQA Index as described in **Table 2-32** normalizes each gate based on the seating capacity of the aircraft that can be accommodated. The basis of 1.0 EQA is 145 seats based on the Group III narrowbody jet, since it represents the majority of commercial aircraft fleet. The EQA of a medium regional aircraft with 50 seats is 0.4.

TABLE 2-32
EQA INDEX

Airplane Design Group	Aircraft Class	Typical Aircraft	EQA Typical Seats	Index
I	Small Regional	(Metro, B99, J31)	25	0.2
II	Medium Regional	(SF340, **CRJ**)	50	0.4
III	Large Regional	(DHC8, **E175**)	75	0.5
III	Narrowbody	(A320, **B737**, MD80)	145	1.0
IV	757	(B757, B757 w/Winglets)	185	1.3
IV	Widebody	(MD-11, B767)	280	1.9
V	Jumbo	(B747, B777, B787, A330, A340)	400	2.8
VI	A380	(A380, B747-8)	525	3.6

Note: Totals may not sum due to rounding. Representative scenario aircraft are bolded.
Source: ACRP Report 25, *Passenger Terminal Planning and Design - Volume 1: Guidebook*, Table V-8, 2010

ACRP Report 25 indicates that, although checked baggage ratios are a consideration for baggage area makeup, these ratios generally affect the total number of baggage carts/containers in use rather than the size of the make-up area. There is an estimated one departure per gate during a three-hour staging period to determine the number of staged baggage carts. Additional planning factors and assumptions include the following:

- 300 square feet per cart/container
- 10 percent additional allowance for baggage cart train circulation

Existing outbound baggage make up area is sufficient to accommodate the near- and mid-term demand. The near-term surplus of space is reflective, and representative of the unused baggage make up pier. Additional space is required to accommodate the forecast ULCC demand. The outbound baggage make-up area requirements are described in **Table 2-33**.

TABLE 2-33
OUTBOUND BAGGAGE MAKE-UP REQUIREMENTS

Baggage Make-up Area	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Make Up Area (sf)	-	450	450	3,150
Bag Cart Train Circulation (sf)	-	30	30	210
Total Area (sf)	680	480	480	3,360
Total Area Surplus (Deficit) (sf)	**-**	**200**	**200**	**(2,680)**

Note: sf=square feet; Numbers are rounded.
Source: RS&H Analysis, 2021

2.12.1.2 Public Circulation and Concessionaires

Concession space at Range Regional Airport allows for additional revenue generating opportunities and greater customer satisfaction. Currently, the concessions program at HIB is mostly pre-security with a café option. After the screening checkpoint, the only concession option for passengers is a vending machine located within the holdroom. Of the total concession space, 7.25 percent is located post-security. With projected enplanements increasing each year, the amount of space required to meet passenger demand for concession space will increase. It is recommended that new concessions be located post-security as industry experience and best practices have shown passengers, especially departing passengers, are more comfortable dining after they have cleared security.

Percentage splits for the public non-secure side and sterile side concession space from ACRP Report 54 were applied to an estimated number of people consuming the food and beverage concessions within the restaurant or designated eating area on the public and sterile side. The percentage split also considers that a number of passengers purchase food as "to-go" and eat outside of the food and beverage establishment (e.g., at the gate or on the plane). The percentage split is as follows:

- Public side – 30 percent
- Sterile side – 70 percent

Based on these planning factors and assumptions, **Table 2-34** outlines concession space requirements.

TABLE 2-34
CONCESSION REQUIREMENTS

Concession Areas	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Public News and Gift (sf)	-	60	90	150
Public Side Food and Beverage (sf)	410	30	30	60
Total Concession Public Side (sf)	**-**	**90**	**120**	**210**
Concessions Surplus (Deficit) (sf)	-	320	290	200
Sterile Side Food and Beverage (sf)	50	140	210	350
Sterile Side News and Gift (sf)	-	70	70	140
Total Concession Sterile Side (sf)	**-**	**210**	**280**	**490**
Concession Surplus (Deficit) (sf)	**-**	**(160)**	**(230)**	**(440)**

Notes: sf= square feet; Numbers are rounded.
Source: RS&H Analysis, 2021

The amount of public circulation space within the terminal building was calculated for secure areas, non-public areas, and general public areas. Secure circulation represents the secure concourse area. This is defined as circulation area accessible to passengers beyond the passenger security screening checkpoint. The secure circulation requirements analysis used methodology described in ACRP Report 25. The analysis indicates that the overall circulation area is sufficient to accommodate forecast demand through the near- and mid-term. Additional general public circulation space is required at the end of the planning period, as shown in **Table 2-35**.

TABLE 2-35
TERMINAL BUILDING CIRCULATION REQUIREMENTS

Public Circulation Areas	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Secured Airside Circulation (sf)	1,190	1,150	2,300	3,440
Non-Secured Landside Circulation (sf)	6,440	1,460	2,920	4,380
Total Public Circulation (sf)	**7,630**	**2,610**	**5,220**	**7,820**
Public Circulation Surplus (Deficit) (sf)		**5,020**	**2,410**	**(190)**

Notes: sf=square feet; Numbers are rounded.
Source: RS&H Analysis, 2021

2.12.1.3 Security/TSA

The passenger security screening checkpoint is the area where TSA officials screen passengers prior to entry into the sterile area of the terminal building. The passenger security screening checkpoint separates the public portion of the terminal building from the sterile area. The passenger security screening checkpoint consists of the screening area and administrative area. The administrative area accounts for TSA administrative offices, private passenger screening areas, support/file storage/break room/toilets, and internal circulation corridors.

The analysis considers the number of enplaned passengers during the peak period. The analysis also assumes no transfer passengers and all enplaning passengers are originating passengers that need to be screened. The analysis results indicate that the passenger security screening checkpoint has sufficient space to accommodate forecast demand throughout the planning horizon until the ULCC scenario, as shown in **Table 2-36**.

TABLE 2-36
PASSENGER SCREENING CHECKPOINT REQUIREMENTS

Passenger Security Screening Areas	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Security Checkpoint (sf)	-	1,940	2,180	2,410
TSA Administration (sf)	-	250	250	250
Total SSCP (sf)	**2,190**	**2,190**	**2,430**	**2,660**
SSCP Surplus (Deficit) (sf)	**-**	**-**	**(240)**	**(470)**

Note: sf=square feet; Numbers are rounded.
Source: RS&H Analysis, 2021

2.12.1.4 Gate and Holdroom

The holdroom area is the area where passengers congregate on the sterile side of the terminal to await aircraft boarding. These areas include seating area, standing area, an airline boarding podium, and queue area. The holdroom analysis was based on methodology identified in ACRP Report 25. Gate requirements are based on the forecast peak hour passenger aircraft arrivals throughout the planning horizon. The analysis estimates the amount of space sufficient to accommodate passengers sitting and standing in the boarding area awaiting departure. The number of seats and standing area is determined based on the type of aircraft expected to use each gate. The analysis also considers space required for airline staff podiums and associated support area. Due to the low number of flights, specific gate allocations to airlines are not considered. Instead, the analysis focuses on aggregate required holdroom space. A 90 percent load factor assumption is used based on average forecast load factor. The following space for seated and standing passengers is required, representing an optimal[78] level of service:

- Seated passenger area – 15 square feet
- Standing passenger area – 10 square feet

The analysis assumes 80 percent of passengers are seated and 20 percent of passengers are standing. The existing holdroom is approximately 2,230 square feet and has sufficient space to accommodate the forecast demand for the Base Case scenario. However, the existing holdroom is insufficient to accommodate departures by PAL 3 in the High Growth and ULCC scenarios.

Gate requirements are based on the forecast peak hour passenger aircraft arrivals throughout the planning horizon. The analysis also considers departures occurring during the peak hour. All aircraft that arrive within the peak hour are expected to depart within an hour of arrival. The number of terminal gates will not be sufficient to accommodate demand throughout the planning period if there is overlap with an Embraer 175 and Boeing 737-800 aircraft. The terminal gate and holdroom requirements are shown in **Table 2-37**.

TABLE 2-37
TERMINAL GATE AND HOLDROOM REQUIREMENTS

Terminal Gates and Holdroom Area	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Peak Hour Enplaned Passengers	45	45	68	165
Total Terminal Gates	**1**	**1**	**1**	**1**
Terminal Gate Surplus (Deficit)	**-**	**0**	**0**	**(1)**
Terminal Holdroom Area (sf)	**2,230**	**1,930**	**1,960**	**3,710**
Terminal Holdroom Surplus (Deficit) (sf)	**-**	**300**	**(270)**	**(1,480)**

Note: sf=square feet; Numbers are rounded.
Source: RS&H Analysis, 2021

2.12.1.5 Restrooms

The restroom requirements are determined based on industry-standard best practices. These have changed in more recent years as accommodations are being provided to nursing mothers and family restrooms with ample space for parents and children or those requiring assistance. Analysis results indicate the existing restroom space is at capacity today and have insufficient space to accommodate demand over the planning period, as shown in **Table 2-38**. At a minimum, an additional 200 square feet

[78] Level of service (LOS) ranges from A to F, with A being the highest and F being the lowest. An LOS A facility is considered "overdesigned" whereas an LOS F facility is considered to be suboptimal. An optimal level of service is considered to be LOS C.

of sterile-side restroom space is recommended to meet baseline (or high growth[79]) demand to support the desired passenger LOS. A 200 sq ft expansion equates to roughly 3 or 4 additional stalls when considering circulation space. It should be noted that increased stalls may require increases supporting fixtures such as hand washing stations.

TABLE 2-38
RESTROOM REQUIREMENTS

Restroom Area	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Total Public Restroom Area (sf)	**630**	**830**	**830**	**1,510**
Restroom Surplus (Deficit) (sf)		**(200)**	**(200)**	**(880)**

Note: sf=square feet; Numbers are rounded.
Source: RS&H Analysis, 2021

2.12.1.6 Baggage Claim

The baggage claim system is used to support arriving flights. Baggage claim is the area in the terminal where arriving passengers retrieve their checked baggage. At HIB, this area includes one revolving baggage claim device and the area surrounding the device. Bag claim frontage length (also known as presentation length) is the linear length of the bag claim where passengers claim their baggage. The frontage length is based on the number of passengers arriving during the peak 20-minute period. Generally, all passengers arrive at bag claim before bags are unloaded onto claim device and most bags are claimed on the first revolution of the claim unit, therefore, this analysis is based on the passenger count rather than baggage count. A 70 percent planning factor is used for number of arriving passengers claiming bags. The analysis accounts for each passenger having 1.2 linear feet of frontage along the baggage claim device while waiting for their baggage. This space factor is equivalent to an LOS C standard.

The existing number of bag claim devices and total claim device frontage length are both sufficient to accommodate demand throughout the planning period. However, there is insufficient space to accommodate the future forecast demand for the baggage claim lobby under the ULCC scenario, as shown in **Table 2-39**.

TABLE 2-39
BAGGAGE CLAIM REQUIREMENTS

Baggage Claim Area	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Inbound Baggage Service Area (sf)	2,180	900	1,110	2,960
Inbound Baggage Surplus (Deficit) (sf)	-	**1,280**	**1,070**	**(780)**
Bag Claim Lobby (sf)	2,600	1,270	1,920	4,640
Bag Claim Lobby Surplus (Deficit) (sf)	-	**1,330**	**680**	**(2,040)**

Note: sf=square feet; Numbers are rounded.
Source: RS&H Analysis, 2021

[79] Under the High Growth scenario, peak hour passenger stall usage is not anticipated to require stall counts greater than baseline.

2.12.1.7 Administrative Storage

This section describes the storage space required for the administrative and support areas located in the terminal building. This includes airport administration space, miscellaneous administration space, and support/storage utility areas.

Airport administration requirements were determined based on the link to forecast annual enplaned passengers. Enplaned passengers are a level of representation of the overall activity level and administration space requirements correlate well to enplanements. The analysis indicates that the airport administration space is not sufficient to accommodate demand throughout the planning period. The airport administration requirements are described in **Table 2-40**.

TABLE 2-40
AIRPORT ADMINISTRATIVE STORAGE REQUIREMENTS

Airport Administrative Storage Area	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Administrative Storage (sf)	420	600	1,100	1,600
Total Administrative Storage Surplus (Deficit) (sf)		**(180)**	**(680)**	**(1,180)**

Note: sf=square feet. Numbers are rounded.
Source: RS&H Analysis, 2021

2.12.2 Terminal Building Requirements Summary

The terminal building requirements are summarized in **Table 2-41**. The table summarizes the terminal functional space required to satisfy the forecast demand associated with each forecast planning period. Airline spaces include ticketing, outbound baggage areas, administration, inbound baggage areas and departure lounges. Transportation Security Administration space includes all areas associated with TSA passenger and baggage screening functions.

TABLE 2-41
FUNCTIONAL AREA TABLE

Commercial Passenger Planning Metrics	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Total Peak Hour Enplaned	45	50	70	160
Total Peak Hour Deplaned	45	50	70	160
Peak Hour Operations	1	1	1	1
Total Terminal Area	**Required Space**			
Airline (Ticketing, Bags, and Gates/Holdrooms) (sf)	6,700	5,360	7,000	17,660
TSA (Screening and Offices) (sf)	2,190	3,700	4,000	5,900
Concessions (Sterile and Non-secure) (sf)	670	600	900	2,060
Public Space (Circulation, Restrooms, Lobbies) (sf)	8,300	4,380	7,640	13,390
Airport Administrative Storage and Misc. Space (sf)	420	600	1,100	1,600
Mechanical, Electrical, and Telecom Space (sf)	2,670	1,610	1,350	1,760
Total Terminal Area	**20,950**	**16,250**	**21,990**	**42,370**
Total Terminal Area Surplus (Deficit) (sf)	**-**	**4,700**	**(1,040)**	**(21,420)**

Note: sf=square feet. All planning values are rounded.
Source: RS&H Analysis, 2021

2.12.3 Air Carrier Apron

The HIB air carrier apron provides the parking, loading, and offloading of commercial service passenger aircraft. The terminal has one boarding bridge providing passengers protected passage from the building to the aircraft. The air carrier apron has a total area of approximately 7,100 sq yd with two lead-in lines for parking passenger aircraft. The westernmost lead-line extends into the transient apron which is adjacent to the air carrier apron on the west side.

To assess the apron, a footprint of required space was determined for each aircraft that could be parked on the apron in relation to the existing lead-in lines. The footprint used the wingspan and length of the existing fleet of commercial aircraft, which includes the Bombardier CRJ200, the Boeing 737-800[80], and the Embraer 175, which is the Airport's future critical aircraft. These footprints assume a 25-foot buffer of space on all sides to provide adequate area for a vehicle service road (VSR) used by ground support equipment (GSE) to support the aircraft.

Bombardier CRJ200 operations currently occur twice daily at times that do not overlap, so the likelihood of both aircraft being on the air carrier apron at the same time is minimal. However, due to the possibility of an unplanned event where aircraft maintenance or diversions related to weather occur, two layouts were developed. Layout 1 positions the Bombardier CRJ200 or the Embraer 175 in the easternmost parking space. This results in the Boeing 737-800 being parked on the western lead-in line. Space requirements under this scenario cause the Boeing 737-800 to extend onto the transient apron by a total of approximately 2,800 sq yds. Layout 2 positions the Boeing 737-800 on the easternmost lead-in line and

[80] Boeing 737-800 had 13 departures in 2019.

uses the western lead-in line for either the Bombardier CRJ200 or the Embraer 175. A comparison of the two layouts shows that Layout 2 preserves the most space on the transient apron for uses other than air carrier parking, however, both scenarios require some degree of use of the transient apron from commercial air carrier parking. It is recommended that when the dual usage of the apron begins to increase in frequency, transient apron space is converted for the air carrier apron use. This requires the FBO and transient apron to be relocated away from an area that impacts terminal operations.

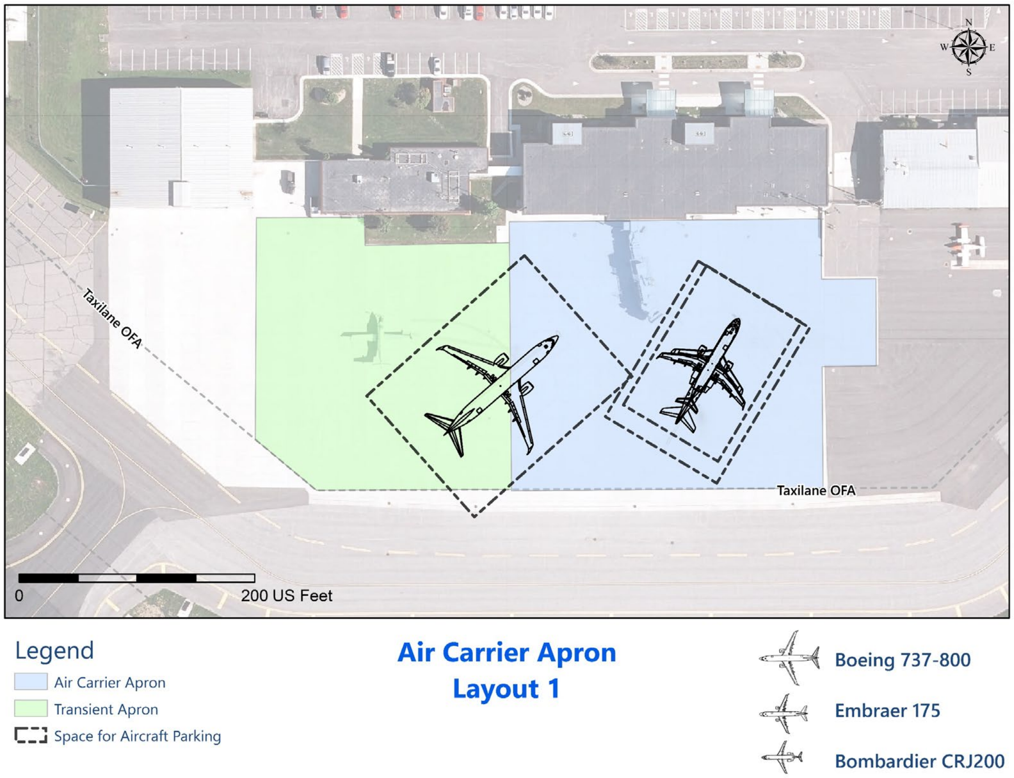
Table 2-42 shows the air carrier apron requirements and **Figure 2-25** graphically shows the two scenario layouts required to accommodate two commercial aircraft simultaneously.

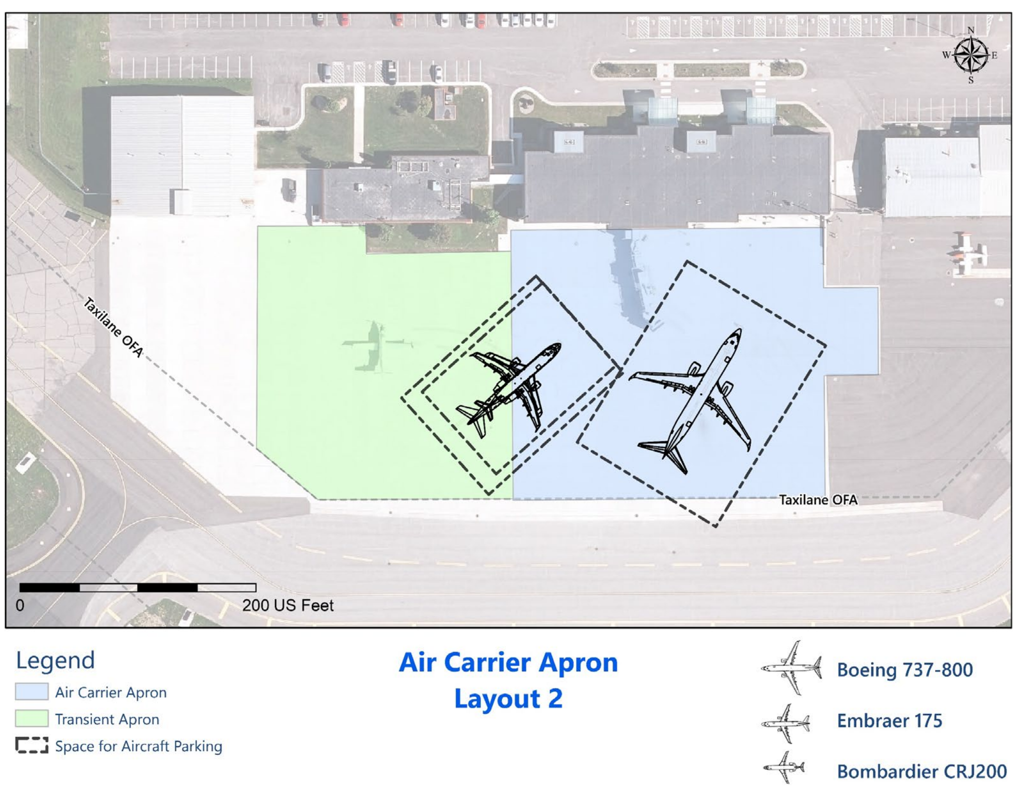
TABLE 2-42
AIR CARRIER APRON REQUIREMENTS

	Existing	Layout 1	Layout 2 (CRJ200)	Layout 2 (Embraer 175)
Air Carrier Apron Requirement (yds)	7,100	9,900	8,900	9,400
Surplus / (Deficit)	**-**	**(2,800)**	**(1,800)**	**(2,300)**

Note: Measured in sq yds
Source: RS&H Analysis, 2021

FIGURE 2-25
AIR CARRIER APRON SCENARIOS





Source: RS&H Analysis, 2021

2.12.3.1 Ground Support Equipment

Ground support equipment (GSE) at Range Regional Airport is owned and operated by the Airport and the airlines. There is adequate space to store GSE on the apron. During cold weather, GSE is stored in Buildings D, F, and G.

From an equipment perspective, it is recommended the Airport tugs be replaced, as they are all over 35 years old and beyond their useful life expectancy. As equipment ages, the cost to maintain it increases to the degree where it makes better financial sense to replace rather than maintain.

Airline Owned

- 1 x Belt Loader
- 1 x Tractor
- 1 x Kubota
- 2 x Baggage Carts
- 1 x Air Start Unit
- 1 x GPU
- 1 x Cleaning Cart
- 1 x Lavatory Cart
- 1 x Potable Water Cart
- Multiple Tow Bars (including a Bombardier CRJ200 Towbar)

Airport Owned

- 2 x Tugs
- 1 x Ground Power Unit (GPU)
- 1 x Lavatory Cart
- 1 x Air Stairs
- Multiple Tow Bars

2.13 GENERAL AVIATION AIRCRAFT PARKING AND STORAGE

This section outlines the requirements during the planning period for the general aviation (GA) facilities used for aircraft parking and storage. The GA facilities evaluated in this section include aircraft hangars, aircraft tie-downs, and apron. The analysis divides aircraft storage needs between based and transient aircraft.

2.13.1 Based Aircraft Storage

The quantity and type of hangar space is driven by many different factors including total number of based aircraft, fleet mix, local weather conditions, airport security, user preference, and other various market forces. This section outlines requirements for T-hangars, conventional hangars, and corporate hangars. These hangar types are general terms used to describe different hangar sizes with somewhat different uses. The following outlines broad definitions for how each hangar space is programmed within the context of this Master Plan:

- T-hangars – Small hangars typically arranged so small aircraft are "nested" next to each other in alternating directions. Approximately 65,000 square feet of airside land is required to develop a 10-unit nested T-hangar facility.
- Conventional hangars – Hangars larger than a T-hangar and potentially housing multiple smaller aircraft. A conventional hangar itself can range from 5,000 – 30,000 square feet. Additional space is required for apron frontage needs, landside/parking, buffers and safety area offsets, and other various site development elements.
- Corporate hangars – Large hangars, containing one or more aircraft, with associated office space for flight crews, corporate passenger staging, and some maintenance. Corporate hangars alone typically range from 30,000 – 60,000 square feet, or more. In addition, incorporated office elements, landside area, and other site development aspects can vary greatly depending on owner preference.

The aviation activity forecast shows steady growth in based aircraft facilitating the need for additional storage. Of the five aircraft types, an increase in the number of based single engine, multi-engine, and jet are forecasted. Only the amount of based helicopter aircraft is forecasted to remain constant over the next 20 years. At PAL 3, an additional 17 aircraft above existing 2020 levels are projected to require storage accommodations, as shown in **Table 2-43.**

TABLE 2-43
BASED AIRCRAFT FORECAST

Based Aircraft	2020	PAL 1	PAL 2	PAL 3
Single Engine	37	44	46	51
Multi Engine	0	1	2	2
Jet Engine	0	0	0	1
Helicopter	1	1	1	1
Other	0	0	0	0
Total	**38**	**46**	**49**	**55**

Source: RS&H Aviation Forecast, 2021

Using historical distributions of based aircraft at HIB and industry trends, the projected square footage for each aircraft storage type was determined at each PAL. It is assumed all based aircraft will be stored inside of a T-hangar or hangar. Because most based aircraft at HIB are single engine pistons, the number of hangar structures needed was determined following the current configuration at HIB. In 2020, the T-hangars housed 92% of the Airport's single engine pistons, and the remaining aircraft (including one helicopter) were stored in conventional hangars. Each conventional hangar at Range Regional Airport has two or more bays that can be used for based aircraft. Additionally, design for the Airport's first multi-bay corporate hangar is currently progressing. This new hangar will have capacity to house a jet or multiple single or multi-engine aircraft.

The forecast for based single engine piston aircraft indicates that if the Airport retains 92% of those within T-hangars, another 12-unit building will be needed by PAL 1. Alternatively, the phased construction of additional conventional hangar or corporate hangars would fulfill necessary space when single engine pistons and/or multiple based aircraft are stored. New conventional hangars are required for in PAL 1 and PAL 2 and a new corporate hangar is anticipated to be needed by PAL 3 with the forecast of a based jet. **Table 2-44** summarizes the amount of existing hangar space compared to forecasted demand over the planning horizon.

TABLE 2-44
BASED AIRCRAFT STORAGE AND PARKING REQUIREMENTS

Storage Facility	Existing	PAL 1	PAL 2	PAL 3
T-Hangar (Units)	36	36	36	36
Required	33	40	42	47
Surplus / Deficit	**3**	**(4)**	**(6)**	**(11)**
Conventional Hangars (Buildings)	2	2	2	2
Bays	4	4	4	4
Required	4	6	7	7
Surplus / Deficit	**0**	**(2)**	**(3)**	**(3)**
Corporate Hangars (Bays)	0	0	0	0
Required	0	0	0	1
Surplus / Deficit	**0**	**0**	**0**	**(1)**

Source: RS&H Analysis, 2021

With consideration to the development trends occurring at HIB over its history, it is reasonable to plan for space accommodations of approximately 65,000 sq ft for T-Hangar development, 50,000 sq ft for conventional hangar siting, and 90,000 sq ft for corporate hangar development. These planning level areas are realistic yet conservative with the understanding that specific site design and development can still occur within a smaller footprint.

2.13.2 Transient Aircraft Parking Apron

Transient aircraft are those aircraft not based at HIB. There are seven tie-downs for parking transient piston aircraft along the western edge of the fuel farm. The transient apron, which is used for larger transient aircraft, is located in front of the FBO in-between the air carrier apron to the east and an aircraft maintenance hangar apron to the west. It is approximately 5,200 sq yds (47,000 sq ft).

To determine the amount of transient apron space required over each PAL, an average number of transient aircraft parked by engine type was calculated. It is assumed that all single engine pistons would be parked in the tie-down area and all other aircraft would be required to park on the transient apron.

Table 2-45 shows the average number of transient aircraft parked on the transient apron or tie-down area.

TABLE 2-45
AVERAGE PEAK TRANSIENT AIRCRAFT

Aircraft	Existing	PAL 1	PAL 2	PAL 3
Single Engine Piston	0.8	0.9	1.0	1.1
Multi-Engine / Turboprop	0.5	0.6	0.7	0.8
Jet	1.2	1.5	1.6	1.8
Helicopter / Other	0.0	0.0	0.0	0.0
Total	**2.5**	**3.1**	**3.3**	**3.7**

Source: RS&H Analysis, 2021; ACRP Report 113

Based on these projections, the tie-down area can accommodate the single engine piston aircraft through the planning horizon. However, the limited space available for the transient multi-engine, turboprop, and jet aircraft would require additional space during peak times due to the size of the apron and the space for taxiing into and out of parked positions.

Based on ACRP Report 113, *Guidebook on General Aviation Facility Planning* guidelines, an apron should be designed for the ADG that, historically, has most often used the space. Following this logic, the spatial requirements of the transient apron are based on ADG-II aircraft given the operations from the FAA Traffic Flow Management Systems Count. This does not prevent any larger aircraft from using the apron, rather it outlines the required space for multiple ADG-II aircraft simultaneously. Analysis shows the Airport currently requires approximately 10,200 sq yds, which puts it at a deficit of 4,800 sq yds.

Table 2-46 shows the transient apron requirements.

TABLE 2-46
TRANSIENT APRON REQUIREMENTS

Transient Apron		Planning Activity Level		
	Existing	PAL 1	PAL 2	PAL 3
Transient Apron Requirement	10,200	11,800	11,800	13,500
Surplus / (Deficit)	**(5,000)**	**(6,700)**	**(6,700)**	**(8,300)**

Note: Apron measured in sq yds.
Source: ACRP Report 113, *Guidebook on General Aviation Facility Planning* (2014); RS&H Analysis, 2021

2.14 AVIATION SUPPORT FACILITIES

Support facilities at an airport encompass a broad set of functions that exist to ensure the airport can fulfill its primary role and mission in a safe and operationally efficient manner. The following sections outline the requirements for these facilities at HIB.

2.14.1 Aircraft Rescue and Fire Fighting

The required Aircraft Rescue and Fire Fighting (ARFF) facilities are determined based on Code of Federal Regulations Title 14 Part 139. This section evaluates the ARFF Index and ARFF station requirements.

2.14.1.1 ARFF Index Determination

The ARFF Index for an airport is based upon the length of an airport's critical aircraft inclusive of all aircraft operating at the airport and their dimensions. Based on the operational activity of the Bombardier CRJ200 and the Boeing 737-800, the Airport has received an ARFF Index B which was approved by the FAA.[81] The forecast projects the future critical aircraft for the Airport to be an Embraer 175 when it replaces the Bombardier CRJ200, maintaining an Index B over the planning horizon.

2.14.1.2 ARFF Vehicle Requirements

"The ARFF Index B vehicle requirements include, either:

1) One vehicle carrying at least 500 pounds of sodium-based dry chemical, halon 1211, or clean agent and 1,500 gallons of water and the commensurate quantity of aqueous film forming foam agent (AFFF) for foam production, or
2) Two vehicles – with one vehicle carrying the extinguishing agents as 500 pounds of sodium-based dry chemical, halon 1211, or 450 pounds of potassium-based dry chemical and water with a commensurate quantity of AFFF to total 100 gallons for simultaneous dry chemical and AFFF application; and one vehicle carrying an amount of water and the commensurate quantity of AFFF so the total quantity of water for foam production carried by both vehicles is at least 1,500 gallons."[82]

The Airport currently has two E-One Titan 4x4 vehicles (Index B) that together satisfy the Index B requirements and are each 22 years old. Given their ages, the Airport has included the purchase of a new Index B ARFF truck on their CIP for 2021[83].

A topic of increasing importance related ARFF vehicles and their AFFF is the impacts of Perfluoroalkyl and polyfluoroalkyl substances (also known as PFAS).[84] The two following two paragraphs provide a discussion on Halotron® and Purple K as two AFFF substances that airport operators should seek alternatives to.

» Halotron® is a so-called "clean-agent" firefighting chemical. It is primarily used in handheld extinguishers and is available in larger pressurized cylinders that have been placed onto ARFF trucks and into other ARFF applications. Halotron® has been marketed as an environmentally friendly alternative to AFFF and also Halon, which it has replaced in many handheld applications. Halotron® has three different formulations, all of which basically work in the same way – a total-flood system that is effective because it starves the fire of oxygen by chemically replacing oxygen in fire the chemistry with a chemical surrogate, such as bromine. Halotron® is made from a class of chemicals called hydrochlorofluorocarbons (HCFCs). The manufacture and sale of most HCFCs have been banned or curtailed by the Clean Air Act in the United States and the Montreal Protocol in Canada. HCFCs are no longer being used due to their role in depleting the ozone layer. While not a hazardous material by definition, their use is no longer being supported by many agencies. Additionally, the manufacturers will not be able to produce additional stocks, so

[81] Index B approved by FAA in 2020 memorandum.
[82] 14 CFR § 139.317 - Aircraft rescue and firefighting: Equipment and agents
[83] Per FAA review comments, the vehicle has input based testing capabilities to minimize the amount of discharge on the ground.
[84] PFAS are a potentially hazardous group of chemicals found in current firefighting foams used at airports.

once a system gets used, either for operational or training use, a new solution would need to be acquired.

- Purple K is a dry chemical fire suppression agent of hydrophobic potassium bicarbonate material that works by inhibiting the chemical reaction in the fire. It is violet colored, hence the name "purple K." Purple-K is used in many forms, from small handheld fire extinguishers to large mobile and stationary units, including fixed-nozzle piping systems. It can be difficult to clean up as it forms a residue when discharged. If the spent agent is dry, it can be removed by suction, but when combined with water, hydrocarbons and other liquids, it forms a thick crusty scum that can be challenging to remove. It is claimed to have more effectiveness than other dry agent suppression systems. It is often used in conjunction with other firefighting systems. Once used, the extinguishers must be refilled with purple K and cannot be used with other dry agents. According to manufacturer's instructions, purple K should not be mixed with any phosphate based extinguishing agents as it could cause a reaction limiting the effect of purple K.

2.14.1.3 ARFF Response Time Requirements

The Airport currently meets the Index B response time requirements are described in Part 139.319. Within three minutes, at least one ARFF truck must reach the midpoint of the farthest runway (13-31) serving air carrier aircraft from its assigned post or reach any other specified point of comparable distance on the movement area that is available to air carriers and begin application of an extinguishing agent. Within four minutes from the time of alarm, all other required vehicles must reach the point specified above from their assigned posts and begin application of an extinguishing agent.

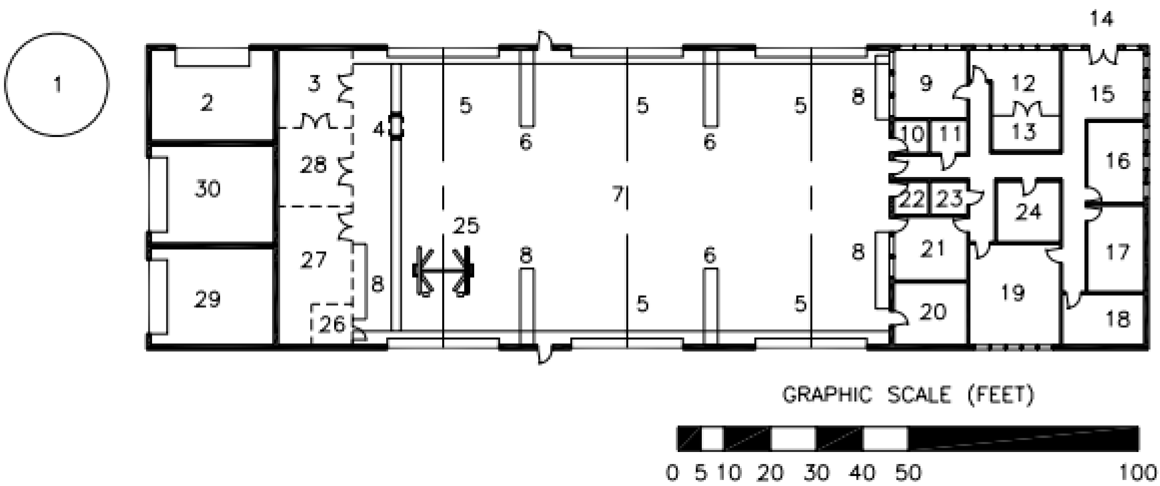
2.14.2 Airport Maintenance Equipment Storage

There are two facilities used for Airport maintenance equipment storage (MES) and repairs. Building C-2 is the Airport's administration building and primary MES facility. The administrative space, located on the south part of the building, is in good condition and adequately sized. The administration area has doors to the maintenance/vehicle storage portion of the building providing both landside and airside access through the garage. The airside portion of the garage only has a single door which makes it challenging to efficiently access or use equipment at times when specific pieces of equipment are needed, and others are blocking their path.

The MES (excluding the administration area) is approximately 20,000 sq ft with one vehicle maintenance bay in the southwest area of the garage and salt/sand storage located in the southeast area of the garage. The salt/sand storage also has an airside access door. The remainder of the MES facility is used for the storage of snow removal equipment (SRE) and other field maintenance equipment. The Airport also uses a second building for MES. This unnumbered, silver-colored garage is located south of the approach end of Runway 4. This garage is in good condition and used for storage of equipment during the colder months of the year, however the design is inefficient for operations like those at HIB.

While the space distributed between the two buildings is adequate for the Airport over the planning horizon, the configuration of the existing layout is somewhat limiting because multiple pieces of equipment are not always easily accessible. This creates more than just operational inconvenience. This situation can result in real personnel safety issues and costs when equipment is accidentally damaged due to the requirement to "shuffle" equipment around. The storage portion of Building C-2 has two garage doors to access equipment, however, the facility itself is not built in a drive-thru configuration. AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*, identifies drive-through facility design as efficient for airports with small to medium equipment fleets. This approach conserves total space needed for the building, thus lowering building costs. **Figure 2-26** shows an example of a maintenance/SRE storage facility using a drive-through design.

FIGURE 2-26
EXAMPLE OF DRIVE-THROUGH MAINTENANCE/SRE STORAGE FACILITY DESIGN



LEGEND

1. LIQUID DEICER TANK
2. HEATED SAND STORAGE
3. PARTS CLEANING/DEGREASER/ BLAST CABINET/PAINT BOOTH
4. BRIDGE CRANE
5. EQUIPMENT PARKING
6. SNOW REMOVAL EQUIPMENT STORAGE
7. VEHICLE WASH/STEAM BAY
8. MECHANIC'S WORK BENCHES
9. SNOW DESK
10. MEN'S REST ROOM
11. MECHANICAL ROOM (HVAC)
12. ELECTRICAL EQUIPMENT REPAIR
13. ELECTRICAL PARTS STORAGE
14. BUILDING ENTRANCE
15. ADMINISTRATION/RECEPTION AREA
16. AIRPORT OPERATIONS MANAGER
17. MEN'S REST ROOM/LOCKERS/SHOWERS
18. WOMEN'S REST ROOM/LOCKERS/SHOWERS
19. CONFERENCE/BREAK ROOM & KITCHEN
20. SPECIAL TOOLS
21. GARAGE SUPERVISOR'S OFFICE
22. WOMEN'S REST ROOM
23. MECHANICAL ROOM (PHONE, ELECTRICAL)
24 REFERENCE LIBRARY
25. MAINTENANCE AREA
26. USED AUTOMOTIVE FLUID STORAGE
27. LARGE/SMALL PARTS STORAGE
28. MACHINE SHOP/WELDING AREA
29. DRY DEICER STORAGE AREA
30. UREA STORAGE AREA

Source: AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials,* Figure 3-1, 2007

As a result, when various pieces of equipment are needed, maneuvering of other unused equipment is often necessary.

The following provides an inventory and average age of the Airport's SRE and mowing equipment:

Snow Removal Equipment

- 2 x Snowplow Trucks (22 yrs)
- 2 x Snow Blowers (22 yrs)
- 1 x Snow Brooms (10 yrs)
- 2 x Loaders (23.5 yrs)
- 1 x Skid steer (15 yrs)

Mowers

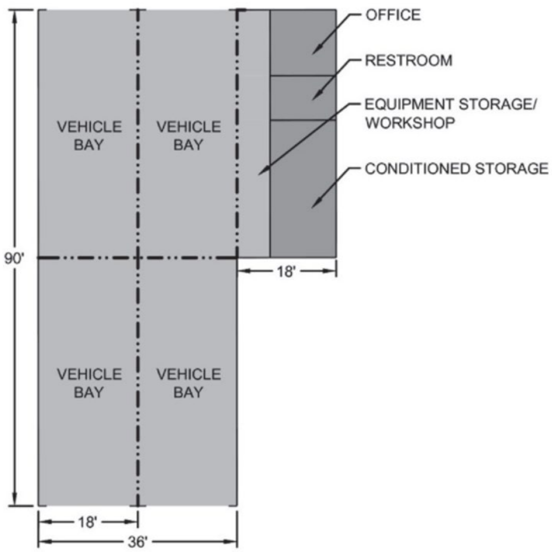
- 2 x Brush Mowers (32 yrs)
- 2 x Mowers (13 yrs)
- 2 x Zero Turn Mowers (12.5 yrs)

FAA AC 150/5200-30D, *Airport Field Condition Assessments and Winter Operations Safety*, states that airports should designate Priority I areas and be able to clear them within an extent of time based on their total number of annual operations. Given the forecast for the Airport's operations, HIB is required to clear its Priority I surfaces within one hour. The Airport meets this requirement.

As previously noted, much of the Airport's SRE is more than 20 years old. Therefore, it is recommended that the Airport plan to phase out older pieces as they become obsolete or unusable due to a lack of parts and program new replacement equipment purchases. The replacement of the Airport's SRE should consider multi-function machines equipped with various combinations of plow, broom, and air blower. Multi-function machines provide added value in their efficiency and time reducing the process of taxiing equipment to and from the storage facilities. Multi-function pieces of equipment are larger and longer than single function pieces of equipment the space, therefore, the space allocated for them in MES facilities will increase. With new space and turning radius requirements associated with the format and size of these new machines, future Airport maintenance facilities should be configured to accommodate pull through bays using drive-through design building configuration (as shown in **Figure 2-26**) for all critical equipment including multi-function SRE. Reconfiguration of the existing building would require a second fully secure airside garage opening that serves as a drive-through accessway.

Figure 2-27 shows two focused sample MES layouts with four vehicle bays and administrative space, similar to the Airport's requirements and current configuration.

FIGURE 2-27
SAMPLE MES LAYOUTS



Source: ACRP Report 113, *Guidebook on General Aviation Facility Planning*, Exhibit 5-41; Delta Airport Consultants, Inc., 2014

2.14.3 Fixed Based Operator

The Range Regional Airport FBO is owned and operated by the Airport. The FBO provides parking and tie-downs for transient aircraft, fueling services, and courtesy car arrangements. However, transient aircraft do not currently have the option of using hangars to park during the winter months. This degrades the customer experience provided by the FBO when temperatures are sub-zero or large amounts of snow have fallen. As a result, it is recommended that the FBO consider constructing a corporate hangar to generate additional revenue as warranted by market demand.

During the Airport Master Plan Visioning Session discussions, general aviation pilots[85] emphasized the value of a facility that provides hi-speed internet access and amenities that allow customers to rest, such as lounges with recliners, between flights. While the building does currently support basic user needs, it is also showing signs of age and degradation, providing an impetus for updates or new construction. In addition to the facilities aging, there is also limited space shared between the air carrier apron and the transient apron discussed in **Section 2.12.3, *Air Carrier Apron*** and **Section 2.13.2, *Transient Aircraft Parking Apron***. Because of this the FBO's proximity to the terminal facilities an operational complication exists. At times when there is a commercial aircraft parked at the terminal, the Security Identification Display Area (SIDA) is active, restricting capacity of the transient apron until the commercial aircraft has left the air carrier apron.

[85] Airport Master Plan Visioning Session, March 2021.

The FAA's *Recommended Security Guidelines for Airport Planning, Design and Construction*,[86] states that:

> "It is advisable to the extent possible to exclude general aviation areas from the SIDA of the airport...The limited security resources of an airport operator should be focused on the critical passenger aircraft operator areas."

Therefore, a relocation of FBO facilities is recommended as it would provide an opportunity to upgrade the facility and achieve many of these with requests with a high level-of-service, while eliminating the conflict of space between the transient and air carrier aprons. The commercial terminal apron and SIDA would then be able to accommodate two simultaneous commercial operations without restricting the use of the transient apron.

2.14.3.1 Fuel Farm

The fuel farm consists of one 12,000-gallon tank of 100LL avgas and one 12,000-gallon tank of jet-A fuel. The fuel farm facility requirements are developed based on five-day fuel need (in gallons). Historical records from the Airport were used to assess how much of each fuel type was used in the peak month on an average day (PMAD). The analysis shows that the Airport, under baseline forecast demand, has adequate storage for both 100LL avgas and jet-A fuels. **Table 2-47** shows the fuel farm requirements for five days in the peak month of operations.

As a means to generate more revenue, it is recommended that the Airport consider a self-serve fuel option for 100LL avgas. Enabling single engine piston users to buy gas at a cheaper rate by fueling their own aircraft might incentivize them to use the Airport over other competing airports.

2.14.3.2 Electric Aircraft Charging Stations

Future FBO facility planning should also consider the infrastructure, utilities, and space necessary for electric aircraft charging stations. Such facilities may begin to show demand over the planning horizon, especially by based electric training aircraft, transient aircraft, and electric vertical takeoff and landing (eVTOL) aircraft. An electric aircraft charging facility would likely need to be located within a hangar large enough to accommodate multiple aircraft and be planned for safety so that it is at an adequate distance from any fuel trucks, fuel tanks, or other chemicals that it could ignite. It is recommended that when the FBO is relocated, the location and space necessary for an electric aircraft charging station should be planned.

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[86] DOT/FAA/AR-00/52 *Recommended Security Guidelines for Airport Planning, Design and Construction* (2001) p.30
https://www.hsdl.org/c/

TABLE 2-47
FUEL FARM REQUIREMENTS

Fuel Facilities	2019	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Peak Month Average Day (PMAD) Operations	38	45	48	53
100LL				
PMAD Operations	5	6	7	7
5-Day Fuel Need (Gallons)	280	330	350	390
Available Fuel Facility Storage (Gallons)	12,000	12,000	12,000	12,000
Total Storage for 5 Day Need: Surplus/ (Deficit)	**11,720**	**11,670**	**11,650**	**11,610**
Jet A				
PMAD Operations	33	39	41	46
5-Day Fuel Need (Gallons)	3,110	3,690	3,900	4,330
Available Storage (Gallons)	12,000	12,000	12,000	12,000
Total Storage for 5 Day Need: Surplus/ (Deficit)	**8,890**	**8,310**	**8,100**	**7,670**

Note: Numbers are rounded.
Source: Airport Records; RS&H Analysis, 2021

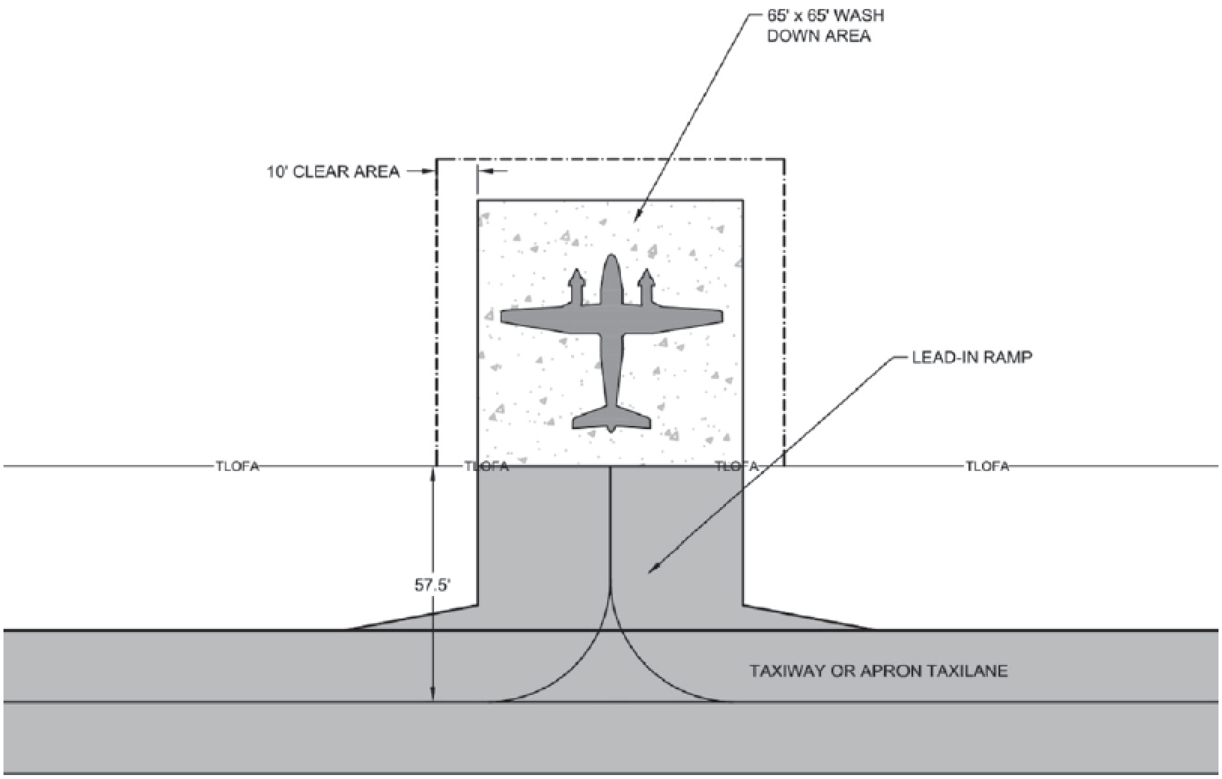
2.14.4 Aircraft Wash Facilities

HIB does not have an aircraft wash rack facility, but this type of facility is generally desirable to small general aviation aircraft owners based at airports. Aircraft wash facilities can be financed/operated by the Airport, private investors, or a combination of both.

There are different styles of aircraft wash facilities possible at HIB. Wash facilities can be an open air, covered, or completely enclosed. When considering local climate, local environmental requirements, and cost, either an open air or covered facility are logical choices for the Airport. Open air has the advantage of size flexibility and cost savings, however, a covered structure benefits from reduced infiltration of precipitation into the drain and less runoff of grease and soaps around the pad. A covered facility also protects people and equipment from the sun and is relatively inexpensive to construct, although more expensive than an open-air concept. The downside of the covered facility is the inflexibility to accommodate aircraft larger than the size of structure.

It is recommended the facility be built to accommodate aircraft up to the size of a Beechcraft King Air 350. A covered structure would need to be 70' by 70' across and 18-feet high. At this size, most general aviation aircraft based at the Airport would be able to use the facility. A wash facility is best located in proximity to small aircraft storage locations and near connections to water, sanitary sewer, electricity utilities. To easily collect fees for this service, a communication line would be required to serve a transaction system that accepts credit cards. The facility needs to be equipped with multiple hose bibs, as well as grease, oil, and sand separators to prevent discharge from entering the sanitary sewer drainage system. Additionally, the facility must be located outside of all taxilane object free areas, in a location that will not penetrate Part 77 surfaces, and away from all areas that may experience prop wash or jet blast. **Figure 2-28** shows an example of wash rack design.

FIGURE 2-28
AIRPORT WASHRACK FACILITY EXAMPLE



Source: ACRP Report 113, *Guidebook on General Aviation Facility Planning*; Delta Airport Consultants, Inc., 2014

2.15 LANDSIDE FACILITIES

Airport landside facilities provide intermodal connections between the Airport and a variety of ground transportation modes. These facilities include regional access connections, on-airport circulation roadways, public and employee parking facilities, and rental car ready/return. These facilities are described briefly in the following sections.

2.15.1 Airport Regional Access and Wayfinding

Regional vehicular access to all landside accessible areas of the Airport is provided via Minnesota State Highway 37 (MN-37). The terminal area entry/exit has a large location sign at an unsignalized intersection to MN-37, however, no wayfinding signage exists prior to the airport along MN-37. Notably, no directional wayfinding signage exists as the nearest major interchanges, US-169/MN-37 to the west in Hibbing, and US-53/MN-37 to the east. It is recommended that the Airport coordinate with the Minnesota Department of Transportation District 1 office[87] to begin the process of creating directional signage to the Airport from these two critical junctions.

It is also recommended that HIB conduct a basic wayfinding study and develop a set of comprehensive guidance and standards for the Airport's landside area. This type of plan ensures the wayfinding system is

[87] http://www.dot.state.mn.us/d1/contacts.html

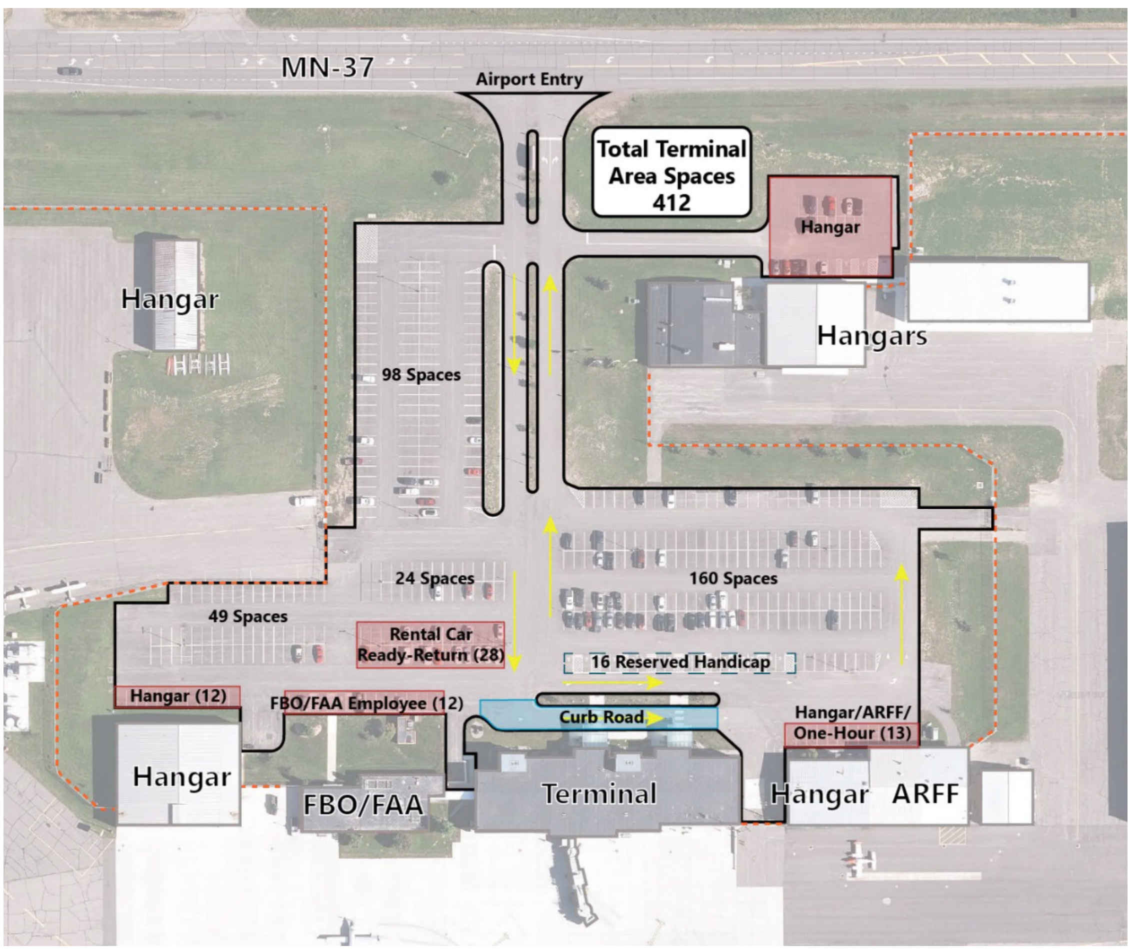
intuitive to users and can help it integrate more seamlessly in with the regional wayfinding/signage system. Providing a coordinated experience for the traveling public elevates overall airport user experience and strengthens the Range Regional Airport brand within the local and regional community.

Access to the east side of the Airport occurs at Hughes Rd. This intersection is unsignalized and discussions with Airport staff revealed safety concerns for drivers entering MN-37 from Hughes Rd. Low areas east of the intersection hinder clear line-of-sight for drivers, limiting the amount of time available to safely turn west onto MN-37 from Hughes Rd. This is especially evident during shift changes at the adjacent industrial facility. As the east side of the airport develops, this intersection safety issue will need to be addressed through regional coordination with MnDOT.

2.15.2 Airport Terminal Area Landside

The terminal area landside at HIB serves a variety of users including terminal passengers and meeters/greeters, airport and tenant employees, general aviation users, and rental car agencies. Observations by Airport staff indicate that nearly all vehicular traffic is privately owned vehicles and taxi service to HIB is limited. The layout for the terminal area landside can be seen in **Figure 2-29**.

FIGURE 2-29
AIRPORT TERMINAL LANDSIDE



Source: Airport Records; RS&H, 2021

2.15.2.1 Terminal Curb Roadway

The terminal curb road is approximately 200 feet long with two lanes, one for loading/unloading vehicles and the other for through vehicles. The curb road is used for picking up and dropping off passengers, and FAA security regulations prohibit vehicles from being left unattended within 300 feet of the terminal. Active loading and unloading of vehicles is encouraged to be done in a timely manner as to promote safety and avoid congestion of the terminal curb road during peak hours. Peak hours at the airport are observed to occur from 5-6:30am (departures peak), 11am-1pm, and 9-10:30pm (arrivals peak). Under baseline 2019/2020 conditions, interviews with Airport staff indicated the terminal curb provides ample space and creates no issues with adjacent facilities under 2019/2020 conditions. It is recommended that as terminal expansion occurs and/or user mode preferences change, landside elements such as the terminal curb layout and dimensions be further studied.

2.15.2.2 Ground Transportation and Rental Car Services

The Airport offers multiple options for ground transportation including on-site car rentals, local taxi service, a van/bus service, and transportation network companies (TNCs). All ground transportation services need to be prearranged with local providers.

Rental car services are currently available through ACAR Auto Rental. Reservations must be made ahead of arriving to the airport. Enterprise Rent-a-Car previously operated on-site but suspended operations as of 7/31/2020 during the COVID-19 pandemic.

As passenger activity grows at HIB, rental car providers may require additional facilities for cleaning, fueling, and maintenance of vehicles. Working closely with rental car tenants with regard to timing of these needs, it is recommended that the Airport consider eventually instituting a Customer Facility Charge (CFC) to cover the capital costs of constructing the facilities. The typical CFC is limited to funding of rental car facilities, associated infrastructure, and meeting their operating costs. The fee is assessed on rental car customers per the number of contract days that a vehicle has been rented. CFC funded facilities would be leased to rental car tenants. Instituting a CFC prior to having the immediate need for rental car facilities would allow them to be constructed at a time that creates a seamless transition for rental car customers without sacrificing a quality level of service. Locations for washing/fueling facilities (known as quick turn-around or QTA) and maintenance shops should be considered in ultimate land use planning for the terminal/landside area.

2.15.2.3 Terminal Area Vehicle Parking

HIB provides approximately four acres of terminal area parking. **Figure 2-29** shows the parking space allocation in the terminal area. Terminal area parking is free of charge for customers exclusively traveling to/from the Airport, however, oversized vehicles, vehicles/trailers, and campers/recreational vehicles are not allowed to park without explicit prior permission from the Airport. There is no time limit for parking, however the Airport asks to be notified for durations extending beyond 14 days. The only parking uses designated by signage are rental car ready-return and one-hour parking. Rental car spaces are located near the General Aviation building west of the terminal. One-hour parking is designated by signs in the front row of the hangar immediately east of terminal. Customers are encouraged to use one-hour parking spaces while assisting arriving or departing passengers.

Prior to a 2019 parking lot expansion, which added 98 spaces, the parking lot reached capacity during Sun Country charter flights. The terminal area parking lot is currently meeting demand during those times. Vehicle parking requirements are shown in **Table 2-48**. Future parking needs for the terminal area were determined using a rational planning factor of terminal area parking spaces-to-annual enplanements. The ratio is developed using parking information from representative airports including Duluth International (DLH), St. Cloud Regional (STC), Cherry Capital (TVC), Bemidji Regional (BJI), and Sioux Gateway (SUX). Analysis assumes the parking lot is effectively full once it reaches 90 percent occupancy of total space capacity, meaning drivers would have difficulty locating an open space at this level of occupancy.

TABLE 2-48
TERMINAL AREA PARKING REQUIREMENTS

Terminal Area Parking	Existing	Baseline	High Growth	ULCC
		PAL 3	PAL 3	PAL 3
Annual Enplaned Passengers	17,753	20,817	41,688	62,505
Total Spaces	350	350	350	350
Effective Capacity	310	310	310	310
Total Required Spaces	**250**	**290**	**580**	**870**
Surplus / (Deficiency)	**60**	**20**	**(270)**	**(560)**

Note: Numbers are rounded.
Source: RS&H Analysis, 2021

2.15.2.4 Paid Terminal Parking

Parking at HIB is currently free. Analysis of airport terminal area parking in the state shows that Bemidji Regional Airport (BJI) and St Cloud Regional Airport (STC) also currently have free parking. Duluth International Airport (DLH), a nearby alternative to HIB for air service, has paid parking but experiences roughly 9 times the number of annual enplaning passengers[88] and offers more air service options.

Determining when to charge for terminal area parking varies greatly by airport and depends on regional circumstances and consumer behaviors. From the most practical perspective, an airport should start charging for parking when the cost of maintenance and repairs grows beyond what can be absorbed by the operating budget and when anticipated parking revenues will, at a minimum, cover expenses related to charging for parking. These expenses include infrastructure, equipment, insurance, and staff. In order to ensure level of service needs are met and security measures are in place, barriers such as entrance and exit stations will need to be installed. It is recommended that a cost-benefit analysis be performed to determine when implementing paid parking makes good business sense.

2.15.2.5 Electric Vehicle Charging Stations

More electric vehicles (EVs) have come to market in recent years and their popularity among consumers has grown. Electric vehicles require charging stations to keep batteries charged, and more public and private facilities have begun to install these charging stations to accommodate electric vehicles. Although

[88] Per 2019 FAA Air Carrier Activity Information System (ACAIS) data.

the cold temperatures associated with Northern Minnesota winters may pose a challenge to EV battery efficiency, or at minimum, delay adoption of EV's by consumers, it is recommended the Airport consider planning for where EV charging stations would be made available to the public. Hibbing currently has no regulations for electric vehicle charging stations in site development. Standards for allocating dedicated electric vehicles charging stations are still in their infancy, but effective 2017, California developed a Green Building Standards Code (Title 24, Part 11). In this code, nonresidential mandatory EV space allocations are dependent upon total required parking spaces and are set at a rate ranging from 4 to 6 percent of total parking. A realistic assumption for planning EV space requirements at HIB would be 1 percent of total allocated spaces should provide charging stations by end of planning period.

2.16 DEICING AND STORMWATER MANAGEMENT

Stormwater and deicing analysis for this Master Plan is included as a comprehensive study in **Appendix C**. All results of that study are incorporated into later Master Plan analysis including development alternatives, implementation planning, and the Airport Layout Plan.

2.17 UTILITIES

The Airport's primary developed area, including the terminal building, is served by main lines of utilities along Highway 37. Most of the remaining Airport property is undeveloped. This section will look at existing utilities and their general locations, with a focus on the Future East Development Area, the most ideal site for future aeronautical development. **Figure 2-30** shows approximate locations of electrical, water, sewer, gas, and communication lines at the Airport.

2.17.1 Water

Water service at Range Regional Airport is supplied by the Hibbing Public Utilities Commission (HPUC).[89] The main water line into the Airport is an 18-inch pipe distribution line running along Highway 37. Airport facilities in the terminal area connect to the main line via 6-inch lines. There is a 10-inch water main pipe running from the main line south into the Future East Development Area. That line is approximately 1,500 feet from Airport's security fence in that area.

2.17.2 Sewage

Sewage service at Range Regional Airport is supplied by the HPUC. The sanitary sewer lines are made up of a 12-inch pipe that runs along Highway 37. There is also a 12-inch sanitary sewer pipe that runs along the same general area as the water main line and feeds into the Future East Development Area. Additionally, there is an 8-inch force main pipe that mirrors the sanitary sewer line.

2.17.3 Gas

Gas service at Range Regional Airport is supplied by the HPUC. There is a two-inch gas main that runs along Highway 37 to the vicinity of the Airport entrance. This line provides a natural gas supply to the Airport. If natural gas would be required to the Future East Development Area, the two-inch line would have to extend past this point and connect to a line that would feed south into that area.

[89] GIS mapping of water, sewer, and gas lines available at: https://gis.cgisservices.com/cgisportalp/apps/webappviewer/index.html?id=fc70b50cdbef48d6af591a17efcaaa26

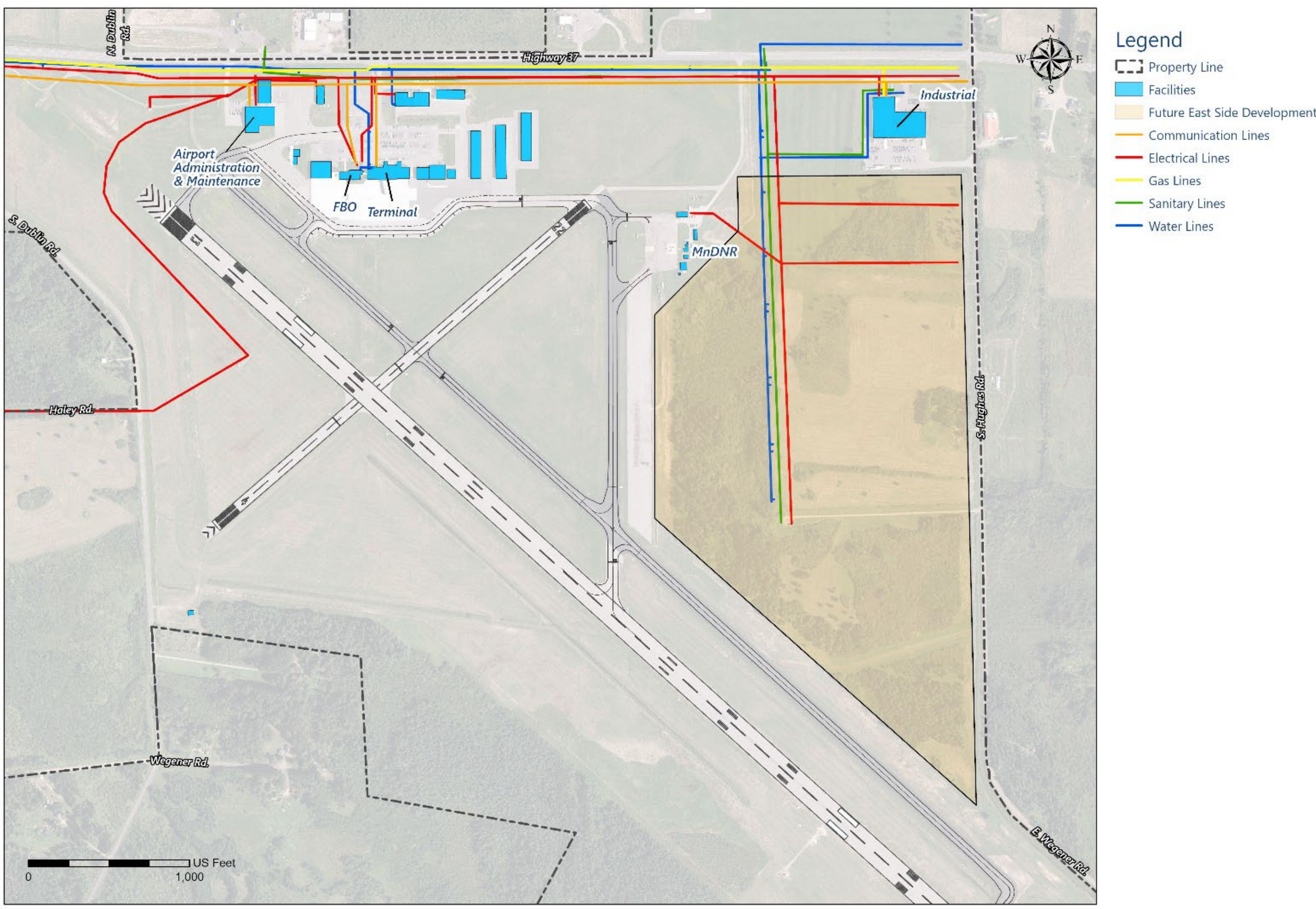
2.17.4 Electricity

Electricity at Range Regional Airport is supplied by Minnesota Power. The primary voltage for the area is 23 kilovolts. The main electrical lines run underground along the south side of Highway 37 and feed into the Airport's terminal area. An underground line also extends south from Highway 37 into the Future East Development Area, providing electrical connectivity to the undeveloped area.

2.17.5 Communications

Communication lines, including Wi-Fi, at Range Regional Airport are supplied by Century Link. An extension of the lines was recently completed along Highway 37, east of the Airport core. It is uncertain whether these lines extend into the Future East Development Area. Therefore, it is recommended presence of those lines be confirmed or extended into the Future East Development Area.

FIGURE 2-30
AIRPORT UTILITY LINES (APPROXIMATED)



Source: City of Hibbing Web Mapping; Minnesota Power; Prepared by RS&H, 2021

2.17.6 Solar Energy System

Airport and stakeholder interest has been expressed in pursuing solar energy harvesting on Airport property as an added source of revenue. One area of land with potential for this use is Airport-owned property north of Highway 37. Due to rapidly growing interest in solar system technologies at airports, the FAA has recently issued guidance on solar energy systems or "solar farms" on airport property in *FAA Airports Solar Guide* (2018).[90]

In summary, planning points from the FAA guidance on solar energy systems include:

- **Solar System Life Cycle** – "A solar system that is designed and installed properly will operate for more than 20 years. The [photovoltaic] PV panel itself has no moving parts and can last more than 30 years."

- **Siting and Feasibility** – "Whether completed internally by the airport, a prospective development partner, or an energy consultant, the siting and feasibility study includes an assessment of the different locations for a project including compatibility with aviation, central design issues such as size and architecture, and a cost/benefit analysis of alternative scenarios. These elements are brought together to form a coherent analysis of the options with recommendations for next steps. An important outcome of this study is to determine if the airport will seek to own the system or lease property to a third-party private developer."

- **Design and Permitting** – "Once a project has been defined, it must go through a more detailed design and the permit approval process. The airport operator or its representatives should initiate early coordination with the FAA as the design is developed to ensure that the project complies with FAR Part 77, NEPA, and FAA requirements for land leases and funding as applicable. Detailed design information may be needed to look at whether a solar tracking system makes sense and to investigate issues such as roof load and geotechnical factors. Once the design has been finalized, applications are filed for all Federal and state permit approvals."

- **Installation** – "Depending on project size and installation platform (building or ground), solar projects are relatively simple to install with construction occurring in days, weeks, or months."

- **Operation and Maintenance** – "When the solar facility is operating, regular operations and maintenance (O&M) activity is minimal. However, the system must be constantly monitored to ensure that its electricity production is maximized. Should system production fall drastically, the owner will likely call in a local technical firm contracted to perform O&M to look at the problem and make component changes as needed. This same firm may also conduct periodic cleaning of the panels and vegetation management to ensure that the panels are optimizing their electricity production potential. Typically, cleaning will occur twice each year and vegetation management will depend on the setting."

[90] https://www.faa.gov/airports/environmental/policy_guidance/media/FAA-Airport-Solar-Guide-2018.pdf

With consideration to this guidance and the availability of undeveloped land at HIB with potential for siting a solar farm, alternatives development within this Master Plan will consider potential solar sites for future study. It is recommended that a solar feasibility study be performed to analyze physical constraints and the preferred ownership model. These will include evaluations such as natural resource impacts, solar flare analysis, and financial cost-benefit modeling. The study would also provide guidance on required regulatory coordination, design considerations, and evaluate varying funding strategies.

2.18 FACILITY REQUIREMENTS SUMMARY

The following is a summary list of airport facility needs and improvement considerations through Planning Activity Level 3. These needs and considerations will be the basis for creation of development alternatives in **Chapter 3, *Development Alternatives***, which will be evaluated and refined through public process into a long-range preferred development alternative for the planning period.

Airport Property

- ***Bury Fence*** – Bury wildlife fences to mitigate wildlife hazards on the airfield.
- ***Airport Zoning Study*** – Complete zoning study to meet MnDOT requirements.
- ***Land Acquisition*** – Consider acquiring all property within the immediate departure end of Runway 13. Consider other strategic land purchases for future aeronautical and/or non-aeronautical development.

Runways

- ***Runway Length*** – Extend Runway 13-31 from 6,758 feet to between 7,400 – 8,000 feet.
- ***Runway Width*** – 20-foot shoulders are recommended for Runway 13-31.
- ***Runway Pavement Strength*** – Increase pavement strength of Runway 13-31 prior to Boeing 737-800 activity reaching 130 annual operations. Forecasting this demand requires coordination with Sun Country charters.
- ***Runway Design Standards*** –
  - Meet FAA blast pad ADG-III design standards Runway 13-31.
  - Meet FAA blast pad ADG-II design standards Runway 22.
  - Add three signs that would warn any vehicle that might enter the obstacle free zone (OFZ) on Runway 22.
- ***Runway Designation*** – Redesignate Runway 4-22 to Runway 5-23.

Taxiways

- ***Taxiway Design Standards*** – Construct 20-foot paved shoulders for Taxiway A and B-1. Standard fillets are recommended on Taxiways A, A-1, B, B-1, and C, as well as all taxilane intersections.
- ***Taxiway Pavement*** – Reconstruct Taxilane-1, the MnDNR Apron, and Taxiway A.
- ***Runway as a Taxiway*** – Reconfigure the connecting taxiway system to Runway 13-31 and Taxiway C so Runway 4-22 is not considered for use as a taxiway.
- ***Taxiway A*** – Redesign Taxiway A to intersect Runway 22 at a right angle and correct multiple non-standard taxiway deficiencies.
- ***Taxiway B*** – Redesign the intersection of Taxiway B, B-1, and Runway 22 to correct multiple non-standard taxiway deficiencies.
- ***Taxiway B-1*** – Redesign the intersection of Taxiway B-1 and Taxiway B to correct multiple non-standard taxiway deficiencies.
- ***Taxiway C*** – Reconfigure the intersection of Taxiway C and Taxiway B, as well as the intersection of Taxiway C and Runway 13-31 to correct non-standard taxiway deficiencies.

- ***Taxiway C-2*** – Correct designations of Taxiway B and Taxiway C-2 to make them sequential.

NAVAIDS, Signage, and Pavement Markings

- ***Segmented Circle*** – Construct a segmented circle.
- ***ASOS*** – Acquire a backup generator to support the ASOS and/or purchase a new ASOS.
- ***Lighting*** –
  - Pursue touchdown zone lighting on Runway 13-31.
  - Add MITL to Taxiway B.
- **Illumination of Taxiway Hold Signs** –
  - Illumination of hold sign for Taxiway A and Runway 22 intersection is required.
  - Illumination of hold sign for Taxiway B and Runway 22 intersection is required.
- **Pavement Markings** –
  - Remark threshold markings to be 20 feet from the threshold on each of the four runway ends. This modification will cause remarking on the remainder of the runway markings as well, which is recommended as soon as practical.
  - Add chevron markings to Runway 22 blast pad.
- **Vehicle Service Road –** Construct vehicle service road in the northern and eastern areas of the airfield.

Terminal

- ***Terminal Building Space*** – Preserve terminal area space capable of meeting the ULCC PAL 3 scenario. For baseline forecast, increase restroom space, airport administration space, and sterile-side concessions.
- ***Air Carrier Apron*** – Increase air carrier apron space with up-gauging of EAS aircraft or increased frequency of Boeing 737-800.

Aircraft Parking and Storage

- ***Based Aircraft Storage*** –
  - 11 additional T-hangars are required by PAL 3.
  - 3 additional conventional hangars are required by PAL 3.
  - 1 corporate hangar is required by PAL 3.
- ***Transient Aircraft Storage*** – The transient apron requires an additional 8,300 sq yds by PAL 3.

Landside

- ***Wayfinding and Signage*** –
  - Coordinate with MnDOT office to begin the process of creating directional signage to the Airport.
  - Conduct a basic wayfinding study and develop a set of comprehensive guidance and standards for the Airport's landside area.

- ***Rental Cars*** – Coordinate with rental car companies to consider timing/interest in instituting a Customer Facility Charge (CFC) to cover the capital costs associated with future facilities for cleaning, fueling, and maintenance of rental car vehicles.
- ***Parking*** –
  - Perform cost-benefit analysis to determine when implementing paid parking would be required by operating budget constraints.
  - Plan to provide charging stations for 1 percent of total terminal area vehicle parking spaces at HIB by end of planning period.

Support Facilities

- ***Aircraft Rescue and Fire Fighting*** – Purchase a new ARFF Index B truck as soon as possible. The Airport's 2021 CIP currently has a new ARFF truck programmed for purchase.
- ***Airport Maintenance and Equipment Storage Facility*** – Explore different configurations of the MES facility to provide adequate space for safe maneuvering of larger equipment.
- ***Fixed-Based Operator*** –
  - Provide additional space for pilots to rest as well as fast and reliable internet service.
  - Acquire more transient apron and a hangar that is heated for winter months.
  - Perform a cost-benefit analysis for providing self-service 100LL Avgas.
- ***Aircraft Wash Facility*** – Construct one of two wash facility options, including:
  1. A 70' by 70' wash structure, preferably covered, that is 18-feet high (Accommodates aircraft up to the size required by a Beechcraft King Air 350), or
  2. A basic 70' by 70' open air facility as close to based piston aircraft as practical.

Utilities

- ***Expansion of Utilities into the Future East Development Area*** – Connect natural gas and communication lines to the main lines on Highway 37 in a similar path to that of the existing water, sewer, and electrical lines.
- ***Airport Energy Sustainability*** – Perform solar feasibility study and identify potential sites for harvesting of renewable energy.