
Attachment 2. Hangar Availability Evaluation and State Funding Recommendations

1.1. Introduction

Airports encompassed within the Minnesota state aviation system support all types of aviation users ranging from private recreational pilots operating single-engine piston aircraft to air cargo providers operating some of the largest aircraft in the world. At the time of this writing in July 2021, there are 6,374 registered aircraft in Minnesota which rely on airports to have adequate levels of service and available infrastructure.¹ Hangars are a critical piece of that infrastructure to protect aircraft against warm summer and extreme winter climates in Minnesota. Additionally, aircraft hangars can also generate a revenue stream for airports to help sponsors cover the high costs of airport maintenance, operations, and improvements.

During the initial Phase 1 of the Minnesota State Aviation System Plan (MnSASP), airports and pilots identified the lack of hangar availability across Minnesota as one of the top issues affecting Minnesota aviation. To determine the full scope of this issue, a comprehensive data collection effort was completed during Phase II of the MnSASP (or 2022 MnSASP). This data collection effort quickly revealed that airports cannot access sufficient funds for new hangar development or the maintenance of existing facilities. Additionally, many airport users identified the use of hangars for non-aeronautical-related purposes as a major challenge, compounding the issue of hangar availability. This attachment summarizes these findings and presents recommendations to the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) and airports for alleviating hangar-related issues across the state aviation system. The information is subdivided into the following sections:

- Review of System Needs
- Current Hangar Funding Techniques
- Recommendations

1.2. Review of System Needs

A comprehensive data collection and outreach effort was completed to evaluate the current hangar capacity, availability, and demand that exists across the state aviation system. This was completed through two complementary efforts:

- Inventory data collection effort related to hangar capacity, occupancy, and rates and charges assessed
- Outreach effort to aircraft pilots/owners currently on a waitlist for hangar space to understand the specific demands and needs of hangar users

The following subsections present the findings of these efforts.

¹ FAA (2021). "Aircraft Registration." Available online at https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/releasable_aircraft_download/ (accessed July 22, 2021).

1.2.1.2. Total Hangar Occupancy

Airports were also asked to provide information on current hangar availability, including total hangar occupancy and occupancy by hangar type. Based on a review of the aggregated data, 95.7 percent of hangar capacity across the state aviation system is currently occupied. Further, all classifications of airports had a hangar occupancy rate of over 84 percent. Key GA airports had the highest percent occupied rate at over 97 percent. **Table 2** presents the total hangar occupancy by state classification. Please note that some airports were unable to provide complete data regarding hangar occupancy rates; as such, the totals reported in **Table 2** are not reflective of the total hangar capacity cited in **Table 1** (4,998 spaces total versus 4,456 with available occupancy data).

Table 2. Total Hangar Occupancy by State Classification⁶

State Classifications	Total Occupied Spaces	Total Available Hangar Spaces	Percent Occupied
Key Commercial Service	445	487	91.4%
Key General Aviation	1,594	1,638	97.3%
Intermediate Large	1,185	1,228	96.6%
Intermediate Small	950	996	95.4%
Landing Strip Turf	90	107	84.3%
Total	4,265	4,456	95.7%

Source: MnSASP Inventory Data, 2021

The high occupancy rates indicated in **Table 2** shows alignment with the findings from Phase 1 of the MnSASP regarding the lack of hangar availability. However, through an outreach effort with airport pilots and owners in Minnesota, it was found that some hangar spaces are being utilized for non-aeronautical use, such as storing other vehicles and personal belongings like a conventional facility. The improper use of hangars is likely a factor in the lack of aircraft storage. This issue will be examined further in **Section 1.2.3. Section 1.4.1** will provide recommendations to mitigate this issue.

1.2.1.3. T-Hangar Occupancy

A review of systemwide T-hangar occupancy was also conducted based on inventory data. The analysis reveals that 93.9 percent of T-hangar spaces in the system is currently occupied, amounting to 1,841 spaces. Intermediate Large airports have the highest occupancy rate at 96.1 percent, while Landing Strip Turf airports have the lowest occupancy rate at 67.9 percent. **Table 3** presents the current T-hangar occupancy across the different state classifications. Please note that with the limited occupancy data provided by airports, the totals are not reflective of the total T-hangar capacity cited in **Table 1** (2,150 spaces total versus 1,960 that have occupancy data available).

⁶ With the limited occupancy data provided by airports, the totals are not reflective of the total hangar capacity cited in **Table 1** (4,998 spaces). This table is based on 124 airports with available occupancy data.

Table 3. T-Hangar Occupancy by State Classification⁷

State Classifications	Total Occupied Spaces	Total Available Hangar Spaces	Percent Occupied
Key Commercial Service	288	313	92.1%
Key General Aviation	556	597	93.1%
Intermediate Large	501	521	96.1%
Intermediate Small	483	508	95.0%
Landing Strip Turf	14	21	67.9%
Total	1,841	1,960	93.9%

**Note: T-hangar occupancy may be used to store based or transient aircraft. Source: MnSASP Inventory Data, 2021*

1.2.1.4. Box Hangar Occupancy

A review of systemwide box hangar occupancy was also conducted. The data show that approximately 97.1 percent of box hangar spaces in the system are occupied, amounting to 2,424 spaces. Key General Aviation airports have the highest occupancy rate at nearly 100 percent, with Landing Strip Turf airports showing an average of 88 percent occupancy. **Table 4** presents the current T-hangar occupancy across the different state classifications. Please note that with the limited occupancy data provided by airports, the totals are not reflective of the total box hangar capacity cited in **Table 1** (2,749 spaces total vs 2,496 that have occupancy data available).

Table 4. Box Hangar Occupancy by State Classification (Based Aircraft Storage Only)⁸

State Classifications	Total Occupied Spaces	Total Available Hangar Spaces	Percent Occupied
Key Commercial Service	157	174	90.2%
Key General Aviation	1,039	1,041	99.7%
Intermediate Large	685	707	96.9%
Intermediate Small	467	488	95.8%
Landing Strip Turf	76	86	88.3%
Total	2,424	2,496	97.1%

**Note: Box hangar occupancy is only reflective of facilities that store based aircraft. T-hangar occupancy may be used to store based or transient aircraft. Source: MnSASP Inventory Data, 2021*

⁷ With the limited occupancy data provided by airports, the totals are not reflective of the total T-hangar capacity cited in **Table 1** (2,150 spaces). This table is based on 90 airports with available T-hangar occupancy data.

⁸ With the limited occupancy data provided by airports, the totals are not reflective of the total box hangar capacity cited in **Table 1** (2,749 spaces). This table is based on 126 airports with available box hangar occupancy data.

1.2.1.5. Hangar Rates and Charges Analysis

Airports were asked to provide hangar rates and charges data for all airport-owned hangars, as well as detailed information about the age, size, condition, monthly rent, and utilities available for each type of hangar space (i.e., box and T-hangar). These data were reviewed in the aggregate to calculate average monthly rental rates established across different types of hangars.

In total, 61 airports⁹ provided adequate T-hangar details to calculate weighted average monthly rental rates. **Table 5** presents the weighted average monthly rental rate by T-hangar condition for each state classification. The averages noted in the table with an asterisk are based off only one airport.

Table 5. T-Hangar Average Monthly Rent by Condition¹⁰

State Classification	Number of Airports	Good (\$)	Fair (\$)	Poor (\$)
Key Commercial Service	6	\$175	\$142	\$150*
Key General Aviation	13	\$245	\$250	\$228
Intermediate Large	17	\$152	\$117	\$134
Intermediate Small	28	\$119	\$107	\$71
Landing Strip Turf	1	None reported	\$50*	None

Source: MnSASP Inventory Data, 2021

Box hangar rates were also reviewed across different sizes and conditions by state classification. In total, 42 airports¹¹ in the state aviation system provided adequate box hangar details to calculate a weighted average monthly rent by hangar size. **Table 6** presents the weighted average monthly rental rates by box hangar size for each state classification. The averages noted in the table with an asterisk are based off only one airport.

Table 6. Box Hangar Weighted Average Monthly Rent by Size (sq/ft)¹²

State Classification	Number of Airports	Less Than 2,500 SF (\$Total)	2,500 to 5,000 SF (\$Total)	5,000 to 10,000 SF (\$Total)	More Than 10,000 SF (\$Total)
Key Commercial Service	5	\$308*	\$1,025*	None reported	\$3,158
Key General Aviation	11	None reported	\$746	\$985	\$2,773
Intermediate Large	12	\$347	\$420	\$600	\$700*
Intermediate Small	12	\$93	\$350	\$373	None reported
Landing Strip Turf	2	\$200*	None reported	\$80*	None reported

Source: MnSASP Inventory Data, 2021

⁹ Includes two airports in the Metropolitan Airports Commission (MAC): Crystal Airport (MIC) and Saint Cloud Regional Airport (STC)

¹⁰ Averages with an asterisk are based off only one airport

¹¹ Includes four airports within MAC airport system: Anoka County-Blaine Airport (ANE), Saint Paul Downtown Airport (STP), Flying Cloud Airport (FCM), Saint Cloud Regional Airport (STC)

¹² Ibid.

The results of the rates and charges analysis indicates that airports may be undervaluing hangars by setting the lease rates lower than the recommended market rate. By setting low lease rates, airports may be unable to recoup the cost to construct and maintain hangars and other aspects of the airport. As such, many airports are reliant on local, state, and federal funding sources for capital improvements and operating funds – deviating away from the goal of airport self-sufficiency. In addition to generally being the goal of all airports, self-sufficiency is explicitly a goal established by Minnesota GO under the objective of System Stewardship. By establishing a more sustainable lease rate structure, airports can better upkeep existing facilities and move towards a more self-sufficient operation. **Section 1.4.2** provides recommendations for establishing more appropriate lease rate structure for airport facilities.

1.2.2. AIRCRAFT OWNER/PILOT OUTREACH SURVEY RESULTS

To better identify the actual hangar demand across the state aviation system (i.e., specific and current hangar needs), an outreach effort was conducted with aircraft pilots and owners seeking aircraft hangar storage. The outreach process started with the MnSASP inventory effort collecting hangar waitlists from airports to identify users inquiring about hangar storage. This collection effort yielded information about 309 waitlisted individuals across 24 different airports, 176 of which had contact information available to initiate the outreach process.¹³ These individuals were contacted in one of two approaches based on the waitlist information provided by airports:

- Distributed an Aircraft Hangar Waitlist Survey via email asking respondents to provide the intended airports for aircraft storage, type(s) of hangars requested, reason(s) for basing their aircraft at a certain airport, ideal amenities, aircraft information, among other information
- Called waitlisted individuals to request information on hangar needs, using the Aircraft Waitlist Survey as a guide through the discussion

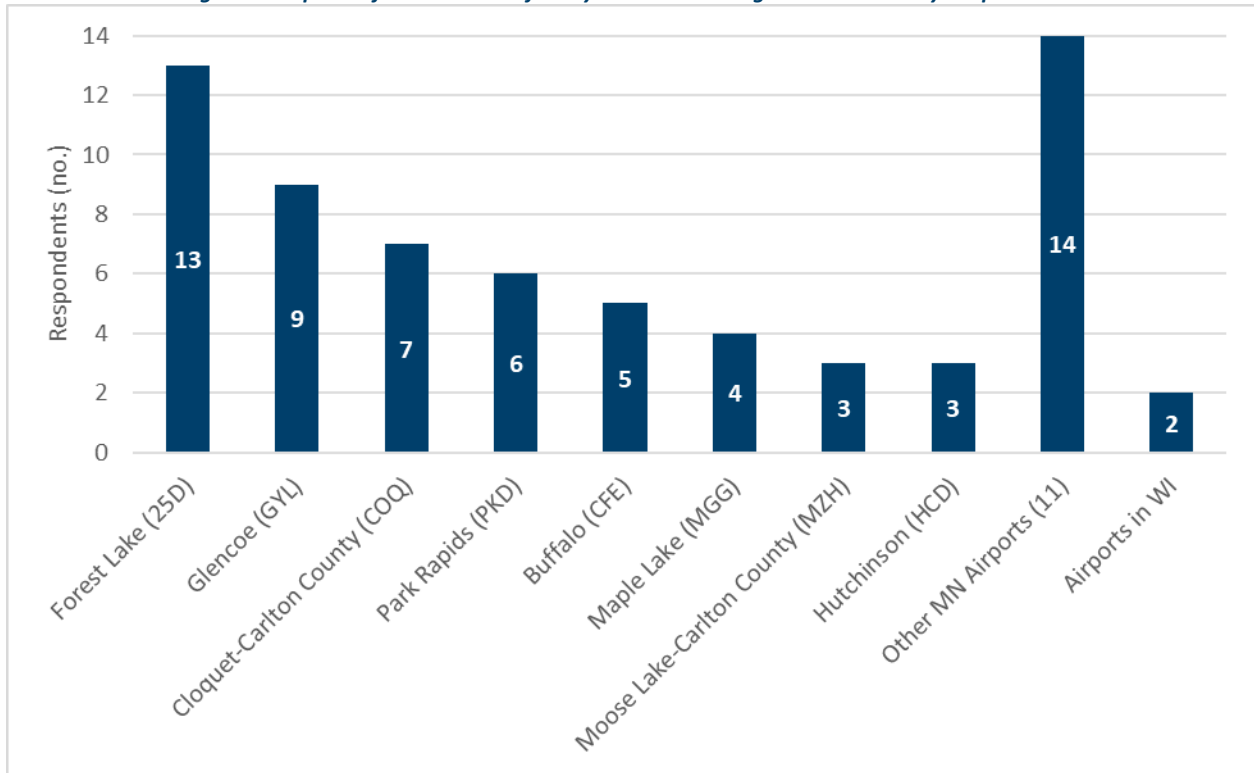
Through attempted contact with all 176 individuals, it was found that the vast majority of individuals no longer had a need for hangar storage. This indicated that many hangar waitlists across the states may not have been validated to confirm the ongoing interest of waitlisted individuals seeking hangars. As such, the outreach effort yielded 47 individuals who confirmed their current need for hangar storage and provided adequate information on their hangar needs in terms of purpose of need, type of hangar requested, aircraft to be stored, and sought-after amenities. The responses from these individuals were analyzed in the aggregate and presented in the following subsection.

1.2.2.1. Hangar Waitlist Survey Results

According to the survey results collected for 47 aircraft pilots/owners seeking hangars, a majority (47 percent) of respondents indicated that they do not have a preference regarding the type of hangar requested. The remaining respondents indicated having a particular preference for hangar type, with 40 percent seeking box hangar space(s) and 13 percent seeking T-hangar spaces. **Figure 3** illustrates this breakdown in hangar type preference.

¹³ All airports were asked to provide hangar waitlist information to the project team for surveying current hangar demand. However, many airports did not provide a waitlist, as this information is either not maintained or the airport did not come forth with the information due to privacy and other concerns.

Figure 4. Airports of Interest Identified by Minnesota Hangar Waitlist Survey Respondents



Source: MnSASP Hangar Waitlist Survey, 2021

The respondents were also asked to provide the reason(s) for seeking to base their aircraft at a certain location. The results generated from the respondents are presented in **Figure 5**. Among the 47 respondents, the top reasons included being in closer proximity to their home (85 percent of respondents), cost savings (21 percent of respondents), closer proximity to business (15 percent of respondents), and airport services provided (nine percent of respondents). The most sought-after airport service was identified to be the availability of 100 low lead (LL) fuel, which 49 percent of respondents indicated as an important service.

Table 7. Aircraft T-hangars versus Non-aeronautical, Off-airport Storage Lease Rates

Associated City	Airport Name (FAA ID)	T-Hangar Average Cost/SF (\$)	Non-Aeronautical, Off-Airport Storage Average Cost/SF (\$)
Marshall	Marshall-Southwest Minnesota Regional Airport (MML)	\$0.06	\$0.37
Thief River Falls	Thief River Falls Regional Airport (TVF)*	\$0.13	\$0.43
Bemidji	Bemidji Regional Airport (BJI)*	\$0.16	\$0.36
Alexandria	Alexandria Municipal Airport (AXN)	\$0.11	\$0.34
Eveleth	Eveleth-Virginia Municipal Airport (EVM)*	\$0.14	\$0.38

Sources: MnSASP Inventory Data, 2021; Kimley-Horn, 2021

The review indicates a significant difference in lease rates for on-airport, aeronautical-related hangar storage and off-airport, non-aeronautical-related storage options in Minnesota. The largest disparity found across the five cities is in Marshall, where the average unit cost per square for off-airport storage is more than six times higher than a T-hangar at the local airport (Marshall-Southwest Minnesota Regional Airport [MML]). Across all five cities, the average unit cost for off-airport storage is at least twice as high as hangar storage at the local airport. As such, users may see aircraft hangars as a less expensive storage alternative compared to a conventional storage unit located off-airport property. This review supports the issue of low lease rates across the state aviation system. **Section 1.4.2** provides recommendations for airports to establish appropriate hangar lease rates.

In addition to the low cost of hangars relative to comparable off-airport storage facilities, many airports have neither formal rules/standards associated with hangar usage nor inspection policies. Federally obligated airports (i.e., airports with active grant assurances with the Federal Aviation Administration [FAA]) must use airport property for aviation-related purposes (unless otherwise approved by the FAA). However, the enforcement of this policy can be limited at some airports. The issue with non-aeronautical use of hangars will be addressed further in the recommendations section of this evaluation (see **Section 1.4.1**).

Aircraft owners and operators also cited avoiding hangars managed by the Duluth Airport Authority (DLH and DYT) due to a new requirement for a fire suppression system in the hangars, adding significant cost to construction. The National Fire Protection Association (NFPA) sets hangar fire suppression system standards based on hangar group (determined by square footage and construction type). It is unknown whether the fire suppression requirements established by the Duluth Airport Authority exceed those established by NFPA, as well as other airports' compliance with NFPA fire suppression system standards.

1.3. Current Hangar Funding Techniques

The development and maintenance of aircraft hangars can be expensive for many airports, especially with the limited revenue that most airports generate. As such, there are state and federal capital programs available to airports to support the cost of hangar development and maintenance. **Section 1.3.1** details the funding programs available to Minnesota airports. Additionally, a review of other states' hangar funding mechanisms was completed and summarized in **Section 1.3.2** to provide a point of comparison and identify potential opportunities to enhance hangar funding in Minnesota.

1.3.1. MNDOT/FAA PROGRAMS

In state fiscal year (SFY) 2021, hangar development represented the largest requested project type for state funding. As of July 2021, four state funding mechanisms are available to airports in the state seeking financial support for hangars. MnDOT Aeronautics administers three funding programs to provide support for airport development and maintenance:

- Hangar Loan Revolving Account Program
- Airport Development Grant Program
- Airport Maintenance and Operations (M&O) Grant Program

However, most aspects of hangar construction are ineligible for state grant funding under the Airport Construction Grant Program, and available funding is typically not prioritized towards hangars. While airports can expend some M&O funding on hangar maintenance, this need must compete with many other operating expenses incurred by an airport. The Hangar Loan Revolving Account Program can be used; however, the need for funds generally exceeds available dollars – meaning that airport sponsors must sometimes wait long periods until funds become available as other airport sponsors repay loans to the state. Additionally, some airport sponsors do not have available dollars in the general fund to repay the loan and are thus unable to utilize the program.

The Minnesota Department of Employment and Economic Development (DEED) provides grant funding for hangars through the Airport Infrastructure Renewal (AIR) Program. Federal funding is also available to select airports included in the National Plan of Integrated Airport Systems (NPIAS) through the FAA's Airport Improvement Program (AIP), though hangar development is a low priority for the FAA and is not typically funded through federal grants. The U.S. Economic Development Administration (EDA) provides an additional source of federal funding to projects that can demonstrate an economic benefit. The following subsections provide details into the funding structure, eligibility requirements, and project prioritization criteria (as applicable) within each program.

1.3.1.1. Hangar Loan Revolving Account Program

MnDOT Aeronautics primarily supports hangar development at airports in the state aviation system through the Hangar Loan Revolving Account Program.¹⁴ This funding comes in the form of an interest-free loan that covers up to 80 percent of the hangar site preparation and construction expenses in a one-time reimbursement-basis. The loan is to be paid back in equal monthly installments over a 20-year period.

To be eligible for this funding, the airport must list the hangar development projects on the state’s Capital Improvement Program (CIP) at least two years in advance and contact the assigned MnDOT Aeronautics regional planner to add the project on the Hangar Loan waitlist. Funding is provided on a first-come, first-serve basis. Once MnDOT Aeronautics has provided notice that the funding is available, the airport sponsor works with MnDOT Aeronautics to prepare a Hangar Loan Agreement. Upon the agreement being completed and signed, the sponsor is approved to begin work. Loan funding is provided as a one-time reimbursement at the conclusion of the project once the airport sponsor submits all project invoices. Airports often pair a Hangar Loan with capital grant dollars awarded through the Airport Development Grant Program. Hangar-related projects eligible for state grant dollars include site preparation work including the building foundation and flooring.

More information about the State Hangar Loan Revolving Account Program can be found at <https://www.dot.state.mn.us/aero/airportdevelopment/fundingandgrants.html>.

1.3.1.2. Airport Development Grant Program

MnDOT Aeronautics supports capital improvement projects at airports in the state aviation system largely through the Airport Development Grant Program.¹⁵ To be eligible for this grant funding, airports must show that the project has a justifiable benefit to the air-travelling public via a project request letter. Disbursements are based on a state match of the project expenses depending on project type, airport type, population, and SFY. The amount of funding awarded through this program varies by year. The state expended \$11.8 million in airport development grants in SFY 2019, \$7.6 million in SFY 2020, and \$17.7 million in SFY 2021.¹⁶

For supporting hangar development, this program can provide funding for some aspects of hangar construction, repair, and site preparation work (including hangar foundation and flooring), contingent on funding availability once all other funds have been disbursed. This funding is often paired with a loan through the State Hangar Loan Revolving Account Program to support the full hangar construction project.

More information about this program can be found at <https://www.dot.state.mn.us/aero/airportdevelopment/fundingandgrants.html>.

¹⁴ MnDOT Aeronautics (2021). “Hangar Loan Program.” Available online at <http://www.dot.state.mn.us/aero/airportdevelopment/needsmeeting/Hangar%20Loan%20Handout.pdf> (accessed August 2021).

¹⁵ MnDOT Aeronautics (2021). “Funding and Grants.” Available online at <https://www.dot.state.mn.us/aero/airportdevelopment/fundingandgrants.html> (accessed October 2021).

¹⁶ The state expenditure in SFY 2020 was significantly lower because of the 100 percent federal match for AIP projects provided by the Coronavirus Aid, Relief, and Economic Security (CARES) Act.

1.3.1.3. *Maintenance and Operations Grant Program*

MnDOT Aeronautics supports much of the routine maintenance and operational activities occurring across the state aviation system through the M&O Grant Program.¹⁷ This program operates on a reimbursement basis and covers up to 75 percent of eligible costs. Airports can leverage the program for “minor maintenance and repair of sponsor-owned hangars.” Additional details about the specific types of projects typically funded by M&O funds are unavailable.

More information about this program can be found at: <https://www.dot.state.mn.us/aero/airportdevelopment/mando.html>.

1.3.1.4. *Airport Infrastructure Renewal Program*

An additional state funding pool available to airports is the AIR Program, provided by the Minnesota DEED.¹⁸ This grant program is intended to “enhance jobs in the area [surrounding airports], increase the tax base, or [expand/create] new economic development.” More specifically, projects considered for the AIR Program must demonstrate an ability to generate economic development in at least one of the following categories:

- Technology
- Warehousing and distribution
- Research and development

The program can provide up to \$250,000 to airports situated outside of major metropolitan areas seeking to redevelop existing facilities or construct new facilities. Airports are eligible to receive grant funding every other year. Per Minnesota Statute section 473.121, all airports in the state aviation system are eligible except for the seven airports managed by the MAC, Forest Lake Airport (25D), and South Saint Paul Municipal (SGS). Projects must be 50 percent funded by non-state sources to be eligible for the AIR program. Applications submitted to the AIR program are first evaluated across the following set of criteria to determine initial eligibility:

- Capital investment and economic development (40 points)
 - Private capital investment
 - Non-state capital investment
 - Increase in tax base
 - Economic development
- Full-time job creation or retention (40 points)
 - New or retained jobs by identified business(es) within one year
 - New or retained jobs by unidentified and identified business(es) within five years

¹⁷ MnDOT Aeronautics (2021). “M&O.” Available online at <https://www.dot.state.mn.us/aero/airportdevelopment/mando.html> (accessed October 2021).

¹⁸ Minnesota DEED (2021). “AIR Program.” Available online at <https://mn.gov/deed/government/financial-assistance/business-funding/airport/> (accessed July 2021).

- Readiness (20 Points)
 - Committed funding
 - Project Identified on an Airport Layout Plan (ALP)
 - Environmental documentation is complete
- Priority to eligible applicants not previously receiving funds (30 points)

Applications need to achieve a minimum of 50 points amongst the four criteria to establish eligibility. Eligible applications are then selected for funding based on the ability to demonstrate the following:

- Provides an effective solution to a strong, well-documented need, including documenting financial costs, reasonable budgets, and secured leverage resources
- How the proposal addresses the goal of the application
- A letter from business(es) documenting the number of full-time jobs created or being created and their salaries
- Able to start soon after AIR grant approval and completed by June 30 (project readiness)
- Evidence that the eligible applicant can perform and complete the tasks stated within the application (capacity)

Since inception, the program has announced one set of project awards (in 2020), which included a disbursement of \$250,000 to the City of Elbow Lake for a 4,800 SF hangar extension. The program has allocated \$500,000 available to airports in SFY2022.

More information about this program can be found at: <https://mn.gov/deed/government/financial-assistance/business-funding/airport/>.

1.3.1.5. FAA Airport Improvement Program

The AIP is the FAA's main funding mechanism to support planning, development, or noise compatibility projects at public-use airports in the NPIAS. As stated on the FAA website, "eligible projects include those improvements related to enhancing airport safety, capacity, security, and environmental concerns." In general, sponsors can get AIP funds for most airfield capital improvements or rehabilitation projects and, in some specific situations, for terminals, hangars, and non-aviation-related development. Aircraft hangars are explicitly stated as an ineligible project for AIP funding with one stipulation: Nonprimary airports may be conditionally eligible if all other airside needs have been met. Between 2016 - 2020, approximately \$19.5 million in AIP funding has been directed to hangar development across the U.S. Minnesota has been awarded the second highest amount of funding across these years at \$3.2 million. Nonprimary airports are instructed to contact their assigned Airport District Office (ADO) or Regional Office for more information.

1.3.1.6. U.S. Economic Development Administration

The U.S. EDA is an agency within the U.S. Department of Commerce that serves to promote economic competitiveness nationwide by supporting business and community development. There are several funding programs facilitated by the EDA that can be leveraged to support development projects that demonstrate an economic benefit to a community. Historically, this has included airport improvement

projects, such as a \$800,000 grant to the Bemidji Regional Airport Authority in 2017 to make infrastructure improvements at the Bemidji Regional Airport (BJI). This included two 10-unit T-hangars to support additional aviation demands in the area.

More information about the EDA's programs can be found at: <https://www.eda.gov/funding/programs>.

1.3.2. OTHER STATE HANGAR FUNDING PROGRAMS

Support for airport hangar development varies greatly across states, ranging from loan funding with a set payback period to grant funding. To better inform and identify best practices for supporting hangar development, a comprehensive review was completed of 10 states that identified having one or more hangar funding mechanisms (at the time of writing in July 2021). This review included evaluating each state's current funding mechanism(s) for hangar development, eligibility criteria, funding levels, and prioritization structure.

Table 8 summarizes this information for the 10 states included in the review, and the subsequent sections provide more detailed information on each state's established programs for hangar development. This information will be utilized to best practices and recommendations to MnDOT on better supporting hangar development.

Table 8. Summary of 10 States' Support of Hangar Development

State	Agency Name	Name of Program(s)	Grant/Loan	Eligible Applicants	Eligible Hangar Work	Funding Level	Payback Period (Loans)	Prioritization
Alabama	Alabama Department of Transportation (ALDOT) Aeronautics Bureau	Alabama Airport Improvement Funding Program	Grant	Publicly owned airports	Hangar development	Up to \$500,000 with a mandatory local match and some guidelines for federal funding matches (see section)	Not applicable (N/A)	FAA-funded projects are given priority. Projects are scored based on the type of work being completed, airport usage by based aircraft, state classification, and sponsor responsibilities with licensing compliance, minimum standards, zoning, and other planning efforts.
California	California Department of Transportation (Caltrans) Division of Aeronautics	Acquisition and Development (A&D) Grant	Grant	Public agency, publicly owned, public-use airports	"Acquisition or development of airports" - Public Utilities Code (PUC) Section 21683	90 percent of total project cost with a 10 percent local match required, up to \$500,000 annually	N/A	Project selection is in accordance with a California Transportation Commission (CTC) approved priority matrix, which evaluates projects against the goals of safety, capacity, and security improvements.
		Local Airport Loan Program	Loan	Airports owned by a city, county, or airport district that is public-use	"Projects that enhance an airport's ability to provide GA services (hangars, GA terminals, utilities, GA fueling facilities, A&D-eligible projects, etc.)"	Dependent on available balance in the account, no local match requirement	Maximum of 17 years	Department evaluates the project feasibility, economic feasibility, and the airport sponsor's financial situation
Idaho	Idaho Transportation Department (ITD) Division of Aeronautics	Idaho Airport Aid Program (IAAP)	Grant	Publicly owned airports	Construction of public owned/use hangars. Planning, land ownership/acquisition, and land use documents.	Based on NPIAS classification	N/A	Prioritizes preservation and acquisition of existing landing facilities in danger of being lost, improving aircraft operational safety, maximizes federal funds, and protects prior public investment
Iowa	Iowa Department of Transportation (IDOT) Office of Aviation	Commercial Service Vertical Infrastructure (CSVI)	Grant	Publicly owned commercial service airports	Construction and major renovations of hangars at commercial service airports	Unknown	N/A	Local funding participation is considered in prioritization of projects. No other information available on specific prioritization structure.
		General Aviation Vertical Infrastructure (GAVI)	Grant	Publicly owned GA airports	Construction and renovation of hangars at GA airports	Up to 85 percent state share. Maximum funding for new construction is \$150,00/rehab is \$75,000.	N/A	Local funding participation is considered in prioritization of projects. No other information available on specific prioritization structure.
Mississippi	Mississippi Department of Transportation (MDOT) Aeronautics Division	Multimodal Transportation Improvement Program	Grant	Publicly owned airports in the NPIAS	Building foundation, hangar structure, utilities	Maximum of 50 percent of the total project cost	N/A	Scoring on 100-point scale based on the operational impact on airport, economic impact of the project, airport activity support, funding requirement, and airport layout

State	Agency Name	Name of Program(s)	Grant/Loan	Eligible Applicants	Eligible Hangar Work	Funding Level	Payback Period (Loans)	Prioritization
Nebraska	Nebraska Department of Transportation (NDOT) Department of Aeronautics	Revolving Hangar Program	Loan	Public-use airports	Multiple eligible projects, see specific section for details	No interest loan of up to 70 percent of eligible costs for new construction and 50 percent for existing hangar rehabilitation and/or door replacement. Maximum disbursement of \$600,000 per airport.	Based on total of all loans outstanding under the program, and project type: \$0-600,000 is 10 years. Hangar rehab, replacement doors, or acquiring private hangar is five-year payback.	The Nebraska Aeronautics Commission details a list of priorities which sets the highest priority to new construction or rehabilitation of existing buildings that have all spaces occupied. See Section 1.3.2.6 for the detailed list.
New York	New York Department of Transportation (NYDOT)	Aviation Capital Grant Program	Grant	Public-use airports in the latest state aviation system plan	Construction, reconstruction, improvement, reconditioning, and preservation of capital facilities	Up to \$1,500,000 state share. Minimum matching-share requirements provided in description.	N/A	100-point scoring based on project-specific benefits identified (economic benefit, operational efficiency, safety) and airport-specific benefits (potential for attracting aviation activity, past experience managing grants). See Section 1.3.2.7 .
North Carolina	North Carolina Department of Transportation (NCDOT) - Division of Aviation	Capital Improvement Project Funding/State Transportation Investments (STI)	Grant	NPIAS airports	New hangar buildings	Program pulls 4 percent of Highway Trust Fund for non-highway transportation modes, and 6 percent of Highway Trust Fund for use across all transportation modes	N/A	Detailed scoring process to compete for funds with all other transportation modes. STI has classified airports into three separate funding categories, based on their size and contribution to the system in terms of statewide mobility, regional impacts, and division needs.
		Airport Economic Development Funding Program	Grant	Publicly owned and operated GA airports	Land acquisition, construction, or building expansion of hangars	\$7.3 million available to all airports as of 09/01/2018	N/A	Quantitative (benefit-cost analysis) and qualitative evaluation to review significance of project and characteristics of the airport
North Dakota	North Dakota Aeronautics Commission (NDAC)	Airport Grant Funding	Grant	Publicly owned and operated airports	Community hangars	50 percent of project costs, with the remaining costs covered by local sources. If a higher state funding level is needed, the airport sponsor can indicate the level that is required and provide justification within the grant application.	N/A	Priority rating scale indicates a low importance with community hangars (10 points out of maximum of 50). See Section 1.3.2.9 .
Washington	Washington Department of Transportation (WSDOT) Aviation Division	Community Aviation Revitalization Board (CARB) Loan Program	Loan	Public-use GA airports	Revenue-producing capital projects (hangars)	Up to \$750,000 at 2 percent interest to airports with less than 75,000 annual commercial enplanements. Total of \$5 million apportioned for 2021-2023 biennium.	Maximum 20-year loan period with up to a 3-year loan repayment grace period	Funding is directed by eight-member CARB Board consisting of a representative from WSDOT Aviation Division, the Public Works Board (PWB), and a non-legislative member of the Community Economic Revitalization Board (CERB).

Sources: Kimley-Horn, 2021; ALDOT, 2021; Caltrans, 2019; ITD, 2021; IDOT, 2021; MDOT, 2020; NDOT, 2012; NYDOT, 2019; NCDOT, 2016; NCDOT, 2018; NDAC, 2019; WSDOT, 2021

1.3.2.1. *Alabama*

The ALDOT Aeronautics Bureau supports hangar development through their sole state airport funding mechanism: the Alabama Airport Improvement Funding Program.¹⁹ This grant program operates on a reimbursement basis and is designed to support planning and capital improvements across publicly owned airports in Alabama. Hangar development is an eligible project under this program, with ALDOT able to provide up to \$500,000. ALDOT Aeronautics Bureau provides a 50 percent state match to airports eligible for federal funding and providing state matching funds to AIP projects is one of the agency's highest priorities.

Project prioritization for all project types is based on the existence of federal funding and a score (on a 100-point scale) based on the specific project type, number of based aircraft, ability to meet a local economic development need, and the airport sponsor's licensing and minimum standard compliance. Hangar construction is given a relatively low score for a maximum possible score of 74. In comparison, airfield safety projects such as removing runway approach obstructions are given a higher priority with a maximum possible score of 100. Refer to Appendix 1 of the ALDOT Aeronautics Bureau Grant Program Guidelines for the detailed scoring breakdown.²⁰ MnDOT Aeronautics could consider scoring hangar projects relative to other projects in the statewide CIP by as opposed to awarding funding on a first-come, first-serve basis.

1.3.2.2. *California*

Caltrans Division of Aeronautics supports hangar development through the A&D Grant Program as well as the Local Airport Loan Program.²¹

Acquisition and Development Grant Program

The A&D Grant Program is available to publicly owned, public-use airports in California and provides funding for the "acquisition and development of airports" (California Code, PUC § 21683), which includes hangar development. Eligibility for funding through the A&D program includes the following:

- Have a valid state permit for a public-use airport
- Ensure that the airport is open to the public without restriction to general and commercial aviation
- Adopt rules that provide sufficient control over airport operations
- Have height restrictions that prevent obstructions in the airport's "imaginary" surfaces
- Establish a Special Aviation Fund which accounts for airport pavements received and expenditures related to California Aid to Airports Program (CAAP) funds
- Annually certify eligibility with the form DOA-0007, CAAP Certification

¹⁹ ALDOT Aeronautics Bureau (2021). "Grant Program Guidelines." Available online at <https://www.dot.state.al.us/publications/Aero/pdf/AirportImprovementProgram.pdf> (accessed August 2021).

²⁰ *Ibid.*

²¹ Caltrans Division of Aeronautics (2019). "State Dollars for Your Airport." Available online at <https://dot.ca.gov/-/media/dot-media/programs/aeronautics/documents/1016-state-dollars-for-your-airport-october-2019-a11y.pdf> (accessed July 2021).

Funding through the A&D program is currently set at 90 percent of project costs but is also at the discretion of the CTC, up to \$500,000 per airport. This includes a minimum 10 percent local match that can be increased to 50 percent at the CTC's discretion. Requests for funding through the A&D program are initiated by the airport sponsor including the project on the state's CIP. The project selection follows a CTC-approved priority matrix.

The A&D Grant Program has a similar intent to MnDOT Aeronautics' Airport Development Grant Program. However, MnDOT Aeronautics could consider adjusting the required local match based on an airport's financial situation and the local community's ability to support the airport.

Local Airport Loan Program

The Local Airport Loan Program is available to publicly owned, public-use airports in California and provides funding for projects defined as "enhancing an airport's ability to provide GA services (hangars, GA terminals, utilities, GA fueling facilities, A&D-eligible projects, etc.)."²² This loan program does not have a defined funding cap per airport, but the available balance in the account is considered to determine the funding level. There is no local match requirement for this funding, and the maximum term of the loan is set at 17 years. Program eligibility includes the following requirements for the airport sponsor to meet:

- Airport is open to the public with no restrictions
- Valid state permit for airport operation
- Adoption of rules for the sponsor to have sufficient control of airport operations
- Establish height restrictions around the airport to avoid any obstructions
- Certify eligibility with Form DOA-0007 - CAAP Program Certification
- Local government approval per Title 21, Section 4072.1(a) of the California Code of Regulations²³

Prioritization for loan funding is dependent on the Caltrans Division of Aeronautics' evaluation of the project feasibility, economic feasibility, and the airport sponsor's financial situation. MnDOT Aeronautics could incorporate these considerations into a prioritization scoring system for the State Hangar Loan Revolving Account Program to ensure funding is directed based on feasibility and financial standing.

1.3.2.3. Idaho

ITD Division of Aeronautics supports hangar development through one sole funding mechanism for airports: the IAAP.²⁴ This discretionary grant program is eligible for publicly owned airports in Idaho and provides funding for the planning, land acquisition, and construction of hangars defined for public use. The level of funding allocated to airports is dependent on state classification, inclusion in the NPIAS, and the project type. Below are the differing levels of funding applicable to supporting hangar development:

²² Caltrans Division of Aeronautics (2021). "Airport Loans." Available online at <https://dot.ca.gov/programs/aeronautics/airport-loans> (accessed July 2021).

²³ California Code of Regulations, Title 21, Division 2.5, Chapter 5, Section 4072.1. Available online at <https://www.law.cornell.edu/regulations/california/21-CCR-Sec-4072-1> (accessed July 2021).

²⁴ ITD Division of Aeronautics (2021). "Idaho Airport Aid Program (IAAP)." Available online at <https://itd.idaho.gov/aero/#:~:text=The%20Idaho%20Airport%20Aid%20Program,funds%20to%20Idaho%20airport%20owners.&text=The%20funds%20are%20derived%20from,governments%20for%20public%20airport%20improvements> (accessed June 2021).

- Primary Airports: Approximately 19 percent of the ITD Division of Aeronautics budget is directed towards these airports (currently seven commercial service airports). Funding through the IAAP is tied to the relative activity level of each airport.
- GA NPIAS Airports: Approximately 40 percent of the ITD Division of Aeronautics budget is directed towards these airports (currently 31 Idaho airports). Funding through the IAAP is set at half of the local match required for an FAA AIP grant, covering state apportionment funds, Nonprimary entitlement funds, and GA discretionary funds.
- GA Non-NPIAS Community Airports: Approximately 30 percent of the ITD Division of Aeronautics budget is directed towards these airports (currently 30 Idaho airports). Without any FAA AIP funding to leverage, these airports rely mainly on state and local funding sources. As such, the IAAP will cover 50 to 90 percent of the project costs dependent on the community size.
- Small Airport Planning Studies: This applies to small communities and state-operated airports preparing current airport planning documents which typically includes the narrative report with a CIP or ALP sheets. These are required for airports to request funding through the IAAP for other projects, including hangars. Approximately nine percent of the ITD Division of Aeronautics budget is directed towards these types of projects.

Funding for this program is derived from the aviation fuel tax collected across airports. The prioritization of funding includes the following considerations:

- Preservation and acquisition of existing landing facilities in danger of being lost
- Projects at existing airports that demonstrate need and provide statewide benefits.
- Development of new/additional landing facilities in areas of greatest need, such as large areas where there is no air accessibility, new landing facilities in urban areas that are losing airports, or recreational areas where land is becoming difficult to obtain
- Projects to improve aircraft operational safety
- Projects to maximizing use of federal funds
- Projects to protect prior public investment

MnDOT Aeronautics could follow a similar funding disbursement strategy that can be applied towards the state classifications. Each of the five state classifications recognized in the MnSASP can be eligible for a certain portion of the total hangar development funds from the State Hangar Loan Revolving Account Program.

1.3.2.4. Iowa

The IDOT Office of Aviation supports hangar development through two grant programs directed to vertical infrastructure projects at airports: GAVI and CSVI.²⁵ Both programs are applicable to publicly owned commercial service and GA airports, respectively. Eligible projects include construction and major renovations of hangars. It is explicitly stated that routine maintenance and minor renovations on buildings are not eligible for this grant funding.

²⁵ IDOT Office of Aviation (2021). "Airport State Funding." Available online at <https://iowadot.gov/aviation/pdfs/StateApplicationInstructions.pdf> (accessed June 2021).

The GAVI program provides up to 85 percent of project costs as a state share, with the maximum funding level set at \$150,000 for new construction and \$75,000 for rehabilitation work. Local funding participation is considered in prioritization of projects, along with the ability for an airport to produce a documented hangar waitlist with their grant application. The CSVI operates in a similar fashion, with eligible projects including construction and major renovations of hangars at commercial service airports in Iowa.

To better justify distributing hangar development funds to airports, MnDOT Aeronautics could require airports to provide a documented hangar waitlist with their funding request. The recommended contents of a well-managed waitlist are described further in **Section 1.4.3**.

1.3.2.5. *Mississippi*

The MDOT supports hangar development through the Multimodal Transportation Improvement Fund (Multimodal Fund).²⁶ This fund is through the Multimodal Transportation Improvement Program to support the improvement of public ports, airports, railroads, and transit systems in Mississippi. Approximately 34 percent of the total funding pool in the Multimodal Fund is eligible for publicly owned airports in the NPIAS. Eligible hangar-related project components include the building foundation, hangar structure, and installation of utilities (electricity, water, gas etc.). The current funding level for these projects is capped at 50 percent of the project cost.

Project prioritization is based on a 100-point scale that evaluates a project across several different criteria. **Table 9** presents the scoring breakdown by each specific scoring criteria utilized for prioritizing projects requesting funding through the Multimodal Fund.

Table 9. Mississippi Multimodal Fund Prioritization Structure

Criteria Category	Evaluation of Criteria	Maximum Score
Operational Impact on Airport	Will the project improve operational safety or security of the airport?	25 points
	Will the project enhance aviation service to the public?	
Economic Impact of the Project	Will the project produce revenue or result in cost savings for the airport?	25 points
	Will the project benefit the economy of the surrounding community?	
	Does the application include a cost-benefit analysis of the project evidencing the net value of the project to the airport and surrounding community? (Not required, but helpful.)	
	Will the project create new jobs or support existing jobs, directly or indirectly, at the airport or in the local community?	
Airport Activity Support	Does the project support current operations or new operations at the airport?	20 points
Funding	Are Multimodal Grant funds necessary for the project to be completed? (Multimodal Funds are intended to provide funds where other funds are not available or unlikely to be sufficient to complete a project.)	15 points

²⁶ MDOT (2020). "Multi-modal Transportation Improvement." Available online at https://mdot.ms.gov/portal/multi-modal_transportation_improvement (accessed June 2021).

Criteria Category	Evaluation of Criteria	Maximum Score
	Will Multimodal Grant funds be leveraged by matching federal AIP or other funds?	
	Are budgeted project costs reasonable?	
Airport Layout	Does the project meet current FAA design standards and allow for further airport development consistent with the Airport's Layout Master Plan?	15 points

Source: MDOT, 2020

The prioritization model employed by Mississippi could be considered for MnDOT's Airport Development Grant Program, along with the state's existing funding equation. Some of the more qualitative benefits of projects (economic benefit, enhancing aviation service to the public) could be captured better through adopting some of the criteria in Mississippi's Multimodal Fund Prioritization Structure.

1.3.2.6. *Nebraska*

NDOT Division of Aeronautics supports hangar development through a dedicated Revolving Hangar Loan Program.²⁷ This loan program provides an interest-free loan for new hangar construction, hangar rehabilitation, hangar door replacement, or the acquisition of a private hangar at public-use airports in Nebraska. The current state funding level is based on the project type: up to 70 percent of new hangar construction costs and up to 50 percent of hangar rehabilitation or door replacement costs. The maximum disbursement per airport is set at \$600,000.

The standard repayment time is 10 years for new hangar construction and five years for all other eligible hangar projects. The hangar must be built on a site shown on an approved ALP and meet NDOT minimum standards and licensing standards. The sponsor must insure the hangar for the life of the loan agreement. Prioritization for hangar projects is set by the Nebraska Aeronautics Commission and is detailed below, listed in terms of highest to lowest priority²⁸:

- Building new hangars or rehabilitating existing hangars that have all aircraft spaces occupied and a higher number of spaces requested from a hangar waiting list
- Building new hangars or rehabilitating existing hangars at airports with some available spaces, but the hangars are too small for the size of aircraft in demand
- Hangar rehabilitation or hangar door replacement
- Building new hangars or rehabilitating existing hangars at all other airports

²⁷ NDOT Division of Aeronautics (2012). "Revolving Hangar Program." Available online at <https://dot.nebraska.gov/media/12297/hl.pdf> (accessed June 2021).

²⁸ For hangar projects that fall in the same category, a tiebreaker is enforced to consider the airport with the longest waiting list, most pressing need, or the least requested amount of funding

This program is similar to MnDOT Aeronautics’ Hangar Loan Revolving Account Program. MnDOT Aeronautics could consider setting specific funding levels for different hangar project components to better align with objectives of the organization (e.g., new hangar construction if more focused on infrastructure expansion versus hangar rehabilitation if focused more on existing system maintenance).

1.3.2.7. *New York*

NYDOT supports hangar development through the Aviation Capital Grant Program.²⁹ This grant program is eligible for public-use airports in the latest state aviation system plan and provides funding for the “construction, reconstruction, improvement, recondition, and preservation of capital facilities.” The funding level is on a matching basis based on airport enplanements, with up to 90 percent of project costs being covered with a 10 percent minimum local share. The state share for one project cannot exceed \$1.5 million, and airports are limited to two applications for funding per grant cycle. The airport must show that the hangar project has a minimum service life of 10 years.

Project prioritization for the Aviation Capital Grant Program is based off specific scoring criteria that fall within three categories: project-specific, application-specific, and airport-specific considerations. Project-specific considerations include evaluating the economic benefit, operational efficiency, and safety standard. Application-specific considerations include the quality of the grant application, innovation, creativity, and the amount of proposed matching share. Airport-specific considerations include potential to generate additional activity and the airport sponsor’s history of effectively managing grants. These criteria are all evaluated on a 100-point scale to determine project prioritization shown in **Table 10**.

Table 10. NYDOT Aviation Capital Grant Program Scoring Model

Category	Criteria	Maximum Score
Project Factors	Economic benefit	60 Points
	Operational efficiency	
	Safety improvements	
Application Factors	Quality of grant application	20 Points
	Innovation and creativity	
	Matching share	
Airport Factors	Potential for attracting aviation activity	20 Points
	Past experience managing grants	

Source: NYDOT, 2019

MnDOT Aeronautics could adopt some of the criteria in the NYDOT Aviation Capital Grant Program scoring model to consider some of the more qualitative aspects of hangar development not already captured through the existing prioritization funding equation. This includes looking at economic benefit, innovative practices planned for construction, or creative materials being used in the hangar development recommended by the Airport Cooperative Research Program (ACRP) or the Aircraft Owners

²⁹ NYDOT (December 2019). “Aviation Capital Grant Program.” Available online at <https://www.dot.ny.gov/divisions/operating/opdm/aviation/repository/NOFA-Guidelines-Final%20-GG%20Dec2019.pdf> (accessed May 2021).

and Pilots Association (AOPA). ACRP Report 113: *Guidebook on General Aviation Facility Planning*, and AOPA’s *Aircraft Hangar Development Guide* are resources that detail these creative practices.^{30,31}

1.3.2.8. North Carolina

NCDOT Division of Aviation supports hangar construction through two grant programs: The Capital Improvement Project Funding/ STI and North Carolina Airport Economic Development Funding Program.^{32,33}

STI Program

The STI program is available to NPIAS airports in North Carolina for supporting new hangar construction. Funding for the STI is sourced through the Highway Trust Fund. The STI has a detailed scoring process that has projects within all transportation modes competing for funding. Regarding funding to airports, the STI classifies airports into three separate funding categories based on their size and contribution to the system: statewide mobility, regional impacts, NCDOT Division of Aviation needs. **Table 11** defines the categories and associated funding levels.

Table 11. North Carolina STI Program Funding Structure

Airport Funding Category	Project Focus	Airport Type	Definition	Annual Funding Level
Statewide Mobility	Address significant congestion	Commercial service airports included in the NPIAS	International service or 375,000 annual enplanements	\$500,000 per project per airport
Regional Impacts	Improve connectivity within regions	Commercial service airports included in the NPIAS	Not included in “Statewide Mobility”	\$300,000 per project per airport
Division Needs	Address local needs	GA Airports included in the NPIAS	Not included under “Statewide Mobility” or “Regional Impacts”	Statewide total not to exceed \$18.5 billion

Source: NCDOT, 2016

MnDOT Aeronautics could adopt separate funding categories for the different types of hangar development projects and airports in the Minnesota state aviation system. Using the five state classifications defined in the MnSASP, MnDOT could direct pre-determined funding levels to different types of airports.

³⁰ ACRP (2014). “Report 113: Guidebook on General Aviation Facility Planning.” Available online at <https://www.trb.org/Publications/Blurbs/171315.aspx> (accessed June 2021).

³¹ AOPA (no date). “Aircraft Hangar Development Guide.” Available online at <https://www.aopa.org/-/media/files/aopa/home/supporting-general-aviation/get-involved/airport-support-network/airport-support-network-aircraft-hangar-development-guide/hangar-planning.pdf> (accessed June 2021).

³² NCDOT (April 2016). “Program Guidance Handbook.” Available online at https://connect.ncdot.gov/municipalities/State-Airport-Aid/State%20Airport%20Aid%20Documents/2016_NC_Airport_PG_Handbook.pdf (accessed May 2021).

³³ NCDOT (2018) N.C. Airport Economic Development Funding Program (accessed June 2021).

North Carolina Airport Economic Development Funding Program

The North Carolina Airport Economic Development Funding Program is available to publicly owned and operated GA airports to support many types of development projects, including land acquisition, construction, and expansions of hangars. As of 2018, there was \$7.3 million available for all airports. Project prioritization is based off a quantitative review (benefit-cost analysis) and qualitative review to evaluate the significance of the project and characteristics of the airport requesting funding.

To provide justification for funding certain hangar development projects, MnDOT Aeronautics could also request airports to complete a quantitative review (potentially in the form of a benefit-cost analysis) and/or provide a summary of the societal benefits for the proposed hangar development that are difficult to quantify.

1.3.2.9. *North Dakota*

NDAC supports hangar development through the Airport Grant Funding Program.³⁴ This grant project is available to publicly owned and operated airports in North Dakota to fund the construction of community hangars, among other airport projects. Current funding level for this program is set at 50 percent of the project cost, with the remaining half being covered by local funding sources. However, if the airport sponsors require a higher state funding level to complete the hangar project, the airport sponsor can indicate the level that is required and provide additional justification with the grant application. Specifically, with constructing community hangars or fuel facilities, airport sponsors are required to provide a business plan with the project's grant application. Funding prioritization is defined in a rating scale based on the type of project requested. This is presented in **Table 12**.

³⁴ NDAC (May 2019). "Airport Grant Funding." Available online at https://aero.nd.gov/image/cache/Policy_-_GR-2_-_Airport_Grant_Funding_2.pdf (accessed June 2021).

Table 12. North Dakota Priority Rating of Airport Projects

Categories	50 (High Priority)	40	30	20	10 (Low Priority)
Obstructions, Navigation, and Lighting	<ul style="list-style-type: none"> - Approach obstruction removal - Marking/lighting obstructions - Displaced threshold - Airfield light replacement/repair 	<ul style="list-style-type: none"> - Relocate roads, P-lines, buildings - Airport beacons - Airside security improvements - Lighted windsocks - Painting of airside markings 	<ul style="list-style-type: none"> - Wildlife/security fencing - Weather reporting system – Automated Weather Observing Systems (AWOS) - Navigation aids – Precision approach path indicator (PAPI)/Visual approach slope indicator (VASI) - Reflector markings - Radio controlled runway lights - Instrument approach development 	<ul style="list-style-type: none"> - Segmented circle - Airfield signage - Runway edge identifier lights 	<ul style="list-style-type: none"> - Runway surface sensors
Preservation of Existing System	<ul style="list-style-type: none"> - Pavement reconstruction - Drainage & culverts - Earthwork & grading - Crack filling - Seal/fog costs 	<ul style="list-style-type: none"> - Realignment - Pavement overlays - Runway/taxiway extensions - Regrade & smoothen turfs - Reseed & fertilize turfs 	<ul style="list-style-type: none"> - Heliport areas - Access roads - Terminals – air service - SRE building 	<ul style="list-style-type: none"> - X-wind runway/taxiway - Runway grooving - Auto parking - Terminals – GA - Fuel facilities 	<ul style="list-style-type: none"> - Storage buildings - Airport signage - Community hangars
Planning	<ul style="list-style-type: none"> - Emergency grants - Federal grants - TSA requirements 	<ul style="list-style-type: none"> - Project engineering/design - New construction 	<ul style="list-style-type: none"> - Air service/air cargo studies - Master plan studies - Airport layout plan studies 	<ul style="list-style-type: none"> - Other special plans (economic, air service, etc.) 	<ul style="list-style-type: none"> - None
Land Easements and Acquisition	<ul style="list-style-type: none"> - Zoning implementation - Land acquisition for obstruction removal 	<ul style="list-style-type: none"> - Land acquisition for Runway Protection Zones (RPZ) - Land acquisition for new airport 	<ul style="list-style-type: none"> - Land acquisition for operational capacity 	<ul style="list-style-type: none"> - Land acquisition for future expansion 	<ul style="list-style-type: none"> - None
Environmental	<ul style="list-style-type: none"> - None 	<ul style="list-style-type: none"> - Environmental assessments - Environmental impact statements 	<ul style="list-style-type: none"> - Wetlands delineation/mitigation - Stormwater Pollution Prevention Plan (SWPPP)/Spill Prevention Control and Countermeasure (SPCC), Stormwater Management (SWM), etc. 	<ul style="list-style-type: none"> - FAA Part 150 studies - Other special studies 	<ul style="list-style-type: none"> - None
Airfield Equipment	<ul style="list-style-type: none"> - Aircraft Rescue and Firefighting (ARFF) equipment 	<ul style="list-style-type: none"> - None 	<ul style="list-style-type: none"> - Mower unit - Snow removal equipment 	<ul style="list-style-type: none"> - Tractors - Operations vehicles - Turf rollers/sweepers 	<ul style="list-style-type: none"> - None

Source: NDAC, 2016

The Airport Grant Funding Program led by NDAC is similar in intent to the Airport Development Grant Program led by MnDOT Aeronautics. However, MnDOT’s grant program and hangar loan revolving account program could be improved by directing airports to provide a business plan for the proposed site development and new hangar construction. This business plan could detail the anticipated rate structure that will be set for the new hangars to ensure a return on investment and an eventual revenue stream for the airport. Refer to **Section 1.4.2** for guidance on an appropriate rates structure for hangars.

1.3.2.10. *Washington*

WSDOT Aviation supports hangar development through the CARB Loan Program.³⁵ This loan program is available to public-use GA airports in Washington for funding revenue-producing capital projects, including hangars. The program currently has \$5 million available for the 2021-2023 biennium with the airport funding level set at up to \$750,000 per loan at two percent interest. The loan period can be a maximum of 20 years with up to a three-year loan repayment grace period. MnDOT could consider adding a similar grace period for the state Hangar Loan Revolving Account Program, accommodating any shifting financial circumstances that occur with airports.

Funding is directed by eight-member CARB Board consisting of a representative from WSDOT Aviation Division, the PWB, and a non-legislative member of the CERB. Loan requests submitted to the CARB are evaluated in a two-step process. The first step is an initial screening to determine eligibility for funding in which airports must fulfill all the following criteria:

- Project support GA activities at public-use airports
- Airport have less than 75,000 annual commercial air service enplanements, as published by the FAA
- Airport sponsor commits to provide public access for one and one-half times the term of the loan, up to 30 years
- Application is supported by the airport sponsor where the project is located
- Airport provides commensurate public access and benefit
- Application clearly identifies the source of funds intended to repay the loan
- Application is complete and includes the loan application and supporting documentation

Following this screening, requests are then scored on a 100-point scale based on the following criteria:

- Is the project ready to proceed? (20 points)
- Will the project create or retain long-term revenue generating opportunities? (20 points)
- Will a specific private development or expansion will occur, and will only occur, if the aviation facility improvement is made? (20 points)
- How long does the sponsor plan to repay the loan? (10 points)
- Does the project leverage additional funding for the project? (10 points)
- Does the loan project result in the creation of jobs or private sector capital investment? (10 points)

³⁵ WSDOT (2021). “CARB Loan Program.” Available online at <https://wsdot.wa.gov/aviation/funding/CARB-Loan.htm> (accessed June 2021).

- Does the project improve opportunities for successful maintenance, operations, or expansion of the airport or adjacent business park? (10 points)

The CARB will make the final selection of projects based on the scores generated from the above criteria. MnDOT Aeronautics could consider establishing a similar scoring process to incorporate some of the qualitative aspects of airport projects into the funding decision-making process.

1.3.2.11. Key Findings from Other States

After a review of 10 state’s funding mechanisms for hangar development, there are several takeaways that MnDOT Aeronautics could consider towards updating their existing funding programs (i.e., Hangar Loan Revolving Account Program and Airport Development Grant Program).

- Require airports to demonstrate that the hangar development being requested will increase aviation or business activity. This could be presented in a benefit-cost analysis, letter(s) of support, or other documentation.
 - Require airports to provide a documented hangar waitlist with their funding request to justify actual need. The recommended contents of a well-managed waitlist are described further in **Section 1.4.3**.
 - Require airports to provide a business plan for proposed new hangars. This business plan could detail the anticipated rate structure that will be set for the new hangars to ensure a return on investment and an eventual revenue stream for the airport. Refer to **Section 1.4.2** for guidance on an appropriate rates structure for hangars.
- Prioritize funding by financial need and project and economic feasibility to more effectively direct funding to where it is most beneficial. The prioritization process should be clearly and transparently documented to formalize the process for MnDOT planners so it can be applied during project evaluation.
 - Establish a scoring system for project requests that considers project readiness, planning, funding sources, economic impact, and ability of the airport to be self-sufficient.
 - Consider qualitative benefits (i.e., enhancing aviation service to the public) for project prioritization in MnDOT’s Airport Development Grant Program in conjunction with the state’s existing funding equation. Refer to the prioritization methodology being used in Mississippi (**Section 1.3.2.5**) for insight into how this could be applied.
- Set specific fund levels based on state classification. Each of the five state classifications recognized in the MnSASP could be eligible for a certain portion of the total hangar development funds from the State Hangar Loan Revolving Account Program or total state investment dollars available through the Airport Development Grant Program.

- Establish specific funding levels for different types of hangar projects to better align with objectives/philosophy of MnDOT Aeronautics (e.g., new hangar construction if more focused on infrastructure expansion versus hangar rehabilitation if focused more on existing system preservation).
- Add a loan repayment grace period to the Hangar Loan Revolving Account Program to provide airport sponsors with time to establish positive cashflow (similar to WSDOT Aviation’s CARB Program).

1.4. Recommendations

The review of the inventory and waitlist outreach survey results presented in **Section 1.2** identified several issues related to hangar availability, development, and funding levels. **Table 13** summarizes these key issues and provides recommendations to address, with further details provided in the following subsections.

Table 13. Recommendations Summary

Key Issues	Recommendations
Lack of Hangar Availability Across Select Airports	<ul style="list-style-type: none"> - Consider other alternative funding strategies - Address any potential non-aeronautical use of hangars
Non-Aeronautical Use of Hangars	<ul style="list-style-type: none"> - Include provision in Hangar Loan Revolving Account Program requiring all existing hangars be used for aeronautical purposes - Establish minimum standards for airport-owned hangars
Current Hangar Lease Rates Are Inadequate to Cover the Cost of Development and Facility Maintenance	<ul style="list-style-type: none"> - Establish appropriate hangar lease rates per guidance provided by the ACRP Report 213
Hangar Loan Revolving Account Program Does Not Evaluate True Hangar Needs	<ul style="list-style-type: none"> - Establish eligibility and justification requested from airports for submitting a funding request
Hangar Loan Revolving Account Program Disburses Funding On A First-Come, First Serve Basis	<ul style="list-style-type: none"> - Establish prioritization structure for available funding

Source: Kimley-Horn, 2021

1.4.1. ADDRESSING NON-AERONAUTICAL USE OF HANGARS

The FAA has adopted a Policy on the *Non-aeronautical Use of Airport Hangars* in 2017 stating the following:

The [airport] sponsor is required to charge a fair market commercial rental rate for any hangar rental or use for non-aeronautical purposes...If an airport tenant pays an aeronautical rate for a hangar and then uses the hangar for a non-aeronautical purpose, the tenant may be paying a below-market rate in violation of the [airport] sponsor’s obligation for a self-sustaining rate structure and FAA’s Revenue Use Policy.

This policy is only applicable to federally obligated airports but should be adopted by MnDOT Aeronautics to fairly charge the market rate for leasing aircraft hangar spaces. It should also be the obligation of all airports to prioritize hangar space to aeronautical users. MnDOT Aeronautics can solidify this through grant and/or loan assurances associated with state investment into hangar development, although the impetus will remain with airports and MnDOT Aeronautics to ensure those provisions are actually enforced. This could include the requirement that airport sponsors must adopt MnDOT Aeronautics-approved minimum standards to restrict or prohibit the non-aeronautical use of hangars. It should be the obligation of airports seeking funding for hangar development to establish and maintain the aeronautical use of hangars to ensure existing and future demands can be fulfilled.

1.4.2. ESTABLISH APPROPRIATE HANGAR LEASE RATES

Existing aircraft hangars across Minnesota have very low lease rates, resulting in the airport not being able to receive a profitable return on investment associated with the construction and maintenance of these facilities. Additionally, there is the lost opportunity for hangars to serve as an additional revenue stream to support airport operations. The FAA has released guidance and direction for airports establishing rates and charges for revenue generating facilities. FAA Grant Assurance 24 states that the airport sponsor should “maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible under the circumstances existing at the particular airport, taking into account such factors as the volume of traffic and economy of collection.”³⁶

Additionally, the *FAA Policy Regarding the Establishment of Airport Rates and Charges* states that the rates must be “fair and reasonable”, does not unjustly discriminate, and make the airport as “financially self-sustaining as possible.”³⁷ It is recommended that MnDOT Aeronautics adopts a similar stance regarding airport rates and charges to direct airports towards establishing a more self-sufficient operation.

1.4.2.1. ACRP Guidance on Establishing Market Rent

Guidance released by the ACRP can help airports establish a more sustainable hangar lease rate structure. The ACRP released Report 213: *Estimating Market Value and Establishing Market Rent at Small Airports*, in 2020 to provide guidance on best practices for establishing better lease rates with revenue-generating airport facilities. The report describes two approaches to establishing market rent for hangars recommended for consideration in Minnesota:

- Cost approach (consider project cost and ancillary improvements made)
- Comparable rent analysis (compare other similar properties that have been constructed and leased out)

³⁶ ACRP (2020). “Report 213: Estimating Market Value and Establishing Market Rent at Small Airports.” Available online at <https://www.trb.org/Publications/Blurbs/180278.aspx> (accessed August 2021).

³⁷ FAA (2008). “Policy Regarding the Establishment of Airport Rates and Charges.” Available online at <https://www.federalregister.gov/documents/2013/09/10/2013-21905/policy-regarding-airport-rates-and-charges> (accessed August 2021).

For new hangar construction that is being funded through the State Hangar Loan Revolving Account Program, the cost approach can be used to estimate the suggested lease rate as follows:

Total project cost divided by the total lease term in years divided by 12 for each month in the year. Then split further by the number of units in the facility (if applicable).

As an example, a 10-unit T-hangar is estimated to cost \$1 million to be constructed. Assuming all units cost the same and a 20-year life span is utilized, the airport would need to establish a monthly lease rate of approximately \$417 per unit.³⁸ Rates and charges data collected from the MnSASP Inventory (**Section 1.2.1.5**) reveals that current lease rates range from \$50 to \$250 based on airport classification and hangar condition – significantly lower than what is required to break even in a 20-year life span. The cost approach could also be utilized to estimate a suggested monthly lease rate for an existing hangar. Like the previous methodology, the current market value of the entire hangar facility could be divided by the estimated life of the building in years, then by 12 for each month in the year, and then split further by the number of units in the facility (if applicable). This yields an estimated monthly rent that airports should charge tenants.

As the previous example shows, the monthly rent yielded from this methodology is nearly always higher than the lease rates that airports are currently charging for hangars. This presents the challenge of tenants relocating to another airport. However, this concern would be mitigated by establishing a statewide recommendation or construction grant assurances so airports are impacted equitably.

Alternatively, a comparable rent analysis can be completed to compare the lease rates of other similar properties to identify a fair rates structure. This can be helpful for airports to not overprice available hangars out of the market. However, this approach may not establish a fair rates structure for the hangar to generate a positive rate of return for the airport, especially if nearby facilities are similarly undercharging for hangars storage.

1.4.2.2. Other Considerations for Establishing Hangar Lease Rates

Airports should also account for the different characteristics of existing hangars, including type, condition, amenities, and access, when establishing lease rates. The condition of hangars could consider the construction materials used and the presence of any hazardous conditions (e.g., asbestos). Access could consider the relative location of the hangar to important airport infrastructure (e.g., runway[s], fixed-base operator [FBO], deicing facility, terminal building) and landside automobile parking. Amenities of the hangar should also be considered in hangar lease rates. The presence/type of lighting and utilities available are appealing to aircraft owners, especially heating to maintain aircraft during the winter season. Other attributes that should also be considered include the age of the facility (including the date of recent improvements if applicable) and the hangar door width/height.

Table 14 details a suggested lease rate adjustment structure based on the condition, access, and available amenities with hangars. This is a standard real estate practices and could serve as a standard for airports to adopt to account for the different characteristics of hangars.

³⁸ \$1 million construction cost / (20 years * 12 months/year) / 10 units = ~\$417 monthly lease rate per unit

Table 14. ACRP Suggested Market Rent Adjustments³⁹

Condition	Rent Adjustment by Condition	Rent Adjustment by Access	Rent Adjustment by Amenities
Excellent	+10%	+10%	+10%
Good	+5%	+5%	+5%
Average	0%	0%	0%
Fair	-5%	-5%	-5%
Poor	-10%	-10%	-10%

Source: ACRP Report 213, 2020

1.4.2.3. Rate Adjustments for Market Fluctuation

Throughout the life of the hangar, lease rates should be adjusted to reflect shifting market conditions. The Consumer Price Index (CPI) is a mechanism that indicates economic trends and could be used for airports to adjust lease rates. Airports could also use a fixed percentage adjustment based on CPI. By considering the CPI along with other economic indicators available (employment, payroll, spending) and inflation, airports can account for shifting consumer buying power and align lease rates with the market. As an example, a suggested monthly lease rate of \$417 for a T-hangar unit in 2011 would be worth \$495 in 2021 dollars when adjusted with the CPI.⁴⁰ Without adjusting the lease rate with CPI, the airport would lose approximately nine percent of the lease rate value between 2011 and 2021 from the T-hangar unit, amounting to \$4,653 revenue loss across the ten-year span. As such, it is recommended that lease rates should be reevaluated annually to account for these market fluctuations.

1.4.2.4. Integration with Airport Financial Planning

Establishing an effective hangar lease rate structure and adjustment schedule should maintain alignment with other revenue streams of the airport and expenses incurred. This can be documented as a part of overall airport revenue/expense financial review in the form of a financial project proforma. The AOPA recommends that airports develop a financial projection of hangar development, maintenance, and operations in the form of a proforma to assess the impact of the project on revenue, expenses, and liabilities of the airport over the life of the asset.⁴¹ By completing this ahead of project initiation, the airport can anticipate a potential variance in revenues/expenses and plan accordingly with funding strategies (adjusting rates and charges assessed to airport users, right-sizing operations). Additionally, providing this documentation when seeking state hangar development funding helps ensure that MnDOT Aeronautics is directing state funds to more robust and well-planned airport operations. In the long-term,

³⁹ ACRP (2020). "Report 213: Estimating Market Value and Establishing Market Rent at Small Airports." Available online at <https://www.trb.org/Publications/Blurbs/180278.aspx> (accessed August 2021).

⁴⁰ Utilized CPI Inflation Calculator hosted by the U.S. Bureau of Labor Statistics: https://www.bls.gov/data/inflation_calculator.htm (accessed October 2021).

⁴¹ AOPA (n.d.). "Hangar Planning." Available online at <https://www.aopa.org/-/media/files/aopa/home/supporting-general-aviation/get-involved/airport-support-network/airport-support-network-aircraft-hangar-development-guide/hangar-planning.pdf> (accessed September 2021).

project proformas and overall financial assessments can help steer airports towards achieving a state of self-sufficiency that mitigates the need for federal/state funding.

1.4.3. ELIGIBILITY AND JUSTIFICATION FOR HANGAR FUNDING

MnDOT Aeronautics primarily supports hangar development through the State Hangar Loan Revolving Account Program with additional support provided by the Airport Development Grant Program. However, neither program adequately screens airports for true hangar-related need. With the current funding-constrained environment, it is important for MnDOT Aeronautics to be good stewards of state funds through effective and transparent funding strategies. As such, it is recommended that MnDOT Aeronautics bolster the current eligibility and justification requirements to only support airports that can demonstrate a true need and demand for hangar development. Currently, for airports to be eligible for MnDOT's State Hangar Loan Revolving Account Program, the airport sponsor must:

- List the hangar development projects on the state's CIP at least two years in advance
- Contact the appropriate MnDOT Aeronautics region engineer to include the project on the Hangar Loan waiting list

This eligibility does not consider the potential non-aeronautical use of hangars that may exist at airports, which reduces capacity available to fulfill aviation-related demands (described in **Section 1.4.2**). Additionally, it is also important to show that the proposed hangar development is being depicted on the MnDOT-approved ALP. This ensures that the site is following all applicable land use and zoning ordinances as well as fits with the long-term planning of the airport. As such, it is recommended that the eligibility requirements include that airports must have minimum standards that enforce the aeronautical use of hangars and have the proposed hangar development indicated on the approved ALP.

Airports must also demonstrate that there is active demand for aircraft storage that cannot be fulfilled with the airport's current capacity. This can be documented through a validated hangar waitlist that airports upkeep continuously and that captures critical information on interest and need. Information that should be collected includes the following:

- Date of inquiry (initial and ongoing check-ins)
- Contact information of interested party (name, phone, email)
- Size/type of hangar requested
- Amenities requested with hangar (utilities, heated, etc.)
- Aircraft N-number (to identify new or shifting demand)
- Aircraft type (make, model)
- Aircraft status (owned or new purchase)
- Current location of aircraft
- Note any fees incurred to be included on waitlist
- Letter(s) of intent

Throughout the inventory process, it was found that most airports reporting a need for hangar spaces do not currently maintain an adequate hangar waitlist. Without substantiated data to reference, MnDOT Aeronautics is challenged to evaluate the magnitude and type of demand affecting their facility. By providing a validated hangar waitlist, MnDOT Aeronautics will be able to effectively distribute funding to

In the financially constrained environment in which MnDOT Aeronautics operates, the business plans submitted by airports can be useful for identifying the greatest need for hangar development and prioritizing state investment effectively. The next section describes some considerations for MnDOT Aeronautics to prioritize hangar development projects across the system.

1.4.4. FUNDING PRIORITIZATION STRUCTURE

MnDOT Aeronautics should adopt a more formalized prioritization methodology for funding requests received through the State Hangar Loan Revolving Account Program. Historically, MnDOT has awarded funding Program on a first-come, first-serve basis dictated by funding availability. Combined with the lack of a validated waitlist (as described in **Section 1.4.3**), the current funding practice could be leaving out airports that have a greater need for hangars to satisfy local demands. As a steward of public funds, it is important that MnDOT Aeronautics consider how to direct funding at airports with the greatest need and projects best positioned to leverage those dollars to generate positive cashflow back to the airport sponsor.

Upon a review of other hangar funding mechanisms in other states, it was discovered that many utilize a scoring system to quantify considerations with capital projects. Out of the 10 airports reviewed, five have a scoring model to prioritize capital projects. MnDOT Aeronautics could adopt a scoring model specific to hangars that could be applied both to the State Hangar Revolving Loan Program and “companion” grants issued through the Airport Construction Grant Program for site preparation work. Potential criteria that could be employed are as follows:

- Number of individuals waitlisted for a hangar (documented in a validated hangar waitlist, as detailed in **Section 1.4.3**)
- Compliance with current FAA design standards and allow for further airport development consistent with airport planning (as depicted on an ALP)
- Reasonableness of budgeted project costs
- Additional funding sources for the project
- Ability to generate new jobs, support existing jobs (directly or indirectly), or generate private sector capital investment at the airport or in the local community
- Airport sponsor’s licensing and minimum standard compliance (could be aligned with airport metrics defined in the last completed MnSASP)
- Length of the loan repayment term
- Inclusion of an appropriate hangar lease rate structure and project proforma to demonstrate alignment with overall airport planning and good financial standing (as described in **Section 1.4.2**)
- Innovation and creativity being employed for project construction
- Number of based aircraft
- Type of aviation activity to be supported by the hangar

The scoring system could be framed into a 100-point scale, with each of the chosen criteria being allocated a maximum score. By applying a consistent scoring system, MnDOT Aeronautics can more concretely and effectively rank and prioritize hangar development funding requests to better support the Minnesota state aviation system.⁴²

1.5. Summary

Aircraft owners and pilots rely on hangars to provide critical storage to protect aircraft from the state’s extreme climate. When properly administered, hangars can also serve as a revenue-generating facility for airport sponsors. Through the public outreach process of Phase I of the MnSASP and data collection efforts of Phase II, the availability of hangars has been continuously reinforced as a top issue within the state. Because state and federal support for hangar maintenance and development is limited, airports in many regions of the state are unable to accommodate storage demands. Lack of available hangar space has led to airports to turn away owners interested in basing aircraft at their facilities. Some aircraft owners reported that they have been on hangar waitlists for multiple years with little hope of hangar space ever becoming available at their preferred facility.

While offering additional state support for hangar development appears to be a simple solution to this issue, the data collection and analyses of the 2022 MnSASP revealed the true complexity of the issue. Aircraft owners, pilots, and other airport users cited issues of existing hangar spaces being utilized for non-aeronautical purposes. This takes away a valuable storage option from Minnesota’s diverse aviation community and limits growth that could be generated by new based and transient users. Additionally, inadequate hangar lease rates were generally found statewide. Low lease rates coupled with high initial construction costs reduce the ability of hangars to generate a positive revenue-stream for the airport; in some cases, hangars are unable to recover the cost of construction through the course of their useful lives. Airports are also generally poor at documenting actual needs and ensuring those needs are maintained current over time.

To overcome these primary challenges, as well as supporting the state’s ability to fund the facilities that will most effectively expand capacity where it is most needed in the state, MnDOT Aeronautics and airport sponsors should carefully consider the recommendations identified in **Section 1.4**. These recommendations are designed to improve financial assistance for airports with justified hangar development needs while addressing some of the key issues that may be impacting existing and future storage capacity.

⁴² Additional recommendations associated with prioritization of state funding for airport development is provided in **Chapter 3. System Performance and Cost Estimates** of the 2022 MnSASP Technical Report.