MINNESOTA GO

STATE AVIATION SYSTEM PLAN

DEPARTMENT OF TRANSPORTATION

TECHNICAL REPORT

2022 MnSASP

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395 John Ireland Boulevard
Saint Paul, Minnesota 55155

September, 2023

The Minnesota Department of Transportation envisions a transportation system that maximizes the health of people, the enviroment and our economy. Our quality of life and economic wellbeing depend on a multimodal transportation system that works for everyone. Minnesota is home to a diverse network of 133 publicly owned, public-use commercial service and general aviation airports that serve their local communities. These airports are supported by MnDOT's Office of Aeronautics, which ensures that Minnesota's airports function as an interconnected system that meets Minnesota's growing air transportation needs.

The Minnesota State Aviation System Plan (MnSASP) is the state's long-term strategic plan that provides an overview and assessment of the public airport system's current performance, and guidance for future development. This plan update was developed with extensive input from Minnesotans and aviation professionals throughout the state. As part of the planning process, the online MnSASP Hub was created and allows MnDOT and aviation stakeholders to engage in continuous system and airport planning.

The MnSASP aligns with the following, six primary objectives found in the Statewide Multimodal Transportation Plan, the highest transportation policy plan in the state:

- Transportation Safety: Safeguard aviation users and the communities the system travels through. Apply proven strategies to reduce fatatlities and serious injuries for aviation. Foster a culture of aviation safety in Minnesota.
- System Stewardship: Strategically build, maintain, operate and adapt the aviation system based on data, performance and community needs. Ensure effective and efficient use of resources.
- Climate Action: Advance a sustainable and resilient transportation system. Enhance transportation options and technology to reduce greenhouse gas emissions. Adapt Minnesota's transportation system to a changing climate.
- Critical Connections: Maintain and improve multimodal transportation connections essential for Minnesotans' prosperity and quality of life. Strategically consider new connections that help meet performance targets and maximize social, economic and environmental benefits.
- Healthy Equitable Communities: Foster healthy and vibrant places that reduce disparities and promote healthy outcomes for people, the environment and our economy.
- Open Decision-Making: Make transportation system decisions through processes that are inclusive, engaging and supported by data and analysis. Provide for and support coordination, collaboration and innovation. Ensure efficient and effective use of resources.

Through continued collaboration, together we can build and maintain an air transportation system that realizes the MnSASP objectives, while ensuring air transportation is equitable, sustainable, resilient and healthy for all.

Sincerely,

Nancy Daubenberger

Nancy Daubenberger, P.E.
Commissioner

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395 John Ireland Boulevard
Saint Paul, Minnesota 55155

Septiembre de 2023

El Departamento de Transporte de Minnesota concibe un sistema de transporte que maximice la salud de las personas, el medio ambiente y nuestra economía. Nuestra calidad de vida y bienestar económico dependen de un sistema de transporte multimodal que funcione para todos. Minnesota alberga una red diversa de 133 aeropuertos de aviación general y de servicio comercial de uso público y de propiedad pública que atienden a sus comunidades locales. Estos aeropuertos cuentan con el respaldo de la Oficina de Aeronáutica de MnDOT, que garantiza que los aeropuertos de Minnesota funcionen como un sistema interconectado que satisfaga las crecientes necesidades de transporte aéreo de Minnesota.

El Plan del Sistema de Aviación del Estado de Minnesota (MnSASP) es el plan estratégico a largo plazo del estado que brinda una descripción general y una evaluación del desempeño actual del sistema de aeropuertos públicos, y como una guía para el desarrollo futuro. Esta actualización del plan se desarrolló con una gran cantidad de aportes de los habitantes de Minnesota y los profesionales de la aviación de todo el estado. Como parte del proceso de planificación, se creó el MnSASP Hub en línea y permite que el MnDOT y las partes interesadas de la aviación participen en la planificación continua del sistema y del aeropuerto.

El MnSASP se alinea con los siguientes seis objetivos principales que se encuentran en el Plan estatal de transporte multimodal, el mayor plan de política de transporte del estado:

- Seguridad en el transporte: Proteger a los usuarios de la aviación, y como a las comunidades por las que viaja el sistema. Aplicar estrategias comprobadas para reducir las muertes y las lesiones graves en la aviación. Fomentar una cultura de seguridad en la aviación en Minnesota.
- Administración del sistema: Construir, mantener, operar y adaptar estratégicamente el sistema de aviación en función de los datos, el rendimiento y las necesidades de la comunidad. Garantizar un uso eficaz y eficiente de los recursos.
- Acción climática: Avanzar en un sistema de transporte sostenible y resiliente. Mejorar las opciones de transporte y la tecnología para reducir las emisiones de gases de efecto invernadero. Adaptar el sistema de transporte de Minnesota a un clima cambiante.
- Conexiones críticas: Mantener y mejorar las conexiones de transporte multimodal esenciales para la prosperidad y la calidad de vida de los habitantes de Minnesota. Considerar estratégicamente nuevas conexiones que ayuden a alcanzar los objetivos de desempeño y maximizar los beneficios sociales, económicos y ambientales.
- Comunidades sanas y equitativas: Fomentar lugares saludables y vibrantes que reduzcan las disparidades y promuevan resultados saludables para las personas, el medio ambiente y nuestra economía.
- Toma de decisiones abierta: Tomar decisiones sobre el sistema de transporte a través de procesos que sean inclusivos, atractivos y respaldados por datos y análisis. Proporcionar y apoyar la coordinación, la colaboración y la innovación. Garantizar un uso eficaz y eficiente de los recursos.

A través de una colaboración continua, juntos podemos construir y mantener juntos un sistema de transporte aéreo que cumpla los objetivos de MnSASP, al mismo tiempo aseguramos que el transporte aéreo sea equitativo, sostenible, resiliente y saludable para todos.

Atentamente,

Nancy Daubenberger

Nancy Daubenberger, P.E.
Comisionada

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395 John Ireland Boulevard
Saint Paul, Minnesota 55155

Lub Cuaj Hlis Ntuj 2023

Lub tuam tsev saib xyuas kev tsav tsheb hu ua Minnesota Department of Transportation muaj lub zeem muag pom tias qhov tswv yim ntawm kev tsav tsheb es ua muaj qhov zoo tshaj plaws rau kev noj qab nyob zoo ntawm tib neeg, thas mas xaj ntawm cov chaw ib puag ncig thiab peb qhov kev ua lag ua luam kev ua hauj lwm. Peb ua lub neej kaj siab thiab kev ua lag ua luam kev ua hauj lwm mus tau zoo nyob ntawm ntau hom kev pab tau rau tib neeg ncig mus los es zoo rau txhua tus. Lub xeev Minnesota yog qhov chaw rau ntau haiv neeg lawv sib paub (diverse network) es cov pej zeem yog cov tswv ntawm 133 lub tshav nyooj hoom, cov ib zej tsoom siv khiav ua lag luam thiab siv thuaj pias ntawm cov tshav nyooj hoom es pab rau cov pej xeem hauv lub zej zog. Cov tshav dav hlau yog txhawb los ntawm lub tuam tsev MnDOT's Office of Aeronautics, es saib xyuas kom zoo kom cov tshav dav hlau hauv lub xeev Minnesota zoo siv kom yog li ib qho chaw tsaws es tauj txuas ntxiv tau mus rau lwm qhov chaw kom thiaj li pab tau rau lub xeev Minnesota qhov kev vam meej ntawm kev ya nyooj hoom.

Lub tuam tsev MnDOT's Office of Aeronautics (MnSASP) yog lub xeev ib qhov kev tawm tswv yim hu ua long-term strategic plan es muaj cov ntaub ntawv saib ib muag txog thiab kev ntsuam xyuas txog seb tam sim no cov tswv yim rau cov tshav nyooj hoom khiav hauj lwm tau zoo li cas, thiab cov kev cob qhia rau kev txhim kho lawm yav tom ntej. Daim ntawv muaj cov tswv yim no muaj cov ntaub ntawv qhia dua tshiab es tsim tawm nrog rau cov tswv yim qhia los ntawm cov pej xeem hauv lub xeev Minnesota thiab cov kws tsav nyooj hoom thoob plaws hauv lub xeev. Qhov es yog ib feem ntawm qhov txheej txheem npaj cov tswv yim no, qhov chaw online ntawm MnSASP yog tsim tawm thiab cia kom MnDOT thiab cov neeg tseem ceeb es tswj thiab tsav nyooj hoom kom muaj ib qho chaw rau lawv sib tham kom muaj cov tswv yim dhia hauj lwm kom zoo ntxiv thiab npaj tswv yim rau cov tshav nyooj hoom.

Lub tuam tsev MnSASP teeb kom haum ntawm rau (6) lub hom phiaj hauv qab no es nrhiav pom nyob hauv daim ntawv tawm tswv yim hu ua Statewide Multimodal Transportation Plan, daim ntawv tawm tswv yim es yog txhooj cai siab tshaj plaws ntawm kev tsav tsheb hauv lub xeev:

- Puaj Phais txog kev Thauj mus los: Cov Neeg siv kev Nyab xeeb ntawm kev tsav nyooj hoom thiab cov zej zog cov tswv yim los yog qhov system ya mus rau. Yeej siv cov tswv yim muaj pov thawj tias txo tau kev nruam sim thiab kev raug mob loj txog ya nyooj hoom. Txhawb kom muaj kev puaj phais txog kev ya nyooj hoom hauv lub xeev Minnesota.
- Lub tswv yim hu ua System Stewardship: Ua twb zoo tsim tawm, ceev, khiav hauj lwm thiab lees txais cov tswv yim ya nyooj hoom raws li cov ntaub ntawv data muaj qhhia, ya nyooj hoom tau zoo npaum cas thiab qhov raws li lub zej zog xav tau. Kom paub meej txog kev siv cov ntaub ntawv qhia txog kev pab kom zoo.
- Kev raus tes hu ua Climate Action: ua kom cov tswv yim thauj mus los (transportation system) kom vam meej dua es kav kom ntev thiab ruaj khov. Kom muaj kev xaiv ntawm cov kev thauj mus los es zoo dua thiab cov cuab yeej thev nos los ntsis kom txo tau cov pa roj greenhouse gas emissions. Lees txais thiab siv lub xeev qhov tswv yim ntawm kev thauj mus los hu ua Minnesota's transportation system kom hloov pauv tau cov huab cua.
- Muaj kev sib txuas tauj mus ntxiv es tseem ceeb: Ceev thiab txhim kho ntau hom qhov kev thauj mus los kom sib cuag tau rau cov pej xeem hauv lub xeev Minnesota qhov kev vam meej thiab kev kaj siab ntawm lub neej. Ua twb zoo xav txog siv qhov kev sib txuas tauj mus kom sib cuag tau tshiab es pab kom ua tau raws li cov hom phiaj thiab kom muaj cov txiaj ntsim rau kev sib cog phooj ywg, kev lag luam kev ua hauj lwm, thiab cov thas mab xaj nyob ib puag ncig.
- Cov zej zog kom muaj kev noj qab nyob zoo yam sib npaug zos: Txhawb kev noj qab nyob zoo thiab txhawb cov chaw kom muaj kev kaj siab es txo tej yam tsis muaj kev pab sib npaug zos thiab txhawb kom tej yam ntawd muaj kev noj qab nyob zoo rau tib neeg, rau cov thas mab xaj ntawm ib puag ncig thiab peb cov lag luam cov kev ua hauj lwm.

- Qhib Kev Txiav Txim Siab Rau Txhua Tus: Ua kom cov tswv yim ntawm kev thauj mus los hu ua transportation system cov kev txiav txim siab qhov txheej txheem kom txhob cais lwm tus, kom muaj kev sib tham, thiab txhawb los ntawm cov ntaub ntawv data thiab kev luj xyuas. Muab kev pab txhawb rau kev pab tswj, kev koom tes, thiab tawm tswv yim. Kom paub meej txog kev siv cov ntaub ntawv qhia txog kev pab kom zoo.

Ntawm qhov kev sib koom tes mus ntxiv, koom ua ke peb yeej ua tau hauj lwm los tsim thiab ceev kev ya nyooj hoom es ua tau raws li cov hom phiaj nyob hauv MnSASP, thiab kom paub meej thiab thaum ya saum nyooj hoom muaj kev ncaj ncees yam sib npaug zos, kom kav ntev ntev, kom ruaj khov thiab muaj kev noj qab nyob zoo rau txhua tus.

Ua tsaug,

Nancy Daubenberger

Nancy Daubenberger, P.E.
Tus Thawj Tswj

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Saint Paul, Minnesota 55155

Siteembar 2023

Waaxda Gaadiidka ee Minnesota waxa ay hiigsanaysaa nidaam gaadiid oo kor u qaada caafimaadka dadka, deegaanka iyo dhaqaalaheena. Tayada nolosheena iyo ladnaanteena dhaqaale ayaa waxay ku xirantahay nidaamka gaadiidka kala duwan ee u shaqeeya qof kasta. Minnesota waxay hoy u tahay shabakado kala duwan oo ka kooban 133 ay dadweynuhu iska leeyihiin oo adeeg ganacsi dadweyne oo garoon diyaarado u adeega bulshooyinkooda maxalliga ah. Garoomadaas diyaaradaha waxaa taageera Xafiiska duulimaadyada hawada ee MnDOT, kaas oo hubiya in garoomada diyaaradaha Minnesota ay u shaqeeyaan sida nidaam isku xiran oo buuxinaya baahida sii kordheysa ee gaadiidka hawada ee Minnesota.

Qorshaha Nidaamka Duulimaadyada Gobolka Minnesota (Minnesota State Aviation System Plan (MnSASP)) waa qorshaha istiraatijiyadeed ee muddada-dheer ee gobolka kaas oo bixinaya guudmarka iyo qiimaynta waxqabadka hadda jira ee nidaamka garoommada diyaaradaha dadweynaha, iyo hagida horumarka mustaqbalka. Cusboonaysiinta qorshahan waxaa laga sameeyay iyada oo la adeegsanayo fikrado badan oo ka yimid dadka reer Minnesota iyo xirfadlayaasha duulista ee gobolka oo dhan. Iyada oo qayb ka ah habka qorshaynta, khadka internetka ee MnSASP Hub ayaa la sameeyay oo u ogolaatay MnDOT iyo daneeyayaasha duulista inay ku hawlanyihiin nidaam joogto ah iyo qorshaynta garoonada diyaaradaha.

MnSASP waxay la jaanqaaddaysaa lixda ujeeddooyin ee aasaasiga ah ee soo socda ee laga helay Qorshaha Gaadiidka Noocyada Badan ee Gobolka oo dhan, qorshaha xeerka gaadiidka ee ugu sarreeya gobolka:

- Badbaadada Gaadiidka: In la ilaaliyo badbaadada isticmaalayaasha duulista iyo bulshooyinka nidaamku dhex maraayo. In lagu dabaqo xeelado la xaqiijiyay si loo yareeyo dhimashada iyo dhaawacyada halista ah ee duulista. In la kobciyo hab-dhaqanka badbaadada leh ee duulista ee Minnesota.
- Maamulida Ilaalinta Nidaamka: Si xeeladaysan in loo dhiso, loo ilaaliyo, loogu shaqeeyo oo la waafajiyo nidaamka duulista iyadoo lagu salaynayo xogta, waxqabadka iyo baahiyaha bulshada. In la hubiyo in si waxtar leh oo hufan loo isticmaalo khayraadka.
- Talaabada Wax ka Qabashada Cimilada: In la horumariyo nidaam gaadiid oo waara oo adkaysi leh. In la kobciyo fursadaha gaadiidka iyo farsamada si loo yareeyo qiiqa gaaska deegaanka In lala qabadsiiyo nidaamka gaadiidka ee Minnesota cimilada isbeddelaysa.
- Xiriirada Muhiimka ah: In la ilaaliyo oo wanaajiyo isku xirka gaadiidka kala duwan ee muhiimka u ah barwaaqada iyo tayada nolosha ee dadka reer Minnesota. Si in xeeladaysan in looga fiirso isku xirka cusub ee caawinaya buuxinta yoolalka waxqabadka ee kordhiya faa'iidooyinka bulshada, dhaqaalaha iyo deegaanka.
- Bulshooyin Sinnaan leh oo Caafimaad qaba: In la kobciyo goobo caafimaad qaba oo firfircoon oo yareeya kala hoosaynta korna loo qaado natiijooyinka caafimaadka u leh dadka, deegaanka iyo dhaqaalaheena.
- Go'aan qaadasho Furan: In la sameeyo go'aannada nidaamka gaadiidka iyada oo loo marayo habab loo dhan yahay, ka qaybgalin, oo ay taageerayaan maclumaadka xogta iyo falanqayntu. In adeeg la siiyo oo la taageero isku duwidda, iskaashiga, iyo hal abuurka. In la hubiyo in si hufan oo waxtar leh loo isticmaalo khayraadka.

Iyadoo loo marayo wada shaqayn joogto ah, si wadajir ah waxaynu u dhisi karnaa oo aan ilaalin karnaa nidaamka gaadiidka hawada oo xaqiiqjinaya ujeedooyinka MnSASP, iyadoo la hubinayo in gaadiidku yahay mid loo simanyahay, waara, adkaysi leh oo caafimaad qab u leh dhammaan.

Mahadsanid,

Nancy Daubenberger

Nancy Daubenberger, P.E.
Commissioner

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Chapter 1. Introduction and Design

1.1. Introduction

Minnesota is a land rich with cultural history; world-class business, research, manufacturing, and educational institutions; and extensive natural beauty. The state is home to 18 Fortune 500 companies, and the Mayo Clinic – a world-renowned hospital – is the largest employer in the state with nearly 47,500 employees.[1] The Minnesota Department of Agriculture reports that the state ranks fifth in the United States (U.S.) in terms of total agricultural production ($17.1 billion in annual agricultural sales [2019]) and is the nation's top producer of sugar beets, green peas, and wild rice.[2] These industries are the foundation of the state's strong and diverse economic base and contribute to Minnesota's accolades as one of the nation's top places to live, work, and raise a family.

Airports and the aviation services they support are a critical component of the state's infrastructure base. Whether allowing businesses to thrive, supporting Minnesota's exceptional quality of life, or allowing travelers to experience the "Star of the North," the state's aviation network allows goods and people to move into, out of, and within the state. Between 2016 – 2020, Airports Council International (ACI) named Minneapolis-St. Paul International Airport (MSP) the "Best Airport in North America" in the 25 – 40 million passenger category. In addition to this large hub facility, Minnesota is home to a diverse network of 133 publicly owned, public-use commercial service and general aviation (GA) airports. These airports are supported by the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics). The 2022 Minnesota Aviation System Plan (2022 MnSASP or MnSASP) is MnDOT Aeronautics' long-term strategic plan, designed to provide a description and assessment of the system's current performance, as well as guidance for future development. The MnSASP offers recommendations addressing MnDOT Aeronautics' decision-making, funding, and other policies, each of which has implications for the agency as well as individual system airports. The MnSASP is forward-thinking, offering guidance suited for the aviation environment today while considering evolving requirements anticipated in the years and decades ahead.

MnDOT Aeronautics has a long history of planning, beginning with the first system plan published in 1970. Major updates have been completed every five to seven years since that time, with the most recent update completed in 2012. Phase I of this current update was initiated in 2017 (discussed further in Section 1.2). Since the MnSASP was last updated in 2012, the aviation industry has been affected by numerous technological, regulatory, economic, and traveler behavior trends nationally, as well as shifting aviation activity levels within Minnesota specifically. Additionally, MnDOT published the 50-year vision for the state's transportation network in 2011. Known as Minnesota GO, this study provides the direction for the development of all modes, driven by an overarching vision to provide a "multimodal transportation

[1] Minnesota Department of Employment and Economic Development (no date [n.d.]). "A Robust and Diverse Economy." Available online at https://mn.gov/deed/joinusmn/why-mn/our-economy (accessed May 2022).
[2] Minnesota Department of Agriculture (2019). "Minnesota Agricultural Profile." Available online at https://www.mda.state.mn.us/sites/default/files/inline-files/mnagprofile2019.pdf (accessed May 2022).

[that] maximizes the health of people, the environment, and our economy." Minnesota GO identifies three thematic features of the state's transportation system:

QUALITY OF LIFE

- Recognizes and respects the importance, significance, and context of place – not just as destinations, but also where people live, work, learn, play, and access services
- Is accessible regardless of socioeconomic status or individual ability

ENVIRONMENTAL HEALTH

- Is designed in such a way that it enhances the community around it and is compatible with natural systems
- Minimizes resource use and pollution

ECONOMIC COMPETITIVENESS

- Enhances and supports Minnesota's role in a globally competitive economy as well as the international significance and connections of Minnesota's trade centers
- Attracts human and financial capital to the state

The vision and thematic features of Minnesota GO can only come to fruition through careful and ongoing planning efforts within each specific mode. As such, each mode develops a system investment plan within the framework of the larger statewide policy driven by Minnesota GO and the associated *Statewide Multimodal Transportation Plan*. These mode-specific investment plans compose the MnDOT Family of Plans. The MnSASP is the aviation's system investment plan, offering mode-specific strategies, establishing performance measures and performance-based needs, and identifying system priorities.

At the national level, the Federal Aviation Administration (FAA) updated Advisory Circular (AC) 150/5070-7, *The Airport System Planning Process* in January 2015 through Change 1. In addition to several other changes, AC 150/5070-7 suggests a more specific focus on multimodal transportation and environmental considerations within system plans – which serves to further bolster the multidisciplinary and holistic vision of Minnesota GO. AC 150/5070-7 more broadly provides the general components of an aviation system plan. State-level plans are used by the FAA to inform the National Plan of Integrated Airport Systems (NPIAS). This is primarily accomplished by coordinating the NPIAS with the national Airport Capital Improvement Program (ACIP) by prioritizing federal investment into airports and/or projects deemed most critical to the safe and efficient operation of the National Airspace System (NAS). It is important to note that many states, including Minnesota, also encompass non-NPIAS airports in the state airport system due to their important roles at state, regional, and/or local levels.

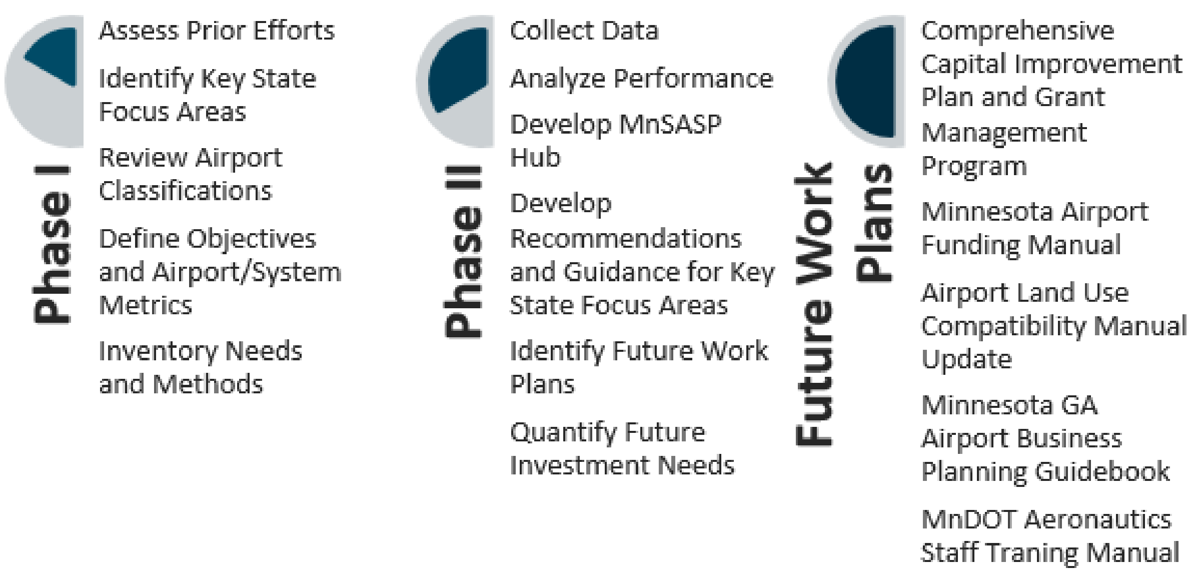
The section below provides specific details about the means by which the MnSASP advances the vision of Minnesota GO and fulfills the purpose of system planning for the State of Minnesota and FAA.

1.2. 2022 MnSASP Process

To carry forward the vision of Minnesota GO and align aviation policies with current needs and trends, MnDOT Aeronautics embarked on a wholesale system plan update in 2017. The agency recognizes that, "the intent for this plan is that it be accepted and embraced by the Minnesota aviation community, regulatory and funding agencies, the general public, and lawmakers."[3] Towards that end, MnDOT Aeronautics embraced an open, collaborative, and innovative development process split between two phases (Phase I and Phase II). Completed in spring 2019, Phase I of the MnSASP was primarily designed to identify those issues and trends most relevant to Minnesota's aviation stakeholders, establish the framework for the system performance assessments, and gain widespread support for the work to be completed during Phase II. The issues and trends identified during Phase I were carried forward into Phase II as "key state focus areas" (see Chapter 5. Key State Focus Areas).

Phase II collected the data to assess system performance, provided guidance on the key state focus areas, and published all final documents in non-technical, user-friendly formats. An online Geographic Information System (GIS)-based Hub application known as the MnSASP Hub was also developed to support continuous performance monitoring over time. Phase II also identified potential follow-on studies to be completed as they become feasible (referred to as future work plans). The primary objectives of each MnSASP phase are presented in Figure 1.1.

Figure 1.1. MnSASP Key Objectives by Phase

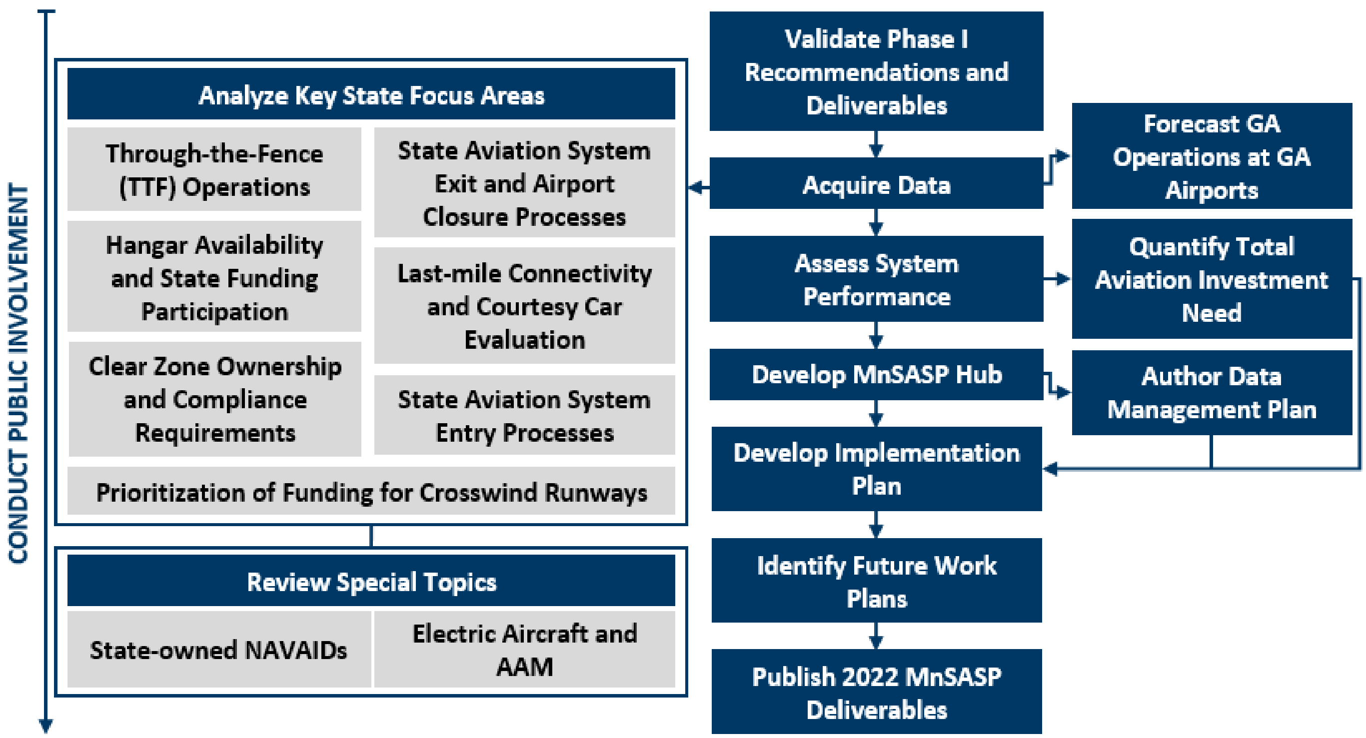


Sources: MnDOT Aeronautics, 2019; Kimley-Horn, 2020

[3] *MnDOT (n.d.). "System Investment Plans." Available online at https://www.dot.state.mn.us/minnesotago/plans.html (accessed May 2022).*

Figure 1.2 provides a more in-depth depiction of the interrelated tasks that comprised Phase II of the MnSASP, guided by the framework established in Phase I. This includes in-depth evaluations of seven key state focus areas that stakeholders identified during an extensive public outreach process in Phase I, as well as two special topics. Focus areas are summarized in Chapter 5 of the 2022 MnSASP Technical Report, with resulting deliverables prepared as Attachments 1 through 7. The state-owned navigational aids (NAVAIDs) task is summarized in Appendix C. Minnesota NAVAIDs. The final stakeholder presentation associated with electric aircraft and advanced air mobility (AAM) is included in Appendix B. Public Participation (no additional deliverables were prepared for this task).

Figure 1.2. 2022 MnSASP Phase II Tasks



Source: Kimley-Horn, 2022

Public involvement was also an important component of Phase II. For this effort, MnDOT Aeronautics convened six Focus Area Working Groups (Working Groups) to provide guidance and regional- and use-case-specific insight on six topics potentially affecting the future of Minnesota's aviation system and MnDOT Aeronautics:

- Airport Closure Guidance
- Prioritization of State Funding for Crosswind Runways
- Operations Counting and Forecasting
- Cost Estimates and Airport/ System Funding
- Electric Aircraft and AAM
- MnSASP Hub

Working Groups comprised representatives from commercial service and GA airports, the Minnesota Pilots' Association, the FAA, various state agencies, and others. Each group met at least two times during Phase II to provide input on the recommendations developed by the MnSASP.

The 2022 MnSASP has been developed within the context of the MnDOT Family of Plans, in compliance with the directives of AC 150/5070-7, and extensive public involvement during Phases I and II. The outcomes of the plan align MnDOT Aeronautics' policies and system airports with the current state of the industry, driven by factors inherent to and external from aviation itself. To offer the foundation for the development of the 2022 MnSASP, a brief overview of major aviation trends potentially affecting MnDOT Aeronautics and Minnesota airports is presented below.

1.3. Major Aviation Trends and the Impacts of COVID-19

Since the MnSASP was last updated in 2012, the aviation industry has been affected by numerous technological, regulatory, economic, and traveler behavior trends nationally, as well as shifting aviation activity levels within Minnesota specifically. Until 2020, scheduled commercial passenger service had experienced several years of continued expansion. Between 2010 and 2019, air carriers posted continuous profits driven by growing demands and revenue-earning and -saving steps such as right-sizing equipment, consolidating routes, adding/increasing ancillary fees to ticket purchases, and other strategies. Air cargo similarly witnessed continuous growth, driven in part by consumer demand for near-immediate delivery of goods and shifting purchasing patterns from brick-and-mortar stores to e-commerce. In general, aviation significantly benefitted from thriving global and domestic economic markets. Jet and rotorcraft operations and production numbers were similarly on an upward trend, although small recreational GA has been experiencing decreased activity in all categories except light sport.

These trends, however, dramatically and rapidly shifted in March 2020 with the arrival of COVID-19 in North America. The virus nearly shut down commercial air travel in the months immediately following its emergence. During the pandemic, most business and many leisure travelers abided by stay-at-home guidance issued by local and state officials, as well as mandates issued by individual employers. GA activity was affected more varyingly, with many airports reporting an uptick in operations as recreational pilots had more time to fly, employers chose business/corporate aviation in lieu of scheduled commercial service, and fewer alternative recreational activities were available due to COVID-related shutdowns and social distancing requirements.

Air cargo activity has arguably benefitted most positively, although some operators experienced capacity challenges due to the decreased availability of belly space in passenger aircraft. Shoppers have exhibited growing predilections for online shopping to buy nearly all durable and non-durable consumer goods. J.P. Morgan Chase reported that U.S. consumers spent $211.5 billion during the second quarter of 2020 on e-commerce, up 31.8 percent quarter-over-quarter. This equates to 16.1 percent of all U.S. sales being conducted online, up from 11.8 percent during the first quarter of 2020.[4] This, coupled with consumers'

[4] J.P. Morgan Chase. (November 2020). "How COVID–19 Has Transformed Consumer Spending Habits." Available online at https://www.jpmorgan.com/solutions/cib/research/covid-spending-habits (accessed December 2020).

increasing expectations for near-immediate delivery, resulted in new demands placed on air cargo providers. To meet these new demands, some air carriers converted a portion of their fleets to carry packages instead of people.

During the height of the pandemic, analysts generally predicted a three- to five-year recovery period before passenger air travel were restored to pre-COVID levels. Just as the MnSASP was initiated in fall 2020, signs were already indicating that travelers are ready to return to the skies. MSP reported that nearly 17,500 passengers cleared Transportation Security Administration (TSA) checkpoints on Thursday, October 15, 2020 – making it the busiest day since the week of March 16, 2020 at the start of the pandemic.[5] Delta Air Lines reinstated service between MSP and Amsterdam Airport Schiphol (AMS) on October 25, 2020, with four weekly flights. This was the first transoceanic service to return to Minnesota since March when the pandemic began. By the time the 2022 MnSASP completed in late spring 2022, approximately two-thirds of the U.S. population was vaccinated and many government and corporate policies prohibiting/limiting travel had been lifted.

It is also important to remember that similar historical events have disrupted air travel in the past, yet demand has always returned at higher rates subsequent to each occurrence. The *Boeing Commercial Market Outlook 2020-2039* observes that, "The fundamentals that have driven air travel the past five decades and doubled air traffic over the past 20 years remain intact. While aviation has seen periodic demand shocks since the beginning of the Jet Age, our industry has recovered from these downturns every time throughout its history."[6] Demand is anticipated to return in a similar manner as populations are vaccinated and travel restrictions are lifted in the months and potentially years to come.

1.4. Summary

The 2022 MnSASP serves as MnDOT Aeronautics' long-term strategic investment plan. The plan comprehensively evaluated the major current and anticipated future trends and issues affecting Minnesota airports and the state system. This process helps to ensure the state maximizes its investment into aviation to most effectively and significantly benefit the air traveling public in consideration of the broader context in which airports operate. The framework of the 2022 MnSASP is based on the vision of Minnesota GO and in alignment with FAA guidelines as established by AC 150/5070-7.

[5] *Metropolitan Airports Commissions (October 2020). "MEA Week Saw the Most Traffic at MSP Since March." Available online at https://www.mspairport.com/blog/mea-week-saw-most-traffic-msp-march (accessed November 2020).*
[6] *Boeing (October 2020). Commercial Market Outlook 2020-2039. Available online at https://www.boeing.com/resources/boeingdotcom/market/assets/downloads/2020_CMO_PDF_Download.pdf (accessed October 2020).*

Chapter 2. Phase I Validation and Framework

2.1. Introduction

The Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) conducted the 2022 Minnesota Aviation System Plan (MnSASP or 2022 MnSASP) in two phases. Phase I was primarily designed to identify those trends and issues most relevant to Minnesota's aviation stakeholders and establish the framework to assess system performance. Phase II implemented that framework. This included a comprehensive data collection process and assessment of the system's ability to meet the needs of current and potential future aviation demands. Phase II also provided an in-depth evaluation of key policies affecting aviation in Minnesota and develops a plan for continuous performance monitoring over time.

This chapter provides an overview and assessment of the MnSASP framework developed during Phase I. Each of the Phase I deliverables was evaluated in terms of continued alignment with the current needs of MnDOT Aeronautics, Minnesota airports, and state and federal requirements. The MnSASP Phase II planning team closely considered the framework developed during Phase I. In this way, this Phase I validation serves as the architecture for all other MnSASP Phase II tasks. In some cases, recommendations were made to enhance the MnSASP's ability to assess and provide guidance for current and future system development. MnDOT Aeronautics reviewed and confirmed all suggested revisions offered during this Phase II validation.

The Phase I outcomes evaluated in this chapter are as follows:

- Airport Classifications (Section 2.2.1)
- Objectives and Strategies (Section 2.3.1)
- Airport Metrics (Section 2.3.2)
- System Metrics (Section 2.3.3)

Additionally, this chapter summarizes the review of MnDOT Aeronautics' existing environmental justice (EJ) methodology and tool (Section 2.4). Recommendations have been developed to improve the implementation of this tool during airport planning and development projects throughout Minnesota. A step-by-step EJ Analysis Tool Update Guide was also developed as part of the 2022 MnSASP. This document is for internal MnDOT Aeronautics purposes only and was not distributed in conjunction with the other plan deliverables.

All airport-specific tables included in this chapter are provided in Section 2.6 to maintain the flow of the narrative, with summaries and statewide-level reporting provided within the text.

2.2. Minnesota State Aviation System Airports

The Minnesota state aviation system is composed of 133 publicly owned, public-use airports eligible to receive grants through the State Airport Fund. The system is officially designated by the Commissioner of Transportation and approved by the Governor. [1] The Minnesota state aviation system airports within the scope of Phase II of the MnSASP are listed in Table 2.45 of Section 2.6. Individual Airport Tables. It is important to note that Phase I recognized 135 system airports. Since that time, Silver Bay Municipal (BFW) and Murdock Municipal (23Y) airports closed and thus removed from the Minnesota state aviation system.

2.2.1. AIRPORT CLASSIFICATIONS

Each of the 133 airports within the Minnesota state system serves a unique role within the aviation community, driven by available facilities, geographic service areas, the most common types of activities supported, and other factors that contribute to their development and functionalities. The classification of airports is a fundamental component of the system planning process. This step helps align recommended facilities and services at each airport with the type and frequency of activities it typically supports. Further, by planning at the system level, each airport can effectively support a sub-set of activities, with the statewide system of airports accommodating all aviation-related needs.

This section of the Phase I validation presents the current classifications of Minnesota's 133 system airports at federal and state levels, as well as highlights the ways in which these classifications are applied during subsequent analyses. An overview of each methodology is presented below, with airport-specific classification tables provided in Section 2.6.

2.2.1.1. Federal Classifications

The Federal Aviation Administration (FAA) is responsible for planning a safe, efficient, and integrated system of airports to support the needs of the civil aviation industry. To accomplish this overarching goal, the FAA identifies all airports deemed critical to the National Airspace System (NAS) in the National Plan of Integrated Airport Systems (NPIAS). The NPIAS categorizes airports in terms of the roles they currently serve in the system, as well as documents the amount and type of airport development projects eligible for federal funding under the Airport Improvement Program (AIP). Approximately 65 percent of all public-use airports in the United States (U.S.) are recognized in the NPIAS, including all commercial service airports and some general aviation (GA) facilities that meet minimum entry criteria and other programmatic requirements.

Prepared every two years, the current *NPIAS for Fiscal Year (FY) 2021 – 2025* (*NPIAS 2021 – 2025*) was published on September 30, 2020. The *NPIAS 2021 – 2025* contains 3,304 existing and six new airports anticipated for construction within the next five years. [2] The report identifies $43.6 billion in AIP-eligible

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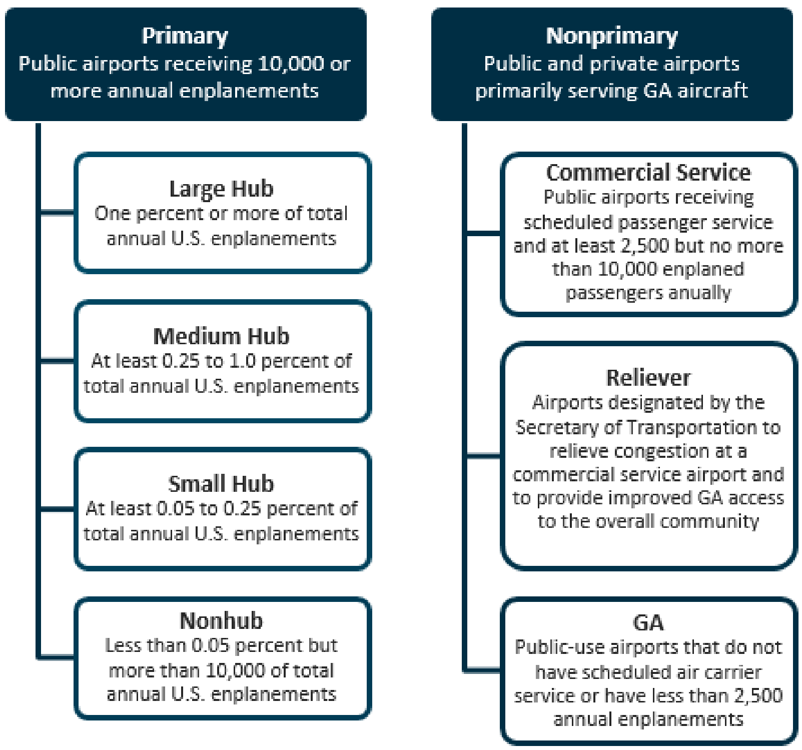
[1] MnDOT Aeronautics. (no date [n.d.]). "Funding and Grants." Available online at https://www.dot.state.mn.us/aero/airportdevelopment/fundingandgrants.html.
[2] FAA (September 2020). NPIAS 2021 – 2025. Available online at https://www.faa.gov/airports/planning_capacity/npias/ (accessed October 2020) p.5.

projects between 2021 and 2025, an increase of $8.5 billion (24 percent) from just two years ago.[3] Airports in the NPIAS fulfill diverse roles within the NAS, including transporting goods and cargo; serving agricultural, emergency preparedness, and other specific needs; offering access and mobility to remote communities; and supporting manufacturing and other commercial functions.

As shown in **Figure 2.1**, the FAA categorizes airports as Primary or Nonprimary, defined in terms of whether they have service from a scheduled air carrier and receive at least 10,000 annual enplanements.[4] Primary airports are further subcategorized as Large Hub, Medium Hub, Small Hub, and Nonhub based on percent of annual U.S. enplanements. Nonprimary airports are subcategorized as Commercial Service, Reliever, and GA. **Figure 2.1** depicts NPIAS classifications and provides a definition for each associated category.

Figure 2.1. NPIAS Classifications by Category



Sources: FAA NPIAS 2021 – 2025 (Appendix C); Kimley-Horn, 2020

Mainly used by GA aircraft, Nonprimary airports represent a small portion of total U.S. operations but are often critical in meeting local and regional aviation needs. Nonprimary airports are further grouped into five roles to more clearly indicate their functions within the system. The FAA's Nonprimary airport roles are defined in **Table 2.1**.[5]

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[3] *Ibid. p.1.*

[4] *Enplanements are defined as revenue-paying passengers boarding an aircraft.*

[5] *Role criteria are defined in NPIAS 2021 – 2025, Appendix C: Statutory and Policy Definitions, Data Sources, and NPIAS Process. Available online at https://www.faa.gov/sites/faa.gov/files/airports/planning_capacity/npias/current/NPIAS-2021-2025-Appendix-A.pdf.*

Table 2.1. Nonprimary Airport Roles

Nonprimary Role	Role in the System
National	Support the national airport system by providing communities access to national and international markets in multiple states and throughout the U.S. National airports have very high levels of aviation activity with many jets and multiengine propeller aircraft.
Regional	Support regional economies by connecting communities to regional and national markets. They are generally located in metropolitan areas and serve relatively large populations. Regional airports have high levels of activity with some jets and multiengine propeller aircraft. The metropolitan areas in which regional airports are located can be Metropolitan Statistical Areas with an urban core population of at least 50,000 or Micropolitan Statistical Areas with a core urban population between 10,000 and 50,000.
Local	Supplement local communities by providing access to markets within a state or immediate region. Local airports are most often located near larger population centers, but not necessarily in metropolitan or micropolitan areas. Most of the flying at local airports is by piston aircraft in support of business and personal needs. These airports typically accommodate flight training, emergency services, and charter passenger service.
Basic	Provide a means for general aviation flying and link the community to the national airport system. These airports support general aviation activities such as emergency response, air ambulance service, flight training, and personal flying. Most of the flying at basic airports is self-piloted for business and personal reasons using propeller-driven aircraft. They often fulfill their role with a single runway or helipad and minimal infrastructure.
Unclassified	Currently in the NPIAS but with limited activity. If the next review of an unclassified airport's activity shows levels that meet the criteria for one of the classifications, the airport will be reclassified in the next published NPIAS.

Source: FAA NPIAS 2021 – 2025 (Appendix C)

Minnesota has 97 airports identified in the *NPIAS 2021 – 2025*, including Silver Bay Municipal (BFW). The airport is now closed and will be removed from the next report iteration. The number of Minnesota airports by NPIAS Primary category and Nonprimary role is provided in **Table 2.2**. The state has three unclassified airports including Ortonville Municipal-Martinson Field (VVV), Springfield Municipal (D42), and Wheaton Municipal (ETF). **Table 2.46** at the end of this chapter provides a listing of NPIAS airports by Primary category and Nonprimary role (as applicable).

Table 2.2. Number of Minnesota Airports by NPIAS Category and Role

Primary Category	No. of MN Airports	Nonprimary Role	No. of MN Airports
Large	1	National	3
Medium	0	Regional	9
Small	0	Local	51
Nonhub	7	Basic	23
Total	8	Unclassified	3
		Total	**89***

Note: This includes Silver Bay Municipal, which has since closed and will be removed from the next NPIAS report.
Source: FAA NPIAS 2021 – 2025

Figure 2.2 depicts the 96 NPIAS airports in the Minnesota state aviation system by category and role. Silver Bay Municipal Airport is not depicted because it is no longer in the state system.

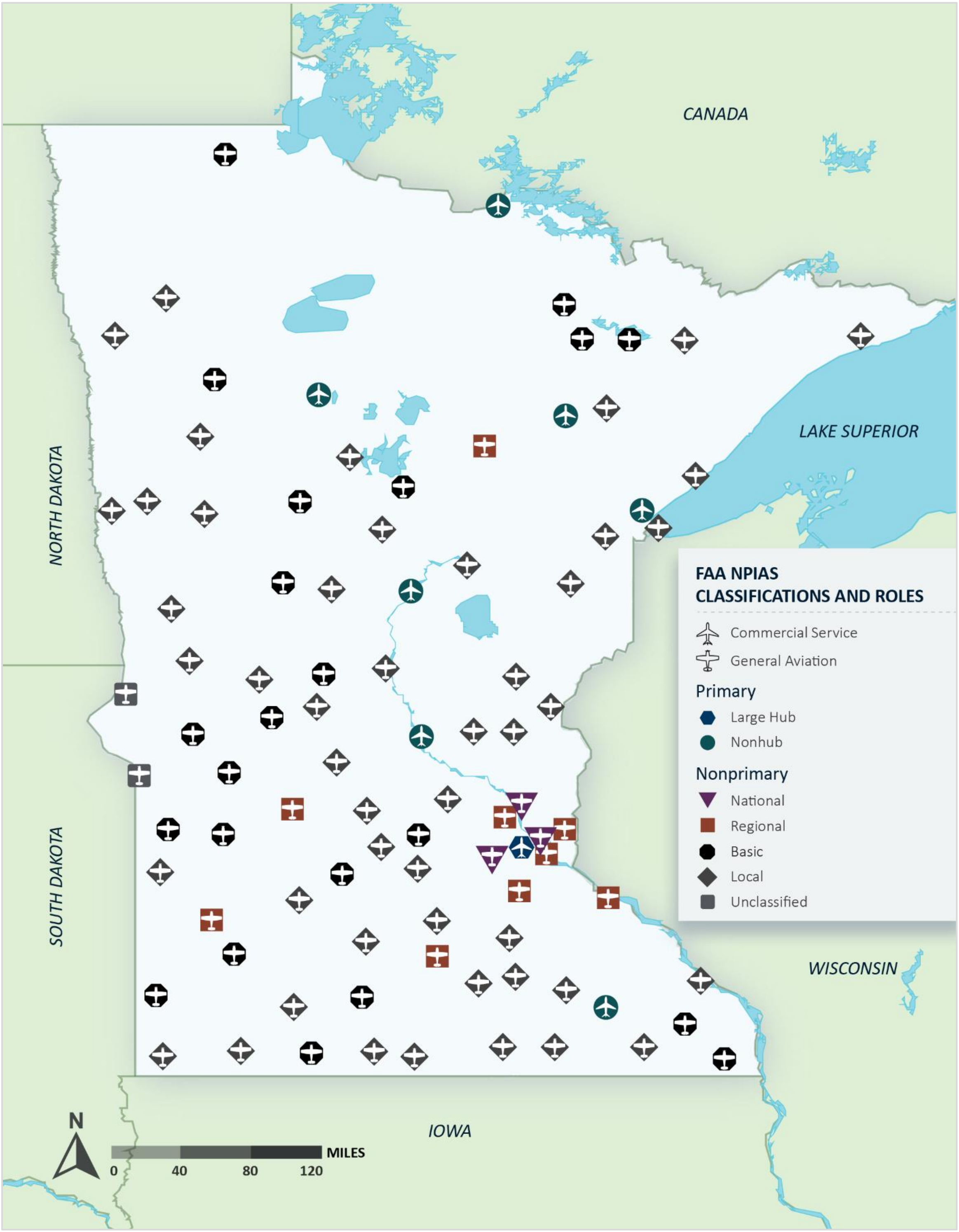


Figure 2.2. Minnesota Airports by NPIAS Category and Role

Source: FAA NPIAS 2021 – 2025

2.2.1.2. State Classifications

Airports are also classified at the state level to define their functions within local, regional, and statewide spheres. Minnesota Statutes Chapter 630.305 (Subdivision 2) requires airports have a classification designation before the airports can receive state investment into airport projects. The state system of airports is composed of 133 publicly owned, public-use airports, including 96 NPIAS airports and 37 non-NPIAS airports. While these non-NPIAS facilities are not considered critical to the NAS, they often provide valuable services within their communities in terms of economic support and quality of life. This may include access to remote communities, business/corporate aviation, emergency preparedness and disaster response, medical flights, and agricultural services.

Phase I updated the previous state classification methodology, which was first established in 1974 and most recently confirmed in the previous 2012 MnSASP. The Phase I plan conducted a series of outreach meetings to obtain feedback from MnDOT Aeronautics and the system plan advisory and technical advisory committees. An Aviation Consultant Community Workshop was also conducted. Meeting participants indicated that the existing state classification methodology inadequately described the functions of airports within the system. Additionally, stakeholders stated that the existing methodology did not easily allow for the inclusion of seaplane bases.[6] Although no seaplane bases without a collocated turf or paved runway are currently in the system, they may be included in the future and should be properly identified within the classification methodology.

As such, Phase I subdivided the previous airport classifications as shown in **Table 2.3**. The updated Phase I classification methodology primarily organizes airports in terms of Part 139 certifications, primary runway length, and surface type and defines facilities in terms of the types of aircraft and aviation functions typically supported.

Table 2.3. Minnesota State Classification Definitions

Previous Classifications (1974 – 2012)	Phase I Classifications (2019)	Criteria	Types of Aircraft Primarily Supported	Primary Functions and Users
Key	Key Commercial Service	Part 139 certificate and paved runway ≥4,900 feet	Commercial and GA jets	Same functions as key GA airports and regular airline service
	Key General Aviation	Paved runway ≥4,900 feet	Most business jets, all single-engine aircraft, and larger multiengine aircraft	Primary landing facilities for GA jets that serve business and air freight activity

[6] *The Minnesota state airport system does not currently include seaplane bases that do not have a collocated turf or paved runway. Phase I recommended that in the future the state consider including seaplane bases without a collocated turf or paved runway in the state system. Minnesota currently has 11 publicly owned seaplane bases. These airports would need to be officially designated by the Commissioner of Transportation and approved by the Governor for inclusion in the state system (Minnesota Statutes, Chapter 360). State statute allows no more than 195 airports to be in the state airport system.*

Previous Classifications (1974 – 2012)	Phase I Classifications (2019)	Criteria	Types of Aircraft Primarily Supported	Primary Functions and Users
Intermediate	Intermediate Large	Paved and lighted runway ≥3,800 feet and <4,900 feet	Small aircraft with approach speeds of greater than 50 knots and 10 or more passenger seats	Recreational flights, flight training, emergency medical transports, business flights, agricultural flights, cargo distribution, and other GA uses
	Intermediate Small	Paved runway <3,800 feet	Small single and multiengine aircraft with less than 10 passenger seats	Recreational flights, flight training, emergency medical transport, business flights, agricultural flights, and other GA uses
Landing Strip	Landing Strip Turf	Unpaved turf runway of any length	Single-engine aircraft and some multiengine aircraft	Agricultural activities such as crop seeding and spraying services and recreational GA uses
	Landing Strip Seaplane Base*	Water runway	Single-engine and multiengine seaplanes	Recreational use and access to remote areas only accessible by seaplane

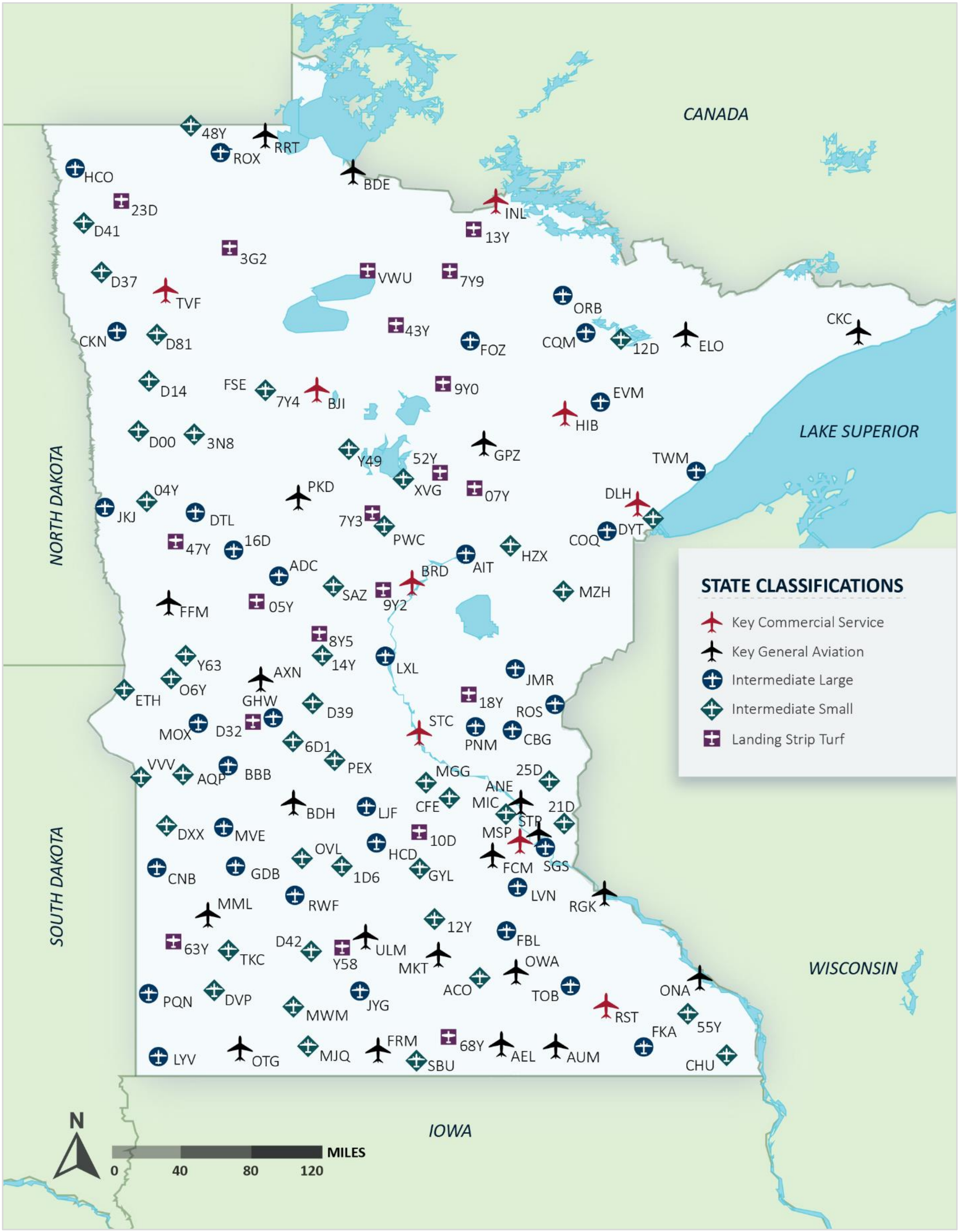
**Note: Seaplane bases are not included in the 2020 state aviation system. MnDOT reports that the state is home to 11 publicly owned seaplane facilities. Source: MnSASP Phase I, 2019*

MnSASP Phase II applied the methodology defined in Phase I to classify Minnesota's 133 state system airports. Runway and Part 139 certification data were obtained from the FAA's Airport Data and Information Portal (ADIP) (accessed November 2020). The total number of Minnesota system airports by classification is provided in **Table 2.4**. Airports by state classification are depicted in **Figure 2.3** and listed by state classification in **Table 2.47** at the end of this chapter.

Table 2.4. Number of Minnesota Airports by State Classification

State Classifications	No. of MN Airports	Example AirportS
Key Commercial Service	9	Bemidji Regional Airport (BJI) Duluth International Airport (DLH)
Key General Aviation	24	Fairmont Municipal Airport (FRM) New Ulm Municipal Airport (ULM) Red Wing Regional Airport (RGK)
Intermediate Large	36	Cook Municipal Airport (CQM) Hallock Municipal Airport (HCO) Pipestone Municipal Airport (PQN)
Intermediate Small	43	Buffalo Municipal Airport (BFE) Forest Lake Airport (25D) Minneapolis Crystal Airport (MIC)
Landing Strip Turf	20	Pelican Rapids Municipal Airport (47Y) Sleepy Eye Municipal Airport (Y58) Starbuck Municipal Airport (D32)
Total	**133**	NA

Figure 2.3. Minnesota State Aviation System by Classification



Sources: MnSASP Phase I, 2019; FAA ADIP, 2020; Kimley-Horn, 2020

2.2.1.3. Phase II Applications

Because airport classifications provide a mechanism for planning airports in alignment with the aviation functions and users most typically supported, they have widespread applicability in Phase II. The Airport Metrics discussed in **Section 2.3.2** are established by state airport classification (see **Table 2.5**). As such, airport performance is evaluated in terms of achieving classification-specific targets. MnDOT Aeronautics could choose to prioritize state funding by classification to close any performance gaps identified during this process.

In addition to the fundamental role that classifications play in ensuring airports can optimally support the needs of all aviation users, policy recommendations may be established by state and/or federal classifications. Classifications play the most important role in the operations and forecasting task documented in **Chapter 3**. The 2022 MnSASP only projected future aircraft operations at non-towered GA facilities. The preferred methodology applied a different growth rate by state airport classification to most effectively align drivers of aviation demand with operational activity levels.

2.3. System Performance Framework

Airport classifications play an important role in assessing the system's ability to meet current and potential future aviation-related needs in Minnesota. The system performance framework identifies what those specific needs are, as well as provides the mechanisms by which performance is measured and tracked over time. The framework is composed of multiple interrelated elements as depicted in **Figure 2.4**.

Figure 2.4. MnSASP System Performance Framework

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

A vision statement is a strategic goal that clearly and concisely articulates an organization's aspirations for its future. Visions communicate purpose and intent and serve as an important strategic decision-making tool. Defined during the 2012 MnSASP and confirmed during Phase I of the 2022 MnSASP, Minnesota's vision for aviation is as follows:

Minnesota's aviation system will enable safe, fast, and reliable air transportation for the citizens and businesses of Minnesota through partnership and innovation.

Based on this vision, objectives and strategies provide specific definitions of what an aviation system looks like in actionable terms to meet the vision. Objectives and strategies offer guidance and direction: a tangible means by which the aviation vision can be advanced. Finally, metrics directly relate to measuring the system's and airports' performance in meeting specific strategies. Metrics are categorized by "measures" and "indicators." Measures are items that MnDOT Aeronautics or airports can influence through funding, policy changes, or other action. Indicators are informational—they are used to monitor progress but can neither be controlled nor influenced with a specific action. The MnSASP system performance framework provides a direct link between what MnDOT Aeronautics is trying to achieve at the systemwide level and the specific targets airports should meet to realize that aspiration.

In the following sections, each element of the system performance framework as developed/confirmed during Phase I is evaluated. In some cases, elements have been recommended for modification or deletion to enhance the framework's alignment with the current needs of MnDOT Aeronautics and/or airports. These sections also highlight the ways each element is applied during the Phase II analyses.

2.3.1. VISION, OBJECTIVES, AND STRATEGIES

Minnesota's aviation vision was developed during the 2012 MnSASP to describe the desired future air transportation system in the state. The development of the vision entailed extensive stakeholder engagement and was designed to advance Minnesota GO's 50-year vision as well as align with the 2022 Statewide Multimodal Transportation Plan. As such, the 2022 MnSASP maintains this aviation vision without modification.

Phase I identified five objectives and 17 strategies to provide guidance on how MnDOT Aeronautics can advance its vision. Objectives were adopted from the 2017 Statewide Multimodal Transportation Plan (SMTP) and replaced the "goals" developed during the 2012 MnSASP. Phase I also consolidated many of the strategies developed during the 2012 MnSASP (31 in 2012 to 17 in 2022). This consolidation allows MnDOT Aeronautics to focus on those elements most critical to system performance. Other strategies were modified to allow for greater flexibility during implementation.

It is important to note that Phase I was completed before the SMTP was updated in 2022. Phase II of the MnSASP adopted the 2022 SMTP updates including a new objective (Climate Action). The following subsections summarizes the objectives and strategies identified during Phase I of the 2022 MnSASP and was updated in Phase II to reflect the 2022 SMTP. The table notes any associated system and airport metrics (used to measure progress towards each strategy) and indicates if and how each strategy is carried forward into Phase II. Phase II applicability, purpose, and recommendations are provided for each strategy.

The 2022 MnSASP comprises the following tasks referenced throughout **Section 2.3** (the 2022 MnSASP Technical Report section that documents the outcomes of each task is provided in parathesis):[7]

- Task 4 - Analyze Policy Issues (Chapter 3. Baseline Operations and Forecasting, Chapter 5. Key State Focus Areas, and Attachments 1 - 7)
  - Task 4.1 - Operations Counting and Forecasting
  - Task 4.2 - Through-the-Fence (TTF) Operations
  - Task 4.3 - Hangar Availability and Funding Participation
  - Task 4.4 - Airport Closures
  - Task 4.5 - Crosswind Runway Analysis
  - Task 4.6 - Clear Zone Policy and Ownership
  - Task 4.7 - Last-mile Connectivity
- Task 5 - Validate and Modify Phase I Acquisition Plan (Chapter 2. Phase I Validation)
- Task 6 - Acquire Data (Chapter 4. Systemwide Costs & Implementation Plan
- and Chapter 6. Continuous Aviation Planning)
- Task 7 - Develop Data Management Plan (Chapter 6. Continuous Aviation Planning)
- Task 8 - Database and Display Dashboard (Chapter 6. Continuous Aviation Planning and the MnSASP Hub at mnsasp-mndot.hub.arcgis.com)
- Task 9 - Conduct Public Involvement (Appendix B. Public Involvement)
- Task 10 - Develop Implementation Plan (Chapter 4. Systemwide Costs & Implementation Plan, Attachments 1 – 7, Appendix E. Implementation Plan)
  - Task 10.1 - Investment Plan
  - Task 10.2 - Policy Plan
  - Task 10.3 - Action (Work) Plan
- Task 11 - Public and Produce the MnSASP Document (2022 MnSASP Technical Report, Executive Summary, Overview Primer, Key State Focus Areas Primer)
- Task 12 - Navigational Aids (NAVAIDs) Plan (Appendix C. Minnesota NAVAIDs)
- Task 13 - Drones and Advanced Air Mobility (AAM, Appendix B. Public Involvement)

2.3.1.1. Objective 1: Transportation Safety

Safeguard aviation users as well as the communities the system travels by applying proven strategies to reduce fatalities and serious injuries for aviation. Foster a culture of aviation safety in Minnesota.

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[7] Task 1 through 3 generally address project management and plan design, as well as the topics addressed in this chapter (Phase I Validation, also covered in Task 5). For more information about the Phase I and II components of the MnSASP, see Chapter 1. Introduction and Design. Additionally, the names indicated in the bulleted list refer to the task names identified in the scope of work. Some nomenclature was updated to more clearly indicate the topics covered but the intent of the tasks remained unchanged (e.g., the Display Dashboard identified by Task 8 was renamed the "MnSASP Hub" during project implementation. The policy issues in Task 4 are now referred to as "key state focus areas," with minor title changes in nearly all subtopics addressed in Task 4.1 through 4.7).

Strategy 1: Approach Airspace Obstructions

Obstructions within an airport's approach airspace presents a safety risk towards aircraft operations and may force the instrument approach minimums to be raised. There are several system metrics associated with this strategy: Adequate Approaches to Airports, Airport Surfaces Clear of Obstructions, Adequate Safety Zoning Ordinances, Aviation Related Accidents, Aviation Fatalities. There are several airport metrics associated with this strategy: Primary Runway Approaches, Airport Surfaces, Airport Zoning, Minimum Standards.

This strategy will proceed into Phase II. Airspace obstructions represent a significant hazard to pilots and passengers in the air as well as people and property on the ground. The Clear Zone Policy and Ownership analysis (Task 4.6) maps all FAA Part 77 approach surfaces, which can be used to identify natural and manmade objects that exceed federal height restrictions. FAA 5010 Master Records will also be reviewed to obtain data regarding displaced thresholds and close-in-obstructions. Airports located in jurisdictions with airport compatible land use zoning and with clear zones depicted on their Airport Layout Plans (ALP) were also identified during the airport inventory process.

Strategy 2: Clear Zone Policy

Obstructions within the clear zones beyond airport runways are hazardous towards aircraft operations, people and property within the runway approach area. There are several system metrics associated with this strategy: Adequate Approaches to Airports, Airport Surfaces Clear of Obstructions, Aviation Related Accidents, Aviation Fatalities. There are several airport metrics associated with this strategy: Primary Runway Approaches, Airport Surfaces, Clear Zone Ownership.

This strategy will proceed into Phase II. Clear zones have been established by MnDOT to protect life and property in runway approach areas. This policy is comprehensively evaluated during the Clear Zone Policy and Ownership analysis (Task 4.6).

Strategy 3: Safety Initiatives

Educational initiatives and workshops of the hazards towards transportation safety help to increase the promotion of safety throughout the Minnesota transportation system.

This strategy will proceed into Phase II. As often said in the aviation world, "safety first." All policies and recommendations developed during the MnSASP will be designed to uphold the highest level for all aviation users as well as people and property on the ground. The educational tools developed as part of the Clear Zone Policy and Ownership analysis (Task 4.6) will be specifically designed to enhance users' knowledge about and understanding of a land acquisition policy intended to enhance the safety of aircraft operations and people and property on the ground. The executive summary and audience-specific primers developed as part of the Publish and Produce the MnSASP Document (Task 11) will likely include information regarding aviation safety. The MnSASP Hub (Task 8) also includes metrics regarding safety incidents recorded at airports such as runway incursions and aviation-related fatalities. Additionally, the Drone and AAM task (Task 13) presents an opportunity to educate AAV users and airports about their responsibilities associated with this transformative technology.

2.3.1.2. Objective 2: System Stewardship

Strategically build, manage, maintain, and operate all transportation assets using system data analysis, performance measures and targets, and achieving stakeholder needs.

Strategy 1: Technology Use

MnDOT Aeronautics should explore ways to integrate technology into existing asset management techniques to better maintain the airport system. There are two system metrics associated with this strategy: Pavement Condition Index (PCI), Adequate Arrival/Departure Terminal Building. There are two airport metrics associated with this strategy: Based Aircraft, Airport Operations.

This strategy will proceed into Phase II. Asset management refers to the ongoing tracking and monitoring of physical property and systems owned or managed by MnDOT Aeronautics or airport sponsors. A coordinated asset management approach supports funding and investment decisions, extends asset life, reduces downtime, achieves better control over performance, and reduces lifecycle costs. The MnSASP Hub (Task 8) is a key element in MnDOT's asset management strategy. The airport inventory process included as part of the Acquire Data task (Task 6) provides MnDOT Aeronautics with baseline data to be integrated into this system.

Strategy 2: Airport System Workforce Promotion

The use of marketing, education, and outreach will help increase the system user base and workforce to build resiliency within the airport system. There is one system metric associated with this strategy: Licensed Pilots. There is one airport metric associated with this strategy: Certified Pilots within 30 miles of an Airport.

This strategy will be modified for Phase II. This strategy is not explicitly addressed in Phase II of the MnSASP. However, it is recognized that cultivating interest in aviation helps ensure a pipeline of new talent entering the workforce, including a stream of pilots entering the field. MnDOT Aeronautics and airports can employ several marketing, outreach, and educational strategies to promote aviation. Information regarding airports' outreach and educational efforts is obtained during the airport inventory process. The FAA also maintains a database of all aviation-related training programs in the U.S. (including air traffic control, Part 65 Aircraft Dispatcher Certification, maintenance schools, and pilot schools).

Strategy 3: Right-sizing the System

MnDOT should reorient system investment and infrastructure through right sizing (i.e., consolidating services and investment). There are several system metrics associated with this strategy: PCI, Up-to-Date Planning Documents, Adequate Arrival/Departure Terminal Building, Registered Aircraft. There are several airport metrics associated with this strategy: Based Aircraft, Primary Runway Width, Runway Lighting, Parallel Taxiway, Navigation Systems, Weather Reporting, Aircraft Parking, Automobile Parking, Fencing, Fuel, Transient Aircraft Storage, ALPs.

This strategy will proceed into Phase II. Right-sizing an airport refers to the alignment of the services and facilities provided with current aviation demands at that facility. This same concept can also be applied at the system level. When planned as a system, each airport needs only to support a sub-set of specific aviation activities. The system as a whole provides adequate and equitable access to aviation services for residents, visitors, and businesses across the state while minimizing duplication of services. As such, the MnSASP inherently supports the right-sizing of Minnesota's airport system. On a more specific level, the classification-specific airport metrics provide facility and service recommendations aligned with the type and frequency of aviation activities that typically occur within that classification. The Airport Closure analysis (Task 4.4) looks specifically at airport closures and entry into the state system. This task provides a framework for evaluating airport closures and system entry in terms of impacts to the system – including nearby communities that may rely on a facility for "quality of life" aviation activities. Sound resource allocation and project prioritization is addressed in the Policy Plan (Task 10.2).

Strategy 4: Airport Self-Sufficiency

MnDOT Aeronautics should support the ability of airports to be financially self-sufficient rather than relying on existing federal/state funding. There are two system metrics associated with this strategy: PCI, Registered Aircraft. There are several airport metrics associated with this strategy: Fuel, Courtesy Car/Rental Car, Transient Aircraft Storage, ALPs.

This strategy will be modified for Phase II. Airport self-sufficiency is the ability of an airport to operate without additional contributions from the airport sponsor (from the general fund or other source) or third-party source. Airport revenue typically comes from rents and leases of property and facilities, as well as user fees, fuel flowage fees, and sales of goods and services provided by the airport. Specifically, hangar leases often provide an important source of revenue for airports, although many airports cannot access sufficient funds for new hangar development. This issue is addressed in the Hangar Availability and Funding Participation analysis (Task 4.3). The MnSASP airport inventory is obtaining data regarding rates and charges assessed by each facility. It is further recommended that revenue generation, diversification, and self-sufficiency be included in the Action (Work) Plan (Task 10.3) as a topic for further investigation.

2.3.1.3. Objective 3: Climate Action

Advance a sustainable and resilient transportation system, enhance transportation options and technology to reduce greenhouse gas emissions, and adapt Minnesota's transportation system to a changing climate.

Following completion of Phase I, Climate Action was added as a new objective to the SMTP. Phase II of the MnSASP incorporates this new objective along with any other updates to the SMTP published in 2022. As the SMTP was updated after completion of Phase I, no strategies were developed for Climate Action.

2.3.1.4. Objective 4: Critical Connections

Maintain and improve multimodal transportation connections essential for Minnesotans' prosperity and quality of life, strategically consider new connections that help meet performance targets and maximize social, economic and environmental benefits.

Strategy 1: Last-mile Connections

Last-mile connections allow airport users to reach their final destinations from the airport via non-aviation modes. This can include rental cars, courtesy cars, public transit, shuttles, etc. There is one system metric associated with this strategy: Courtesy and Rental Cars. There are several airport metrics associated with this strategy: Automobile Parking, Courtesy Car/Rental Car, Minimum Standards.

This strategy will proceed into Phase II. Last-mile connectivity refers to the ability of an airport user to leave airport property and reach their final destinations. This ground connectivity helps the airport bolster economic activity in surrounding areas, as visitors can spend money at local restaurants, hotels, retail establishments, and other sectors within the hospitality industry. Many airports facilitate the movement of visitors by providing a courtesy car; other options include public transit, transportation network companies (TNCs), rental cars, and shuttle service. The Last-mile Connection Opportunity analysis (Task 4.7) offers information regarding the state of last-mile connectivity between Minnesota airports and surrounding communities. State policy guidance addressing courtesy cars is also provided. This information can be disseminated in the outreach materials developed in Task 11.

Strategy 2: Awareness and Promotion

MnDOT Aeronautics and airports should collaborate with state and local tourism entities to promote the use of the Minnesota aviation system throughout the state. There are several system metrics associated with this strategy: Population Access to an Airline Service Airport, Courtesy and Rental Cars, Licensed Pilots, Registered Aircraft. There are two airport metrics associated with this strategy: Courtesy Car/Rental Car, Certified Pilots within 30 miles of an Airport.

This strategy will not proceed into Phase II. Phase II of the MnSASP does not include a specific analysis focusing on the use of Minnesota airports as gateways to exploring the state. The implementation of this strategy is difficult to measure, as it is not feasible to assess if travelers utilize Minnesota airports because of a MnDOT initiative (i.e., collaboration with state and local tourism entities) or if they would have done so regardless of MnDOT action. While "collaboration" itself can be measured (e.g., number of meetings with state and local tourism entities), the outcomes of that collaboration are significantly more difficult to quantitatively assess, particularly at the statewide level. Additionally, it is assumed that most travelers who visit locations across Minnesota move by ground transportation because of a barrier to air service (e.g., cost, access to ground transportation upon arrival, etc.), as most travelers prefer air travel when other variables are equal. Hence, it is recommended that this strategy be removed for Phase II of the MnSASP.

Strategy 3: Community Connections

MnDOT Aeronautics should support new methods of connecting airports to their associated communities through new transportation modes and/or partnerships. There are several system metrics associated with this strategy: Emergency Medical Response, Population Access to an Airline Service Airport, Courtesy and Rental Cars. There are two airport metrics associated with this strategy: Automobile Parking, Courtesy Car/Rental Car.

This strategy will be modified for Phase II. Transportation technologies and travel choices and behaviors have evolved over the past decade. Automobiles are more advanced and comfortable, and semi-autonomous functions are already entering the market (e.g., vehicles can automatically detect impending collisions or dangerous driving behaviors). Younger generations are showing less affinity for private car ownership, often preferring to rely on TNCs or other modal options to move between destinations. These and other transportation trends affect the long-term planning efforts of other modal types and may be reflected in local/regional comprehensive or transportation plans. As such, Phase II recommends modifying this strategy to assess the number of airports that are included in local/regional planning efforts. The relationship between aviation and other modes in the context of evolving transportation technologies and trends may also be considered as an additional study as documented in the Action (Work) Plan (Task 10.3).

Additionally, the system indicator of emergency medical response is recommended for modification. Phase II of the MnSASP posed questions that are unable to be answered within the scope of the plan. These questions are as follows: (1) Ability of the existing weather reporting system to adequately serve the aeromedical needs of the state. (2) Average response time for aeromedical service by region. Approximating answers to these questions would require extensive outreach to state hospitals, air medical flyers, and likely other stakeholders generally beyond the data collection efforts of the 2022 MnSASP. Instead, the Phase II recommends modifying this indicator to assess the percent of system airports that support air medical operations.

Strategy 4: Transportation Infrastructure Investment

MnDOT should increase transportation investment that aims to support net-positive economic opportunities throughout the Minnesota economy. There is one system metric associated with this strategy: Economic Impact. There are two airport metrics associated with this strategy: Courtesy Car/Rental Car and Available Services.

This strategy will proceed into Phase II. Airports can be significant engines of economic activity within communities. Many airports host aeronautical- and non-aeronautical-related tenants who employ workers. On-airport workers, including those hired directly by the airport sponsor, spend their wages within their communities on retail purchases, living expenses, educational costs, and countless other expenses, which generate additional economic impacts within local regions and statewide. Airports also conduct large-scale capital improvement projects, which generate economic impacts in terms of temporary construction jobs and the purchasing of construction supplies. These are just a few examples of how airports support the economic vitality, diversity, and strength of Minnesota communities. Airports and MnDOT can take actionable steps to support the role of airports as economic engines and enhance the economic opportunities generated by aviation facilities. For example, some states include criteria in their project prioritization methodology to fund improvement projects that have a net-positive economic impact in the state. This and other strategies are evaluated in the Policy Plan analysis (Task 10.2).

2.3.1.5. Objective 5: Healthy Equitable Communities

Foster healthy and vibrant places that reduce disparities and promote healthy outcomes for people, the environment and out economy.

Strategy 1: Airport Zoning Ordinances

MnDOT Aeronautics should support airport sponsor, community, and joint airport zoning board (JAZB) efforts to understand, adopt, and enforce airport zoning ordinances. There are two system metrics associated with this strategy: Adequate Safety Zoning Ordinances, Aviation Fatalities. There are two airport metrics associated with this strategy: Airport Zoning, Minimum Standards.

This strategy will proceed into Phase II. Airport compatible land use zoning and height restrictions are an important element of airport safety and are designed to protect against airspace obstructions, uses that interfere with aircraft flight, and land uses that put people at risk should an incident occur. Land use compatibility restrictions also help reduce noise and other nuisance complaints that can arise when sensitive land uses such as residential, schools, and churches are located in the vicinity of airports.

MnDOT is recognized as a leader in terms of the proactive role it has taken to support land use compatibility. The state has both a clear zone policy for airports, as well as land use safety zoning standards for communities within airport influence areas. Phase II of the MnSASP furthers the agency's continued support for this critical issue in Clear Zone Policy and Ownership (Task 4.6). This task clarifies and updates existing policies, as well develops a suite of educational tools for airports, planners, and developers. The task also clarifies MnDOT's policies in terms of each party's responsibility in supporting the safe and peaceful coexistence of airports and their neighboring communities. The audience-specific primers developed in Publish and Produce the MnSASP Document task (Task 11.3) also provide the opportunity to educate airports about this important topic.

Strategy 2: Compatible Land Use

Maintain compatible uses near airports through comprehensive planning and zoning efforts. Compatible land uses near airports can help ensure that transportation and the surrounding context improve safety and work together in promoting community, economic, and environmental health while limiting the long-term costs of potential discrepancies.

This strategy will proceed into Phase II. Airports, MnDOT, and local planning officials all have important roles to play in land use compatibility. This strategy addresses the role of the local zoning authority, including airports in comprehensive planning processes and depicting airport safety zones on official zoning maps. In addition to the education materials developed as part of Clear Zone Policy and Ownership analysis (Task 4.6), information about land use zoning is provided in the MnSASP Hub (Task 8) and primer included in the Publish and Produce the MnSASP Document task (Task 11.3).

Strategy 3: Unleaded Aviation Fuel

MnDOT Aeronautics should support the transition towards unleaded aviation fuel to align with the efforts of the FAA and U.S. Environmental Protection Agency (EPA). There is one airport metric associated with this strategy: Fuel.

The environmental and health concerns associated with emissions from piston aircraft fueled with 100LL (100 Low Lead, often referred to as AvGas) have motivated the FAA and EPA to phase out AvGas usage as soon as possible. However, while research is ongoing, an acceptable alternative has not yet been identified. The impacts of phasing out AvGas prior to having clear alternative solutions in-place would pose major challenges to the GA community. Conversely, considerable advances have been made to replace Jet A with sustainable biofuels for use in turbine engines. Phase II of the MnSASP identifies airports that offer or plan to offer sustainable Jet A alternative biofuels. It is further recommended this topic is considered for inclusion in the Action (Work) Plans (Task 10.3).

2.3.1.6. Objective 6: Open Decision-making

Open decision-making is defined as making transportation system decisions through processes that are inclusive, engaging, and supported by data and analysis. It provides for and supports coordination, collaboration, and innovation. It ensures efficient and effective use of resources.

Strategy 1: Outreach and Collaboration

Collaborate and aid aviation stakeholders through education, outreach, and advocacy. There are no system and airport metrics associated with this strategy.

This strategy will proceed into Phase II. Outreach and collaboration has been fundamental to the development of the scope of work for Phase II. That level of commitment continues through the implementation phase of this plan. Most notably, the Focus Area Working Groups (Task 9) provide input on current policy issues affecting Minnesota airports and the aviation system. The MnSASP Hub (Task 8) provides a user-friendly and accessible tool to obtain airport data. Public outreach documents (Task 11), including the executive summary and audience-specific primers, are specifically designed to communicate key plan findings to diverse audiences including airport sponsors, pilots, travelers, aircraft owners, aviation businesses, and other stakeholders. Clear Zone Policy and Ownership (Task 4.6) provides for the development of a suite of education tools related to clear zones.

Strategy 2: Disseminating Airport Activity Information

Explore new means of measuring and communicating airport activity levels. There are two airport metrics associated with this strategy: Based Aircraft and Airport Operations.

This strategy will proceed into Phase II. Tracking operations at non-towered airports is a significant challenge in aviation planning. Available technologies can be inaccurate, expensive to install or maintain, or both. Manual counts require significant personnel time to implement and accounting for seasonal changes in activity levels may be difficult. Accurate operations data are critical during planning efforts conducted by the airport, MnDOT Aeronautics, and the FAA, as this information is one of the most crucial drivers of future airport infrastructure needs. Task 4.1 specifically addresses this issue by identifying proposed methods to track and estimate airport activity levels. This includes a discussion regarding the transformative role that ADS-B may play in the future of airport operations counting and forecasting at non-towered facilities. Additionally, the MnSASP Hub (Task 8) provides an effective platform for communicating airport activity levels. Data can be regularly updated to improve decision-making, increase transparency, and promote understanding of the system's usage and value.

Strategy 3: Review of Funding and Selection Criteria

Continuous evaluation of the project prioritization formula, selection criteria, and funding rates to assess effectiveness and public understanding. There are several airport metrics associated with this strategy: Primary Runway Width, Runway Lighting, Parallel Taxiway, Taxiway Width, Navigational Systems, Weather Reporting, Airport Parking, GA Terminal / Administration Building, Fencing, Minimum Standards.

This strategy will proceed into Phase II. As often said in the aviation world, "safety first." All policies and recommendations developed during the 2022 MnSASP uphold the highest level of safety for all aviation users as well as people and property on the ground. The educational tools developed as part of the Clear Zone Policy and Ownership analysis (Task 4.6) enhance users' knowledge about and understanding of a land acquisition policy intended to enhance the safety of aircraft operations and people and property on the ground. The executive summary and audience-specific primers developed as part of the Publish and Produce the MnSASP Document (Task 11) include information regarding aviation safety. The MnSASP Hub (Task 8) addresses metrics regarding safety incidents recorded at airports such as runway incursions and aviation-related fatalities. Additionally, the Drone and AAM task (Task 13) presents an opportunity to educate unmanned aerial vehicle (UAV) pilots and airports about their responsibilities associated with this transformative technology.

2.3.2. AIRPORT METRICS

Airport metrics measure progress toward each strategy at the airport level and encompass airport measures and indicators. Measures are actionable items and can be influenced by MnDOT Aeronautics or airport actions. Airport measures comprise facility, service, and administrative items that each classification of airport should provide to optimally support the type and frequency of aviation activities that typically occurs at a given type of airport. Measures provide planning-level guidance for airports regarding how to improve their abilities to serve users and enhance the statewide aviation system. Airports may provide facilities, services, and administrative items that exceed or are below the guidance offered for their classification and still be fulfilling their roles based on local needs and conditions. However, airports that do not achieve measures may negatively impact the efficacy and performance of the statewide system and ultimately the ability of MnDOT Aeronautics to achieve its vision for aviation in the state. It is important to note that these measures do not replace the need for individual airport and project-specific planning efforts. Airports are still required to show project justification to request state or federal funding.

ACRONYMS

The acronyms used in the table are defined as follows:

ALP	Airport Layout Plan
ASOS	Automated Surface Observation System
AWOS	Automated Weather Observation System
HIRLs	High Intensity Runway Lights
LIRLs	Low Intensity Runway Lights
LPV	Localizer Performance with Vertical Guidance
MIRLs	Medium Intensity Runway Lights
MP	Master Plan
NAVAIDs	Navigational Aids
REILs	Runway End Identifier Lights
RDC	Runway Design Code
TDG	Taxiway Design Group
VGSI	Visual Glideslope Indicator

Phase I established 19 airport measures, with specific targets indicated as “required,” “recommended,” and “as needed” by classification (see Table 2.5). These targets were defined based on stakeholder feedback, and no additional recommendations or modifications have been identified during Phase II. As such, the analysis of system performance conducted during Phase II applies the targets as shown (as reported in the Hub and documented in Chapter 4. System Performance and Cost Estimates). Phase I also developed targets for Landing Strip Seaplane Bases should this type of airport be included in the state airport system in the future.

Table 2.6 through Table 2.24 present each of the 19 airport measures identified during Phase I of the MnSASP, including an overview of the measure, category (airport facility/service/administrative item), and description/purpose of each. These tables provide the strategy for the collection, manipulation, and application of each data point during Phase II, as well as any additional insight into how MnDOT Aeronautics can use the data to improve system performance in the future.

Table 2.25 through Table 2.28 address the four airport indicators identified during Phase II. Informational in nature, indicators cannot be directly influenced or controlled by MnDOT Aeronautics or airport actions.

Instead, indicators provide important data points to collect and monitor to help identify trends affecting aviation demand over time. The tables summarize the Phase II plan to collect and apply the data for each indicator.[8] Indicators are not categorized by facility/service/administrative items like airport measures, so they are organized differently in the section below.

It is important to highlight that the information presented in this chapter represents the plan to collect data during the 2022 MnSASP. During the data collection and analysis phases of the study, some of the details changed due to various circumstances, such as data quality, availability, or and other sources factors that arose during implementation. Chapter 6. Continuous Aviation Planning of the 2022 MnSASP provides detailed descriptions of final data sources, manipulation required, and other important information to allow MnDOT Aeronautics to maintain current data over time.

[8] *The actual (i.e., final) data collection methodology is presented in **Chapter 6. Continuous Planning**, including data sources and manipulation. While the plan generally aligned with the actual methodology employed, there were some differences based on data availability, quality, accessibility, and other factors that arose during actual data collection processes.*

Table 2.5. MnSASP Airport Measure Targets by Classification

Metric	Targets by State Classification - Key Commercial Service	Targets by State Classification - Key General Aviation	Targets by State Classification - Intermediate Large	Targets by State Classification - Intermediate Small	Targets by State Classification - Landing Strip Turf
FACILITY METRICS	KEY COMMERCIAL SERVICE Targets	KEY GENERAL AVIATION Targets	INTERMEDIATE LARGE Targets	INTERMEDIATE SMALL Targets	LANDING STRIP TURF Targets
Primary Runway Width	Required: At least 100 feet minimum, corresponding to RDC C-II and B-II with a ½ mile approach procedure and FAA standards for visibility minimums < ¾ mile Recommended: A width of 150 feet is recommended for RDC C-III to accommodate large regional jets	Required: At least 100 feet minimum, corresponding to FAA design standards for RDC C-II and B-II with visibility minimums < ¾ mile to accommodate instrument approaches < ½ mile visibility minimum	Required: At least 60 feet minimum, corresponding to the minimum width of a hard surface runway in Minnesota Administrative Rules Recommended: A width of 75 feet is recommended to align with RDC B-II runways with one-mile visibility minimums	Required: At least 60 feet minimum, corresponding to the minimum width of a hard surface runway in Minnesota Administrative Rules Recommended: A width of 75 feet is recommended to align with RDC B-II runways with one-mile visibility minimums	Required: At least 75 feet minimum, corresponding to the minimum width of turf runway provided in Minnesota Administrative Rules
Runway Lighting	Required: HIRLs	Required: MIRLs Recommended: HIRLs	Required: MIRLs	Required: MIRLs	Required: Edge markers for turf runways without lighting Recommended: LIRLs
Primary Runway Approaches	Required: Precision approach with minimums of ½ mile to at least one primary runway end	Required: Precision approach with minimums of ¾ mile to at least one primary runway end Recommended: Precision approach with minimums of ½ mile to at least one primary runway end	Required: Non-precision instrument approach with one-mile visibility or lower to at least one runway end Recommended: Approaches with vertical guidance (e.g., LPV)	Required: Non-precision instrument approach with one-mile visibility or lower to at least one runway end Recommended: Approaches with vertical guidance (e.g., LPV)	Required: Visual approaches

Metric	Targets by State Classification - Key Commercial Service	Targets by State Classification - Key General Aviation	Targets by State Classification - Intermediate Large	Targets by State Classification - Intermediate Small	Targets by State Classification - Landing Strip Turf
Parallel Taxiway	Required: Full parallel taxiway to align with the requirement of a precision approach with less than one-mile visibility	Required: Full parallel taxiway to align with the requirement of a precision approach with less than one-mile visibility	Required: Full parallel taxiway if the airport has an approach minimum of less than one mile. A partial parallel taxiway is required if the visibility minimums are one mile or greater	Required: Partial parallel taxiway Recommended: Full parallel taxiway	Required: Taxiway connectors Recommended: Partial parallel taxiway
Taxiway Width	Required: At least 35 feet corresponding to TDG 2 Recommended: At least 50 feet corresponding to TDG 3	Required: At least 35 feet corresponding to TDG 2	Required: At least 25 feet corresponding to TDG 1A and 1B aircraft Recommended: At least 35 feet for TDG 2	Required: At least 25 feet corresponding to TDG 1A and 1B aircraft	Required: At least 25 feet corresponding to TDG 1A and 1B aircraft
Navigation Systems	Required: Approach lighting system, REILs, VGSI, beacon, wind cones	Required: Approach lighting system, REILs, VGSI, beacon, wind cones	Required: VGSI, wind cone, rotating beacon	Required: Beacon, wind cone	Required: Wind cone
Weather Reporting	Required: AWOS	Required: AWOS or ASOS	Recommended: AWOS	Recommended: AWOS	Recommended: AWOS as-needed
Aircraft Parking	Required: Tiedowns for at least three more aircraft than are normally parked at the airport	Required: Tiedowns for at least three more aircraft than are normally parked at the airport	Required: Tiedowns for at least three more aircraft than are normally parked at the airport	Required: Tiedowns for at least three more aircraft than are normally parked at the airport	Required: Tiedowns for at least three more aircraft than are normally parked at the airport

Metric	Targets by State Classification - Key Commercial Service	Targets by State Classification - Key General Aviation	Targets by State Classification - Intermediate Large	Targets by State Classification - Intermediate Small	Targets by State Classification - Landing Strip Turf
GA Terminal / Admin Bldg.	Required: GA terminal with a phone and restroom	Required: GA terminal with a phone and restroom	Required: GA terminal with a phone and restroom	Required: GA terminal with a phone and restrooms	Required: Phone and restroom Recommended: GA terminal with a phone and restroom
Auto Parking	Required: Adequate parking as determined at the local level	Required: Adequate parking as determined at the local level	Required: Adequate parking as determined at the local level	Required: Adequate parking as determined at the local level	Required: Adequate parking as determined at the local level
Fencing	Required: Full perimeter fencing per Part 139 certification Recommended: Fencing height of 10-12 feet with three strands of barbed wire per FAA CertAlert 04-16	Required: Controlled vehicle access As-needed: Full perimeter and wildlife fencing as determined at the local level	Required: Controlled vehicle access As-needed: Full perimeter and wildlife fencing as determined at the local level	As-needed: Controlled vehicle access and full perimeter and wildlife fencing as determined at the local level	As-needed: Controlled vehicle access and full perimeter and wildlife fencing as determined at the local level
Airport Surfaces	Required: All airport surfaces must be clear of obstructions	Required: All airport surfaces must be clear of obstructions	Required: All airport surfaces must be clear of obstructions	Required: All airport surfaces must be clear of obstructions	Required: All airport surfaces must be clear of obstructions
SERVICE METRICS	KEY COMMERCIAL SERVICE Targets	KEY GENERAL AVIATION Targets	INTERMEDIATE LARGE Targets	INTERMEDIATE SMALL Targets	LANDING STRIP TURF Targets
Fuel	Recommended: 100LL and Jet A fuel	Recommended: 100LL and Jet A fuel	Recommended: 100LL As-needed: Jet A	Recommended: 100LL As-needed: Jet A	As-needed: 100LL

Metric	Targets by State Classification - Key Commercial Service	Targets by State Classification - Key General Aviation	Targets by State Classification - Intermediate Large	Targets by State Classification - Intermediate Small	Targets by State Classification - Landing Strip Turf
Courtesy / Rental Cars	Recommended: Rental and courtesy cars	Recommended: Rental and courtesy cars	Recommended: Courtesy cars	Recommended: Courtesy cars	As-needed: Courtesy cars
Transient Aircraft Storage	Recommended: Heated transient storage	Recommended: Heated transient storage	As-needed: Transient storage	As-needed: Transient storage	As-needed: Transient storage
ADMIN. METRICS	KEY COMMERCIAL SERVICE Targets	KEY GENERAL AVIATION Targets	INTERMEDIATE LARGE Targets	INTERMEDIATE SMALL Targets	LANDING STRIP TURF Targets
ALPs/ MP	Required: ALP and MP updates at least every 10 years	Required: ALP and MP updates at least every 10 years	Required: ALP and MP updates at least every 15 years	Required: ALP and MP updates at least every 15 years	Required: ALP updates as-needed
Airp ort Zoni	Required: Adequate airport zoning (per state law)	Required: Adequate airport zoning (per state law)	Required: Adequate airport zoning (per state law)	Required: Adequate airport zoning (per state law)	Required: Adequate airport zoning (per state law)
Clear Zone Ownership	Required: Clear zones controlled in fee title	Required: Clear zones controlled in fee title	Required: Clear zones controlled in fee title	Required: Clear zones controlled in fee title	Required: Clear zones controlled in fee title
Minimum Standards	Recommended: Documented minimum standards	Recommended: Documented minimum standards	Recommended: Documented minimum standards	Recommended: Documented minimum standards	Recommended: Documented minimum standards

Source: MnSASP Phase I, 2019

Table 2.6. Airport Metric Evaluation – Primary Runway Width

Data Assessment	Primary Runway Width
Category	Facilities
Type	Measure
Description/Purpose	The primary runway width is the minimum required for accommodating the airport's critical aircraft (aircraft that requires the greatest runway width for safe operations and has or is forecasted to have over 500 operations per year).
Anticipated Source(s)	FAA 5010 Master Record
Data Update Cycle	FAA 5010 Master Record review/inspection, or upon completion of a runway widening project
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	High - MnDOT can prioritize funding for runway widening projects.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan (Incorporate existing projects into the MnSASP Capital Improvement Plan [CIP])

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.7. Airport Metric Evaluation – Runway Lighting

Data Assessment	Runway Lighting
Category	Facilities
Type	Measure
Description/Purpose	The runway lighting system required for each airport is based on the type of aircraft operating at an airport at night or during low visibility conditions and existing runway approaches.
Anticipated Source(s)	FAA 5010 Master Record
Data Update Cycle	FAA 5010 Master Record review/inspection, or upon completion of lighting improvement project
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	High - MnDOT can prioritize funding for runway lighting projects.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan Task 12 - Advise on Navigational Systems Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.8. Airport Metric Evaluation – Primary Runway Approaches

Data Assessment	Primary Runway Approaches
Category	Facilities
Type	Measure
Description/Purpose	Runway approach procedures provide guidance for aircraft transitioning from the en route phase of a flight to the approach and landing phases.
Anticipated Source(s)	FAA Terminal Procedures Publication
Data Update Cycle	The FAA publishes the Terminal Procedures Publication every 56 days. However, it is recommended the MnDOT review system performance on an annual basis.
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	Evaluation of airport safety
Ability to Influence Data	Low - MnDOT can support the modifications to approach procedures, but the FAA has jurisdiction over this metric.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.9. Airport Metric Evaluation – Parallel Taxiway

Data Assessment	Parallel Taxiway
Category	Facilities
Type	Measure
Description/Purpose	Parallel taxiways mitigate the potential conflict between taxiing aircraft and arriving or departing aircraft and increase runway capacity.
Anticipated Source(s)	Visual inspection of airfield via aerial imagery; airport inspection reports as available
Data Update Cycle	As warranted upon completion of a taxiway improvement project
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	High - MnDOT can prioritize funding for taxiway improvement projects.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.10. Airport Metric Evaluation – Taxiway Width

Data Assessment	Taxiway Width
Category	Facilities
Type	Measure
Description/Purpose	Taxiways are intended to quickly and safely transition aircraft from runway surfaces to the apron. Taxiway turns and intersections should be designed to maximize the safe and efficient movement of aircraft while minimizing excess pavement. Taxiway width standards are dependent on the critical aircraft at an airport and the associated TDG.
Anticipated Source(s)	MnSASP airport inventory, visual inspection of airfield via aerial imagery
Data Update Cycle	As warranted upon completion of a taxiway improvement project
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	High - MnDOT can prioritize funding for taxiway improvement projects.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.11. Airport Metric Evaluation – Navigation Systems

Data Assessment	Navigation Systems
Category	Facilities
Type	Measure
Description/Purpose	Navigation systems aid aircraft moving into and out of airspace. These systems are tailored towards the users of each airport classification and can include the following devices: approach lighting systems, VGSI, REILs, rotating beacon, and wind cones.
Anticipated Source(s)	FAA 5010 Master Record
Data Update Cycle	FAA 5010 Master Record review/inspection, or upon the installation of modification to a NAVAID
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	High - MnDOT can prioritize funding for NAVAIDs.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan Task 12 - Advise on Navigational Systems Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.12. Airport Metric Evaluation – Weather Reporting

Data Assessment	Weather Reporting
Category	Facilities
Type	Measure
Description/Purpose	Weather reporting facilities broadcast weather information over a radio frequency for pilots to use when operating on and in the vicinity of an airport. The two types of facilities include an AWOS and ASOS.
Anticipated Source(s)	MnDOT (http://dot.state.mn.us/aero/navigationsystems/awos-map-online.html), FAA (https://www.faa.gov/air_traffic/weather/asos/?state=MN)
Data Update Cycle	As warranted upon installation of an AWOS/ASOS
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	High - MnDOT can prioritize funding for weather reporting facilities.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan Task 12 - Advise on Navigational Systems Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.13. Airport Metric Evaluation – Aircraft Parking

Data Assessment	Aircraft Parking
Category	Facilities
Type	Measure
Description/Purpose	Aircraft parking spaces allow for both based and transient aircraft to be parked for long-term and short-term use.
Anticipated Source(s)	MnSASP airport inventory (number and type)
Data Update Cycle	Annual updates are recommended (aerial inspections via Google Earth after initial data collection)
Difficulty in Data Collection	Moderate - Airport coordination is required
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	Moderate - The installation of additional tiedowns may require pavement expansion or strengthening projects, as well as available land for development. Hence, tiedown projects can be costly and limited by the availability of developable airport property.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.14. Airport Metric Evaluation – GA Terminal/Administration Building

Data Assessment	GA Terminal/Administration Building
Category	Facilities
Type	Measure
Description/Purpose	GA terminal, administration, and arrival/departure buildings provide space, shelter, and work areas for pilots, passengers, and travelers.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	Annual updates are recommended (aerial inspections via Google Earth after initial data collection)
Difficulty in Data Collection	Moderate - Airport coordination is required
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	Moderate - While determining if an airport has a GA terminal with a phone and restroom is straightforward initially, it is the airport's responsibility to ensure the phone and restroom are in acceptable operating condition.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.15. Airport Metric Evaluation – Automobile Parking

Data Assessment	Automobile Parking
Category	Facilities
Type	Measure
Description/Purpose	Dedicated automobile parking is critical to ensuring that automobile and aircraft traffic do not mix. Required parking capacity is determined at the local level for all airport classifications.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Moderate - Airport coordination is required
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to plan for current or potential airport funding needs.
Ability to Influence Data	Moderate - The addition of automobile parking may be limited by available landside property.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.16. Airport Metric Evaluation – Airport Fencing

Data Assessment	Airport Fencing
Category	Facilities
Type	Measure
Description/Purpose	Airport fencing impedes wildlife from entering an airport environment and enhances airport security.
Anticipated Source(s)	MnSASP airport inventory, visual inspection of airfield via aerial imagery
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Moderate - Airport coordination is required
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	High - MnDOT can prioritize the funding of appropriate fencing.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.17. Airport Metric Evaluation – Airport Surfaces

Data Assessment	Airport Surfaces
Category	Facilities
Type	Measure
Description/Purpose	Airport surfaces must be clear of obstructions to allow aircraft to conduct safe take-offs and landings. Obstructions can pose safety risks to pilots and may require instrument approach procedure minimums to be raised.
Anticipated Source(s)	MnSASP Part 77 maps developed as part of Task 4.6 - Clear Zone Policy and Ownership. Close-in obstructions reported on FAA 5010 Master Record.
Data Update Cycle	Biennial updates are recommended
Difficulty in Data Collection	High - While close-in obstructions are recorded during FAA 5010 inspections, obstructions can arise quickly. The FAA records human-made obstructions in its Digital Obstacle File. Because many obstacles are naturally occurring, maintaining a current obstacle database at the statewide level can be difficult.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to identify airport-specific safety hazards. This information can also be used to develop airport-specific obstacle removal/mitigation plans.
Ability to Influence Data	Moderate - MnDOT can develop airport-specific obstacle removal/mitigation plans to enhance aviation safety statewide. However, the development of such plans can be costly, and their implementation depends on cooperation and coordination with local airport sponsors.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.18. Airport Metric Evaluation – Fuel

Data Assessment	Fuel
Category	Services
Type	Measure
Description/Purpose	Fuel availability is largely dependent on the type of users at an airport. Piston-powered aircraft require 100LL, while turbine engines require Jet A. Service offerings can be either self- or full-service and provided by the airport or a third-party (such as a fixed base operator [FBO]).
Anticipated Source(s)	FAA 5010 Master Record, Minnesota Airport Director and Travel Guide, confirmed during airport inventory
Data Update Cycle	As warranted upon installation of a new fuel farm
Difficulty in Data Collection	Low
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate existing airport facilities versus required/recommended targets to support project funding prioritization.
Ability to Influence Data	Low - Because fuel farms are a revenue-producing project, they are generally low priority for FAA funding. As such, some airports may not have adequate local funds to support this improvement. Fuel farms can be installed by FBOs, but this would be market-driven and difficult for MnDOT to influence.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.19. Airport Metric Evaluation – Courtesy Car/Rental Car

Data Assessment	Courtesy Car/Rental Car
Category	Services
Type	Measure
Description/Purpose	Ground transportation options such as rental and courtesy cars provide connectivity between airports and surrounding communities.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Moderate - Airport coordination is required to obtain detailed information about airport courtesy cars (including make, model, and vehicle condition). Third-party websites provide some information about courtesy car availability (http://www.airportcourtesycars.com); this information should be independently validated prior to being published by the state.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to assess available ground transportation options at airports across the state. This assessment can be used to inform the development of an effective and germane state policy regarding airport connectivity.
Ability to Influence Data	Moderate - Obtaining a courtesy car requires minimal up-front investment, as an acceptable used vehicle can be purchased for less than $10,000. Due to a variety of reasons, many airport sponsors have difficulty obtaining funding for insurance and registration costs. MnDOT can develop an educational campaign

Data Assessment	Courtesy Car/Rental Car
	to help airports understand their options in terms of enhancing intermodal connectivity and clarify state policies regarding funding/insurance availability for and liability associated with courtesy cars.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 4.7 - Last-mile Connection Opportunity

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.20. Airport Metric Evaluation – Transient Aircraft Storage

Data Assessment	Transient Aircraft Storage
Category	Services
Type	Measure
Description/Purpose	A transient aircraft is an aircraft that is temporarily visiting an airport from outside of the local traffic pattern, usually established at travel beyond 20 nautical miles. Transient airport users may prefer to store their aircraft in climate-controlled hangars to avoid inclement weather, and some owners are hesitant to leave their aircraft parked outdoors in any conditions.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Moderate - Data collection for hangar storage capacity can be difficult because conventional hangar capacity is a function of the type of aircraft being stored. As such, determining if an airport's capacity is "adequate" relies on estimations and can change should typical airport users shift over time.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to evaluate the adequacy of hangar storage across the state and inform the development of a statewide program to fund hangar development.
Ability to Influence Data	Low - MnDOT has little control over transient aircraft operations. Hangar development can be costly, and funds are generally unavailable from the FAA. As such, hangar development is primarily be driven at the local level even if new funding programs are established. Some airports do not have adequate land for new hangar development.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.2 - TTF Operations (private developers may construct hangars adjacent to airport property should TTF operations be permitted by state policy) Task 4.3 - Hangar Availability and Funding Participation Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.21. Airport Metric Evaluation – ALPs

Data Assessment	ALPs
Category	Administrative
Type	Measure
Description/Purpose	ALPs provide a graphical representation of existing/planned facilities and design standards at an airport. An airport master plan serves as an airport's long-term strategic plan to guide future development.
Anticipated Source(s)	MnSASP airport inventory, review of existing planning documents on file with MnDOT
Data Update Cycle	Annual review of ALP/master plan study years is recommended (i.e., annually review study years to identify airports that need to update their planning documents)
Difficulty in Data Collection	Moderate - Airport coordination is required to ensure MnDOT has a copy of the most recent airport planning document. ALP revisions may not always be distributed to MnDOT, so regular communication and annual data requests may be required.
Data Manipulation Plan	None
MnDOT Application of Data	Master plans and ALPs provide detailed, airport-specific information regarding current and future aviation demands, as well as planned airport improvement projects. Reviewing copies of current planning documents can help MnDOT identify and plan for long-term needs at Minnesota airports. ALPs also depict airport clear zones.
Ability to Influence Data	High - MnDOT can prioritize funding for ALP or master plan updates, as well as tie grant funding to a proposed project being depicted on a current (within the past 10 or 15 years) ALP.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.22. Airport Metric Evaluation – Airport Zoning

Data Assessment	Airport Zoning
Category	Administrative
Type	Measure
Description/Purpose	Airport sponsors must have an established zoning authority for the airport, or be in the process of doing so, to receive various types of state funding. The authority must develop airport zoning ordinances that comply with Minnesota Statutes. Additionally, communities within airport influence areas must enact airport compatible zoning in accordance with state law.
Anticipated Source(s)	MnSASP Aeronautics records
Data Update Cycle	Annual reviews are recommended
Difficulty in Data Collection	High - Local zoning ordinances can be difficult to understand, zoning can be updated without the input or knowledge of the local airport, and enforcement is the responsibility of the local planning authority.

Data Assessment	Airport Zoning
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use the data obtained in this analysis to evaluate compliance with existing policies and inform the development of recommended changes or enhancements to existing policies.
Ability to Influence Data	Low - While MnDOT has a role in educating local land use planners about their responsibilities associated with airport compatible development, the agency has limited authority to mandate compliance with state statutes. Additionally, local zoning authorities also have jurisdiction over the enforcement of pertinent regulations.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.23. Airport Metric Evaluation – Clear Zone Ownership

Data Assessment	Clear Zone Ownership
Category	Administrative
Type	Measure
Description/Purpose	Clear zones are trapezoidal shapes beyond each runway end based on the runway approach. Land uses that may be hazardous to the operational safety of aircraft and may put life and property in undue danger should a safety incident occur are restricted within clear zones. As such, airport owners are encouraged to purchase clear zones in fee title. Airports that do not own adequate clear zones may be ineligible to receive state funding.
Anticipated Source(s)	Clear zones to be mapped as part of Task 4.6 - Clear Zone Policy and Ownership. Clear zones are also generally depicted on ALPs.
Data Update Cycle	Reviews conducted in accordance with master plan and ALP updates (10- to 15-year cycle based on airport classification)
Difficulty in Data Collection	Moderate - State grant assistance is available to purchase parcels of land designated as clear zones. In such cases, MnDOT Aeronautics would be aware of airports that purchase surrounding clear zones. Airport sponsors may purchase land designated as clear zones using local money. MnDOT Aeronautics would not be automatically notified of these purchases. As such, data collection requires some airport coordination.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT will use this data to evaluate airports' compliance with Policy Statement No. 1: Clear Area Requirements. Per MnDOT policy, airports that do have adequate ownership of clear zones may be ineligible to receive state grant assistance.
Ability to Influence Data	Moderate - State grant assistance is available to purchase clear zones. However, it is assumed that airports must provide a local match for land acquisition. As such, compliance with this standard is at the discretion of the local jurisdiction.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.24. Airport Metric Evaluation – Minimum Standards

Data Assessment	Minimum Standards
Category	Administrative
Type	Measure
Description/Purpose	Minimum standards document the requirements that must be met to supply adequate aeronautical services at an airport; provide a safe operating environment; and protect the public, airport facilities, users, and tenants.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	Biennial reviews are recommended
Difficulty in Data Collection	Moderate - Airport coordination is required
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT will use this data to evaluate the safety and security of airport environments. MnDOT could require airports to document and enforce minimum standards as a condition of state grant eligibility.
Ability to Influence Data	Moderate - MnDOT could require minimum standards as a condition of state grant eligibility. However, the ongoing enforcement of minimum standards may be difficult to track over time.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.25. Airport Metric Evaluation – Based Aircraft

Data Assessment	Based Aircraft
Type	Indicator
Description/Purpose	Based aircraft are those that are operational, airworthy, and based at an airport for the majority of the year. Based aircraft are reported by type (single-engine, multi-engine, jets, helicopters). This metric provides a mechanism for reporting airport usage.
Anticipated Source(s)	FAA's National Based Aircraft Inventory Program (Nonprimary NPIAS airports), MnSASP airport inventory (non-NPIAS and Primary airports), Airport Master Record
Data Update Cycle	Nonprimary NPIAS airports are required to update based airport counts via basedaircraft.com annually. Non-NPIAS and Primary airports report based aircraft counts during 5010 inspections (conducted annually for Part 139 airports and on a three-year cycle for non-NPIAS facilities).
Difficulty in Data Collection	Moderate - Because the FAA tracks based aircraft counts closely, obtaining this information for NPIAS facilities is straightforward. Obtaining accurate based aircraft counts at non-NPIAS facilities is not difficult; however, the accuracy of the data can be flawed.
Data Manipulation Plan	None
MnDOT Application of Data	Based aircraft are one primary indicator of aviation activity levels. As such, this data can be used to develop airport-specific and system-level activity forecasts and estimate current and potential aircraft storage needs.

Data Assessment	Based Aircraft
Ability to Influence Data	Low - Based aircraft are generally driven by market demands and other local factors that are difficult to influence.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.1 - Operations Counting and Forecasting Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.26. Airport Metric Evaluation – Airport Operations

Data Assessment	Airport Operations
Type	Indicator
Description/Purpose	The number of airport operations (takeoffs or landings) helps to measure airport activity and related trends. For all classifications, the number of annual operations is measured.
Anticipated Source(s)	The FAA's Air Traffic Activity Data System (ATADS) provides operations data for towered airports. Operations data for non-towered airports is difficult to measure and involves obtaining data during the MnSASP inventory process and from the FAA's Traffic Flow Management System Counts (TFMSC). ADS-B data are evaluated as available through data collection platforms installed by third-party vendors.
Data Update Cycle	Data are updated annually
Difficulty in Data Collection	Moderate - As noted previously, data from towered airports is easily obtainable and accurate. Operations at non-towered airports can be obtained, but the accuracy of that data can be questionable. Recently enacted ADS-B requirements may modernize the system and dramatically improve operations counts at non-towered facilities.
Data Manipulation Plan	None
MnDOT Application of Data	Operation counts are a primary indicator of aviation activity levels. As such, these data are used to develop airport-specific and system-level activity forecasts.
Ability to Influence Data	Low - Operations are driven by many factors both inherent to an airport and external to it.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.1 - Operations Counting and Forecasting Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.27. Airport Metric Evaluation – Available Services

Data Assessment	Available Services
Type	Indicator
Description/Purpose	Various airport services (e.g., FBO, ground transportation, fuel, maintenance, underwing camping) are offered throughout the Minnesota airport system. These should be identified at each airport.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	Biennial updates are recommended

Data Assessment	Available Services
Difficulty in Data Collection	Moderate - While some services are recorded during FAA 5010 inspections, this data point generally requires coordination directly with airports.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to ensure the Minnesota aviation system meets the needs of all aviation users and to identify gaps or surpluses within specific regions or statewide.
Ability to Influence Data	Low - Available airport services are generally market-driven, providing MnDOT little opportunity to improve performance.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.28. Airport Metric Evaluation – Certified Pilots Within 30 Miles of an Airport

Data Assessment	Certified Pilots within 30 miles of an Airport
Type	Indicator
Description/Purpose	The total number of certified pilots within a certain distance of an airport is one indicator of the potential demand for a local airport. Airports in close proximity to large concentrations of pilots have a higher likelihood of experiencing higher demand levels.
Anticipated Source(s)	FAA Civil Airmen Statistics (https://www.faa.gov/licenses_certificates/airmen_certification/releasable_airmen_download/)
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Low - Data on file with the FAA.
Data Manipulation Plan	None
MnDOT Application of Data	This indicator can help MnDOT understand the type and level of demands placed on individual airport facilities.
Ability to Influence Data	Low - Pilot locations are driven by many factors external to the aviation industry. As such, MnDOT has little opportunity to influence this data point.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

2.3.3. SYSTEM METRICS

System metrics are used to evaluate the performance of Minnesota's airports at the systemwide level. Like airport metrics, system metrics comprise system measures and system indicators. MnDOT Aeronautics and airports can directly impact measures through investment, policy, or other actionable items. System measures comprise various safety, planning, and service-related items indicative of the performance of the statewide system. During Phase I, MnDOT Aeronautics established classification-specific targets for each measure, with systemwide targets indicating the composite performance of all classifications.

Table 2.29 provides the eight system measures identified during Phase I. Classification-specific targets were established for six of those measures during Phase I; two targets were developed during subsequent analyses of Phase II (adequate wind coverage and adequate arrival/departure building). Table 2.30 through Table 2.37 present each of the eight system measures identified during Phase I of the MnSASP, including an overview of the measure as well as the plan for the collection, manipulation, and application of each data point during Phase II.[9] Additional details regarding how MnDOT Aeronautics can use the data to improve system performance in the future are also provided.

System indicators cannot be directly controlled and are generally driven by market demand, local and regional socioeconomic conditions, consumer choice, and other factors. Tracking indicators can help MnDOT Aeronautics and other policymakers identify trends affecting aviation demand over time. Table 2.38 through Table 2.44 provide the Phase II plan to collect and apply the data for the six system indicators identified during Phase I and carried forwarded into Phase II. These indicators are a significant departure from those collected during the previous 2012 MnSASP, with numerous deletions and additions. Phase I stakeholders indicated that the 2022 MnSASP should focus on the most meaningful, straightforward, and easily understandable data points for continuous monitoring over time.

[9] *Actual data collection methodology is presented in **Chapter 6. Continuous Planning**.*

Table 2.29. System Measure Targets by Classification

Data Point	Key Commercial Service Targets	Key General Aviation Targets	Intermediate Large Targets	Intermediate Small Targets	Landing Strip Turf Targets
Adequate Approaches to Airports	Precision instrument approach to at least one runway end	Precision instrument approach to at least one runway end	Precision instrument approach to at least one runway end	Precision instrument approach to at least one runway end	Visual approaches
PCI	Eighty-five percent of primary runway pavements (weighted by area) are in "very good" or "excellent" condition (PCI of 70 or greater)	Eighty-five percent of primary runway pavements (weighted by area) are in "very good" or "excellent" condition (PCI of 70 or greater)	Eighty-four percent of all runway and parallel taxiway pavements (weighted by area) are in at least "good" condition (PCI of 55 or greater), and no more than four percent of all runway and parallel taxiway pavements (weighted by area) are in "poor" condition (PCI of 40 or less)	Eighty-four percent of all runway and parallel taxiway pavements (weighted by area) are in at least "good" condition (PCI of 55 or greater), and no more than four percent of all runway and parallel taxiway pavements (weighted by area) are in "poor" condition (PCI of 40 or less)	NA
Airport Surfaces Clear of Obstructions	No obstructions to protected airspace	No obstructions to protected airspace	No obstructions to protected airspace	No obstructions to protected airspace	No obstructions to protected airspace
Adequate Navigational Systems	Approach lights, REILs, VGSI, beacon, and wind cone	Approach lights, REILs, VGSI, beacon, and wind cone	VGSI, beacon, and wind cone	VGSI, beacon, and wind cone	Beacon (if a runway is lit) and wind cone
Adequate Safety Zoning Ordinances	100 percent of airports should have an adequate airport zoning ordinance adopted by JAZB or equivalent authority	100 percent of airports should have an adequate airport zoning ordinance adopted by JAZB or equivalent authority	100 percent of airports should have an adequate airport zoning ordinance adopted by JAZB or equivalent authority	100 percent of airports should have an adequate airport zoning ordinance adopted by JAZB or equivalent authority	100 percent of airports should have an adequate airport zoning ordinance adopted by JAZB or equivalent authority
Up-to-date Planning Documents	ALP and MP updated or revisited at least every 10 years	ALP and MP updated or revisited at least every 10 years	ALP and master plan updated or revisited at least every 15 years	ALP and master plan updated or revisited at least every 15 years	ALP

Data Point	Key Commercial Service Targets	Key General Aviation Targets	Intermediate Large Targets	Intermediate Small Targets	Landing Strip Turf Targets
Adequate Wind Coverage	100 percent of airports should have 95 percent wind coverage based on their primary runway configuration.[10]	100 percent of airports should have 95 percent wind coverage based on their primary runway configuration.[11]	100 percent of airports should have 95 percent wind coverage based on their primary runway configuration.[12]	100 percent of airports should have 95 percent wind coverage based on their primary runway configuration.[13]	100 percent of airports should have 95 percent wind coverage based on their primary runway configuration.[14]
Adequate Arrival/Departure Terminal Building	GA terminal with phone and restroom	GA terminal with phone and restroom	GA terminal with phone and restroom	GA terminal with phone and restroom	Required: Phone and restroom Recommended: GA terminal with phone and restroom

Source: MnSASP Phase I, 2019

[10] *Airports that do not have at least 95 percent wind coverage based on the airports predominant use period should conduct a more detailed wind coverage analysis as discussed in the Crosswind Runway Guidance Statement. Less than 95 percent coverage does not indicate that MnDOT is responsible for funding improvements at that facility.*
[11] *Ibid.*
[12] *Ibid.*
[13] *Ibid.*
[14] *Ibid.*

Table 2.30. System Metric Evaluation – Adequate Approaches to Airports

Data Assessment	Adequate Approaches to Airports
Type	Measure
Description/Purpose	Percent of system airports with adequate approaches appropriate for their classification.
Anticipated Source(s)	FAA Terminal Procedures Publication
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Low - Approach procedures are developed by the FAA following a comprehensive multi-step process. Once established, obtaining information about existing approaches is straightforward and publicly available.
Data Manipulation Plan	None
MnDOT Application of Data	Measuring the percent of system airports with adequate approaches helps MnDOT gauge the overall safety of the system and improve airport accessibility across the state.
Ability to Influence Data	Low - The FAA's Aeronautical Information Service is responsible for developing and maintaining all public instrument approach procedures and airways.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.31. System Metric Evaluation – PCI

Data Assessment	PCI
Type	Measure
Description/Purpose	Percent of system airports with PCI scores at or above classification-specific targets by pavement area. Pavement condition is evaluated on a PCI scale from zero to 100, with zero indicating complete failure and 100 indicating perfect condition. Maintaining pavement within established thresholds extends pavement's useful life and mitigates costly rehabilitation and reconstruction projects. Additionally, keeping pavement in good condition increases airport safety and efficiency. The PCI rating scales identified by MnDOT's Airport Pavement Management System (APMS), and thus to be applied by the MnSASP, are as follows: - ≥ 85 ≤ 100 = Excellent - ≥ 70 < 85 = Very Good - ≥ 55 < 70 = Good - ≥ 40 < 55 = Fair - ≥ 25 < 40 = Poor - ≥ 10 < 25 = Very Poor - ≥ 0 < 10 = Failed
Anticipated Source(s)	MnDOT Aeronautics PCI Reports. Coordinate with Applied Research Associates (ARA) to obtain CAD/GIS data
Data Update Cycle	Annually for a third of the airports each cycle

Data Assessment	PCI
Difficulty in Data Collection	Low - PDF reports are publicly available on the MnDOT website. Note pavement inspections are required to collect PCI data. Data are housed in a software package called MicroPAVER; the software also includes information about pavement maintenance, rehabilitation, and reconstruction needs.
Data Manipulation Plan	Pavement distress is translated into a PCI score, with a score of 100 indicating perfect condition and a score of 0 indicating complete failure.
MnDOT Application of Data	PCI data are used to prioritize pavement rehabilitation projects in accordance with MnDOT's APMS.
Ability to Influence Data	High - Regular pavement maintenance and addressing issues early significantly extends the useful life of aviation pavement. As such, MnDOT Aeronautics' ongoing investment into aviation pavement is of critical importance improving this measure.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.32. System Metric Evaluation – Airport Surfaces Clear of Obstructions

Data Assessment	Airport Surfaces Clear of Obstructions
Type	Measure
Description/Purpose	Percent of system airports with approach surfaces clear of obstructions.
Anticipated Source(s)	FAA 5010 Master Record
Data Update Cycle	FAA 5010 inspection cycle
Difficulty in Data Collection	Low - PDF reports are publicly available on FAA site. However, validating data can be challenging. While close-in obstructions are recorded during FAA 5010 inspections, obstructions such as overgrown vegetation can arise quickly. The FAA records human-made obstructions in its Digital Obstacle File; however, many obstacles are naturally occurring. As such, maintaining a current obstacle database at the statewide level can be difficult.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to identify airport-specific safety hazards. This information can be used to develop airport-specific obstacle removal/mitigation plans, as well as system-wide performance assessments.
Ability to Influence Data	Moderate - MnDOT can develop airport-specific obstacle removal/mitigation plans to enhance aviation safety statewide. However, the development of such plans can be costly, and their implementation depends on cooperation and coordination with local airport sponsors.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.33. System Metric Evaluation – Adequate Navigational Systems

Data Assessment	Adequate Navigational Systems
Type	Measure
Description/Purpose	Percent of system airports with adequate navigational systems and aids.
Anticipated Source(s)	FAA 5010 Master Record
Data Update Cycle	FAA 5010 inspection cycle
Difficulty in Data Collection	Low - PDF reports publicly available on FAA website
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT Aeronautics can use this data to evaluate airport facilities versus required/recommended targets to support informed project funding prioritization
Ability to Influence Data	High - MnDOT can prioritize funding for NAVAIDs.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan Task 12 - Advise on Navigational Systems Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.34. System Metric Evaluation – Adequate Safety Zoning Ordinances

Data Assessment	Adequate Safety Zoning Ordinances
Type	Measure
Description/Purpose	Percent of system airports with an adequate Airport Zoning Ordinance.
Anticipated Source(s)	MnDOT Aeronautics
Data Update Cycle	Annual updates are recommended, or whenever an ALP is approved or a zoning ordinance is adopted, whichever comes first.
Difficulty in Data Collection	High - Local zoning ordinances can be difficult to understand, zoning can be updated without the input or knowledge of the local airport, and enforcement is the responsibility of the local planning authority.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use the data obtained in this analysis to evaluate compliance with existing policies and inform the development of recommended changes or enhancements to existing policies.
Ability to Influence Data	Low - While MnDOT has a role in educating local land use planners about their responsibilities associated with airport compatible development, the agency has limited authority to mandate compliance with state statutes. Additionally, local zoning authorities also have jurisdiction over the enforcement of pertinent regulations.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.6 - Clear Zone Policy and Ownership

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.35. System Metric Evaluation – Up-to-Date Planning Documents

Data Assessment	Up-to-Date Planning Documents
Type	Measure
Description/Purpose	Percent of system airports with up-to-date planning documents.
Anticipated Source(s)	MnSASP airport inventory, review of existing planning documents on file with MnDOT
Data Update Cycle	Annual review of ALP/master plan study years is recommended (i.e., annually review study years to identify airports that need to update their planning documents)
Difficulty in Data Collection	Moderate - Airport coordination is required to ensure MnDOT has a copy of the most recent airport planning document. ALP revisions may not always be distributed to MnDOT, so regular communication and annual data requests may be required.
Data Manipulation Plan	None
MnDOT Application of Data	Master plans and ALPs provide detailed, airport-specific information regarding current and future aviation demands, as well as planned airport improvement projects. Reviewing copies of current planning documents can help MnDOT identify and plan for long-term needs at Minnesota airports. ALPs also depict airport clear zones.
Ability to Influence Data	High - MnDOT can prioritize funding for ALP or master plan updates, as well as tie grant funding to a proposed project being depicted on a current (within the past 10 or 15 years) ALP.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan Task 4.6 - Clear Zone Policy and Ownership

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.36. System Metric Evaluation – Adequate Wind Coverage

Data Assessment	Adequate Wind Coverage
Type	Measure
Description/Purpose	Percent of system airports that have adequate wind coverage.
Anticipated Source(s)	Iowa State University Iowa Environmental Mesonet (IAM)
Data Update Cycle	Wind coverage should be evaluated as airports request state funding for new or maintenance of existing crosswind runways. Additionally, this data could be updated as airports conduct wind analyzes are part of ALP updates/development.
Difficulty in Data Collection	High - While obtaining wind data itself is not difficult, analyzes the percent wind coverage provided by the primary runway requires specialized technical skills. While the MnSASP conducted a statewide analysis based on IAM data, airports can also use the FAA's Wind Analysis Tools available at https://adip.faa.gov/agis/public/#/windAnalysisTools to calculate wind coverage at specific facilities.

Data Assessment	Adequate Wind Coverage
Data Manipulation Plan	The raw wind data obtained from IAM is compiled to determine the percent wind coverage provided by the primary runway by month for a ten-year period. The processes utilized by the MnSASP is summarized in the Task 4.5 deliverables (e.g., Crosswind Model Update Guide and Crosswind Guidance Statement).
MnDOT Application of Data	MnDOT can use the wind coverage to prioritize state investment into the development of new or maintenance of existing crosswind runways.
Ability to Influence Data	Moderate - MnDOT can influence the wind coverage provided by all airports by highly prioritizing state investment into crosswind runways. However, fully supporting crosswind runways would require significant investment. This is particularly true because federal funding via the AIP can rarely be used to support crosswind runway development/maintenance. As such, most crosswind runway projects are only eligible for state and local funding.
Proceed into Phase II	Include
Phase II Application of Data	Task 4.5 - Crosswind Runway Analysis Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.37. System Metric Evaluation – Adequate Arrival/Departure Terminal Building

Data Assessment	Adequate Arrival/Departure Terminal Building
Type	Measure
Description/Purpose	Percent of system airports with an arrival/departure or terminal building in adequate condition.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	To be determined during Phase II
Difficulty in Data Collection	Low - Because state grant money would likely be involved in a terminal enhancement, data would be readily available to conduct this analysis.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to ensure the needs of all aviation users are met across the state. This data can also be used to determine if there is a significant gap in certain regions or at specific types of airports so projects can be prioritized and funded most effectively.
Ability to Influence Data	Moderate - While state grant money would likely be involved in this type of airport improvement, significant local investment would still be required. Hence, a terminal improvement project would be primarily driven by community support and tied to an airport's capital improvement plan (CIP).
Proceed into Phase II	Included
Phase II Application of Data	Task 8 - MnSASP Hub Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.38. System Metric Evaluation – Emergency Medical Response

Data Assessment	Emergency Medical Response
Type	Indicator
Description/Purpose	Medical flights transport patients in emergency and non-emergency situations and healthcare professionals to rural areas without specialized services. Providing a network of airports to connect medical professionals with patients is one of the most important functions an aviation system can provide. Medical flights can be provided by fixed-wing aircraft or rotorcraft. In most cases, fixed-wing air medical operations require the following criteria: - Primary runway length of approximately ≥ 4,000 feet - Jet A fuel service provided 24 hours/7 days a week (24/7) - At least non-precision instrument (NPI) approach capability - Weather reporting - De-icing services - Available heated conventional transient aircraft storage Rotorcraft require fewer specific conditions to operate but are able to travel shorter distances and require more fuel to fly compared to fixed-wing aircraft.
Anticipated Source(s)	MnSASP airport inventory
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Low – While airport manager coordination is required, the frequency and type of medical air flights supported by an airport is easily assessed.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT could use the results of this evaluation to identify specific geographic regions of the state that do not support air medical flights. This could indicate a deficiency associated with one of the criteria listed above. A similar evaluation could be used to prioritize funding requests for one or more of these facilities/services.
Ability to Influence Data	Medium – While MnDOT Aeronautics can fund the facilities and services noted above, air medical providers ultimately decide where to operate. Also, operational frequency and type are driven by emergency/non-emergency situations requiring medical air transportation and the type/number of healthcare professionals traveling into a community to provide care.
Proceed into Phase II	Modify – Phase I recommended the following two questions be evaluated during Phase II: - Ability of the existing weather reporting system to adequately serve the aeromedical needs of the state - Average response time for aeromedical service by region Approximating answers to these questions would require extensive outreach to state hospitals, air medical flyers, and other stakeholders beyond the data collection efforts of the 2022 MnSASP. As such, Phase II identifies the airports that currently support air medical transportation by type and frequency.
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.39. System Metric Evaluation – Aviation-related Accidents

Data Assessment	Aviation-Related Accidents
Type	Indicator
Description/Purpose	Total number of annual aviation-related accidents in Minnesota.
Anticipated Source(s)	National Transportation Safety Board (NTSB) Aviation Accident Database (https://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx)
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Low - NTSB database is publicly available and allows for filtering by state
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use the results of this evaluation to identify common accident regions and develop strategies to reduce risks associated with the most common threats to aviation safety.
Ability to Influence Data	Low - Aviation-related accidents are caused by a variety of factors outside of MnDOT control including pilot skill and aircraft performance.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.40. System Metric Evaluation – Aviation Fatalities

Data Assessment	Aviation Fatalities
Type	Indicator
Description/Purpose	Total number of annual aviation-related fatalities in Minnesota.
Anticipated Source(s)	NTSB Aviation Accident Database (https://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx)
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Low - NTSB database is publicly available and allows for filtering by state
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use the results of this evaluation to identify common accident regions and develop strategies to reduce risks associated with the most common threats to aviation safety.
Ability to Influence Data	Low - Aviation fatalities are caused by a variety of factors outside of MnDOT control including pilot skill and aircraft performance.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.41. System Metric Evaluation – Runway Incursions

Data Assessment	Runway Incursions
Type	Indicator
Description/Purpose	Total number of reported runway incursions at towered airports in Minnesota. Categories to be used include: - Category A: Serious incident in which collision was narrowly avoided - Category B: Incident in which separation decreases and there is a significant potential for collision - Category C: Incident characterized by ample time and/or distance to avoid a collision - Category D: Incident such as the incorrect presence of a single vehicle/person/aircraft in the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences
Anticipated Source(s)	FAA Aviation Safety Information Analysis and Sharing (ASIAS) (https://www.asias.faa.gov/apex/f?p=100:1:::::)
Data Update Cycle	Annual updates are recommended
Difficulty in Data Collection	Moderate - The ASIAS database relies on a narrative search to filter for runway incursions.
Data Manipulation Plan	None
MnDOT Application of Data	MnDOT can use this data to identify airports that are at particularly high risk for runway incursions. Runway/taxiway improvements can be implemented to mitigate runway "hotspots" before a serious safety issue arises.
Ability to Influence Data	Moderate - The FAA's Runway Incursion Mitigation (RIM) program is designed to identify high-risk airport locations and implement mitigation techniques to reduce risks at these facilities. MnDOT can partner with the FAA to implement RIM projects should areas of concern be identified. MnDOT can also prioritize funding to address major issues.
Proceed into Phase II	Include
Phase II Application of Data	Task 10.1 - Investment Plan

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.42. System Metric Evaluation – Economic Impact

Data Assessment	Economic Impact
Type	Indicator
Description/Purpose	Contribution of on-airport activities and visitor spending to local, regional, and statewide economies in terms of annual employment, payroll, spending, and economic activity.
Anticipated Source(s)	2019 Minnesota Statewide Airport Economic Impact Study
Data Update Cycle	Economic impact studies should be conducted every five to seven years
Difficulty in Data Collection	High - Calculating economic impact involves comprehensive data collection and modeling processes to estimate the economic contributions of on-airport activities and visitor spending in terms of direct, indirect, and induced impacts.

Data Assessment	Economic Impact
Data Manipulation Plan	Data are manipulated using an input/output model such as IMPLAN to calculate how on-airport activities and visitor spending continue to generate impacts within the state through supplier sales (indirect impacts) and the re-spending of worker income (induced impacts). Data manipulation is also required to translate impacts into measures of economic activity (i.e., employment, payroll, spending, and economic activity).
MnDOT Application of Data	Airport economic impact studies help demonstrate the value of airports to elected officials, policymakers, and members of the public, which can translate into additional investment into or support for airports in the state.
Ability to Influence Data	Low/Moderate - Economic impacts are generated by on-airport employment, capital improvement spending, and the spending of non-local visitors who arrive in Minnesota by air transportation. MnDOT Aeronautics and airports have some ability to create business-friendly airport environments to potentially increase tenant activities; increase funding for capital improvement spending; and work with local tourism and commerce organizations to enhance out-of-state/international visitation. These steps can be time-consuming and require the involvement of numerous business and community partners.
Proceed into Phase II	Include - Incorporate the results of the 2019 Minnesota Statewide Airport Economic Impact Study
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.43. System Metric Evaluation – Population Access to an Airline Service Airport

Data Assessment	Population Access to an Airline Service Airport
Type	Indicator
Description/Purpose	Percent of the population within 60-minutes surface travel time to a Key Commercial Service Airport with scheduled airline service.
Anticipated Source(s)	Drive-time analysis using U.S. Census Bureau data and ArcGIS
Data Update Cycle	Updates to be conducted in conjunction with U.S. Census cycles
Difficulty in Data Collection	Low - Drive-time maps are a common planning tool that can be developed by internal GIS staff or a third-party consultant
Data Manipulation Plan	Yes - Population data to be mapped against airport locations
MnDOT Application of Data	Drive-time analyses indicate the airport system's overall accessibility. They can reveal areas of the state without adequate access to scheduled commercial service and/or identify airports with overlapping catchment areas.
Ability to Influence Data	Low - The availability of scheduled commercial service is largely a factor of market demand. Demand is driven by population, socioeconomic factors, and other variables outside of MnDOT's control.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

Table 2.44. System Metric Evaluation – Fuel Availability at Airports

Data Assessment	Fuel Availability at Airports
Type	Indicator
Description/Purpose	Percent of airports within 50 nautical miles (nm) of another airport with Jet A fueling available 24 hours a day, 7 days a week (24/7) and 30 nm of another airport with 100 low lead (LL) fuel available 24/7.
Anticipated Source(s)	ArcGIS analyses using FAA 5010 data
Data Update Cycle	FAA 5010 inspection cycle
Difficulty in Data Collection	Low - This analysis can be conducted by internal GIS staff or by a third-party consultant.
Data Manipulation Plan	Yes - Fuel availability data to be mapped against airport locations.
MnDOT Application of Data	This analysis can be used to ensure adequate access to 24/7 fuel. Convenient access to fuel allows pilots to plan more direct routes, carry less fuel, and reduce the risk of running out of fuel. It can also promote safety and security, as aircraft used for emergency services need to be able to obtain fuel at all hours.
Ability to Influence Data	Low - Because fuel farms are a revenue-producing project, they rarely receive FAA support. As such, some airports may not have adequate local funds to support this improvement. Fuel farms can be installed by FBOs, but this would be market-driven and difficult for MnDOT to influence.
Proceed into Phase II	Include
Phase II Application of Data	Task 8 - MnSASP Hub

Sources: MnSASP Phase I, 2019; Kimley-Horn, 2020

2.4. Environmental Justice Methodology and Plan

According to the U.S. EPA, "environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[15] This concept is an important consideration of any planning project conducted by a public agency and is federally mandated when federal dollars are involved in most cases. As such, MnDOT is working to incorporate EJ throughout the agency's transportation planning processes, including the airport planning work occurring throughout Minnesota's airport system. This section describes MnDOT's existing EJ policies and the steps that MnDOT Aeronautics has taken to apply those policies. Section 2.4.4 provides specific recommendations for improved implementation at the statewide and airport-specific levels.

The following subsections summarize the background of EJ, provide an overview of MnDOT's EJ policies, and outline MnDOT Aeronautics' EJ analysis tool. With this foundation, the MnSASP Phase II provides recommendations on what the EJ plan means for airports and how it can be utilized toward the MnSASP.[16]

2.4.1. FEDERAL REQUIREMENTS

Several federal legal precedents mandate the consideration of EJ during the planning, design, and implementation of federally funded projects. The Civil Rights Act of 1964 addresses civil rights and labor laws by outlawing discrimination based on race, color, religion, sex, or national origin. Title VI was enacted as part of this landmark act to mandate the end of discrimination within federally assisted programs. Executive Order 12898 (E.O. 12898) issued in 1994 builds off Title VI by requiring federal agencies to avoid disproportionately impacting the environment and health of low income, racial minority, and other historically underserved populations. It also directs each federal agency to develop a strategy for implementing EJ to include a plan for enhancing the participation of and communication with groups historically omitted from decision-making processes. In response to this directive, the U.S. Department of Transportation (USDOT) issued the Final Environmental Justice Order, DOT Order 5610.2. The order lays out how EJ principles must be applied during the planning and programming of all federally funded transportation projects. Additionally, consideration of EJ is required by the National Environmental Policy Act (NEPA) of 1969 and the Clean Air Act of 1970.[17]

These federal precedents serve as the basis for why agencies must incorporate EJ considerations into any actions receiving federal funds. Chapter 10 of the FAA's 2007 *Environmental Desk Reference for Airport*

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[15] EPA (November 2020). "Environmental Justice." Available online at https://www.epa.gov/environmentaljustice (accessed November 2020).

[16] Note the information presented regarding EJ background information and MnDOT's existing policies is generally based on MnDOT Aeronautics' "Environmental Justice Analysis" (2019) whitepaper. This internal document outlines federal and state EJ policies affecting transportation development in Minnesota and presents the methodology of MnDOT Aeronautics' EJ analysis tool. Recommendations were developed in Phase II of the MnSASP in consultation with MnDOT Aeronautics.

[17] EPA (October 2020). Environmental Justice and National Environmental Policy Act. Available online at https://www.epa.gov/environmentaljustice/environmental-justice-and-national-environmental-policy-act (accessed November 2020).

Actions (Desk Reference) provides guidance on how EJ should be applied to airport development.[18] This synopsis defines the different vulnerable populations cited in the USDOT Order 5610.2 (i.e., low income and minority groups) and describes the potential applicability of EJ during airport development projects (e.g., airfield/landside expansions, movement area extensions, establishment of navigational aids off property, etc.).

In addition, the Desk Reference underlines the importance of tailored public outreach efforts to ensure vulnerable populations have an opportunity and platform to communicate any concerns regarding development efforts. This may include specifically reaching out to community leaders, conducting public involvement events in non-traditional locations or at multiple times, and providing information in multiple languages if non-English speaking populations are present.

2.4.2. MNDOT INTEGRATION

MnDOT projects funded by federal dollars (in whole or part) are required to conform with EJ principles mandated at the federal level, and the agency "supports environmental justice through every stage of its planning, construction and maintenance processes."[19] Airport projects receiving funds from FAA or other federal agencies "must take into consideration EJ impacts to surrounding populations regarding airport noise, airport construction, or other adverse human health and environmental effects."[20] In addition to the requirements outlined at the federal level, MnDOT has adopted its own policies and plans to consider EJ in its day-to-day operations and long-range plans to advance equity in Minnesota.[21] MnDOT emphasizes three fundamental principles of EJ:[22]

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations

MnDOT's Title VI policy also adds protected classes beyond the federal requirements by prohibiting discrimination on the basis of sex, age, disability, and income status. MnDOT is dedicated to ensuring that its programs offer access to Limited English Proficiency (LEP) populations and individuals. These principles are summarized in MnDOT's Title VI Program Policy:[23]

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[18] FAA (2007). "Environmental Desk Reference for Airport Actions." Available online at https://www.faa.gov/airports/environmental/environmental_desk_ref/ (accessed November 2020).

[19] MnDOT (2020). "Environmental Justice at MnDOT." Available online at http://www.dot.state.mn.us/environmentaljustice/ (accessed November 2020).

[20] FAA (March 2017). "Environmental Justice (EJ)." Available online at https://www.faa.gov/about/office_org/headquarters_offices/acr/com_civ_support/envir_justice/ (accessed November 2020).

[21] MnDOT (2019). "Environmental Justice Analysis." (internal whitepaper).

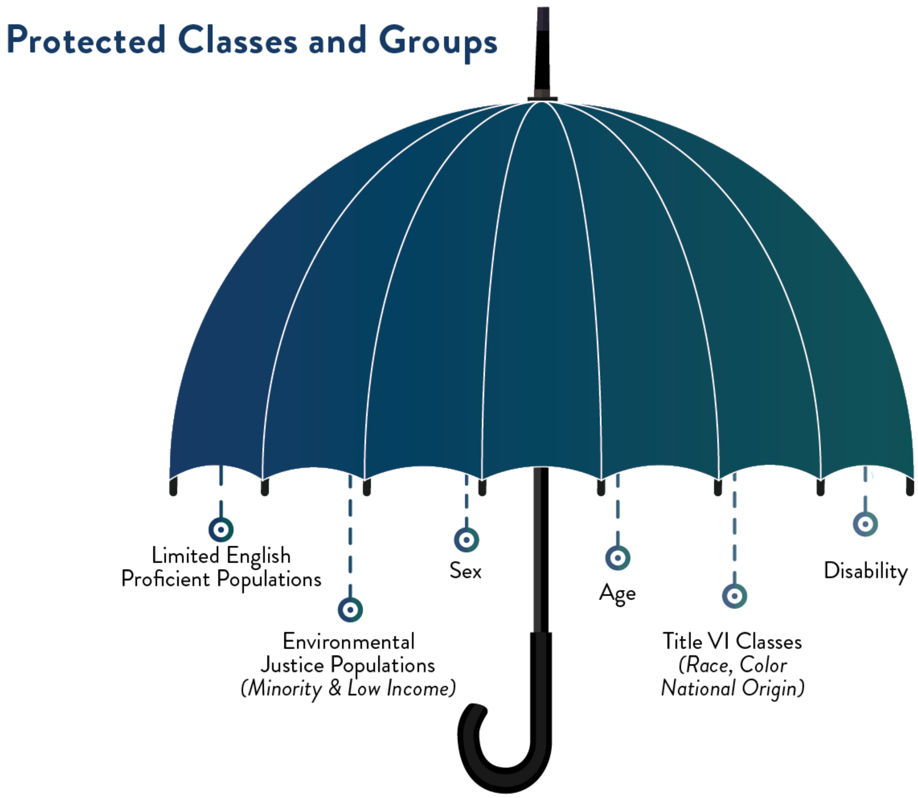
[22] MnDOT (2020). "Environmental Justice at MnDOT."

[23] MnDOT (2020). "Title VI Program: LEP." Available online at https://www.dot.state.mn.us/civilrights/limited-english-proficiency.html.

MnDOT is committed to ensuring that no person in the State of Minnesota, on the basis of race, color, national origin, sex, age, disability, or income status, is excluded from participation in, denied the benefits of, or otherwise is subjected to discrimination under any and all programs, services, or activities administered by the department, its recipients, subrecipients, and contractors. Additionally, MnDOT is committed to ensuring that its programs incorporate access for people with LEP.

Figure 2.5 visually depicts all protected classes under the Title VI Program.

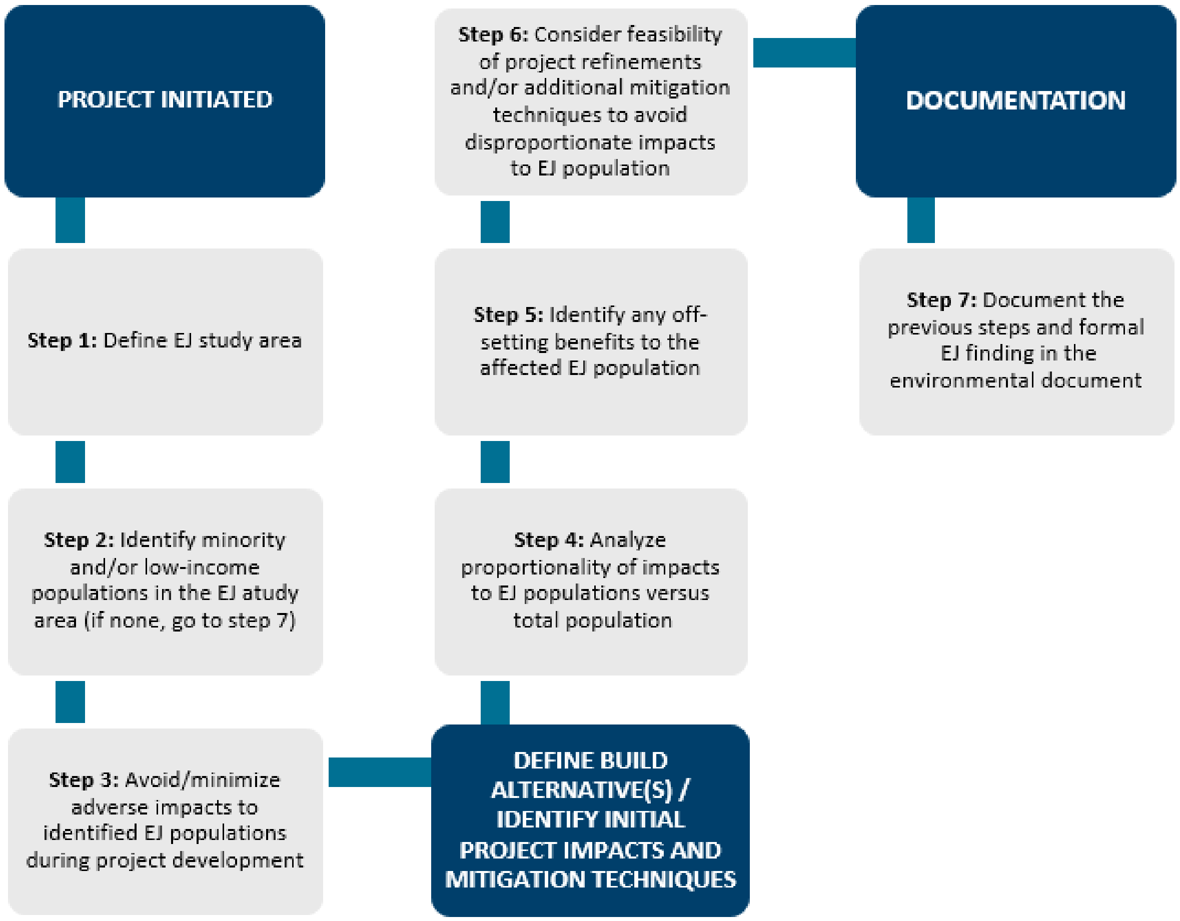
Figure 2.5. MnDOT's Title VI Protected Classes and Groups



Source: MnDOT, 2020

To clearly articulate how EJ should be incorporated into transportation programming within the state, MnDOT developed a formalized seven-step procedure. This model was first designed for the Highway Project Development Process (HPDP) and has since been adapted for implementation by other modes, including aviation. Figure 2.6 summarizes the seven steps of MnDOT's EJ Determination Process.

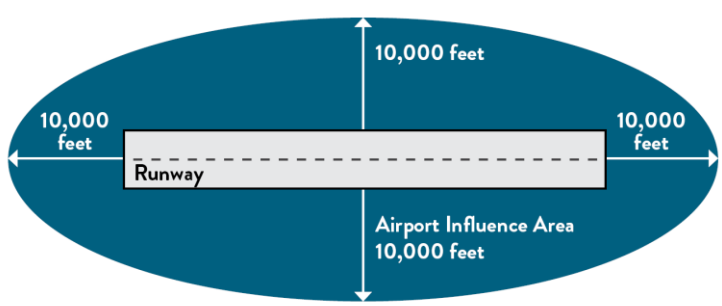
Figure 2.6. MnDOT EJ Determination Process Summary



Source: MnDOT, 2017

At this time, MnDOT Aeronautics has implemented steps one and two MnDOT's EJ Determination Process by developing an EJ analysis tool that measures the social vulnerability of EJ populations in the vicinity of Minnesota's airports. As the first step of the Determination Process, MnDOT Aeronautics has defined the EJ study areas as airport influence areas (AIAs), which comprise 2.3 percent of the state's land area. Extending out 10,000 feet from edge of each airport runway, these areas are most likely to be impacted by airport activities in terms of safety and noise (see Figure 2.7).

Figure 2.7. Airport Influence Area



Source: Kimley-Horn, 2020

To identify potentially vulnerable populations within airport influence areas, MnDOT Aeronautics developed a statewide EJ analysis tool. This tool conducts a systematic and replicable analysis utilizing U.S. Census Bureau demographics to develop a social vulnerability index (SoVI) within each individual airport influence area. This methodology identifies communities that exhibit a combination of social conditions that can lead to disproportionate risks and challenges to their safety and wellbeing. The impacts of these social conditions are indicated by specific demographics that are often associated with vulnerability, including racial minorities and low-income households. MnDOT Aeronautics' statewide EJ analysis tool measures the social vulnerability of populations living within airport influence areas by aggregating and assigning a composite index score to this demographic data. The following subsection provides additional details about the EJ analysis tool and methodology, which align with steps one and two of MnDOT's EJ Determination Process.

2.4.3. EJ ANALYSIS TOOL METHODOLOGY AND RESULTS

The starting point for the EJ analysis tool is identifying populations in Minnesota that are potentially vulnerable to disproportionate impacts due to EJ-related concerns. For instance, families that do not own a car could face particularly acute risks should the need to evacuate arise during a disaster.[24] Lacking an automobile could also pose a barrier to providing project input, as it could be challenging to attend public outreach meetings. Being able to speak and understand English with less than native fluency could similarly inhibit opportunities for public participation in terms of being notified of meetings and to meaningfully participate. MnDOT Aeronautics' EJ analysis tool identifies 14 different populations that are deemed socially vulnerable in Minnesota, categorized within eight demographic types:

- Income
  - Households in poverty
  - Average per capita income
- Racial Minorities
  - Nonwhite
  - Black
  - Native
  - Asian
  - Hispanic (all races)
- Age
  - Individuals younger than five
  - Individuals older than 64
- Education
  - Individuals over the age of 25 without a high school diploma
- Transportation access

[24] *MnDOT Aeronautics (2019). Environmental Justice Analysis (accessed November 2020).*

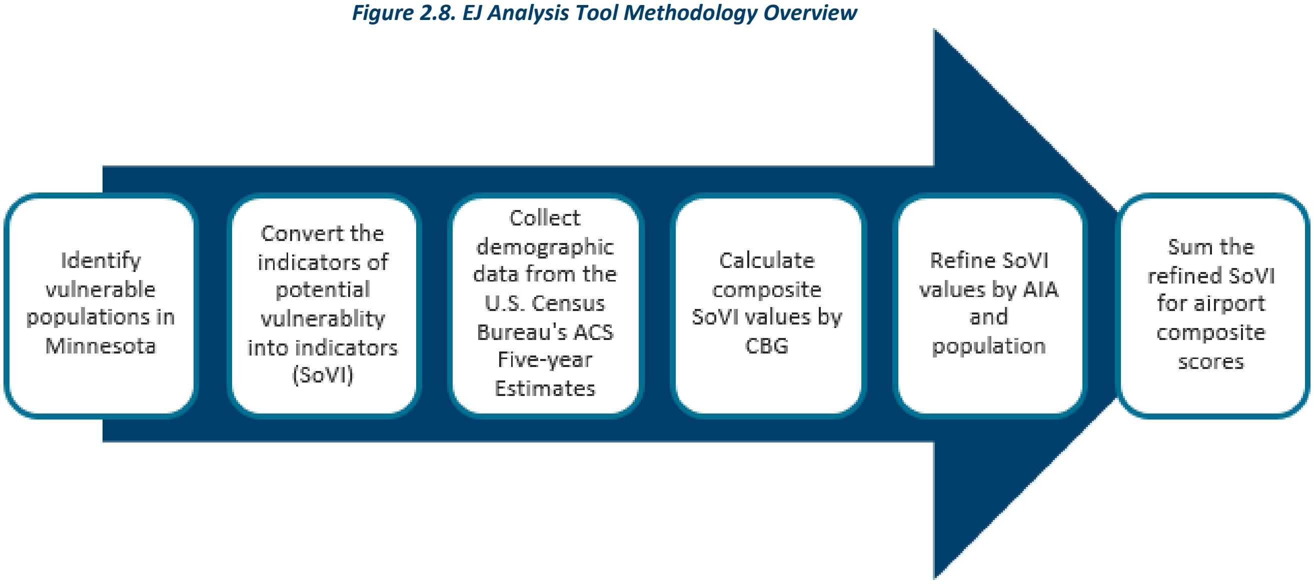
  - Households without access to a vehicle
- Nativity
  - Households with English as a second language (ESL)
- Family Structure
  - Single-parent families
- Disability
  - Households with at least one disabled member

The EJ analysis tool translated these indicators of potentially vulnerable populations into measurable indices. To accomplish this, nearly all concepts were converted into percentages (e.g., percent of households in poverty, percent of individuals older than 64, etc.) except for average per capita income.

Demographic data was collected from the U.S. Census Bureau via the American Community Survey (ACS) 5-Year Estimates data profile. At the time the analysis was conducted (2019), the most recent release of this profile was in 2017 (2013 - 2017 data years). To conduct a granular analysis, Census Block Groups (CBGs) were evaluated, as opposed to examining demographics within census tracts, urban areas, zip codes, counties, etc. CBGs are the smallest geographic unit published at the aggregate level by the U.S. Census Bureau. CBGs do not cross state, county, or city limits boundaries, although they do cross boundaries of Tribal holdings.

Once this data was collected for each CBG in Minnesota, the indicator data was translated into distinct index scores. A reductionist technique in GIS called the Jenks natural break algorithm was used to score each demographic indicator by CBG. Scores were then summed to develop a composite index for each CBG ranging from 0-44; this composite score is the SoVI value by CBG. Using GIS, the SoVI was then plotted within the portion of CBGs that fall within Minnesota's airport influence areas. To account for variation in population amongst the CBGs and only incorporate the percent of populations within the study areas, further refinement was needed. This included multiplying the SoVI by population of the CBG and by the percentage of the CBG that falls within the study area. By aggregating the SoVI by each airport influence area to determine the final composite score, system airports can be compared against one another and the Minnesota statewide average. Figure 2.8 provides an overview of the methodology of MnDOT's EJ analysis tool.

Figure 2.8. EJ Analysis Tool Methodology Overview

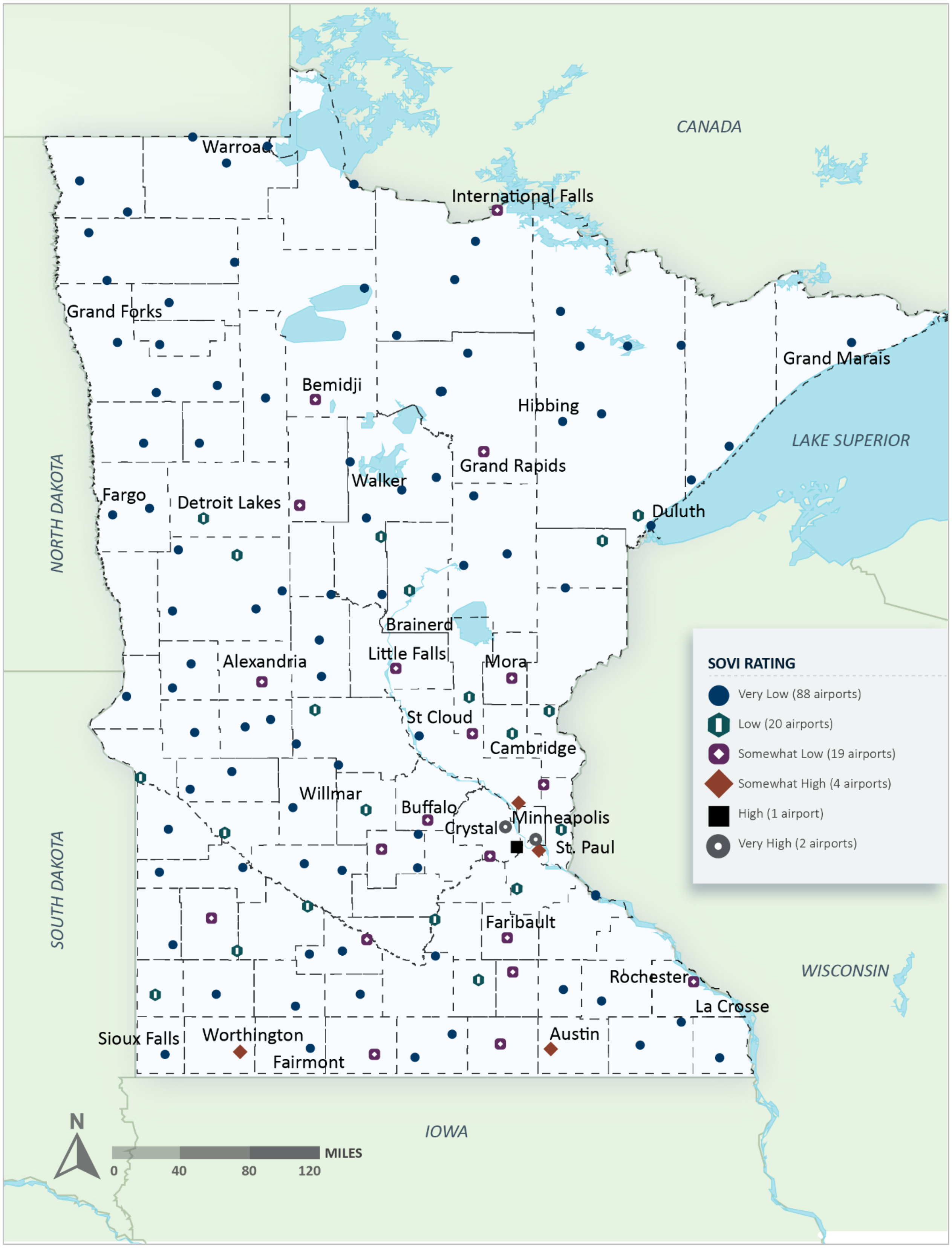


Sources: MnDOT, 2019; Kimley-Horn, 2020

Table 2.48. at the end of this chapter reports the composite SoVIs for each Minnesota system airport.[25] To supplement the comparison analysis, these SoVI composites were ranked into six distinct categories using the Jenks natural break algorithm. **Figure 2.9** maps these classifications among each system airport.

[25] *At the time that the composite SoVI values were calculated (2019), the Minnesota system consisted of 134 airports. This included Silver Bay Municipal Airport which has since closed to reduce the system to 133 airports.*

Figure 2.9. SoVI Ratings for Minnesota System Airports



Source: MnDOT, 2019

2.4.4. EJ IMPLEMENTATION RECOMMENDATIONS

MnDOT's EJ Determination Process outlines seven steps for not only identifying vulnerable populations within Minnesota, but also taking actionable steps to mitigate the potential for disproportionally impacting those groups during transportation development actions. MnDOT Aeronautics' EJ analysis tool completes steps one and two of the Determination Process by clearly recognizing vulnerable populations within the vicinity of Minnesota's system airports. The 2022 MnSASP builds upon this prior work to offer guidance on how to take that recognition forward into action. The following recommendations are primarily aimed at improving the implementation of MnDOT EJ Determination Process, although some are targeted at the methodology itself.

Recommendation 1: Methodological Improvements

The following section addresses two recommendations pertaining to enhancing the methodology of the EJ analysis tool.

Reduce the Number of Indicators of Vulnerability

MnDOT's Aeronautics' EJ analysis tool assesses the composite vulnerability of each airport influence area based on 14 factors including but not limited to indicators of income, ethnicity, age, education, and access to transportation. While each of these factors could indicate a systemic disadvantage, the inclusion of so many factors can make the process unduly onerous in terms of future updates and communicating the methodology to airports, their consultants, and others responsible for implementation. Additionally, the FAA identifies just two factors in identifying vulnerable population based on guidance provided in USDOT Order 5610.2:[26]

- Low-income populations: Groups of low-income persons living in geographic proximity to one another. A low-income person is one having a median household income at or below the Department of Health and Human Services' (HHS) poverty guidelines or the U.S. Census Bureau's annual statistical poverty thresholds on income and poverty.
- Minority populations: Populations that are comprised of Black, Hispanic, Asian-American, or American Indian and Alaskan Native. These populations should be considered as an aggregate group within the specific project limit or area of impact.

The US DOT Order 5610.2 also addresses non-English speaking populations in terms of providing outreach materials in languages other than English, but these populations are not deemed inherently at-risk. Should MnDOT Aeronautics revise the methodology of its analysis tool at some point in the future, the agency may consider simplifying its process to consider only EJ populations instead of all protected classes under Title VI. Note: steps should be taken to ensure equitable opportunities for input from all protected classes during airport planning and development projects.

Enhance Geographic Equity

As the final step in the development of the SoVI composite scores, each score was multiplied by the population that lives within the CBG. This inherently skews the results so that only urban areas are

[26] *FAA (2007). Chapter 10, p.1.*

recognized as having a high SoVI composite score, especially when compared to less densely populated areas of the state. Population density does not inherently make a population vulnerable and may simply indicate the presence of multi-family housing units characteristic of urban environments. The actual SoVI composite score could be quite low but multiplying that score by population may artificially inflate the number to indicate vulnerability instead of density. Only eight airports in Minnesota have a score of "Somewhat High" or above. Six of these airports are in the Minneapolis/St. Paul metropolitan area, with the top three airports clustered in a relatively small geographic area.

MnDOT Aeronautics should carefully consider if determining vulnerability should be based on a statewide ranking of airports (as in the existing methodology) or by conducting an independent evaluation of the composition of populations living proximate to specific airports. Using this latter alternative, MnDOT Aeronautics could identify potential EJ concerns in terms of percent of total population within an airport influence area or by a certain number of people. This is the method used by the LEP four-factor analysis (see Recommendation 5), which sets the threshold for potential language accommodation at five percent or 1,000 persons, whichever is less. MnDOT Aeronautics could adopt this threshold for EJ more broadly.

Recommendation 2: Consult EJ Analysis Tool During Airport Planning and Development

As noted previously, EJ must be considered during all airport actions receiving federal funds. Airports and their consultants are generally directed to the *FAA Environmental Desk Reference for Airport Actions* for guidance on how to comply with environmental policies, regulation, and other federal mandates. Chapter 10: Environmental Justice provides an outline for determining if a project triggers EJ-related concerns. MnDOT's EJ Determination Process presented in Section 2.4.2 closely reflects this federal guidance.

MnDOT Aeronautics should consider requiring airports to consult the EJ analysis tool for any project receiving state investment and then develop an EJ accommodation plan to ensure meaningful participation of all potentially affected groups. If occurring at an airport with an SoVI rating of "Somewhat Low" or above (see Figure 2.9), airports could be required to identify if the specific project triggers EJ concerns, then identify strategies to properly mitigate or offset those concerns. This would require airports to identify the specific population(s) that are affected by proposed airport actions and develop a plan to address the needs of that group. This information could be obtained in the ACS 5-Year Estimates data profile. For example, LEP residents would require a different type of accommodation than groups without access to transportation, elderly residents, or families with young children. Examples of questions to consider when developing an EJ accommodation plan may include:

- Would the population within the airport influence area benefit from the following types of support services:
  - Translation of printed or audio materials
  - Outreach materials in easily understandable language
  - Visual depictions of potential impacts associated with proposed airport actions
  - Public participation events scheduled at multiple times or at nontraditional locations
  - Childcare services offered during outreach events
  - Transportation options, such a shuttle to transport residents from their homes to a public meeting hall

- What is this population's preferred method of communication (e.g., phone, internet, mailings, in-person update events)?
- Does this population have access to reliable internet service to obtain up-to-date project information?
- What transportation options are available to reach scheduled outreach events?
- Is there a community-based organization that could assist with project communications, such as school, church, or other civic groups?
- What are the primary obstacles this population could face that may hinder equitable and meaningful participation in this proposed project?
- To the best of your knowledge, have local community members provided input on past projects or been invited to do so? What was the outcome of such efforts? Were the concerns addressed or incorporated into the final project or action?

The answers to this final question should drive future outreach actions, as groups that have historically been excluded from public involvement processes may be less willing to participate in future efforts. Overcoming this challenge often requires partnerships with local community leaders or the involvement of a third party who already has the trust of a historically disenfranchised group. Additional recommendations pertaining to improving public participation processes for potentially vulnerable groups are provided in Recommendation 5.

Airports can access the Minnesota Social Vulnerability Index and Airport Influence Zones web application to determine their SoVI rating. MnDOT Aeronautics could require airports to include a screenshot of this application depicting their airport influence area for submission with Airport Construction Grant, Airport Maintenance and Operation, and Hangar Loan Revolving Account program applications. This would help MnDOT Aeronautics easily determine if an EJ accommodation plan may be required for the proposed project. The development of an EJ accommodation plan could be tied to state grant assurances to ensure follow-through.

Recommendation 3: Include SoVI in the MnSASP Hub

As noted above, the SoVI rating for each airport is already in GIS format and housed in the Minnesota Social Vulnerability Index and Airport Influence Zones web application. To improve awareness amongst airports, their consultants, and MnDOT, this information could be incorporated into the MnSASP Hub currently being developed as part Phase II of the 2022 MnSASP (Task 8). Merging this web application into the MnSASP Hub could allow MnDOT Aeronautics staff to more clearly identify projects triggering potential EJ concerns and better incorporate EJ considerations into planning, outreach, design, and construction phases. The web application's inclusion into the MnSASP Hub also enhances the Dashboard's functionality as a repository of all MnDOT Aeronautics GIS data.

Recommendation 4: Conduct Regular Updates

The MnDOT Aeronautics EJ analysis tool should be updated at regular intervals to capture evolving community demographics in Minnesota. The ACS provides current data about all communities every year, instead of every 10 years as with the U.S. Census. The ACS survey is sent to a small percentage of households on a rotating basis to develop current estimates of community demographics. It is not necessary to update the EJ analysis tool annually, but population demographics do change over time. The Minnesota State Demographic Center reports that the state's population grew 7.1 percent between 2010 and 2019, adding 376,412 net new residents.[27] Some counties grew significantly faster, including Carver (17.7 percent increase), Wright (11.1 percent increase), and Hennepin (11.1 percent increase). Forty-three counties lost population during this same timeframe. These major population shifts are important to capture so the EJ analysis tool maintains relevancy over time. As such, a five-year (or less) update cycle is strongly recommended.

To assist MnDOT Aeronautics in this process, Phase II of the MnSASP developed a step-by-step update guide (for internal purposes only and not distributed as part of publicly released deliverables). The most recent update to the analysis tool occurred in December 2020 with 2015 – 2019 data. In some cases, this data may be significantly more up-to-date than provided in the existing EJ analysis tool (2013 – 2017 data).

Recommendation 5: Improve Public Participation Processes, Including LEP

EJ issues arise not only when EJ communities are disproportionally impacted by airport actions, but when those communities did not have equal opportunity to provide meaningful input during planning and design. The EPA, FAA, and other agencies emphasize that developing a public outreach plan that effectively considers the needs of EJ communities is not a "one-size-fits-all" solution. The challenges faced by historically disenfranchised populations are diverse and unique, as is the context of the project in question. As such, it is difficult to provide a list of discrete steps that should be taken to ensure all communities are equitably represented during public input processes. Instead, the EPA has developed a list of "critical elements" for effective long-term community engagement in its "Model Guidelines for Public Participation."[28] Effective public participation should include:[29]

- A two-way process of distributing and receiving information
- A process for increasing the number of community members who view themselves as "stakeholders" in the issues under consideration
- A system of processes and mechanisms for community outreach, input, and engagement at different levels
- An emphasis on the quality of input received instead of quantity of responses
- Recognition of the level of local expertise and experience offered by community members and leaders
- Efforts to design outreach methods, processes, and information targeted at the specific audiences

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[27] Minnesota State Demographics Center (n.d.). "Our Estimates." Available online at https://mn.gov/admin/demography/data-by-topic/population-data/our-estimates/ (accessed December 2020).
[28] U.S. EPA (January 2013). "Model Guidelines for Public Participation: An Update to the 1996 National Environmental Justice Advisory Committee Model Plan for Public Participation." Available online at https://www.epa.gov/sites/production/files/2015-02/documents/recommendations-model-guide-pp-2013.pdf (accessed December 2020).
[29] Ibid. p.2.

- An overall approach tailored to the specific, unique needs of the community where activities are being implemented

Specific outreach strategies may include offering public outreach meetings at nontraditional times and in locations within communities instead of asking residents to drive to distant conference sites. Information should be presented in multiple formats. In addition to in-person forums such as public meetings, briefings, and telephone contacts, project planners should also consider “remote” outreach tools. Examples include printed information such as fact sheets, newsletters, and bulletins; websites; informational hotlines; the involvement of traditional press and media; and social media. Using multiple formats is preferable to enhance overall access to information. For example, some community members may not have access to fast or reliable internet service, and printed materials may be cumbersome for residents with limited literacy or language skills. In those cases, community residents would need to receive information using alternative formats.

Moreover, FAA grant recipients are already required to ensure equal access to information and other benefits associated with federally funded projects. This requirement extends to persons with LEP, defined as “persons for whom English is not their primary language and who have a limited ability to speak, understand, read, or write English” (FAA Order 1400.11, *Nondiscrimination in Federally-assisted Program at the FAA*). MnDOT’s Title VI Program also establishes LEP consideration as critical for ensuring the full and meaningful participation of all individuals in MnDOT programs and activities.

As such, airports and their consultants should be conducting an LEP four-factor analysis to identify populations that may require specific accommodation for actions involving state money. An LEP four-factor analysis comprises the following steps:

1. Identify the number or proportion of LEP persons eligible to be served or likely to be encountered in a service area. The threshold for potential accommodation is set at five percent or 1,000 persons, whichever is less.
2. Determine the frequency of contact between LEP individuals and the recipient’s services. The more frequent the contact between the services and the LEP population, the more likely the need for language assistance.
3. Assess the nature and importance of recipient’s programs, activities, or services to people’s lives. If a delay or denial of access could have serious health or life-threatening implications, it is probably “important.”
4. Determine the resources available to the recipient and cost. A grant recipient’s available resources and the costs associated with accommodation may impact the steps required to provide access for all LEP individuals.

The MnDOT Title VI Program provides further information and compliance resources to ensure agency actions and activities are compliant with state and federal policies. This includes translation services for MnDOT’s internal workforce and external communications.[30] MnDOT Aeronautics should advance

[30] *MnDOT (2020). “Title VI Program: LEP.” Available online at https://www.dot.state.mn.us/civilrights/limited-english-proficiency.html.*

existing LEP policies by requiring language accommodation when warranted during state-funded airport actions and coordinating such requirements with MnDOT's Title VI Program.

2.5. Summary

Phase II of the 2022 MnSASP is designed to closely evaluate many of the cornerstone funding and other decision-making policies of MnDOT Aeronautics. MnDOT Aeronautics developed the scope of work after actively listening to aviation constituents for nearly two years. The agency heard about emerging technologies such as UAS and ADS-B, the impacts of FAA policies on airport operations, and the need to enhance airports' revenue-generating capabilities. The aviation environment over the next 20 years may look quite different than the world today, and the speed of those changes could only hasten as the implications of COVID-19 continue to unravel through the development of the plan. Phase II of the MnSASP takes on these pressing issues and help MnDOT Aeronautics and airports adopt new strategies to advance and thrive within an evolving aviation landscape. The information and analyses presented in this chapter set that foundation for that work by providing a clear understanding of where we are now and the path to move ahead.

2.6. Individual Airport Tables

The following section includes the individual airport detail tables referenced throughout this chapter. Tables include:

- Table 2.45. Minnesota State Aviation System – State Classifications and Inclusion in NPIAS
- Table 2.46. NPIAS Airports by NPIAS Category and Hub Size/Role (As Applicable)
- Table 2.47. Minnesota Airport System by Classification
- Table 2.48. EJ Analysis Tool Results – SoVI Composite Scores by Airport

Note that Table 2.45 and Table 2.48 are organized alphabetically by associated city. Table 2.46 is organized in terms of NPIAS category, hub size (Primary airports), role (Nonprimary airports), and then by associated city. Table 2.47 is organized first by state classification, then alphabetically by associated city. These organizational structures are designed to offer readers the ability to most readily access the most germane information provided in each table.

Table 2.45. Minnesota State Aviation System – State Classifications and Inclusion in NPIAS

Associated City	Airport Name	FAA ID	State Classification	NPIAS Inclusion
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	Intermediate Small	No
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	Yes
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	Yes
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	Yes
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	No
Austin	Austin Municipal Airport	AUM	Key General Aviation	Yes
Backus	Backus Municipal Airport	7Y3	Landing Strip Turf	No
Bagley	Bagley Municipal Airport	7Y4	Intermediate Small	No
Baudette	Baudette International Airport	BDE	Key General Aviation	Yes
Bemidji	Bemidji Regional Airport	BJI	Key Commercial Service	Yes
Benson	Benson Municipal Airport	BBB	Intermediate Large	Yes
Big Falls	Big Falls Municipal Airport	7Y9	Landing Strip Turf	No
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	No
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	Yes
Bowstring	Bowstring Airport	9Y0	Landing Strip Turf	No
Brainerd	Brainerd-Crow Wing County Regional Airport	BRD	Key Commercial Service	Yes
Brooten	Brooten Municipal Airport	6D1	Intermediate Small	No
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	Yes
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	Yes
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	Yes
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	Yes
Clarissa	Clarissa Municipal Airport	8Y5	Landing Strip Turf	No
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	Yes
Cook	Cook Municipal Airport	CQM	Intermediate Large	Yes
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	Yes
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	Yes

Associated City	Airport Name	FAA ID	State Classification	NPIAS Inclusion
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	Yes
Duluth	Duluth International Airport	DLH	Key Commercial Service	Yes
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	Yes
East Gull Lake	East Gull Lake Airport	9Y2	Landing Strip Turf	No
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	Yes
Ely	Ely Municipal Airport	ELO	Key General Aviation	Yes
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	Yes
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	Yes
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	Yes
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	Yes
Fertile	Fertile Municipal Airport	D14	Intermediate Small	No
Forest Lake	Forest Lake Airport	25D	Intermediate Small	No
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	Yes
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	Yes
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	Yes
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	Yes
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	Yes
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	No
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	Landing Strip Turf	No
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	Yes
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	Yes
Hector	Hector Municipal Airport	1D6	Intermediate Small	Yes
Henning	Henning Municipal Airport	05Y	Landing Strip Turf	No
Herman	Herman Municipal Airport	06Y	Intermediate Small	No
Hibbing	Hibbing-Chisholm-Hibbing Municipal Airport	HIB	Key Commercial Service	Yes
Hill City	Hill City-Quadna Mountain Airport	07Y	Landing Strip Turf	No
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	Yes

Associated City	Airport Name	FAA ID	State Classification	NPIAS Inclusion
International Falls	International Falls-Falls International Airport	INL	Key Commercial Service	Yes
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	Yes
Karlstad	Karlstad Municipal Airport	23D	Landing Strip Turf	No
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	Yes
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	Yes
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	Yes
Littlefork	Littlefork Municipal Hanover Airport	13Y	Landing Strip Turf	No
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	Yes
Longville	Longville Municipal Airport	XVG	Intermediate Small	Yes
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	Yes
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	Yes
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	Yes
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	Yes
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	No
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	Yes
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	No
Milaca	Milaca Municipal Airport	18Y	Landing Strip Turf	No
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	Yes
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	Yes
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	Yes
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	Yes
Minneapolis	Minneapolis/St. Paul International Airport	MSP	Key Commercial Service	Yes
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	Yes
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	Yes
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	Yes
Mora	Mora Municipal Airport	JMR	Intermediate Large	Yes
Morris	Morris Municipal Airport	MOX	Intermediate Large	Yes

Associated City	Airport Name	FAA ID	State Classification	NPIAS Inclusion
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	Yes
Northome	Northome Municipal Airport	43Y	Landing Strip Turf	No
Olivia	Olivia Regional Airport	OVL	Intermediate Small	No
Orr	Orr Regional Airport	ORB	Intermediate Large	Yes
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	Yes
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	Yes
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	Yes
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	Yes
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	Landing Strip Turf	No
Perham	Perham Municipal Airport	16D	Intermediate Large	No
Pine River	Pine River Regional Airport	PWC	Intermediate Small	Yes
Pinecreek	Piney-Pinecreek Border Airport	48Y	Intermediate Small	No
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	Yes
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	Yes
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	Yes
Red Lake Falls	Red Lake Falls Municipal Airport	D81	Intermediate Small	No
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	Yes
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	Yes
Remer	Remer Municipal Airport	52Y	Landing Strip Turf	No
Rochester	Rochester International Airport	RST	Key Commercial Service	Yes
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	Yes
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	Yes
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	Yes
St. Cloud	Saint Cloud Regional Airport	STC	Key Commercial Service	Yes
St. James	Saint James Municipal Airport	JYG	Intermediate Large	Yes
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	Yes
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	Yes

Associated City	Airport Name	FAA ID	State Classification	NPIAS Inclusion
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	Yes
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	No
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	Landing Strip Turf	No
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	Yes
Springfield	Springfield Municipal Airport	D42	Intermediate Small	Yes
Staples	Staples Municipal Airport	SAZ	Intermediate Small	Yes
Starbuck	Starbuck Municipal Airport	D32	Landing Strip Turf	No
Stephen	Stephen Municipal Airport	D41	Intermediate Small	No
Thief River Falls	Thief River Falls Regional Airport	TVF	Key Commercial Service	Yes
Tower	Tower Municipal Airport	12D	Intermediate Small	Yes
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	Yes
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	Yes
Tyler	Tyler Municipal Airport	63Y	Landing Strip Turf	No
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	Yes
Walker	Walker Municipal Airport	Y49	Intermediate Small	Yes
Warren	Warren Municipal Airport	D37	Intermediate Small	No
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	Yes
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	Yes
Waskish	Waskish Municipal Airport	VWU	Landing Strip Turf	No
Waskish	Wells Municipal Airport	68Y	Landing Strip Turf	No
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	Yes
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	Yes
Windom	Windom Municipal Airport	MWM	Intermediate Small	Yes
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	Yes
Winsted	Winsted Municipal Airport	10D	Landing Strip Turf	Yes
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	Yes

Sources: MnSASP Phase I, 2019; FAA ADIP, 2020; Kimley-Horn, 2020; FAA NPIAS 2021 – 2024

Table 2.46. NPIAS Airports by NPIAS Category and Hub Size/Role (As Applicable)

Category	Associated City	Airport Name	FAA ID	Hub Size/ Role, As applicable
Primary	Minneapolis	Minneapolis/St. Paul International Airport	MSP	Large
	Bemidji	Bemidji Regional Airport	BJI	Nonhub
	Brainerd	Brainerd-Crow Wing County Regional Airport	BRD	Nonhub
	Duluth	Duluth International Airport	DLH	Nonhub
	Hibbing	Hibbing-Chisholm-Hibbing Municipal Airport	HIB	Nonhub
	International Falls	International Falls-Falls International Airport	INL	Nonhub
	Rochester	Rochester International Airport	RST	Nonhub
	St. Cloud	Saint Cloud Regional Airport	STC	Nonhub
Commercial Service	Thief River Falls	Thief River Falls Regional Airport	TVF	Local
Reliever	Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	National
	Minneapolis	Minneapolis Flying Cloud Airport	FCM	National
	St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	National
	Minneapolis	Minneapolis Airlake Airport	LVN	Regional
	Minneapolis	Minneapolis Crystal Airport	MIC	Regional
	South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Regional
	St. Paul	Saint Paul-Lake Elmo Airport	21D	Regional
General Aviation	Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Regional
	Mankato	Mankato Municipal Airport	MKT	Regional
	Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Regional
	Red Wing	Red Wing Regional Airport	RGK	Regional
	Willmar	Willmar Municipal Airport	BDH	Regional
	Aitkin	Aitkin Municipal Airport	AIT	Local
	Albert Lea	Albert Lea Municipal Airport	AEL	Local
	Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Local

Category	Associated City	Airport Name	FAA ID	Hub Size/ Role, As applicable
General Aviation (continued)	Austin	Austin Municipal Airport	AUM	Local
	Baudette	Baudette International Airport	BDE	Local
	Blue Earth	Blue Earth Municipal Airport	SBU	Local
	Buffalo	Buffalo Municipal Airport	CFE	Local
	Cambridge	Cambridge Municipal Airport	CBG	Local
	Canby	Canby Municipal Airport (Myers Field)	CNB	Local
	Cloquet	Cloquet-Carlton County Airport	COQ	Local
	Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Local
	Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Local
	Dodge Center	Dodge Center Municipal Airport	TOB	Local
	Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Local
	Elbow Lake	Elbow Lake Municipal Airport	Y63	Local
	Ely	Ely Municipal Airport	ELO	Local
	Eveleth	Eveleth-Virginia Municipal Airport	EVM	Local
	Fairmont	Fairmont Municipal Airport	FRM	Local
	Faribault	Faribault Municipal Airport	FBL	Local
	Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Local
	Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Local
	Grand Marais	Grand Marais-Cook County Airport	CKC	Local
	Hallock	Hallock Municipal Airport	HCO	Local
	Hawley	Hawley Municipal Airport	04Y	Local
	Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Local
	Le Sueur	Le Sueur Municipal Airport	12Y	Local
	Litchfield	Litchfield Municipal Airport	LJF	Local
	Little Falls	Little Falls-Morrison County Airport	LXL	Local
	Luverne	Luverne Municipal Airport	LYV	Local
	Mahnomen	Mahnomen County Airport	3N8	Local

Category	Associated City	Airport Name	FAA ID	Hub Size/ Role, As applicable
General Aviation (continued)	Moorhead	Moorhead Municipal Airport	JKJ	Local
	Moose Lake	Moose Lake-Carlton County Airport	MZH	Local
	Mora	Mora Municipal Airport	JMR	Local
	New Ulm	New Ulm Municipal Airport	ULM	Local
	Owatonna	Owatonna Degner Regional Airport	OWA	Local
	Paynesville	Paynesville Municipal Airport	PEX	Local
	Pine River	Pine River Regional Airport	PWC	Local
	Preston	Preston Fillmore County Airport	FKA	Local
	Princeton	Princeton Municipal Airport	PNM	Local
	Redwood Falls	Redwood Falls Municipal Airport	RWF	Local
	Rush City	Rush City Municipal Airport	ROS	Local
	Sauk Centre	Sauk Centre Municipal Airport	D39	Local
	Staples	Staples Municipal Airport	SAZ	Local
	Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Local
	Walker	Walker Municipal Airport	Y49	Local
	Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Local
	Waseca	Waseca Municipal Airport	ACQ	Local
	Windom	Windom Municipal Airport	MWM	Local
	Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Local
	Worthington	Worthington Municipal Airport	OTG	Local
	Benson	Benson Municipal Airport	BBB	Basic
	Caledonia	Caledonia-Houston County Airport	CHU	Basic
	Cook	Cook Municipal Airport	CQM	Basic
	Fosston	Fosston Municipal Airport	FSE	Basic
	Glenwood	Glenwood Municipal Airport	GHW	Basic
	Hector	Hector Municipal Airport	1D6	Basic
	Jackson	Jackson Municipal Airport	MJQ	Basic

Category	Associated City	Airport Name	FAA ID	Hub Size/ Role, As applicable
General Aviation (continued)	Long Prairie	Long Prairie Airport (Todd Field)	14Y	Basic
	Longville	Longville Municipal Airport	XVG	Basic
	Madison	Madison-Lac Qui Parle Airport	DXX	Basic
	Montevideo	Montevideo-Chippewa County Airport	MVE	Basic
	Morris	Morris Municipal Airport	MOX	Basic
	Orr	Orr Regional Airport	ORB	Basic
	Park Rapids	Park Rapids Municipal Airport	PKD	Basic
	Pipestone	Pipestone Municipal Airport	PQN	Basic
	Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Basic
	Rushford	Rushford Municipal Airport	55Y	Basic
	St. James	Saint James Municipal Airport	JYG	Basic
	Tower	Tower Municipal Airport	12D	Basic
	Tracy	Tracy Municipal Airport	TKC	Basic
	Wadena	Wadena Municipal Airport	ADC	Basic
	Winsted	Winsted Municipal Airport	10D	Basic
	Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Unclassified
	Springfield	Springfield Municipal Airport	D42	Unclassified
	Wheaton	Wheaton Municipal Airport	ETH	Unclassified

Source: FAA NPIAS 2021 – 2024

Table 2.47. Minnesota Airport System by Classification

State Classification	Associated City	Airport Name	FAA ID	Length (feet)	Surface Type
Key Commercial Service - Part 139 Certificate	Bemidji	Bemidji Regional Airport	BJI	7,004	Paved
	Brainerd	Brainerd-Crow Wing County Regional Airport	BRD	6,512	Paved
	Duluth	Duluth International Airport	DLH	10,591	Paved
	Hibbing	Hibbing-Chisholm-Hibbing Municipal Airport	HIB	6,758	Paved
	International Falls	International Falls-Falls International Airport	INL	7,400	Paved
	Minneapolis	Minneapolis/St. Paul International Airport	MSP	10,000	Paved
	Rochester	Rochester International Airport	RST	9,034	Paved
	St. Cloud	Saint Cloud Regional Airport	STC	7,500	Paved
	Thief River Falls	Thief River Falls Regional Airport	TVF	6,504	Paved
Key GA - Paved Runway ≥4,900 Feet	Albert Lea	Albert Lea Municipal Airport	AEL	5,000	Paved
	Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	5,099	Paved
	Austin	Austin Municipal Airport	AUM	5,800	Paved
	Baudette	Baudette International Airport	BDE	5,498	Paved
	Ely	Ely Municipal Airport	ELO	5,596	Paved
	Fairmont	Fairmont Municipal Airport	FRM	5,503	Paved
	Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	5,639	Paved
	Grand Marais	Grand Marais-Cook County Airport	CKC	5,002	Paved
	Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	5,756	Paved
	Mankato	Mankato Municipal Airport	MKT	6,600	Paved
	Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	7,221	Paved
	Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	5,000	Paved
	Minneapolis	Minneapolis Flying Cloud Airport	FCM	5,000	Paved
	New Ulm	New Ulm Municipal Airport	ULM	5,401	Paved

State Classification	Associated City	Airport Name	FAA ID	Length (feet)	Surface Type
Key GA - Paved Runway ≥4,900 Feet (continued)	Owatonna	Owatonna Degner Regional Airport	OWA	5,500	Paved
	Park Rapids	Park Rapids Municipal Airport	PKD	5,497	Paved
	Red Wing	Red Wing Regional Airport	RGK	5,010	Paved
	St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	6,491	Paved
	Warroad	Warroad International Airport (Swede Carlson Field)	RRT	5,400	Paved
	Willmar	Willmar Municipal Airport	BDH	5,500	Paved
	Winona	Winona Municipal Airport (Max Conrad Field)	ONA	5,679	Paved
	Worthington	Worthington Municipal Airport	OTG	5,500	Paved
Intermediate Large - Paved and Lighted Runway ≥3,800 Feet and <4,900 Feet	Aitkin	Aitkin Municipal Airport	AIT	4,000	Paved
	Benson	Benson Municipal Airport	BBB	4,000	Paved
	Bigfork	Bigfork Municipal Airport	FOZ	3,998	Paved
	Cambridge	Cambridge Municipal Airport	CBG	4,001	Paved
	Canby	Canby Municipal Airport (Myers Field)	CNB	4,648	Paved
	Cloquet	Cloquet-Carlton County Airport	COQ	4,002	Paved
	Cook	Cook Municipal Airport	CQM	4,000	Paved
	Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	4,300	Paved
	Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	4,502	Paved
	Dodge Center	Dodge Center Municipal Airport	TOB	4,500	Paved
	Eveleth	Eveleth-Virginia Municipal Airport	EVM	4,000	Paved
	Faribault	Faribault Municipal Airport	FBL	4,257	Paved
	Glenwood	Glenwood Municipal Airport	GHW	4,500	Paved
	Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	4,357	Paved
Intermediate Large - Paved and Lighted Runway ≥3,800 Feet and	Hallock	Hallock Municipal Airport	HCO	4,007	Paved
	Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	4,000	Paved
	Litchfield	Litchfield Municipal Airport	LJF	4,002	Paved
	Little Falls	Little Falls-Morrison County Airport	LXL	4,010	Paved

State Classification	Associated City	Airport Name	FAA ID	Length (feet)	Surface Type
<4,900 Feet (continued)	Luverne	Luverne Municipal Airport	LYV	4,200	Paved
	Minneapolis	Minneapolis Airlake Airport	LVN	4,099	Paved
	Montevideo	Montevideo-Chippewa County Airport	MVE	3,999	Paved
	Moorhead	Moorhead Municipal Airport	JKJ	4,300	Paved
	Mora	Mora Municipal Airport	JMR	4,794	Paved
	Morris	Morris Municipal Airport	MOX	4,002	Paved
	Orr	Orr Regional Airport	ORB	4,000	Paved
	Perham	Perham Municipal Airport	16D	4,102	Paved
	Pipestone	Pipestone Municipal Airport	PQN	4,306	Paved
	Preston	Preston Fillmore County Airport	FKA	4,001	Paved
	Princeton	Princeton Municipal Airport	PNM	3,900	Paved
	Redwood Falls	Redwood Falls Municipal Airport	RWF	4,001	Paved
	Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	4,400	Paved
	Rush City	Rush City Municipal Airport	ROS	4,401	Paved
	South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	4,002	Paved
	St. James	Saint James Municipal Airport	JYG	3,999	Paved
	Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	4,400	Paved
	Wadena	Wadena Municipal Airport	ADC	4,007	Paved
Intermediate Small - Paved Runway < 3,800 feet	Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	3,103	Paved
Intermediate Small - Paved Runway < 3,800 feet (continued)	Appleton	Appleton Municipal Airport	AQP	3,500	Paved
	Bagley	Bagley Municipal Airport	7Y4	3,800	Paved
	Blue Earth	Blue Earth Municipal Airport	SBU	3,400	Paved
	Brooten	Brooten Municipal Airport	6D1	3,500	Paved
	Buffalo	Buffalo Municipal Airport	CFE	3,200	Paved
	Caledonia	Caledonia-Houston County Airport	CHU	3,499	Paved

State Classification	Associated City	Airport Name	FAA ID	Length (feet)	Surface Type
	Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	2,600	Paved
	Elbow Lake	Elbow Lake Municipal Airport	Y63	3,401	Paved
	Fertile	Fertile Municipal Airport	D14	3,000	Paved
	Forest Lake	Forest Lake Airport	25D	2,700	Paved
	Fosston	Fosston Municipal Airport	FSE	3,502	Paved
	Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	3,300	Paved
	Hawley	Hawley Municipal Airport	04Y	3,398	Paved
	Hector	Hector Municipal Airport	1D6	2,776	Paved
	Herman	Herman Municipal Airport	06Y	2,997	Paved
	Jackson	Jackson Municipal Airport	MJQ	3,591	Paved
	Le Sueur	Le Sueur Municipal Airport	12Y	3,000	Paved
	Long Prairie	Long Prairie Airport (Todd Field)	14Y	3,501	Paved
	Longville	Longville Municipal Airport	XVG	3,549	Paved
	Madison	Madison-Lac Qui Parle Airport	DXX	3,300	Paved
	Mahnomen	Mahnomen County Airport	3N8	3,400	Paved
	Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	2,796	Paved
	McGregor	McGregor-Isedor Iverson Airport	HZX	3,400	Paved
	Minneapolis	Minneapolis Crystal Airport	MIC	3,268	Paved
	Moose Lake	Moose Lake-Carlton County Airport	MZH	3,200	Paved
Intermediate Small - Paved Runway < 3,800 feet (continued)	Olivia	Olivia Regional Airport	OVL	3,498	Paved
	Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	3,417	Paved
	Paynesville	Paynesville Municipal Airport	PEX	3,302	Paved
	Pine River	Pine River Regional Airport	PWC	3,000	Paved
	Pinecreek	Piney-Pinecreek Border Airport	48Y	3,297	Paved
	Red Lake Falls	Red Lake Falls Municipal Airport	D81	2,500	Paved
	Rushford	Rushford Municipal Airport	55Y	3,200	Paved
	Sauk Centre	Sauk Centre Municipal Airport	D39	3,296	Paved

State Classification	Associated City	Airport Name	FAA ID	Length (feet)	Surface Type
	Slayton	Slayton Municipal Airport	DVP	3,005	Paved
	Springfield	Springfield Municipal Airport	D42	3,402	Paved
	St. Paul	Saint Paul-Lake Elmo Airport	21D	2,849	Paved
	Staples	Staples Municipal Airport	SAZ	3,305	Paved
	Stephen	Stephen Municipal Airport	D41	2,700	Paved
	Tower	Tower Municipal Airport	12D	3,400	Paved
	Tracy	Tracy Municipal Airport	TKC	3,098	Paved
	Walker	Walker Municipal Airport	Y49	3,220	Paved
	Warren	Warren Municipal Airport	D37	3,199	Paved
	Waseca	Waseca Municipal Airport	ACQ	3,399	Paved
	Wheaton	Wheaton Municipal Airport	ETH	3,298	Paved
	Windom	Windom Municipal Airport	MWM	3,598	Paved
Landing Strip Turf – Unpaved Runway of Any Length	Backus	Backus Municipal Airport	7Y3	3,585	Turf
	Big Falls	Big Falls Municipal Airport	7Y9	2,850	Turf
	Bowstring	Bowstring Airport	9Y0	2,565	Turf
	Clarissa	Clarissa Municipal Airport	8Y5	2,600	Turf
	East Gull Lake	East Gull Lake Airport	9Y2	2,618	Turf
Landing Strip Turf – Unpaved Runway of Any Length (continued)	Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	3,437	Turf
	Henning	Henning Municipal Airport	05Y	3,199	Turf
	Hill City	Hill City-Quadna Mountain Airport	07Y	2,902	Turf
	Karlstad	Karlstad Municipal Airport	23D	2,606	Turf
	Littlefork	Littlefork Municipal Hanover Airport	13Y	3,000	Turf
	Milaca	Milaca Municipal Airport	18Y	2,900	Turf
	Northome	Northome Municipal Airport	43Y	3,199	Turf
	Pelican Rapids	Pelican Rapids Municipal Airport	47Y	3,260	Turf
	Remer	Remer Municipal Airport	52Y	2,765	Turf
	Sleepy Eye	Sleepy Eye Municipal Airport	Y58	2,575	Turf

State Classification	Associated City	Airport Name	FAA ID	Length (feet)	Surface Type
	Starbuck	Starbuck Municipal Airport	D32	2,512	Turf
	Tyler	Tyler Municipal Airport	63Y	2,517	Turf
	Waskish	Waskish Municipal Airport	VWU	2,992	Turf
	Waskish	Wells Municipal Airport	68Y	2,897	Turf
	Winsted	Winsted Municipal Airport	10D	3,248	Turf

Sources: MnSASP Phase I, 2019; FAA ADIP, 2020; Kimley-Horn, 2020

Table 2.48. EJ Analysis Tool Results – SoVI Composite Scores by Airport

Associated City	Airport Name	FAA ID	Composite SoVI
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	154
Aitkin	Aitkin Municipal Airport	AIT	11,457
Albert Lea	Albert Lea Municipal Airport	AEL	62,438
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	36,004
Appleton	Appleton Municipal Airport	AQP	5,585
Austin	Austin Municipal Airport	AUM	91,352
Backus	Backus Municipal Airport	7Y3	2,300
Bagley	Bagley Municipal Airport	7Y4	8,587
Baudette	Baudette International Airport	BDE	261
Bemidji	Bemidji Regional Airport	BJI	57,721
Benson	Benson Municipal Airport	BBB	9,755
Big Falls	Big Falls Municipal Airport	7Y9	103
Bigfork	Bigfork Municipal Airport	FOZ	684
Blue Earth	Blue Earth Municipal Airport	SBU	8,090
Bowstring	Bowstring Airport	9Y0	743
Brainerd	Brainerd-Crow Wing County Regional Airport	BRD	18,059
Brooten	Brooten Municipal Airport	6D1	1,300
Buffalo	Buffalo Municipal Airport	CFE	41,781
Caledonia	Caledonia-Houston County Airport	CHU	7,545
Cambridge	Cambridge Municipal Airport	CBG	24,885
Canby	Canby Municipal Airport (Myers Field)	CNB	9,067
Clarissa	Clarissa Municipal Airport	8Y5	4,874
Cloquet	Cloquet-Carlton County Airport	COQ	15,585
Cook	Cook Municipal Airport	CQM	635
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	83
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	29,586
Dodge Center	Dodge Center Municipal Airport	TOB	6,679
Duluth	Duluth International Airport	DLH	17,276
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	5,239
East Gull Lake	East Gull Lake Airport	9Y2	2,184
Elbow Lake	Elbow Lake Municipal Airport	Y63	3,061
Ely	Ely Municipal Airport	ELO	756
Eveleth	Eveleth-Virginia Municipal Airport	EVM	3,562
Fairmont	Fairmont Municipal Airport	FRM	53,532
Faribault	Faribault Municipal Airport	FBL	41,850
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	9,965
Fertile	Fertile Municipal Airport	D14	7,108
Forest Lake	Forest Lake Airport	25D	47,730

Associated City	Airport Name	FAA ID	Composite SoVI
Fosston	Fosston Municipal Airport	FSE	7,055
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	10,931
Glenwood	Glenwood Municipal Airport	GHW	799
Grand Marais	Grand Marais-Cook County Airport	CKC	437
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	58,971
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	713
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	69
Hallock	Hallock Municipal Airport	HCO	3,754
Hawley	Hawley Municipal Airport	04Y	1,868
Hector	Hector Municipal Airport	1D6	5,840
Henning	Henning Municipal Airport	05Y	7,981
Herman	Herman Municipal Airport	06Y	169
Hibbing	Hibbing-Chisholm-Hibbing Municipal Airport	HIB	906
Hill City	Hill City-Quadna Mountain Airport	07Y	183
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	38,977
International Falls	International Falls-Falls International Airport	INL	49,353
Jackson	Jackson Municipal Airport	MJQ	7,520
Karlstad	Karlstad Municipal Airport	23D	5,936
Le Sueur	Le Sueur Municipal Airport	12Y	13,032
Litchfield	Litchfield Municipal Airport	LJF	23,519
Little Falls	Little Falls-Morrison County Airport	LXL	50,525
Littlefork	Littlefork Municipal Hanover Airport	13Y	347
Long Prairie	Long Prairie Airport (Todd Field)	14Y	1,917
Longville	Longville Municipal Airport	XVG	1,535
Luverne	Luverne Municipal Airport	LYV	6,283
Madison	Madison-Lac Qui Parle Airport	DXX	4,449
Mahnomen	Mahnomen County Airport	3N8	2,050
Mankato	Mankato Municipal Airport	MKT	5,611
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	9,264
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	43,568
McGregor	McGregor-Isedor Iverson Airport	HZX	1,168
Milaca	Milaca Municipal Airport	18Y	18,936
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	142,876
Minneapolis	Minneapolis Flying Cloud Airport	FCM	79,912
Minneapolis	Minneapolis Airlake Airport	LVN	23,756
Minneapolis	Minneapolis Crystal Airport	MIC	773,176

Associated City	Airport Name	FAA ID	Composite SoVI
Minneapolis	Minneapolis/St. Paul International Airport	MSP	482,408
Montevideo	Montevideo-Chippewa County Airport	MVE	22,988
Moorhead	Moorhead Municipal Airport	JKJ	2,309
Moose Lake	Moose Lake-Carlton County Airport	MZH	5,253
Mora	Mora Municipal Airport	JMR	34,755
Morris	Morris Municipal Airport	MOX	5,843
New Ulm	New Ulm Municipal Airport	ULM	37,771
Northome	Northome Municipal Airport	43Y	107
Olivia	Olivia Regional Airport	OVL	5,743
Orr	Orr Regional Airport	ORB	191
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	15,895
Owatonna	Owatonna Degner Regional Airport	OWA	42,900
Park Rapids	Park Rapids Municipal Airport	PKD	45,598
Paynesville	Paynesville Municipal Airport	PEX	6,126
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	671
Perham	Perham Municipal Airport	16D	14,285
Pine River	Pine River Regional Airport	PWC	17,480
Pinecreek	Piney-Pinecreek Border Airport	48Y	63
Pipestone	Pipestone Municipal Airport	PQN	33,138
Preston	Preston Fillmore County Airport	FKA	400
Princeton	Princeton Municipal Airport	PNM	34,972
Red Lake Falls	Red Lake Falls Municipal Airport	D81	999
Red Wing	Red Wing Regional Airport	RGK	9,337
Redwood Falls	Redwood Falls Municipal Airport	RWF	27,997
Remer	Remer Municipal Airport	52Y	658
Rochester	Rochester International Airport	RST	3,062
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	272
Rush City	Rush City Municipal Airport	ROS	15,445
Rushford	Rushford Municipal Airport	55Y	3,957
Sauk Centre	Sauk Centre Municipal Airport	D39	24,381
Slayton	Slayton Municipal Airport	DVP	5,174
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	4,909
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	192,637
Springfield	Springfield Municipal Airport	D42	9,038
St. Cloud	Saint Cloud Regional Airport	STC	4,408
St. James	Saint James Municipal Airport	JYG	2,702
St. Paul	Saint Paul-Lake Elmo Airport	21D	21,502
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	882,382
Staples	Staples Municipal Airport	SAZ	11,981

Associated City	Airport Name	FAA ID	Composite SoVI
Starbuck	Starbuck Municipal Airport	D32	5,348
Stephen	Stephen Municipal Airport	D41	4,251
Thief River Falls	Thief River Falls Regional Airport	TVF	6,971
Tower	Tower Municipal Airport	12D	1,408
Tracy	Tracy Municipal Airport	TKC	21,840
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	1,085
Tyler	Tyler Municipal Airport	63Y	1,854
Wadena	Wadena Municipal Airport	ADC	1,219
Walker	Walker Municipal Airport	Y49	2,476
Warren	Warren Municipal Airport	D37	2,825
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	5,409
Waseca	Waseca Municipal Airport	ACQ	14,118
Waskish	Wells Municipal Airport	68Y	3,385
Waskish	Waskish Municipal Airport	VWU	67
Wheaton	Wheaton Municipal Airport	ETH	364
Willmar	Willmar Municipal Airport	BDH	10,792
Windom	Windom Municipal Airport	MWM	2,779
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	48,408
Winsted	Winsted Municipal Airport	10D	4,869
Worthington	Worthington Municipal Airport	OTG	98,598

Source: MnDOT, 2019

Chapter 3. Operations Counting and Forecasting

3.1. Introduction

Forecasting aviation demand is a fundamental component of aviation system planning. Forecasting can help identify areas within the state that may face capacity constraints over the selected forecast horizon and support short- and mid-term operational planning to mitigate against anticipated deficiencies. These same objectives also play an important role in the identification of aviation investment needs at individual airport and statewide levels.

Forecasts can be developed for various indicators of aviation activity including commercial enplanements, based aircraft, or aircraft operations.[1] The 2022 Minnesota State Aviation System Plan (MnSASP or 2022 MnSASP) focuses specifically on aircraft operations at the 124 general aviation (GA) airports in the state aviation system.[2] This indicator of aviation demand is important because the number and type of operations experienced by an airport can influence the facilities and services that should be provided to optimally accommodate such activity. For example, airports anticipated to witness significant growth in the number and/or sophistication of aircraft utilizing their facilities may evaluate the need for a runway extension, pavement strengthening project, and/or additional storage facilities. In short, projecting future operations offers valuable insight into potential investment needs that may be required as demands change over time.

Identifying current operations is the first step of the forecasting process. Unfortunately, capturing these baseline operational counts at airports without an air traffic control tower (ATCT) is inherently difficult and the results are often inaccurate. GA airports that host a high percentage of operations conducted under Visual Flight Rules (VFR) are at a particular disadvantage, the reasons for which will be explored at length in the sections below. As such, this task of the MnSASP begins by exploring various strategies that may be employed at non-towered airports to estimate baseline operations. Following this investigation, a statewide methodology that offers a standard and uniform process for estimating baseline operations at Minnesota's non-towered GA airports is proposed.

Operational counts obtained using this process are then applied to forecast future activities at all publicly owned, public-use GA airports in the Minnesota state aviation system over the next 20 years. Forecasted operations are applied to operational thresholds established by the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics). These operational thresholds provide insight into when and what type of airport development needs may be required as operations reach certain annual levels by state classification. Finally, the chapter concludes by assessing airports currently supporting a significant number of operations by aircraft larger than their design codes. In such cases, additional improvements may be warranted to maintain airfield safety and operational efficiency.

[1] An aircraft operation is defined as a takeoff or landing. Therefore, one flight comprises two operations.
[2] Per the 2022 MnSASP scope approved by the FAA, the MnSASP only forecasted aircraft operations across Minnesota's 124 GA airports.

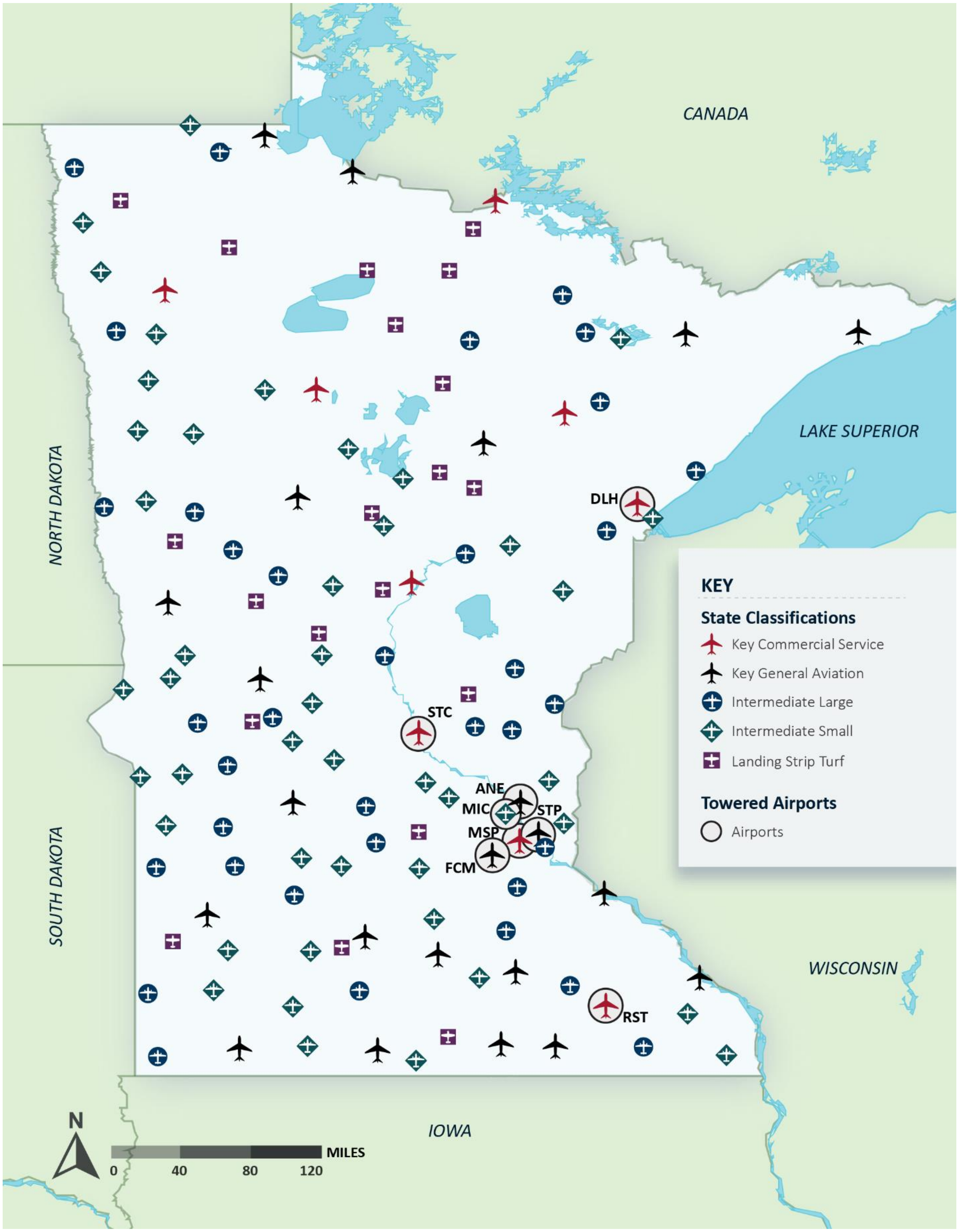
Accordingly, this chapter is organized as follows:

- Baseline Operations at GA Airports (Section 3.2)
- Forecasts of Aircraft Operations (Section 3.3)
- Operational Threshold Analysis (Section 3.4)
- Identification of Airports with Operations Exceeding Airport Reference Code (ARC) (Section 3.5)

It is important to emphasize several key points with the GA baseline operations and forecasts summarized in this chapter and detailed in Appendix A:

- This task specifically focuses on operations at the 124 GA airports in the Minnesota state aviation system. Commercial service airports typically conduct detailed, independent evaluations of future aviation activities at the airport-specific level for their own planning and investment purposes. As such, MnDOT Aeronautics is focusing its efforts on GA airports, of which 97 percent are non-towered (120 of 124). Figure 3.1 depicts all 133 airports in the Minnesota state aviation system by classification, with the airports with an ATCT circled in red. GA airports with an ATCT include Minneapolis Flying Cloud (FCM), Minneapolis Anoka County/Blaine (ANE), Saint Paul Downtown Airport (Holman Field) (STP), and Minneapolis Crystal Airport (MIC).
- The GA operations forecasts were prepared at the same time as the evolving impacts of the COVID-19 public health emergency. The FAA's approval of the forecasts (issued on February 7, 2023) was based on the methodology, data, and conclusions at the time this document was prepared. However, consideration of the impacts of the COVID-19 public health emergency on aviation activity is warranted to acknowledge the reduced confidence in growth projections using currently available data.
- The FAA approved the GA operations forecasts on February 7, 2023. This approval does not constitute justification for future projects. Justification for future projects will be made based on activity levels at the time the project is requested for development. Documentation of actual activity levels meeting planning activity levels will be necessary to justify Federal funding for eligible projects.
- All GA airport operations estimates and forecasts presented in the 2022 MnSASP shall not be used for individual airport planning or funding decisions. Each airport is expected to prepare their own aviation activity forecast for FAA review and approval as a basis for justifying the planning and proposed development identified in the airport sponsor's Capital Improvement Plan (CIP).

Figure 3.1. Airports with an ATCT in the Minnesota State Aviation System



Sources: MnDOT Aeronautics, 2021; FAA Airport Data and Information Portal (ADIP), 2021

3.2. Baseline Operations at GA Airports

Calculating baseline operations is a cornerstone of many aviation planning tasks, serving as the foundation upon which forecasts are developed. Because of their importance during planning and investment decision-making processes, forecasts must be reviewed or approved by the Federal Aviation Administration (FAA) during system and master planning, respectively. Yet despite their importance, calculating operations at non-towered airports is difficult and often a costly and time-consuming endeavor. This challenge is well-recognized in the field of aviation planning and has prompted the authorship of several Airport Cooperative Research Program (ACRP) studies. Studies on the topic include *Synthesis 4: Counting Operations at Non-towered Airports* (2007) and the updated *Report 129: Evaluating Methods for Counting Aircraft Operations at Non-towered Airports* (2015).

Since the 2015 study was released, new FAA regulations came into effect that promised to significantly enhance the quality and availability of operations data at all airports. Aircraft flying in controlled airspace and at certain altitudes in uncontrolled airspace were required to install Automatic Dependent Surveillance-Broadcast (ADS-B) out equipment no later than January 1, 2020 as part of the agency's NexGen initiative. While NextGen remains promising, several issues have complicated the program's efficacy in obtaining operational counts at many small airports. The accuracy of ADS-B data depends on the percent of aircraft using an airport that are ADS-B out-equipped, coverage provided by the receiver at the airport, and the type of operations being conducted. Notably, flight training and military operations are generally under-counted due to technological limitations. Further, pilots operating at rural GA airports, such as those outside of Minnesota's urban cores, rarely fly in controlled airspace. For these reasons, ADS-B technologies may someday offer a solution to the challenges faced by many non-towered airports but do not yet offer the level of accuracy significantly better than other types of available operational counting strategies.

Despite these improvements, non-towered airports are at a significant disadvantage in terms of obtaining accurate information about the type and number of operations occurring at their facilities. This includes 120 non-towered state system airports in Minnesota (four GA airports in the state system have an ATCT). In general, operations counting at non-towered airports involves either calculating numbers based on available data (e.g., filed flight plans, number/type of based aircraft, fuel sales, etc.) or deploying a technology-based solution such as acoustical counters and video-capturing devices, or conducting visual surveys. The following section provides an overview of such technologies, each of which can aid in estimating operations occurring at a particular airport. Then, a Minnesota-specific alternative is proposed that estimates operations using available data.

3.2.1. OPERATIONS COUNTING TECHNOLOGIES

Many operations counting technologies exist and vary widely in terms of how data are captured, processed, and reported out. The accuracy of the results also differs based on factors including, but not limited to, airfield layout, type(s) and volume of activity occurring, and airport staff's ability and available time to manipulate and process the data. Airports that are considering deploying an operations counting technology should carefully evaluate the available alternatives and select the options that most closely aligns with their unique needs. This often involves consultation with the manufacturers directly, who are generally in the best position to provide airport-specific information about performance characteristics, installation needs, device efficacy, pricing, and other considerations important in the selection process. Table 3.1 provides an overview of the most common operations counting technologies on the market today, with additional narrative following.

Table 3.1. Overview of Ops Counting Technologies

Methodology	Tool/Instrument (Product Name)	Provider	Description	Pros	Cons	Cost	Potentially Suitable Facility Condition(s)	Accuracy
Automated Acoustic Counters (AACs)	Automated acoustical counter (Aircraft Detection System [ADS] 4000 Phoenix)	Wilderness Systems and Technologies	This type of device operates by monitoring acoustic signals and recording only those that match an aircraft takeoff. This count of takeoffs is multiplied by two to calculate the total number of operations with the assumption that the aircraft will eventually terminate the flight at the same airport of origin.	1) Durability 2) Accuracy rate over 90 percent is possible 3) Low maintenance needs, including the ability to be untouched for several months, even in below-freezing temperatures	1) Difficulty in recording quieter aircraft 2) Multiple devices needed for longer runways 3) Difficulty in capturing touch-and-go operations 4) No supplemental aircraft information is provided by the device (e.g., no information about type of aircraft, etc.)	$4,950 per unit	Automated acoustical counters are generally best suited to airports with limited touch-go operations and a single runway less than 5,000 feet long. Airports with longer runways require multiple units to be deployed to accurately capture operations. This type of unit may be suitable for rural airports without on-site staff members due to low maintenance needs.	A study completed by the Florida Department of Transportation (FDOT) in 2018 deployed this type of device across eight GA airports. This assessment calculated an overall accuracy of 61 percent. The accuracy of results at individual airports ranged from 2 to 76 percent. ACRP Report 129 cites that accuracy can be as high as 90 percent if installed correctly and suitable facility conditions are met.
Radio Transmissions	General Audio Recording Device (G.A.R.D.)	Invisible Intelligence, LLC	G.A.R.D. monitors an airport's UNICOM frequency and uses automated recognition to identify and record airport traffic to a computer hard drive. The software uses an algorithm to analyze communications, and users input the estimated number of transmissions per arriving and departing aircraft. Based on user input and recordings, the software provides an estimated number of operations.	1) Accuracy can be high (up to 91 percent according in an FDOT study) 2) Testimonials from several GA airports describe the accuracy as high	1) Accuracy can vary greatly by the variance of radio communications at an airport. The higher the variance, the less accurate the system will be as the device uses a baseline number of transmissions inputted by the user 2) No supplemental aircraft information is provided by the device	$3,950 (software, interface box, operation count software, radio scanner, computer)	G.A.R.D. is best suited to airports that support a consistent type of operation, which may increase the accuracy of user-input settings impacting calculated results. Airports with significant flight training activity may not be the best candidates for this technology, as student pilots may transmit messages at a different rate than more experienced pilots. The system must be placed in the same room as the UNICOM system and next to a window. Metal roofs and white noise on frequency can affect the system's ability to record operations.	Based on the FDOT study completed in 2018, the overall accuracy was recorded at 85 percent. Individual airport accuracy ranged from 37 to 91 percent.
Video Imaging	Camera system, RADAR receiver, and flight plan tracker (VANTAGE)	Vector Airport Systems	VANTAGE is an automated aircraft identification and tracking system that utilizes a combination of ground-based video image detection (VID), RADAR, and other sources to detect operations. The VID system is able to capture N-numbers to provide details on specific aircraft, unlike many other available technologies.	1) Can capture aircraft N-numbers to obtain aircraft type, make, model for further analysis 2) Very accurate when combined with NextGen data (greater than 90 percent accuracy) 3) Backed by multiple data sources, allowing for all weather types and lighting conditions	1) Very expensive	$25,000+ for purchase and installation, $10,000+ annually to maintain	When combined with the NextGen data product provided by L3Harris, this package is designed to work with all airports that have installed a camera system (aircraft ID pods) on the airfield and an ADS-B receiver attached in a high place with good lateral clearance around.	L3Harris asserts that the NextGen data provide 99 percent accuracy, with the VANTAGE system backing up this claim. An ACRP report completed in 2015 reported accuracy results of 90 percent for the Vector system alone. The 2018 FDOT study tested the device at two airports and found the overall accuracy to be 89 percent with Vector alone (1,842 operations captured compared to 2,064 actual).

Methodology	Tool/Instrument (Product Name)	Provider	Description	Pros	Cons	Cost	Potentially Suitable Facility Condition(s)	Accuracy
Satellite Tracking	ADS-B Receivers, FAA's System Wide Information Management (SWIM) database, Radio Detection and Ranging (RADAR), multilateration tracking (MLAT)	FlightAware	FlightAware operates with company-issued and crowd-sourced ADS-B receivers to capture ADS-B and Mode S-equipped aircraft. Airports can purchase flight history reports to obtain historic activity. This technology pulls in data from the FAA's SWIM database and RADAR feeds to provide a "Hyperfeed" for airport and airspace operations.	1) Draws results from multiple sources beyond ADS-B 2) Option to purchase individual airport reports with up to a 36 -month history 3) Can be more cost-effective when purchased on a subscription basis	1) Can be expensive if reports are pulled frequently 2) Records touch-go-operations as one operation, rather than multiple for each landing or takeoff 3) Does not capture military operations	12-month reports can range from $450 for a Landing Strip Turf up to $4,500 for MSP (all without aircraft ownership data, which costs about 30 percent more)	Airports with limited touch-go operations and comprehensive tracking coverage are best suited for this technology. Refer to the following link for the latest coverage map: https://flightaware.com/adsb/coverage/#data-coverage.	No published statistics are available. Accuracy is based on the volume of touch-go-operations at the airport, which are only counted as one operation.
	ADS-B Receivers, RADAR, MLAT	FlightRadar24	FlightRadar24 employs receivers that capture Mode-S signals. The subscription provides live flight tracking and can capture registration, type, age, ground speed, real-time position, squawk code, altitude, airspeed, and other data. Business subscriptions provide three years of flight/aircraft history. This option is only applicable for International Air Transportation Association (IATA)-registered airports.	1) Potentially very low-cost 2) Widespread implementation 3) Provides additional flight attribute data that can be helpful towards other airport planning efforts	1) Ability to capture touch-and-go and VFR traffic is questionable 2) Not available to airports that are not registered by IATA	Equipment - Free if there is a coverage gap in the company's network Subscription - $499.99/year or free (see notes)	Airports registered in IATA with limited touch-go operations are best suited for this technology.	No published statistics available.
	ADS-B Receivers, FAA's SWIM database, MLAT (RadarBox)	AirNav	This technology depends on receivers that capture ground and satellite-based Mode-S signals. The subscription service also taps into other data sources including FAA SWIM, and MLAT. The subscription provides live flight tracking and can capture registration, type, age, ground speed, real-time position, squawk code, altitude, airspeed, etc.	1) Potentially very low-cost 2) ADS-B feed can be merged with other sources to capture aircraft not equipped with ADS-B	1) Ability to capture touch-and-go and VFR traffic is questionable	Equipment - $200 for standard ADS-B receiver, free if there is a coverage gap Subscription - $399.50/year or free	Airports with limited touch-go operations and comprehensive tracking coverage are best suited for this technology.	No published independently assessed accuracy statistics available. AirNav cites an accuracy of 99 percent.

Sources: Kimley-Horn, 2021; Various manufacturers'' websites, 2021; ACRP, 2015; FDOT, 2018

3.2.1.1. *Automated Acoustics Counters*

An AAC is an acoustical device that can identify and capture departing aircraft by the unique acoustic signature emitted. These counted takeoffs are multiplied by two to calculate an estimated total number of aircraft operations at the airport. Wilderness Systems and Technologies provides an AAC device to airports called the ADS 4000 Phoenix. This device costs $4,950 at the time of publishing and is advertised to be durable enough to be untouched for several months, even in below freezing temperatures. Based on information obtained during the MnSASP, the developer reported that the device is designed for small turf runways, which would imply that it is best suited for Landing Strip Turf airports in Minnesota. However, the device has difficulty recording relatively quiet aircraft such as small single-engine propeller aircraft, which are common users of Landing Strip Turf airports in Minnesota. According to a study completed by FDOT in 2018, the ADS 4000 Phoenix struggles to accurately count operations for runways longer than 5,000 feet if only one unit is installed. Difficulty in capturing touch-and-go activities was also cited by the FDOT study.

With these limitations, the ADS 4000 Phoenix is only recommended at Intermediate Small airports with shorter runways and limited touch-go operations. The developer reported that the ADS 4000 Phoenix is operating at 12 airports in Minnesota on a 24/7 basis (as of the of fall 2021). **Figure 3.2** depicts an installed AAC from three perspectives.

Figure 3.2. AAC Installation

Source: Kimley-Horn, 2018

3.2.1.2. *Radio Transmissions*

General aviation airports can track aircraft operations through monitoring aircraft radio frequencies. G.A.R.D. records aircraft operations by counting radio transmissions registered by an airport's UNICOM station. A UNICOM station establishes radio frequencies for airports to provide flight advisories to nearby aircraft and for pilots to report their position to other aircraft. G.A.R.D. taps into an airport's UNICOM and uses automated speech recognition to identify distinct aircraft on frequency. The software is configured to review the communications on UNICOM and identify a relevant operation based on a pre-established number of transmissions that constitutes an arriving/departing aircraft. Based on device settings established by users, the device identifies arriving/departing aircraft and excludes aircraft transitioning through nearby airspace that are not conducting an airport operation. However, G.A.R.D. is not able to account for pilots transmitting on UNICOM either more or less frequently than the users-established number of transmissions. In these cases, G.A.R.D. can inaccurately count operations. Accordingly, G.A.R.D. is suitable for airports that observe consistency in pilot communication on UNICOM. According to a study completed by FDOT, the overall accuracy of the G.A.R.D. was recorded to be 85 percent, with one airport recording 91 percent accuracy (note the accuracy is highly dependent on the precision of user data parameters; namely, the number of transmissions estimated per takeoff or landing). **Figure 3.3** shows the final G.A.R.D. installation including hardware and graphical interface.

Figure 3.3. G.A.R.D. Final Installation Hardware (left) and Graphical Interface (right)

Source: Kimley-Horn, 2018

3.2.1.3. Video Imaging

Vector Airport Systems provides an operations counting device called VANTAGE that uses a combination of ground-based video imaging, RADAR, and flight plan tracking.[3] Unlike acoustical counters, the VANTAGE system can capture more details on operating aircraft by using video imaging to record aircraft registration numbers, also known as "N-numbers." This ground-based equipment is installed on the airfield to capture N-numbers of arriving/departing aircraft, as pictured in **Figure 3.4**. Airports can also elect to pair the VANTAGE system with the Xtend product by L3Harris to incorporate the FAA NextGen data feed, enabling greater accuracy and visibility to provide more aircraft/flight details (i.e., date/time of operation, operation type, tail number, flight number, runway used, aircraft operator information). The device manufacturer reports that the VANTAGE system coupled with the Xtend product by L3Harris is 99 percent accurate in capturing aircraft operations.

[3] Vector (2021). "Vantage Automated Aircraft Identification System." Available online at https://9c679666-ee7a-4e01-9a24-69deb1efe2b2.filesusr.com/ugd/0af77d_bb33b9c80e054b8eb279295bf23daa41.pdf (accessed August 2021).

Figure 3.4. VANTAGE Video Imaging Equipment

Source: Vector Airport Systems, 2021

The cost to purchase and implement this solution is estimated to be at least $25,000, with an additional $10,000 in annual maintenance costs. This may be prohibitive for many smaller GA airports in Minnesota with limited funding availability. As such, this system is best suited for larger GA and commercial service airports that may have greater financial resources. These airports may also more greatly benefit from the level of detail this solution provides.

3.2.1.4. Satellite Tracking

As a part of the FAA’s NextGen initiative to improve the National Airspace System (NAS), ADS-B utilizes satellite tracking to capture aircraft operations more accurately and efficiently than conventional RADAR. As of January 1, 2020, all aircraft operating in airspace defined in 14 Code of Federal Regulations (CFR) Part 91.225 are required to have an ADS-B out receiver equipped. In response, several providers have emerged to leverage ADS-B to provide accurate flight tracking capabilities to airports. ADS-B tracking is typically complemented by other data sources and tracking capabilities such as the FAA's SWIM database and RADAR MLAT systems. These federal programs help to identify aircraft not yet equipped with an ADS-B out transponder to broadcast their positions. An overview of several of the largest manufacturers operating in the United States (U.S.) is provided below.

FlightAware

FlightAware owns a network of company-issued and crowdsourced ADS-B receivers in the U.S. to capture aircraft equipped with ADS-B and Mode S. The company also leverages other data sources such as FAA's SWIM, RADAR feeds, and MLAT to provide a "Hyperfeed" for airport and airspace tracking.[4] This allows the system to capture some aircraft operating under VFR or without an FAA-filed flight plan. However, FlightAware is unable to record military operations and records touch-and-go activity as one operation, rather than isolating each instance of a takeoff/landing. This can significantly undercount operations at airports that witness a large volume of flight training and military activities.

Airports can purchase historical reports of activity from FlightAware. Depending on the timeframe and airport type (i.e., activity levels), historical 12-month reports range from approximately $450 to over $4,500. Such one-time purchases can be more cost-effective for airports looking for historical snapshots on-demand. Continuous, subscription-based data services are also available.

FlightRadar24

FlightRadar24 employs a combination of data feeds including ADS-B, RADAR, and MLAT to provide real-time flight tracking. All users can view basic flight and aircraft details for each tracked operation. Paid subscribers can gain visibility to other aircraft/flight/weather details (aircraft serial number, age, vertical speed, wind conditions etc.) and up to three years of historical data.[5] The top-tier business subscription for airports provides all available information and up to three years of historical data.

The FlightRadar24 business subscription operates on a yearly subscription basis at $499.99 per year (as of fall 2021). However, if an airport is willing to install a complimentary ADS-B receiver and make the data publicly available, the yearly fee is waived. While FlightAware may provide the most cost-effective solution for some airports, the technology is still limited in its ability to capture touch-and-go and VFR operations. As such, FlightRadar24 may not be appropriate for all airports.

AirNav RadarBox

AirNav's RadarBox provides real-time flight tracking using a combination of 12 different data feeds, including ADS-B, FAA's SWIM, and MLAT. With the free basic access, all users can view basic aircraft and flight details (aircraft type, altitude, location, arrival/departure airport, serial number). Like FlightRadar24, paid subscribers have access to additional aircraft, flight, and weather details (ground speed, vertical speed, aircraft age, weather RADAR layers) and can pull more than a week's worth of historical flight data. The business subscription provides all available flight data for up to a year's worth of historical flights collected by RadarBox.

[4] FlightAware (2021). "FlightAware's Data Sources." Available online at https://flightaware.com/about/datasources/ (accessed November 2021).

[5] FlightRadar24 AB (2021). "Subscription Plans." Available online at https://www.flightradar24.com/premium?utm_source=website&utm_medium=nav&utm_campaign=menu_subs (accessed November 2021).

RadarBox's business subscription is available on a monthly ($39.95 per month) or yearly subscription basis ($399.50 yearly). AirNav provides and installs an ADS-B receiver at airports able to fill a gap in its flight tracking coverage free of charge. Additionally, the business subscription cost is waived if the airport elects to make the data public. With the undercounting associated with touch-and-go operations, RadarBox is best suited for airports with limited flight training or military activities.

3.2.2. OPERATIONS AT MINNESOTA'S NON-TOWERED GA AIRPORTS

As highlighted by the previous section, non-towered airports have several potential options to capture operational activity. Alternatives vary in accuracy, data limitations, cost, ability to access historical details, data process requirements, and other variables. In some cases, airports may opt to visually survey takeoffs and landings. A staff member or volunteer can manually report operations during different time periods of the year (e.g., winter, summer, special events). Collected data can then be extrapolated to estimate annual operations. Well-designed surveys that account for factors including seasonality and special events can provide high-quality results sufficient for planning-level activities at many airports.

In addition to the operations counting strategies deployed at the individual airport level, the FAA's Operations & Performance Database comprises several systems that record historical aircraft operations, aviation forecasts, and delay statistics nationally (reported by airport). The Operations Network (OpsNet) is the FAA's official source for air traffic operations. OpsNet continuously captures operations data for airports with an ATCT (or towered airports).[6] The FAA also manages the Traffic Flow Management System Count (TFMSC) data repository. The TFMSC records flights conducted under Instrument Flight Rules (IFR), for which flight plans were filed with the FAA, and when some en route flights are detected in the NAS. The TFMSC is typically considered the most complete dataset of aircraft operations in the U.S., with over 97 percent accuracy at the nation's busiest airports. However, the TFMSC is insufficient for obtaining data about many GA airports because flights conducted under VFR are generally excluded. OpsNet only captures data from ATCTs. Both the TFMSC and OpsNet are critical in understanding activity with the NAS despite these limitations. Additionally, the FAA maintains 5010 Airport Master Records for all airports in the U.S. 5010 Airport Master Records include operations by type (e.g., air carrier, air taxi, military, GA local, GA itinerant, etc.). However, data are reported by airport managers/sponsors without validation. Data may significantly under- or over-report activity that are actually occurring.

The goal of the 2022 MnSASP was to develop a strategy to overcome the data limitations of OpsNet and the TFMSC while adding a layer of validity and accuracy to data in the 5010 Airport Master Record. The resulting approach couples federal and local 5010 data to provide a recommended methodology to estimate operations at non-towered GA airports in Minnesota. Airport sponsors and planning consultants are encouraged to consider using these baseline counts in their own planning efforts unless actual data are captured via an operations counting technology, survey, or other validated process.

While MnDOT Aeronautics acknowledges that the results obtained from this effort are based on extrapolation, they provide uniformity, transparency, and standardization in how they were obtained. Airport operations estimates developed in the MnSASP are used to aggregate operations for system planning. Individual airport information shall not be used independently for establishing an airport's

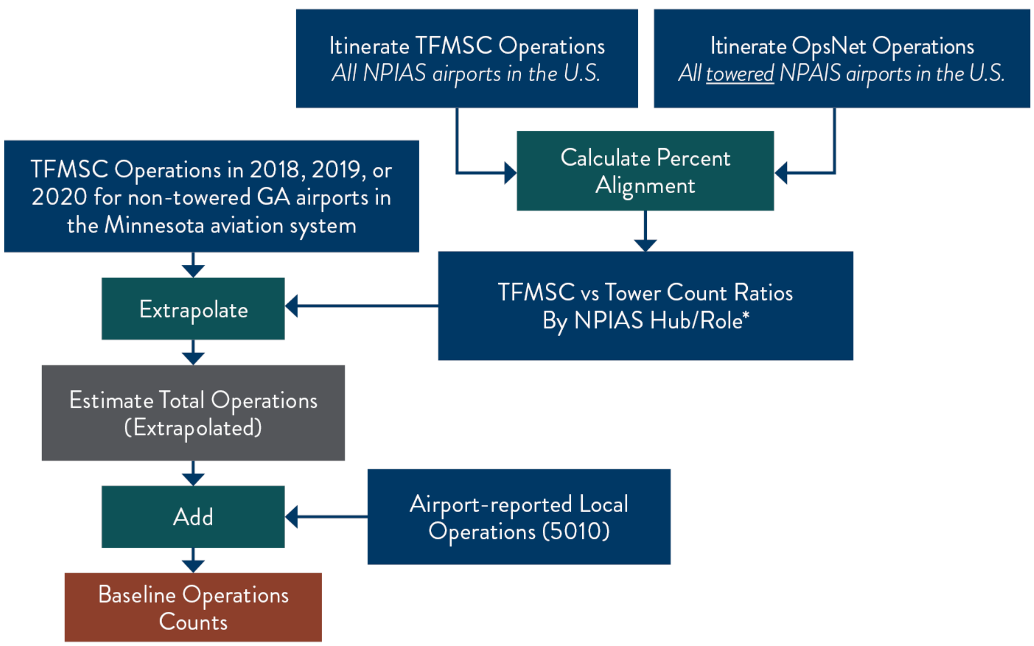
[6] Note it is acknowledged that many ATCTs do not operation 24 hours a day, 7 days a week (24/7). However, this analysis assumes that towers provide the most accurate source of data available and do capture most operations occurring at an airport.

forecast and/or funding decisions. Airport sponsors should coordinate with their assigned MnDOT Aviation Planner and the FAA (National Plan of Integrated Airport Systems [NPIAS] airports only) prior to beginning any forecasting effort to confirm the suitability of baseline operations employed in an airport-specific analyses.

3.2.2.1. Methodology

The 2022 MnSASP leveraged federal databases combined with airport-specific estimates to generate a standard methodology for obtaining baseline operations for Minnesota's non-towered GA airports. In summary, the MnSASP employed OpsNet and the TFMSC to estimate operations conducted via IFR at non-towered, GA Minnesota system airports, then added local operations reported on each airport's 5010 Airport Master Record (assumed to fly using VFR). **Figure 3.5** summarizes the 2022 MnSASP methodology.

Figure 3.5. MnSASP Baseline Annual Operations Methodology Process



**Note: Non-NPIAS airports applied the nationwide TFMSC vs OpsNet percent alignment for Local/Basic airports.*
Source: Kimley-Horn, 2021

As the first step in the Minnesota operations counting methodology, the percentage between itinerant traffic captured by OpsNet versus reported in the TFMSC was calculated for all towered airports in the U.S. While OpsNet generally provides the most accurate data available, activity occurring when an ATCT is closed is not captured. A portion of operations conducted when the tower is closed would be reported in the TFMSC but not in OpsNet. Only itinerant traffic was considered in the TFMSC versus OpsNet alignment to prevent duplication with adding airport-reported local operations from the 5010 (the last step of the operations counting methodology as illustrated in **Figure 3.5**). The itinerant TFMSC versus itinerant OpsNet alignment percentages were calculated by Nonprimary NPIAS role (i.e., National, Regional, Local, Basic, Unclassified). Due to the low sample size of towered Local and Basic airports nationwide (14 and 2, respectively), the TFMSC versus OpsNet alignment percentages were combined for both roles to create a "Local/Basic" average of itinerant TFMSC versus itinerant OpsNet percentage alignment.

It was determined that the itinerant OpsNet versus itinerant TFMSC percent alignment by Nonprimary Role provided the most granularity and were therefore carried forward in the analysis. Additionally, calculating the percentages can be replicated to determine baseline operations in future years for system planning purposes. Percentages were calculated for 2018, 2019, and 2020 (the reason for which is explained in the following steps). **Table 3.2** presents the TFMSC versus OpsNet percent alignments applied in the methodology. At National facilities, the number of operations reported in TFMSC is approximately 34 percent of those reported in OpsNet. This means that 34 percent of operations reported in the TFMSC were also reported in OpsNet. However, that percent alignment generally decreases as airports become smaller, with GA – Local/Basic airports reporting a correlation of approximately 15 percent. This is not surprising, as smaller airports generally do not have an active ATCT. Further evaluation is warranted to understand the various factors that could be impacting the percent of operations reported in the TFMSC versus OpsNet, as well as the potential implications for planning efforts that rely on the data being reported in the two repositories.

Table 3.2. Itinerant OpsNet versus Itinerant TFMSC Percent Alignment by Nonprimary Role

NPIAS Role	No. of Airports	TFMSC VS OPSNET Alignment – 2018	TFMSC VS OPSNET Alignment - 2019	TFMSC VS OPSNET Alignment - 2020
GA - National	75	38.2%	37.2%	34.2%
GA - Regional	123	18.4%	17.9%	17.1%
GA – Local/Basic	16	16.4%	15.3%	14.5%
GA – Unclassified*	1	42.6%	49.9%	46.1%

**Note: There is one Unclassified non-towered airport in the U.S. The results of this percent alignment were not employed during subsequent steps of the methodology due to the sample size. Sources: FAA OpsNet (accessed May 2021); FAA TFMSC (accessed May 2021); Kimley-Horn, 2021*

The percentages presented in **Table 3.2** were then multiplied by total operations by airport reported in the TFMSC for all non-towered airports in the Minnesota state aviation system. The percentage for GA – Local/Basic airports was applied to non-NPIAS facilities.[7] The percentage year varied because the results of this analysis were added to local operations reported in 5010 Airport Master Records (as will be discussed in the next step). 5010 Airport Safety Inspections typically occur on a three-year cycle which ranged from 2018 to 2020 at the time of analysis.[8] The 2022 MnSASP planning team felt it was important to maintain consistency between the percent alignment year, airport-specific data from the TFMSC, and the airport's latest 5010 Airport Master Record.

This extrapolation resulted in the estimated GA itinerant and military traffic. Airport-reported local operations from the 5010 Airport Master Record were then added. Per the FAA, local operations are defined as operations performed by an aircraft that remain in the local traffic pattern, execute simulated

[7] While there is one Unclassified towered airport in the U.S., this sample size is insufficient to provide confidence in the results.
[8] Slayton Municipal Airport (DVP) was the only airport with 5010 Airport Master Record dating from 2017. Data years are different because 5010 Airport Safety Inspections are completed on a three-year cycle for airports without air carrier service.

instrument approaches or low passes at the airport, and operations to or from the same airport within a designated practice area within a 20-miles radius of the tower.[9] It was determined that the initial extrapolated results under-reported local traffic flying under VFR, and that airport managers could provide the most accurate estimation of this type of activity. The FAA publishes the airport's local operations in the 5010 Airport Master Record on a three-year cycle, accessible through the FAA's Airport Data and Information Portal (ADIP). As this data is updated regularly, easily accessible through ADIP, and could provide the most accurate estimates of local operations, the MnSASP incorporated these counts into the baseline annual operations methodology. It is understood that local operations published in the 5010 Airport Master Record may be estimates provided by the airport manager with little validation. However, as discussed at the beginning of **Section 3.2**, it is difficult to count operations at nontowered airports. MnDOT Aeronautics recommends that airports consider the operations counting technologies described in **Section 3.2.1** to capture more robust and accurate baseline operations.

Local operations were obtained based on the airport's current (at the time of the analysis in May 2021) 5010 Airport Master Record, nearly all of which ranged from 2018 to 2020.[10] Extrapolated plus airport-reported local operations provide the baseline operations counts for non-towered GA airports in Minnesota. The equation is summarized as follows:

TFMSC x TFMSC vs OpsNet Ratio + 5010 GA Local Operations =
Extrapolated Baseline Operations at Non-towered GA Airports

OpsNet data (2019) was obtained for towered GA airports and carried forward into the forecasting task. A 2019 base year was selected because it was the most recent full year of data available when the analysis was conducted. Additionally, flight activity in 2020 was significantly impacted by COVID-19. The year 2020 did not provide an accurate representation of activity occurring in a typical year.

3.2.2.2. Results

Table 3.3 presents the aggregated total baseline operation counts generated from the Excel-based annual operations estimation tool for all GA airports in the Minnesota state aviation system. These extrapolated counts were compared with the airport-reported annual operations collected in triennial 5010 Airport Safety Inspections as reported on the 5010 Airport Master Records. Extrapolated baseline operations at all non-towered GA airports are estimated to be four percent higher than data recorded in the FAA's 5010 Airport Master Record. Extrapolated baseline operations at Minnesota's largest GA airports (Key GA) are 7 percent lower, indicating that these airports may be over-reporting operations. Intermediate Large, Intermediate Small, and Landing Strip Turf airports also have a similar comparison, indicating that airports statewide may be over-reporting operations. Extrapolated baseline operations at all 124 GA airports are 18 percent lower than reported in 5010 Airport Master Records. Airport-specific baseline operations counts are provided in **Table A.1** in **Appendix A. Operations Counting and Forecasting Tables.**

[9] Federal Aviation Administration (2023). "OPSNET Reports: Definitions of Variables" Available online at https://aspm.faa.gov/aspmhelp/index/OPSNET_Reports__Definitions_of_Variables.html (accessed January 2023).
[10] Ibid.

Table 3.3. Baseline Operation Counts by State Classification

State Classification	Number of airports	Total 5010 operations*	MnSASP Extrapolated baseline operations	Percentage difference
Key GA	22	623,166	577,446	-7%
Intermediate Large	36	437,000	347,341	-21%
Intermediate Small	46	402,674	296,714	-26%
Landing Strip Turf	20	69,157	41,458	-40%
Total	123	1,531,997	1,262,979	-18%

**Note: 5010 data reflect the most current available at the time of analysis in May 2021. Table A.1 in Appendix A indicates the data year for each airport. Sources: Kimley-Horn, 2021; FAA 5010 Master Record (accessed October 2021); FAA TFMSC (accessed May 2021); FAA's OpsNet (accessed May 2021)*

3.3. Forecasts of Aircraft Operations

Baseline operations calculated using the Minnesota-specific ops counting methodology described in Section 3.2.2 were carried forward into the MnSASP forecasting effort. The scope of this task encompasses operations at the state's 124 GA airports. Commercial service airports generally develop detailed forecasts as part of their own planning efforts. It should be noted that the MnSASP forecasting effort does not replace airport-specific forecasting efforts completed during master planning and published in the FAA's Terminal Area Forecasts (TAF).

Many factors inherent to and external from the aviation industry may impact future operations in Minnesota. This includes statewide, national, global trends associated with the economy; traveler behavior; regulatory requirements; and a host of other variables that affect how, why, and when people take to the skies. At the time of this writing in early 2022, the world continues to deal with the uncertainty associated with the ongoing impacts of COVID-19, although vaccines are now widely available in the U.S. While the pandemic has primarily impacted scheduled commercial service activities, the potential for new variants remains a threat. Interestingly, COVID-19 has correlated with a rise in GA activities for a variety of reasons. When asked about this issue during the MnSASP data inventory in spring 2021, GA airport managers nearly ubiquitously reported a rise in activity levels and fuel sales during the height of the pandemic. Any new COVID-related development could precipitate a rise or decline in activity based on geography, airport type, activity indicator (GA, commercial enplanements, air cargo tonnage, etc.), and other factors.

With the ongoing backdrop of COVID-19, the U.S. is facing inflation, a labor shortage, supply chain issues, and general economic uncertainty. The cost of crude oil is rising in many places in the world, including the U.S. Geopolitical unrest impends eastern Europe, with impacts that could threaten energy exports throughout the region. Closer to home, Minnesota's population is moving away from rural agricultural areas to urban centers. Such migration may shift demands on airports that provide the recreational, commercial, and quality-of-life benefits upon which nearby residents, businesses, and visitors rely.

Within the aviation industry, the small piston-powered GA fleet continues to shrink while demand for larger GA aircraft, including jets and rotorcraft, rises. The FAA and U.S. Environmental Protection Agency

(EPA) stress the health and environmental concerns associated with 100 low lead (100LL), which remains the only lead-containing fuel in the U.S. The U.S. Congress and these agencies have discussed banning 100LL although a viable alternative has not yet been identified. New aviation technologies such as electric aircraft with vertical/short takeoff and landing capabilities (eVTOL/eSTOL), are moving closer to commercial deployment. These technologies may make flight cheaper, greener, and more accessible than ever before. At the same time, traditional revenue streams (e.g., fuel flowage fees) could diminish while facility needs increase (e.g., hangar storage capacity, ramp space, electric charging stations).

In short, future aviation activities are uncertain, and year-over-year demand variations are expected. However, the MnSASP forecasts were developed in consideration of historic trends and projected future activities associated with socioeconomic conditions and national aviation projections. They are assumed to present an accurate view of future activities over the mid- and long-terms. Demand projections have been developed through 2040 at five-year increments (2025, 2030, 2035, 2040).

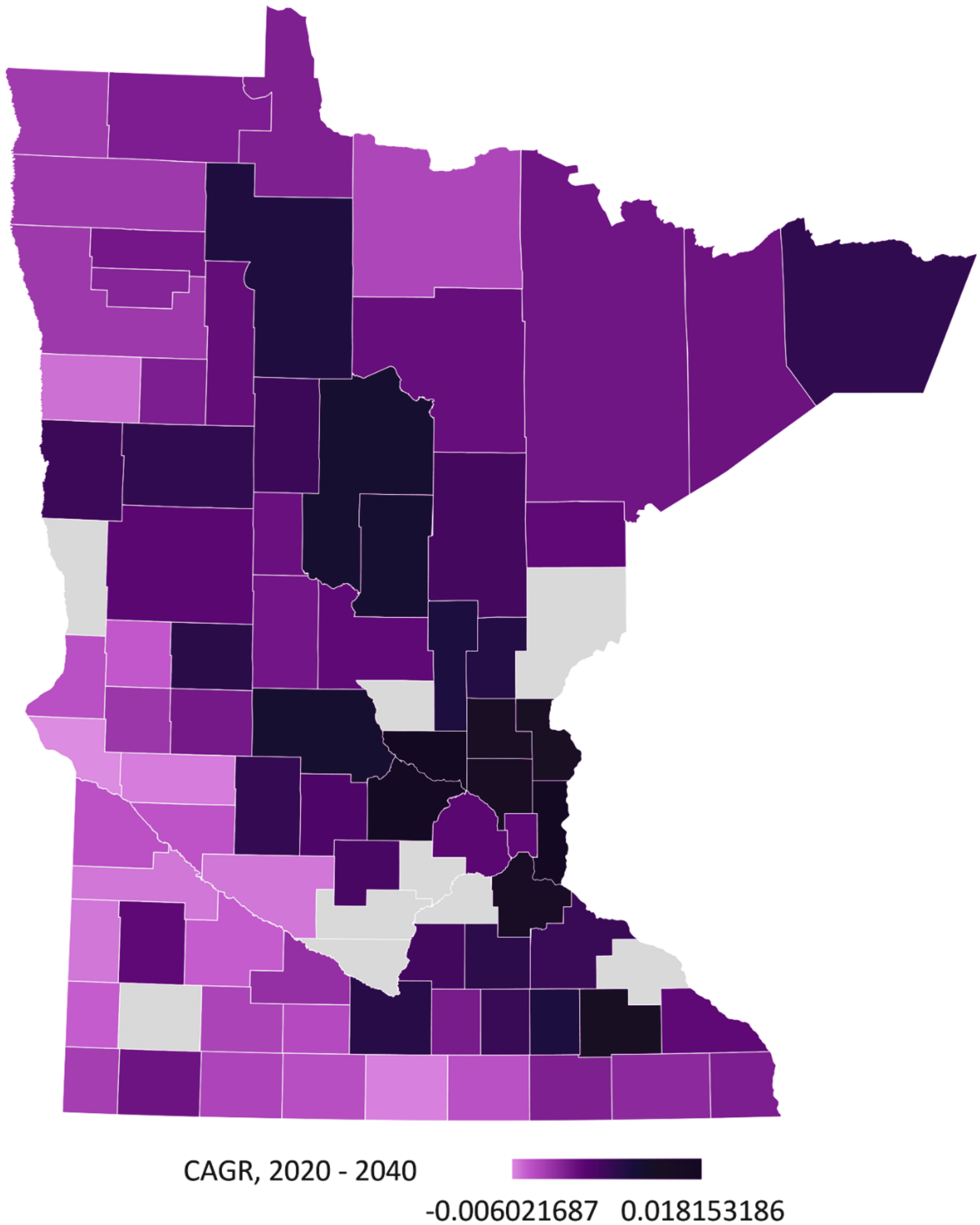
Four methodologies were evaluated to forecast civilian operations at each of Minnesota's 124 GA airports. Military activities were excluded because they are driven by federal policies and global forces and cannot be projected using GA methodologies. The MnSASP GA forecast methodologies looked at county-specific socioeconomic factors (population and per capita personal income [PCPI]) and national GA trends (flight hours flown). A methodology was also evaluated that blended the two socioeconomic factors (population and PCPI) and GA hours flown to account for the combined impacts of all variables. Based on discussions with MnDOT Aeronautics and the FAA, it was determined that methodologies should be selected by state classification to most effectively align drivers of aviation activity with future operations. As such, a "Mixed Methodology" is also presented. The Mixed Methodology is the preferred methodology of the 2022 MnSASP. A summary of each methodology is provided below, with airport-specific results presented in **Tables A.2 through A.7** in **Appendix A**.

3.3.1. SOCIOECONOMIC – POPULATION GROWTH BY COUNTY

Socioeconomic projections can be a useful indicator of future airport activity. The population living around GA airports typically represents its primary user base. Residents may also attract commercial, non-military government, other supporting aviation activities such as air cargo and medical air flying. As such, population growth may predicate an increase in operations occurring at an airport. This methodology assumes that GA operations are correlated with the projected population growth of the county in which each airport is located. County-specific population forecasts were obtained from Woods & Poole (W&P) for the 20-year planning horizon. Population growth rates were applied to the baseline operations counts, projecting each airport's operations through 2040. The same growth rates are applied to airports located in the same county.

As **Figure 3.6** shows, Minnesota's fast-growing counties in terms of population are projected to be Sherburne (1.82 percent compound annual growth rate [CAGR]), Washington (1.79 percent CAGR), and Wright (1.72 percent CAGR) counties. Twenty-six counties primarily located in southwest Minnesota are projected to lose population through the planning horizon. This aligns with the ongoing general trend of urbanization occurring in many U.S. states including Minnesota. The counties depicted in beige do not have state system airports.

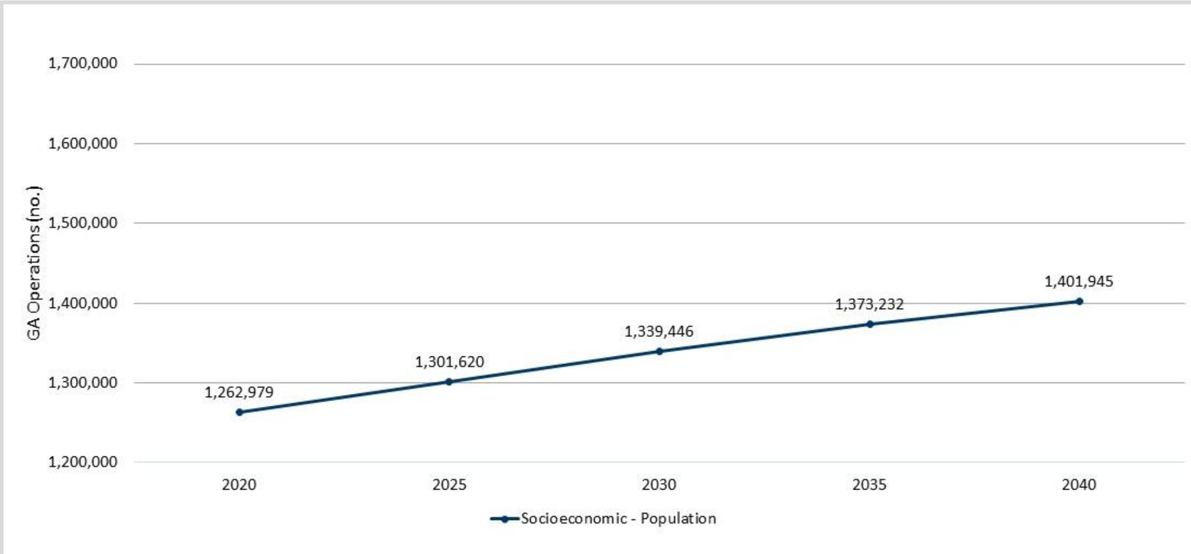
Figure 3.6. Population Growth Rates by Minnesota County, 2020 – 2040



Note: The counties depicted in beige do not have a state system airport. Source: W&P, 2021

The results of this analysis shown an increase from 1,262,979 baseline operations in 2020 to 1,401,945 by 2040, resulting in a 0.52 percent CAGR. This is the lowest growth rate evaluated as part of the MnSASP forecasting task. Individual airport results are included in Table A.2 in Appendix A.

Figure 3.7. MnSASP GA Methodology 1: Socioeconomic – Population Growth by County



Sources: W&P, 2021; Kimley-Horn, 2022

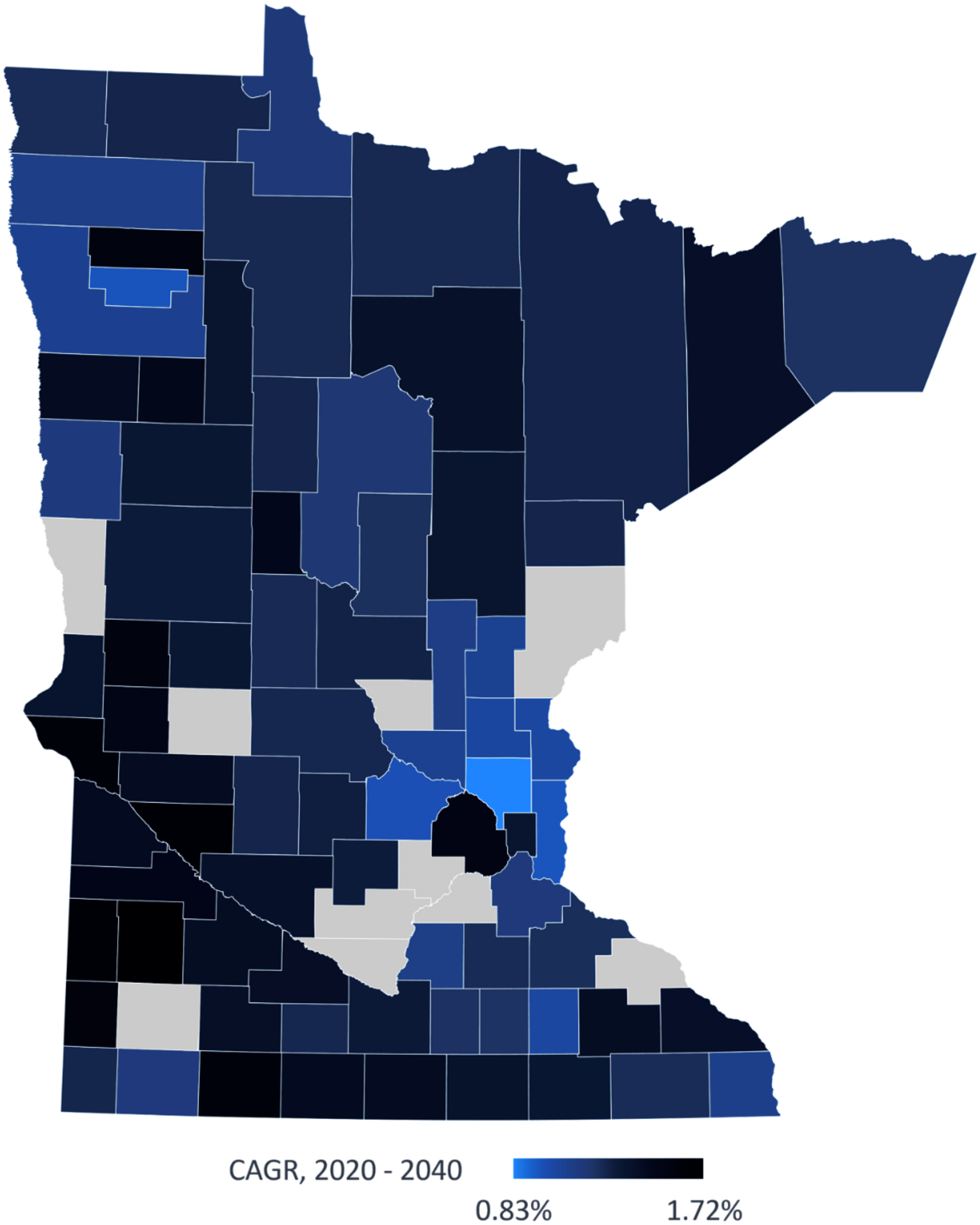
3.3.2. PCPI GROWTH RATES BY COUNTY

Projected income growth can also be an indicator of future airport activity. Engaging in some types of GA activities such as recreational flying and flight training is expensive for users. As such, there can be a correlation drawn between GA operations and PCPI. However, this methodology does not always adequately account for critical GA activities that are independent of the income of nearby residents. For example, aerial spraying, medical air flying, and government activities are all supported by GA facilities but not tied to PCPI.

This methodology assumes that airport activity is correlated with the projected PCPI growth of the county that each airport is located in. County-specific PCPI forecasts were collected from W&P for the 20-year planning horizon. Annual growth rates were applied to baseline operations counts by airport. Like the Population Growth Rates by County, airports in the same county are projected to grow at the same rate.

Figure 3.8 shows PCPI growth by Minnesota county between 2020 and 2040. All counties are anticipated to experience a rise in PCPI through the forecast horizon between 0.83 and 1.72 percent. Counties depicted in dark green are projected to experience the most significant percent growth rate. As depicted, income is generally rising most steeply in southwestern Minnesota, with Lyon, Lincoln, and Chippewa counties experiencing the highest CAGRs (1.72 percent, 1.56 percent, and 1.56 percent CAGRs, respectively). This is interesting because counties in this same region are anticipated to most rapidly lose population through 2040.

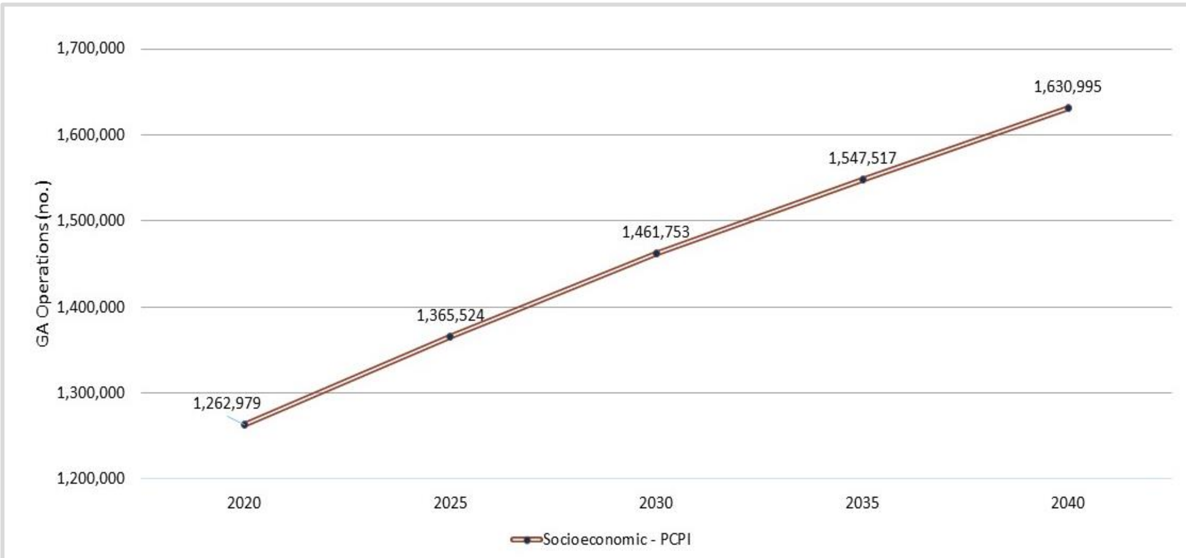
Figure 3.8. PCPI Growth by MN County, 2020 – 2040



Note: The counties depicted in beige do not have a state system airport. Source: W&P, 2021

The results of this analysis show that GA operations in Minnesota will increase from 1,262,979 in 2020 to 1,630,995 by 2040 for a CAGR of 1.29 percent (see Figure 3.9). This methodology projects the highest growth rate of all alternatives evaluated by the MnSASP. Individual airport results are included in Table A.3 in Appendix A.

Figure 3.9. MnSASP GA Methodology: Socioeconomic – PCPI



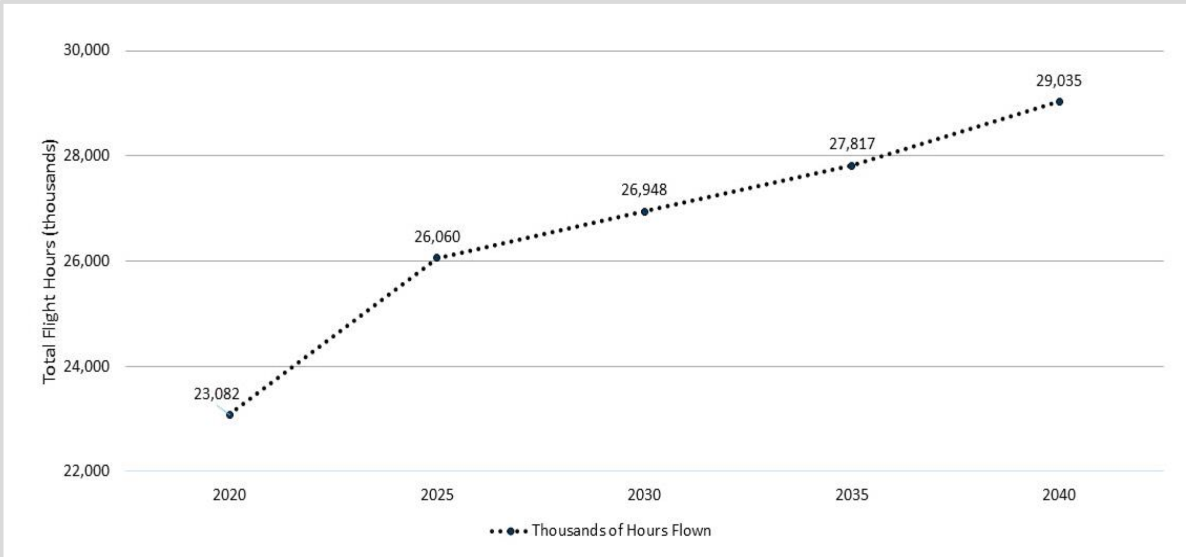
Sources: W&P, 2021; Kimley-Horn, 2022

3.3.3. U.S. TOTAL GA FLIGHT HOUR GROWTH RATES

The number of hours GA aircraft are flying in the NAS is an important indicator of demand on the system. Flight hours flown likely gauge capacity needs better than based aircraft, as some GA aircraft rarely. The FAA forecasts GA flight hours flown at a national scale as reported in the biennial Aerospace Forecasts. Forecast rates for the MnSASP were obtained from the *FAA Aerospace Forecasts, Fiscal Years 2021 - 2041 (Aerospace Forecasts 2021 - 2041*), which was the most current report available at the time of analysis. The *Aerospace Forecasts 2021 - 2041* project a higher annual growth rate in the near-term, with the pace of growth slowing in the mid-term. It is important to note that the FAA anticipates that growth in GA activity will be driven by the more sophisticated turbine-powered fleet (including rotorcraft) due in part to corporate flying. The fixed-wing piston-powered fleet may decline due to aging private pilots, the cost of aircraft ownership, and the availability of lost-cost alternative for recreational usage. According, the light sport aircraft category is predicted to grow through the forecast horizon, with the total fleet size expected to nearly double by 2040 based on the 2018 fleet.

Figure 3.10 shows the projected total number of hours flown by the total U.S. GA fleet. Between 2020 and 2040, hours flown are forecast to increase from 26,039 to 30,205 for a CAGR of 0.7 percent.

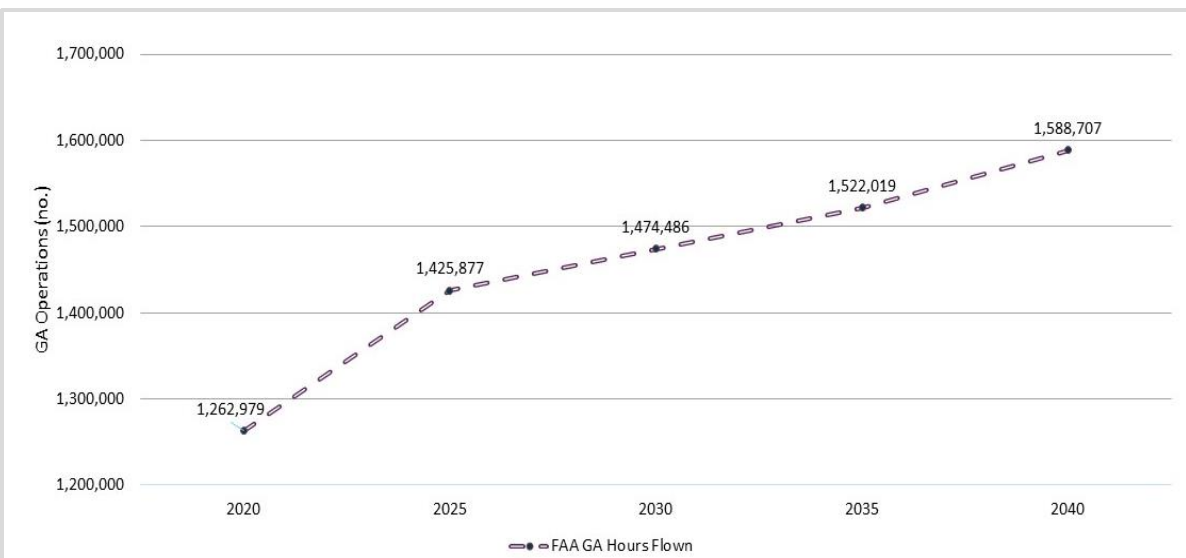
Figure 3.10. Projected U.S. GA Flight Hours Flown, 2020 – 2040



Source: FAA Aerospace Forecasts, 2021 - 2041

This methodology produces a growth rate of 1.15 percent in GA operations in Minnesota through the forecast period. As shown in Figure 3.11, total statewide operations are projected to reach 1,588,707 by 2040. Individual airport results are included in Table A.4 in Appendix A.

Figure 3.11. MnSASP GA Methodology: GA Flight Hours Flown



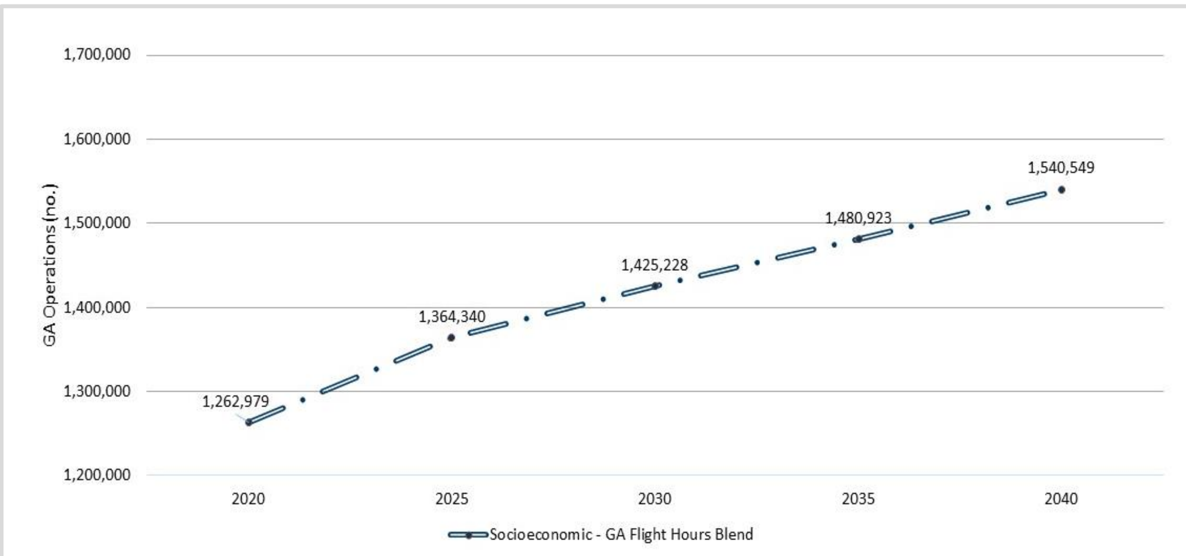
Sources: FAA Aerospace Forecasts, 2021 - 2041; Kimley-Horn, 2022

3.3.4. SOCIOECONOMIC – GA FLIGHT HOURS BLEND

Each of the variables considered in the methodologies discussed above provide insight into one driver of GA activity in Minnesota. As these various methodologies imply, the reasons people choose to fly as opposed to another mode of transportation are based on many factors including but not limited to required travel time, distance between origin and destination, reliability, modal preferences, cost, safety, and security. This methodology is designed to capture, in part, the complexity of aviation demand drivers by blending the aviation growth rates applied in the three previous methodologies.

This methodology yields a CAGR of 1.00 percent, representing an average of the two socioeconomic and one aviation-specific (i.e., GA hours flown) growth rates reported above. Statewide operations would increase from 1,262,979 in 2020 to 1,540,549 by 2040. Individual airport results are included in Table A.5 in Appendix A.

Figure 3.12. MnSASP GA Methodology: Socioeconomic – GA Flight Hours Blend



Sources: W&P, 2021; FAA Aerospace Forecasts, 2021 - 2041; Kimley-Horn, 2022

3.3.5. MIXED METHODOLOGY (PREFERRED)

As noted above, aviation demand is driven by a variety of factors. These factors are not the same for all airports. Indeed, the extent to which local socioeconomic factors, broader aviation trends, and other potential influences significantly differs between facilities. Current and future activities are highly influenced by the type of aviation activities typically supported by an airport. For example, a large corporation that depends on business aviation would affect an airport that primarily supports flight training quite different than one with the facilities and services to support business jets should that corporation locate nearby. Demand at the first airport, which typically witnesses a high amount of flight training, may not be impacted at all. Conversely, the second airport, which primarily supports business aviation, would likely witness an uptick in demand.

As this example highlights, the function(s) and facilities/services associated with individual airports play a vital role in understanding how factors of demand impact future activity.

Considering airport-specific demand drivers is a key task of airport master planning and generally outside of the scope of aviation system planning. However, a system plan can identify demand drivers affecting groupings of airports to add a layer of granularity into the analysis. Minnesota system airports are categorized into state classifications.[11] State classifications are defined by Part 139 certification status, runway length, and surface type (i.e., paved versus turf). As such, they provide insight into the types of aviation activities typically supported at those facilities and ergo key drivers of future activity. Accordingly, the MnSASP matched forecast methodologies with state classifications based on the demand drivers most likely to predict future activities. The proposed forecast methodology by classification, as well as the reasoning for each selection, is summarized in **Table 3.4**. This methodology is referred to as the "Mixed Methodology."

Table 3.4. Preferred Methodology by State Classification

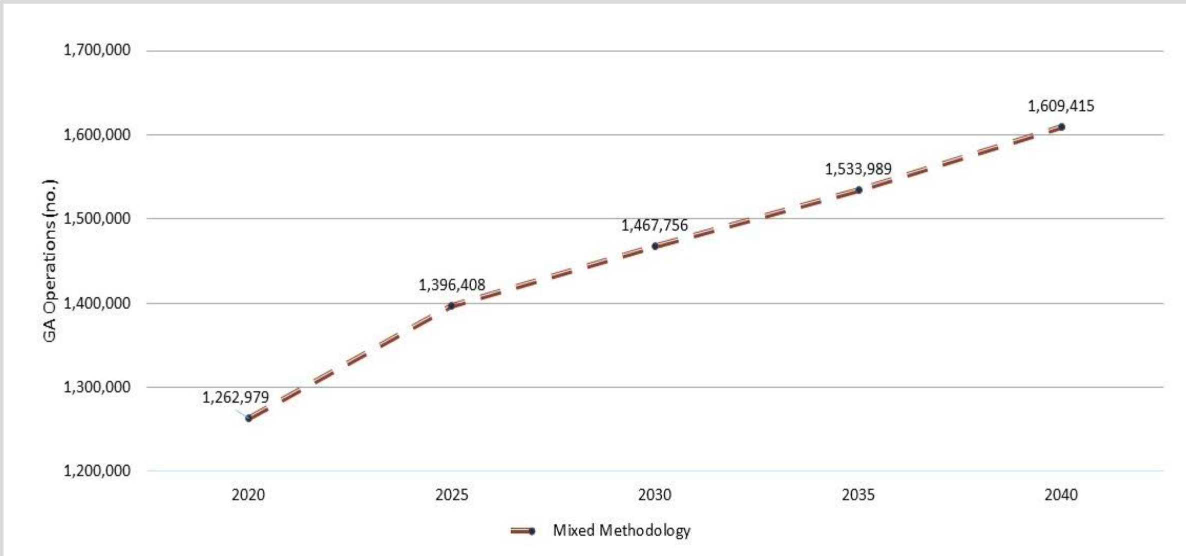
State Airport Classification	Forecast Methodology	Relevancy
Key GA	PCPI	With their longer runways, Key GA airports can support larger and/or more sophisticated aircraft typical of corporate and other demanding aviation activities. Because of the cost of operating such aircraft, it is assumed that PCPI would most likely correlate with projected demand.
Intermediate Large	GA Hours Flown	Intermediate Large and Small airports generally support recreational flying and flight training. Therefore, growth at Intermediate airports is most fundamentally driven by changes to the aviation industry itself. The FAA specifically looks at potential factors impacting these sectors when it developed that *FAA Aerospace Forecasts*. As such, it is assumed that GA Hours Flown would most effectively indicate change over time.
Intermediate Small	GA Hours Flown	See relevancy above (same as Intermediate Large).
Landing Strip Turf	Socioeconomic – GA Flight Hours Flown Blend	Activity at Landing Strip Turf airports is primarily driven by recreational flying and agricultural spraying. These diverse activities are principally correlated with nearby economic activities and local demographics. As such, the Socioeconomic – GA Flight Hours Flown Blend was selected as the most appropriate methodology to apply to future growth.

Source: Kimley-Horn, 2022

The Mixed Methodology projects a combined statewide growth rate of 1.23 percent over the planning horizon. GA operations would increase from 1,262,979 in 2020 to 1,609,415 by 2040. This equates to an additional 346,436 takeoffs and landings at Minnesota's GA airports over the next two decades. Statewide results of the Mixed Methodology are presented in **Figure 3.13**, within individual airport results included in **Table A.6** in **Appendix A**.

[11] *The classification of Minnesota's system airports is presented in Task 3: Validation of Phase I deliverables.*

Figure 3.13. MnSASP GA Methodology: Mixed Methodology



Sources: W&P, 2021; FAA Aerospace Forecasts, 2021 - 2041; Kimley-Horn, 2022

3.3.6. FORECAST METHODOLOGY EVALUATION RESULTS

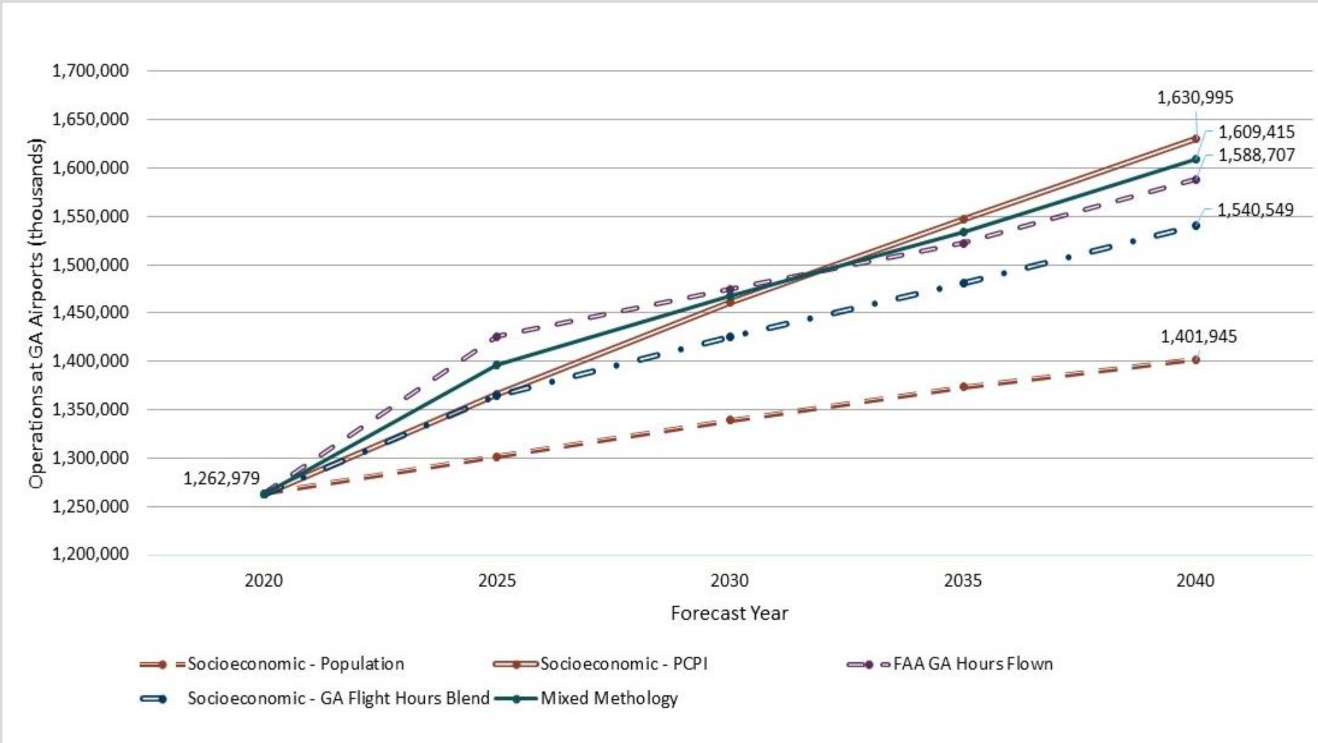
Summarized in Table 3.5, the five methodologies evaluated by the MnSASP indicate that GA operations at Minnesota's 124 GA airports may annually increase between 0.52 percent (Socioeconomic – Population Growth by County) and 1.29 percent (Socioeconomic – PCPI). Should this occur, 2022 MnSASP airports would support between 138,966 to 368,016 additional takeoffs and landings over the next two decades. Based on discussions with the FAA, MnDOT Aeronautics, and the Operations Counting and Forecasting Focus Area Working Group, the Mixed Methodology was ultimately selected as the preferred methodology of the 2022 MnSASP. This methodology most effectively accounts for the unique roles that system airports play within their communities and regions while producing a reasonable projection of growth through 2040 (1.22 percent CAGR). The preferred Mixed Methodology is shaded in dark grey in the table below. A summary of all evaluated methodologies is presented in Figure 3.14.

Table 3.5. MnSASP GA Operations Forecast Statewide Summary by Methodology

Methodology	2020	2025	2030	2035	2040	CAGR (%)
Socioeconomic – Population	1,262,979	1,301,620	1,339,446	1,373,232	1,401,945	0.52%
Socioeconomic – PCPI	1,262,979	1,365,524	1,461,753	1,547,517	1,630,995	1.29%
FAA GA Hours Flown	1,262,979	1,425,877	1,474,486	1,522,019	1,588,707	1.15%
Socioeconomic – GA Flight Hours Blend	1,262,979	1,364,340	1,425,228	1,480,923	1,540,549	1.00%
Mixed Methodology	**1,262,979**	**1,396,408**	**1,467,756**	**1,533,989**	**1,609,415**	**1.22%**

Sources: W&P, 2021; FAA Aerospace Forecasts 2021 – 2041; Kimley-Horn, 2022

Figure 3.14. MnSASP GA Operations Forecast Statewide Summary by Methodology



Sources: W&P, 2021; FAA Aerospace Forecasts 2021 – 2041; Kimley-Horn, 2022

3.3.7. COMPARISON WITH THE TERMINAL AREA FORECAST (TAF)

The FAA prepares the TAF to assist with the budget and planning needs of the agency, including demands on the NAS and airspace controllers. The TAF prepares airport-specific forecasts for busiest commercial service airports in the U.S. and detailed forecast models incorporating industry trends for all airports in the NPIAS. Advisory Circular (AC) 150-5070 (change 1), *The Airport System Planning Process*, indicates that state system plan forecasts should be compared with the TAF to ensure reasonableness.

A comparison of the baseline operations and forecasted operations at the 87 Minnesota GA airports in the TAF is provided in Table 3.6. The TAF projects that operations at these facilities will increase by 0.65 percent CAGR through 2040, while the MnSASP's preferred Mixed Methodology projects an increase of 1.23 percent CAGR during this same period. Additionally, the TAF and MnSASP evaluate a different number of baseline operations (1,134,615 in the MnSASP versus 1,347,805 in the TAF for a -15.82 percent difference). As a result of the differing growth rates and baseline operations, the disparity between the projected number of GA operations in the TAF versus the MnSASP shrinks over time. By 2040, a difference of 5.50 percent (84,372 operations) is anticipated between the two methodologies.

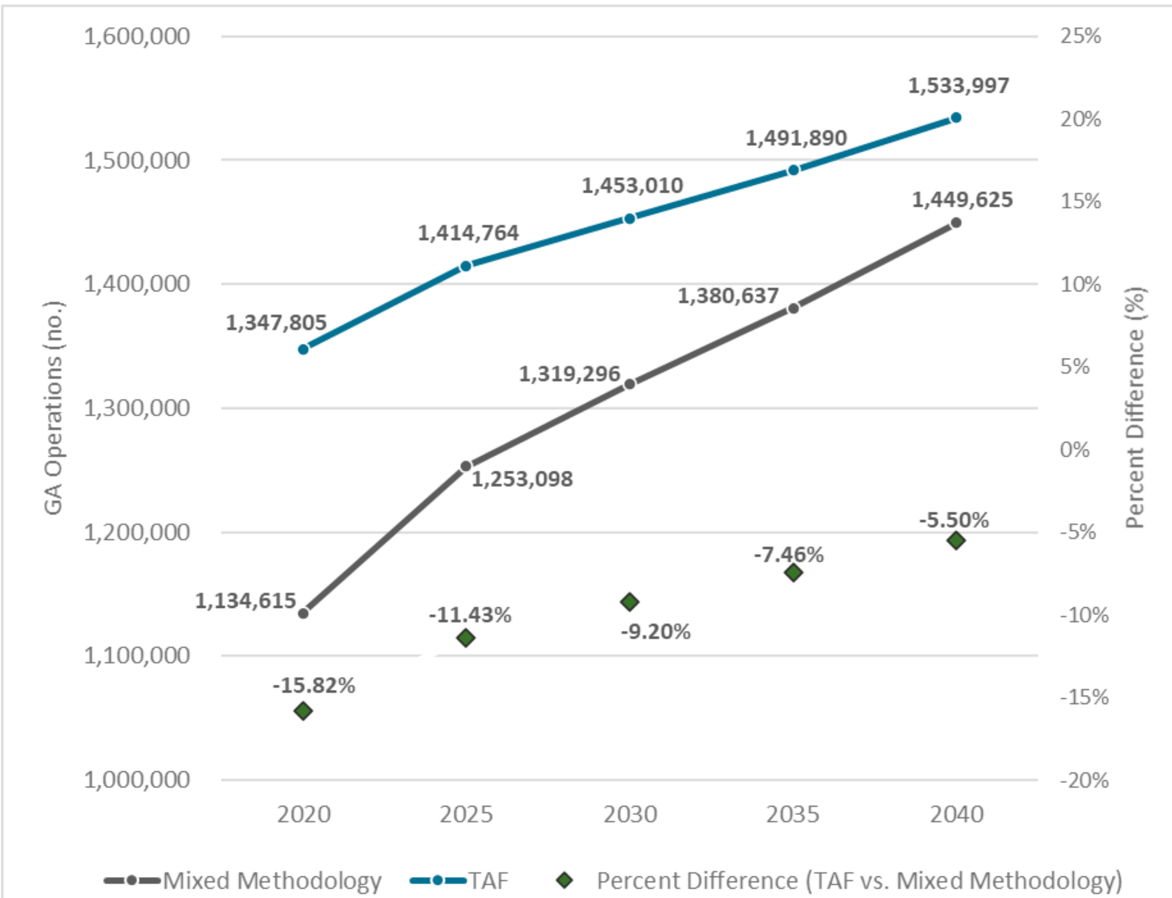
A comparison between the 2022 MnSASP forecast and TAF is depicted in Figure 3.15, with comparison by airport provided in Table A.7 in Appendix A.

Table 3.6. Preferred Mixed Methodology of the 2022 MnSASP versus TAF (Number and Percent Difference)

Forecast Timeframe	Year	Preferred Mixed Methodology	TAF	% Difference
Base Year	2020	1,134,615	1,347,805	-15.82%
Base Year + 5 Years	2025	1,253,098	1,414,764	-11.43%
Base Year + 10 Years	2030	1,319,296	1,453,010	-9.20%
Base Year + 15 Years	2035	1,380,637	1,491,890	-7.46%
Base Year + 20 Years	2040	1,449,625	1,533,997	-5.50%
	N/A	1.23%	0.65%	0.58%

Sources: W&P, 2021; FAA Aerospace Forecasts 2021 - 2041; Kimley-Horn, 2022; FAA TAF (accessed May 2021)

Figure 3.15. Preferred Mixed Methodology of the 2022 MnSASP versus TAF (Number and Percent Difference)



Sources: W&P, 2021; FAA Aerospace Forecasts 2021 - 2041; Kimley-Horn, 2022; FAA TAF (accessed May 2021)

3.4. Operational Threshold Analysis

Forecasting is one of the primary tools that airport planners use to identify future airport improvement needs. The results of such analyses can be used to evaluate the types of facilities and services may be required to support aircraft and the pilots, passengers, and cargo they serve, as well as the general timeframes in which those improvements are justified. The 2022 MnSASP established three operational thresholds for Minnesota's GA airports by state classification. These thresholds represent planning activity levels (PALs). Airports should be evaluated for additional development when annual operations achieve the established PALs. Operational thresholds established for each airport classification were reviewed and validated with the Operations and Forecasting Focus Area Working Group and developed in conjunction with MnDOT Aeronautics.

It is important to note that airport operations provide one perspective on airport facility needs. Critical aircraft, defined as the most demanding aircraft conducting at least 500 operations, are a key element in airfield planning and design. Planning decisions are driven not only by how many operations are occurring, but also the type of aircraft conducting those operations. Other indicators of aviation demand such as enplanements (as applicable), based aircraft, and air cargo activities must also be considered during airport planning processes. Identified facility needs defined in this section does not imply FAA funding eligibility or justification at NPIAS airports.

The recommended airport development needs applied in this analysis are based on the airport metrics established in Phase I of the MnSASP and validated during Phase II.[12] These airport metrics provide the recommended facilities, services, and administrative items that an airport should provide to optimally support the aviation activities typically occurring at airports within each state classification. Table 3.7 provides the operational thresholds (i.e., number of annual operations) established by classification. These numbers were calculated by applying the Jenks natural break algorithm to the total annual operations that occurred during the baseline year (2018 - 2020, see Section 3.2.2). Thresholds provide three PALs representing low, medium, and high numbers of annual operations.

Table 3.7. Operational Thresholds by State Classification (GA Only)

State Classification (GA Only)	No. of Annual Operations - PAL 1 (Low)	No. of Annual Operations - PAL 2 (Medium)	No. of Annual Operations - PAL 3 (High)
Key GA	3,762	13,016	40,934
Intermediate Large	1,357	10,530	21,055
Intermediate Small	431	8,150	16,421
Landing Strip Turf	198	700	2,006

Sources: 5010 Airport Master Record, Various Years; FAA TFMSC, 2018 - 2020 (accessed May 2021); Kimley-Horn, 2023

[12] *Airport metrics are discussed at length in **Chapter 2. Phase I Validation** of the 2022 MnSASP Technical Report.*

Table 3.8 provides recommended, required, and as-needed airport facilities, services, and administrative items by state classification (GA airports only) for each operational threshold (referred to as PALs). **Table A.8** in **Appendix A** reports the forecast year in which each GA state system airport are anticipated to achieve each established PAL. It is important to reiterate that annual operations only provide one factor associated with airport development needs. These operational thresholds provide airport system planning-level guidance only and do not replace master planning activities. Airports are responsible for preparing airport-specific planning documents to monitor and justify development needs over time. It should be noted that Identified facility needs as prescribed by **Table 3.8** do not imply FAA funding eligibility or justification at NPIAS airports.

ACRONYMS

The acronyms used in the table are defined as follows:

ALP	Airport Layout Plan
ASOS	Automated Surface Observation System
AWOS	Automated Weather Observation System
HIRLs	High Intensity Runway Lights
LIRLs	Low Intensity Runway Lights
LPV	Localizer Performance with Vertical Guidance
MIRLs	Medium Intensity Runway Lights
MP	Master Plan
NAVAIDs	Navigational Aids
REILs	Runway End Identifier Lights
RDC	Runway Design Code
TDG	Taxiway Design Group
VGSI	Visual Glideslope Indicator

Table 3.8. GA Operational Thresholds (PALs) by State Classification

Metric	Targets by State Classification - Key General Aviation	Targets by State Classification - Intermediate Large	Targets by State Classification - Intermediate Small	Targets by State Classification - Landing Strip Turf
FACILITY METRICS	KEY GENERAL AVIATION FACILITY TARGETS	INTERMEDIATE LARGE FACILITY TARGETS	INTERMEDIATE SMALL FACILITY TARGETS	LANDING STRIP TURF FACILITY TARGETS
Primary Runway Width	PAL 1	PAL 1	PAL 1	NA
	Required: At least 100 feet minimum, corresponding to FAA design standards for RDC C-II and B-II with visibility minimums < ¾ mile to accommodate instrument approaches < ½ mile visibility minimum	Required: At least 60 feet minimum, corresponding to the minimum width of a hard surface runway in Minnesota Administrative Rules Recommended: A width of 75 feet is recommended to align with RDC B-II runways with one-mile visibility minimums	Required: At least 75 feet minimum, corresponding to the minimum width of turf runway provided in Minnesota Administrative Rules	None
Runway Lighting	PAL 1 (REQUIRED) / PAL 2 (RECOMMENDED)	PAL 2	PAL 2	PAL 1
	Required: MIRLs Recommended: HIRLs	Required: MIRLs	Required: MIRLs	Required: Edge markers for turf runways without lighting Recommended: LIRLs
Primary Runway Approaches	PAL 1 (REQUIRED) / PAL 2 (RECOMMENDED)	PAL 2 (REQUIRED) / PAL 3 (RECOMMENDED)	PAL 2 (REQUIRED) / PAL 3 (RECOMMENDED)	PAL 1
	Required: Precision approach with minimums of ¾ mile to at least one primary runway end Recommended: Precision approach with minimums of ½ mile to at least one primary runway end	Required: Non-precision instrument approach with one-mile visibility or lower to at least one runway end Recommended: Approaches with vertical guidance (e.g., LPV)	Required: Non-precision instrument approach with one-mile visibility or lower to at least one runway end Recommended: Approaches with vertical guidance (e.g., LPV)	Required: Visual approaches
Parallel Taxiway	PAL 1	PAL 2	PAL 1 (REQUIRED) / PAL 3 (RECOMMENDED)	PAL 2 (REQUIRED) / PAL 3 (RECOMMENDED)
	Required: Full parallel taxiway to align with the requirement of a precision approach with less than one-mile visibility	Required: Full parallel taxiway if the airport has an approach minimum of less than one mile. A partial parallel taxiway is required if the visibility minimums are one mile or greater	Required: Partial parallel taxiway Recommended: Full parallel taxiway	Required: Taxiway connectors Recommended: Partial parallel taxiway
Taxiway Width	PAL 1	PAL 2 (REQUIRED) / PAL 3 (RECOMMENDED)	PAL 3	PAL 3
	Required: At least 35 feet corresponding to TDG 2	Required: At least 25 feet corresponding to TDG 1A and 1B aircraft Recommended: At least 35 feet for TDG 2	Required: At least 25 feet corresponding to TDG 1A and 1B aircraft	Required: At least 25 feet corresponding to TDG 1A and 1B aircraft
Navigation Systems	PAL 2	PAL 1	PAL 1	PAL 1
	Required: Approach lighting system, REILs, VGSI, beacon, wind cones	Required: VGSI, wind cone, rotating beacon	Required: Beacon, wind cone	Required: Wind cone
Weather Reporting	PAL 1	PAL 2	PAL 2	PAL 3
	Required: AWOS or ASOS	Recommended: AWOS	Recommended: AWOS	Recommended: AWOS as-needed

Metric	Targets by State Classification - Key General Aviation	Targets by State Classification - Intermediate Large	Targets by State Classification - Intermediate Small	Targets by State Classification - Landing Strip Turf
Aircraft Parking	PAL 2 Required: Tiedowns for at least three more aircraft than are normally parked at the airport	PAL 3 Required: Tiedowns for at least three more aircraft than are normally parked at the airport	PAL 3 Required: Tiedowns for at least three more aircraft than are normally parked at the airport	PAL 3 Required: Tiedowns for at least three more aircraft than are normally parked at the airport
GA Terminal / Admin Bldg.	PAL 2 Required: GA terminal with a phone and restroom	PAL 3 Required: GA terminal with a phone and restroom	PAL 3 Required: GA terminal with a phone and restrooms	PAL 3 (REQUIRED AND RECOMMENDED) Required: Phone and restroom Recommended: GA terminal with a phone and restroom
Auto Parking	PAL 1 Required: Adequate parking as determined at the local level	PAL 1 Required: Adequate parking as determined at the local level	PAL 1 Required: Adequate parking as determined at the local level	PAL 1 Required: Adequate parking as determined at the local level
Fencing	PAL 2 (REQUIRED AND AS-NEEDED) Required: Controlled vehicle access As-needed: Full perimeter and wildlife fencing as determined at the local level	PAL 3 (REQUIRED AND AS-NEEDED) Required: Controlled vehicle access As-needed: Full perimeter and wildlife fencing as determined at the local level	PAL 3 As-needed: Controlled vehicle access and full perimeter and wildlife fencing as determined at the local level	PAL 3 As-needed: Controlled vehicle access and full perimeter and wildlife fencing as determined at the local level
Airport Surfaces	PAL 1 Required: All airport surfaces must be clear of obstructions	PAL 1 Required: All airport surfaces must be clear of obstructions	PAL 1 Required: All airport surfaces must be clear of obstructions	PAL 1 Required: All airport surfaces must be clear of obstructions
Services Metrics	Key General Aviation Service Targets	Intermediate Large Service Targets	Intermediate Small Service Targets	Landing Strip Turf Service Targets
Fuel	PAL 2 Recommended: 100LL and Jet A fuel	PAL 3 (RECOMMENDED AND REQUIRED Recommended: 100LL As-Needed: Jet A	PAL 3 (RECOMMENDED AND REQUIRED) Recommended: 100LL As-Needed: Jet A	PAL 3 (AS-NEEDED) As-needed: 100LL
Courtesy / Rental Cars	PAL 2 Recommended: Rental and courtesy cars	PAL 3 Recommended: Courtesy cars	PAL 3 Recommended: Courtesy cars	PAL 3 As-needed: Courtesy cars
Transient Aircraft Storage	PAL 2 Recommended: Heated transient storage	PAL 3 (AS-NEEDED) As-needed: Transient storage	PAL 3 (AS-NEEDED) As-needed: Transient storage	PAL 3 (AS-NEEDED) As-needed: Transient storage

Metric	Targets by State Classification - Key General Aviation	Targets by State Classification - Intermediate Large	Targets by State Classification - Intermediate Small	Targets by State Classification - Landing Strip Turf
Administrative Metrics	Key General Aviation Administrative Targets	Intermediate Large Administrative Targets	Intermediate Small Administrative Targets	Landing Strip Turf Administrative Targets
ALPs/ MP	PAL 1	PAL 1	PAL 1	PAL 2
	Required: ALP and MP updates at least every 10 years	Required: ALP and MP updates at least every 15 years	Required: ALP and MP updates at least every 15 years	Required: ALP updates as-needed
Airport Zoning	PAL 1	PAL 1	PAL 1	PAL 1
	Required: Adequate airport zoning (per state law)	Required: Adequate airport zoning (per state law)	Required: Adequate airport zoning (per state law)	Required: Adequate airport zoning (per state law)
Clear Zone Ownership	PAL 1	PAL 1	PAL 1	PAL 1
	Required: Clear zones controlled in fee title	Required: Clear zones controlled in fee title	Required: Clear zones controlled in fee title	Required: Clear zones controlled in fee title
Minimum Standards	PAL 1	PAL 1	PAL 1	PAL 1
	Recommended: Documented minimum standards	Recommended: Documented minimum standards	Recommended: Documented minimum standards	Recommended: Documented minimum standards

Sources: MnDOT Aeronautics, 2021; Kimley-Horn, 2022

3.5. Identification of Airports with Operations Exceeding ARC

The total number of operations occurring at an airport is one way to identify airports where capacity enhancements are recommended. An ARC analysis provides another means of assessing airports' abilities to optimally support the aviation activities occurring there by looking at the type of aircraft utilizing the airport (as opposed to the number as in the case of operations forecasts). An ARC analysis identifies airports where a significant portion of activity is conducted by aircraft larger than the airport is designed to support based on the design or critical aircraft.[13] Many facets of airport planning and design are driven by an airport's ARC. The ARC is comprised of two components:

- **Aircraft Approach Category (AAC):** Represented by a letter A through E, the ACC indicates the approach speed of an airport's design aircraft
- **Airplane Design Group (ADG):** Represented by a Roman numeral I through VI, the ADG indicates the wingspan and tail height of an airport's design aircraft

The combination of the AAC and ADG compose an airport's ARC. Classifications are summarized in **Table 3.9**. Airports, runways, and aircraft can be referred to by these characteristics.

Table 3.9. ARC Summary

AAC	Approach Speed	ADG	WINGSPAN (feet)	Tail Height (feet)
A	Less than 91	I	Less than 49	Less than 20
B	91 to 120	II	49 to 78	21 to 29
C	121 to 140	III	79 to 117	0 to 44
D	141 to 165	IV	118 to 170	45 to 59
E	166 or Greater	V	171 to 213	60 to 65
E	166 or Greater	VI	214 up to but less than 262	66 up to but less than 80

Source: FAA AC 150/5300-13A, Change 1, Airport Design, 2019

In general, smaller ARCs (A-I through B-I) represent small, single- and multi-piston aircraft. ARCs in the B-II to C-III categories represent turbo-prop and corporate aircraft. The largest categories (C-IV and up) generally represent by commercial airliners and heavy military aircraft. **Table 3.10** provides example aircraft in each ARC.

Table 3.10. Example Aircraft by ARC

ARC	Example Aircraft
A-I and B-I, including A-I and B-I small aircraft	Beech Bonanza, Cessna 172, Beech King Air 100, Cessna 421, Piper Cheyanne
A-II and B-II	DHC Twin Otter, Super King Air 200, Cessna Citation II
A-III, B-III C-I through C-III D-I through D-III	DHC Dash 8, Beech 400, Learjet 25, Embraer ERJ-170, Gulfstream 500, Bombardier Q-400

[13] *A design or critical aircraft is defined as the most demanding aircraft conducting at least 500 operations at the airport.*

ARC	Example Aircraft
A-IV and B-IV C-IV through C-VI D-IV through D-VI	Boeing 757, Boeing 767, Boeing 777, Lockheed C-130 Hercules
E-I through E-VI	Special military use only

Source: FAA AC 150/5300-13A (Consolidated Change 1), Airport Design (Table 3-1), 2019

The ARC analysis was conducted by comparing 2020 aircraft operations with the ARC designation of each airport. ARC designations were obtained from the latest MnDOT-approved ALPs collected during the MnSASP airport inventory. Operations data were collected from the FAA's TFMSC for calendar year 2020 for all Minnesota system airports. The TFMSC only collects data from filed flight plans and/or when flights are detected in the NAS. As such, most VFR and some non-en route IFR traffic is excluded. Because of this data limitation, 100 Minnesota system airports had adequate data for analysis. This ARC analysis methodology is intended to be replicable for MnDOT Aeronautics to apply in the future to inform future system planning.

As **Table 3.11** shows, five airports experience operations by aircraft more demanding than their existing ARC designations more than 10 percent of the time. Brooten Municipal Airport (6D1) hosts the highest percent of operations above its existing ARC designation at 33 percent. Brooten Municipal Airport should continue to monitor the type of operations it typically supports to ensure safety and operational efficiency. Facility improvements may be warranted at some point in the future to achieve B-II designation (indicated as Brooten Municipal Airport's ultimate runway build-out on its 2011 ALP).

Table 3.11. Airports with More than 10 Percent of Total Operations Exceeding Existing ARC

Associated City	Airport Name	FAA ID	Existing ARC	Ultimate ARC	ALP Approval Date	Total TFMSC Operations - 2020	Percent of Ops Greater than Existing ARC
Brooten	Brooten Municipal Airport	6D1	A-I	B-II	2011	3	33%
New Ulm	New Ulm Municipal Airport	ULM	B-II	B-II	2009	333	23%
Duluth	Duluth International Airport	DLH	C-III	D-V	2018	13,148	16%
Preston	Preston Fillmore County Airport	FKA	B-I	B-II Small	2020	65	14%
Long Prairie	Long Prairie Airport (Todd Field)	14Y	A-I	B-II	2006	23	13%

Sources: FAA AC 150/5300-13A (Consolidated Change 1), Airport Design (Table 3-1), 2019; TFMSC, 2020 (accessed May 2021)

3.6. Summary

Understanding the current and future activities occurring at airports is critical to assessing potential airport improvement needs and engaging in a proactive planning process. Future demands help guide planning-level decisions about airport development needs and estimate potential investment requirements in the long-term. Each of the components of the 2022 MnSASP forecasting effort, including estimates of baseline operations, forecasting operations, operational thresholds, and operations exceeding existing ARCs, provides a nuanced perspective on how demands may change over time. While airport-level planning is required to make specific funding allocation decisions, these interrelated analyses provide critical insight into Minnesota's aviation environmental in the years and decades to come.

As shown on the following pages, the GA operations forecasts developed during the 2022 MnSASP were approved by the FAA on February 7, 2023.

U.S. Department of Transportation
Federal Aviation Administration

Dakota-Minnesota Airports District Office
Bismarck Office
2301 University Drive, Building 23B
Bismarck, ND 58504

Dakota-Minnesota Airports District Office
Minneapolis Office
6020 28th Avenue South, Suite 102
Minneapolis, MN 55450

February 7, 2023

Mr. Rylan Juran, C.M.
Aviation Planning Director
Minnesota Department of Transportation
Office of Aeronautics
395 John Ireland Boulevard, Mail Stop 410
Saint Paul, MN 55155-1800

Minnesota State Aviation System Plan (Phase II) Forecast Approval
State of Minnesota (MNS)
AIP 3-27-0000-010-2020

Dear Mr. Juran:

The FAA approves the General Aviation (GA) Aircraft Operations Forecast as summarized in Table 3.6 of the draft Minnesota State Aviation System (MnSASP) Phase II report for use in the system planning study. This forecast approval is subject to the caveats identified below being inserted as a disclaimer at the beginning of the forecast document.

	Base Year (2020)	**Forecast (2040)**	**Data Source**
GA Aircraft Operations	1,134,615	1,449,625	Table 3.6
Source: Draft Minnesota State Aviation System Plan Phase II, Chapter 3, January 2023			

This forecast was prepared at the same time as the evolving impacts of the COVID-19 public health emergency. Forecast approval is based on the methodology, data, and conclusions at the time the document was prepared. However, consideration of the impacts of the COVID-19 public health emergency on aviation activity is warranted to acknowledge the reduced confidence in growth projections using currently-available data.

Accordingly, FAA approval of this forecast does not constitute justification for future projects. Justification for future projects will be made based on activity levels at the time the project is requested for development. Documentation of actual activity levels meeting planning activity levels will be necessary to justify Federal funding for eligible projects.

Please note that all GA airport operations estimates and forecasts presented in the MnSASP shall not be used for individual airport planning or funding decisions. Each airport is expected to prepare their own aviation activity forecast for FAA review and approval as a basis for justifying the planning and proposed development identified in the airport sponsor's Capital Improvement Plan (CIP).

If you have any questions or would like to discuss this information further, please feel welcome to contact me at (612) 253-4635 or marcus.s.watson@faa.gov.

Sincerely,

MARCUS SLOAN WATSON

Digitally signed by MARCUS SLOAN WATSON
Date: 2023.02.07 11:50:52 -06'00'

Marcus S. Watson, C.M.
Community Planner

cc: Zach DeVeau, Kimley-Horn (email)
Lindsay Butler, FAA (email)
Gina Mitchell, FAA (email)

Chapter 4. Systemwide Costs & Implementation Plan

4.1. Introduction

Over the next 20 years, demand for aviation will change – evolving in concert with needs and trends arising at local, statewide, and global scales. As shown in **Chapter 3. Operations Counting and Forecasting**, general aviation (GA) airports are anticipated to support nearly one-half million additional operations annually by 2040. Commercial service airports are similarly anticipated to witness substantial growth through 2040. For example, the latest Long-term Plan (LTP, November 2021) prepared for the Minneapolis-St. Paul International Airport (MSP) projects that the airport could serve an additional 16.1 million annual enplanements by 2040.[1] Growth will not be evenly distributed across airports, with some airports serving equal or even diminishing activity levels over time.

Several tasks of the 2022 Minnesota Aviation System Plan (2022 MnSASP or MnSASP) have focused on such shifting demands and, consequently, how airport facilities and services must similarly evolve in response to those changes. Some airports should primarily focus on preservation to continue providing the level of support currently offered. Other airports should focus on both preservation and expansion, with improvement projects targeted at the type and frequency of activity levels anticipated in the future. This task of the 2022 MnSASP estimates the costs of such projected future improvements inclusive of both preservation and expansion needs. These costs have been obtained from a variety of different sources, each of which is presented in turn before being compiled at systemwide and classification-specific levels.

Systemwide aviation investment needs are then compared to current and anticipated future state and federal funding availability. This process reveals that Minnesota airports will face a significant funding deficiency in the years to come – forcing the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) to carefully consider how projects are selected for state assistance. Accordingly, the 2022 MnSASP provides targeted guidance to help MnDOT Aeronautics reevaluate and ultimately revise the funding prioritization methodology employed by the state. The distribution of state assistance is one of the most impactful agency tasks, with implications for Minnesota's communities, businesses, and visitors. State funding should be awarded in a way that maximizes the value of each dollar spent and considers diverse aviation functions such as supporting access, mobility, commercial activities, recreation, safety/security, and quality of life services. With these objectives in mind, this chapter of the 2022 MnSASP is organized as follows:

- Aviation Investment Needs by Source (**Section 4.2**)
- Total Minnesota Aviation Investment Need (**Section 4.3**)
- Aviation Funding Sources (**Section 4.4**)
- State Funding Prioritization (**Section 4.5**)

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[1] *Metropolitan Airports Commission (2021). "MSP 2040: LTP Activity Forecast." Available online at https://www.mspairport.com/sites/default/files/2021-12/LTP%20Forecast%20Executive%20Summary_11-21%20%282%29.pdf (accessed April 2022).*

It is important to note that costs presented throughout this chapter are estimates only prepared at the systemwide level based on design and construction costs as of spring 2022. Individual airports must continue to conduct independent planning process to prepare costs aligned specifically to their needs, physical locations, implementation timing, and many other project-specific considerations. Additionally, inclusion in the 2022 MnSASP neither guarantees nor implies state support. The 2022 MnSASP is a high-level guidance document to assist MnDOT Aeronautics in its long-term decision-making processes and cannot be considered a project programming document.

4.2. Aviation Investment Needs by Source

The 2022 MnSASP obtained airport improvement needs from a variety of sources, each of which is discussed in turn below. These costs are not duplicative; instead, costs layer upon one another to sum to the total systemwide aviation investment needs presented in **Section 4.3**.

4.2.1. 2022 MNSASP COSTS

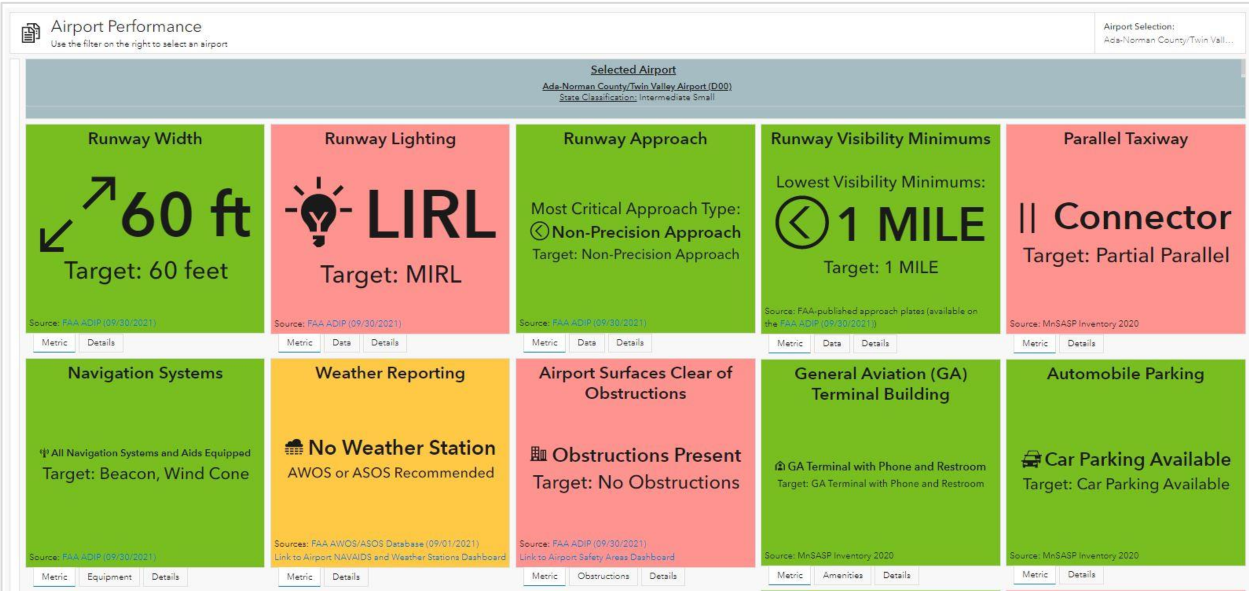
Discussed in **Chapter 2. Phase I Validation**, Phase I of the MnSASP identified a series of recommended facility, service, and administrative metrics that each Minnesota state system airport should provide based on state classification. These various measures guide airports in the types of needs that should be met to optimally support the types and volumes of aviation demand typically witnessed within each classification. In addition to guiding airport sponsors during long-term planning processes, metrics are used to measure progress towards various strategies and objectives associated with the overall vision for the state aviation system. Metrics are split into actionable "measures" and informational "indicators," as well as defined for individual airports and systemwide. Many duplications exist between airport and system metrics, although some are unique to each category.

Phase I defined performance targets for each metric by airport classification. Airport measures were further defined in terms of "recommended," "required," and "as-needed" targets.[2] Phase II evaluated airports' performance against airport and system targets following a comprehensive data collection effort conducted in early 2021.[3] The results of the airport and system performance assessments are presented in two Dashboards within the MnSASP Hub discussed in **Chapter 6. Continuous Planning**. Example screenshots of the Airport Performance and System Performance dashboards are depicted in **Figure 4.1** and **Figure 4.2** (respectively). The MnSASP Hub is available online at mnsasp-mndot.hub.arcgis.com/.

[2] *Table 2.6 and Table 2.30 in **Chapter 2. Phase I Validation** provide all airport and system performance measure targets (respectively) by classification. Recommended, required, and as-needed targets were not established for all metrics. For example, Key Commercial Service airports are required to have high intensity runway lighting (HIRLs). Key GA Airports are required to have Medium Intensity Runway Lighting (MIRLs) and recommended to have High Intensity Runway Lights (HIRLs). Neither Key Commercial Service nor Key General Aviation airports have as-needed targets for the runway lighting measure.*

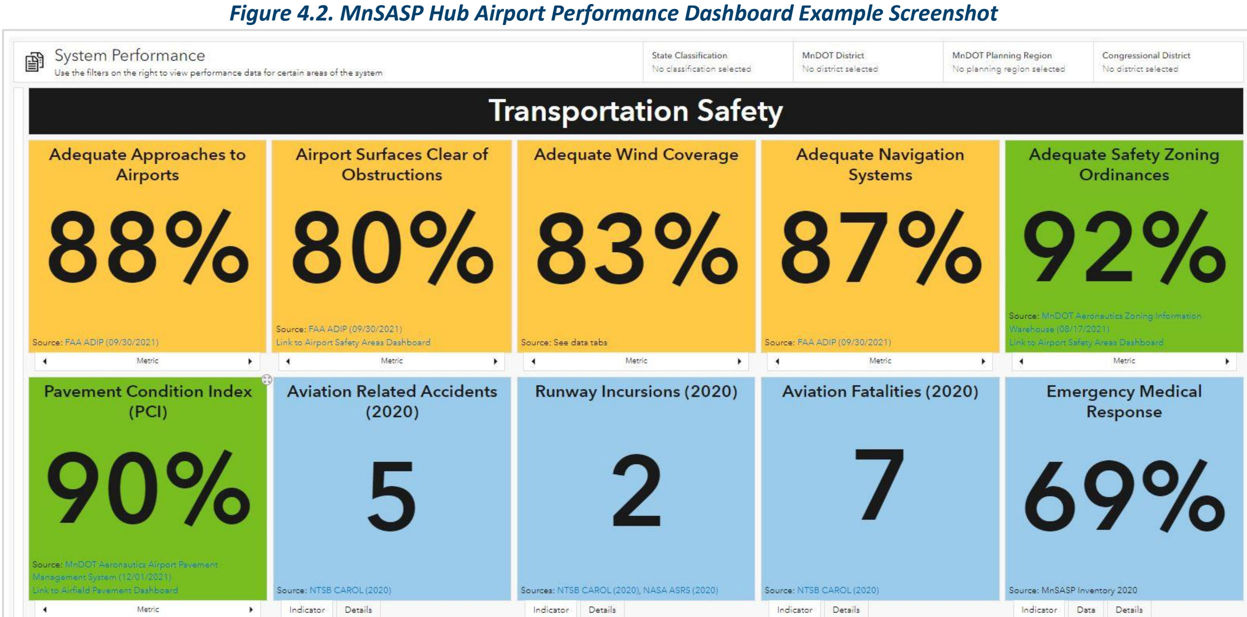
[3] *The performance assessment is based on calendar year 2020, which was the first full year of data available at the time of collection.*

Figure 4.1. MnSASP Hub Airport Performance Dashboard Example Screenshot



Sources: MnDOT Aeronautics, 2022; Kimley-Horn, 2022

Figure 4.2. MnSASP Hub Airport Performance Dashboard Example Screenshot



Sources: MnDOT Aeronautics, 2022; Kimley-Horn, 2022

The 2022 MnSASP costs build upon this performance assessment by identifying project needs at airports that currently do not meet airport and/or system performance targets. Recommended projects are only associated with performance measures, as these recommended facilities, services, and administrative items are inherently actionable and can be improved via project implementation. The subsequent sections present the recommended project costs to improve Minnesota's system of airports relation to the strategies identified by the MnSASP.

Following a brief methodological discussion, costs are presented individually by airport and system measures. Costs are summarized to achieve the greatest performance target (e.g., required, recommended, or as-needed) to provide a consistent presentation of need by measure and classification (as not all classifications have all target levels).

4.2.1.1. Cost Methodology

The 2022 MnSASP investment need represents the cost of required, recommended, and/or as-needed improvement projects based on established future performance targets for individual airports and systemwide. For example, Key Commercial Service airports are required to have HIRLs in accordance with the airport measures established during Phase I of the MnSASP. Any Key Commercial Service airport that does not have HIRLs triggers a project need with an associated cost.

Rough-order-of-magnitude (ROM) unit cost estimates were developed for nearly all airport and system measures based on 2022 design, construction, and material costs in Minnesota and nearby states. Costs were tailored by classification and region (e.g., urban versus rural locales). For example, pavement strength is assumed to be higher at Key Commercial Service airports relative to Intermediate facilities based on typical fleet mixes at these airports. Accordingly, unit pavement costs at Key airports are higher at these facilities. Costs from relevant recent airport improvement projects were also considered.

The following measures were obtained using a different methodology:

- **Clear zones:** All system airports are required to own 100 percent of clear zones off all runway ends in fee simple. Cost estimates for clear zones were estimated as follows for airports that reported owning less than 100 percent of clear zones during the MnSASP Airport Inventory:
    - Review the most recent Airport Layout Plan (ALP) on-file with MnDOT Aeronautics to identify clear zones not owned in fee simple by the airport sponsor based on maximum build out for each runway end configuration
    - Calculate the total acreage of all clear zones needing to be acquired in full or part based on the dimensional standards established during the 2022 MnSASP (see **Attachment 6. Clear Zone Guidance Statement**). Airport sponsors that reported "partial" ownership of clear zones during the MnSASP Airport Inventory are assumed to own 25 percent of the total acreage (75 percent to be acquired)
    - Obtain the average cost of land by county from the Minnesota Land Dataset prepared by the University of Minnesota Department of Applied Economics[4]
    - Multiply the estimated clear zone acreage to be acquired by the average cost of land by county

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[4] *Minnesota Land Economics (no date [n.d.]). "Minnesota Land Dataset." Available at https://landeconomics.umn.edu/ (accessed February 2022).*

- **Pavement Rehabilitation/Maintenance:** The MnSASP system measures indicate a required target Pavement Condition Index (PCI) for primary runways and total airside pavement. The 2022 MnSASP reports pavement rehabilitation and maintenance cost as calculated by the Minnesota Airport Pavement Management System (APMS). This dataset includes pavement costs for 103 paved airports in Minnesota. Airports are inspected on a three-year cycle with individual airport costs published following their respective inspection years.[5] Pavement maintenance and rehabilitation costs are incorporated into the system measures presented in **Section 4.2.1.3 System Measures**. Notably, airports owned and operated by the Metropolitan Airports Commission (MAC) including the Minneapolis-St. Paul International Airport and six Reliever facilities are excluded from the Minnesota APMS. Pavement maintenance and rehabilitation costs for these facilities are reported in **Section 4.2.3. MAC Investment Needs**.

Finally, project needs identified by the MnSASP were compared with the Minnesota statewide Capital Improvement Plan (CIP). Costs for specific projects identified by both the MnSASP and the CIP were generally obtained from the CIP in lieu of ROM cost estimates, as it is assumed CIP costs are more accurate since they are prepared by specific airports. However, CIP cost estimates were first reviewed for reasonableness, with requests significantly higher or lower than average unit costs rejected in favor of the ROM unit costs developed for the MnSASP.

4.2.1.2. Airport Measures

Airport measures represent facility, service, and administrative needs associated with the ability of individual airports to optimally support the types of aviation activities typically occurring at each classification of airport. Performance targets were established during Phase I of the MnSASP and evaluated based on the data collection and assessment efforts of Phase II. This analysis revealed that $235.4 million in investment would be required for all Minnesota state system airports to meet their airport measure performance targets.

Parallel taxiways represent the highest singular need, both in terms of systemwide total ($64.8 million) as well as the classification-specific level ($63.5 million at Intermediate Small airports). The significant need at Intermediate Small airports is driven by the recommended performance target of a full parallel taxiway – a target met by only 13 of the 46 Intermediate Small airports in the state (28 percent compliance). Clear zones contribute the second-highest need at $46.3 million at the statewide level. Eighteen Minnesota system airports report 100 percent ownership of all clear zones (18 percent compliance), resulting in a significant performance gap. Key GA airports generate the highest classification-specific need at $21.1 million. Three of the 21 Key GA airports currently comply with this measure (14 percent compliance), leaving a performance gap at 19 airports (86 percent non-compliance). **Table 4.1** presents system investment needs associated with the MnSASP airport measures by type and classification. This information is depicted in the following **Figure 4.3**. The MnSASP Hub Airport Measure Dashboard presents performance by airport.

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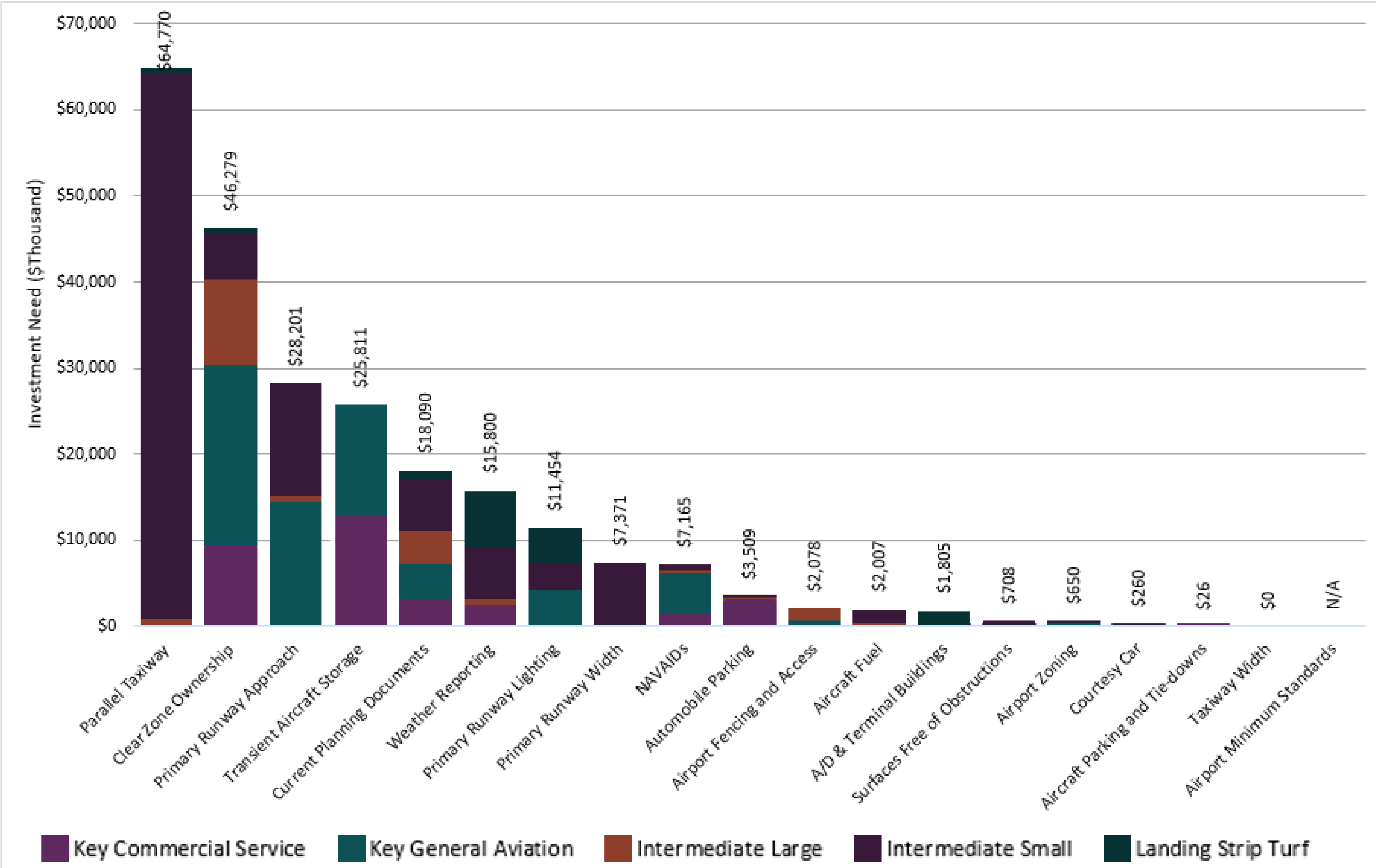
[5] *MnDOT Aeronautics (n.d.). "Pavement Management." Available online at https://www.dot.state.mn.us/aero/airportdevelopment/pavementmanagement.html (accessed December 2021).*

Table 4.1. MnSASP Airport Measure Investment Needs by Type and Classification

Airport Measures	Investment Needs for Key Commercial Service ($)	Investment Needs for Key General Aviation ($)	Investment Needs for Intermediate Large ($)	Investment Needs for Intermediate Small ($)	Investment Needs for Landing Strip Turf ($)	Investment Needs for All Classifications ($)
Parallel Taxiway	$0	$0	$808,889	$63,448,283	$513,058	**$64,770,230**
Clear Zone Ownership	$9,310,798	$21,123,654	$9,818,359	$5,238,225	$787,955	**$46,278,991**
Primary Runway Approach	$0	$14,404,609	$840,000	$12,956,022	N/A	**$28,200,631**
Transient Aircraft Storage	$12,975,000	$12,836,000	$0	$0	$0	**$25,811,000**
Current Planning Documents	$3,100,000	$4,200,000	$3,780,000	$6,017,000	$992,500	**$18,089,500**
Weather Reporting	$2,450,000	$0	$700,000	$6,000,000	$6,650,000	**$15,800,000**
Primary Runway Lighting	$0	$4,302,955	$0	$3,130,740	$4,020,085	**$11,453,780**
Primary Runway Width	$0	$0	$0	$7,370,767	$0	**$7,370,767**
Navigational Aids (NAVAIDs)	$1,375,000	$4,800,000	$280,000	$710,000	$0	**$7,165,000**
Automobile Parking	$3,104,000	$75,000	$121,600	$205,400	$3,240	**$3,509,240**
Airport Fencing and Access	$0	$680,000	$1,397,500	$0	$0	**$2,077,500**
Aircraft Fuel	$0	$0	$275,000	$1,732,000	$0	**$2,007,000**
Arrival/Departure (A/D) & Terminal Buildings	$26	$65	$115,065	$125,917	$1,564,378	**$1,805,451**
Surfaces Free of Obstructions	$21,000	$26,200	$7,000	$653,570	$0	**$707,770**
Airport Zoning	$125,000	$160,000	$60,000	$225,000	$80,000	**$650,000**
Courtesy Car	$10,000	$10,000	$70,000	$170,000	$0	**$260,000**
Aircraft Parking and Tie-Downs	$3,400	$3,400	$3,400	$11,900	$3,400	**$25,500**
Taxiway Width	$0	$0	$0	$0	$0	**$0**
Airport Minimum Standards[1]	N/A	N/A	N/A	N/A	N/A	**N/A**
Total	**$32,474,198**	**$62,621,818**	**$18,161,748**	**$107,868,907**	**$14,248,238**	**$235,374,909**

Note: (1) Airport minimum standards are an airport measure but do not have an associated cost. This measure is considered an operational exercise that could be implemented as part of an airport sponsor's normal business operations. Sources: MnSASP Data Inventory, 2021; Minnesota Land Economics, 2022; Kimley-Horn, 2022

Figure 4.3. MnSASP Total Airport Measure Needs by Type



Sources: MnSASP Data Inventory, 2021; Minnesota Land Economics, 2022; Kimley-Horn, 2022; MnDOT Aeronautics, 2022

4.2.1.3. System Measures

System measures serve as gauges to measure the Minnesota state aviation system's ability to meet the needs of the diverse constituencies that rely on air transportation. System performance targets were established during Phase I of the MnSASP and evaluated based on the data collection and assessment efforts of Phase II. This analysis revealed that $182.3 million in investment would be required for the Minnesota state system airports to meet their system performance measure performance targets.

Pavement rehabilitation and maintenance compose the two highest system investment needs at $116.4 million and $20.3 million, respectively. Because Minnesota's state airport classification methodology primarily categorizes airports in terms of runway length, it is not surprising that Key GA airports contribute the greatest investment needs. These facilities require $52.7 million in pavement rehabilitation and $11.1 million in pavement maintenance investment to meet the PCI standards established by MnDOT Aeronautics. Pavement costs were obtained from the Minnesota APMS and represent a five-year need. As such, costs likely under-represent the total investment need through the ten-year planning horizon of the MnSASP. However, the plan adopted a conservative approach to maintain the integrity of costs presented.

Table 4.2 presents system measure investment needs by type and classification, with this same information visually presented in Figure 4.4. The MnSASP Hub System Dashboard presents performance by measure. Results can also be filtered by classification, MnDOT Planning Region,[6] and Congressional District.

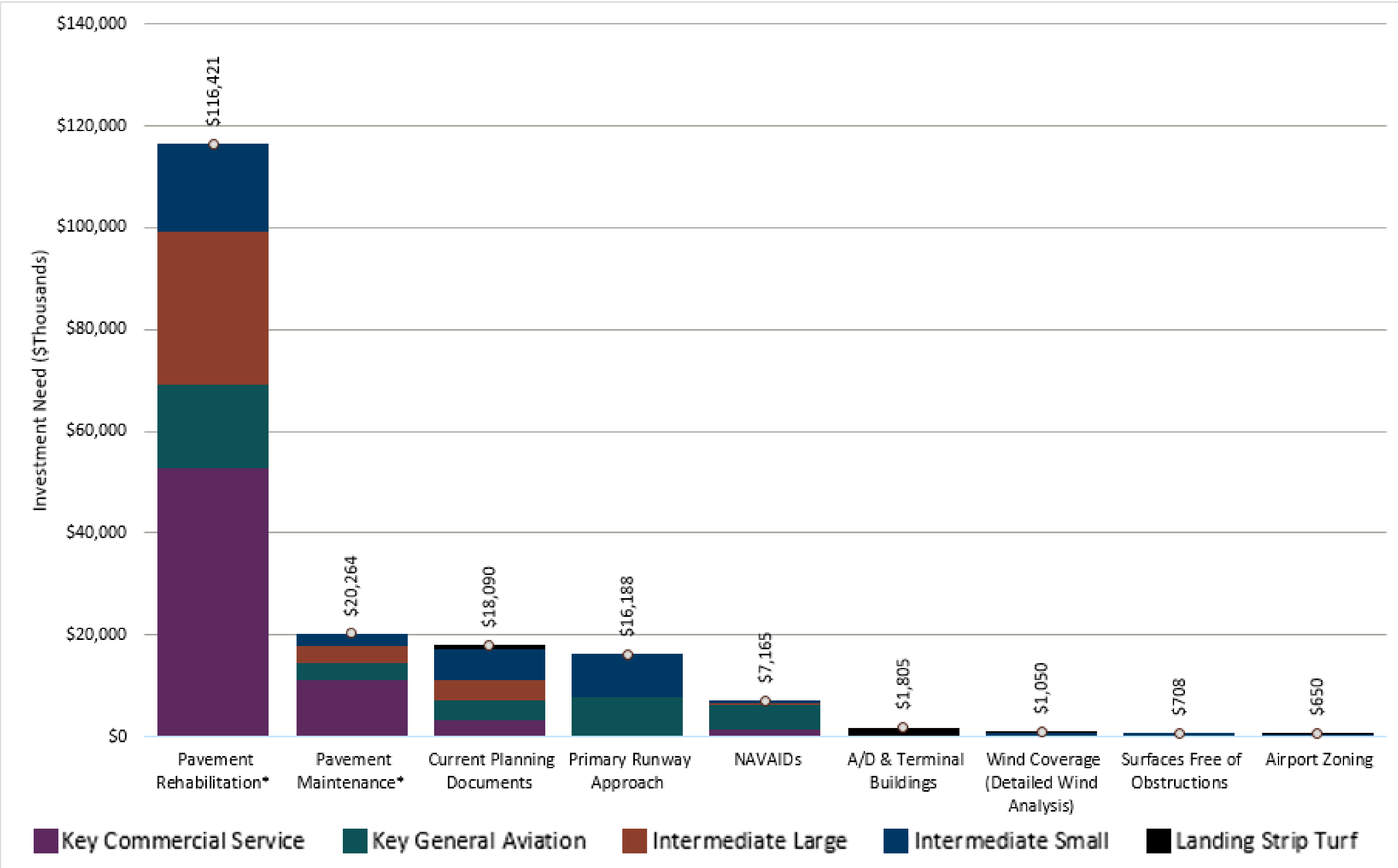
[6] MnDOT Aeronautics has divided Minnesota into three planning regions (i.e., North, Central, and South) for statewide planning purposes. Each region has dedicated planning and airport development staff who assist airports located in their assigned regions. A map of the MnDOT Aeronautics planning regions and contact details for assigned staff members are available online at https://www.dot.state.mn.us/aero/planning/contacts.html.

Table 4.2. MnSASP System Measure Investment Needs by Type and Classification

System Measures	investment needs for Key Commercial Service ($)	investment needs for Key General Aviation ($)	investment needs for Intermediate Large ($)	investment needs for Intermediate Small ($)	investment needs for Landing Strip Turf ($)	investment needs for ALL CLASSIFICATIONS ($)
Pavement Rehabilitation[1]	$52,675,416	$16,350,199	$30,152,479	$17,242,798	$0	**$116,420,892**
Pavement Maintenance[1]	$11,148,313	$3,273,764	$3,344,144	$2,497,721	$0	**$20,263,942**
Current Planning Documents	$3,100,000	$4,200,000	$3,780,000	$6,017,000	$992,500	**$18,089,500**
Primary Runway Approach	$0	$7,711,778	$0	$8,476,022	$0	**$16,187,800**
NAVAIDs	$1,375,000	$4,800,000	$280,000	$710,000	$0	**$7,165,000**
A/D & Terminal Buildings	$26	$65	$115,065	$125,917	$1,564,378	**$1,805,451**
Wind Coverage[2]	$0	$0	$225,000	$600,000	$225,000	**$1,050,000**
Surfaces Free of Obstructions	$21,000	$26,200	$7,000	$653,570	$0	**$707,770**
Airport Zoning	$125,000	$160,000	$60,000	$225,000	$80,000	**$650,000**
Total	**$68,444,755**	**$36,522,006**	**$37,963,688**	**$36,548,028**	**$2,861,878**	**$182,340,355**

*Notes: (1) Reflects five-year need as reported in the MnDOT APMS. (2) The system performance target for the wind coverage measure indicates that all airports should provide 95 percent wind coverage based on the orientation of their primary runway for the allowable crosswind component of their critical aircraft. The MnDOT Crosswind Runway Guidance Statement (included as **Attachment 5** in the **2022 MnSASP Technical Report**) indicates that airports must be eligible for funding support based on wind coverage as well as justified in that need. As such, the investment need represents the cost of conducting a detailed wind analysis required to demonstrate justification. Sources: MnDOT APMS, 2021; MnSASP Data Inventory, 2021; Kimley-Horn, 2022*

Figure 4.4. MnSASP Total System Measure Investment Needs by Type



**Note: Reflects five-year need as reported in the MnDOT APMS. Sources: MnDOT APMS, 2021; MnSASP Data Inventory, 2021; Kimley-Horn, 2022; MnDOT Aeronautics, 2022*

4.2.1.4. Total MnSASP Costs

Minnesota's state system airports require $373.7 million in total investment need to achieve all airport and system performance targets. Pavement rehabilitation composes the highest need within the state at $116.4 million. Parallel taxiway investment needs are the second-highest at the systemwide level at $64.8 million – although this is just below one-half of investment needs contributed by pavement rehabilitation. Statewide results are summarized in **Table 4.3**, with detailed results provided in **Table 4.4** and depicted in

Figure 4.5.

Table 4.3. MnSASP Total Airport and System Measure Investment Need Summary

Airport/System Measures	Total Investment Needs ($)
Pavement Rehabilitation	$116,420,892
Parallel Taxiway	$64,770,230
Clear Zone Ownership	$46,278,991
Primary Runway Approach	$28,200,631
Transient Aircraft Storage	$25,811,000
Pavement Maintenance	$20,263,942
Current Planning Documents	$18,089,500
Weather Reporting	$15,800,000
Primary Runway Lighting	$11,453,780
Primary Runway Width	$7,370,767
NAVAIDs	$7,165,000
Automobile Parking	$3,509,240
Airport Fencing and Access	$2,077,500
Aircraft Fuel	$2,007,000
A/D & Terminal Buildings	$1,805,451
Surfaces Free of Obstructions	$707,770
Airport Zoning	$650,000
Courtesy Car	$260,000
Aircraft Parking and Tie-downs	$25,500
Airport Minimum Standards[1]	N/A
Total	**$373,717,194**

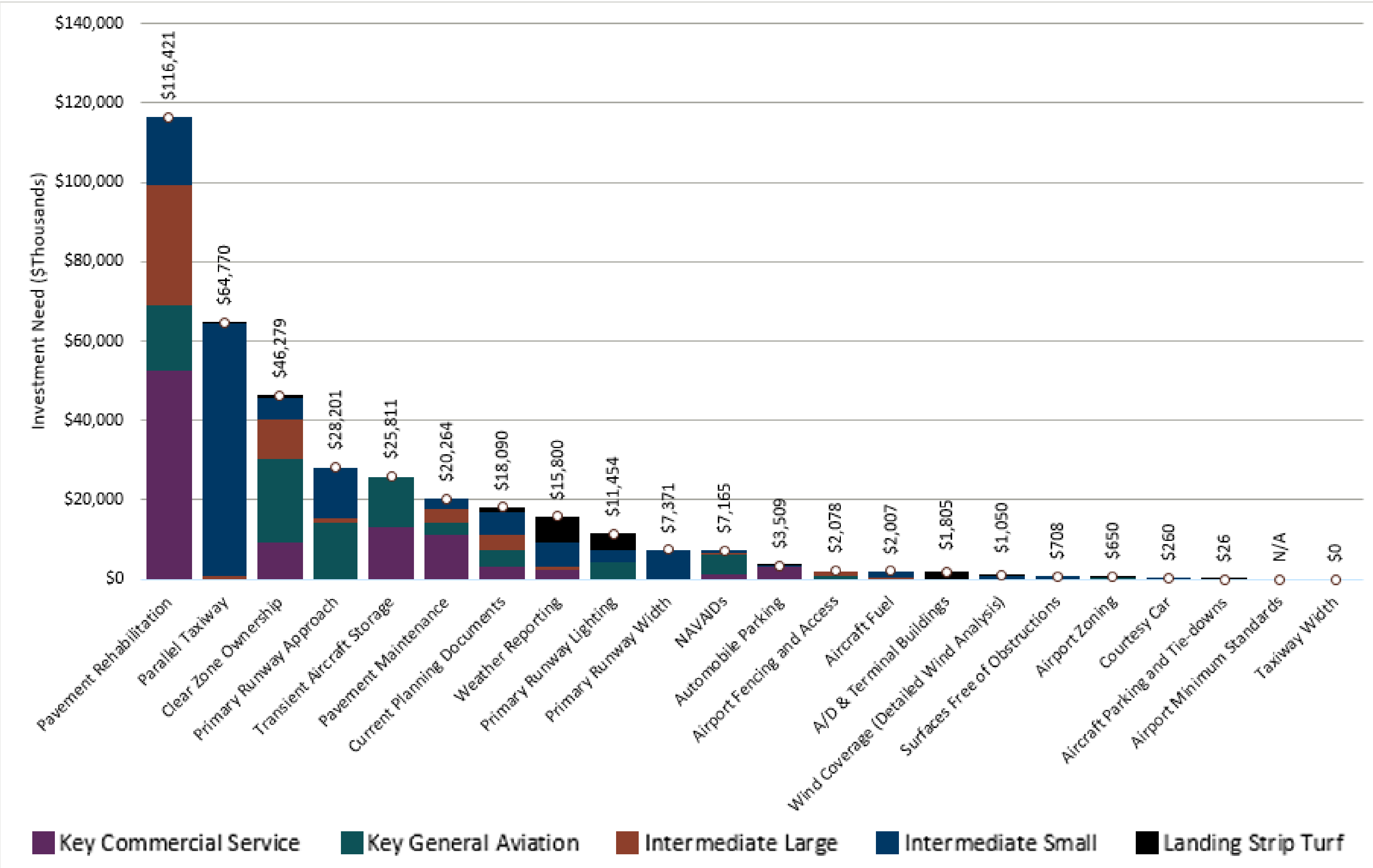
Note: (1) No associated project costs. Sources: MnDOT APMS, 2021; MnSASP Data Inventory, 2021; Kimley-Horn, 2022; Minnesota Land Economics, 2022

Table 4.4. MnSASP Total Airport and System Measure Investment Needs by Classification

Airport/System Measures	Investment Needs for Key Commercial Service ($)	Investment Needs for Key General Aviation ($)	Investment Needs for Intermediate Large ($)	Investment Needs for Intermediate Small ($)	Investment Needs for Landing Strip Turf ($)	Investment Needs for ALL CLASSIFICATIONS ($)
Pavement Rehabilitation	$52,675,416	$16,350,199	$30,152,479	$17,242,798	$0	**$116,420,892**
Parallel Taxiway	$0	$0	$808,889	$63,448,283	$513,058	**$64,770,230**
Clear Zone Ownership	$9,310,798	$21,123,654	$9,818,359	$5,238,225	$787,955	**$46,278,991**
Primary Runway Approach	$0	$14,404,609	$840,000	$12,956,022	$0	**$28,200,631**
Transient Aircraft Storage	$12,975,000	$12,836,000	$0	$0	$0	**$25,811,000**
Pavement Maintenance	$11,148,313	$3,273,764	$3,344,144	$2,497,721	$0	**$20,263,942**
Current Planning Documents	$3,100,000	$4,200,000	$3,780,000	$6,017,000	$992,500	**$18,089,500**
Weather Reporting	$2,450,000	$0	$700,000	$6,000,000	$6,650,000	**$15,800,000**
Primary Runway Lighting	$0	$4,302,955	$0	$3,130,740	$4,020,085	**$11,453,780**
Primary Runway Width	$0	$0	$0	$7,370,767	$0	**$7,370,767**
NAVAIDs	$1,375,000	$4,800,000	$280,000	$710,000	$0	**$7,165,000**
Automobile Parking	$3,104,000	$75,000	$121,600	$205,400	$3,240	**$3,509,240**
Airport Fencing and Access	$0	$680,000	$1,397,500	$0	$0	**$2,077,500**
Aircraft Fuel	$0	$0	$275,000	$1,732,000	$0	**$2,007,000**
A/D & Terminal Buildings	$26	$65	$115,065	$125,917	$1,564,378	**$1,805,451**
Wind Coverage	$0	$0	$225,000	$600,000	$225,000	**$1,050,000**
Surfaces Free of Obstructions	$21,000	$26,200	$7,000	$653,570	$0	**$707,770**
Airport Zoning	$125,000	$160,000	$60,000	$225,000	$80,000	**$650,000**
Courtesy Car	$10,000	$10,000	$70,000	$170,000	$0	**$260,000**
Aircraft Parking and Tie-downs	$3,400	$3,400	$3,400	$11,900	$3,400	**$25,500**
Airport Minimum Standards	N/A	N/A	N/A	N/A	N/A	**N/A**
Taxiway Width	$0	$0	$0	$0	$0	**$0**
Total	**$96,297,953**	**$82,245,846**	**$51,998,436**	**$128,335,343**	**$14,839,616**	**$373,717,194**

Sources: MnDOT APMS, 2021; MnSASP Data Inventory, 2021; Kimley-Horn, 2022; Minnesota Land Economics, 2022; MnDOT, 2022

Figure 4.5. MnSASP Total Airport and System Measure Investment Needs



Sources: MnDOT APMS, 2021; MnSASP Data Inventory, 2021; Kimley-Horn, 2022; Minnesota Land Economics, 2022 ; MnDOT, 2022

4.2.2. MNDOT AERONAUTICS STATEWIDE CIP

As part of MnDOT Aeronautics' annual airport funding process, airport sponsors submit capital improvement requests via the MnDOT Aeronautics statewide CIP. Capital improvement project requests must be listed on the CIP to be eligible for state support through an Airport Development Grant, although inclusion on the CIP does not guarantee funding. Eligible projects include planning, design, and construction projects as well as land acquisition for clear zones and site development, NAVAIDs, weather reporting equipment, obstruction removal, and many other project types. Projects are selected for funding generally based on a prioritization methodology last evaluated during the 2012 MnSASP. MnDOT Aeronautics maintains significant flexibility and discretion during this process.

Airport sponsors are asked to submit 20-year needs in support of MnDOT Aeronautics' long-term investment planning processes. However, the 2022 MnSASP funding evaluation revealed that the number of projects and dollar amounts requested significantly diminish in the long-term. Projects included on the CIP drastically decline after 2030, with many airports submitting no projects or projects without associated costs. As a result, the 2022 MnSASP reports state investment requests over a 10-year planning horizon (2020 – 2030) to maintain the highest level of accuracy in reporting development needs. Additionally, airports owned and operated by the MAC submit only a small portion of capital improvement needs to the CIP managed by MnDOT Aeronautics. The MnDOT Aeronautics statewide CIP is thus not comprehensive of all capital improvement needs identified by state system airports. The MAC CIP is discussed in Section 4.2.3.

The 2020 - 2030 MnDOT Aeronautics statewide CIP includes over 2,220 projects with a total investment need of $1.17 billion. Project requests by airport classification and dollars are summarized in Table 4.5 and depicted in Figure 4.6, listed in order of total investment need. Runways represent the largest state investment request via the CIP at $220.5 million. Runways are also the most requested project type by Key GA, Intermediate Large, and Intermediate Small airports. Pavement maintenance projects are the most requested project type by Key Commercial Service facilities at $87.5 million (excluding Minneapolis-St. Paul International Airport).

It is important to note that airport sponsors indicate project type when submitting CIP requests to MnDOT Aeronautics. This allows for a significant amount of subjectivity in how various project types are reported. For example, a runway mill and overlay project could be categorized as a "runway" or "pavement maintenance" project, leading to some degree of inconsistency in project needs by type. Nonetheless, available data does reflect the general types of airport improvement needs identified by state system airports over the ten-year reporting horizon.

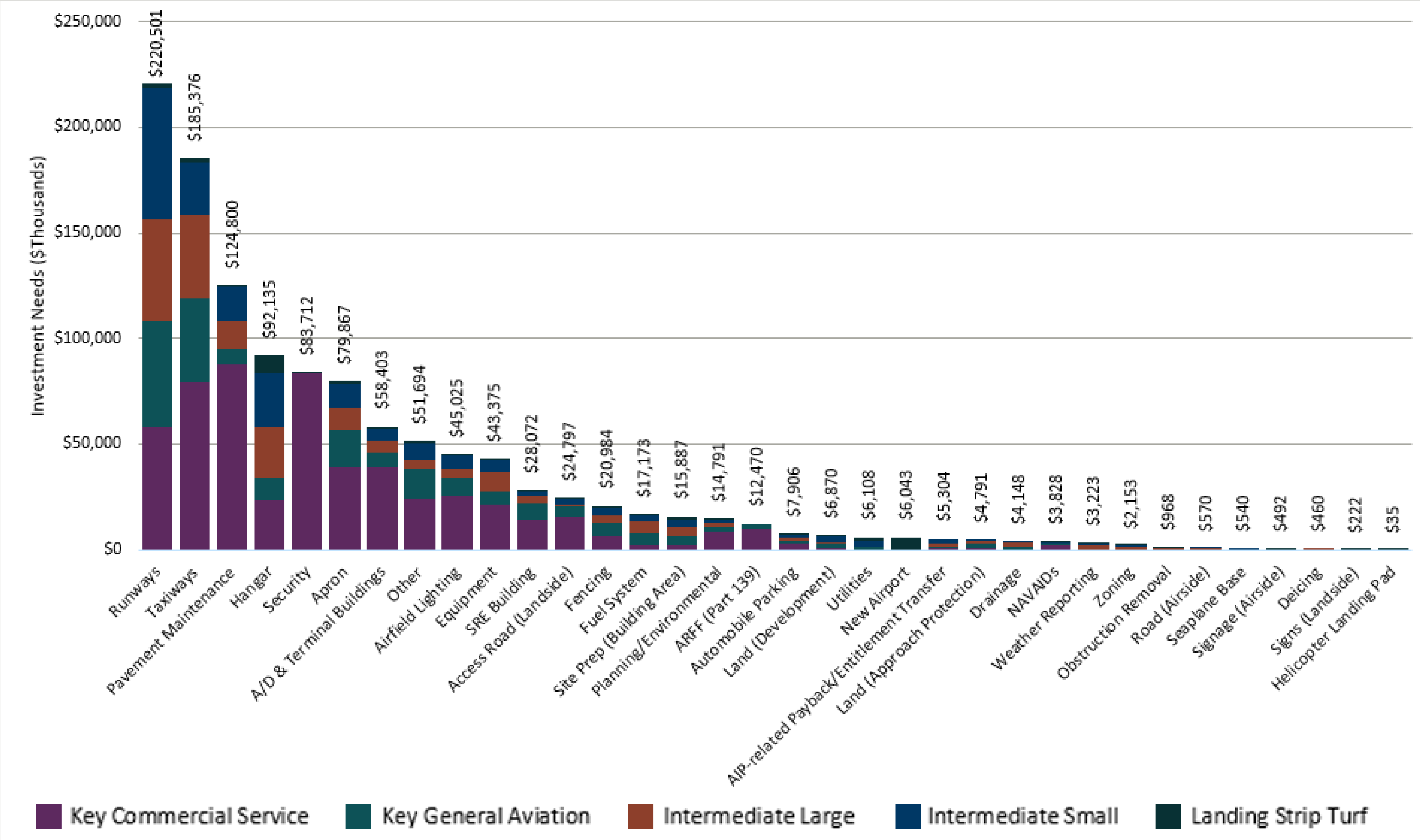
Table 4.5. MnDOT Aeronautics Statewide CIP Investment Needs by Type and Classification, 2020 - 2030

Project Type	CIP Investment Need for Key Commercial Service ($)	CIP Investment Need for Key General Aviation ($)	CIP Investment Need for Intermediate Large ($)	CIP Investment Need for Intermediate Small ($)	CIP Investment Need for Landing Strip Turf ($)	Total Investment Need ($)
Runways	$58,235,000	$50,402,920	$47,771,941	$62,080,954	$2,010,600	**$220,501,416**
Taxiways	$79,580,375	$39,033,301	$40,138,577	$24,352,563	$2,271,000	**$185,375,816**
Pavement Maintenance	$87,850,000	$7,235,000	$13,125,556	$16,336,760	$253,000	**$124,800,316**
Hangars	$23,350,000	$10,828,000	$23,637,152	$25,482,401	$8,837,100	**$92,134,653**
Security	$83,400,000	$0	$60,000	$194,000	$58,000	**$83,712,000**
Apron	$38,772,900	$18,270,216	$10,541,302	$11,377,766	$904,367	**$79,866,551**
A/D & Terminal Buildings	$38,752,200	$7,690,000	$5,047,771	$5,611,583	$1,301,251	**$58,402,805**
Other	$23,875,000	$14,590,000	$4,351,789	$7,559,000	$1,318,283	**$51,694,072**
Airfield Lighting	$25,450,000	$8,383,500	$4,662,287	$6,058,001	$471,700	**$45,025,489**
Equipment	$21,274,553	$6,612,000	$9,354,000	$5,062,310	$1,072,500	**$43,375,363**
SRE Building	$14,439,994	$7,743,500	$3,285,000	$2,245,000	$358,500	**$28,071,994**
Access Road (Landside)	$15,725,000	$4,881,667	$1,072,720	$2,503,700	$614,000	**$24,797,087**
Fencing	$6,600,000	$6,307,000	$3,287,030	$3,493,700	$1,296,000	**$20,983,730**
Fuel System	$2,435,000	$5,290,000	$5,490,000	$3,210,300	$748,000	**$17,173,300**
Site Prep (Building Area)	$2,500,000	$3,985,000	$4,125,000	$3,568,700	$1,708,000	**$15,886,700**
Planning/Environmental	$8,785,000	$1,736,500	$2,270,000	$1,589,150	$410,000	**$14,790,650**
Aircraft Rescue & Firefighting Equipment (Part 139)	$10,000,000	$2,470,000	$0	$0	$0	**$12,470,000**
Automobile Parking	$3,298,000	$1,063,000	$1,655,000	$895,417	$994,500	**$7,905,917**
Land (Development)	$1,040,000	$1,945,000	$865,000	$2,712,600	$307,500	**$6,870,100**
Utilities	$0	$1,210,000	$395,000	$2,586,000	$1,917,000	**$6,108,000**
New Airport	$0	$0	$0	$0	$6,043,000	**$6,043,000**

Project Type	CIP Investment Need for Key Commercial Service ($)	CIP Investment Need for Key General Aviation ($)	CIP Investment Need for Intermediate Large ($)	CIP Investment Need for Intermediate Small ($)	CIP Investment Need for Landing Strip Turf ($)	Total Investment Need ($)
AIP-related Payback/Entitlement Transfer	$500,000	$898,398	$1,889,330	$2,016,564	$0	**$5,304,292**
Land (Approach Protection)	$1,100,000	$1,896,000	$1,365,000	$430,000	$0	**$4,791,000**
Drainage	$50,000	$1,593,009	$2,246,000	$259,060	$0	**$4,148,069**
NAVAIDs	$2,340,000	$294,350	$435,000	$362,500	$396,500	**$3,828,350**
Weather Reporting	$0	$230,000	$2,086,400	$866,000	$41,000	**$3,223,400**
Zoning	$250,000	$175,000	$839,000	$649,000	$240,000	**$2,153,000**
Obstruction Removal	$195,000	$70,000	$631,000	$61,050	$11,000	**$968,050**
Road (Airside)	$300,000	$100,000	$150,000	$20,000	$0	**$570,000**
Seaplane Base	$0	$120,000	$0	$420,000	$0	**$540,000**
Signage (Airside)	$260,600	$135,000	$50,000	$4,000	$42,000	**$491,600**
Deicing	$360,000	$0	$100,000	$0	$0	**$460,000**
Signs (Landside)	$11,600	$152,500	$5,000	$28,000	$25,000	**$222,100**
Helicopter Landing Pad	$0	$0	$0	$0	$35,000	**$35,000**
Totals	**$550,730,222**	**$205,340,861**	**$190,931,856**	**$192,036,080**	**$33,684,801**	**$1,172,723,819**

Source: MnDOT Aeronautics, 2022

Figure 4.6. Minnesota Statewide CIP by State Classification and Type, 2020 – 2030

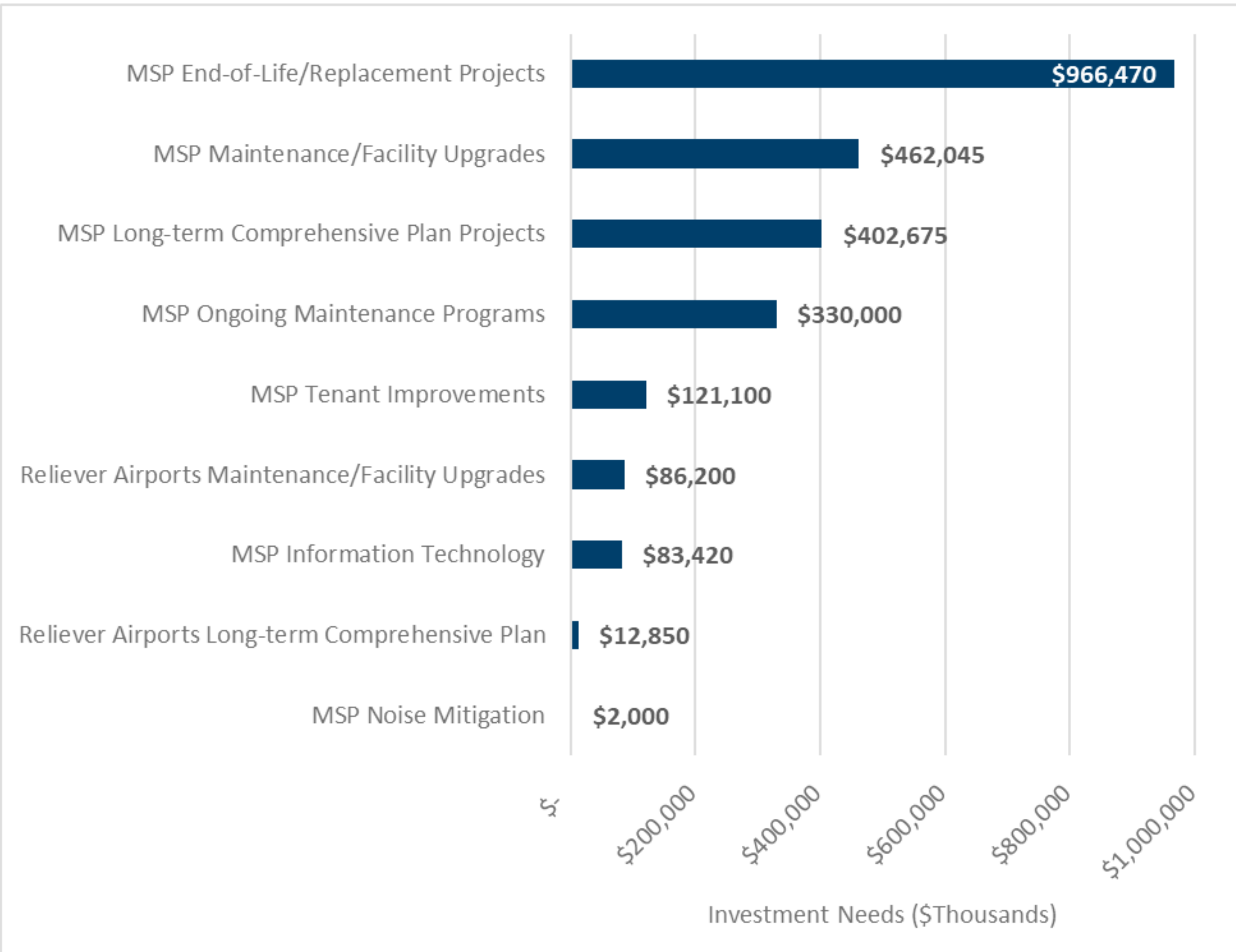


Source: MnDOT Aeronautics, 2022

4.2.3. MAC PROJECT NEEDS

In addition to the MnDOT Aeronautics statewide CIP prepared by MnDOT Aeronautics, the MAC independently prepares its own MAC CIP representing the development needs of Minneapolis-St. Paul International Airport and the six GA facilities under its jurisdiction. The 2022 - 2028 MAP CIP reports $2.47 billion in programmed project needs, as shown in **Figure 4.7**. Approximately $1.41 billion of investment is generated by an ongoing Terminal 1 expansion, remodeling, and modernization program at the Minneapolis-St. Paul International Airport. Other significant investments include $299.98 million focused on airside field and runway needs and $206.25 million for Terminal 2 maintenance and enhancements. Nearly 96 percent of total need is attributable to MSP ($2.37 billion), while the six GA facilities in the MAC system generate an additional $99.05 million in required investment through 2028.

Figure 4.7. 2022 - 2028 MAC CIP by Type (Final Draft for Commission Approval)



Source: MAC, 2022

4.2.4. NAVAIDS AND WEATHER REPORTING STATIONS

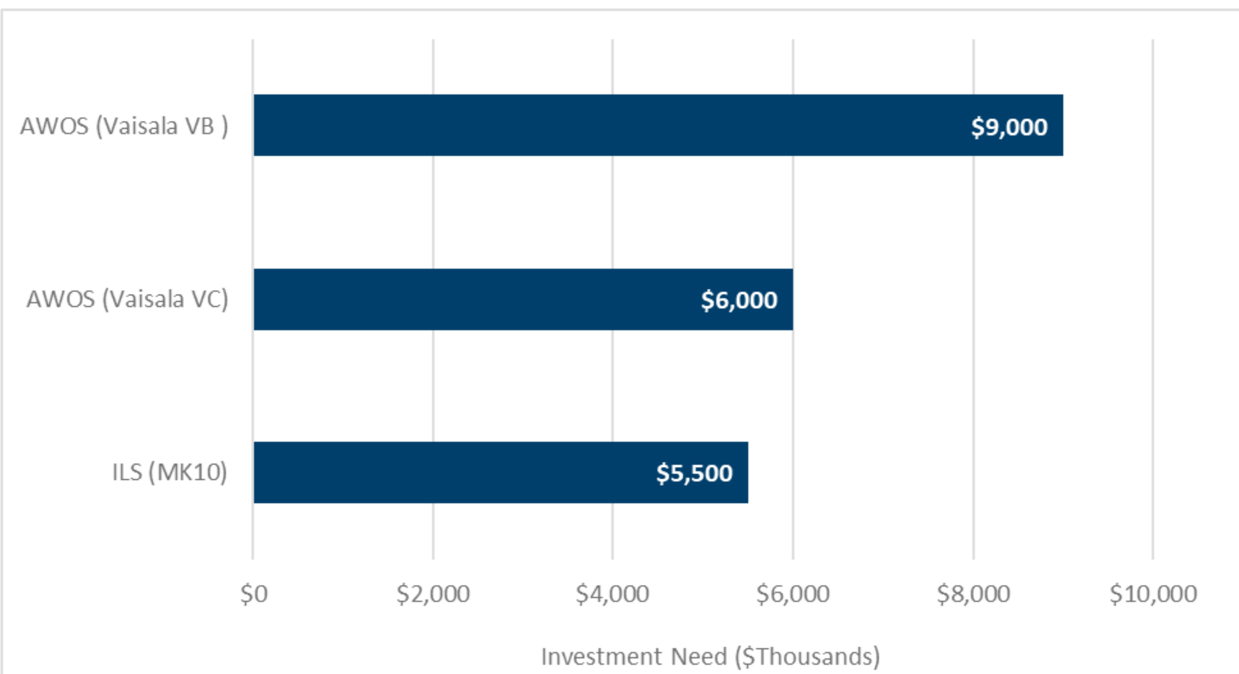
Discussed extensively in **Appendix C. Minnesota Navigational Aids**, MnDOT Aeronautics owns and/or manages the largest network of non-federal NAVAIDs and weather reporting stations in the United States (U.S.). The state network encompasses over 530 pieces of equipment at airports, heliports, hospitals, and seaplane bases across Minnesota. The equipment dates back as far as the 1950s, with many components now beyond the end of their useful lives. Many NAVAIDs and weather reporting stations are outdated and no longer in production, forcing MnDOT Aeronautics to obtain replacement pieces from other states and airports that have decommissioned equipment.

This issue is particularly acute for state-owned weather reporting stations. Of the 80 automated weather observing systems (AWOS) owned by MnDOT Aeronautics, 75 pieces of equipment and its underlying electrical infrastructure are identified for replacement. This includes 45 Vaisala Model VB AWOS systems which have been out of production for more than two decades and are well beyond their manufacturer-stated life expectancy of 20 years. Thirty Vaisala Model VC AWOS are also in severe need of preservation work or replacement. This model is similarly out-of-production, and parts are challenging to obtain.

Additionally, the state owns 11 Instrument Landing Systems (ILS), production of which ceased over a decade ago. ILS are available at most of the state's busiest Key Commercial Service and GA airports, some of which support scheduled airline service, air cargo, and other economically important activities. ILS are also important to air medical providers and other emergency responders to maintain operations during nighttime or inclement weather conditions.

In total, MnDOT Aeronautics identified a $30.0 million need to replace 45 AWOS, 30 ASOS, and 11 ILS across the state, as shown in **Figure 4.8**.

Figure 4.8. MnDOT Critical NAVAIDs Needs by Type



Source: MnDOT Aeronautics, 2022

4.2.5. ESTIMATED MAINTENANCE AND OPERATIONS (M&O) NEEDS

In addition to the capital improvement needs discussed in the sections above, airports require significant investment in ongoing M&O expenses. M&O needs includes various types of airside and landside repairs and operational needs such as (but not limited to):

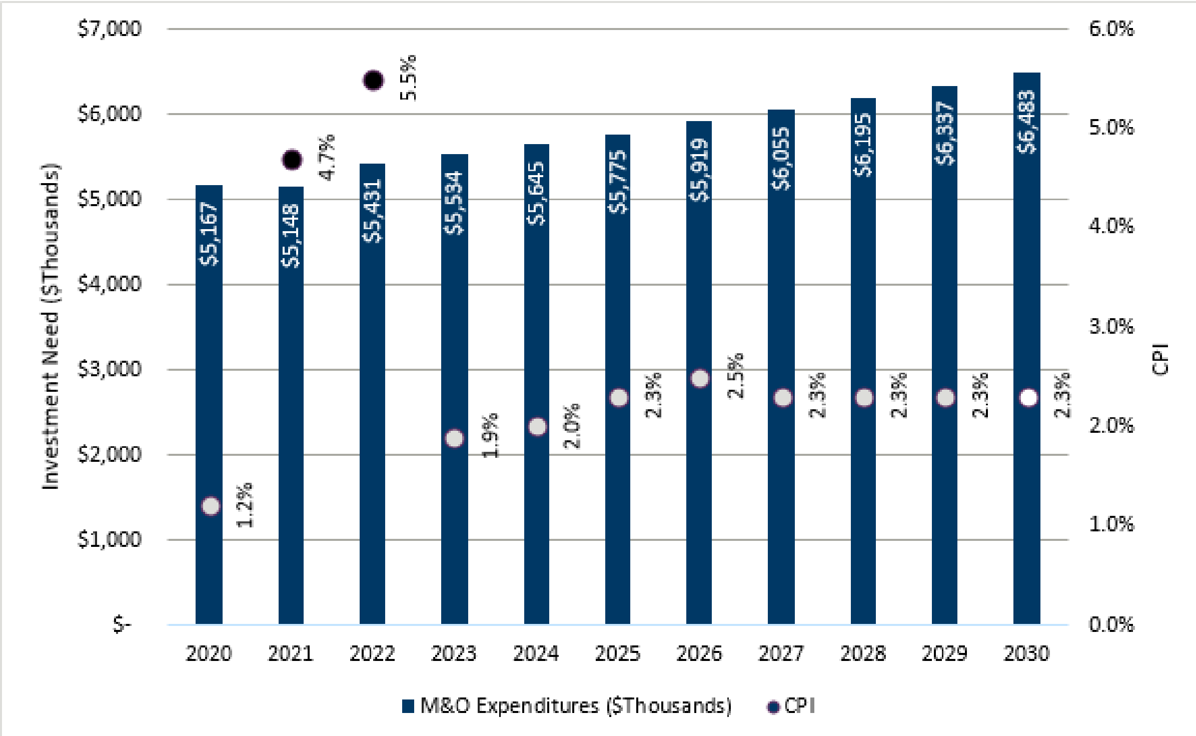
- Mowing and vegetation control
- Snow removal
- Pavement crack sealing
- Building repairs (A/D buildings, terminals, hangars, etc.)
- Airfield lighting equipment and repairs
- Maintenance vehicle and ground support equipment upkeep and fuel
- Trash collection and janitorial services
- Safety and security programs and expenses (e.g., fire and security systems and services)
- Airport utilities including gas, electric, water, sanitary sewer, and septic systems

M&O needs vary significantly between airports depending on the facilities and services offered; type and volume of aviation activities supported; geographic location; and other factors. These expenses are generally the responsibility of airport sponsors, although MnDOT Aeronautics provides a grant to offset eligible expenses known as the M&O Grant Program. At many small airports, ongoing M&O expenses represent a significant portion of or even the total annual expenditure made into the local airport. Accordingly, capturing M&O investment needs is an important component of developing the total statewide aviation investment need in Minnesota.

In Fiscal Year (FY) 2020, MnDOT Aeronautics expended $5.17 million to support the M&O Grant Program. This funding is awarded based on each airport's available infrastructure using a standard formula. The average award was approximately $15,000, with individual awards ranging from Waskish Municipal Airport (VWU) at $3,700 to Rochester International Airport (RST) at over $200,000. The M&O Grant Program only supports 70 percent of eligible project expenses, many expense types are ineligible for state support, and MSP does not receive a distribution through the MnDOT M&O Grant Program. Based on an M&O need analysis conducted by MnDOT Aeronautics in FY 2018, airports in the state require at least $15.0 million in funding to cover basic operational needs.

While it is thus clear that the approximately $5.17 million in state expenditure does not represent the total annual need, this baseline figure was used to estimate total need through the 2030 investment horizon established by the MnSASP. This figure is based on actual historical data and accordingly represents the most defensible dollar amount for inclusion in the MnSASP. M&O costs are assumed to increase with inflation defined in terms of the Consumer Price Index (CPI). Inflation increased sharply in 2021 at 4.71 percent. Consulting firm Deloitte projects inflation to continue the steep climb in 2022 to 5.5 percent before eventually moderating to 2.3 percent in the long-term. If M&O costs grow in alignment with CPI, the Minnesota state aviation system requires $63.69 million in operational investment between 2020 – 2030. Figure 4.9**Figure 4.9** shows investment need and project CPI by year through 2030.

Figure 4.9. M&O Investment Needs by Year, 2020 – 2030



Sources: MnDOT Aeronautics, 2022; Deloitte, 2022; Kimley-Horn, 2022

4.3. Total Minnesota Aviation Investment Need

Each of the sections above describe the individual components that comprise the Minnesota statewide aviation investment need. The number of sources that contribute to the total investment need highlights the many stakeholders acutely involved in the management, operations, and development the Minnesota aviation system, including the Federal Aviation Administration (FAA), MnDOT Aeronautics, and 129 airport sponsors (including the MAC). The total Minnesota aviation investment needs combine the project needs identified by these key stakeholders to quantify the total financial need of the Minnesota aviation system. This exercise is helpful when considering how to strategically prioritize limited federal, state, and local funding. Projects identified in multiple sources are only reported once to avoid duplication.[7] For example, an AWOS recommended by the MnSASP, identified by the NAVAIDs replacement program, and included on the statewide CIP are recorded with the MnSASP project needs as to avoid over-reporting aviation investment needs.

The total costs of the system organized by greatest need are shown in **Table 4.6**. Project costs identified for the system are estimated to be $4.09 billion through the investment horizon of 2030. Airside and landside maintenance and improvements for MSP and associated Reliever GA facilities contribute the

[7] *As noted previously, projects identified in more than one source are only accounted for once in the presentation of systemwide costs to avoid double-counting projects. For example, a parallel taxiway identified as a required project need by the MnSASP and requested by an airport sponsor in the Statewide CIP is only presented in the MnSASP costs. This task was completed to avoid inaccurately inflating the total aviation investment need by including duplicative costs.*

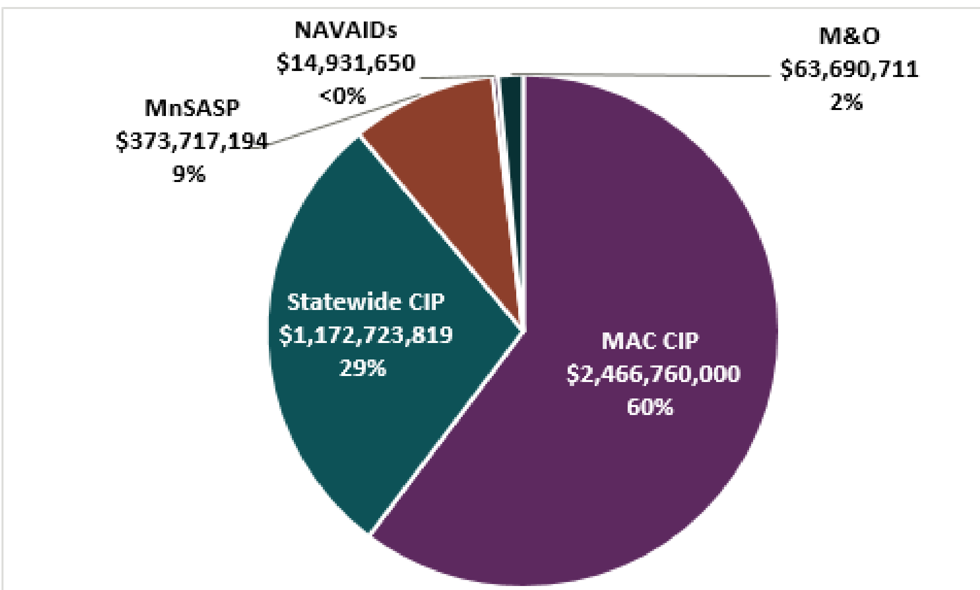
greatest need at $2.57 billion. As shown in **Figure 4.10**, this represents 60 percent of the statewide total. The statewide CIP contribute an additional $1.17 million (29 percent of total). The 2022 MnSASP's airport and system measure gaps identified by the MnSASP require $373.7 million in total investment, representing nine percent of the total.

Table 4.6. Total Minnesota Aviation Investment Need, 2020 - 2030

Source	Total Investment Need ($)
MAC CIP[1]	$2,466,760,000
Statewide CIP	$1,172,723,819
MnSASP	$373,717,194
NAVAIDs[2]	$14,931,650
M&O	$63,690,711
Statewide Investment Need	**$4,091,823,374**

Notes: (1) MAC 2022 – 2028 investment need. (2) This figure is different than the $30.0 million NAVAIDs need reported in Section 4.2.4 due to duplicative project costs. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

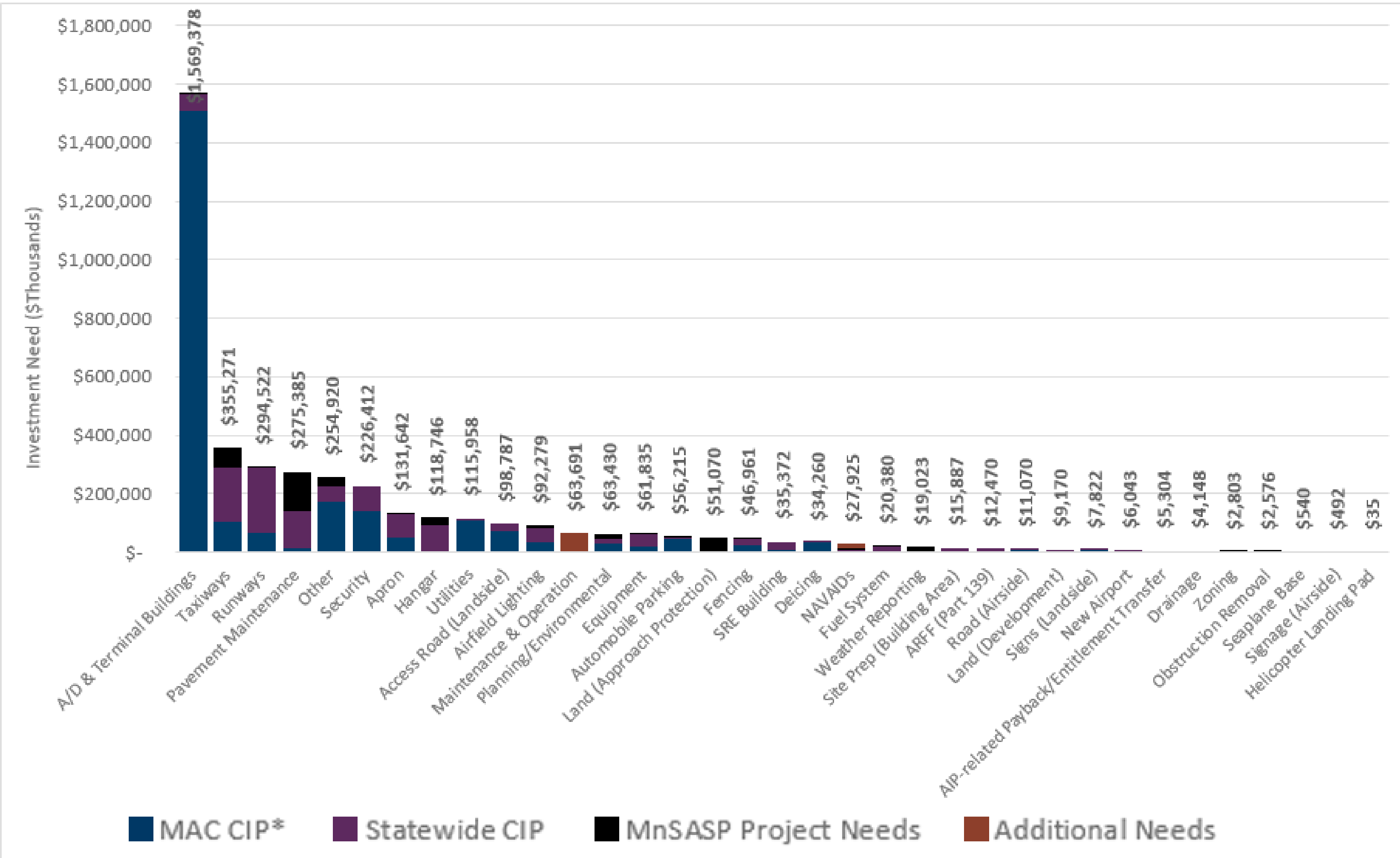
Figure 4.10. Total Minnesota Aviation Investment Need by Source, 2020 – 2030



Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

Figure 4.11 depicts total investment by project type. A/D buildings and terminals contribute the greatest singular investment need in Minnesota at $1.57 billion, driven primarily by the ongoing Terminal 1 modernization project at MSP. The next three greatest project types (e.g., taxiways, runways, and pavement maintenance) are not surprising, as well-maintained airside pavement is typically an airport's greatest asset and expense. The majority of these projects are identified on the statewide CIP as requested by airport sponsors. MnDOT Aeronautics should consider better leveraging the statewide APMS to prioritize these project requests. Using a data-driven process – as the APMS facilitates – ensures awarded funding aligns with the airports and pavement sections most in need of state support.

Figure 4.11. Total Minnesota Aviation Investment Needs by Type, 2020 – 2030



Notes: (1) Represents the 2022 – 2028 MAC CIP investment need. (2) "Additional Needs" comprise estimated M&O and NAVAIDs costs. In total, these sources generate less than three percent of the total statewide need. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

4.3.1. INVESTMENT NEEDS BY CLASSIFICATION

Total aviation investment needs by source and state classification are presented in Table 4.7. Figure 4.12 depicts MAC CIP, statewide CIP, and MnSASP system costs by state classification, as well as statewide needs by percent total. Although there are only nine Key Commercial Service airports in the Minnesota system, these airports comprise 74 percent of costs at $3.01 billion. Available airport facilities and services required to meet the demands placed upon these airports are key factors contributing to the significant costs associated with them. Concurrently, it is important to consider that Key Commercial Service Airports have the greatest access to funding through Passenger Facility Charges (PFCs) and many other revenue-producing activities primarily associated with scheduled commercial service.

The GA airport classifications generally contribute fewer investment needs as airports become smaller, and all GA classifications require significantly less funding than commercial service facilities. Key GA airports generate $348.44 million in costs (nine percent of total), followed by Intermediate Small at $340.87 million (eight percent of total), and Intermediate Large at $254.83 million (six percent of total). Landing Strip Turf airports contribute just $48.52 million in total needs (one percent of total).

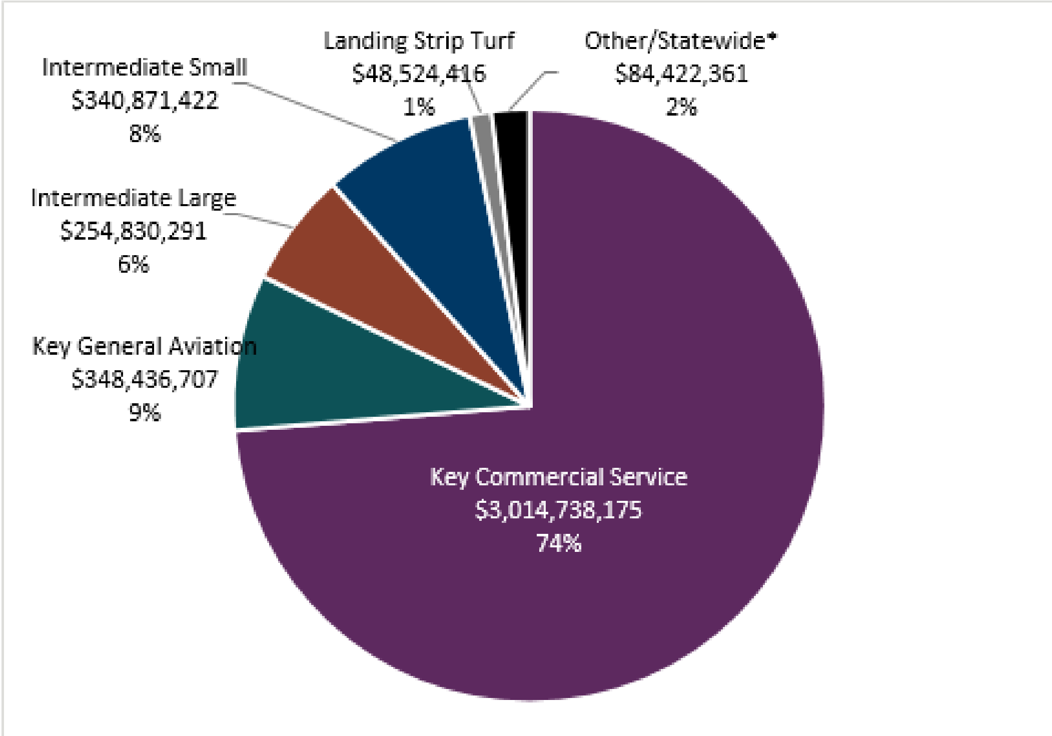
When reviewing system needs, consider that the proportion of federal, state, and local funding available to an airport is dependent on its role at the federal and state levels. Primary and Nonprimary National Plan of Integrated Airport Systems (NPIAS) airports are eligible for federal funding through the Airport Improvement Program (AIP), the State Airports Fund, and local dollars, while non-NPIAS airports are only eligible to receive funding from the latter two sources. This issue is explored further in the following section.

Table 4.7. Total Aviation Investment Need by State Classification and Source, 2020 - 2030

Airport Classification	Source: MAC CIP[1] ($)	SOURCE: Statewide CIP ($)	SOURCE: MnSASP ($)	SOURCE: Additional[2] ($)	Total Investment ($)
Key Commercial Service	$2,367,710,000	$550,730,222	$96,297,953	-	**$3,014,738,175**
Key GA	$60,850,000	$205,340,861	$82,245,846	-	**$348,436,707**
Intermediate Large	$11,900,000	$190,931,856	$51,998,436	-	**$254,830,291**
Intermediate Small	$20,500,000	$192,036,080	$128,335,343	-	**$340,871,422**
Landing Strip Turf	-	$33,684,801	$14,839,616	-	**$48,524,416**
Other/Statewide*	$5,800,000	-	-	$78,622,361	**$84,422,361**
Total by Source	**$2,466,760,000**	**$1,172,723,819**	**$372,059,743**	**$78,622,361**	**$4,091,823,374**

Notes: (1) MAC 2022 – 2028 investment need. (2) "Additional Needs" comprise estimated M&O and NAVAIDs costs, as these needs cannot be attribute to one classification. In total, these sources generate less than three percent of the total statewide need. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

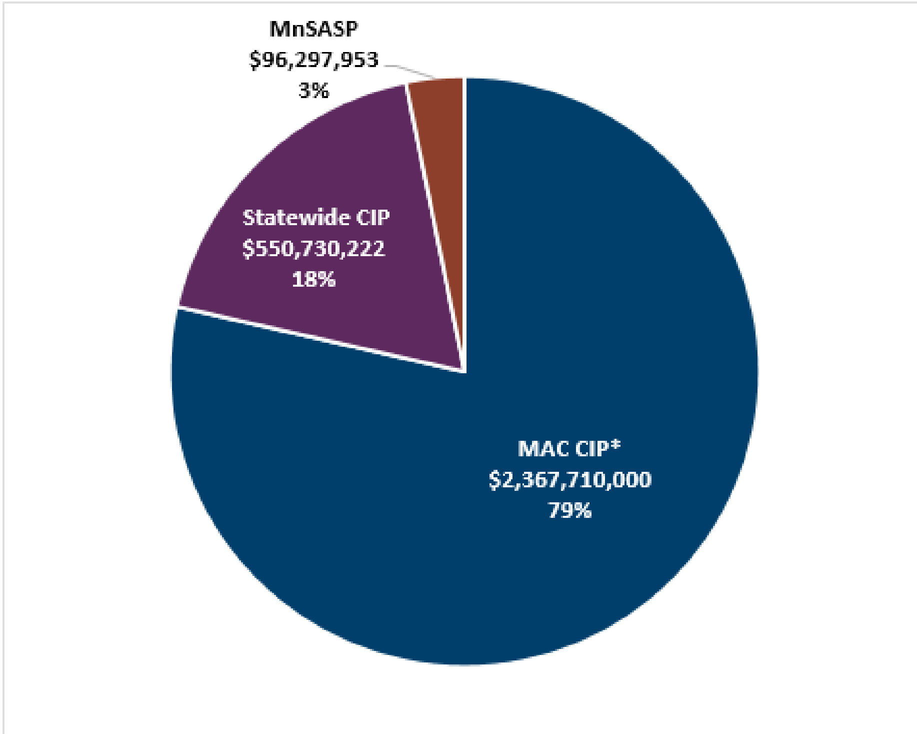
Figure 4.12. Total Aviation Investment Need by Classification, 2020 – 2030



Note: (*) MAC 2022 – 2028 investment need. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

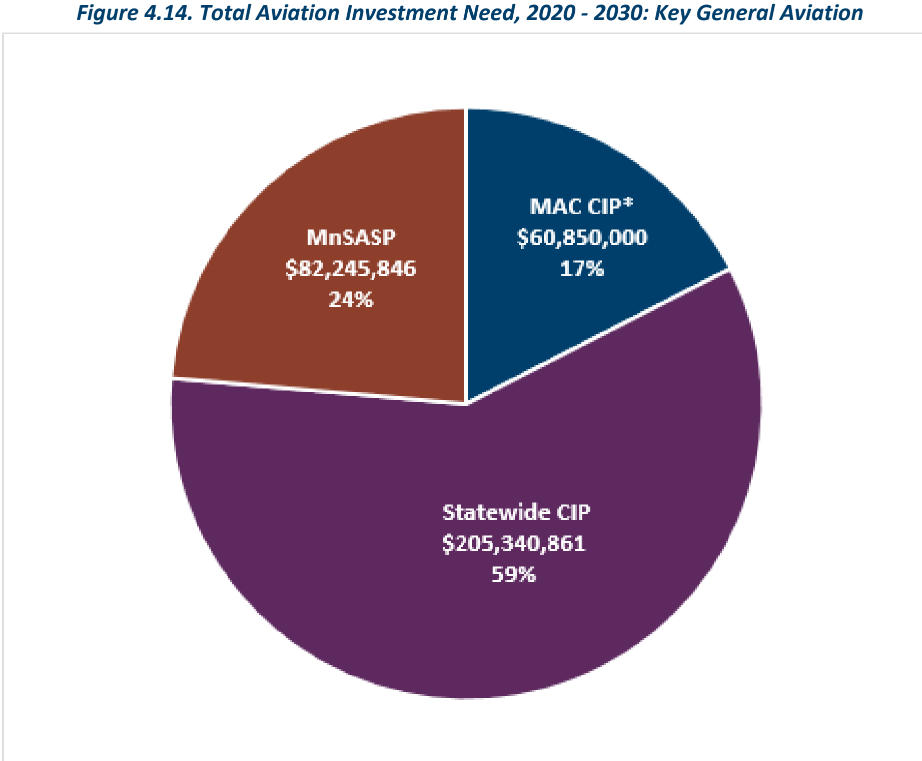
Figure 4.13 through Figure 4.17 summarize the system costs for each state classification. Nearly all costs included on the MAC CIP are associated with the MSP; as such the MAC CIP comprise the highest costs for Key Commercial Service Airports, both in terms of percent and total dollars. The state CIP reports the highest investment needs for all GA airport classification, ranging from 56 percent at Intermediate Small to 75 percent at Intermediate Large airports.

Figure 4.13. Total Aviation Investment Need, 2020 - 2030: Key Commercial Service



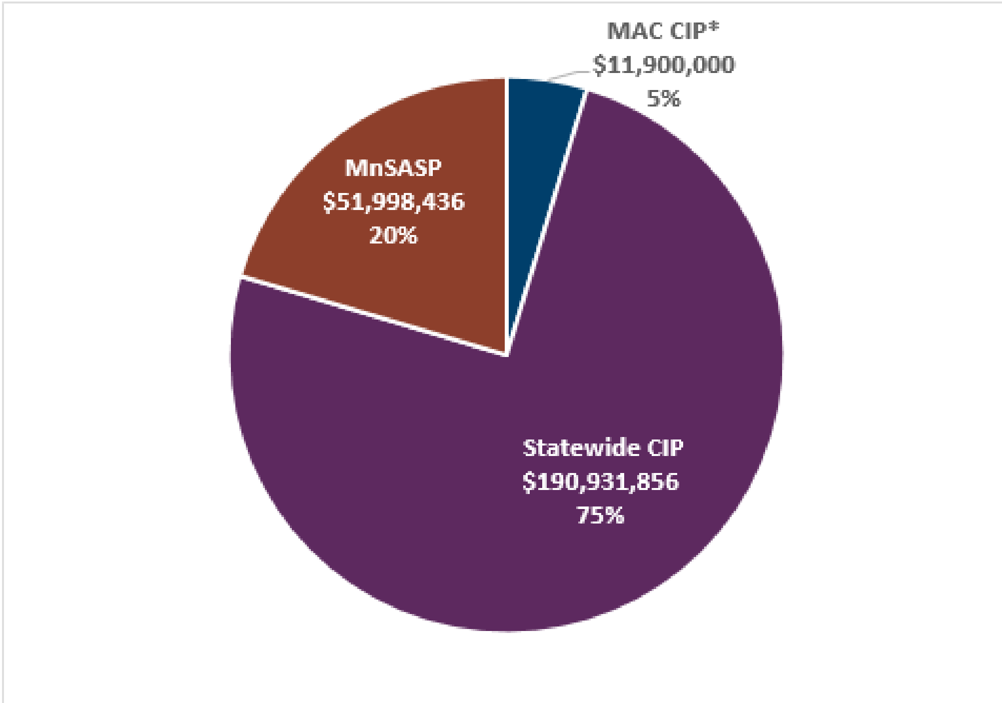
Note: (*) MAC 2022 – 2028 investment need. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

Figure 4.14. Total Aviation Investment Need, 2020 - 2030: Key General Aviation



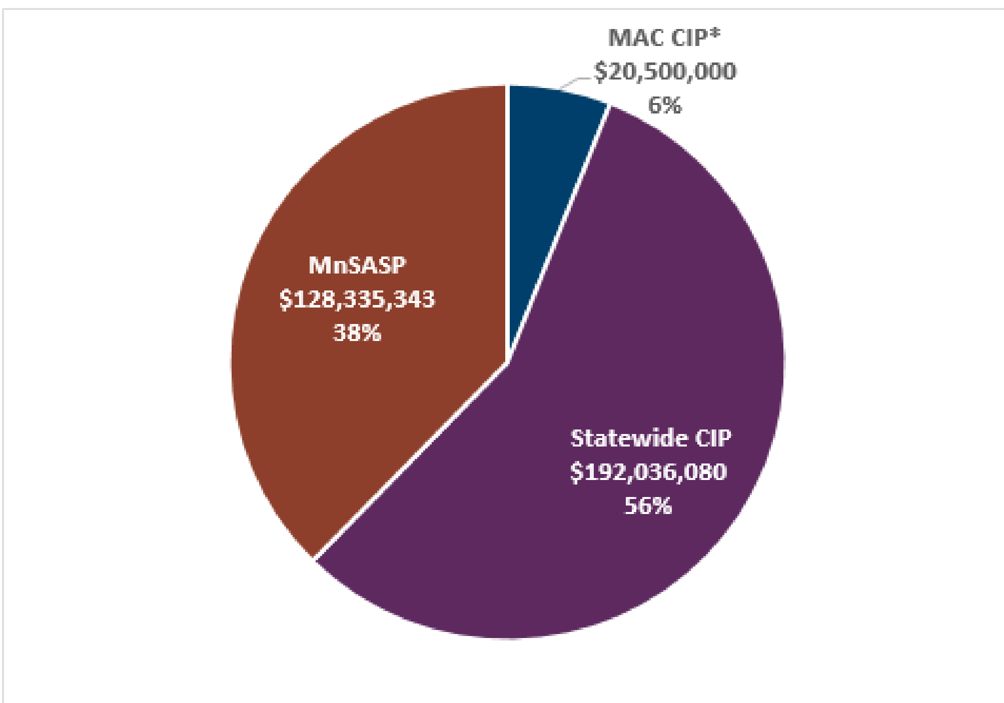
Note: (*) MAC 2022 – 2028 investment need. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

Figure 4.15. Total Aviation Investment Need, 2020 - 2030: Intermediate Large



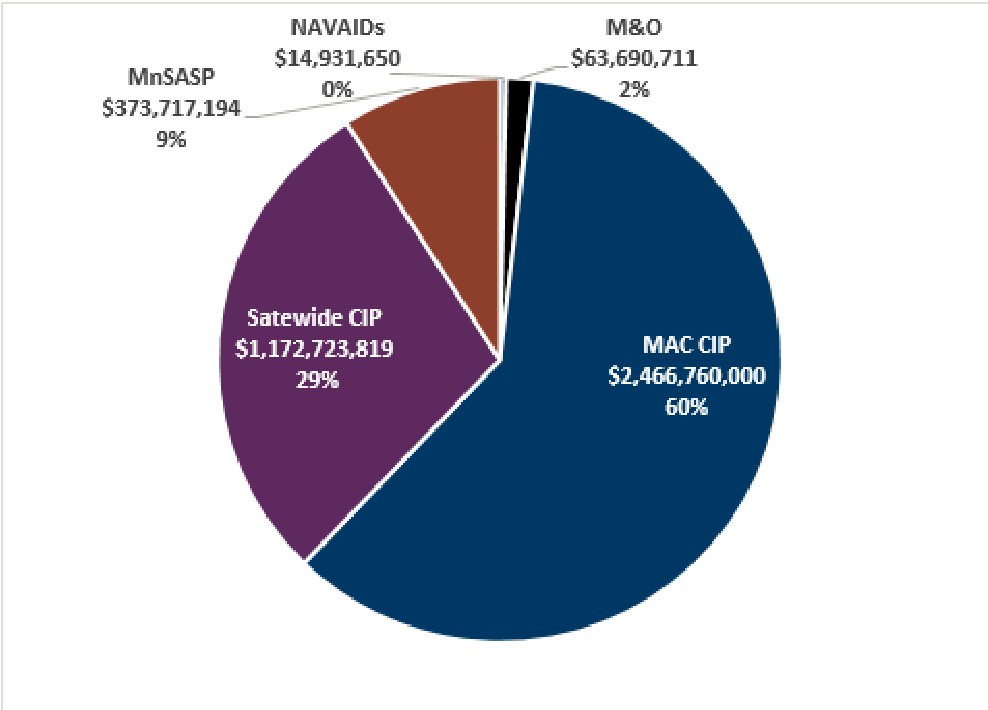
Note: (*) MAC 2022 – 2028 investment need. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

Figure 4.16. Total Aviation Investment Need, 2020 - 2030: Intermediate Small



Note: (*) MAC 2022 – 2028 investment need. Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

Figure 4.17. Total Aviation Investment Need, 2020 - 2030: Landing Strip Turf



Sources: MnDOT Aeronautics, 2022; MAC, 2022; Kimley-Horn, 2022

4.4. Aviation Funding Sources

Calculating the total investment need in Minnesota is a critical component of understanding the long-term financial outlook for MnDOT Aeronautics. The other side of the equation is estimating available funding to meet those anticipated needs. Minnesota's 96 NPIAS airports are eligible to receive funding from federal, state, local, and private sources, while the 37 non-NPIAS facilities are only eligible for the latter three. The availability of local and private funding is dependent on numerous site-specific factors beyond the analyses of the 2022 MnSASP. While these factors are not discussed in detail, airport sponsors are responsible for contributing a local share to capital investment and M&O projects. Private funding may also be used to bolster the local match; however, private funding is uncommon and typically associated with a business improving the airport to support its commercial activities.

The composition of funding sources available to support specific airports and projects depends on eligibility requirements, needs, and characteristics. The following subsections take a closer look at federal and state aviation investment into Minnesota airports. This information is then used to project future funding to assess the long-term financial sustainability of the system.

4.4.1. FEDERAL AIRPORT IMPROVEMENT PROGRAM

The FAA AIP provides entitlement and discretionary funding to airports deemed critical to the National Airspace System (NAS) and thus included in the NPIAS. The AIP is supported by the Airport and Airway Trust Fund (AATF), the revenue for which is obtained from user fees, ticket taxes, fuel taxes, and other aviation-related revenue sources. AIP grants are available to fund projects serving to develop and improve airports in the areas of safety, capacity, security, environmental issues, and noise compatibility. In general, AIP grants are available for most airfield improvements or rehabilitation projects and – in some specific instances – terminals, hangars, and non-aviation-related development. Professional services related to airport development such planning, design, survey, and environmental compliance are also eligible for federal support. Operational expenses are ineligible for federal grants, as are revenue-producing projects unless all other airside development needs and other stringent eligibility criteria have been met.

Airport sponsors that accept AIP grants must agree to certain conditions and obligations associated with federal grant assurances. Grant assurances remain active through the useful life of the project or in perpetuity in the case of land acquisition. Because of the strict requirements of federal grant assurances, airport sponsors should carefully consider their community's long-term commitment to the airport before accepting federal money. Sponsors that break grant assurances must reimburse the FAA for the grant, which can present a major challenge to many municipalities.

AIP funds are distributed based on national priorities and objectives established by the FAA and Congress. AIP funds are first apportioned to major entitlement categories (Primary, Nonprimary, cargo). Remaining funds are then distributed via discretionary grants awarded in accordance with a national prioritization formula. In some years, supplemental funds are available in addition to standard entitlement and discretionary grants. Supplement funds are subject to the parameters established in the enabling legislation instead of normal AIP set-asides and discretionary formulas.

Figure 4.18 depicts AIP grants awarded to Minnesota's NPIAS airports since FY 2017. At the national level, discretionary and entitlement funding has remained flat for many years. Between FYs 2018 and 2020, Minnesota's airports received an average of $62.2 million in entitlement and discretionary funding.[8] In FY 2019, Public Law 116-6, "Consolidated Appropriations Act, 2019" included $500.0 million in supplemental funding for U.S. airports.[9] The following year, Public Law 116-260, "Consolidated Appropriations Act, 2021," included $400.0 million for supplemental funding.[10] Airports in the state received $17.5 million and $14.6 million in FYs 2019 and 2020, respectively, in addition to typical grant funds. In FY 2020, Public Law 116-136, "Coronavirus Aid, Relief, and Economic Security (CARES) Act" included $10.0 billion in funds to be awarded as economic relief to eligible U.S. airports hard-hit by the pandemic.[11] Sixty-two Minnesota airports received a total of $8.6 million in CARES Act funding in FY 2020. MSP received the highest single award at $3.2 million.

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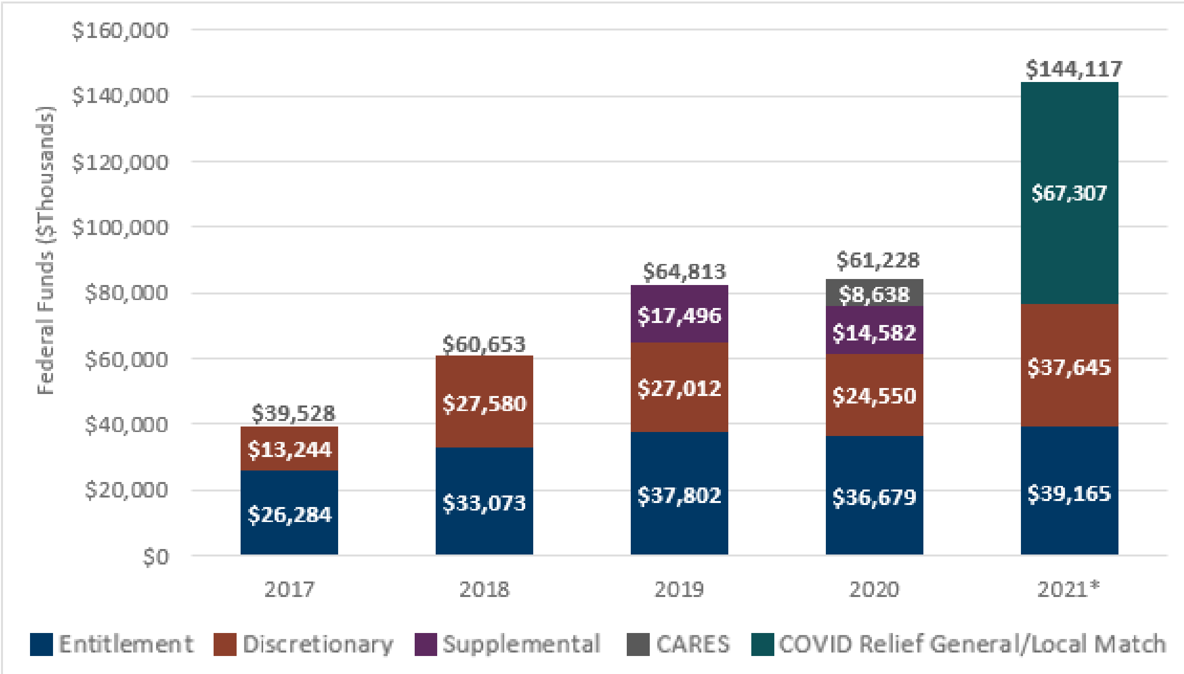
[8] A notable dip is federal grant dollars is apparent in FY 2017 at $39.5 million in entitlement and discretionary grant awards. Additional research would be required to explain the reasons behind this occurrence.

[9] FAA (n.d.). "AIP 2019-2021 Supplemental Appropriation." Available online at https://www.faa.gov/airports/aip/aip_supplemental_appropriation/2019/ (accessed April 2022).

[10] FAA (November 2021). "AIP 2021-2023 Supplemental Appropriation." Available online at https://www.faa.gov/airports/aip/aip_supplemental_appropriation/ (accessed April 2022).

[11] FAA (April 2022). "2020 CARES Act Grants." Available online at https://www.faa.gov/airports/cares_act/ (accessed April 2022).

Figure 4.18. Historical AIP Grants by Type, 2017 - 2020 ($Thousands)



**Note: The COVID Relief General/Local match was awarded under CRRSAA and ARPA and were one-time non-recurring funds.*
Source: FAA, 2022

In FY 2021, an additional $67.3 million was awarded to Minnesota airports. This federal assistance was awarded under Public Law 116-220, "Coronavirus Response and Relief Supplemental Appropriation Act" (CRRSAA) and Public Law 117-2, "The American Rescue Plan Act" (ARPA). CRRSAA provided nearly $2.0 billion to be awarded to airports and eligible aviation-related businesses such as airlines to prevent, prepare for, and respond to COVID-19.[12] ARPA provided approximately $8.0 billion in grant money to eligible U.S. airports in response to COVID-19.[13] In FY 2021, $144.1 million federal dollars were awarded to Minnesota airports. Further, neither MnDOT Aeronautics nor recipient airports are responsible for providing state or local matches to CRRSSA funding.

Through the COVID-19 pandemic, the federal government has awarded unprecedented amounts of grant funding to eligible U.S. airports. The funding may have reached its zenith with P.L. 117-58, "Infrastructure Investment and Jobs Act" (known as the Bipartisan Infrastructure Bill [BIL]). BIL provides $15.0 billion for airport-related projects under the existing AIP grant and PFC criteria to be distributed over the next five years. In FY 2022, $2.89 billion is available to eligible U.S. airports. The FAA awarded $59.3 million in BIL funding across 94 Minnesota airports in FY 2022. MSP received 59.2 percent of total funding at $35.1 million. Rochester International (RST) and Duluth International (DLH) airports each received approximately three percent of the total funding. Eight airports received between one and two percent total, and the remaining 83 facilities received less than one percent of total awarded dollars in FY 2022.

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[12] FAA (April 2022). "Airport Coronavirus Response Grant Program." Available online at https://www.faa.gov/airports/crrsaa/ (accessed April 2022).
[13] FAA (April 2022). "Airport Rescue Grants." Available online at https://www.faa.gov/airports/airport_rescue_grants/ (accessed April 2022).

The FAA will also award AIP grants in FY 2022, although specific funding amounts have not been released at the time of this writing in spring 2022.

4.4.2. STATE AIRPORTS FUND

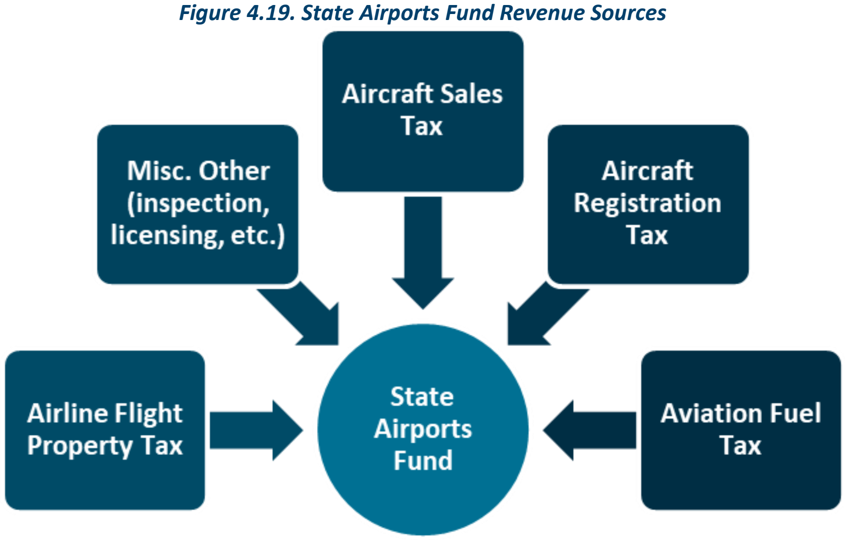
All Minnesota state system airports are eligible for state funding through the State Airports Fund as authorized by Minnesota Statutes Section 360.017. This money must be used in the following ways:[14]

- Planning, acquisition, construction, improvement, maintenance, and operation of airports and other air navigation facilities
- Conducting scheduled air service marketing
- Promoting interest and safety in aeronautics through education and information
- Paying the salaries and expenses of MnDOT related to aeronautics planning, administration, and operation

Funding for these operations is obtained through various user-assessed revenue sources including airline flight property, aircraft sales, aircraft registration, and aviation fuel taxes, as well as miscellaneous other minor revenue streams. Figure 4.19 depicts an overview of the revenue streams into the State Airports Fund.

Figure 4.20 provides revenues between state fiscal year (SFY) 2016 and SFY 2021. Total revenues into the fund average $24.8 million annually. Sales tax on aircraft and the flight property tax are the largest contributors to the fund, each contributing between a quarter and just below one-half of the total during each year of the planning period.

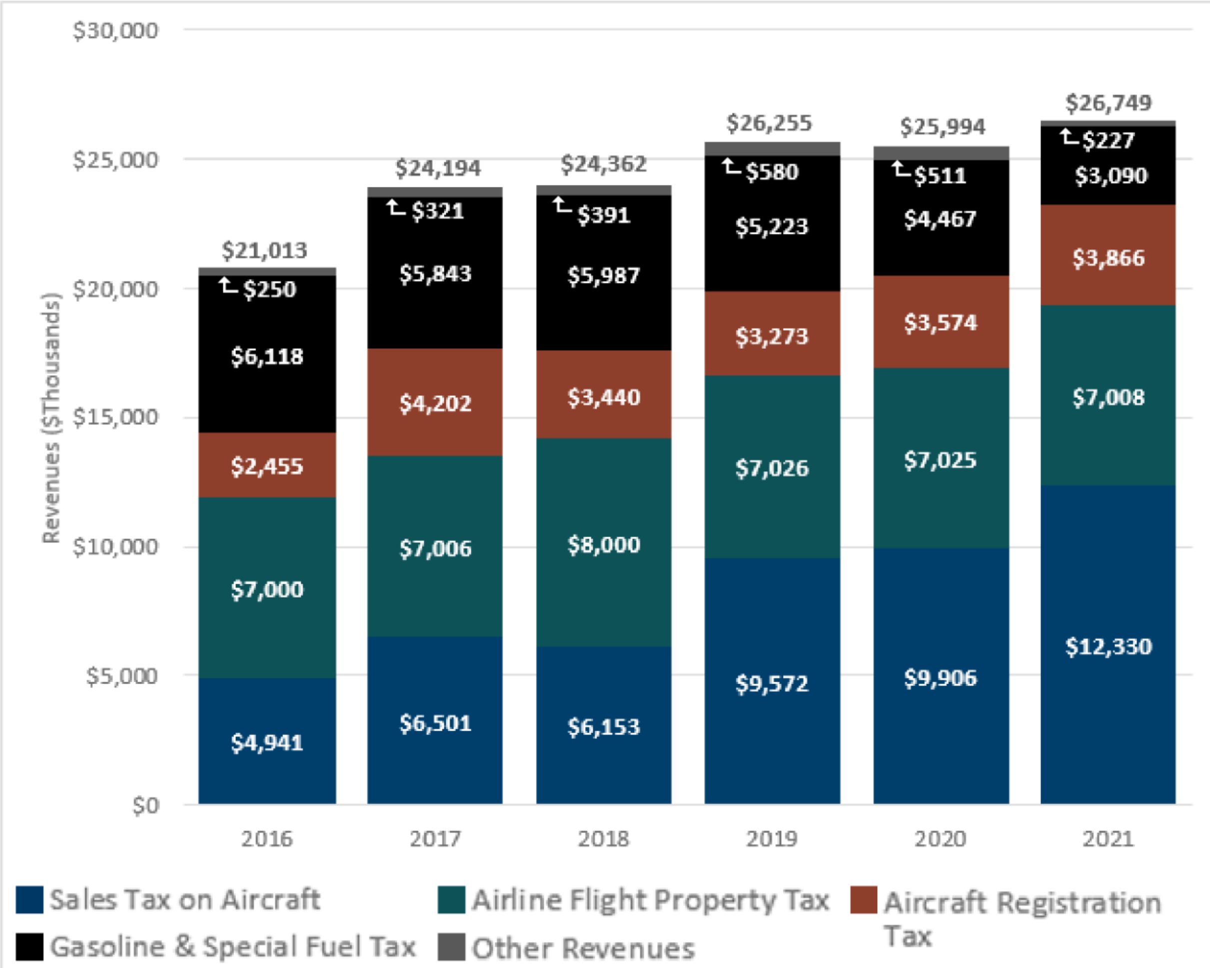
Figure 4.19. State Airports Fund Revenue Sources



Sources: MnDOT Aeronautics, 2022; Kimley-Horn, 2022

[14] *Minnesota Statutes Chapter 360.017, State Airports Fund, Subdivision 1.*

Figure 4.20. State Airports Fund Revenues by Source, SFY 2016 - SFY 2021

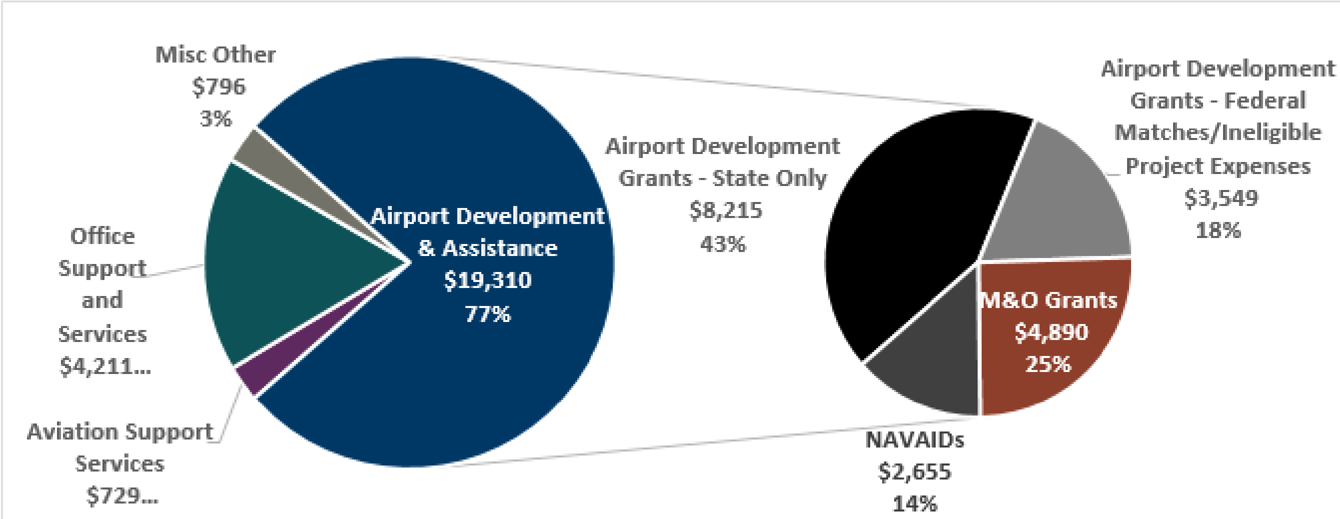


Source: MnDOT Aeronautics 2022

The State Airports Fund allowed MnDOT Aeronautics to invest an average of $19.9 million annually into airport development and assistance between SFYs 2016 and 2021.[15] **Figure 4.21** depicts the expenditure breakdown between MnDOT programs in SFY 2019 to represent a typical pre-COVID-19 year. State expenditures for airport development and assistance generally compose approximately 75 percent of the total MnDOT budget, with the remaining budget expended for MnDOT operational and other miscellaneous expenses. Assistance to airports is allocated through three programs: Airport Development Grants, NAVAIDs Program, and M&O Grant Program. Airport Development Grants are further subdivided into investment dollars used to support projects only funded with state and local dollars (referred to as "state only"), and those that support otherwise federally funded projects (either to provide the state match or to fund federally ineligible project expenses).

[15] *State investment into airports was significantly higher in SFY 2021 because MnDOT Aeronautics was not required to provide a state match to federally funded projects due to CRRSSA. Average state investment into airports between SFYs 2016 and 2020 was $18.7 million.*

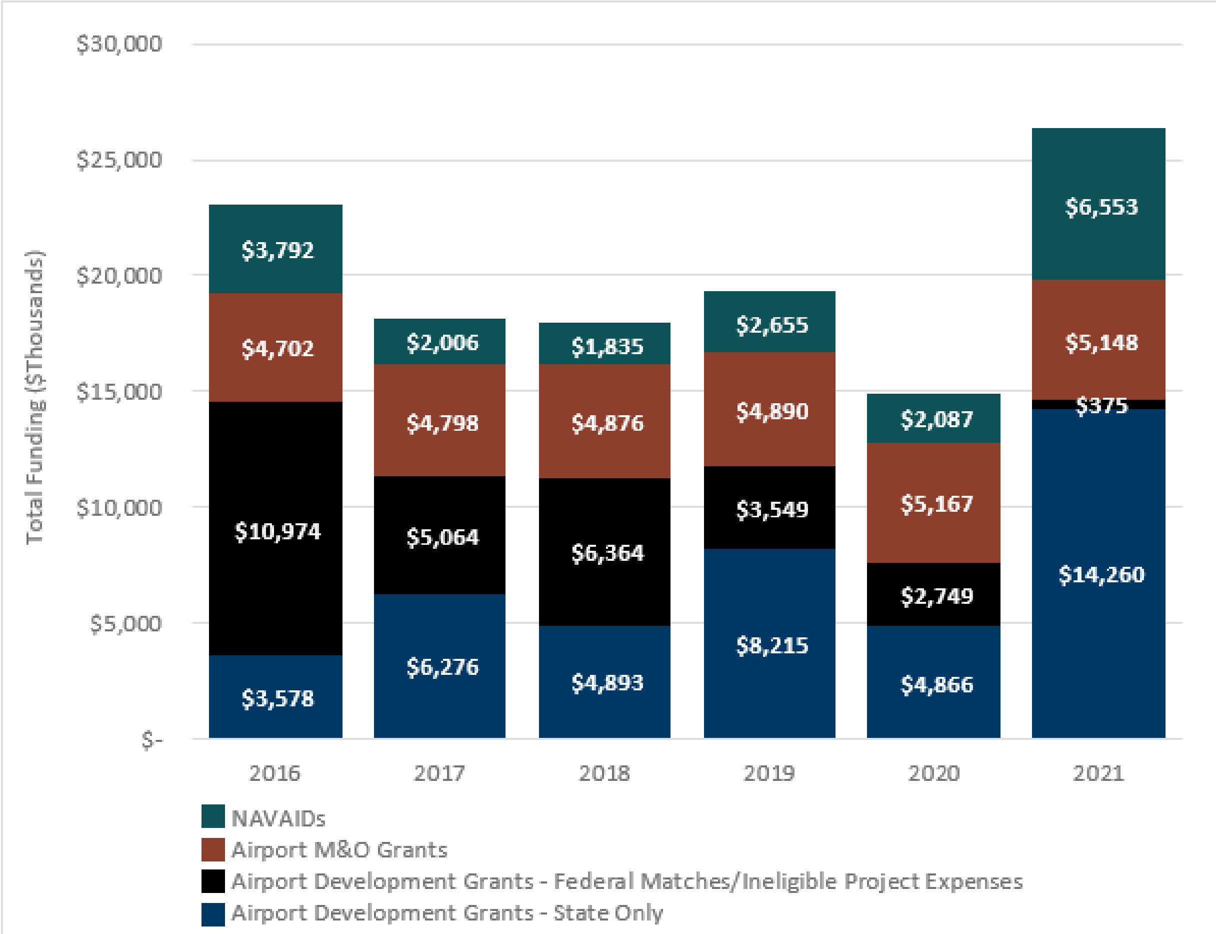
Figure 4.21. Expenditures by Program, SFY 2019 ($Thousands)



Note: Miscellaneous other expenses in SFY2019 included funding for the Civil Air Patrol, the Duluth Airport Authority, and statewide indirect expenses. Source: MnDOT Aeronautics, 2022

Figure 4.22 presents airport development and assistance program expenditures by type between SFY 2016 through 2021. State investment into airports was different in SFY 2021 in terms of total dollars and composition due to the 100 percent federal match under CRRSSA. State investment is anticipated to return to pre-COVID-19 trends as the impacts of the pandemic wane and special federal funding programs cease. In most years, approximately 65 percent of state investment into airports is allocated to Airport Development Grants (state only and federal matches/ineligible project expenses), 25 percent into the M&O Grant Program, and 10 percent into the NAVAIDs Program.

Figure 4.22. Airport Development and Assistance Program Expenditures by Type, SFY 2016 - 2021 ($Thousands)



Source: MnDOT Aeronautics, 2022

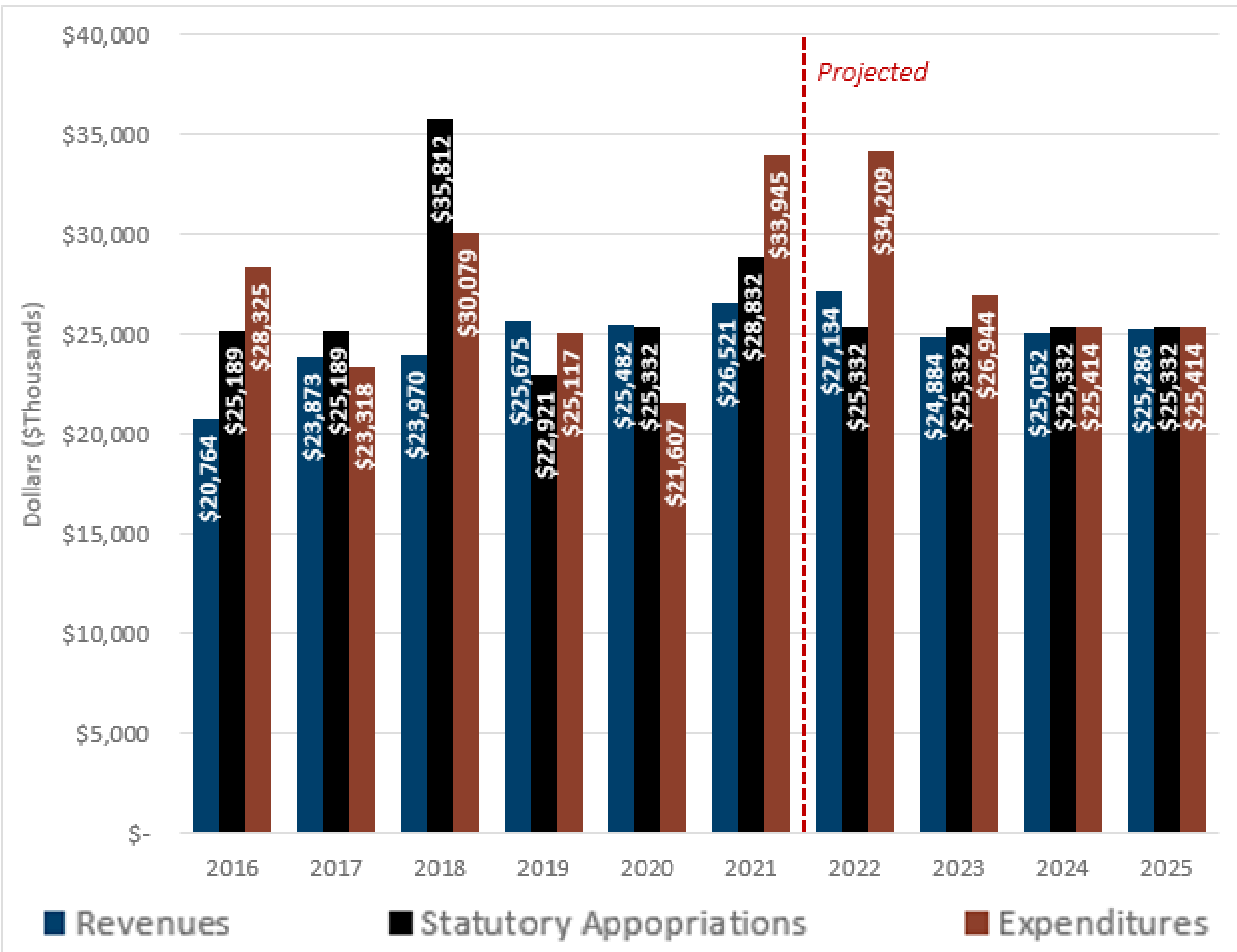
4.4.3. FUTURE FUNDING OUTLOOK

Over the long-term, state and federal dollars available to support airport operations and capital development are anticipated to remain stable. Since FY 2019, federal dollars available to NPIAS airports have been notably high due to influxes of investment immediately prior to and throughout the COVID-19 pandemic. However, special federal investment programs will expire within the next five years. Following the passage of the BIL in early 2022, it is unlikely that Congress will approve additional supplemental investments into the nation’s infrastructure for many years. Once the CARES Act, CRRSAA, and BIL funds are expended or expire, it is anticipated that the AIP program will continue to award entitlement and discretionary funds at historically “normal” levels.

State Airports Fund revenues are also anticipated to remain stable through the forecast horizon. Most significantly, MnDOT Aeronautics has a fund balance policy to ensure that the State Aviation Fund does not fall below or grow above a certain percentage of appropriations. Minnesota Statutes 270.071 through 270.079 require that MnDOT Aeronautics establish the airline flight property tax annually by calculating the difference between the “total fund appropriation and the estimated total fund revenue from other sources.” This means that the airline flight property tax rate varies from year-to-year depending on anticipated revenues from other funding sources to maintain stability. The airline flight property tax rate is established in December based on the November forecast and collected in April.

Figure 4.23 depicts historic and projected future State Airports Fund revenues, statutory appropriations, and expenditures prepared by Minnesota Management Budget (MMB). Between SFY 2016 and 2021, statutory appropriations associated with the State Airports Fund averaged $27.2 million. Appropriations were significantly higher in SFY 2018 than other years within this period. During the forecast period of SFY 2022 through 2025, approximately $25.0 million is anticipated to be available to support Minnesota airports and the work of MnDOT Aeronautics.

Figure 4.23. Historic and Projected Future State Airports Fund Revenues, Statutory Appropriations, and Expenditures, SFYs 2016 – 2025

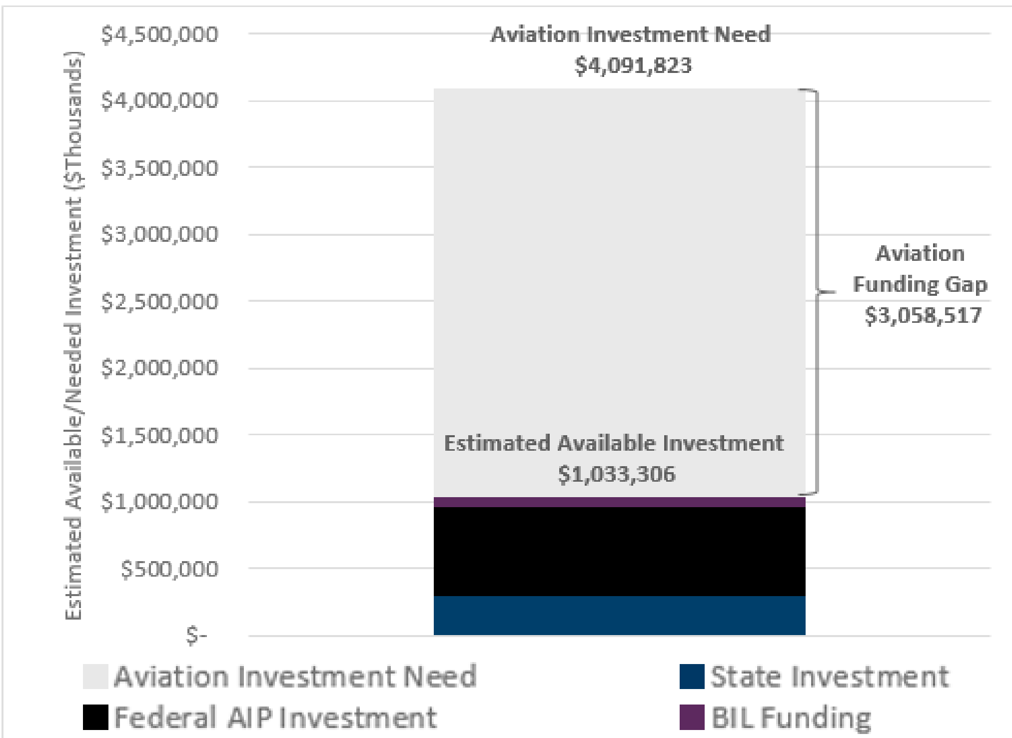


Notes: State Airports Fund revenues and spending will not necessarily align due to timing of spending, available balances from prior years, etc. A notable spike in 2018 statutory appropriations is attributable to a one-time balance transfer to restore aviation funding transferred to the general fund that occurred in a previous year due to state budgetary challenges.
Source: MMB, 2022

4.4.3.1. Aviation Funding Gap

As discussed above, pre-COVID federal and state aviation funding levels serve as a reasonable baseline for estimating future revenues in the long-term. Neither federal nor state dollars are anticipated to increase during the planning horizon. Based on this assumption, an estimated $1.03 billion in federal and state funding is projected to become available to support Minnesota's airports through 2030. As shown in **Figure 4.24**, a $3.1 billion aviation funding gap may arise over the next decade. This equates to just one-quarter of the estimated $4.1 billion in airport maintenance and improvement needs through the planning horizon – leaving 75 percent of needs unmet. With design and construction costs anticipated to rise in the years, the gap may ultimately be significantly higher than this analysis portends.

Figure 4.24. Minnesota Aviation Funding Gap by 2030



Sources: MnDOT Aeronautics, 2021; Kimley-Horn, 2022; FAA, 2022; MAC, 2022

It is important to state that this funding gap analysis only looked at federal and state investment. Local funds contributed by the airport sponsor or revenues generated by the airport were not considered, as such data are unavailable and cannot be reasonably forecasted. This issue is particularly acute for investment needs versus available funding at MSP. The volume and sophistication of aviation activities at MSP require the greatest facility needs and costs for preservation and expansion. However, MSP also generates significant revenues from airlines and the passengers they serve – including the assessment of PFCs.

While MSP may have the greatest opportunity to generate revenues, nearly all airports have some ability to generate some revenues through lease holdings, fuel sales, landing and tie-down fees, and other strategies. In consideration of the significant aviation funding gap anticipated through 2030, the importance of airport economic self-sufficiency becomes even more critical. Local airport sponsors and private airport users play a pivotal role in ensuring airports remain safe, efficient, compliant with all applicable regulations, and responsive to the needs of airport users. Sponsors must work in collaboration with MnDOT Aeronautics to support the state's air traveling public to meet aviation demands today and in the future.

4.4.3.2. Investment Needs by Funding Source (Excluding MAC CIP)

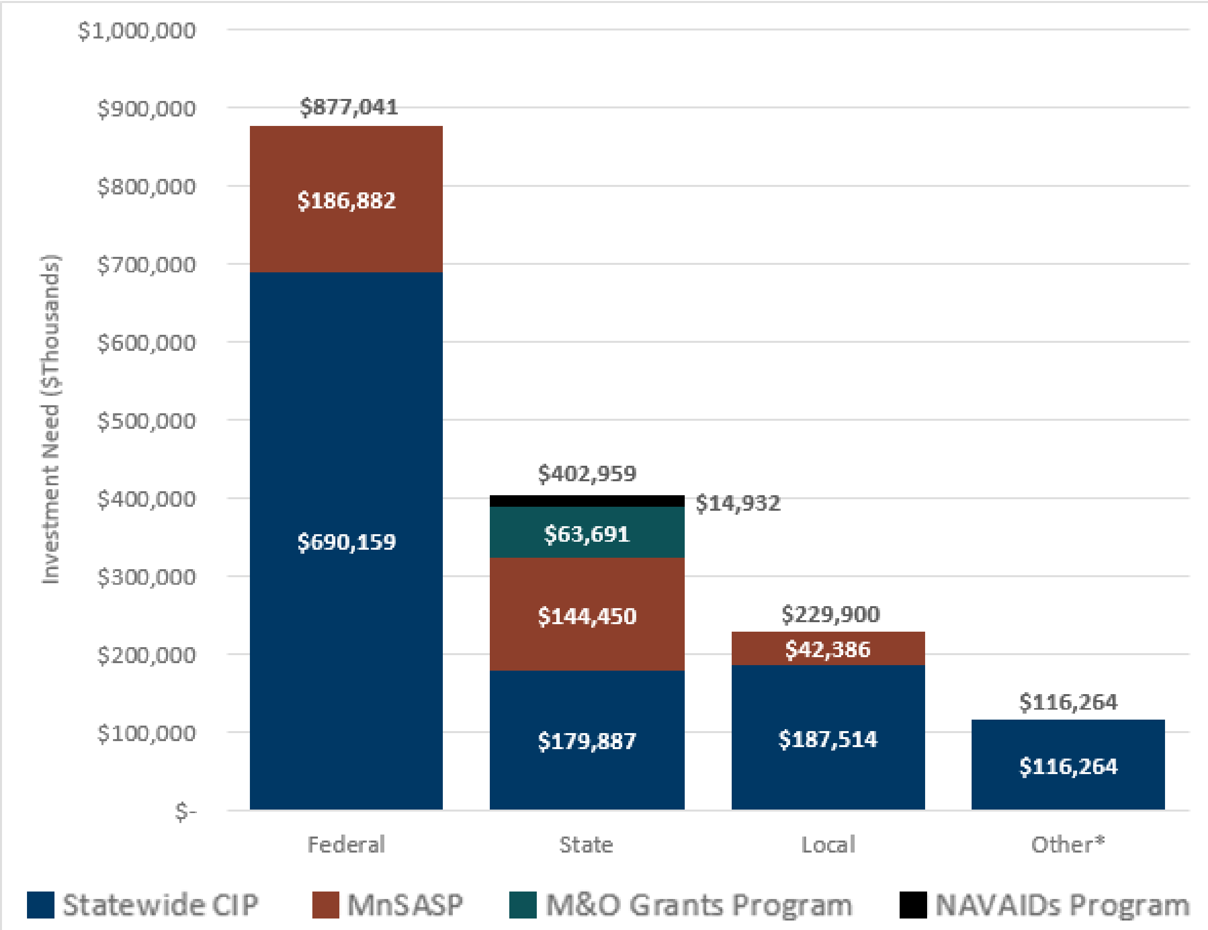
In addition to quantifying total investment needs, it is helpful to review projects in terms of funding eligibility. The state system plan is primarily designed to assist MnDOT Aeronautics' long-term planning efforts in support of system viability and sustainability over time. This analysis presents total investment needs by funding source eligibility to quantify the state's estimated share.

The investment needs reported in the MAC CIP are excluded from the analysis. This is because MAC system airports have access to funding sources unavailable to or infeasible for most other airports in the state. Because of the unique composition of funding amounts and types available to the MAC, the airport authority is responsible for funding its own maintenance and development needs. These needs are thus less pertinent to the primary objective of the state system plan.

Figure 4.25 shows investment needs excluding the MAC by project source. Investment needs excluding the MAC CIP total $1.6 billion through 2030. Based on federal and state eligibility guidelines and participation rates,[16] the state's share of these needs is an estimated $403.0 million (25 percent). This equates to $40.3 million annually, over twice available airport assistance funds provided through the State Airports Fund. Fifty-four percent of need is eligible for AIP funding ($877.0 million). The remaining $346.2 million (21 percent) composes the local and "other" share, as identified by airport sponsors within the statewide CIP. The source of these other funds is unknown but assumed to be contributed by private sources.

[16] *The state share is based on MnDOT Aeronautics' SFY 2020 Participation Rates letter as the base year of the 2022 MnSASP. Federal participation rates were obtained from the FAA Order 5100.38D, change 1, AIP Handbook.*

Figure 4.25.Total Investment Needs by Funding Source Excluding MAC CIP, 2020 – 2030



Note: (*) "Other" funding sources reported in the statewide CIP as input by airport managers. It is unknown what these sources are specifically; however, they likely refer to various private funders. Sources: MnDOT Aeronautics, 2021; Kimley-Horn, 2022; FAA, 2022

4.5. State Funding Prioritization

At nearly all funding levels, aviation investment need exceeds available funds. All airport sponsors are responsible for maintaining existing assets to maintain safe, secure, and efficient operating conditions. Some airport sponsors are also faced with expansion needs as demands grow and/or change over time. Faced with the reality that not all needs can be met, funding agencies must decide which projects can be supported through the prioritization of available dollars. The FAA regularly reviews the national prioritization model so the AIP project selection process aligns with the overarching goals of the agency and the U.S. Congress. MnDOT Aeronautics utilized the 2022 MnSASP to carefully review the prioritization of the State Airports Fund. This review was conducted with the goal of ensuring state funds are allocated appropriately and in alignment with the needs of the agency and aviation stakeholders such as airport sponsors, pilots, and the air traveling public. Additionally, MnDOT is placing renewed emphasis on agency transparency in project selection processes for all transportation modes.

4.5.1. STAKEHOLDER PARTICIPATION

Through the 2022 MnSASP process, MnDOT Aeronautics has embraced collaborative, stakeholder-driven decision-making processes. In fact, the plan was undertaken in two distinct phases. Phase I was specifically designed to gather stakeholder input on current and anticipated future aviation issues of highest importance in Minnesota. This feedback was used to develop the scope of Phase II, providing a direct link between stakeholder needs and the objectives, goals, and methodologies of the state system plan. To continue in its "customer-driven" focus, MnDOT Aeronautics established six Focus Area Working Groups to provide input on and review the work of Phase II of the 2022 MnSASP. State airport funding was identified as a key issue during Phase I, and a specific Focus Area Working Group was convened to offer guidance on associated tasks conducted during Phase II (referred to as the Airport Funding Working Group or Working Group).

The following organizations participated in the Working Group, representing a diversity of stakeholders including Minnesota pilots, airport sponsors, government agencies, and consulting firms:

- Aircraft Owners and Pilots Association
- Alexandria Municipal Airport (AXN)
- Bolling Engineering
- Bolton & Menk Inc.
- Austin Municipal Airport (AUM)
- Moorhead Municipal Airport (JKJ)
- Duluth Airport Authority
- Experimental Aircraft Association (EAA)
- FAA
- MAC
- Mead & Hunt
- Mid-Minnesota Development Commission
- Minnesota Pilot's Association
- Owatonna Degner Regional Airport (OWA)
- PRO TRAIN Aviation
- Rochester International Airport (RST)
- St. Cloud Regional Airport (STC)
- Thief River Falls Airport (TVF)

Additionally, MnDOT Aeronautics played an important role in facilitating Working Group discussions and offering historical insight, guidance, etc. Three Airport Funding Working Group meetings were conducted during the 2022 MnSASP in August 2021, February 2022, and March 2022.

The following sections summarize the funding-related feedback obtained during each meeting. The complete PowerPoint presentations from these meetings are included in **Appendix B. Public Participation**.

4.5.1.1. Meeting #1 (August 2021)

Conducted in August 2021, meeting #1 of the Airport Funding Focus Area Working Group was designed to educate participants about the 2022 MnSASP and state investment into the Minnesota state aviation system. The presentation highlighted MnDOT Aeronautics' many roles and functions within the state, as summarized in **Table 4.8**.

Table 4.8. MnDOT Aeronautics Operations

MnDOT Aeronatuics Role	Functions
Regulatory Compliance and Enforcement	- Airport licensing - Commercial operator licensing - Tall tower permits - Aircraft registration
Minnesota's Aviation Workforce	- Continuing education of airport personnel, pilots, and aircraft maintenance technicians - Public outreach
System Maintenance and Operations	- NAVAIDs maintenance and operations - Airport M&O Grants - Statewide runway markings - Airport Directory and aeronautical charts - Statewide APMS
System Development	- Statewide planning - Airport master planning - Airport safety zoning - State grants for airport development - Channeling act state for federal AIP grants
Office Support and Services	- State Airports Fund management - Aeronautics workforce - Information Technology (IT) - MnDOT Unmanned Aerial Systems (UAS) shared services - Aeronautics building management - Aircraft fleet management - Automobile fleet management
Air Transportation	- Provide air transportation services to state employees - Out-of-state travel reservations for MnDOT

Source: MnDOT Aeronautics Business Plan, 2021

Additionally, the three primary mechanisms for funding airports (i.e., Airport Development Grants, NAVAIDs Program, and M&O Grant Program) was discussed – emphasizing that need exceeds available investment dollars in all cases. Rooted in this foundational premise, the Working Group was presented with a core question:

What strategies should MnDOT consider pursuing to optimize state investment into airports given the reality of rising investment needs and limited options for increasing revenues into the State Airports Fund?

Preliminary strategies to close the Minnesota aviation funding gap are presented in Figure 4.26.

Figure 4.26. Potential Strategies to Close the Minnesota Funding Gap

Restructure	Allocations between MnDOT expenditure categories
Eliminate	State-funding programming or services
Overhaul	Project prioritization process to further limit project eligibility
Revise	Funding participation rates to increase local match

Source: Kimley-Horn, 2022

The feedback received during meeting #1 indicated that group members had insufficient information regarding current funding prioritization processes. Participants requested additional information about several topics including:

- Airport Development Grant selection processes
- Detailed breakdowns of expenditures by major airport assistance programs
    - Airport Development Grant awards by project type and airport
    - NAVAIDs Program expenditures to operate and maintain each piece of equipment
    - M&O Grant Program expenditures by type

Additionally, much of the discussion focused on increasing revenues into the State Airports Fund instead of reprioritizing/decreasing expenditures. However, although not extensively discussed during meeting #1, revenues into the State Airports Fund are generally balanced to match legislative appropriations (see Section 4.4.3. Future Funding Outlook for details regarding the airline flight property tax).

These questions were subsequently researched, with responses distributed prior to Airport Funding Working Group meeting #2. This information can be found in the back section of the Airport Funding Focus Area Working Meeting #2 slide deck available in Appendix B.

4.5.1.2. Meeting #2 (February 2022)

Because of the extensive research required to adequately respond to the data requested during meeting #1, the second Airport Funding Working Group occurred several months after meeting #1 in February 2022. Working Group participants were asked to review the historical expenditure data distributed via email prior to the meeting and submit questions to the project team in advance. While several participants did provide input regarding the distributed presentation, no substantive questions were received regarding how the State Airports Fund had been expended in the past.

Meeting #2 was primarily targeted at obtaining focused stakeholder input on the core question noted above: How should MnDOT Aeronautics revise how funds are expended? In general, it is assumed that the agency can pursue two primary methods (not mutually exclusive). MnDOT Aeronautics can:

- Reallocate funds between the three major airport assistance programs
- Reprioritize the allocation of awards within those programs

These options were each discussed in turn during the discussion. The presentation first highlighted that shifting airport assistance dollars between Airport Development Grants, the NAVAIDs Program, and the M&O Program would shift responsibilities between the state and local authorities. If state funds were no longer available for one project type, a new party would need to take over funding responsibilities, an asset would no longer be available for air transportation users, and/or levels of service would generally decline. Table 4.9 shows the key considerations regarding the potential implications for shifting state dollars between major airport assistance programs.

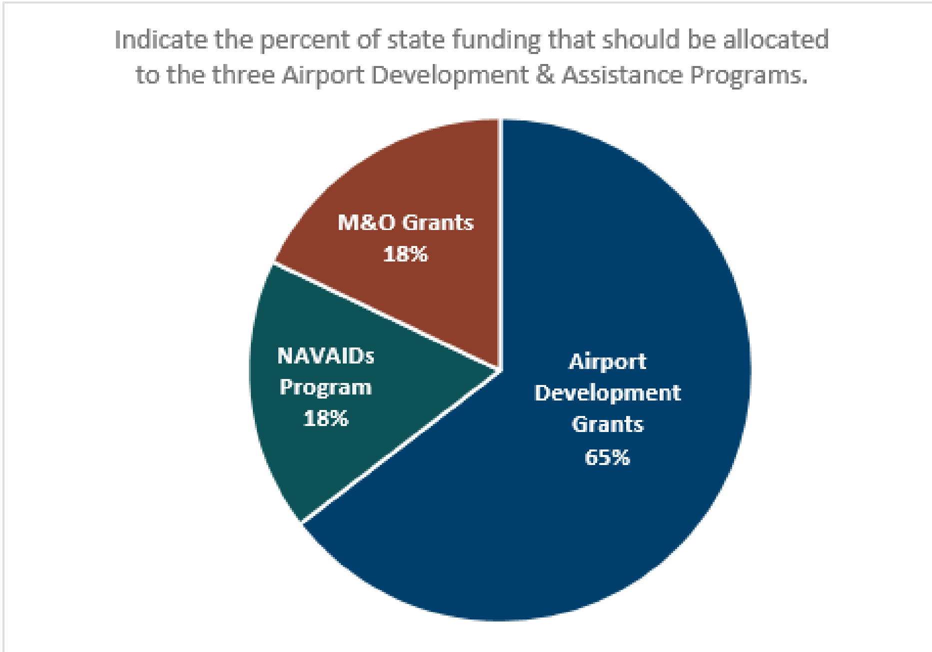
Table 4.9. Key Considerations in Shifting State Funding Between Major Airport Assistance Programs

Funding Program	Increase in Funding	Decrease in Funding
Airport Development Grants	- Greater availability of funding for capital improvements, which may be critical as demands increase over time - Potential for increased flexibility in terms of how funds are expended between capital improvements and M&O	- Increases the difficulty of conducting large-scale capital improvements, with capacity expansion projects likely being the hardest-hit - Pavement conditions may deteriorate to the extent that full reconstruction/rehabilitation becomes required
M&O Grant Program	- Airports may better be able to obtain equipment including maintenance vehicles and snow removal equipment (SRE)	- Increases risk of deferred maintenance, which can lead to costly issues in the long-term - Some airports may be unable to complete critical safety projects, resulting in more frequent (Notice to Air Missions) NOTAMs and other implications for the flying community
NAVAIDS Program	- State would have the ability to replace/upgrade outdated equipment instead of maintaining antiquated systems and decommissioning - Potential to increase coverage in underserved areas of the state	- Responsibility for NAVAID maintenance shifts to airports - Increased airports share, use federal money - Programs, such as the Statewide Marking & Painting Program, may be cut - Certain equipment may have to be decommissioned, either at failure or through a coordinated process

Sources: Kimley-Horn, 2022; MnDOT Aeronautics, 2022

Airport Funding Working Group participants were asked via an interactive online poll about how State Airports Fund dollars should be allocated between programs. Presented in Figure 4.27, participants indicated that 65 percent of available dollars should be invested in Airport Development Grants with the M&O Grant and NAVAIDs programs each receiving equal shares in the remaining dollars. This allocation of funding generally aligns with the existing allocation methodology shown in Figure 4.22.

Figure 4.27. Airport Funding Working Group Stakeholder Feedback: Allocation of Funding Between Major Airport Assistance Program



Sources: Kimley-Horn, 2022; Airport Funding Focus Area Working Group, 2022

Once it was established that MnDOT Aeronautics should retain its existing structure for allocating funds between major airport assistance programs, the Airport Funding Working Group was asked to provide input on the prioritization of dollars within Airport Development Grants. The existing prioritization methodology for awarding Airport Development Grants considers the purpose and type of projects, component of the airport it addresses, and the airport classification. MnDOT Aeronautics offered several additional criteria that could be applied in the prioritization of state dollars. These criteria, as well as some advantages and disadvantages of each, are presented in Table 4.10.

Table 4.10. Potential Airport Development Grants Prioritization Criteria

Potential Prioritization Criteria	Advantages	Disadvantages
Expansion vs. Preservation	Can better leverage historic investment in the system by preserving existing infrastructure before expanding new facilities.	Fails to recognize growing demand for aviation services, including air cargo. May better suit rural areas as opposed to growing urban centers.
Economic Impact by Classification	Bolsters airports' abilities to generate economic impact for their communities and state. Additional jobs created for Minnesota workers. If airports with low economic impact are prioritized for funding, potentially underserved/rural areas of the state may have the opportunity to bolster local support for their airport and serve as an economic catalyze for the communities/regions.	If funds are prioritized to airports with high economic impacts, airports with low economic impact will be inequitably disadvantaged and may struggle to maintain their current economic impacts. Low community support may result in less local investment and incidents of conflict with surrounding population (e.g., noise/nuisance complaints, etc.).
MnSASP Objective Category	Aligns funding with the needs and services deemed most critical to supporting aviation in MN as established by Minnesota GO.	Can be difficult to tailor to the needs of specific airports, as this methodology typically assumes a "standard" need across all airport classifications/types.
MnSASP Airport Metrics	Incentivizes airports to achieve the facility and service metrics established by the MnSASP.	Assumes that MnSASP-defined targets are appropriate for all airports by classification, which is not always the case.
Airport Classification	Aligns funding with airports with higher needs due to more extensive/sophisticated facilities and typically higher activity levels.	Under-funding small airports could result in deferred maintenance needs, which are often more costly and time-consuming to address in the long-term. May under-fund airports that are most likely to serve agricultural needs and medical flying, many of which are in rural Minnesota.
Population within 30 Minutes	Increases the number of Minnesota residents who directly benefit from state investment in airports.	May exacerbate issues of unequitable access to aviation services for residents of the most rural/remote parts of the state.
Based Aircraft	Matches state investment into airports with the airports supporting the highest number of based/local users.	May fail to fund airports that serve critical aviation needs (e.g., air medical transport, search & rescue) in potentially remote and under-served areas of the state. Does not account for the type of aviation activities occurring at an airport or its importance to safety, security, well-being, etc.
Availability of Other Funding Sources	Provides an additional incentive for having airports seek alternative and potentially innovative outside funding mechanisms.	Airports with limited local support may lose access to state funding. Less investment overall may negatively impact facilities and available services, resulting in less activity, and consequently even less local support.

Source: Kimley-Horn, 2022

The Working Group was asked to provide input on the inclusion of each prioritization criterion, as well as how project should be scored within each. For example, improvement projects focused on airport preservation (such as a pavement maintenance project) could be considered high priority for state funding and thus receive a high score in the prioritization methodology. Consequently, expansion projects would be less likely to receive state support. **Table 4.11** summarizes respondents' input on which types of projects should be more highly prioritized for state funding.

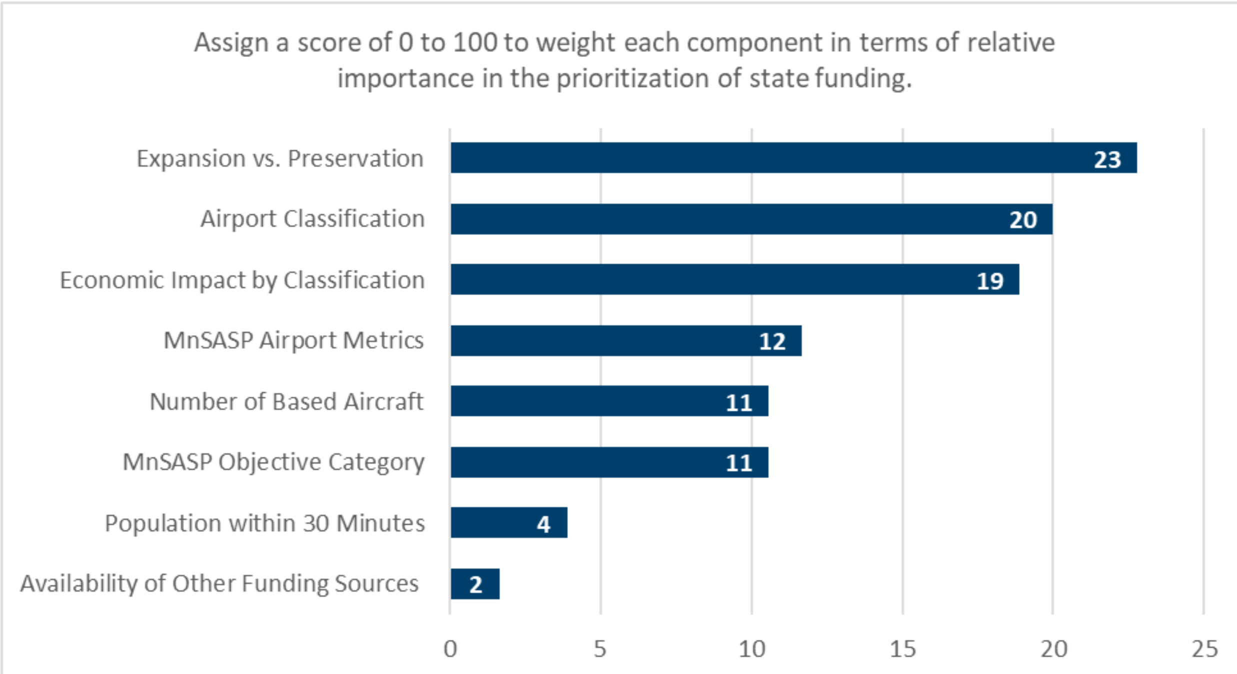
Table 4.11. Airport Funding Working Group Stakeholder Feedback: Prioritization of Projects within Each Potential Prioritization Criterion

Potential Prioritization Criteria	Priority for State Funding
Expansion vs. Preservation	Preservation
Economic Impact by Classification	High economic impact. Note respondents further indicated that airports should be considered in terms of economic impact within their specific regions instead of comparing at the statewide level. In response, airports were subsequently evaluated in terms of the percent of total economic impact relative to county Gross Regional Product (GRP).
MnSASP Objective Category	Listed by highest to lowest priority for state support: Transportation Safety, System Stewardship, Critical Connections, Open Decision-making, Healthy Communities.
MnSASP Airport Metrics	N/A. This is a yes/no criterion referring to whether a proposed project fills an airport/system measure deficiency identified by the 2022 MnSASP.
Airport Classification	List by highest to lowest priority for state support: Key, Intermediate, Landing Strip.
Population within 30 Minutes	High population. This indicates that airports located in urban areas should receive priority for state support.
Number of Based Aircraft	N/A. This criterion looks specifically at numerical values.
Availability of Other Funding Sources	Airport sponsors providing a 30 percent or higher local match should receive priority for state support.

Source: Kimley-Horn, 2022

Airport Funding Working Group participants were then asked to provide input on the relative importance of the potential prioritization criteria relative to one another. As depicted in **Figure** 4.28**,** participants indicated that expansion vs. preservation, airport classification, economic impact by classification, and MnSASP airport metrics were the most valuable criteria in the prioritization of state funding via the Airport Development Program. Note participants were also asked to provide ideas regarding other prioritization criteria, but no feedback was received.

Figure 4.28. Airport Funding Working Group Stakeholder Feedback: Potential Prioritization Criteria for Airport Development Grants



Sources: Kimley-Horn, 2022; Airport Funding Focus Area Working Group, 2022

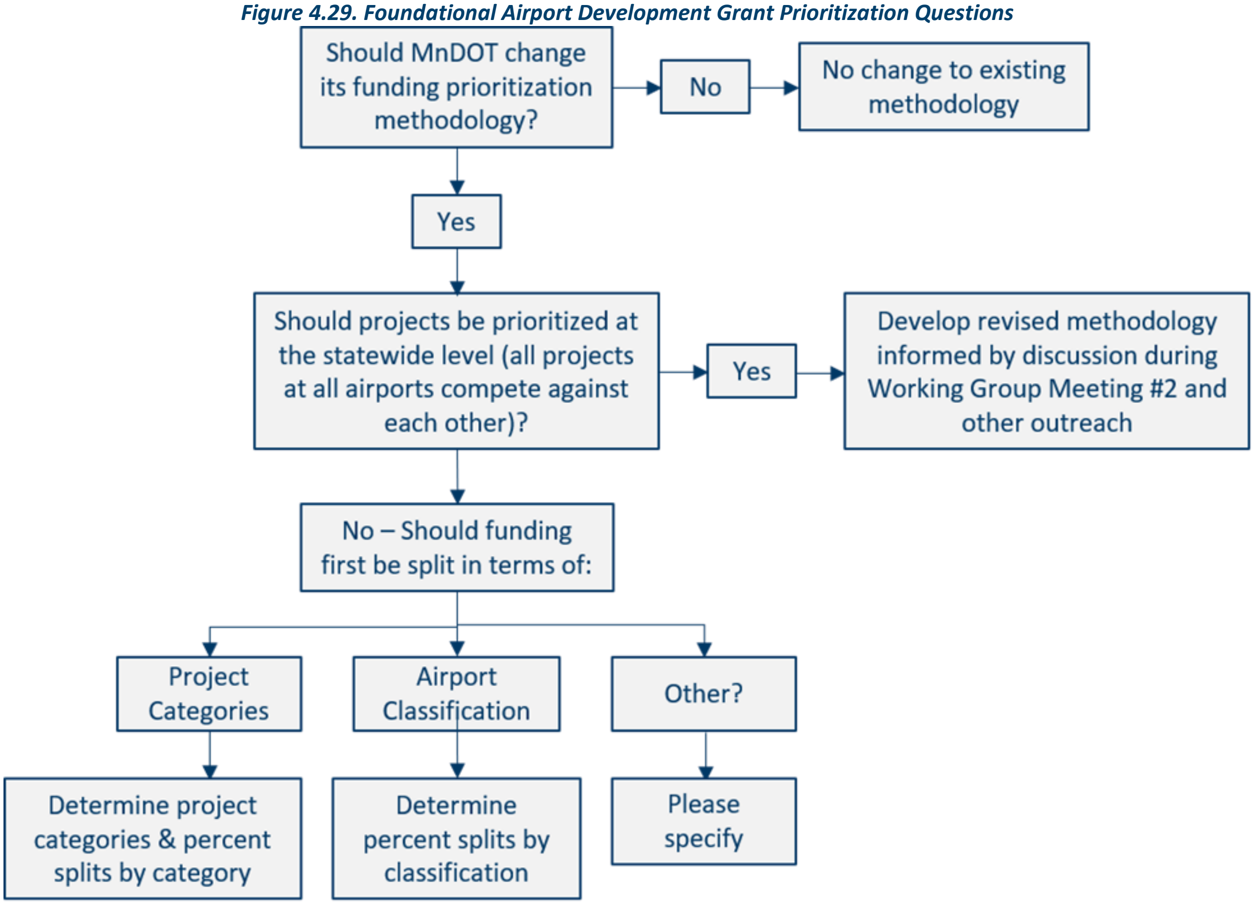
Following Airport Funding Working Group meeting #2, an additional survey was distributed via email asking participants to provide input on state participation rates. Two responses were received as follows:

- MnDOT Aeronautics should increase its participation in work related to airport zoning and alternative land use controls over clear zones.
- MnDOT Aeronautics should decrease its participation in state-only projects at non-NPIAS airports and increase its participation in state-only projects at NPIAS airports. State participation rates in federal AIP projects should remain as-is.

4.5.1.3. Meeting #3 (March 2022)

Following close consideration of the input gathered during meetings #1 and #2, MnDOT Aeronautics determined that the final meeting of the Airport Funding Working Group should gather input on foundational issues not yet contemplated by the group. It is anticipated that the input gathered during the first two meetings will be used in future work; however, MnDOT Aeronautics used the final discussion to take a slightly broader view of the state funding question. Figure 4.29 summarizes the major inflection points in the distribution and award of Airport Development Grants. Each question was discussed extensively by participants during meeting #3.

Figure 4.29. Foundational Airport Development Grant Prioritization Questions



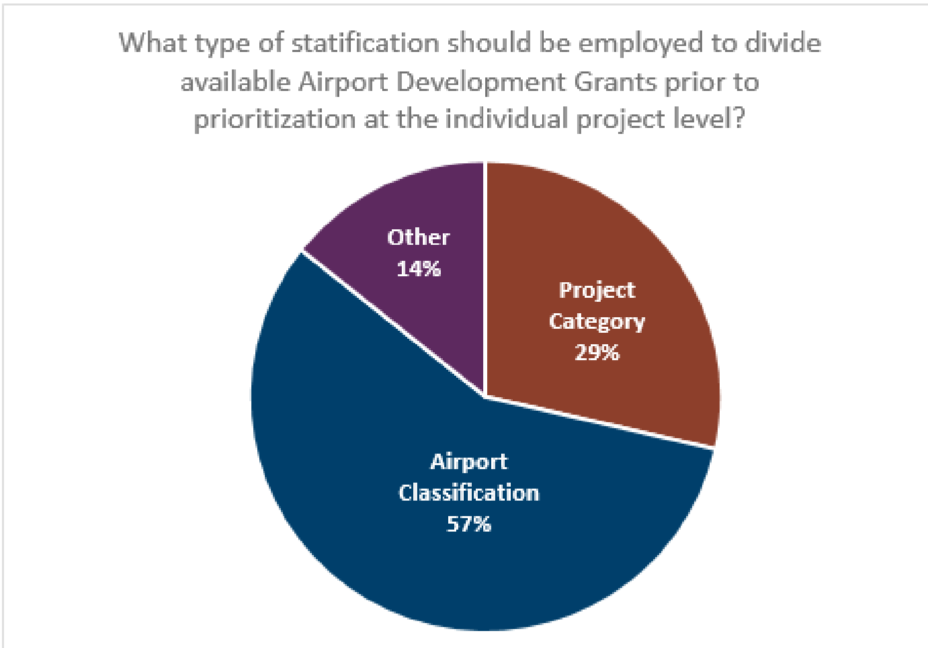
Sources: MnDOT Aeronautics, 2022; Kimley-Horn, 2022

Airport Funding Working Group participants universally agreed that MnDOT Aeronautics should change its existing prioritization methodology. MnDOT Aeronautics then asked if projects should be prioritized at the statewide level, or if various categories should be defined to split available funding first before selecting individual projects. The former option aligns with the existing methodology, in which all projects in the state compete for the same pot of available funds. The latter option would split available funds first the project category (e.g., airside pavement, terminal, planning), airport classification (i.e., Key, Intermediate, Large), or other stratification. MnDOT Aeronautics would prioritize requested projects against "peer" requests to offer greater opportunities for certain airports or project types to receive some amount of funding.

When asked if capital improvement projects should be prioritized at the state level, 37.5 percent of participants responded in the affirmative. Sixty-two-point-five percent of participants responded in the negative, opting instead for establishing pots of money based on project categories, airport classification, or other stratification. Note that only eight participants attended the Airport Funding meeting #3.

The Working Group was then asked to provide input on how funding should be split if MnDOT Aeronautics decides to establish pots of available funds for various types of projects, airport classifications, or other stratification. Figure 4.30 shows that participants indicate a preference for subdividing available funds by airport classification, which would provide some investment dollars to all classifications prior to awarding at the individual project level. Such a methodology recognizes that not all classifications request the same project types, and projects that may be of great importance to one airport may be of little value to another facility. For example, a mower may be highly valuable to a Land Strip Turf airport but a Key airport would find little value in that same project. As such, these airports should not compete against one another for available funds because they have little in common in terms of priority needs.

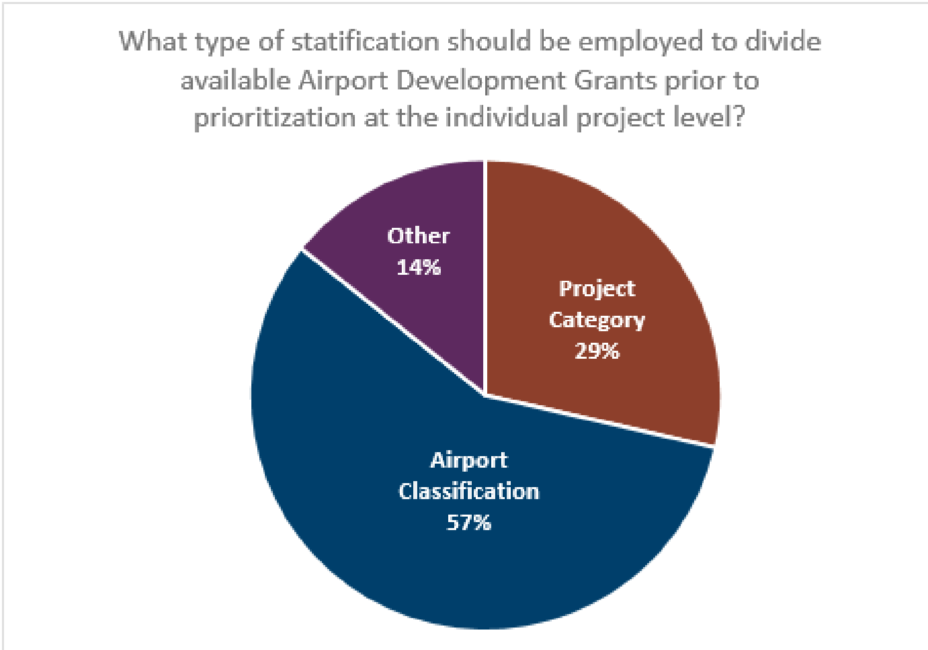
Figure 4.30. Airport Funding Working Group Stakeholder Feedback: Potential Stratification Methodologies



Sources: Kimley-Horn, 2022; Airport Funding Focus Area Working Group, 2022

Expanding upon the question above, participants were asked the percent of dollars that should be set-aside for each classification. As shown in Figure 4.31, participants recommend that 54 percent of funding should be awarded to Key airports, 39 percent to Intermediate airports, and the remaining seven percent to Landing Strip airports. Note this is not significantly different to how funds are expended under the existing methodology, although funds are not first split by classification.

Figure 4.31. Airport Funding Working Group Stakeholder Feedback: Proposed Allocation of Funds by Classification



Sources: Kimley-Horn, 2022; Airport Funding Focus Area Working Group, 2022

Participants also offered some additional suggestions regarding how set-asides could be established:

- Regional approach due to association with economic impact
- Consideration of certain "need" factors (PCI, hangar waiting list, justification reports, etc.)
- Availability of sponsor matching funds
- Revenue-producing projects to help airports fund their own projects

As the final question for the Airport Funding Working Group, participants were asked to provide feedback on the state's handling of federal matches. Under the existing methodology, MnDOT Aeronautics matches all federal grants first, prior to the prioritization of state-only projects. In the future, MnDOT Aeronautics has several alternatives in terms of participation with AIP-funded projects:

- State funds could be awarded first, prior to the prioritization of state-only funding (existing methodology)
- Federal matches could be established as a percent total available funding or a set dollar amount
- MnDOT Aeronautics could not participate in federally funded projects

One hundred percent of participants indicated that MnDOT Aeronautics should establish a percent funding cap on their participation in federal projects.

4.5.1.4. Airport Funding Working Group Key Take-aways

Through the Airport Funding Focus Area Working Group of the 2022 MnSASP, participants have indicated a strong preference for updating the existing grant prioritization methodology. Stakeholders understand that investment needs exceed funding. Further, needs are growing while the purchasing power of a dollar is declining due to inflation and the rising cost of design and construction. MnDOT Aeronautics will be forced to make several difficult decisions as it seeks to better align its funding and other decision-making processes with the investment reality. In many ways, these difficult decisions will be rooted in determining which infrastructure assets the state can no longer support – whether that be specific project types (e.g., secondary or crosswind runways) or under-utilized airports. Airport Funding Working Group participants provided several key points that MnDOT Aeronautics should consider as it looks to refine its prioritization methodology in the future:

- The three primary airport assistance programs should be retained as-is, and funding allocations between programs should not be a major focus area for revision in the future.
- The prioritization of capital improvement projects requested via the Airport Development Program no longer meets stakeholder needs. Updating the project prioritization methodology should be of top precedence for MnDOT Aeronautics.
- Participants indicated a preference for establishing pots of funding to prioritize peer projects or airports relative to one another instead of evaluating all projects at the statewide level.
  - Project needs by classification are inherently different. The recommended funding amounts by classification do not significantly differ relative to historic funding values.
  - If MnDOT Aeronautics adopts a methodology that establishes pots of funding by classification, airports would retain the total amount of funds they are accustomed to receiving. However, they may be more likely to receive funds for the projects of highest value to them by aligning project priority scores by airport classification.
- Top criteria for project prioritization include preservation versus expansion, airport classification, regional economic impact, and a project's ability to fill an airport or system measure gap as identified by the 2022 MnSASP.
- MnDOT Aeronautics should reevaluate its existing process of matching all federal grants first, potentially instituting a percent total investment cap for federal projects.

Additionally, the analyses required to compile historical grant data revealed that existing procedures do not allow for easily tracking projects requested, evaluated, and ultimately funded. The following section provides a framework to assist MnDOT Aeronautics revise its Airport Development Grants prioritization methodology in alignment with the current needs of Minnesota's aviation stakeholders, enhance agency transparency, and improve the ability to conduct internal analyses of historic funding decisions and procedures.

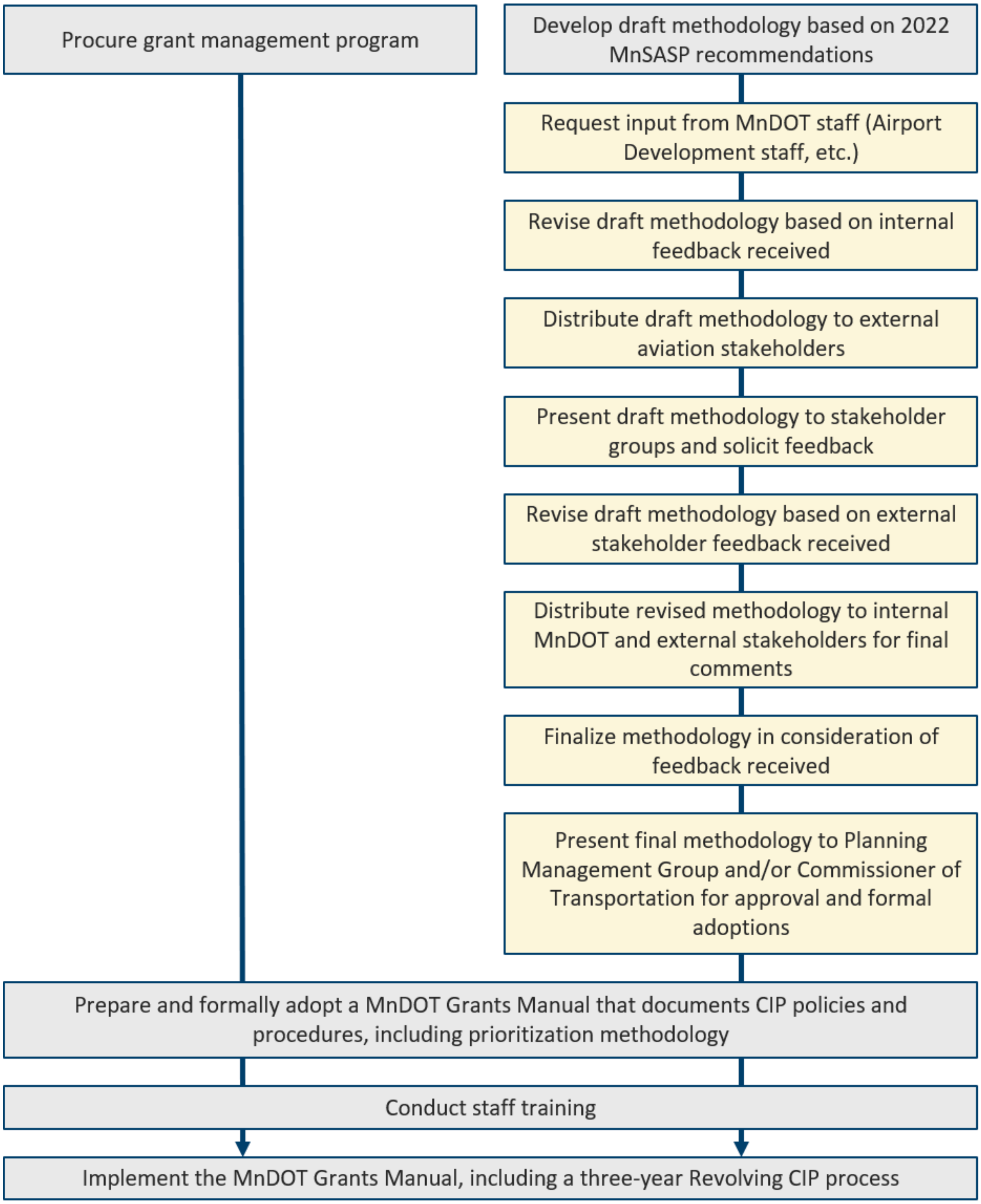
4.5.2. FUTURE PRIORITIZATION NEXT STEPS

The input provided by the Airport Funding Working Group and various funding-related tasks of the 2022 MnSASP has provided a solid foundation from which MnDOT Aeronautics can ultimately revise its Airport Development Grant prioritization process. This section outlines the general steps to apply the insight gathered through these interrelated processes to finalize and implement a revised process for capital improvement project selection and grant management. These recommendations have been developed considering the following guiding principles:

- **Transparent, Data-driven Processes:** As stewards of public funds, MnDOT must make all decisions in a manner transparent to Minnesota taxpayers. Transparently also allows airport sponsors and consultants to align project requests with the priorities of the state aviation system to support a philosophy of holistic management of the system.
- **Long-term Viability:** A forward-thinking grant management process allows MnDOT Aeronautics to more carefully plan investment decisions over the long-term. With needs significantly exceeding available dollars, MnDOT Aeronautics must make decisions that retain the long-term viability of the system in terms of access, mobility, safety, security, and the overall benefit to the system. Decisions can be made that allow the system to meet all aviation demands, rather than just one airport. Maintaining an operationally efficient, advanced, and functional airport system is only possible through long-term planning instead of making decisions simply on an annual basis.

Figure 4.32 highlights the recommended next steps for MnDOT Aeronautics as it seeks to revise its CIP management process, including the Airport Development Grant prioritization methodology. The specific timing is unknown, but it is anticipated that procuring a grant management program and finalizing the prioritization process would minimally take months to complete. Additional information regarding the major steps shown in grey are presented below the figure.

Figure 4.32. Grant Management Next Steps



Source: Kimley-Horn, 2022

4.5.2.1. Procure a MnDOT Grant Management Program

The existing Airport System Manager (ASM) platform is outdated and no longer meets the grant management needs of MnDOT Aeronautics nor airport sponsors. The 2022 MnSASP recommends that MnDOT Aeronautics procure an effective MnDOT grant management program that comprehensively administers the statewide CIP in conjunction with grant selection, contract execution, invoices, reimbursements/payments, inspection procedures, contract close-out, and other workflow tasks. The grant management program should serve as a "one stop shop" for MnDOT Airport Development staff to easily track and manage all phases of a state-funded project. Additionally, the software should provide robust functionality to analyze historic expenditures to guide future improvements and support the agency's need for transparency.

4.5.2.2. Implement a Three-year Revolving CIP Process

In recent years, MnDOT Aeronautics has asked that airport sponsors provide 20-year development needs in support of the agency's long-term planning processes. However, the 2022 MnSASP has revealed serious inconsistences in the volume and quantify of data provided by airports into the current ASM CIP management software. Because partial data is being input, resultant analysis may appear correct but in-fact significantly under-report actual needs. Additionally, the 2022 MnSASP revealed that many airport sponsors are unable to accept grant funding offered by MnDOT Aeronautics. While many factors could lead to this decision, an airport sponsor may turn down state money if they are unprepared to provide a local match or the project is no longer needed.

The 2022 MnSASP recommends implementing a revolving three-year CIP process. In this process, airport sponsors or their designated consultants input project requests over a three-year planning process. While projects are selected for funding annually, the airport sponsor and MnDOT Aeronautics can effectively budget for upcoming needs. Projects can be more seamlessly funded from planning through design and construction or in multiple phases since needs have clearly been identified and planned for beyond year one. Three-year costs are also generally more accurate than those projected using a longer timeframe. Airport sponsors/consultants should be asked to annually review and update projects included on the three-year CIP, with the general expectation that grants will be accepted if selected for funding. Non-emergency projects not included on the CIP should be ineligible for state support.

4.5.2.3. Revise Prioritization Methodology

Highlighted throughout Section 4.5.1. Stakeholder Participation, the current prioritization of capital improvement projects through the Airport Development Program no longer meets the needs of Minnesota system airports nor MnDOT Aeronautics. The 2022 MnSASP has made significant process in identifying the key issues and priorities of Minnesota aviation stakeholders. Stakeholders clearly understand that MnDOT Aeronautics is not able to fund all identified needs at all airports, and the agency must now make difficult decisions regarding what it can continue to support across the state. In consideration of feedback received throughout the 2022 MnSASP, it is recommended that MnDOT Aeronautics establish funding percentages by state classification. Individual projects can then be prioritized based on the needs within those classifications.

It is recommended that MnDOT continue to seek additional input prior to finalizing the methodology, such as from the Minnesota Council of Airports (MCOA). To assist MnDOT Aeronautics in the development process, an Excel-based prioritization tool has been developed as part of the 2022 MnSASP. The tool can be used to dynamically evaluate the implications of various scoring methodologies for MnDOT Aeronautics and system airports.

4.5.2.4. Develop and Adopt a Grants Manual

Building off the previous recommendation, updated grant policies and procedures must be documented in a grants manual that has been formally approved and adopted by MnDOT. An adopted manual would be an important tool and ally for MnDOT Aeronautics to more effectively manage the statewide CIP and communicate requirements to airport sponsors and internal staff. A grants manual affords the opportunity to implement a more structured program with better defined eligibility and decision-making guidelines while making the agency more accountable for its funding decisions.

4.5.2.5. Staff Training

The support and participation of MnDOT Aeronautics staff is fundamental as the agency seeks to enhance, refine, and improve the allocation of state aviation funding for the ultimate benefit of Minnesota's air traveling public. New processes will most likely change the duties of many MnDOT Aeronautics staff members, with particularly acute impacts on Airport Development and Planning team members. Staff must fully understand not only their responsibilities, but also how their work is a component of a broader workflow designed at enhancing the process for both MnDOT and users. Staff training sessions must occur throughout implementation process. Communication should focus on both expectations/duties as well as the purpose of the policy/process changes.

4.6. Summary

The investment needs presented in this chapter underline the importance of carefully and intentionally allocating available investment dollars to those projects with the greatest ability to enhance air transportation in Minnesota in the long-term. As costs and demand for aviation services continue to rise, the funding gap may in fact become significantly higher than 2022 MnSASP projections portend. The public participation processes of the 2022 MnSASP provide valuable insight into the priorities of various stakeholder groups. With this guidance in-hand, MnDOT Aeronautics can continue to refine its own processes – realizing that the state may need to make difficult decisions about what it can and cannot continue to support in the future.

Chapter 5. Key State Focus Areas offers recommendations and processes associated with how MnDOT Aeronautics can evaluate some types of specific funding-related decisions, such as support for hangars, crosswind runways, and courtesy cars. Additionally, the Airport Closure Guidance provides a pathway to allow struggling airports to close if they so choose. This guidance can help MnDOT Aeronautics "right-size" the system and focus its limited resources on the assets and airports most able to fill aviation demands within Minnesota.

Chapter 5. Key State Focus Areas

5.1. Introduction

The 2022 Minnesota State Aviation System Plan (2022 MnSASP or MnSASP) offered the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) a valuable opportunity to closely examine several issues of unique importance to the agency, Minnesota airports, and aviation stakeholders across the state. Referred to as key state focus areas, these issues are current – representing some of most pressing and complex topics being presented to MnDOT Aeronautics today. Each topic demanded careful analysis of associated pros and cons, as well as consideration of the multiple stakeholders that may be affected by the actions of MnDOT Aeronautics. The 2022 MnSASP offers additional context surrounding each focus area with the overarching goal of providing guidance and/or recommendations to support MnDOT Aeronautics' ability to navigate decisions associated with these challenging issues.

In total, the 2022 MnSASP identified seven key state focus areas for analysis. Comprehensive guidance statements were developed for five of the seven issues, while recommendations for future implementation were identified for the remaining two. The key state focus areas falling into these two categories are identified in Table 5.1.

Table 5.1. MnDOT Key State Focus Areas by Type

MnDOT Aeronautics Guidance Statements	Recommendations for Future Implementation
- Through-the-Fence (TTF) Operations - State Aviation System Exit and Airport Closure Processes - State Aviation System Entry Processes - Prioritization of State Funding for Crosswind Runways - Clear Zone Ownership and Compliance Requirements	- Last-mile Connectivity and Courtesy Cars - Hangar Availability and State Funding Recommendations

Source: Kimley-Horn, 2022

For the MnDOT Aeronautics guidance statements, resulting deliverables take the form of explicit processes, responsibilities, and office-level policies that govern how these topics will be handled moving forward. Issue-specific guidance clarify MnDOT Aeronautics' understanding of each issue; identify applicable Minnesota Statutes, Administrative Rules, and other requirements; and detail uniform processes for airports, their consultants, and MnDOT Aeronautics.

For the key state focus areas that fall into the latter category (i.e., recommendations for future implementation), the 2022 MnSASP conducted comprehensive analyses of existing conditions at Minnesota system airports. This is because – while hangars and ground transportation connectivity were identified as "issues" – the full breadth and scope of the concerns were not well understood prior to the MnSASP. These analyses were then applied to develop recommendations to address the primary concerns revealed. The 2022 MnSASP deliverables take the form of whitepapers that document existing conditions; review how other states' handle similar topics; and offer recommendations and strategies to be implemented by MnDOT Aeronautics, airport sponsors, and other stakeholders.

The seven key state focus areas are summarized in Section 5.3. Each subsection provides an overview of the issue and highlights the key requirements associated with the first five issues (i.e., TTF operations, system exit/airport closure, system entry, crosswind runways, clear zones) and recommendations associated with the latter two (i.e., hangars and courtesy cars). Table 5.3 at the end of the chapter summarizes the primary responsibilities of MnDOT Aeronautics, airport sponsors, and other potential stakeholders associated with implementing the MnSASP outcomes. Attachments 1 – 7 of the 2022 MnSASP Technical Report provide full documentation for each key state focus area.

Attachments 1 – 7 provide full documentation associated with each key state focus area.

As noted previously, these issues do not simply affect MnDOT Aeronautics. Instead, the key state focus areas may involve airport sponsors, aircraft owners and pilots, land use planners, residents and businesses adjacent to airports, and others. Recognizing how its actions affect a variety of aviation stakeholders, MnDOT Aeronautics undertook a comprehensive public outreach process during Phase I of the MnSASP used to guide the work conducted during the scope of Phase II. Section 5.2 discusses the public engagement processes used to identify the key state focus areas and inform the guidance statements and recommendations developed during Phase II.

5.2. Public Engagement

As discussed in Chapter 1. Introduction and Design, the MnSASP has been conducted in two phases (Phase I and Phase II). Phase I was designed to establish the framework of the MnSASP in alignment with Minnesota GO and identify the opportunities and challenges with the greatest potential to impact Minnesota’s airports in the coming decades. This effort included a comprehensive, statewide public engagement process conducted over many months. The Phase I outreach efforts culminated in the scope of Phase II, developed specifically to ensure the aviation system plan is “more relevant to more people more of the time.”

The key state focus areas represent the top issues identified by stakeholders during Phase I. Phase II guidance and recommendations were developed in coordination with several Focus Area Working Groups (Working Groups). These advisory committees offered insight into the scope of each issue; details regarding how they may affect MnDOT Aeronautics, Minnesota airports, and the air traveling public; and valuable feedback applied during the development of final recommendations. The presentations developed for each Working Group meeting are included in Appendix B.

5.3. State Focus Area Overviews

The MnSASP offers guidance to help MnDOT Aeronautics proactively plan for and address seven key state focus areas to support Minnesota’s ability to achieve its vision of a multimodal system that “maximizes the health of people, the environment, and our economy.” These issues, as well as the primary requirements and/or recommendations associated with each, are summarized in the following subsections. Full guidance/position statements and whitepapers are included as Attachments 1 through 7 of the 2022 MnSASP Technical Report.

5.3.1. THROUGH-THE-FENCE OPERATIONS

TTF operations refer to aircraft that seamlessly transition from an airport's airside facilities to land adjacent to – but not on – airport property. Establishing TTF operations can bolster airports' economic impacts, enhance community relationships, and provide additional space for aviation-related development. TTF operations can also pose significant issues related to security, airport compatible land use, parity between traditional on-airport users and TTF operators, and other concerns. The TTF Guidance Statement establishes MnDOT Aeronautics' official position on residential, commercial, and noncommercial aeronautical TTF operations. As its guiding principles, MnDOT Aeronautics established its TTF Position Statement to ensure all TTF operations in Minnesota:

- Comply with all applicable Minnesota State Statutes and Administrative Rules
- Provide a benefit to civil aviation
- Maintain or enhance the long-term viability, safety, security, efficiency, utilization, and economic well-being of the airport and airport sponsor

Attachment 1 of the 2022 MnSASP Technical Report provides a TTF Operations Introduction and MnDOT Guidance Statement. The key elements of the MnDOT TTF position are as follows:

- Because the Federal Aviation Administration (FAA) maintains strict policies associated with TTF access at federally-obligated airports, MnDOT Aeronautics shall limit its review and approval of TTF operations to non-federally obligated airports (referred to as state-only airports).
- MnDOT Aeronautics shall support the FAA's decision to approve or deny proposed TTF operations at federally obligated facilities.
- State-only airports are required to prepare and submit a TTF Assessment Report for MnDOT Aeronautics' approval. MnDOT Aeronautics' approval is founded on ensuring the proposed TTF development is in the best interest of the airport; existing and potential future on-airport tenants, operators, and users; and the air traveling public.
- Access agreements, rates and charges, and other provisions established at federally obligated and state-only airports must meet or exceed the state-specific requirements established in the MnDOT TTF Standards. Airports in violation of these standards may lose eligible to receive state investment through the State Airports Fund.

5.3.2. HANGAR AVAILABILITY AND STATE FUNDING RECOMMENDATIONS

The 2022 MnSASP revealed that 94 percent of T-hangars and 97 percent of conventional box hangars in Minnesota are occupied. Additionally, some aircraft hangars are used for non-aeronautical purposes, further exacerbating capacity constraints experienced at many facilities. The 2022 MnSASP proposes several strategies to address the primary hangar issues in Minnesota related to availability, use, rates and charges, and funding.

Attachment 2 of the 2022 MnSASP include the Hangar Availability Evaluation and State Funding Recommendations. Key recommendations associated with hangar development and funding are as follows:

- MnDOT Aeronautics should:
  - Include provision in the terms of the Hangar Revolving Loan Program requiring all existing publicly owned hangars be used for aeronautical purposes prior to offering state loans for the development of new hangar facilities
  - Establish a requirement that airport sponsor justify need for additional aircraft storage in conjunction with state funding requests for the development of new hangar facilities
  - Establish a formal prioritization structure for the award of Hangar Revolving Loans in lieu of the existing process of distributing loans on a "first-come, first-serve" basis
- Airport sponsors should:
  - Establish minimum standards that address airport-owned hangars, the enforcement of which should be a requirement to receive a Hangar Revolving Loan
  - Establish appropriate hangar lease rates per the guidance provided by the ACRP Report 213: *Estimating Market Value and Establishing Market Rent at Small Airports*, the assessment of which should be a requirement to receive a Hangar Revolving Loan

5.3.3. STATE AVIATION SYSTEM EXIT AND AIRPORT CLOSURE PROCESSES

The **Airport Closure Guidance Statement** provides a uniform procedure for airports to exit the state aviation system and/or close while complying with all applicable statutes and regulations. An associated **Vulnerability Assessment** identified Minnesota airports susceptible to closure based on a quantitative evaluation. Airports scoring less than 30 points in the assessment are eligible for a "fast-track" closure process. Nineteen Minnesota system airports are currently considered vulnerable to closure and thus eligible for this expedited process.

Attachment 3 of the 2022 MnSASP provides the Airport Closure Guidance Statement. The key elements of the guidance statement are as follows:

- MnDOT Aeronautics can allow some airports to follow an expeditated closure process by receiving a score of less than 30 in the Airport Vulnerability Assessment.
  - "Fast-track" airports are permitted to close without additional MnDOT Aeronautics review if the provisions of Minnesota Statutes section 360.046, *Requirements for Closure of Municipal Airport*, are followed.
  - MnDOT Aeronautics may release "fast-track" airport sponsors from active state grant assurances at its discretion and upon legal review.
- The **Airport Closure Standard Operating Procedure (SOP)** provides uniform requirements for all other airport sponsors and MnDOT Aeronautics to follow when requesting to exit the state aviation system and/or close.
  - These requirements include the development an **Impact Evaluation** and hosting of a public hearing.
  - Data used to develop the Impact Evaluation are compiled by the airport sponsor, while MnDOT Aeronautics is responsible for the development of the actual report.

- The Commissioner of Transportation (Commissioner) is responsible for issuing a final determination for an airport to be released from the state aviation system and/or close.

5.3.4. STATE AVIATION SYSTEM ENTRY PROCESSES

According to Minnesota Statutes, airports must be included in the state aviation system to be eligible to receive financial assistance through the State Airports Fund. The **State Aviation System Entry Guidance Statement** outlines a detailed process for MnDOT Aeronautics and airport sponsors to gain entry into the state aviation system compliant with all licensure and statutory requirements.

Attachment 4 of the 2022 MnSASP Technical Report includes the State Aviation System Entry Guidance Statement. The key requirements of the guidance statement are as follows:

- Airports must be owned by a public sponsor in accordance with Minnesota Statutes Chapter 360.031 and open for public use for inclusion in the state aviation system.
- An airport requesting entry into the state aviation system must meet one of the following eligibility criteria:
    - Located at least 30 nautical miles (nm) from an existing state system airport
    - Provides at least two of the following aircraft services: fuel (Jet A and/or Avgas [100LL] provided by the sponsor or a third-party); maintenance, repair, and overhaul (MRO) services; fixed-base operator (FBO); de-icing; on-site weather reporting
    - Airport catchment area increases the percent of Minnesota population with access to an airport within 30 nm by at least two percent
    - Serves a Tribal community
- Airport sponsors must prepare an **Entry Request** for the Commissioner that confirms the airport meets at least one eligibility criterion, details the surrounding catchment area and anticipated users, documents the airport sponsor's business plan for a minimum five-year period, and identifies known airport deficiencies based on Minnesota's airport licensure requirements.
- MnDOT Aeronautics is responsible for preparing an **Evaluation Report** based on data submitted in the Entry Request and supplemental sources, as required. The Commission is responsible for reviewing the Evaluation Report and issuing an Order should the airport be approved for inclusion in the system.
- Airports that have received preliminary approval to enter the state system from the Commissioner are eligible to receive an Airport Planning Grant for planning purposes only. These funds may not be expended for any other purpose.
- An airport is permitted to enter the state aviation system when the following four criteria have been met:
    - Complies with all licensure requirements in accordance with Minnesota Administrative Rules Part 8800.1600, *Public Airport Licensing*
    - Owns 100 percent of clear zones off all runway ends based on ultimate build-out conditions
    - Has an Airport Layout Plan (ALP) approved by MnDOT Aeronautics
    - Is zoned is accordance with Minnesota Administrative Rules Part 8800.2400, *Airport Zoning Standards,* and Minnesota Statutes Chapter 360.061 through 360.074, *Airport Zoning*

5.3.5. PRIORITIZATION OF STATE FUNDING FOR CROSSWIND RUNWAYS

Crosswind runways enable airports to provide continuous support of aviation demand through variable weather conditions. The **Crosswind Runway Guidance Statement** guides MnDOT Aeronautics in the prioritization of state support for existing and proposed new crosswind runways. The **Minnesota Crosswind Runway Eligibility Model (MCREM)** is a key element of the state prioritization methodology. The model evaluates airports' need for a crosswind runway based on standard criteria. Airports must receive a threshold score to be eligible for state support. Airports must also submit a **Crosswind Runway Justification Report (CRJR)** to justify funding requests. The Crosswind Runway Guidance Statement is only applicable to airports requesting state-only support for crosswind facilities.

Attachment 5 of the 2022 MnSASP Technical Report includes the Crosswind Runway Guidance Statement. The key provisions of the guidance statement are as follows:

- To be eligible for state funding, an airport must receive a score greater than or equal to 1.5 using the MCREM.[1]
  - Airports not meeting this eligibility threshold may submit an **Exception Request** to waive this requirement.
  - The Exception Request documents how or why the MCREM does not adequately reflect current or forecasted conditions at the airport.
- To be justified to receive to state funding, an airport must demonstrate that the presence of a crosswind runway meaningfully enhances the airport's ability to safely and efficiently accommodate the type and frequency of aviation activities typically occurring there or provides significant public benefit. MnDOT Aeronautics will evaluate if an airport's funding request is justified based on the documentation provided in the CRJR.

5.3.6. CLEAR ZONE OWNERSHIP AND COMPLIANCE REQUIREMENTS

The airspace in and around airports must be clear of obstructions to maintain a safe and navigable environment for aircraft operations. The MnDOT Aeronautics **Clear Zone Guidance Statement** confirms that airport sponsors must acquire 100 percent of clear zones based on ultimate build-out conditions in fee simple or complete a MnDOT-approved **Clear Zone Acquisition Plan (CZAP)** be eligible for state funds.

Attachment 6 of the 2022 MnSASP Technical Report provides the Clear Zone Guidance Statement. The key requirements elements with this guidance are as follows:

- An airport must be in full compliance with the Clear Zone Guidance effective at the time when its ALP was or is signed and approved by MnDOT Aeronautics to be eligible for state funding.
  - Compliance with the current (2022) Clear Zone Guidance is required for all new or updated ALPs signed on or after the effective date of 01 June 2022.

[1] Attachment 5b of the 2022 MnSASP Technical Report provides the MCREM scores as prepared during the plan period. The data used to generate the results were obtained in the late spring 2021, with the final scores produced in July 2021. The least favorable wind coverage is based on two years of data (2019 – 2020) in all weather conditions.

- Clear zone dimensions are based on runway category,[2] visibility minimums (as applicable), and most critical approach type. The MnDOT clear zone dimensions are provided in Table 5.2.

Table 5.2. MnDOT Clear Zone Dimensions

Approach Type (Runway Category) – Visibility Minimum, as applicable	Length of Surface (feet)	Length Beyond Runway End	Inner Width	Outer Width
Turf	1,000	End of the primary surface as prescribed by surface type	Width of primary surface as prescribed by the runway's most precise approach for either end of the runway	Outer width of approach surface at clear zone length of surface
A(V)	1,000			
B(V)	1,000			
NP(A)	1,000			
NP(C) – Visibility minimums greater than ¾ mile	1,700			
*NP(D1) – Greater than or equal to ¾ - mile visibility	1,700			
*NP(D2) – ½ - mile visibility	2,500			
PIR	2,500			

**Note: Clear zone dimensions differ from those established by FAR Part 77 for airports with a non-precision instrument approach (NP) by providing separate dimensions for runway ends with visibility minimums greater than ¾ mile (referred to as D1) and visibility minimums of ½ mile (referred to as D2). FAR Par 77 only provides one dimensional standard for NP(D) for visibility minimums as low as ¾ mile. Definitions: A = Utility runways. B = Runways larger than utility. C = Visibility minimums greater than ¾ mile. D1 = Visibility minimums greater or equal to ¾ mile. D2 = Visibility minimums of ½ mile. V = Visual approach. NP = Non-precision instrument approach. PIR = Precision instrument approach. Sources: MnDOT Aeronautics, 2022; Federal Aviation Regulations (FAR) Part 77*

- The CZAP is an alternative compliance mechanism for airports that do not own 100 percent of clear zones off all runway ends based on ultimate build-out conditions.
- The CZAP achieves the following objectives:
  - Documents the proposed clear zone property interest to be acquired in fee (if any)
  - Provides justification regarding why some or all clear zones cannot be acquired in fee
  - Identifies existing or proposed alternative land use control mechanisms enacted or pursued to enhance safety and reduce nuisances associated with aircraft operations
- The MnDOT Aeronautics Planning Director is responsible for reviewing and approving CZAPs in based on if the proposed clear zone exception provides for a reasonable level of safety for airport users and surrounding populations in consideration of airport-specific constraints and requirements.

[2] *Runway categories are defined in terms of surface type (i.e., turf versus paved) and utility versus other-than-utility.*

5.3.7. LAST-MILE CONNECTIVITY AND COURTESY CAR EVALUATION

The usability of many airports is affected by the availability of ground transportation options for pilots, passengers, and cargo. The Last-mile Connectivity and Courtesy Car Evaluation reviewed the multimodal options provided by all Minnesota state system airports. Because the availability and condition of airport courtesy cars was identified as a key concern at many general aviation (GA) airports by aviation stakeholders during Phase I, the 2022 MnSASP offers prioritized recommendations for addressing the availability, maintenance, and funding of courtesy cars at Minnesota's GA airports.

Attachment 7 of the 2022 MnSASP Technical Report provides the Last-mile Connectivity and Courtesy Car Evaluation. The key recommendations identified by this task are provided below.

- MnDOT Aeronautics should:
  - Add courtesy car maintenance as an eligible expense for Maintenance and Operations (M&O) Grant funding
  - Require that airport sponsors establish trip agreements prior to offering state assistance for the acquisition and maintenance of courtesy cars
- Airport sponsors should:
  - Acquire vehicles through MnDOT's used fleet equipment program or the Minnesota Department of Administration Fleet and Surplus Services
  - Partner with local businesses to sponsor courtesy cars vehicles to cover operating expenses
  - Leverage the insurance offerings provided by governmental trusts in Minnesota
  - Require airport users to hold their own auto coverage to serve as the primary policy during use
  - Establish a trip agreement with courtesy car users for detailing the terms of use and documenting driver information
  - Promote and educate community partners about the economic activity generated by courtesy car users (e.g., allowing transient GA pilots and passengers to visit local businesses)
  - Request that courtesy car users complete a trip tracker to document the business(es) supported during their visits

5.4. MnSASP Key State Focus Area Summary Table

Table 5.3 summarizes the key state focus area by area of responsibility, with most elements assigned to MnDOT Aeronautics or airport sponsors.

Table 5.3. Summary of Responsibilities Associated with Key State Focus Area Elements and Recommendations

Key Focus Area	MnDOT Aeronautics	Airport Sponsors	Other
TTF Operations	- Review and approve TTF Assessment Reports for state-only airports - Review TTF access agreements for compliance with MnDOT TTF Standards	- Federally-obligated airports: Coordinate with the FAA to determine ability to establish TTF operations - State-only airports: Prepare TTF Assessment Report for MnDOT Aeronautics review and approval - All airports: Prepare TTF access agreements in compliance with MnDOT TTF Standards	- FAA: Review and approve proposed TTF operations at federally-obligated airports
Hangar Availability Evaluation and State Funding Recommendations	- Require that airport sponsors establish and enforce airport minimum standards specifying that all publicly owned hangars are used for aeronautical-related purposes as a term of receiving state support for new hangar development - Require that airport sponsor establish appropriate hangar lease rates as a term of receiving state support for hangar development - Require that airport sponsors demonstrate the need for additional hangar storage via a formal justification request - Establish a uniform prioritization methodology for the distribution of Hangar Revolving Loans and Airport Development Grants	- Establish and enforce airport minimum standards specifying that all publicly owned hangars must be used for aeronautical-related purposes - Establish appropriate hangar lease rates in accordance with ACRP Report 213: *Estimating Market Value and Establishing Market Rent at Small Airports* - Prepare hangar funding justification request for submission in conjunction with hangar funding requests	- None
State Aviation System Exit and Airport Closure Processes	- Prepare Impact Evaluation based on data received from airport sponsor and other supplemental sources, as required	- Provide a written notice to the Commissioner requesting intent to be released from the airport system and/or close	- MnDOT Legal Team: Determine if an airport can be released from its state grant assurances based on request from MnDOT Aeronautics Planning Director

Key Focus Area	MnDOT Aeronautics	Airport Sponsors	Other
	- Release draft Impact Evaluation for public comment at least 30 days prior to public hearing - Incorporate public comments into the draft Impact Evaluation as warranted - Submit final Impact Evaluation to the Commissioner of Transportation (Commissioner)	- Submit all data required to prepare an Impact Evaluation - Schedule a public hearing - Summarize public comments received after the public hearing and submit to MnDOT Aeronautics - Address as federal and state grant assurances, as applicable, prior to closure - Upon receiving Commissioner approval for closure, file FAA Form 7480-1 - Notify the Commissioner of final closure and return state operating license to MnDOT Aeronautics - Comply with all closure requirements provided by the FAA, including those outlined in Advisory Circular (AC) 150/5340-1, *Standards for Airport Markings*	- Commissioner: Review final Impact Evaluation as prepared by MnDOT Aeronautics - Commissioner: Determine if an airport's closure or release from the state aviation system will have an unreasonable impact in terms of safety, access, and mobility to Minnesota residents, visitors, and/or businesses
State Aviation System Entry Processes	- Prepare Evaluation Report based on data provided in the Entry Request and other supplemental sources, as required - Award an Airport Planning Grant to airport sponsors that have received preliminary approval for system inclusion (to be expended on planning projects only) - Award Airport Development and M&O Grant once the Commission issues a public airport license	- Prepare Entry Request for submission to the MnDOT Aeronautics that confirms airport meets at least one of the four entry criteria and provides other important information used to develop the Evaluation Report - Obtain 100 percent of clear zones in fee simple based on maximum build-out conditions - Develop MnDOT-approved ALP - Zone airport in accordance with Minnesota State Statutes and Minnesota Administrative Rules	- Commissioner: Issue an Order to indicate that the airport is preliminarily approved for system inclusion - Commissioner: Issue a public airport license when all state requirements are met, including those associated with public airport licensure, clear zone ownership, zoning, and MnDOT-approved ALP

Key Focus Area	MnDOT Aeronautics	Airport Sponsors	Other
Prioritization of State Funding for Crosswind Runways	- Update the MCREM on a two-year cycle - Maintain a current list of airports eligible to receive state funding support for the development of a new or maintenance of an existing crosswind runway based on receiving a score of 1.5 or greater in the MCREM - Award eligible and justified projects state funding based on the statewide prioritization methodology (a project's inclusion on the statewide Capital Improvement Plan [CIP] does not guarantee funding will be available or approved)	- Work with the FAA Airports District Office (ADO) to determine proposed project's eligibility for federal support through the AIP - Contact MnDOT Aeronautics to determine project's eligibility for state support based on MCREM score - Prepare and submit an Exception Request if project receives a MCREM score of less than 1.5 - Once eligibility has been established, prepare and submit a CRJR for Commission review - If justified for state support, include proposed project on MnDOT-approved ALP and statewide CIP	- Commissioner: Review Exception Requests to determine if the MCREM inadequately reflects the airport's need for an existing or new crosswind runway - Commissioner: Evaluate CRJR to determine if the proposed project meaningfully enhances the safety, security, access, or mobility within Minnesota or provides another public benefit - Commissioner: Issue a written recommendation to MnDOT Aviation Planning Director indicating if the project is justified for public support
Clear Zone Ownership and Compliance Requirements	- Maintain a list of grant-eligible airports based on compliance with clear zone guidance statement (i.e., 100 percent ownership based on ultimate build-out conditions in fee simple or having a CZAP on-file with MnDOT Aeronautics) - Evaluate CZAPs to ensure proposed plan provides for a reasonable level of safety for aircraft and surrounding populations in consideration of airport-specific constraints and requirements - Issue a written record of determination documenting approval or denial of proposed CZAP	- Acquire 100 percent of clear zones in fee simple based on ultimate build-out conditions - If 100 percent fee simple ownership is infeasible, develop a CZAP for submission to the MnDOT Aeronautics Planning Director	- None

Key Focus Area	MnDOT Aeronautics	Airport Sponsors	Other
Last-mile Connectivity and Courtesy Cars	- Add courtesy car maintenance as an eligible expense for M&O Grant funding - Require that airport sponsors establish trip agreements prior to offering state assistance for the acquisition and maintenance of courtesy cars	- Acquire vehicles through MnDOT's used fleet equipment program or the Minnesota Department of Administration Fleet and Surplus Services - Partner with local businesses to sponsor courtesy cars vehicles to cover operating expenses - Leverage the insurance offerings provided by governmental trusts in Minnesota - Require airport users to hold their own auto coverage that will serve as the primary policy during use - Establish a trip agreement with courtesy car users for detailing the terms of use and documenting driver information - Promote and educate community partners about the economic activity generated by courtesy car users (i.e., visiting GA pilots and passengers) - Request drivers complete a trip tracker to document the business(es) supported during their visits	- None

Sources: Kimley-Horn, 2022; MnDOT Aeronautics, 2022

5.5. Summary

The key state focus areas of the 2022 MnSASP represent some of the most complex issues facing MnDOT Aeronautics today. These concerns have very real implications for aviation stakeholders across the state, and the decisions made around them can affect how people and goods can move into, out of, and within the state – both in the air and on the ground. The guidance and recommendations offered by the 2022 MnSASP are designed to provide context and clarity around these concerns to enhance the system's ability to serve its constituents.

Chapter 6. Continuous Aviation Planning

6.1. Introduction

The 2022 Minnesota State Aviation System Plan (MnSASP or 2022 MnSASP) collected a wide variety of aviation data points pertaining to the Minnesota state aviation system (or system). This comprehensive data collection effort was guided by a detailed data acquisition plan approved by the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) Airport Planning Staff to complete a comprehensive evaluation of the system's ability to meet current and potential future aviation demands.[1] The findings from this evaluation are used to identify and prioritize airport improvement projects that align with MnDOT's objectives for the state aviation system.[2]

The MnSASP data also includes other aviation information that provides MnDOT Aeronautics staff with the full scope of aviation activities, facilities, and services occurring at or supported by the state aviation system. However, these data will quickly become outdated if without focused attention and ongoing maintenance. As such, it is imperative that MnDOT Aeronautics keep the data collected through the MnSASP (or MnSASP data) up-to-date to engage in continuous system planning using accurate data.

The MnSASP data are maintained in an ArcGIS-based Hub application referred to as the MnSASP Hub (or Hub), which serves as an intuitive user-friendly interface for interacting with the data through several Dashboards, StoryMaps, and Web Map applications. A screenshot of the Hub's landing page and a link to access the Hub is provided on the right. To support the continuous nature of system planning, this data management plan (or plan) was developed to document how all the MnSASP data can be kept current. The first section of this plan provides an overview of all the data sources referenced during the MnSASP, followed by more detailed information about the specific data points obtained from those sources and their application in the MnSASP.

This information is organized in the following sections:

- Data Sources (Section 6.2)
- Data Points Assessment (Section 6.3)

[1] *The data acquisition plan is documented in **Chapter 2. Phase I Validation** of the 2022 MnSASP Technical Report.*
[2] *MnDOT's objectives are defined in the Minnesota GO, a comprehensive multimodal study providing a 50-year vision for the state's transportation network. More information on the Minnesota GO can be found at the following website: https://minnesotago.org/*

- Supplemental Data Points and Manipulation Details (**Section 6.4**)

Appendix D. MnSASP Hub Data Matrix consolidates the information included in this chapter. Additionally, the MnSASP Hub User's Guide was prepared for MnDOT Aeronautics as a compendium to this document. The MnSASP Hub User's Guide provides detailed instructions on how to update the MnSASP data within the Hub. This document is for internal MnDOT Aeronautics purposes only and not distributed in conjunction with other 2022 MnSASP documents, although is referenced here for MnDOT Aeronautics staff responsible for ensuring the Hub remains current over time.

6.2. Data Sources

The MnSASP data originate from several different sources. Much of the data originated from a comprehensive airport data collection effort completed within the 2022 MnSASP across the entire system. However, several data points were pulled from publicly available data repositories maintained by MnDOT, the Federal Aviation Administration (FAA), and other data providers. **Table 6.1** details each distinct data repository that was queried to obtain MnSASP data.

Table 6.1. MnSASP Data Sources

Data Source	Summary	Responsible Author/Agency	Source Data Update Cycle[3]	Website
Aircraft Registration Database	The FAA's Aircraft Registration Database records all civil aircraft in the United States, including detailed records of each aircraft (registration, manufacturer, model), owner information (name and address), and the airworthiness certificates on-file. The complete database can be downloaded as a ZIP folder (including an Excel workbook) for further analysis.	FAA	Daily	https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/releasable_aircraft_download/
Airmen Certification Database	The FAA maintains a database recording all individuals that have an active airmen certificate including detailed records for each certificate holder including name, address, medical certificate on-file, and airworthiness certificate(s) and rating(s) acquired. The full database can be downloaded as a CSV or text file for further analysis.	FAA	Monthly (on the first day of each month)	https://www.faa.gov/licenses_certificates/airmen_certification/releasable_airmen_download/
Airport Data and Information Portal (ADIP)	The FAA's ADIP is a data repository of airport and aeronautical data. This repository includes airport data collected from the FAA's 5010 Airport Safety Inspection program, FAA-published approach plates, and presents airport map imagery. Airport 5010 inspections collect data on airport facilities, services, activities, and obstructions intruding into the airport's critical safety areas. This data can be downloaded in an Excel format from Airport Data and Information Portal (ADIP) using the advanced facilities search query to select the intended airports for review. This data is organized in four categories: Facility, Runway, Remark, and Schedule Data.[4]	FAA	FAA 5010 inspection cycle (typically every three years for airports without air carrier service and annually for airports with scheduled commercial service)	https://adip.faa.gov/agis/public/#/public
Airport Improvement Program (AIP) Grant Histories	The FAA's AIP directs federal funding to airports included in the National Plan of Integrated Airport Systems (NPIAS). Historical summaries of all grants awarded through the AIP can be downloaded in a PDF or Excel format for further analysis.	FAA	Annually	https://www.faa.gov/airports/aip/grant_histories/
Low Altitude Authorization and Notification Capability (LAANC)	The FAA has introduced the LAANC program to support integrating unmanned aerial vehicles (UAV) activity into the National Airspace System (NAS). The LAANC facilitates communication between UAV users and aviation stakeholders (including airports) for identifying sensitive airspace and gaining visibility into the locations and times of UAV activity.	FAA	Unknown[5]	https://www.faa.gov/uas/programs_partnerships/data_exchange/#:~:text=LAANC%20is%20the%20Low%20Altitude,pilots%20can%20and%20cannot%20fly.
National Based Aircraft Inventory Program	The FAA's National Based Aircraft Inventory Program is a data repository recording all based aircraft at Nonprimary NPIAS airports. These airports are required to submit their based aircraft into the program's website to be validated with the FAA's Aircraft Registration database. Specific details on the based aircraft at each airport is limited to authorized personnel (i.e., airport managers, sponsors). However, summary reports of the total based aircraft at each airport are made publicly available on the program's website.	FAA	Annually to maintain eligibily for federal funding (responsibility of airport sponsors)	https://basedaircraft.com/Default.aspx?ReturnUrl=%2f
NPIAS	The NPIAS reports all existing and proposed airports that are included in the NAS. Appendix A of the report details all NPIAS airports including the roles they currently serve and the amounts and types of airport development eligible for federal funding under the AIP over the next five years. This appendix can be downloaded in a PDF or Excel format for further analysis.	FAA	Biennially	https://www.faa.gov/airports/planning_capacity/npias/current/
Operational Network (OpsNet)	The FAA's OpsNet is a database containing official operations data reflective of FAA air traffic operations recorded across the NAS. This includes operations counts among airports with an air traffic control tower (ATCT), which can be queried and downloaded as an Excel file, Word document, or viewable in HTML for further analysis.	FAA	Monthly	https://aspm.faa.gov/opsnet/sys/main.asp
Traffic Flow Management System Counts (TFMSC)	The FAA's TFMSC is a database that maintains operations data across all airports in the NAS. The operation counts recorded in TFMSC are limited to aircraft operations that fly under instrument flight rules (IFR) and are captured by the FAA's en route computers. Most aircraft operating under visual flight rules (VFR) are not captured by this database.	FAA	Monthly	https://aspm.faa.gov/tfms/sys/main.asp

[3] This column indicates the frequency that each data source is updated by the responsible author/agency. It is not the intention that the data points pulled from the sources are updated in the same frequency. Refer to ***Section 6.3*** *for the suggested update cycle and trigger point(s) associated with each data point maintained in the Hub.*
[4] The categories are accurate as of 01/18/2022 and are subject to change. Refer to the data dictionary available in the advanced facilities search for the most current organization of ADIP.
[5] As of 01/18/2022, the list of airports participating in the LAANC was last updated in June of 2021.

Data Source	Summary	Responsible Author/Agency	Source Data Update Cycle[3]	Website
Airport Layout Plans (ALPs)	ALPs provide a graphical representation of existing/planned facilities and design standards at an airport. MnDOT Aeronautics maintains a repository of ALPs and master plans submitted by airports for review and MnDOT approval.	MnDOT Aeronautics / Airports	Varied	N/A
Airport Pavement Management System (APMS)	MnDOT Aeronautics maintains a comprehensive APMS for paved airports in the system.[6] The airfield pavement at each participating airport is inspected on a three-year cycle and evaluated against the FAA's and MnDOT's pavement design and condition standards to identify current and future airfield pavement maintenance needs. This information helps informs airports and MnDOT Aeronautics on developing the state's Capital Improvement Program (CIP). The data maintained in the APMS is documented in Pavement Condition Reports prepared for each participating airport, which are available as downloadable PDFs. The data are also available in a geospatial format and exportable as an E70 file that can be parsed into shapefiles. The APMS also maintains an interactive web-based map application (AIRView) for viewing the pavement condition data collected across all airports.	MnDOT Aeronautics	Three-year cycle	https://www.dot.state.mn.us/aero/airportdevelopment/pavementmanagement.html
Minnesota Airport Directory and Travel Guide	MnDOT Aeronautics annually publishes an airport directory that includes airport and aeronautical information relevant to pilots operating in Minnesota. Profiles of each airport's points of contact, available facilities, services, nearby attractions, and aerial images are provided within the directory. The directory is available in three versions: a downloadable PDF, a custom content pack for pilots to upload into the Foreflight app, and codified in the web-based AirportFinder app.[7]	MnDOT Aeronautics	Annually	Home page: https://www.dot.state.mn.us/aero/airportdirectory/ Link to the AirportFinder app: https://www.dot.state.mn.us/aero/airportdirectory/airportfinder/index.html
MnSASP Airport Inventory	A comprehensive airport inventory was completed across the system as a part of the MnSASP using an Airport Inventory Form. The Inventory Form collected information about airport facilities, services, and activities, among other topics that was unavailable through federal, state, or other third-party sources.	MnDOT Aeronautics	MnSASP update (typically a 10-year cycle)	N/A
MnSASP Baseline Operations Estimation Tool	The 2022 MnSASP update developed an Excel-based tool for estimating a baseline count of aircraft operations across all general aviation (GA) airports in the system. This tool pulls in operations counts recorded in the FAA's TFMSC database, extrapolates these counts using nationwide ratios of TFMSC vs FAA OpsNet operations stratified by NPIAS hub/role, and adds the airport-reported local operations collected during airport 5010 inspections.[8]	MnDOT Aeronautics	Annually (recommended)	N/A
Statewide Airport Economic Impact Study	MnDOT Aeronautics completes a periodic statewide study to quantify the annually economic impact that the system generates to the Minnesota economy. The findings of this study are summarized and published in a technical report downloadable in a PDF format.	MnDOT Aeronautics	As determined by MnDOT Aeronautics	http://www.dot.state.mn.us/airport-economic-study/
Zoning Information Warehouse	MnDOT Aeronautics maintains a data repository of airport zoning ordinances established by the jurisdictions in which system airports are located. The repository includes ordinance documentation, map visuals, and GIS-compatible map files (Shapefiles) to map into a GIS mapping software (i.e., ArcMap, ArcGIS Pro, ArcGIS Online). The Zoning Information Warehouse also includes an interactive map application for viewing all airport zoning across the system (Statewide Airport Zoning Tool).	MnDOT Aeronautics	Unknown	https://www.dot.state.mn.us/aero/planning/zoning-warehouse.html
Aviation Safety Reporting System (ASRS)	The National Aeronautics and Space Administration (NASA) maintains a data repository of aviation incidents occurring worldwide. This repository is populated by aviation users (pilots, air traffic controllers, mechanics, flight attendants) that voluntarily report aviation incidents in a confidential manner. The incidents are categorized by several different user and event characteristics (environmental conditions, aircraft, location, event assessment) which are searchable through a public-facing search query to view each recorded incident. The incident data is viewable in HTML and downloadable in three different formats: Excel file, comma-separated values (CSV), and Word.	NASA	Monthly	https://asrs.arc.nasa.gov/search/database.html

[6] The latest update to the APMS included 103 paved airports in the system, not including the airports managed by the Metropolitan Airports Commissions (MAC).
[7] The AirportFinder app is linked and presented as a Dashboard in the MnSASP Hub (in the Airport Dashboards page).
[8] Additional information about the GA operations counting methodology can be obtained in Chapter 3. Operations Counting and Forecasting of the 2022 MnSASP Technical Report.

Data Source	Summary	Responsible Author/Agency	Source Data Update Cycle[3]	Website
Aviation Weather Center (AWC)	The National Oceanic and Atmospheric Administration (NOAA) maintains the AWC as live data repository for aviation weather information. Real-time weather information is published by AWC through meteorological aerodrome reports (METAR) reported for each airport in the system. The METAR reports are viewable directly in the website as text and can be copy/pasted into another application for further analysis.	NOAA	Live updates	https://www.aviationweather.gov/
Case Analysis and Reporting Online (CAROL)	The National Transportation Safety Board (NTSB) maintains a comprehensive database of all transportation-related accidents in the United States (U.S.). As a public-facing platform for this data, CAROL is a query tool for finding information on all transportation-related investigations completed and ongoing by the NTSB. This includes aviation accident cases started after 2008. The accident data is viewable directly in the query tool and the NTSB reports are downloadable in a PDF format.	NTSB	Daily	https://data.ntsb.gov/carol-main-public/landing-page

Sources: Kimley-Horn, 2022; Various state and federal databases, 2022

6.3. Data Points Assessment

This section provides a comprehensive review of all the data points MnDOT Aeronautics has selected to maintain in the MnSASP Hub. Additional data were collected during the MnSASP airport inventory conducted in 2021. Many of these data were used in the analyses of the MnSASP but will not be included in the Hub (e.g., airport rates and charges, certain types of aviation activities). All MnSASP data are available in static Excel format. For simplicity and ease of use, the assessment consolidates and organizes the data points into categories. Each data category is evaluated across 11 different criteria (described in Table 6.2) providing a complete summary of all the data points, including guidance on updating all the data points.

Table 6.2. Data Points Assessment Criteria

Assessment Criteria	Description
Data Point(s)	Lists out all the data points associated with the assigned category
Data Type	Format of the data points (all data points are in a tabular format, but may have associated spatial data [polygons, points, lines])
Description	Summary of all the data points
Source(s) (and Details)	Identifies and describes the source of the data points (if applicable, a link to access the source is included)
Date of Initial Data Collection	Date that the data points were initially collected for the 2022 MnSASP
Update Cycle	Recurring cycle that the data points should be updated to remain current for MnDOT's continuous system planning efforts
Trigger Point(s) for Evaluation Outside of Update Cycle	Events outside of the normal update cycle that the data should be evaluated and updated to reflect new conditions
Hub Presentation/Use	Identifies the page(s) and applications in the Hub where the data points are presented
MnSASP Hub Layer/Table	Denotes the feature layer (and table where applicable) that the data points are stored in the Hub's backend data[9]
MnDOT Aeronautics Responsibility	Identifies the individual/group within MnDOT Aeronautics recommended to be responsible for updating the data points
Data Manipulation Plan from Raw State (if applicable)	Details how the raw data needs to be manipulated to conform with the parameters of the MnSASP data

Source: Kimley-Horn, 2022

This evaluation completed across all 11 data categories are codified into tables and included in the following subsections.

[9] Refer to the MnSASP Hub User's Guide for more information on the construct of the Hub's backend data. The MnSASP Hub User's Guide is a compendium document prepared for MnDOT Aeronautics to provide detailed instructions on how to update the MnSASP Hub. This document is for internal MnDOT Aeronautics purposes only and not distributed in conjunction with other 2022 MnSASP documents.

6.3.1. AIRPORT BACKGROUND

Airport background information identifies the airports in the system and provides relevant information for MnDOT Aeronautics to engage in airport planning and development efforts. Table 6.3 through Table 6.10 document all the data points providing airport background information maintained in the MnSASP data.

Table 6.3. Airport Contact Information

Data Assessment	Contact information
Data Point(s)	On Site Manager Manager Name Manager Title Manager Phone Manager Cell Manager Email Other Contact Name Other Contact Title Other Contact Phone Other Contact Cell Other Contact Email
Data Type	Tabular data
Description	Maintaining an up-to-date directory of airport contact information is critically important for airport users and MnDOT Aeronautics to connect with the airport staff. In many cases, airports have a manager (on- or off-site) employed by the airport sponsor to oversee airport management/administration, operations, and improvement. Some airports have identified an additional point of contact ("Other Contact") as an alternate option for connecting with the airport.
Source(s)	MnSASP Airport Inventory
Source(s) Details	The MnSASP Airport Inventory includes contact information for the airport's designated manager and an alternate point of contact.
Date of Initial Data Collection	06/02/2021 (2022 MnSASP Airport Inventory)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	Airport staffing changes
Hub Presentation/Use	MnSASP Report Card: Airport details element Airport Geodata: Weather Stations & Navigational Aids (NAVAIDs) Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/MN Airport Background
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.4. Airport Coordinates

Data Assessment	Airport Coordinates
Data Point(s)	Latitude Longitude Airport Elevation (feet [ft])
Data Type	Spatial data (points)
Description	Airport reference point (ARP) data (maintained as latitude/longitude data in ADIP) refers to the centerpoint of the primary runway and is used to identify the location of each airport facility in the system. The ARP serves as the main reference for plotting each airport point in the "Airport Background" layer.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	Coordinate data are included in a downloadable "Facilities" dataset available through ADIP's advanced search query. Refer to the key below for the field names containing the data points: - Latitude: ARP Latitude - Longitude: ARP Longitude - Airport Elevation (ft): Elevation
Date of Initial Data Collection	10/20/2020
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Major airfield geometry update or airport relocation
Hub Presentation/Use	MnSASP Report Card: Airport details element and map Airport Dashboards: Airport Economic Impact Dashboard (map) Airport Geodata: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/MN Airport Background
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	The coordinate data (latitude, longitude) in ADIP is recorded in DMS format, which is incompatible for the MnSASP data (plotting the points in ArcGIS). See **Section 6.4.1** for instructions on converting DMS to decimal degrees to conform with the Hub data parameters. Refer to the MnSASP Hub User's Guide for guidance on mapping the airport points in the Hub.

Source: Kimley-Horn, 2022

Table 6.5. Airport Identification

Data Assessment	Airport Identification
Data Point(s)	FAA ID Airport Name
Data Type	Tabular data
Description	Airports are commonly identified using a unique name and three-character identified assigned by the FAA
Source	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The data points are included in a downloadable “Facilities” dataset available through the ADIP advanced search query. Refer to the key below for the field names containing the data points: - FAA ID: LocationID - Airport Name: FacilityName
Date of Initial Data Collection	11/01/2020
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Airport name or FAA ID change
Hub Presentation/Use	System Performance: Dashboard filters, metric/indicator data cards Airport Performance: Dashboard filter, metric/indicator data cards MnSASP Report Card: Airport selection list, airport details element Airport Dashboards: Airport Directory Dashboard, Airport Economic Impact Dashboard, FAA-Filed Flight Plans Dashboard Airport Geodata: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data (The FAA ID is used as the common key for all tables and layers in the MnSASP Hub Airport Data feature layer)
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.6. Airport Physical/Mailing Address

Data Assessment	Airport Physical/Mailing Address
Data Point(s)	Physical Address Owner/Mailing Address
Data Type	Tabular data
Description	Each airport maintains a physical address and a mailing address (assigned as the owner's address) to indicate how the airport can be reached via ground transportation and contacted via mail.
Source(s)	- MnDOT Airport Directory - FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The physical address is published in the MnDOT Airport Directory for each airport. Owner/mailing address is included in a downloadable "Facility" dataset available through ADIP's advanced search query under the field name "Owner Address."
Date of Initial Data Collection	10/20/2020
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Airport relocation
Hub Presentation/Use	MnSASP Report Card: Airport details element Airport Geodata: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/MN Airport Background
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.7. Airport Planning Jurisdiction

Data Assessment	Airport Planning Jurisdiction
Data Point(s)	MnDOT District Aeronautics Planning Region Congressional District
Data Type	Tabular data
Description	Airports can be categorized into various planning jurisidctions including (but not limited to) Aeronautics Planning Regions, MnDOT Districts, and Congressional Districts.
Source(s)	MnDOT Aeronautics
Source(s) Details	None

Data Assessment	Airport Planning Jurisdiction
Date of Initial Data Collection	MnDOT District: 12/16/2020 Aeronautics Planning Region: 12/16/2020 Congressional District: 06/18/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Jurisdictional boundary changes
Hub Presentation/Use	System Performance: Dashboard filters, metric/indicator data cards MnSASP Report Card: Airport details element Airport Dashboards: Airport Economic Impact Dashboard Airport Geodata: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/MN Airport Background
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.8. Airport Sponsor

Data Assessment	Airport Sponsor
Data Point(s)	Airport Sponsor
Data Type	Tabular data
Description	Airport sponsors are public agencies or tax-supported organizations such as airport authorities or municipal governments authorized to own and operate an airport; obtain property interests; obtain funds; and otherwise be responsible for meeting all applicable legal and financial requirements of current laws, regulations, and other obligations associated with their airport.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	Airport sponsor is included in a downloadable "Facility" dataset available through ADIP's advanced search query under the field name "Owner."
Date of Initial Data Collection	11/01/2020
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Change of airport sponsorship
Hub Presentation/Use	MnSASP Report Card: Airport details element Airport Geodata: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard

Data Assessment	Airport Sponsor
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/MN Airport Background
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.9. NPIAS

Data Assessment	NPIAS
Data Point(s)	NPIAS Inclusion NPIAS Primary / Nonprimary NPIAS Category NPIAS Hub NPIAS Role
Data Type	Tabular data
Description	The NPIAS identifies all existing and proposed airports included in the NAS, the roles they currently serve, and the amounts and types of airport development eligible for federal funding under the AIP over the next five years. The FAA publishes the NPIAS every two years.
Source(s)	FAA NPIAS: https://www.faa.gov/airports/planning_capacity/npias/
Source(s) Details	Appendix A lists each airport's NPIAS classification with five-year forecasted activity and development estimates. This can be downloaded as an Excel or PDF file at the following webpage: https://www.faa.gov/airports/planning_capacity/npias/current/. Information on NPIAS airports in Minnesota is in the sheet named "MN."
Date of Initial Data Collection	11/1/2020 (NPIAS 2021 - 2025)
Update Cycle	Biennially (coinciding with the release of a new NPIAS report)
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Report Card: Airport details element Airport Geodata: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/MN Airport Background
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.10. State Classification

Data Assessment	State Classification
Data Point(s)	State Classification
Data Type	Tabular data
Description	Per Minnesota Statute (630.305 Subdivision 2), airports are required to have a state-specific classification designation before the airports can receive state investment into airport projects. These classifications provide an indication of the role that each airport serves in the system.
Source(s)	- FAA ADIP: https://adip.faa.gov/agis/public/#/public - MnSASP
Source(s) Details	Minnesota state airport classifications are determined by runway length, Part 139 certification, and runway surface type (see **Section 6.4.1**). As such, assigning state classifications to airports requires reviewing airport data maintained in ADIP (see data manipulation plan for details).
Date of Initial Data Collection	11/11/2020
Update Cycle	As required based on trigger points for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Runway extension project, runway paving project, or new Part 139 certification
Hub Presentation/Use[10]	System Performance: Dashboard filters, metric/indicator data cards Airport Performance: Dashboard filter, metric/indicator data cards MnSASP Report Card: Airport details element Airport Dashboards: Airport Economic Impact Dashboard Airport Geodata: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/MN Airport Background
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	State classifications are assigned across the system based on three factors, all of which are included in the MnSASP Hub Airport Data feature layer: - Part 139 certification (**Table 6.16**) - Primary runway length (**Table 6.36**) - Primary runway surface type (**Table 6.36**) See **Section 6.4.1** for the definitions of each state classification in terms of the three factors above.

Source: Kimley-Horn, 2022

[10] *State classifications are used throughout the MnSASP for identifying the appropriate facility, service and administrative items that airports should be providing. These items are dictated by several airport performance metrics defined in during Phase I of the MnSASP (see **Chapter 2. Phase I Evaluation** for more information on metrics). Any changes to an airport's state classification will require a complete reevaluation of the airport's performance across all the airport performance metrics.*

6.3.2. AIRPORT ACTIVITY

Airport activity records the type(s) and magnitude of aviation-related activities supported by or occurring at system airports. The following tables document all the data points included in the MnSASP data related to airport activity.

Table 6.11. Based Aircraft

Data Assessment	Based Aircraft
Data Point(s)	Single-engine Based Aircraft Multi-engine Based Aircraft Jet Turboprop Based Aircraft Helicopter Based Aircraft Other Based Aircraft Military Based Aircraft Total Based Aircraft Based Aircraft Data Source
Data Type	Tabular data
Description	Based aircraft provides one indicator of an airport's type and frequency of activity. This information can be used to inform an airport's need for aircraft storage facilities (hangars, tie-downs) to adequately accommodate aircraft and may be a component of identifying an airport's critical aircraft. An airport's critical aircraft defines the most sophisticated or demanding aircraft conducting at least 500 annual operations and is used to during airport planning and design. The number of aircraft based at an airport is an important component of evaluating the federal role of Nonprimary airports in the NPIAS.
Source(s)	- FAA National Based Aircraft Inventory Program: https://basedaircraft.com/BaCounts/Default.aspx - FAA ADIP
Source(s) Details	The FAA's National Based Aircraft Inventory Program (basedaircraft.com) provides validated counts of based aircraft for each Nonprimary NPIAS airport. Summary reports by state are publically available through the program's website. Authorized users including MnDOT staff can access validated counts by airport. Refer to **Section 6.4.2.1** for instructions on viewing this data for updating the data points. For Primary NPIAS and non-NPIAS airports, the FAA ADIP records the type and number of based aircraft reported by airports during 5010 inspections. The data points are included in a downloadable "Facilities" dataset available through the advanced search query. Refer to the key below for the field names containing the data points: - Single-engine Based Aircraft: SingleEngineGA - Multi-engine Based Aircraft: MultiEngineGA - Jet Turboprop Based Aircraft: JetEngineGA - Helicopter Based Aircraft: HelicoptersGA - Other Based Aircraft: GlidersOperational, Ultralights - Military Based Aircraft: MilitaryOperational - Total Based Aircraft: [sum of the counts populated in the fields above]
Date of Initial Data Collection	06/02/21 (2022 MnSASP Airport Inventory)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Presentation/Use	MnSASP Hub/Airport Performance: Based Aircraft [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Airport Activity

Data Assessment	Based Aircraft
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.2.1** for information regarding obtaining validated based aircraft counts from the National Based Aircraft Inventory Program.

Source: Kimley-Horn, 2022

Table 6.12. Baseline Operations Counts

Data Assessment	Baseline Operations Counts
Data Point(s)	Total Baseline Operations Count Baseline Operations Count Year Baseline Operations Count Source
Data Type	Tabular data
Description	Operation counts are one primary indicator of aviation activity levels. This data are used to develop airport-specific and system-level activity forecasts, which are applied during airport planning and design.
Source(s)	MnSASP Baseline Operations Estimation Tool (using FAA TFMSC, FAA OpsNet, and airport-reported operations data collected during FAA 5010 inspections) FAA OpsNet: https://aspm.faa.gov/opsnet/sys/main.asp
Source(s) Details	The MnSASP Baseline Operations Estimation Tool was developed during the 2022 MnSASP to estimate a baseline operations count at Minnesota's GA airports without an ATCT. The estimation methodology utilizes operations data from the FAA's TFMSC, FAA OpsNet, and airport-reported 5010 operations. Operations are obtained from the Operations Network (OpsNet) for airports with an ATCT, and TFMSC for non-towered commercial service airports. The data point "Baseline Operations Count Source" denotes the source of the baseline operations data referenced for each airport.
Date of Initial Data Collection	11/18/2021 (operation counts for 2020 airport activity is recorded)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/Airport Performance: Airport Operations [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Airport Activity
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.2.2** for obtaining and manipulating operations counts data available via the FAA's OpsNet database. Note that this data is also plugged into the MnSASP Baseline Operations Estimation Tool.

Source: Kimley-Horn, 2022

Table 6.13. Drone/UAV Programs

Data Assessment	Drone/UAV Programs
Data Point(s)	UAV Program Participation – LAANC UAV Program Participation – Other
Data Type	Tabular data
Description	The emergence of commercial/recreational UASs has propted the FAA to develop systems to monitor and regulate UAV activity in the vicinity of airports, which can pose a significant risk to aircraft. The FAA's LAANC program supports the integratation of UAV activity into the NAS by facilitating communication between Part 107 pilots and recreational fliers and air traffic professionals. Under the program, UAV pilots receive near-immediate access to controlled airspace at or below 400 feet above ground level (AGL) and air traffic controllers gain visibility into the locations and times of UAV activity. LAANC can also be used to gain approval to operate a UAV above the designated altitude ceiling in a UAS Facility Map, up to 400 feet AGL. The FAA's DroneZone is available users to register UAVs more than 55 pounds, apply for a waiver/authorization under Part 107, or report a UAS/drone accident. Some airports have also developed independent monitoring/reporting programs for tracking and pre-authorizing UAV activity around their airport.
Source(s)	FAA LAANC (list of participating airports): https://www.faa.gov/uas/programs_partnerships/data_exchange/laanc_facilities/ MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Airport Activity
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.14. Emergency Medical Activity

Data Assessment	Emergency Medical Activity
Data Point(s)	Medical Aircraft – Fixed Wing Medical Aircraft – Rotorcraft Medical Aircraft – Other Aircraft Ambulance Operator 1 Operator 1 Based? Ambulance Operator 2 Operator 2 Based? Ambulance Operator 3 Operator 3 Based? Ambulance Operator 4 Operator 4 Based? Medical Evacuation Activity
Data Type	Tabular data
Description	Emergency and specialized medical care relies on air and ground transportation modes to quickly move trauma vicitims to and transfer patients between medicial facilities for appropriate care. Rotorcraft and fixed-wing aircraft are generally used when ground transportation is infeasible due to time-sensitivity, distance, remote access, or other factors. Airports that support emergency and scheduled medical air flying should optimally provide deicing facilities, Jet A fuel, on-site weather reporting (automated weather observing systems [AWOS]/automated surface observing systems [ASOS]), instrument approach capabilities, and adequate heated transient aircraft storage facilities. The data point "Medical Evacuation Activity" records the approximate frequency of emergency medical activity at the airport.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	System Performance: Emergency Medical [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Airport Activity
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.15. FAA Filed Flight Plans

Data Assessment	FAA Filed Flight Plans
Data Point(s)	Flight ID Number Route – Airport to State Route – State to State Departure Date Departure Airport Name Departure Airport Code Departure Country Departure State Departure Latitude Departure Longitude Arrival Date Arrival Airport Name Arrival Airport Code Arrival Country Arrival State Arrival Latitude Arrival Longitude Number of Flights Departure or Arrival Query Airport State Query Airport Code
Data Type	Tabular data
Description	Reviewing flight information available in FAA-filed flight plans can be a useful indicator of aviation activity, including aircraft traffic routes and the volumes of aircraft activity being supported in the system. Part 91 of the Code of Federal Regulations (CFR) requires pilots to file flight plans with the FAA to operate under IFR in controlled airspace. Understanding the origin and destination of travelers can also be helpful in determining the economic impact of out-of-state fliers utilizing the airport.
Source(s)	FAA TFMSC
Source(s) Details	A login is required for pulling individual flight information collected in the TFMSC. This can be requested using the following link: https://aspm.faa.gov/Control/Users/sysMailTo.asp
Date of Initial Data Collection	09/17/2021
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	Airport Dashboards: FAA Filed Flight Plan Dashboard
MnSASP Hub Layer/Table (if applicable)	FAA Filed Flight Plan Data/All Flight Plan Details

Data Assessment	FAA Filed Flight Plans
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.2.3** for details on pulling the data from the FAA's TFMSC database and organizing the data to upload into the Hub.

Source: Kimley-Horn, 2022

Table 6.16. Part 139 Certification

Data Assessment	Part 139 Certification
Data Point(s)	Part 139 Certification
Data Type	Tabular data
Description	Airport supporting certain types of passenger-carrying operations related to scheduled airline activity are required to hold an Airport Operating Certificate in accordance with CFR Part 139 (such airports are commonly referred to as Part 139 airports).[11] Airport Operating Certificates serve to ensure safety in air transportation. To obtain a certificate, an airport must agree to certain operational and safety standards, including those related to firefighting and rescue activities. Requirements vary depending on the size of the airport and the type of flights available. Additionally, Part 139 Certification status is one of the factors used to determine the state classification of an airport. Refer to **Table 6.5** for more information on state classification and **Section 6.4.1** for the specific criteria applied during the evaluation of state classifications.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	Part 139 Certification is included within the search results in ADIP's advanced facilities search query as denoted under the "Part 139" column (see **Section 6.4.1.3** for a screenshot reference).
Date of Initial Data Collection	09/30/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Part 139 certification
Hub Presentation/Use	<u>MnSASP Report Card</u>: Airport details element <u>Airport Geodata</u>: Weather Stations & NAVAIDs Dashboard, Airport Pavement Dashboard, Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Airport Activity
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

[11] *Dictated by 14 CFR Part 139, available at https://www.ecfr.gov/current/title-14/chapter-I/subchapter-G/part-139*

6.3.3. FACILITIES AND SERVICES

Data on existing airport facilities and services across the system are important to maintain for continuously evaluating the system's capabilities to support different types of airport activity and identify current and future facility and service needs. The following tables document all the data points included in the MnSASP data related to existing airport facilities and services in the system.

Table 6.17. Air Traffic Control Tower

Data Assessment	ATCT
Data Point(s)	ATCT
Data Type	Tabular data
Description	ATCTs facilitate the safe and efficient the flow of traffic in the NAS. These facilities are most common at commercial service and reliever airports although can also be found at some busier GA airports.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	ATCTs are included in the downloadable "Facility" dataset available through ADIP's advanced search query under the field name "ATCT."
Date of Initial Data Collection	10/20/2020
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Construction of a new ATCT
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.18. Aircraft Rental

Data Assessment	Aircraft Rental
Data Point(s)	Aircraft Rental
Data Type	Tabular data
Description	Aircraft rentals can be provided by FBOs or other airport tenants to support aviation users in Minnesota that do not own an aircraft (or the type/size of aircraft to accomplish a specific purpose/flight).
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)

Data Assessment	Aircraft Rental
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/Airport Performance: Available Services [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	The field “Other Services” in ADIP’s “Facilities” dataset will be populated with the character code “RNTL” if the airport has aircraft rentals available. Refer to ADIP’s data dictionary for a full key of character codes used with the field “Other Services.”[12]

Source: Kimley-Horn, 2022

Table 6.19. Airfield Facilities

Data Assessment	Airfield Facilities
Data Point(s)	Beacon Wind Cone
Data Type	Tabular data
Description	Rotating beacons and wind cones serve as important navigational aids for pilots. Per Minnesota Rules 8800.1600 Subp. 7, all public airports must be equipped with a wind cone (referred to as a wind sock in rules).
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The data points are included in a downloadable “Facilities” dataset available through the ADIP advanced search query. Refer to the key below for the field names containing the data points: - Beacon: BeaconSchedule (see Data Manipulation Plan) - Wind Cone: WindIndicator (see Data Manipulation Plan)
Date of Initial Data Collection	09/30/2021
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	System Performance: Adequate Navigational Systems [Metric] Airport Performance: Navigation Systems [Metric] MnSASP Report Card: Navigation Systems [Metric]

[12] The ADIP data dictionary is available online at https://adip.faa.gov/agis/public/#/onlineAmrDataDictionary (accessed May 2022).

Data Assessment	Airfield Facilities
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	The field "BeaconSchedule" in ADIP's "Facilities" dataset will be populated with "Y" if the airport has a beacon installed. If the data point is blank, then the airport does not have a beacon installed. The field "WindIndicator" in the Facilities dataset in ADIP will note a "Y" in the dataset if the airport has a wind cone installed. If a "N" is denoted, the airport does not have a wind cone installed.

Source: Kimley-Horn, 2022

Table 6.20. Airport Reference Code (ARC)

Data Assessment	ARC
Data Point(s)	Existing ARC Future ARC
Data Type	Tabular data
Description	The ARC is a unique designation system created by the FAA to designate the overall planning and design criteria for airports. The identification of an airport's ARC starts with identifying the most critical aircraft accommodated by the airport, which is defined as the most demanding/sophisticated aircraft conducting at least 500 annual operations. Using the operational performance and geometric characteristics of the critical aircraft, airports are assigned an alpha-numeric identifier reflecting the aircraft's approach speed (Aircraft Approach Category [AAC]) and the aircraft's wingspan and tail height (Airplane Design Group [ADG]).
Source(s)	ALPs
Source(s) Details	ALPs denote the existing ARC and the future ARC for the anticipated future and/or maximum build-out of the airport.
Date of Initial Data Collection	06/02/21
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion of a new or updated ALP and/or master plan
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	ALP Program Manager
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.21. Courtesy Car

Data Assessment	Courtesy Car
Data Point(s)	Courtesy Car Courtesy Car Make Courtesy Car Model Courtesy Car Year Courtesy Car Owner Courtesy Car KBB Grade
Data Type	Tabular data
Description	Courtesy cars provide airport visitors with direct connectivity between airports and surrounding communities with greater travel flexibility. To evaluate vehicles, airports reported condition based on Kelley Blue Book (KBB) grades. There is some subjectivity in the vehicle condition(s) being reported. Details on the tiers established by KBB are available at: https://auto.howstuffworks.com/buying-selling/kelley-blue-book4.htm.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/System Performance: Courtesy and Rental Cars [Indicator] MnSASP Hub/Airport Performance: Courtesy Car/Rental Car [Metric], Available Services [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	N/A

Source: Kimley-Horn, 2022

Table 6.22. Fixed-Base Operator (FBO)

Data Assessment	FBO
Data Point(s)	FBO 1 Name FBO 1 Ownership FBO 2 Name FBO 2 Ownership FBO 3 Name FBO 3 Ownership
Data Type	Tabular data

Data Assessment	FBO
Description	FBOs are on-airport businesses that supports aircraft activity and pilots/passengers with aviation-related services such as fuel, aircraft parking, hangar storage, flight planning and pilot lounge space, aircraft maintenance, and aircraft rentals. FBOs may also support and/or facilitate services such as ground connectivity options such as courtesy cars. FBOs can be operated by an independent company or directly by the airport sponsor. This information is noted in the data points titled with “Ownership.”
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/Airport Performance: Available Services [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	N/A

Source: Kimley-Horn, 2022

Table 6.23. Fencing

Data Assessment	Fencing
Data Point(s)	Security Fencing Wildlife Fencing Controlled Vehicle Access Other Airport Fencing
Data Type	Tabular data
Description	Airport fencing impedes wildlife from entering an airport environment and enhances airport security by preventing unauthorized access to the airport. Fencing can range in coverage from full perimeter to encompassing limited parts of the airport (e.g., runway, apron).
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Biennially

Data Assessment	Fencing
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion of a fencing improvement project
Hub Presentation/Use	MnSASP Hub/Airport Performance: Fencing [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.24. Fuel

Data Assessment	Fuel
Data Point(s)	Jet A Available Jet A Available 24/7 Jet A Provider 100LL Available 100LL Available 24/7 100LL Provider SAF Available SAF Available 24/7 Other Fuel Provider Other Fuel Available 24/7 Other Fuel Available
Data Type	Tabular data
Description	Fuel availability is largely driven by the type of users at an airport. Piston-powered aircraft require 100 low lead (LL), while turbine engines require Jet A. Service offerings can be either self- or full-service and provided by the airport or a third-party (such as an FBO). Airports may also provide alternative fuel types including sustainable aviation fuels (SAF) or automobile gas (commonly referred to as MOGAS).
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation of a new fuel farm or provision of a new fuel type
Presentation/Use	MnSASP Hub/System Performance: Fuel Availability at Airports [Indicator] MnSASP Hub/Airport Performance: Fuel [Metric], Available Services [Indicator]

Data Assessment	Fuel
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	The field “Fuel Types” in ADIP’s “Facilities” dataset indicates all the types of fuel available at each airport. This dataset is downloadable as an Excel file in ADIP’s advanced facilities search. Use the following key to identify the fuel type by the corresponding character code populated into the field: - 100LL fuel: “100LL” - Jet A fuel: “A” - MOGAS: “MOGAS” Refer to ADIP’s data dictionary for a full key of character codes used with the “Fuel Types” field (listed as “Fuel” in the dictionary).[13]

Source: Kimley-Horn, 2022

Table 6.25. GA Terminal Building

Data Assessment	GA Terminal Building
Data Point(s)	GA Terminal GA Terminal Comments Restroom Pilot Lounge Car Parking Public Phone
Data Type	Tabular data
Description	GA terminal, administration, and arrival/departure buildings provide space, shelter, and work areas for pilots, passengers, and travelers. Per Minnesota licensing requirements (Minnesota Rules Part 8800.1600), all public airports must provide public restroom facilities and phones. Additionally, airports may also provide car parking and/or pilot lounge space.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	Terminal improvement project (renovation/addition or new construction)
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Arrival/Departure Terminal Building [Metric]

[13] The ADIP Data Dictionary is available at https://adip.faa.gov/agis/public/#/onlineAmrDataDictionary (accessed May 2022)

Data Assessment	GA Terminal Building
	MnSASP Hub/Airport Performance: General Aviation (GA) Terminal/ Administration Building [Metric] MnSASP Hub / MnSASP Report Card: General Aviation (GA) Terminal/ Administration Building [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.26. Maintenance, Repair, Overhaul (MRO) and Other Aircraft Support Services

Data Assessment	MRO and Other Aircraft Support Services
Data Point(s)	Avionics Repair Maintenance Repair Engine Overhaul Other Aircraft Service(s) Other Aircraft Service(s) Details
Data Type	Tabular data
Description	Maintenance, repair, and overhaul (MRO) services are widely available across the system to fulfill aircraft-related needs. MRO services typically include one or more of the following services: avionics repair, aircraft maintenance repair, and engine overhauls. Other aircraft services can include aircraft painting, interior renovations, or specialized MRO support for specific types of aircraft.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/System Performance: Maintenance and Repair at Airports [Indicator] MnSASP Hub/Airport Performance: Available Services [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.27. Rental Car

Data Assessment	Rental Car
Data Point(s)	Rental Car On-site Rental Car Off-site
Data Type	Tabular data
Description	Like courtesy cars, rental cars provide direct connectivity between airports and surrounding communities. Rental car services are typically available at airports that provide scheduled or unscheduled commercial service and can be present on-airport property or off-site at a nearby location.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/Airport Performance: Courtesy Car/Rental Car [Metric], Available Services [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.28. Through-the-Fence (TTF) Operations

Data Assessment	TTF
Data Point(s)	TTF Operations Residential TTF Operations Commercial TTF Operations TTF Operations Description
Data Type	Tabular data
Description	TTF operations allow for aircraft users to directly access airside facilities (runways, taxiways) from land adjacent to, but not on, airport property. There are two major types of TTF: TTF operations tied with residential use (Residential TTF Operations) and TTF operations tied with an off-airport businesses and commercial use (Commercial TTF Operations).
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)

Data Assessment	TTF
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.29. Wind Coverage

Data Assessment	Wind Coverage
Data Point(s)	Wind Coverage
Data Type	Tabular data
Description	Wind coverage indicates the percentage of time that an airport experiences adequate wind conditions based on an airport's runway configuration(s). Adequate wind coverage is determined using the maximum speed and direction of wind that certain aircraft are safely able to operate, known as the allowable crosswind component. Based on the allowable crosswind component and the available runway configuration(s), wind coverage is generated. This data point specifically denotes the wind coverage for all runways in all-weather conditions associated with the highest crosswind component denoted on the ALP.
Source(s)	ALPs
Source(s) Details	All-weather conditions and the highest crosswind component denoted
Date of Initial Data Collection	06/02/21
Update Cycle	None
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion of a new/updated ALP or new runway construction/realignment project
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Wind Coverage [Metric] MnSASP Hub/MnSASP Report Card: Wind Coverage [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Facilities and Services
MnDOT Aeronautics Responsibility	Airport Layout Plan Coordinator
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

6.3.4. RUNWAY/TAXIWAY DATA

Runways and taxiways represent the most important facilities at an airport for supporting aircraft activity. Maintaining attribute and obstruction data on these facilities is important for continuously evaluating the aeronautical capabilities present across the system and identifying any obstructions that present a safety risk to operating aircraft. The following tables document all the data points included in the MnSASP data related to runways and taxiways.

Table 6.30. Primary Runway

Data Assessment	Primary Runway
Data Point(s)	Primary Runway
Data Type	Tabular data
Description	The primary runway is generally defined as having the most critical design specifications and is typically equipped with the most sophisticated NAVAIDs. Each airport's primary runway is evaluated across several system and airport performance metrics (see Hub Presentation/Use for a list of all metrics related to the primary runway).
Source(s)	MnSASP Airport Inventory
Source(s) Details	As a part of the MnSASP Airport Inventory, airports are asked to identify their primary runway based on frequency of use and ability to accommodate the most sophisticated or demanding aircraft utilizing the facility.
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion of a runway improvement project
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Approaches to Airports [Metric], Adequate Navigational Systems [Metric] MnSASP Hub/Airport Performance: Primary Runway Width [Metric], Runway Lighting [Metric], Primary Runway Approaches [Metric], Navigation Systems [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data MnSASP Hub Airport Data/MN PCI Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.31. Runway Approach Type

Data Assessment	Runway Approach Type
Data Point(s)	Base End Approach Type Reciprocal End Approach Type
Data Type	Tabular data
Description	Runway approach procedures provide guidance for aircraft transitioning from the en route phase of a flight to the approach and landing phases. Each runway end can be equipped with different NAVAIDs that provide a different level of approach guidance for pilots. For simplicity, the MnSASP data records six distinct types of approaches for each runway end.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The data points are included in a downloadable "Runways" dataset available through the ADIP advanced search query. Refer to the key below for the field names containing the data points: - Base End Approach Type: Base Obstacle Part77 - Reciprocal End Approach Type: Reciprocal Obstacle Part77
Date of Initial Data Collection	09/30/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Development of a new or modification of an existing runway approach
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Approaches to Airports [Metric] MnSASP Hub/Airport Performance: Primary Runway Approaches [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Each record in ADIP's downloadable runway dataset includes data for each runway among all the airports selected in the advanced search. However, this dataset only provides the FAA site numbers (#) as the airport identifier for each runway record. For joining the FAA IDs to each runway record for updating the "Runway/Taxiway Data" table in the Hub, refer to the instructions included in **Section 6.4.2.3**.

Source: Kimley-Horn, 2022

Table 6.32. Runway Coordinates

Data Assessment	Runway Coordinates
Data Point(s)	Base End Latitude Base End Longitude Reciprocal End Latitude Reciprocal End Longitude
Data Type	Tabular data

Data Assessment	Runway Coordinates
Description	As a spatial point of reference, these data points record the latitude and longitude coordinates of each runway end. These coordinates are in DMS format.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The data points are included in a downloadable "Runways" dataset available through the ADIP advanced search query. Refer to the key below for the field names containing the data points: - Base End Latitude: Base Latitude DMS - Base End Longitude: Base Longitude DMS - Reciprocal End Latitude: Reciprocal Latitude DMS - Reciprocal End Longitude: Reciprocal Longitude DMS
Date of Initial Data Collection	09/30/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Runway extension, relocation, or realignment project
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Each record in ADIP's downloadable runway dataset includes data for each runway at all airports selected in the advanced search. However, this dataset only provides the FAA site numbers (#) as the airport identifier for each runway record. For joining the FAA IDs to each runway record for updating the "Runway/Taxiway Data" table in the Hub, refer to the instructions included in Section 6.4.2.3.

Source: Kimley-Horn, 2022

Table 6.33. Runway Identification

Data Assessment	Runway Identification
Data Point(s)	Runway ID Base End ID Reciprocal End ID
Data Type	Tabular data
Description	Runways are assigned a unique numeric identifier (e.g., 01/19, 18/36) based on the orientation of its magnetic azimuth (compass bearing). Parallel runway identifiers are further indicated by the letters L, R, C for left, right, center (respectively; e.g., 18L/36R, 04R/22L).
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public

Data Assessment	Runway Identification
Source(s) Details	The data points are included in a downloadable "Runways" dataset available through the ADIP advanced search query. Refer to the key below for the field names containing the data points: - Runway ID: Runway Id - Base End ID: Runway Id (all characters before the "/") - Reciprocal End ID: Runway Id (all characters after the "/")
Date of Initial Data Collection	09/30/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion of an ALP update or any type of reorientation
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Approaches to Airports [Metric], Adequate Navigational Systems [Metric], Airport Surfaces Clear of Obstructions [Metric] MnSASP Hub/Airport Performance: Primary Runway Width [Metric], Runway Lighting [Metric], Primary Runway Approaches [Metric], Navigation Systems [Metric] , Airport Surfaces [Metric] MnSASP Hub/MnSASP Report Card: Runway Approach [Metric], Navigation Systems [Metric], Airport Obstructions [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Each record in ADIP's downloadable runway dataset includes data for each runway at all airports selected in the advanced search. However, this dataset only provides the FAA site number (#) as the airport identifier for each runway record. For joining the FAA IDs to each runway record for updating the "Runway/Taxiway Data" table in the Hub, refer to the instructions included in Section 6.4.2.3.

Source: Kimley-Horn, 2022

Table 6.34. Runway Dimensions

Data Assessment	Runway Dimensions
Data Point(s)	Runway Length Runway Width
Data Type	Tabular data
Description	Runways are rectangular surfaces, so the dimensions can be adequate described by the length and width of the surface (measured in feet).
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The data points are included in a downloadable "Runways" dataset available through the ADIP advanced search query. Refer to the key below for the field names containing the data points: - Runway Length: Length

Data Assessment	Runway Dimensions
	- Runway Width: Width
Date of Initial Data Collection	09/30/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Applicable runway improvement project
Hub Presentation/Use	MnSASP Hub/Airport Performance: Primary Runway Width [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Each record in ADIP's downloadable runway dataset includes data for each runway among all the airports selected in the advanced search. However, this dataset only provides the FAA site numbers (#) as the airport identifier for each runway record. For joining the FAA IDs to each runway record for updating the "Runway/Taxiway Data" table in the Hub, refer to the instructions included in **Section 6.4.2.3**.

Source: Kimley-Horn, 2022

Table 6.35. Runway Surface Type and Condition

Data Assessment	Runway Surface Type and Condition
Data Point(s)	Surface Type/Condition
Data Type	Tabular data
Description	Runway surfaces can vary in material to include paved (e.g., concrete, asphalt) and unpaved (e.g., turf, dirt, water).[14] This data point identifies the surface type of each runway and provides a general note on the condition of the surface (i.e., excellent, good, fair, poor, failed).
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	Surface Type/Condition is included in a downloadable "Runways" dataset available through ADIP's advanced search query under the field name "Surface Type Condition."
Date of Initial Data Collection	09/30/2021
Update Cycle	Annual
Trigger Point(s) for Evaluation Outside of Update Cycle	Runway improvement project
Hub Presentation/Use	None

[14] Refer to the data dictionary available in ADIP's advanced facilities search for a complete and updated list of all runway surface types.

Data Assessment	Runway Surface Type and Condition
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Each record in ADIP's downloadable Runway dataset includes data for each runway at the airports selected in the advanced search. However, this dataset only includes the FAA site number (#) as the airport identifier for each runway record. For joining the FAA IDs to each runway record for updating the "Runway/Taxiway Data" table in the Hub, refer to the instructions included in **Section 6.4.2.3**.

Source: Kimley-Horn, 2022

Table 6.36. Runway Lighting

Data Assessment	Runway Lighting
Data Point(s)	Edge Light Intensity Base End VGSI Base End ALS Base End REIL Base End Centerline Lights Base End Touchdown Lights Reciprocal End VGSI Reciprocal End ALS Reciprocal End REIL Reciprocal End Centerline Lights Reciprocal End Touchdown Lights
Data Type	Tabular data
Description	Runway edge lighting intensity can range from low to high intensity and may also include non-standard lighting. Each runway end can also be equipped with one or more navigational aids for pilots including, but not limited to: visual glide slope indicator (VGSI), approach lighting system (ALS), runway end identifier lights (REILs), centerline lights, and touchdown lights.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The data points are included in a downloadable "Runways" dataset available through the ADIP advanced search query. Refer to the key below for the field names containing the data points: - Edge Light Intensity: Edge Light Intensity - Base End VGSI: Base VGSI - Base End ALS: Base ALS - Base End REIL: Base REIL - Base End Centerline Lights: Base Centerline Lights - Base End Touchdown Lights: Base Touchdown Lights - Reciprocal End VGSI: Reciprocal VGSI - Reciprocal End ALS: Reciprocal ALS - Reciprocal End REIL: Reciprocal REIL

Data Assessment	Runway Lighting
	- Reciprocal End Centerline Lights: Reciprocal Centerline Lights - Reciprocal End Touchdown Lights: Reciprocal Touchdown Lights
Date of Initial Data Collection	09/30/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation of runway lighting projects
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Navigational Systems [Metric] MnSASP Hub/Airport Performance: Runway Lighting [Metric], Navigation Systems [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Each record in ADIP's downloadable runway dataset includes data for each runway at the airports selected in the advanced search. However, this dataset only includes the FAA site number (#) as the airport identifier for each runway record. For joining the FAA IDs to each runway record for updating the "Runway/Taxiway Data" table in the Hub, refer to the instructions included in **Section 6.4.2.3**.

Source: Kimley-Horn, 2022

Table 6.37. Runway Visibility Minimums

Data Assessment	Runway Visibility Minimums
Data Point(s)	Base End Minimums Reciprocal End Minimums
Data Type	Tabular data
Description	Approach visibility minimums identify the shortest visible distance that a runway can be safely utilized for an aircraft approach. Each runway end can be equipped with different NAVAIDs that provide a different level of approach guidance and landing capability for pilots. Approach minimums are also determined by topography and terrain characteristics of the area surrounding the airport.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	ADIP maintains FAA-published approach plates associated with all active approach procedures available at airports that denotes the visibility minimums associated with each type of runway approach. See **Section 6.4.2.6** for instructions on obtaining visibility minimums from approach plates.
Date of Initial Data Collection	09/30/2021
Update Cycle	As required based on trigger point for evaluation

Data Assessment	Runway Visibility Minimums
Trigger Point(s) for Evaluation Outside of Update Cycle	Development of a new or modification of an existing runway approach
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Approaches to Airports [Metric] MnSASP Hub/Airport Performance: Primary Runway Approaches [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Runway visibility minimums can be pulled by reviewing FAA-published approach plates available in ADIP. See **Section 6.4.2.6** for instructions on pulling the visibility minimums from approach plates.

Source: Kimley-Horn, 2022

Table 6.38. Runway Obstructions

Data Assessment	Runway Obstructions
Data Point(s)	Base End Obstructions Reciprocal End Obstructions
Data Type	Tabular data
Description	The critical areas surrounding runways must be clear of obstructions. These data points store close-in obstructions (obstructions within 200 feet of a runway end) that are cited in an airport's last 5010 inspection.
Source(s)	FAA ADIP: https://adip.faa.gov/agis/public/#/public
Source(s) Details	The data points are included in a downloadable "Remarks" dataset available through the ADIP advanced search query. See **Section 6.4.2.5** for the Data Manipulation Plan associated with the "Remarks" dataset.
Date of Initial Data Collection	09/30/2021
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion of a runway obstruction removal project or comprehensive obstruction evaluation study
Hub Presentation/Use	MnSASP Hub/System Performance: Airport Surfaces Clear of Obstructions [Metric] MnSASP Hub/Airport Performance: Airport Surfaces [Metric] MnSASP Hub / MnSASP Report Card: Airport Obstructions [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	As a part of airport 5010 inspections, runways are evaluated for close-in obstructions, which present the most acute risk to arriving/departing aircraft.

Data Assessment	Runway Obstructions
	This runway obstruction information is published in the airport's 5010 report under the Remarks section. FAA's ADIP database organizes the Remarks data into a separate downloadable dataset that can be pulled using the advanced facilities search query in ADIP. Refer to **Section 6.4.2.5** for instructions on pulling the Remarks data and manipulating the dataset to conform with the MnSASP data.

Source: Kimley-Horn, 2022

Table 6.39. Taxiway Attributes

Data Assessment	Taxiway Attributes
Data Point(s)	Taxiway Type Taxiway Width
Data Type	Tabular data
Description	Taxiways serve as intermediary connections to connect aircraft between parking/storage facilities and runways. There are several types of taxiways that provide for differing levels of aircraft movement capability: full parallel taxiways, partial parallel taxiways, and connector taxiways. The type of taxiway most appropriate for a specific airport is dependent on the type and frequency of aviation activity witnessed and airside geometry.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Taxiway improvement project
Presentation/Use	MnSASP Hub/Airport Performance: Parallel Taxiway [Metric], Taxiway Width [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Runway/Taxiway Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

6.3.5. AIRCRAFT STORAGE

MnDOT Aeronautics can use aircraft storage capacity and occupancy data to identify specific airports, regions, or airport classifications where capacity needs exist or to measure the total capacity across the system. Aircraft storage options such as tiedowns, t-hangars, and box hangars are available across the system. The following tables document all the data points included in the MnSASP data related to aircraft storage.

Table 6.40. Hangars

Data Assessment	Hangars
Data Point(s)	T-Hangar Total Spaces T-Hangar Spaces Occupied Box Hangar - Based Aircraft Total Spaces Box Hangar - Based Aircraft Heat Box Hangar - Based Aircraft Occupied Box Hangar - Based Aircraft Square Footage Box Hangar - Transient Aircraft Total Spaces Box Hangar - Transient Aircraft Heating Box Hangar - Transient Aircraft Square Footage Total Hangar Spaces Total Hangar Spaces Occupied T-Hangar Shortage Box Hangar Shortage Hangar Shortage Description Hangar Waitlist
Data Type	Tabular data
Description	Aircraft hangars are used to store aircraft indoors while not in-use. Two types of hangars are common in Minnesota: T-hangars for small GA aircraft and box hangars for large GA and commercial service aircraft including jets. In Minnesota, many aircraft hangars are climate-controlled to avoid inclement weather and protect against the cold winter season. Airports without excess capacity (i.e., no available spaces) may maintain a hangar waitlist to track needs and contact individuals seeking a hangar when space becomes available.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	New hangar construction
Hub Presentation/Use	MnSASP Hub/Airport Performance: Transient Aircraft Storage [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Aircraft Storage
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.41. Tiedowns

Data Assessment	Tiedowns
Data Point(s)	Paved Tiedown - Based Aircraft Spaces Paved Tiedown - Based Aircraft Spaces Occupied Paved Tiedown - Transient Aircraft Spaces Grass Tiedown - Based Aircraft Spaces Grass Tiedown - Based Aircraft Spaces Occupied Grass Tiedown - Transient Aircraft Spaces Total Tiedown Spaces Total Tiedown Spaces Occupied
Data Type	Tabular data
Description	Aircraft tiedowns allow for both based and transient aircraft to park outdoors for short-term and long-term use. Tie-downs may be installed on paved aprons or grass/turn areas.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	Addition of new tiedown spaces, apron improvement project, or a hangar construction project
Hub Presentation/Use	MnSASP Hub/Airport Performance: Aircraft Parking [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Aircraft Storage
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

6.3.6. PLANNING AND SPECIAL STUDIES

Airport planning efforts evaluate the current conditions at airports against existing and forecasted future aviation activities; state, federal, and local requirements; and other factors to identify future improvement needs. Because airport improvements typically rely on public funds, it is important for MnDOT Aeronautics to maintain records of all aviation facility planning documentation. MnDOT Aeronautics can use this documentation to make informed decisions about project priorities, resource allocation, and grant management. The following tables document all the data points included in the MnSASP data related to planning and special studies completed at system airports.

Table 6.42. Clear Zone Information (Tabular Data)

Data Assessment	Clear Zone Information
Data Point(s)	Clear Zone Depicted on ALP Clear Zone Ownership Clear Zone Ownership Description Clear Zone Maintenance Description
Data Type	Tabular data (associated spatial layer summarized in Table 6.61)
Description	Clear zones are trapezoidal shapes beyond each runway end that should be clear of all airspace obstructions and owned in fee simple to provide for the highest level of control and airport land use compatibility. These surfaces are based on the approach type at a given runway end and Part 77 surfaces (primary surface and approach surface). Per the MnDOT Clear Zone Policy, airport owners are encouraged to purchase clear zones in fee title or complete a MnDOT-approved Clear Zone Acquisition Plan (CZAP).
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	- Clear zones should be confirmed to be depicted on ALP during ALP approval - Clear zone ownership/description should be evaluated upon clear zone acqusition - Clear zone maintenance should be evaluated in conjunction with clear zone acqusition or an obstruction removal project
Hub Presentation/Use	MnSASP Hub/Airport Performance: Clear Zone Ownership [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	N/A

Source: Kimley-Horn, 2022

Table 6.43. Economic Impact

Data Assessment	Economic Impact
Data Point(s)	Economic Impact - Total Employment Economic Impact - Total Payroll Economic Impact - Total Spending Total Annually Economic Activity Economic Impact Brochure Link
Data Type	Tabular data

Data Assessment	Economic Impact
Description	Airports generate economic benefit to local, regional, and statewide economies through on-airport activities and visitor spending measured in terms of annual employment, payroll, spending, and economic activity.
Source(s)	MnDOT Aeronautics Statewide Airport Economic Impact Study (2019): http://www.dot.state.mn.us/airport-economic-study/
Source(s) Details	The Statewide Airport Economic Impact Study Technical Report includes all the economic impact data for each airport.
Date of Initial Data Collection	10/28/2021 (2019 Statewide Airport Economic Impact Study)
Update Cycle	Completion of a new Statewide Airport Economic Impact Study (anticipated every five to seven years)
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/System Performance: Economic Impact [Indicator] MnSASP Hub / Airport Dashboards: Airport Economic Impact Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.44. Federal Funding

Data Assessment	Federal Funding
Data Point(s)	Federal Funds
Data Type	Tabular data
Description	Public funds are often used to support airport improvement projects, operations, and maintenance of existing facilities. For airports included in the NPIAS, this funding can come from the FAA's AIP. This data point reports the average AIP funding received over the last four years.
Source(s)	FAA AIP Grant Histories: https://www.faa.gov/airports/aip/grant_histories/lookup/
Source(s) Details	None
Date of Initial Data Collection	3/15/2021 (Reflects average AIP funding from 2017-2020)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None

Data Assessment	Federal Funding
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.2.7** for guidance on pulling and organizing the AIP data and organizing the dataset to conform with the MnSASP data.

Source: Kimley-Horn, 2022

Table 6.45. Land Development / Use

Data Assessment	Land Development / Use
Data Point(s)	Available Land for Development Available Land for Development Description Available Land for Development - Water Available Available Land for Development - Gas Available Available Land for Development - Electric Available Available Land for Development - Sewer Available Available Land for Development - ALP Indicated Limitations for Development Limitations for Development Description Land Use or Transportation Planning Land Use or Transportation Planning Description
Data Type	Tabular data
Description	The ability to complete airport development projects is often dictated by the land available for use and the utilities available to support proposed facilities and services. This type of planning is typically completed as a part of an ALP and/or master plan update. Additionally, airports may be included in broader county/municipality planning efforts as documented in land use and transportation plans.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Biennially
Trigger Point(s) for Evaluation Outside of Update Cycle	ALP and/or master plan updates
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies

Data Assessment	Land Development / Use
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.46. Local Obstruction Study

Data Assessment	Local Obstruction Study
Data Point(s)	Local Obstruction Study Local Obstruction Study Year
Data Type	Tabular data
Description	Airports may complete an obstruction study (independent of the close-in obstruction evaluation completed with 5010 inspections) to detail any obstacles into critical airspace on or in the vicinity of airports that can pose a risk to aircraft operations and people and property on the ground.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion of a local obstruction study or ALP with AGIS survey
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.47. Master Plan / Airport Layout Plan

Data Assessment	Master Plan / ALP
Data Point(s)	Master Plan Master Plan Year ALP Narrative ALP Narrative Year ALP No Narrative ALP No Narrative Year

Data Assessment	Master Plan / ALP
Data Type	Tabular data
Description	ALPs provide a graphical representation of existing/planned facilities and design standards at an airport. An airport master plan serves as an airport's long-term strategic plan to guide future development. In lieu of completing a comprehensive master plan, the ALPs may also be completed in conjunction with a narrative report to document existing conditions and future facility needs.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	None
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion and MnDOT approval of a master plan, ALP, and/or narrative report
Hub Presentation/Use	MnSASP Hub/System Performance: Up-to-Date Planning Documents [Metric] MnSASP Hub/Airport Performance: Airport Layout Plans [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport Layout Plan Coordinator
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.48. Minimum Standards

Data Assessment	Minimum Standards
Data Point(s)	Minimum Standards Minimum Standards Description
Data Type	Tabular data
Description	Minimum standards document the minimum requirements that must be met by all airport users to provide a safe operating environment; protect the public, airport facilities, users, and tenants; and provide for fair and equitable commercial activities.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	Bienially
Trigger Point(s) for Evaluation Outside of Update Cycle	Adoption of new minimum standards

Data Assessment	Minimum Standards
Hub Presentation/Use	MnSASP Hub/Airport Performance: Minimum Standards [Metric]
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.49. Part 150 Study

Data Assessment	Part 150 Study
Data Point(s)	Part 150 Part 150 Year
Data Type	Tabular data
Description	Airports complete a Part 150 Noise Compatibility Study to determine to measure existing and future noise generated by an airports and its impacts on the surrounding community. These studies also identify mitigation techniques to reduce noise over sensitive airports and provide recommended actions to enhance airport land use compatibility. Part 150 studies include noise exposure maps to depict the volume of noise experienced in the vicinity of an airport.
Source(s)	MnSASP Airport Inventory
Source(s) Details	None
Date of Initial Data Collection	06/02/21 (2022 MnSASP Update)
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Completion and approval of a Part 150 Noise Compatibility Study
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.50. Pavement Condition Report

Data Assessment	Pavement Condition Report
Data Point(s)	Pavement Condition Report
Data Type	Tabular data (web links)
Description	MnDOT Aeronautics oversees the Airport Pavement Management System (APMS) for nearly all paved airports in Minnesota.[15] This includes completing periodic inspections of all airfield pavement at study airports to determine the pavement condition index (PCI). This evaluation is published in individual pavement condition reports completed for each airport participating in the APMS.
Source(s)	MnDOT Aeronautics APMS[16]
Source(s) Details	The APMS is inclusive of all airports in the state aviation system (see Date of Initial Data Collection).
Date of Initial Data Collection	MnDOT Aeronautics Airport Pavement Management System: 12/01/2021 (includes 103 paved airports in Minnesota not managed by the Metropolitan Airports Commission [MAC])
Update Cycle	Annually for a third of the airports in each system cycle
Trigger Point(s) for Evaluation Outside of Update Cycle	Completed airport pavement inspection
Hub Presentation/Use	MnSASP Hub/System Performance: PCI [Metric] MnSASP Hub / Airport Geodata: Airfield Pavement Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	MnDOT APMS Coordinator
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.51. State and Local Funding

Data Assessment	State and Local Funding
Data Point(s)	State Funds Local Funds
Data Type	Tabular data
Description	Public funds are generally used to support airport capital improvements projects and ongoing operating expenses at nearly all publicly owned, public use airports in Minnesota. This funding can come from state and/or local sources.

[15] MnDOT's APMS includes paved airports in the Minnesota state aviation system that are not managed by the MAC.
[16] Pavement management data collected through the MnDOT APMS is available online at https://www.dot.state.mn.us/aero/airportdevelopment/pavementmanagement.html (accessed December 2021).

Data Assessment	State and Local Funding
	This data point reports the average historical funding received from state and local government sources in the last four years.
Source(s)	MnDOT Aeronautics ACE database
Source(s) Details	The ACE database generates a historical report of expenditures in an Excel format. See **Section 6.4.2.7** for manipulating this Excel output for calculating the total state and local funding by state system airport.
Date of Initial Data Collection	04/01/2021
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	None
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Planning and Special Studies
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.2.7** for manipulating the Excel output generated by ACE for calculating the total state and local funding by system airport.

Source: Kimley-Horn, 2022

6.3.7. AVIATION WEATHER STATIONS

Weather reporting facilities (i.e., AWOS/ASOS) broadcast weather information over the radio as a flight planning aid for pilots. The following tables document all the data points included in the MnSASP data related to aviation weather stations in the system.

Table 6.52. Weather Station Type

Data Assessment	Weather Station Type
Data Point(s)	Type
Data Type	Point layer/Tabular data
Description	Weather reporting facilities broadcast weather information over a radio frequency for pilots to use when flying. The two types of facilities include an AWOS and ASOS (denoted in the data point "Type").
Source(s)	FAA Surface Weather Observation Stations: https://www.faa.gov/air_traffic/weather/asos/?state=MN
Source(s) Details	The FAA's Surface Weather Observation Stations webpage lists all the active AWOS/ASOS weather stations in Minnesota.
Date of Initial Data Collection	09/01/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation or decommissioning of an AWOS/ASOS

Data Assessment	Weather Station Type
Hub Presentation/Use	MnSASP Hub/Airport Performance: Weather Reporting [Metric] MnSASP Hub / Airport Geodata: Weather Stations & NAVAIDs Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Aviation Weather Stations
MnDOT Aeronautics Responsibility	Airport development staff
Data Manipulation Plan from Raw State (if applicable)	None. Additional information regarding the MnSASP Weather Station Visual Assessment is available in **Appendix C. Minnesota NAVAIDs** of the 2022 MnSASP Technical Report.

Source: Kimley-Horn, 2022

Table 6.53. Weather Stations Coordinates

Data Assessment	Weather Station Coordinates
Data Point(s)	Latitude Longitude
Data Type	Spatial data (points)
Description	Coordinate data for the aviation weather stations in Minnesota (maintained as latitude/longitude data in ADIP) is used to identify the location of each weather facility and serves as the main reference for plotting each weather station point in the "MN Aviation Weather Stations" layer.
Source(s)	MnDOT Aeronautics
Source(s) Details	As a part of the MnSASP Weather Station Visual Assessment, all weather stations were validated against the FAA's ADIP.
Date of Initial Data Collection	09/01/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation or decommissioning of an AWOS/ASOS
Hub Presentation/Use	MnSASP Hub/Airport Geodata: Weather Stations & NAVAIDs Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Aviation Weather Stations
MnDOT Aeronautics Responsibility	Airport development staff
Data Manipulation Plan from Raw State (if applicable)	Refer to **Section 6.4.1.1** for converting the coordinates in DMS format to decimal degrees to conform with the MnSASP data parameters.

Source: Kimley-Horn, 2022

Table 6.54. Live Weather Station Data

Data Assessment	Live Weather Station Data
Data Point(s)	METAR Data Link
Data Type	Tabular data (web links)
Description	Live weather readings from each weather station in the system can be accessed through the web links populated in the data point "METAR Data Link." These data are in the format of METAR reports.

Data Assessment	Live Weather Station Data
Source(s)	National Oceanic and Atmospheric Administration (NOAA) Aviation Weather Center (AWC) Meteorological Aerodrome Reports (METARs): https://www.aviationweather.gov/metar
Source(s) Details	None
Date of Initial Data Collection	09/01/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation or decommissioning of an AWOS/ASOS
Hub Presentation/Use	MnSASP Hub/Airport Performance: Weather Reporting [Metric] MnSASP Hub / Airport Geodata: Weather Stations & NAVAIDs Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Aviation Weather Stations
MnDOT Aeronautics Responsibility	Airport development staff
Data Manipulation Plan from Raw State (if applicable)	None

Source: Kimley-Horn, 2022

Table 6.55. Weather Station Visual Assessment

Data Assessment	Weather Station Visual Assessment
Data Point(s)	Validation On Airport? Remarks Sighting Assessment
Data Type	Tabular data
Description	As a part of the 2022 MnSASP, a visual assessment was completed for all weather stations to identify any obstructions within their critical area based on FAA siting requirements. The findings of this visual assessment are documented within these data points: - Validation: Confirming that the weather station is operational in the system - On Airport: Denoting whether the airport is on airport property - Remarks: Additional notes on validating the weather station and its location - Sighting Assessment: Notes any obstructions within the critical areas surrounding the weather stations[17]
Source(s)	MnSASP Weather Station Visual Assessment
Source(s) Details	As a part of the MnSASP Weather Station Visual Assessment, all weather stations were validated against information provided in the FAA's ADIP.
Date of Initial Data Collection	09/01/2021
Update Cycle	Triennially
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation or decommissioning of an AWOS/ASOS

[17] *Critical areas around aviation weather stations are defined per FAA Order 6560.20C.*

Data Assessment	Weather Station Visual Assessment
Hub Presentation/Use	MnSASP Hub/Airport Performance: Weather Reporting [Metric] MnSASP Hub / Airport Geodata: Weather Stations & NAVAIDs Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Aviation Weather Stations
MnDOT Aeronautics Responsibility	Airport development staff
Data Manipulation Plan from Raw State (if applicable)	The visual assessment was a manual process that utilized Google Earth satellite imagery to evaluate each weather station for obstructions that are potentially contributing to errant data being collected. Additional information regarding the MnSASP Weather Station Visual Assessment is available in **Appendix C** of the 2022 MnSASP Technical Report.

Source: Kimley-Horn, 2022

6.3.8. AIRFIELD PAVEMENT

Airfield pavement represents the most important asset to an airport for supporting aircraft activity. It can also represent the greatest expense for an airport to maintain. To help airports preserve this critical aviation facility, MnDOT Aeronautics maintains the APMS to evaluate all airside pavement and develop prioritized recommendations for their ongoing maintenance. This includes completing periodic inspections of all airfield pavement across the system to make informed decisions about pavement preservation needs. The following tables document all the data points included in the MnSASP data related to airfield pavement.

Table 6.56. Airfield Pavement

Data Assessment	Airfield Pavement
Data Point(s)	FAA ID Branch ID Section ID Pavement Use FOD Index PCI Assessment Surface Area (sqft) FOD Inspection Date PCI Inspection Date Shape
Data Type	Polygon layer/Tabular data
Description	MnDOT Aeronautics oversees an APMS for nearly all paved airports in Minnesota.[18] This includes completing periodic inspections of all airfield pavement across the airports in the system and evaluating pavement condition by individual segment (identified as the data point “Section ID”). Pavement condition is evaluated on a scale known as PCI ranging from zero to 100, with zero indicating complete failure and 100 indicating perfect condition (data point “PCI”). Additionally, pavement is also evaluated by the susceptibility of foreign object debris (FOD) created from the pavement (data point “FOD Index”).

[18] MnDOT’s APMS includes paved airports in the Minnesota state aviation system that are not managed by the MAC].

Data Assessment	Airfield Pavement
Source(s)	MnDOT Aeronautics APMS[19]
Source(s) Details	This layer includes 103 paved airports in Minnesota not managed by the MAC.
Date of Initial Data Collection	MnDOT Aeronautics Airport Pavement Management System: 12/01/2021
Update Cycle	Annually for a third of the airports in each system cycle
Trigger Point(s) for Evaluation Outside of Update Cycle	Airfield pavement improvement project
Hub Presentation/Use	MnSASP Hub/System Performance: PCI [Metric] MnSASP Hub/Airport Geodata: Airfield Pavement Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Airfield Pavement
MnDOT Aeronautics Responsibility	MnDOT Aeronautics Pavement Management staff
Data Manipulation Plan from Raw State (if applicable)	The APMS uses PAVER to map all airfield pavement at study airports and store data collected during pavement inspections (PCI, FOD). Upon completion of a new airport pavement inspection cycle, the updated inspection data needs to be reflected in the existing layer in the Hub. Nearly all the data maintained in PAVER have the same field names as the existing layer in the MnSASP data (except for FAA ID, which is recorded as NetworkID in PAVER). For adding new pavement segments, append the new polygon data to the existing layer in the Hub. Note that there are several fields in the existing layer that were added and populated through manual work and code. See below for populating these fields: - Pavement Use: Manual entry - Surface Area (sqft): Use the “Calculate” function in ArcGIS Online to calculate the square footage for the pavement segments (refer to the MnSASP Hub User’s Guide for guidance on using the function)

Source: Kimley-Horn, 2022

6.3.9. NAVAIDS

NAVAIDs are critical facilities to maintain in the system for pilots to safety and efficiently navigate through airspace and provide guidance in low visibility conditions including nighttime and inclement weather. The following tables document all the data points included in the MnSASP data related to NAVAIDs in the system.

Table 6.57. Instrument Landing System

Data Assessment	Instrument Landing System
Data Point(s)	Type NAVAID Name Latitude Longitude Magnetic Variation Elevation (ft)

[19] *MnDOT Aeronautics AMPS data is available online at https://www.dot.state.mn.us/aero/airportdevelopment/pavementmanagement.html (accessed December 2021).*

Data Assessment	Instrument Landing System
	City State Owner Operator Ownership Type Facility ID
Data Type	Point layer / Tabular data
Description	An airport ILS is a radio-based NAVAID for short-range guidance with aircraft landing in low-visibility conditions.
Source(s)	MnDOT Aeronautics Airport Development Staff ArcGIS analysis
Source(s) Details	Airport development staff maintains a data repository of state-managed NAVAIDs in Minnesota including mapping coordinate data. Refer to the MnSASP Hub User's Guide for guidance on mapping coordinate data in the Hub.
Date of Initial Data Collection	08/04/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation of a new NAVAID or decommissioning of existing equipment
Hub Presentation/Use	MnSASP Hub/Airport Geodata: Weather Stations & NAVAIDs Dashboard
MnSASP Hub Layer/Table (if applicable)	NAVAIDs/Instrument Landing System (ILS)
MnDOT Aeronautics Responsibility	Navigation systems engineering team
Data Manipulation Plan from Raw State (if applicable)	Coordinate data (latitude, longitude) is usually recorded in DMS format, which is incompatible for the MnSASP data (plotting the points in ArcGIS). See **Section 6.4.1** for instructions on converting from DMS to decimal degrees to conform with the MnSASP data parameters.

Source: Kimley-Horn, 2022

Table 6.58. VOR/DME/TACAN/VORTAC Location Points

Data Assessment	VOR/DME/TACAN/VORTAC Location Points
Data Point(s)	Type Latitude Longitude Magnetic Variation Facility Name Database Elevation (ft) Facility ID NAVAID Name City Validation Date FAA Region Owner Operator

Data Assessment	VOR/DME/TACAN/VORTAC Location Points
	Class Service Coverages (nm) Hours of Operation ARTCC Channel Frequency Status Ownership Type
Data Type	Point layer/Tabular data
Description	This layer stores the location points for all active VOR/DME, TACAN, and VORTAC stations in Minnesota. Very high frequency omni-directional range (VOR) are radio-based NAVAIDs used for route navigation. These systems are often paired with distance measuring equipment (DME) to provide pilots with the distance to/from a VOR station. A tactical air navigation system (TACAN) is a specialized NAVAID that provides similar navigational guidance as VOR/DME but are specifically used to support military operations. Co-located VORs and TACANs are known as VORTACs.
Source(s)	- MnDOT Airport Development Staff - ArcGIS analysis
Source(s) Details	Airport development staff maintains a data repository of state-managed NAVAIDs in Minnesota including coordinate data. Refer to the MnSASP Hub User's Guide for guidance on mapping the location points in the Hub.
Date of Initial Data Collection	08/04/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation of a new NAVAID or decommissioning of existing equipment
Hub Presentation/Use	MnSASP Hub/Airport Geodata: Weather Stations & NAVAIDs Dashboard
MnSASP Hub Layer/Table (if applicable)	NAVAIDs/VOR/DME/TACAN/VORTAC Location Points
MnDOT Aeronautics Responsibility	Navigation systems engineering team
Data Manipulation Plan from Raw State (if applicable)	The coordinate data (Latitude, Longitude) is usually recorded in DMS format, which is incompatible for the MnSASP data (plotting the points in ArcGIS). See **Section 6.4.1** for instructions on converting from DMS to decimal degrees to conform with the MnSASP data parameters.

Source: Kimley-Horn, 2022

Table 6.59. VOR/DME/TACAN/VORTAC Service Buffers

Data Assessment	VOR/DME/TACAN/VORTAC Service Buffers
Data Point(s)	Database Type Latitude Longitude Magnetic Variation Facility Name Elevation (ft)

Data Assessment	VOR/DME/TACAN/VORTAC Service Buffers
	Facility ID NAVAID Name City Validation Date FAA Region Owner Operator Class Hours of Operation ARTCC Channel Frequency Status Buffer Distance (nm) Minimum Elevation (ft) Maximum Elevation (ft) Ownership Type
Data Type	Spatial data (polygons)
Description	This layer stores the service buffers for all active VOR/DME, TACAN, and VORTAC stations in Minnesota. VOR are radio-based NAVAIDs used for route navigation. These systems are often paired with DME to provide pilots with the distance to/from a VOR station. A TACAN system is a specialized NAVAID that provide similar navigational guidance as VOR/DME but specifically support military operations. Co-located VORs and TACANs are known as VORTACs.
Source(s)	- MnDOT Airport Development Staff - ArcGIS analyses
Source(s) Details	Airport development staff maintains a data repository of state-managed NAVAIDs in Minnesota. Refer to **Section 6.4.1.4** for assigning the service coverages to each NAVAID. Refer to the MnSASP Hub User's Guide for guidance on mapping the service buffers (polygons) in the Hub.
Date of Initial Data Collection	08/04/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Installation of a new NAVAID or decommissioning of existing equipment
Hub Presentation/Use	MnSASP Hub/Airport Geodata: Weather Stations & NAVAIDs Dashboard
MnSASP Hub Layer/Table (if applicable)	NAVAIDs/VOR/DME/TACAN/VORTAC Service Buffers
MnDOT Aeronautics Responsibility	Navigation systems engineering team
Data Manipulation Plan from Raw State (if applicable)	The coordinate data (Latitude, Longitude) is usually recorded in DMS format, which is incompatible for the MnSASP data (plotting the points in ArcGIS). See **Section 6.4.1** for instructions on converting from DMS to decimal degrees to conform with the MnSASP data parameters.

Source: Kimley-Horn, 2022

6.3.10. AIRPORT ZONING

In accordance with Minnesota Statutes and public airport licensing requirements, airport sponsors must have an established zoning authority for the airport, or be in the process of doing so, to receive various types of state funding.[20] Additionally, communities within airport influence areas must also enact airport compatible zoning in accordance with state law. The following table documents all the data points included in the MnSASP data related to airport zoning.

Table 6.60. Zoning

Data Assessment	Zoning
Data Point(s)	Zone Type Shape Area (acres) Shape Year
Data Type	Spatial data (polygons)
Description	Each airport adopts a safety zoning ordinance that in conformance with the standards in Minnesota Rules Chapter 8800.2400. Safety zoning ordinances define the airport compatible land uses in and around airports that must be restricted to enhance the operational safety of aircraft and protect people and property. Minnesota Rules defines three types of zones with different land use regulation: Zone A, Zone B, and Zone C. Refer to **Section 6.4.1.5** for a sample graphic depicting each zone type.
Source(s)	MnDOT Aeronautics Zoning Information Warehouse: https://www.dot.state.mn.us/aero/planning/zoning-warehouse.html
Source(s) Details	None
Date of Initial Data Collection	08/17/2021 ("Year" data point denotes the year of the most recent update to each airport's zoning ordinance)
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	- Updates to airport zoning ordinances - Airport land acquisition
Hub Presentation/Use	MnSASP Hub/System Performance: Adequate Safety Zoning Ordinances [Metric] MnSASP Hub/Airport Performance: Airport Zoning [Metric] MnSASP Hub/Airport Geodata: Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	MnSASP Hub Airport Data/Airport Zoning
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	For updating this layer, remove and append the new polygon data to the existing layer in the Hub. Refer to the MnSASP Hub User's Guide for guidance on mapping the polygons in the Hub. Note that there are several fields in the existing layer that were added and populated through manual work and code: - Zone Type, Year: Manual entry - Shape Area (acres): Use the "Calculate" function in ArcGIS Online to calculate the area of each zone in acres (refer to the MnSASP Hub User's Guide for guidance on using the function)

Source: Kimley-Horn, 2022

[20] *Per Minnesota Statutes Chapter 360.061 to 360.074.*

6.3.11. AIRPORT SAFETY AREAS (SPATIAL LAYERS)[21]

Airports must regulate the airspace in and around aircraft movement areas to keep clear of obstructions. The following tables document all the data layers included in the MnSASP data related to airport safety areas.[22]

Table 6.61. Clear Zones (Spatial Layers)

Data Assessment	Clear Zones
Data Layers	Clear Zones (Existing) Clear Zones (Ultimate)
Data Type	Spatial data (polygons)
Description	Clear zones are trapezoidal areas beyond each runway end that must be clear of all airspace obstructions and zoned appropriated to prevent the congregation of people. These surfaces are based on the approach type at a given runway end and Part 77 surfaces (primary and approach surfaces, see Table 6.62 for details). Per the MnDOT Clear Zone Policy, airport owners are required to purchase clear zones in fee title or have a MnDOT-approved CZAP. The clear zone spatial layer in the MnSASP data is organized by the timeframe that the clear zones are applicable to (i.e., existing or ultimate airport build-out conditions).
Source(s)	Airports (via ALPs and ArcGIS analyses)
Source(s) Details	The initial mapping of the clear zones involved the following steps: - Review ALPs and FAA ADIP to obtain the approach type and runway end coordinates - Calculate all primary surface and approach surface dimensions across the system (Refer to Appendix 7 of the FAA AC 150/5300-13A for Part 77 dimensional standards[23]) Primary and approach surface dimensions and the approach type were used to calculate the dimensions of the clear zone surfaces for each runway end (See Section 6.4.1.6 for clear zone dimensional standards). See Section 6.4.1.7 for a summary of the initial mapping tasks completed during the 2022 MnSASP. Moving forward, MnDOT Aeronautics can require that airports and their consultants provide shapefiles of their clear zones for the airport's existing and ultimate build-out conditions during ALP development/updates (electronic ALP or eALP).
Date of Initial Data Collection	12/15/2021
Update Cycle	As required based on trigger point for evaluation

[21] MnDOT Aeronautics will only be responsible for updating the Hub with the new polygon data provided by airports. It is the responsibility of the airports to develop and provide the polygon layers for MnDOT Aeronautics to upload into the MnSASP Hub. Refer to the MnSASP Hub User's Guide for guidance on importing the new layers into the MnSASP Hub.

[22] This section details the content and organization of the Airport Safety Areas feature layer in the MnSASP data, which includes individual polygon layers for each type of safety area and the timeframe that the safety area is applicable to (i.e., existing or future airport build-out conditions).

[23] The latest version of AC 150/5300-13A can be viewed at the following website: https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5300-13

Data Assessment	Clear Zones
Trigger Point(s) for Evaluation Outside of Update Cycle	- Completion of a ALP or master plan - Updates to runway category, visibility minimums, or approach type
Hub Presentation/Use	MnSASP Hub/Airport Geodata: Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	Airport Safety Areas/Clear Zones (Existing) Airport Safety Areas Clear Zones (Ultimate)
MnDOT Aeronautics Responsibility	Airport planning staff[24]
Data Manipulation Plan from Raw State (if applicable)	Clear zones need to be remapped in GIS in conjunction with a triggering event.[25] See **Section 6.4.1.7** for a summary of the initial mapping tasks completed during the 2022 MnSASP.

Source: Kimley-Horn, 2022

Table 6.62. Part 77 Surfaces

Data Assessment	Part 77 Surfaces
Data Layers	Primary Surface (Existing) Primary Surface (Ultimate) Horizontal Surface (Existing) Horizontal Surface (Ultimate) Conical Surface (Existing) Conical Surface (Ultimate) Approach Surface (Existing) Approach Surface (Ultimate)
Data Type	Spatial data (polygons)
Description	49 CFR Part 77 defines imaginary surfaces in and around airports that are deemed sensitive and must be kept clear of obstructions to maintain safe, navigable airspace. These surfaces are tied with runways to protect aircraft departures and arrivals. All Part 77 spatial layers in the MnSASP data are organized by the timeframe that the surfaces are applicable to (i.e., existing or ultimate airport build-out conditions).
Source(s)	Airports (via ALPs and ArcGIS analyses)
Source(s) Details	The initial mapping of Part 77 surfaces involved: - Obtain runway data (design characteristics and the approach category) from the FAA's ADIP and ALPs - Evaluate these dimensions against the FAA's runway design standards (Refer to Appendix 7 of the FAA AC 150/5300-13A[26]) - Calculate the dimensions and map all Part 77 surfaces See **Section 6.4.1.7** for a summary of the initial mapping tasks completed during the 2022 MnSASP.

[24] MnDOT Aeronautics will only be responsible for updating the Hub with the new polygon data provided by airports. It is the responsibility of the airports to develop and provide the polygon layers for MnDOT Aeronautics to upload into the MnSASP Hub.
[25] Ibid.
[26] The latest version of AC 150/5300-13A can be viewed at https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5300-13

Data Assessment	Part 77 Surfaces
	Moving forward, MnDOT Aeronautics can require that airports and their consultants provide shapefiles of all Part 77 surfaces for existing and ultimate build-out conditions as depicted on their latest ALP (eALPs).
Date of Initial Data Collection	12/15/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Change to applicable dimensions
Hub Presentation/Use	MnSASP Hub/Airport Geodata: Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	Airport Safety Areas
MnDOT Aeronautics Responsibility	Airport planning staff[27]
Data Manipulation Plan from Raw State (if applicable)	Part 77 surfaces need to be remapped in GIS in conjunction with a triggering event.[28] See **Section 6.4.1.7** for a summary of the initial mapping tasks completed during the 2022 MnSASP.

Source: Kimley-Horn, 2022

Table 6.63. Runway Protection Zones (RPZs)

Data Assessment	RPZs
Data Layers	RPZ (Existing) RPZ (Ultimate)
Data Type	Spatial data (polygons)
Description	RPZs are trapezoidal areas off each runway end that are kept clear of obstructions to enhance the protection of people and property on the ground from errant aircraft activity, particularly in cases where aircraft land or crash beyond the runway end. All RPZ spatial layers in the MnSASP data are organized by the timeframe that the surfaces are applicable to (i.e., existing or ultimate airport build-out conditions).
Source(s)	Airports (via ALPs and ArcGIS analyses)
Source(s) Details	The initial mapping of RPZs involved: - Obtain runway data (design characteristics and the approach category) from the FAA's ADIP and ALPs - Evaluate dimensions against the FAA's runway design standards (Refer to Appendix 7 of the FAA AC]150/5300-13A[29]) - Calculate the dimensions and map all RPZs across the system See **Section 6.4.1.7** for a summary of the initial mapping tasks completed during the 2022 MnSASP. Moving forward, MnDOT Aeronautics can require that

[27] MnDOT Aeronautics will only be responsible for updating the Hub with the new polygon data provided by airports. It is the responsibility of the airports to develop and provide the polygon layers for MnDOT Aeronautics to upload into the MnSASP Hub.
[28] Ibid.
[29] The latest version of AC 150/5300-13A can be viewed at https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5300-13

Data Assessment	RPZs
	airports provide shapefiles of their RPZs for the airport's existing and ultimate build-out conditions as depicted on their latest ALP (eALPs).
Date of Initial Data Collection	12/15/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Changes to applicable RPZ dimensions
Hub Presentation/Use	MnSASP Hub/Airport Geodata: Airport Safety Areas Dashboard
MnSASP Hub Layer/Table (if applicable)	Airport Safety Areas
MnDOT Aeronautics Responsibility	Airport planning staff[30]
Data Manipulation Plan from Raw State (if applicable)	RPZs need to be remapped in GIS in conjunction with a triggering event.[31] See **Section 6.4.1.7** for a summary of the initial mapping tasks completed during the 2022 MnSASP.

Source: Kimley-Horn, 2022

6.3.12. SYSTEM INDICATORS

The 2022 MnSASP identified several indicators of the system's activity, available aircraft services, and pilots based in Minnesota. The following tables document all the data points included in the MnSASP data related to system indicators.

Table 6.64. Aviation Fatalities

Data Assessment	Aviation Fatalities
Data Point(s)	Aviation Fatalities
Data Type	Tabular data
Description	This data point reflects the total number of annual aviation-related fatalities in Minnesota.
Source(s)	NTSB CAROL: https://data.ntsb.gov/carol-main-public/landing-page
Source(s) Details	The NTSB's CAROL database records aviation investigations completed by the NTSB. The following criteria were inputted into the search query to obtain details about all aviation-related accidents in Minnesota in 2020 (refer to **Section 6.4.1.8** for a screenshot reference): - State: Minnesota - Event Date: Between 1/1/2020 – 01/01/2021 - Mode: Aviation - Highest Injury Level: Fatal
Date of Initial Data Collection	01/24/2022 (aviation accidents in 2020)

[30] MnDOT Aeronautics will only be responsible for updating the Hub with the new polygon data provided by airports. It is the responsibility of the airports to develop and provide the polygon layers for MnDOT Aeronautics to upload into the MnSASP Hub.
[31] Ibid.

Data Assessment	Aviation Fatalities
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	Aviation-related fatality in Minnesota
Hub Presentation/Use	MnSASP Hub/System Performance: Aviation Fatalities [Indicator][32]
MnSASP Hub Layer/Table (if applicable)	MnSASP Indicator Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Using the search parameters defined in the source details (see **Section 6.4.1.8** for a screenshot reference), all aviation accidents are reported in the results. To identify the total number of fatalities, each event report was downloaded and inspected to identify the total number of fatalities that resulted from each accident. These were added up to develop this data point.

Source: Kimley-Horn, 2022

Table 6.65. Aviation-Related Accidents

Data Assessment	Aviation-Related Accidents
Data Point(s)	Aviation Accidents
Data Type	Tabular data
Description	This data point reflects the total number of annual aviation-related accidents in Minnesota. Aviation accidents are defined as an aviation event with at least one fatality.
Source(s)	NTSB CAROL: https://data.ntsb.gov/carol-main-public/landing-page
Source(s) Details	The NTSB's CAROL database records aviation investigations completed by the NTSB. The following criteria were inputted into the search query to identify details about each aviation-related accident in Minnesota between 2020: - State: Minnesota - Event Date: Between 1/1/2020 - 01/01/2021 - Mode: Aviation - Highest Injury Level: Fatal
Date of Initial Data Collection	01/24/2022 (aviation accidents in 2020)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	Aviation-related accident leading to at least one fatality

[32] *This indicator in the dashboard is a static statistic and will not be able to be filtered using the available filters configured (i.e., state classification, MnDOT district).*

Data Assessment	Aviation-Related Accidents
Hub Presentation/Use	MnSASP Hub/System Performance: Aviation-Related Accidents [Indicator][33]
MnSASP Hub Layer/Table (if applicable)	MnSASP Indicator Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Using the search parameters defined in the source details (see **Section 6.4.1.8** for a screenshot reference), all aviation accidents are reported in the results. The number of results indicate the total number of aviation-related accidents in Minnesota.

Source: Kimley-Horn, 2022

Table 6.66. Certified Pilots Within 30 Nautical Miles of an Airport

Data Assessment	Certified Pilots within 30 Nautical Miles (NM) of an Airport
Data Point(s)	Total MN Certified Pilots Certified Pilots within 30nm
Data Type	Tabular data
Description	The total number of certified pilots within a certain distance of an airport is one indicator of the potential demand for a local airport. Airports in close proximity to large concentrations of pilots have a higher likelihood of experiencing higher activity levels including based aircraft and aircraft operations.
Source(s)	- FAA Civil Airmen Statistics: https://www.faa.gov/licenses_certificates/airmen_certification/releasable_airmen_download/ - ArcGIS analyses (refer to the steps in **Section 6.4.2.2**)
Source(s) Details	Calculating the number of certified pilots within 30 nm of each airport requires running the geocoding service and completing a geographical proximity analysis in ArcGIS Online. Please note that the geocoding analysis require a large number of credits in ArcGIS Online to complete, so consult with your GIS administrator before running this service.[34] Refer to the steps in **Section 6.4.2.2** to complete these analyses and calculate the total number of certified pilots within 30 nm of each system airport.
Date of Initial Data Collection	08/18/2021
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None

[33] This indicator in the dashboard is a static statistic and will not be able to be filtered using the available filters configured (i.e., state classification, MnDOT district).

[34] The geographic proximity analysis requires use of ArcGIS's geocoding system to plot the locations of all certified pilots in Minnesota using the addresses recorded. Using the geocoding function requires a large number of credits to plot the addresses for all certified pilots based in Minnesota. As of 8/18/21, there were a total of 11,874 certified pilots in Minnesota. Geocoding all the addresses associated to all these pilots required approximately 475 credits (40 credits per 1,000 addresses).

Data Assessment	Certified Pilots within 30 Nautical Miles (NM) of an Airport
Hub Presentation/Use	MnSASP Hub/System Performance: Certified Pilots [Indicator][35] MnSASP Hub/Airport Performance: Certified Pilots within 30 nm [Indicator]
MnSASP Hub Layer/Table (if applicable)	Total MN Certified Pilots: MnSASP Indicator Data Certified Pilots within 30nm: MnSASP Hub Airport Data/Airport Activity
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.2.2** for instructions on completing the proximity analysis necessary for populating these data points.

Source: Kimley-Horn, 2022

Table 6.67. Fuel Availability at Airports

Data Assessment	Fuel Availability at Airports
Data Point(s)	Fuel Proximity
Data Type	Tabular data
Description	This data point reflects the total number of airports that are within 50 nm of another airport with Jet A fuel available 24 hours a day, 7 days a week (24/7) and 30 nm of another airport with 100LL fuel available 24/7. This is divided by the total airports in the state aviation system to determine the percentage of airports that fulfill the criteria described above.
Source(s)	- MnSASP Airport Inventory - ArcGIS proximity analysis
Source(s) Details	Calculating the total number of airports that fulfill the criteria for the data point (see Description) requires a proximity analysis using the fuel-specific data points (see Table **6.24**) and all airport reference points (mapped using the data points in Table **6.4**). The proximity analysis spatially compares all the airports in the system with airports that fulfill the fuel availability criteria using a 30 nm and 50 nm proximity (as applicable). This analysis is configured into an ArcGIS Notebook (System Indicators - Proximity Analyses) to automatically calculate the total number of airports that fulfill the criteria and update the data point. Refer to the MnSASP Hub User's Guide for guidance on running the ArcGIS Notebook for updating this data point.
Date of Initial Data Collection	- 2022 MnSASP Update: 06/02/2021 - ArcGIS proximity analysis: 08/18/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Addition or removal of Jet A or 100LL fuel at any system airport
Hub Presentation/Use	MnSASP Hub/System Performance: Fuel Availability at Airports [Indicator]
MnSASP Hub Layer/Table (if applicable)	MnSASP Indicator Data

[35] This indicator in the dashboard is a static statistic and will not be able to be filtered using the available filters configured (i.e., state classification, MnDOT district).

Data Assessment	Fuel Availability at Airports
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	Refer to the MnSASP Hub User's Guide for guidance on running the ArcGIS Notebook "System Indicators – Proximity Analyses" for updating this data point.

Source: Kimley-Horn, 2022

Table 6.68. Population Access to an Airline Service Airport

Data Assessment	Population Access to an Airline Service Airport
Data Point(s)	CS Airport Proximity Total MN Population
Data Type	Tabular data
Description	CSAirportProximity is the total population in Minnesota within a 60-minutes surface travel time to a Key Commercial Service Airport. This is divided by the total population in Minnesota (Total MN Population) to calculate the percentage of Minnesota's population within a 60-minutes surface travel time to a Key Commercial Service Airport.
Source(s)	- ArcGIS drive-time proximity analysis - ESRI Business Analyst
Source(s) Details	Calculating the total population that fulfill the criteria for the data point CSAirportProximity (see Description) requires creating drive-time buffers for each airport with a Part 139 certification (see Table 6.16) and comparing the buffer coverage with the population in Minnesota.36 By plugging in the drive-time buffer layer into ESRI's Business Analyst tool, the population within the 60-minute drive time buffers is calculated to update the CSAirportProximity data point.37
Date of Initial Data Collection	08/18/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Part 139 certification changes or a new U.S. Census release
Hub Presentation/Use	MnSASP Hub/System Performance: Population Access to Airline Service Airport [Indicator][38]
MnSASP Hub Layer/Table (if applicable)	MnSASP Indicator Data
MnDOT Aeronautics Responsibility	Airport planning staff, MnDOT GIS administrator
Data Manipulation Plan from Raw State (if applicable)	Calculating the total population that fulfill the criteria for the data point CSAirportProximity (see Description) requires creating 60-minute drive-time buffers for each airport with a Part 139 certification (see Table 6.16).39 The

[36] Generating drive-time buffers requires the use of credits in ArcGIS Online. Consult with your GIS administrator before running this service.
[37] ESRI's Business Analyst tool requires a paid subscription.
[38] This indicator in the dashboard is a static statistic and will not be able to be filtered using the available filters configured (i.e., state classification, MnDOT district).
[39] Generating drive-time buffers requires the use of credits in ArcGIS Online. Consult with your GIS administrator before running this service.

Data Assessment	Population Access to an Airline Service Airport
	buffers must be snipped to the state boundary (to only count Minnesota residents) and dissolved (to prevent double counting of residents). The resulting refined drive-time buffer layer needs to be uploaded into ESRI's Business Analyst tool to calculate the population within the singular buffer. The data result will update the CSAirportProximity data point.[40]

Source: Kimley-Horn, 2022

Table 6.69. Registered Aircraft in Minnesota

Data Assessment	Registered Aircraft in Minnesota
Data Point(s)	Registered AC
Data Type	Tabular data
Description	Total number of registered aircraft in Minnesota
Source(s)	FAA Aircraft Registry[41]
Source(s) Details	None
Date of Initial Data Collection	08/18/2021
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	None
Hub Presentation/Use	MnSASP Hub/System Performance: Registered Aircraft [Indicator][42]
MnSASP Hub Layer/Table (if applicable)	MnSASP Indicator Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.2.10** for complete instructions on pulling the data from the FAA's Aircraft Registry and organizing the data for conforming to the MnSASP data.

Source: Kimley-Horn, 2022

Table 6.70. Runway Incursions

Data Assessment	Runway Incursions
Data Point(s)	Runway Incursions
Data Type	Tabular data
Description	This data point reflects the total number of reported runway incursions at towered airports in Minnesota.
Source(s)	- NASA ASRS: https://akama.arc.nasa.gov/ASRSDBOnline/QueryWizard_Filter.aspx - NTSB CAROL: https://data.ntsb.gov/carol-main-public/landing-page

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[40] ESRI's Business Analyst tool requires a paid subscription.
[41] The FAA Aircraft Registry is available online at https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/releasable_aircraft_download/ (accessed August 2021).
[42] This indicator is presented in the dashboard as a static statistic as it is representative of the state's total registered aircraft. As such, it cannot be filtered using the available filters configured (i.e., state classification, MnDOT district).

Data Assessment	Runway Incursions
Source(s) Details	Calculating the total number of runway incursions requires a review of the: - NASA ASRS to gather the number of runway incursion incidents - NTSB CAROL database collects the runway incursion accidents See **Section 6.4.1.9** for complete instructions on populating this data point.
Date of Initial Data Collection	10/11/2021 (runway incursions in 2020)
Update Cycle	Annually
Trigger Point(s) for Evaluation Outside of Update Cycle	Runway incursion at a towered airport in Minesota
Hub Presentation/Use	MnSASP Hub/System Performance: Runway Incursions [Indicator][43]
MnSASP Hub Layer/Table (if applicable)	MnSASP Indicator Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	See **Section 6.4.1.9** for complete instructions on populating this data point.

Source: Kimley-Horn, 2022

Table 6.71. Systemwide Maintenance and Repair Availability

Data Assessment	Systemwide Maintenance and Repair Availability
Data Point(s)	MRO Proximity
Data Type	Tabular data
Description	Total number of airports within 50 nm of an airport that has aircraft MRO facilities defined in terms of the following: - Aircraft services, repairing, and maintenance location - Avionics repair location - Engine overhaul location This data point is used to calculate a percentage of the total state aviation system that fulfills the criteria above.
Source(s)	MnSASP Inventory ArcGIS proximity analysis
Source(s) Details	Calculating the total number of airports that fulfill the criteria for the data point (see Description) requires a proximity analysis using the MRO-specific data points (see Table **6.26**) and all airport reference points **(MnSASP Hub Airport Data / Airport Background)**. The proximity analysis spatially compares all airports with airports that have MRO facilities within 50 nm. This analysis is configured into an ArcGIS Notebook (System Indicators - Proximity Analyses) to

[43] *This indicator in the dashboard is a static statistic and will not be able to be filtered using the available filters configured (i.e., state classification, MnDOT district).*

Data Assessment	Systemwide Maintenance and Repair Availability
	automatically calculate the total number of airports that fulfill the criteria and update the data point in the Hub. Refer to the MnSASP Hub User's Guide for guidance on running the ArcGIS Notebook.
Date of Initial Data Collection	08/18/2021
Update Cycle	As required based on trigger point for evaluation
Trigger Point(s) for Evaluation Outside of Update Cycle	Addition or removal of MRO service availability at any system airport
Hub Presentation/Use	MnSASP Hub/System Performance: Maintenance and Repair at Airports [Indicator][44]
MnSASP Hub Layer/Table (if applicable)	MnSASP Indicator Data
MnDOT Aeronautics Responsibility	Airport planning staff
Data Manipulation Plan from Raw State (if applicable)	The workflow for updating this data point is configured into an ArcGIS Notebook (System Indicators - Proximity Analyses). Refer to the MnSASP Hub User's Guide for guidance on running the ArcGIS Notebook.

Source: Kimley-Horn, 2022

6.4. Supplemental Data Points and Manipulation Details

This section provides additional context to the data points assessment in the previous sections and details the data manipulation process for several data points in the MnSASP data. Additionally, a separate matrix has also been prepared that consolidates the most pertinent information for updating all data points in the MnSASP Hub included as Appendix D of the 2022 MnSASP Technical Report. This section is divided into two sections:

- Additional Data Point Information: Provides additional details about specific data points covered in Section 6.3
- Data Manipulation Plan Details: Provides instructions on how to conduct the analyses required to obtain the data points covered in Section 6.3

[44] *This indicator in the dashboard is a static statistic and will not be able to be filtered using the available filters configured (i.e., state classification, MnDOT district).*

6.4.1. ADDITIONAL DATA POINT INFORMATION

The following subsections include additional details on the data points documented in the data points assessment (**Section 6.3**).

6.4.1.1. Convert DMS to Decimal Degrees

ArcGIS Online can only create location points with coordinate information in decimal degrees. To convert DMS to decimal degrees, use the following formula for latitude/longitude coordinates: Decimal degrees = (+/-) Degrees (+/-) (Minutes ÷ 60) (+/-) (Seconds ÷ 3,600). Refer to the following steps for an example of converting the following coordinates to decimal degrees: 47° 15' 37.683" N / 96° 24' 0.95" W

- Latitude conversion: Decimal degrees = 47 + (15 ÷ 60) + (37.683 ÷ 3,600) = 47.2605 N
- Longitude conversion: Decimal degrees = -96 - (24 ÷ 60) – (0.95 ÷ 3,600) = 96.4002 W

The Federal Communications Commission (FCC) has an online calculator tool available online for completing the coordinate conversion: https://www.fcc.gov/media/radio/dms-decimal.

6.4.1.2. State Classifications

Table 6.72 provides the criteria used to classify Minnesota's state system airports. These criteria were updated as part of Phase I of the MnSASP.

Table 6.72. MnSASP State Classification Assignment Criteria

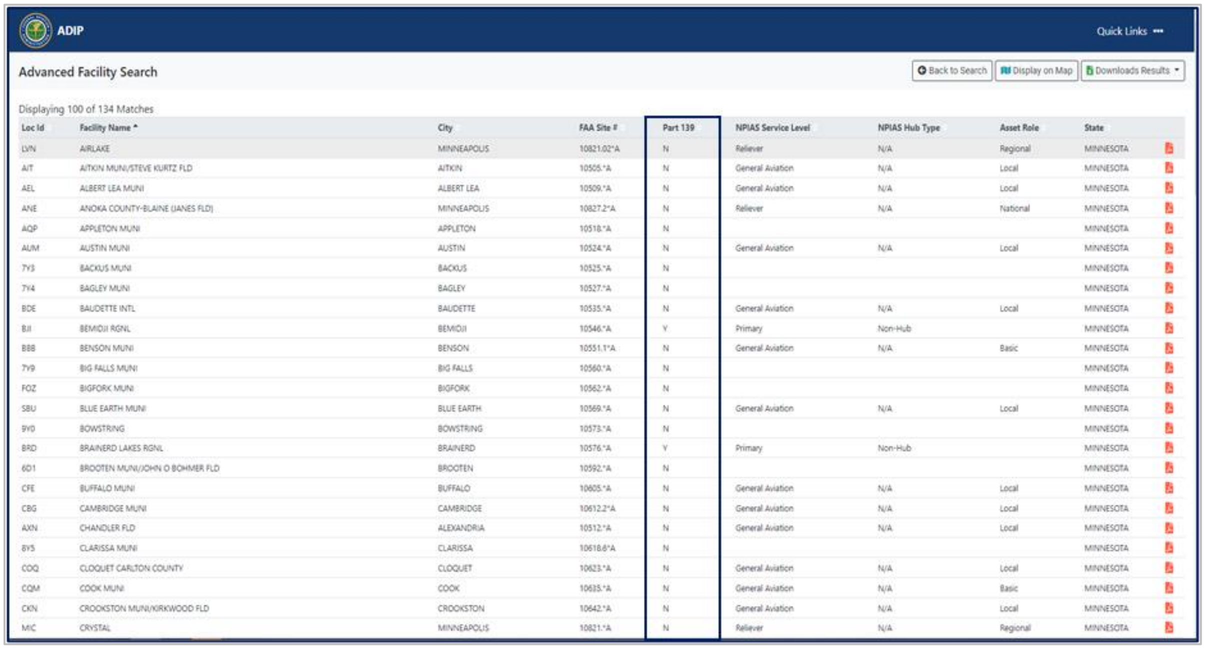
State Classifications	Criteria
Key Commercial Service	Part 139 Certificate
Key General Aviation	General aviation airports with paved runway >4,900 feet
Intermediate Large	Paved runway >3,800 feet and <4,900 feet
Intermediate Small	Paved runway < 3,800 feet
Landing Strip Turf	Unpaved turf runway of any length

Source: MnSASP Phase I, 2019

6.4.1.3. Part 139 Certification

Figure 6-1 provides a screenshot reference for identifying the Part 139 certification status for each airport in ADIP's advanced facility search results.

Figure 6-1. Part 139 Certification in ADIP Advanced Facility Search



ADIP Quick Links

Advanced Facility Search

Back to Search | Display on Map | Downloads Results

Displaying 100 of 134 Matches

Loc Id	Facility Name	City	FAA Site #	Part 139	NPIAS Service Level	NPIAS Hub Type	Asset Role	State
LVN	AIRLAKE	MINNEAPOLIS	10821.02*A	N	Reliever	N/A	Regional	MINNESOTA
AIT	AITKIN MUNI/STEVE KURTZ FLD	AITKIN	10505.*A	N	General Aviation	N/A	Local	MINNESOTA
AEL	ALBERT LEA MUNI	ALBERT LEA	10509.*A	N	General Aviation	N/A	Local	MINNESOTA
ANE	ANOKA COUNTY-BLAINE (JANES FLD)	MINNEAPOLIS	10827.2*A	N	Reliever	N/A	National	MINNESOTA
AQP	APPLETON MUNI	APPLETON	10518.*A	N				MINNESOTA
AUM	AUSTIN MUNI	AUSTIN	10524.*A	N	General Aviation	N/A	Local	MINNESOTA
7Y3	BACKUS MUNI	BACKUS	10525.*A	N				MINNESOTA
7Y4	BAGLEY MUNI	BAGLEY	10527.*A	N				MINNESOTA
BDE	BAUDETTE INTL	BAUDETTE	10535.*A	N	General Aviation	N/A	Local	MINNESOTA
BJI	BEMIDJI RGNL	BEMIDJI	10546.*A	Y	Primary	Non-Hub		MINNESOTA
BBB	BENSON MUNI	BENSON	10551.1*A	N	General Aviation	N/A	Basic	MINNESOTA
7Y9	BIG FALLS MUNI	BIG FALLS	10560.*A	N				MINNESOTA
FOZ	BIGFORK MUNI	BIGFORK	10562.*A	N				MINNESOTA
SBU	BLUE EARTH MUNI	BLUE EARTH	10569.*A	N	General Aviation	N/A	Local	MINNESOTA
9Y0	BOWSTRING	BOWSTRING	10573.*A	N				MINNESOTA
BRD	BRAINERD LAKES RGNL	BRAINERD	10576.*A	Y	Primary	Non-Hub		MINNESOTA
6D1	BROOTEN MUNI/JOHN O BOHMER FLD	BROOTEN	10592.*A	N				MINNESOTA
CFE	BUFFALO MUNI	BUFFALO	10605.*A	N	General Aviation	N/A	Local	MINNESOTA
CBG	CAMBRIDGE MUNI	CAMBRIDGE	10612.2*A	N	General Aviation	N/A	Local	MINNESOTA
AXN	CHANDLER FLD	ALEXANDRIA	10512.*A	N	General Aviation	N/A	Local	MINNESOTA
8Y5	CLARISSA MUNI	CLARISSA	10618.6*A	N				MINNESOTA
COQ	CLOQUET CARLTON COUNTY	CLOQUET	10623.*A	N	General Aviation	N/A	Local	MINNESOTA
CQM	COOK MUNI	COOK	10635.*A	N	General Aviation	N/A	Basic	MINNESOTA
CKN	CROOKSTON MUNI/KIRKWOOD FLD	CROOKSTON	10642.*A	N	General Aviation	N/A	Local	MINNESOTA
MIC	CRYSTAL	MINNEAPOLIS	10821.*A	N	Reliever	N/A	Regional	MINNESOTA

Source: FAA ADIP, 2022

6.4.1.4. VOR/DME/TACAN/VORTAC Service Buffers

Table 6.73 defines the service coverages for all VOR/DME, VORTAC, and TACANs based on the equipment's class (populated in the data point "Class" recorded in corresponding polygon layer in the "MN NAVAIDs_Service Buffers" feature layer). This data should be plugged into the following data points in the layer: Buffer Distance (nm), Minimum Elevation (ft), Maximum Elevation (ft).

Table 6.73. VOR/DME/VORTAC/TACAN Service Coverages

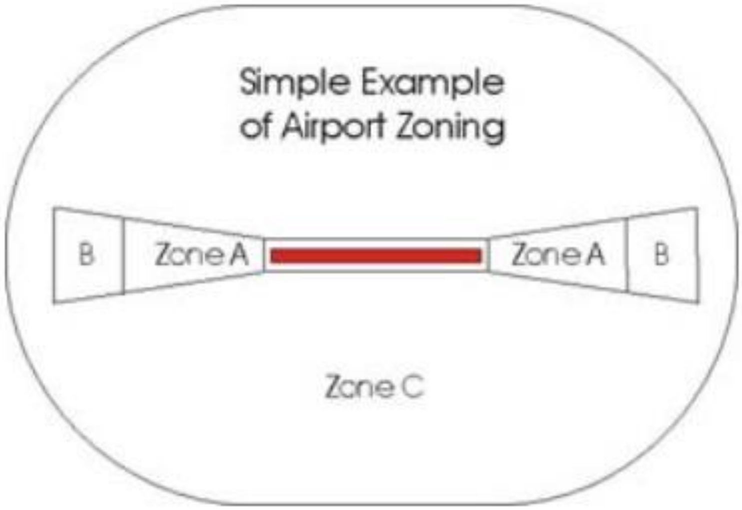
Class	Altitude (ft)	Distance (miles)
T	Below 12,000	25
L	Below 18,000	40
H	Below 14,500	40
H	14,500 – 17,999	100
H	18,000 – 45,000	130
H	Above 45,000	100

Source: FAA Aeronautical Information Manual (Chapter 1, Section 1), 2022

6.4.1.5. Airport Zoning

Figure 6-2 depicts a sample airport zoning map for a visual reference of the three types of safety zones (Zone A, Zone B, Zone C) defined in Minnesota Rules Chapter 8800.2400.

Figure 6-2. MnDOT Airport Zoning Graphic Reference



Source: MnDOT Aeronautics Airport Zoning Information Warehouse, 2022

6.4.1.6. Clear Zones

Clear zone configurations are primarily based on primary and approach surfaces as defined by Federal Aviation Regulations (FAR) Part 77, *Safe, Efficient Use, and Preservation of Navigable Airspace*.[45] Clear zone dimensions are based on runway category,[46] visibility minimums (as applicable), and most critical approach type. **Table 6.74** provides the clear zone dimensions (updated as part of the 2022 MnSASP). Clear zones begin at the end of the primary surface. The primary surface extends 200 feet beyond each runway end for all paved runways. The primary surface ends at the runway ends for all turf runways. Inner widths align with width of the primary surface. Outer widths are determined by the width of the approach surface at the applicable clear zone length.

Table 6.74. Clear Zone Dimensional Standards

Approach Type (Runway Category) – Visibility Minimum, as Applicable	Length Beyond Runway End (Feet)	Inner Width (Feet)	Length of Surface (Feet)	Outer Width (Feet)
Turf	0	250	1,000	Width of Approach Surface at 1,000 feet
A(V)	200	250	1,000	Width of Approach Surface at 1,000 feet
B(V)	200	500	1,000	Width of Approach Surface at 1,000 feet
NP(A)	200	500	1,000	Width of Approach Surface at 1,000 feet

45 Clear zone dimensions break from those established by FAR Part 77 for airports with a non-precision instrument approach (NP) by providing separate dimensions for runway ends with visibility minimums greater than ¾ mile (referred to as D1) and visibility minimums of ½ mile (referred to as D2). FAR Par 77 only provides one dimensional standard for NP(D) for visibility minimums as low as ¾ mile.

46 Runway categories are defined in terms of surface type (i.e., turf versus paved) and utility versus other-than-utility.

Approach Type (Runway Category) – Visibility Minimum, as Applicable	Length Beyond Runway End (Feet)	Inner Width (Feet)	Length of Surface (Feet)	Outer Width (Feet)
NP(C) – Visibility minimums greater than ¾ mile	200	500	1,700	Width of Approach Surface at 1,700 feet
*NP(D1) – Greater than or equal to ¾ - mile visibility	200	1,000	1,700	Width of Approach Surface at 1,700 feet
*NP(D2) – ½ - mile visibility	200	1,000	2,500	Width of Approach Surface at 2,500 feet
PIR	200	1,000	2,500	Width of Approach Surface at 2,500 feet

**Note: Clear zone dimensions break from those established by FAR Part 77 for airports with a non-precision instrument approach (NP) by providing separate dimensions for runway ends with visibility minimums greater than ¾ mile (referred to as D1) and visibility minimums of ½ mile (referred to as D2). FAR Par 77 only provides one dimensional standard for NP(D) for visibility minimums as low as ¾ mile. Definitions: A = Utility runways. B = Runways larger than utility. C = Visibility minimums greater than ¾ mile. D1 = Visibility minimums greater or equal to ¾ mile. D2 = Visibility minimums of ½ mile. V = Visual approach. NP = Non-precision instrument approach. PIR = Precision instrument approach. Sources: MnDOT Aeronautics, 2022; FAR Part 77*

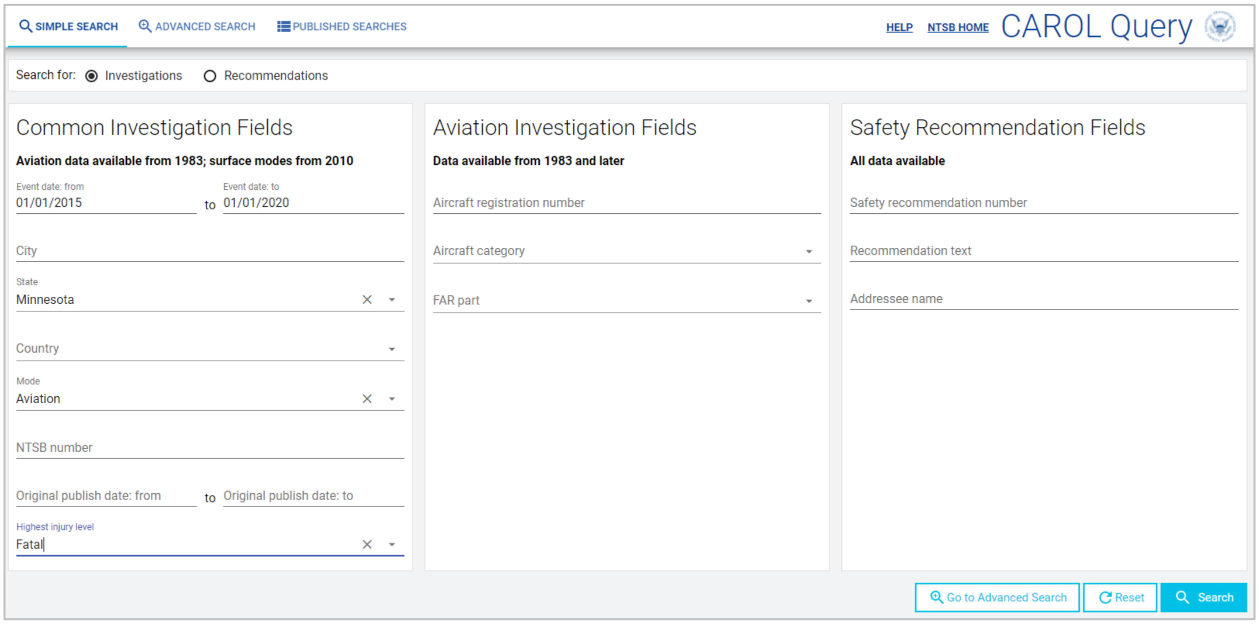
6.4.1.7. Airport Safety Areas Mapping

The initial mapping of the airport safety areas utilized a combination of AutoCAD, a proprietary mapping software developed by Kimley-Horn, and ArcGIS Pro. Within AutoCAD, the first step is to initialize blank AutoCAD drawings and setting the geospatial reference in each. Each dataset is divided by the State Plane Coordinate Zone and there is one drawing file per Zone. Each drawing is then processed through Kimley-Horn's proprietary mapping software by reading in the data files and translating the data into AutoCAD drawing objects (according to the dimensions data). The program then examines this initial output and processes each object type into a separate KML file by State Plane Coordinate Zone. Each KML file is converted into a shapefile using ArcGIS Pro to be published within the Airport Safety Areas feature layer in the Hub.

6.4.1.8. Aviation-Related Accidents and Fatalities

Figure 6-3 presents the parameters to enter in the NTSB CAROL Database search query to return all aviation accident events in Minnesota. The total number of records returned indicate the number of aviation-related accidents in Minnesota to populate into the data point.

Figure 6-3. NTSB CAROL Database Query for Aviation Accidents



Sources: NTSB CAROL Database, 2022; Kimley-Horn, 2022

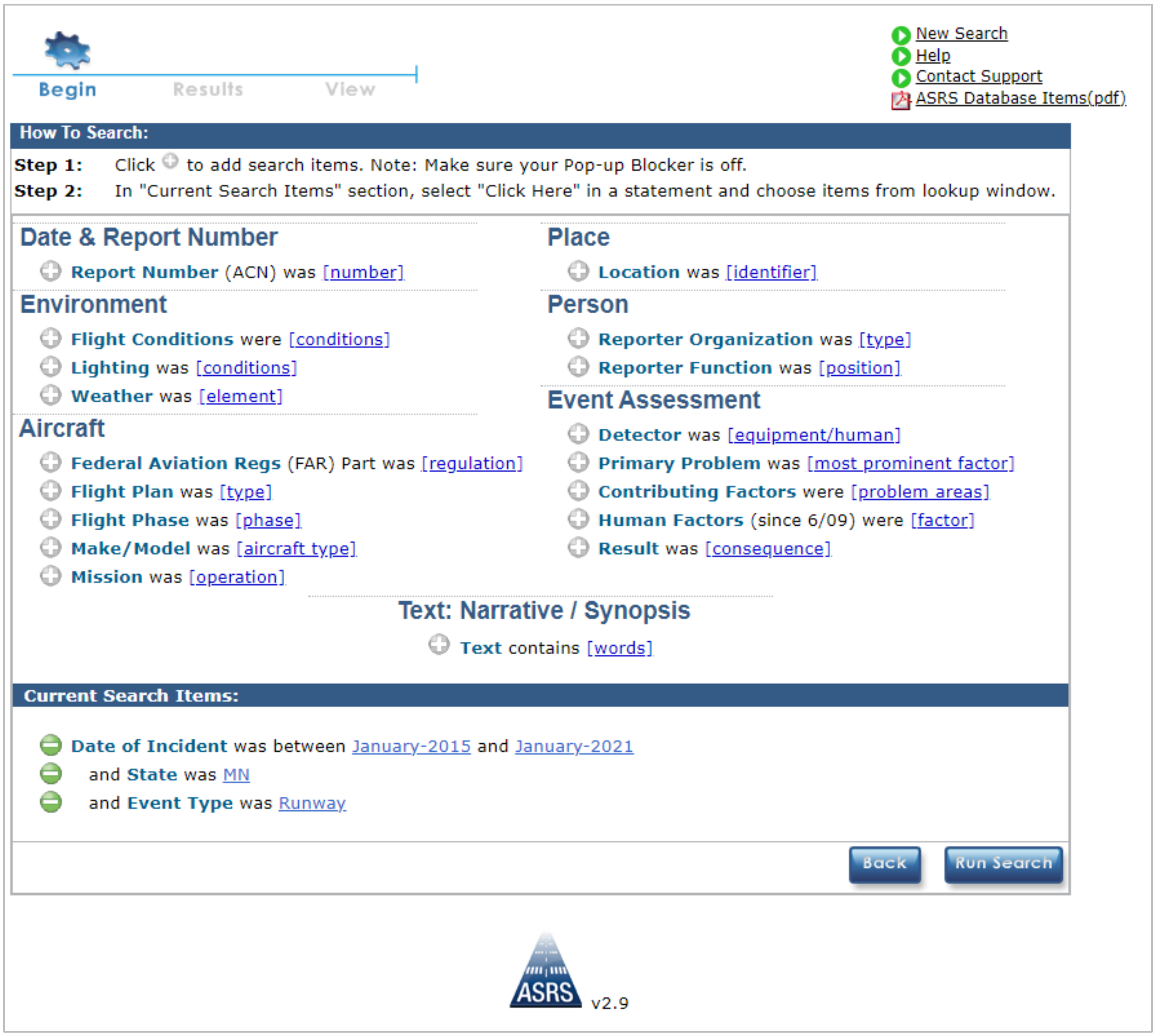
6.4.1.9. Runway Incursions

Refer to the list below and **Figure 6-4** for the parameters to enter into the NASA ASRS Database search query to return all runway incursion incidents in Minnesota.

- Date of Incident: Between 1/1/2015-12/31/2020
- State: "MN"
- Event Type: "Ground Incursion – Runway"

The NASA ASRS only records incidents, so calculating the total number of runway incursions also requires reviewing the NTSB reports completed from aviation accidents recorded in the NTSB CAROL database (refer to **Figure 6-3** for the search parameters). The aviation accidents that were the result of a runway incursion should be reviewed and cross-referenced with the NASA ASRS to identify any accidents not recorded in NASA ASRS. These unique cases should be added to the total number of runway incursions for updating this data point to be comprehensive of all applicable aviation events. The NASA ASRS database can be accessed at https://asrs.arc.nasa.gov/search/database.html.

Figure 6-4. NASA ASRS Database Query for Runway Incursions



Source: NASA ASRS Database, 2022; Kimley-Horn, 2022

6.4.2. DATA MANIPULATION PLAN DETAILS

The following subsections provide guidance on the data manipulation work needed for certain MnSASP data points.

6.4.2.1. Based Aircraft

Complete the following steps to obtain the number of based aircraft at Nonprimary NPIAS airports in Minnesota:

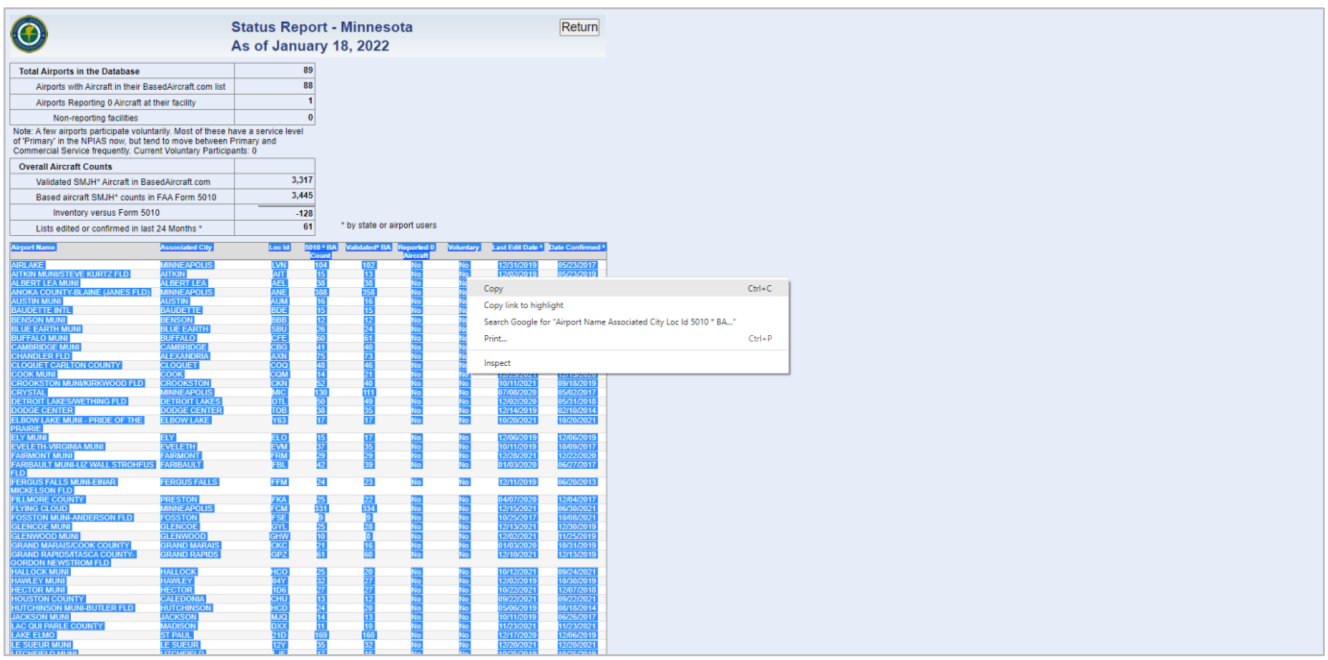
1) Navigate to the following website: https://basedaircraft.com/BaCounts/Default.aspx.

2) In the dropdown next to “State Counts,” select “Minnesota” and click “Go.”

3) The following page will present a summary of all validated and airport-reported based aircraft counts in Minnesota and a table providing a detailed breakdown by Nonprimary NPIAS airport. Select and copy all the content included in the table. Refer to **Figure 6-5** for a screenshot reference.

4) For further analysis, this table content can be pasted into an Excel file.

Figure 6-5. Copy Based Aircraft Counts by Airport



Status Report - Minnesota
As of January 18, 2022

Return

Total Airports in the Database	89
Airports with Aircraft in their BasedAircraft.com list	88
Airports Reporting 0 Aircraft at their facility	1
Non-reporting facilities	0

Note: A few airports participate voluntarily. Most of these have a service level of 'Primary' in the NPIAS now, but tend to move between Primary and Commercial Service frequently. Current Voluntary Participants: 0

Overall Aircraft Counts	
Validated SMJH* Aircraft in BasedAircraft.com	3,317
Based aircraft SMJH* counts in FAA Form 5010	3,445
Inventory versus Form 5010	-128
Lists edited or confirmed in last 24 Months *	61

* by state or airport users

Airport Name	Associated City	Loc Id	5010 * BA Count	Validated* BA	Reported 0 Aircraft	Voluntary	Last Edit Date *	Date Confirmed *
AIRLAKE	MINNEAPOLIS	LVN	104	102	No	No	12/31/2019	05/23/2017
AITKIN MUNI/STEVE KURTZ FLD	AITKIN	AIT	15	13	No	No	12/02/2019	05/23/2019
ALBERT LEA MUNI	ALBERT LEA	AEL	38	38	No	[illegible]	[illegible]	[illegible]
ANOKA COUNTY-BLAINE (JANES FLD)	MINNEAPOLIS	ANE	388	358	No	[illegible]	[illegible]	[illegible]
AUSTIN MUNI	AUSTIN	AUM	16	16	No	[illegible]	[illegible]	[illegible]
BAUDETTE INTL	BAUDETTE	BDE	15	15	No	[illegible]	[illegible]	[illegible]
BENSON MUNI	BENSON	BBB	12	12	No	[illegible]	[illegible]	[illegible]
BLUE EARTH MUNI	BLUE EARTH	SBU	26	24	No	[illegible]	[illegible]	[illegible]
BUFFALO MUNI	BUFFALO	CFE	60	61	No	[illegible]	[illegible]	[illegible]
CAMBRIDGE MUNI	CAMBRIDGE	CBG	41	40	No	[illegible]	[illegible]	[illegible]
CHANDLER FLD	ALEXANDRIA	AXN	75	73	No	[illegible]	[illegible]	[illegible]
CLOQUET CARLTON COUNTY	CLOQUET	COQ	48	46	No	[illegible]	[illegible]	[illegible]
COOK MUNI	COOK	CQM	14	21	No	No	[illegible]	[illegible]
CROOKSTON MUNI/KIRKWOOD FLD	CROOKSTON	CKN	52	40	No	No	10/11/2021	09/18/2019
CRYSTAL	MINNEAPOLIS	MIC	130	111	No	No	07/08/2020	05/02/2017
DETROIT LAKES/WETHING FLD	DETROIT LAKES	DTL	50	49	No	No	12/02/2020	05/31/2018
DODGE CENTER	DODGE CENTER	TOB	38	35	No	No	12/14/2019	02/10/2014
ELBOW LAKE MUNI - PRIDE OF THE PRAIRIE	ELBOW LAKE	Y63	17	17	No	No	10/20/2021	10/20/2021
ELY MUNI	ELY	ELO	15	17	No	No	12/06/2019	12/06/2019
EVELETH-VIRGINIA MUNI	EVELETH	EVM	37	35	No	No	10/11/2019	10/09/2017
FAIRMONT MUNI	FAIRMONT	FRM	29	29	No	No	12/28/2021	12/22/2020
FARIBAULT MUNI-LIZ WALL STROHFUS FLD	FARIBAULT	FBL	42	39	No	No	01/03/2020	06/27/2017
FERGUS FALLS MUNI-EINAR MICKELSON FLD	FERGUS FALLS	FFM	24	23	No	No	12/11/2019	06/20/2013
FILLMORE COUNTY	PRESTON	FKA	25	22	No	No	04/07/2020	12/04/2017
FLYING CLOUD	MINNEAPOLIS	FCM	331	334	No	No	12/15/2021	06/30/2021
FOSSTON MUNI-ANDERSON FLD	FOSSTON	FSE	9	9	No	No	10/25/2017	10/08/2021
GLENCOE MUNI	GLENCOE	GYL	25	28	No	No	12/13/2021	12/30/2019
GLENWOOD MUNI	GLENWOOD	GHW	10	8	No	No	12/02/2021	11/25/2019
GRAND MARAIS/COOK COUNTY	GRAND MARAIS	CKC	21	16	No	No	01/03/2020	10/31/2019
GRAND RAPIDS/ITASCA COUNTY-GORDON NEWSTROM FLD	GRAND RAPIDS	GPZ	61	60	No	No	12/10/2021	12/13/2019
HALLOCK MUNI	HALLOCK	HCO	25	20	No	No	10/12/2021	09/24/2021
HAWLEY MUNI	HAWLEY	04Y	32	27	No	No	12/02/2019	10/30/2019
HECTOR MUNI	HECTOR	1D6	27	27	No	No	10/22/2021	12/07/2018
HOUSTON COUNTY	CALEDONIA	CHU	13	12	No	No	09/22/2021	09/22/2021
HUTCHINSON MUNI-BUTLER FLD	HUTCHINSON	HCD	24	20	No	No	05/06/2019	08/18/2014
JACKSON MUNI	JACKSON	MJQ	14	13	No	No	10/11/2019	06/26/2017
LAC QUI PARLE COUNTY	MADISON	DXX	11	10	No	No	11/23/2021	11/23/2021
LAKE ELMO	ST PAUL	21D	169	160	No	No	12/17/2020	12/06/2019
LE SUEUR MUNI	LE SUEUR	12Y	35	32	No	No	12/20/2021	12/20/2021

Sources: FAA National Based Aircraft Inventory Program, 2022; Kimley-Horn, 2022

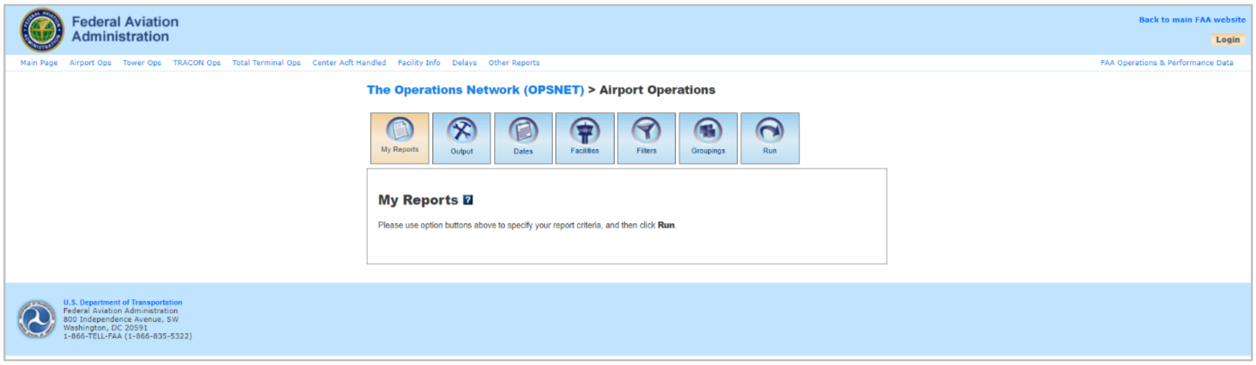
6.4.2.2. Baseline Operations Counts (OpsNet)

Complete the following steps to pull baseline operations counts from the FAA’s OpsNet for towered airports and manipulate the data for populating the corresponding data point:

1) Navigate to the following website: https://aspm.faa.gov/opsnet/sys/main.asp.

2) Click on “Airport Operations” to navigate into the query search for airport-specific operations data. Refer to **Figure 6-6** for a screenshot reference.

Figure 6-6. OpsNet Airport Operations Query Home Page



Source: FAA OpsNet, 2022

3) Under the "Output" tab, select the following:
   - Display: "Standard Report"
   - Options: Check all the fields
   - Format: "MS Excel"
4) Under the "Dates" tab, select the date range that you want to pull operations data for.
5) Under the "Facilities" tab, select "State" and then locate and check "Minnesota" in the list.
6) Under the "Filters" tab, make sure that "No Filters" is selected.
7) Under the "Groupings" tab, select the fields "Date", "Airport", and "State."
8) Upon clicking "Run", an Excel file will download with all the operations data available across the system (Minnesota airports with an ATCT).

6.4.2.3. FAA Filed Flight Plan Data

The following steps detail how to manipulate the raw flight data pulled from FAA TFMSC for updating the MnSASP Hub.

1) Navigate to the FAA's Operations and Performance Data portal (https://aspm.faa.gov/) and login with account credentials. A login can be requested from the FAA using the following link: https://aspm.faa.gov/Control/Users/sysMailTo.asp.
2) Once logged in, navigate to the TFMSC database and use the search query to pull individual flight information for all operations originating or terminating in Minnesota. Given the large amount of data, it is recommended to output this data into two datasets that includes Minnesota-based departures and Minnesota-based arrivals. Steps 3 should be reflected in both datasets.
3) Open the datasets and copy the data into a clean Excel sheet with concise headers to describe each column of data.
4) To conform the data to the MnSASP Hub, several new data fields need to be created to provide background information for each arrival and departure airport.

- Airport ID (one field for each arrival and departure airport): Isolates the airport ID from the concatenated airport ID – name field. Refer to **Figure 6-7** for a screenshot reference.

Figure 6-7. FAA Filed Flight Plan Data – Airport ID Field

SUM =IFERROR(TRIM(LEFT(D2,FIND(" -",D2))),D2)

#	Arrival Date	Departure Date	Arrival Airport ID - Name	Arrival Airport ID
1	Jan-19	Jan-19	04Y - Hawley	D2)
2	Jan-19	Jan-19	06C - Chicago/Schaumburg	06C
3	Jan-19	Jan-19	06C - Chicago/Schaumburg	06C
4	Jan-19	Jan-19	0D8 - Gettysburg	0D8
5	Jan-19	Jan-19	0M5 - Waverly	0M5
6	Jan-19	Jan-19	14G - Fremont	14G
7	Jan-19	Jan-19	14Y - Long Prairie	14Y
8	Jan-19	Jan-19	14Y - Long Prairie	14Y
9	Jan-19	Jan-19	16D - Perham	16D
10	Jan-19	Jan-19	1D2 - Plymouth	1D2
11	Jan-19	Jan-19	1D7 - Webster	1D7

Source: Kimley-Horn, 2022

- Airport Country (one field for each arrival and departure airport): Denotes whether the airport is located in the U.S. This requires referencing a complete dataset of all U.S. airports that includes the FAA ID, state, and coordinate location of each airport. The following dataset was pulled for initially mapping the filed flight plan data in the MnSASP Hub: https://datahub.io/core/airport-codes#resource-airport-codes. Add this dataset into the Excel workbook and refer to **Figure 6-8** for a screenshot reference for the formula used to pull in this information.

Figure 6-8. FAA Filed Flight Plan Data – Airport Country Field

=IFERROR(IF(COUNTIF(Airports!$C$3:$C$20042,$E2)>0,"US",VLOOKUP($E2,'airport-codes_csv'!$A$3:$G$57423,'airport-codes_csv'!$F$1,FALSE)),"Unknown")

VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

ture Date	Arrival Airport ID - Name	Arrival Airport ID	Arrival Airport Country	Arrival Airport State
Jan-19	04Y - Hawley	04Y	'airport-codes_csv'!$A$3:$G$57423,'airport-	MN
Jan-19	06C - Chicago/Schaumburg	06C	US	IL
Jan-19	06C - Chicago/Schaumburg	06C	US	IL
Jan-19	0D8 - Gettysburg	0D8	US	SD
Jan-19	0M5 - Waverly	0M5	US	TN
Jan-19	14G - Fremont	14G	US	OH
Jan-19	14Y - Long Prairie	14Y	US	MN
Jan-19	14Y - Long Prairie	14Y	US	MN
Jan-19	16D - Perham	16D	US	MN
Jan-19	1D2 - Plymouth	1D2	US	MI
Jan-19	1D7 - Webster	1D7	US	SD
Jan-19	1G0 - Bowling Green	1G0	US	OH

Source: Kimley-Horn, 2022

- Airport State (one field for each arrival and departure airport): Denotes the U.S. state that the airport is located in. This requires referencing a complete dataset of all airports that includes the FAA ID, state, and coordinate location of each airport. The following dataset was pulled for initially mapping the filed flight plan data in the MnSASP Hub: https://datahub.io/core/airport-codes#resource-airport-codes. Add this dataset into the Excel workbook and refer to **Figure 6-9** for a screenshot reference for the formula used to pull in this information.

Figure 6-9. FAA Filed Flight Plan Data – Airport State Field

```
=IFERROR(VLOOKUP($E2,Airports!$C$3:$G$20042,Airports!$G$1,FALSE),RIGHT(VLOOKUP($E2,'airport-codes_csv'!$A$3:$G$57423,'airport-codes_csv'!$G$1,FALSE),2))
```

VLOOKUP(lookup_value, **table_array**, col_index_num, [range_lookup])

ture Date	Arrival Airport ID - Name	Arrival Airport ID	Arrival Airport Country	Arrival Airport State
Jan-19	04Y - Hawley	04Y	US	$G$57423,'airport-codes_csv'!$G$1,FALSE)
Jan-19	06C - Chicago/Schaumburg	06C	US	IL
Jan-19	06C - Chicago/Schaumburg	06C	US	IL
Jan-19	0D8 - Gettysburg	0D8	US	SD
Jan-19	0M5 - Waverly	0M5	US	TN
Jan-19	14G - Fremont	14G	US	OH
Jan-19	14Y - Long Prairie	14Y	US	MN
Jan-19	14Y - Long Prairie	14Y	US	MN
Jan-19	16D - Perham	16D	US	MN
Jan-19	1D2 - Plymouth	1D2	US	MI
Jan-19	1D7 - Webster	1D7	US	SD
Jan-19	1G0 - Bowling Green	1G0	US	OH

Source: Kimley-Horn, 2022

- Airport Latitude and Longitude (two fields for each arrival and departure airport): Denotes the latitude and longitude coordinates that the airport is located in. This requires referencing a complete dataset of all airports that includes the FAA ID, state, and coordinate location of each airport. The following dataset was pulled for initially mapping the filed flight plan data in the MnSASP Hub: https://datahub.io/core/airport-codes#resource-airport-codes. Add this dataset into the Excel workbook and refer to **Figure 6-10** for a screenshot reference for the formula used to pull in this information.

Figure 6-10. FAA Filed Flight Plan Data – Airport Coordinate Field (Latitude shown)

```
=IFERROR(IFERROR(VLOOKUP(E2,Airports!$C$3:$AK$20042,Airports!$X$1,FALSE),VLOOKUP(E2,'airport-codes_csv'!$A$3:$N$57423,'airport-codes_csv'!$M$1,FALSE)),"Unknown")
```

VLOOKUP(lookup_value, **table_array**, col_index_num, [range_lookup])

ture Date	Arrival Airport ID - Name	Arrival Airport ID	Arrival Airport Country	Arrival Airport State	Arrival Airport Latitude
Jan-19	04Y - Hawley	04Y	US	MN	$A$3:$N$57423,'airport-codes_csv'!$M$1,
Jan-19	06C - Chicago/Schaumburg	06C	US	IL	41.98934167
Jan-19	06C - Chicago/Schaumburg	06C	US	IL	41.98934167
Jan-19	0D8 - Gettysburg	0D8	US	SD	44.98661111
Jan-19	0M5 - Waverly	0M5	US	TN	36.11661111
Jan-19	14G - Fremont	14G	US	OH	41.33308333
Jan-19	14Y - Long Prairie	14Y	US	MN	45.89759444
Jan-19	14Y - Long Prairie	14Y	US	MN	45.89759444
Jan-19	16D - Perham	16D	US	MN	46.61097222
Jan-19	1D2 - Plymouth	1D2	US	MI	42.34780556
Jan-19	1D7 - Webster	1D7	US	SD	45.29311111
Jan-19	1G0 - Bowling Green	1G0	US	OH	41.391

Source: Kimley-Horn, 2022

5) Use the new country fields to filter the datasets and remove all international routes.
6) Add the following data fields to each dataset (use the exact field names noted):
    - ROUTE_AIRPORT: Concatenate the departure airport ID and arrival airport ID with a hyphen.
    - RP_APT_STATE: Concatenate the departure airport ID and arrival airport state with a hyphen.
    - RT_STATE: Concatenate the departure airport state and arrival airport state with a hyphen.
    - DPT_ARR: Denotes whether the departure or arrival airport is in Minnesota. Populate this field with “Arrival” or “Departure”.
    - QUERY_STATE: For Minnesota arrivals, populate this field with the departure airport state. For Minnesota departure, populate this field with the arrival airport state.
    - QUERY_AIRPORT: For Minnesota arrivals, populate this field with the departure airport ID. For Minnesota departure, populate this field with the arrival airport ID.
7) Combine the departure and arrival datasets and consolidate the data to include the following fields:

- ID_NUM: Flight ID Number
- ROUTE_AIRPORT: Route – Airport Codes
- RT_APT_STATE: Route – Airport to State
- ROUTE_SATE: Route – States
- DPT_DATE: Departure Date
- DPT_AIRPORT_NAME: Departure Airport Name
- DPT_AIRPORT_ID: Departure Airport Code
- DPT_COUNTRY: Departure Airport Country Code
- DPT_STATE: Departure State
- DPT_LAT: Departure Airport Latitude
- DPT_LONG: Departure Airport Longitude
- ARR_DATE: Arrival Date
- ARR_AIRPORT_NAME: Arrival Airport Name
- ARR_AIRPORT_ID: Arrival Airport Code
- ARR_COUNTRY: Arrival Airport Country Code
- ARR_STATE: Arrival State
- ARR_LAT: Arrival Airport Latitude
- ARR_LONG: Arrival Airport Longitude
- QUERY_STATE: Query Airport State
- QUERY_AIRPORT: Query Airport Code

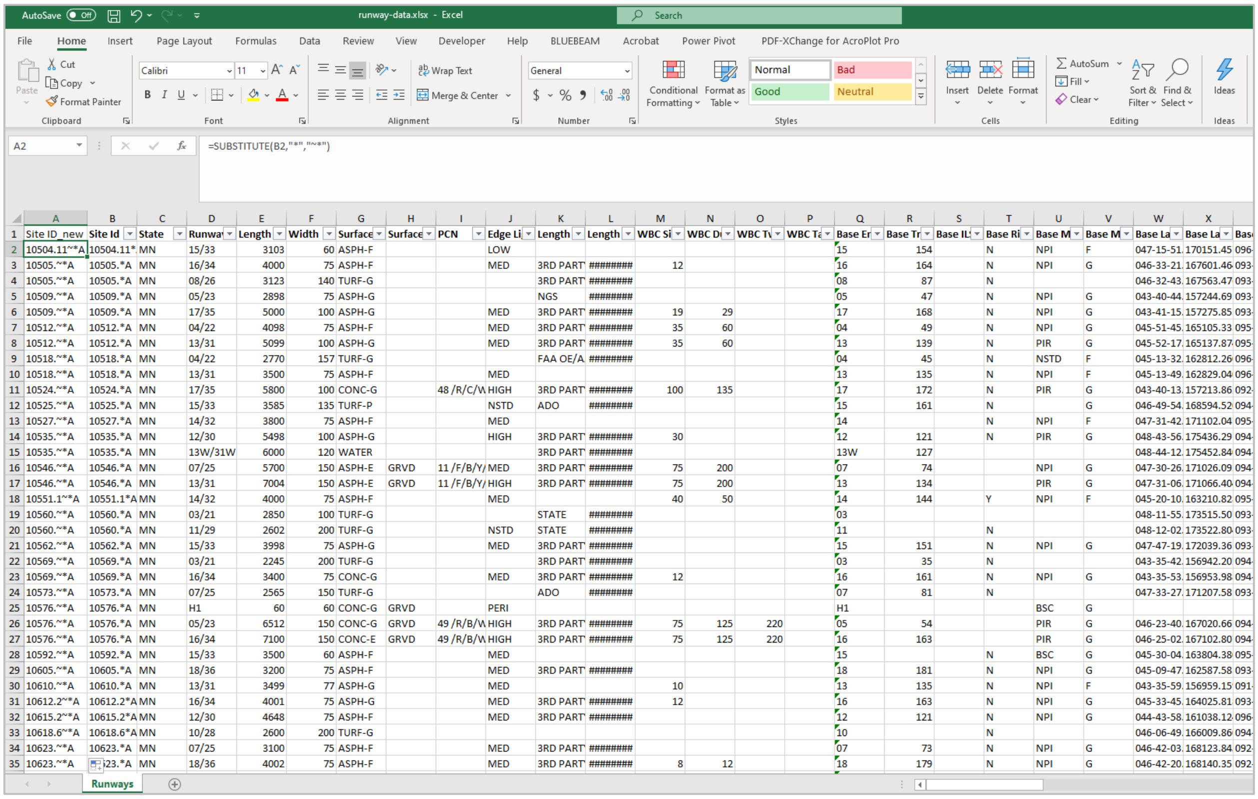
8) Reflect this new data in the "All Flight Plan Details" table included in the FAA Filed Flight Plan Data feature layer. Refer to the MnSASP Hub User's Guide for guidance on updating this data table.

6.4.2.4. Runway Data

The following steps detail how to manipulate the raw runway data pulled from the FAA's ADIP for updating the MnSASP Hub.

1) Navigate to the FAA's ADIP: https://adip.faa.gov/agis/public/#/public.
2) Locate and click "Go To Advanced Facility Search".
3) Using ADIP's advanced facility search, search for all the airports in the state aviation system and click "Execute Search" (as of 1/1/2022, this includes all publicly owned, public use airports in MN).
4) Download the runway and facility datasets.
5) To join the datasets, the Site Id will be used as the common key. However, the Site Ids need to be manipulated to accurately join the airport information using a Vlookup function. Create a new column A in both sheets that will be populated with the manipulated Site Ids.
6) Input the following formula in the first row of the new column that should be referencing the Site Ids: =SUBSTITUTE(B2,"*",".").
7) Copy this formula down through sheet, and repeat for the other sheet (refer to **Figure 6-11** for screenshot reference).

Figure 6-11. Insert Substitute Function for ADIP Runway Data

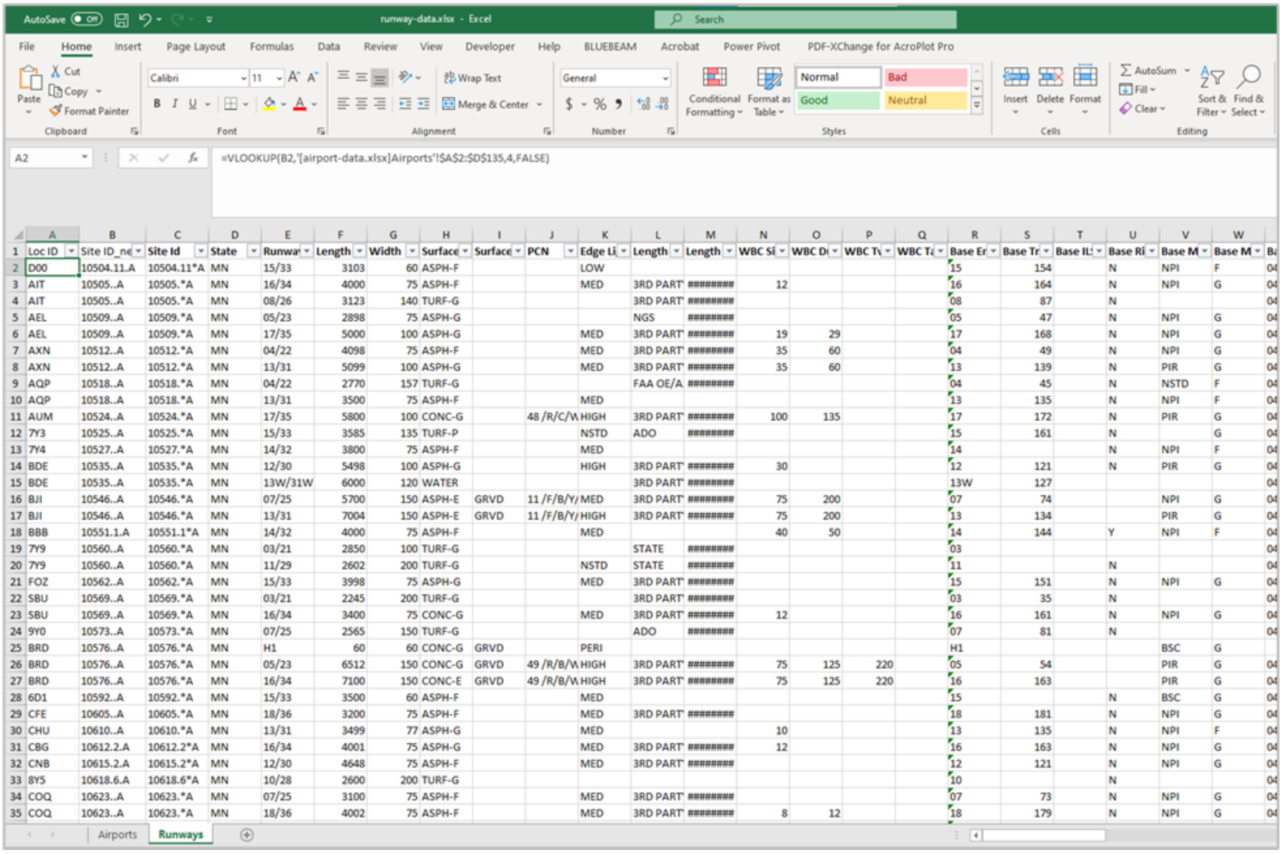


Source: Kimley-Horn, 2022

8) Insert a new column in the runways dataset that will include the FAA three-letter identifiers (titled Loc Id in the airport data sheet).

9) Insert a Vlookup function in the new column to join the Loc ID from the airport data sheet into the runways data sheet using the manipulated site IDs as the common key. See **Figure 6-12** for screenshot reference.

Figure 6-12. Join FAA IDs to ADIP Runway Data



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
1	Loc ID	Site ID_ne	Site Id	State	Runwa	Length	Width	Surface	Surface	PCN	Edge Li	Length	Length	WBC Si	WBC D	WBC T	WBC Ta	Base Er	Base Tr	Base IL	Base Ri	Base M	Base M	Ba
2	D00	10504.11.A	10504.11*A	MN	15/33	3103	60	ASPH-F			LOW							15	154		N	NPI	F	04
3	AIT	10505..A	10505.*A	MN	16/34	4000	75	ASPH-F			MED	3RD PART	########	12				16	164		N	NPI	G	04
4	AIT	10505..A	10505.*A	MN	08/26	3123	140	TURF-G				3RD PART	########					08	87		N			04
5	AEL	10509..A	10509.*A	MN	05/23	2898	75	ASPH-G				NGS	########					05	47		N	NPI	G	04
6	AEL	10509..A	10509.*A	MN	17/35	5000	100	ASPH-G			MED	3RD PART	########	19	29			17	168		N	NPI	G	04
7	AXN	10512..A	10512.*A	MN	04/22	4098	75	ASPH-F			MED	3RD PART	########	35	60			04	49		N	NPI	G	04
8	AXN	10512..A	10512.*A	MN	13/31	5099	100	ASPH-G			MED	3RD PART	########	35	60			13	139		N	PIR	G	04
9	AQP	10518..A	10518.*A	MN	04/22	2770	157	TURF-G				FAA OE/A	########					04	45		N	NSTD	F	04
10	AQP	10518..A	10518.*A	MN	13/31	3500	75	ASPH-F			MED							13	135		N	NPI	F	04
11	AUM	10524..A	10524.*A	MN	17/35	5800	100	CONC-G		48 /R/C/W	HIGH	3RD PART	########	100	135			17	172		N	PIR	G	04
12	7Y3	10525..A	10525.*A	MN	15/33	3585	135	TURF-P			NSTD	ADO	########					15	161		N		G	04
13	7Y4	10527..A	10527.*A	MN	14/32	3800	75	ASPH-F			MED							14			N	NPI	F	04
14	BDE	10535..A	10535.*A	MN	12/30	5498	100	ASPH-G			HIGH	3RD PART	########	30				12	121		N	PIR	G	04
15	BDE	10535..A	10535.*A	MN	13W/31W	6000	120	WATER				3RD PART	########					13W	127					04
16	BJI	10546..A	10546.*A	MN	07/25	5700	150	ASPH-E	GRVD	11 /F/B/Y/	MED	3RD PART	########	75	200			07	74			NPI	G	04
17	BJI	10546..A	10546.*A	MN	13/31	7004	150	ASPH-E	GRVD	11 /F/B/Y/	HIGH	3RD PART	########	75	200			13	134			PIR	G	04
18	BBB	10551.1.A	10551.1*A	MN	14/32	4000	75	ASPH-F			MED			40	50			14	144		Y	NPI	F	04
19	7Y9	10560..A	10560.*A	MN	03/21	2850	100	TURF-G				STATE	########					03						04
20	7Y9	10560..A	10560.*A	MN	11/29	2602	200	TURF-G			NSTD	STATE	########					11			N			04
21	FOZ	10562..A	10562.*A	MN	15/33	3998	75	ASPH-G			MED	3RD PART	########					15	151		N	NPI	G	04
22	SBU	10569..A	10569.*A	MN	03/21	2245	200	TURF-G				3RD PART	########					03	35		N			04
23	SBU	10569..A	10569.*A	MN	16/34	3400	75	CONC-G			MED	3RD PART	########	12				16	161		N	NPI	G	04
24	9Y0	10573..A	10573.*A	MN	07/25	2565	150	TURF-G				ADO	########					07	81		N			04
25	BRD	10576..A	10576.*A	MN	H1	60	60	CONC-G	GRVD		PERI							H1				BSC	G	
26	BRD	10576..A	10576.*A	MN	05/23	6512	150	CONC-G	GRVD	49 /R/B/W	HIGH	3RD PART	########	75	125	220		05	54			PIR	G	04
27	BRD	10576..A	10576.*A	MN	16/34	7100	150	CONC-E	GRVD	49 /R/B/W	HIGH	3RD PART	########	75	125	220		16	163			PIR	G	04
28	6D1	10592..A	10592.*A	MN	15/33	3500	60	ASPH-F			MED							15			N	BSC	G	04
29	CFE	10605..A	10605.*A	MN	18/36	3200	75	ASPH-F			MED	3RD PART	########					18	181		N	NPI	G	04
30	CHU	10610..A	10610.*A	MN	13/31	3499	77	ASPH-G			MED			10				13	135		N	NPI	F	04
31	CBG	10612.2.A	10612.2*A	MN	16/34	4001	75	ASPH-G			MED	3RD PART	########	12				16	163		N	NPI	G	04
32	CNB	10615.2.A	10615.2*A	MN	12/30	4648	75	ASPH-F			MED	3RD PART	########					12	121		N	NPI	G	04
33	8Y5	10618.6.A	10618.6*A	MN	10/28	2600	200	TURF-G										10			N			04
34	COQ	10623..A	10623.*A	MN	07/25	3100	75	ASPH-F			MED	3RD PART	########					07	73		N	NPI	G	04
35	COQ	10623..A	10623.*A	MN	18/36	4002	75	ASPH-F			MED	3RD PART	########	8	12			18	179		N	NPI	G	04

Source: Kimley-Horn, 2022

6.4.2.5. Runway Obstruction Data

As a part of airport 5010 inspections, runways are evaluated for close-in obstructions in the critical areas that can present a risk to arriving/departing aircraft. This runway obstruction information is published in the airport's 5010 report under the remarks section. FAA's ADIP database organizes the remarks data into a separate downloadable dataset that can be pulled using the advanced facilities search query in ADIP. See below for instructions on accessing the remarks data and pulling the runway obstruction data.

1) Navigate to the FAA's ADIP: https://adip.faa.gov/agis/public/#/public.

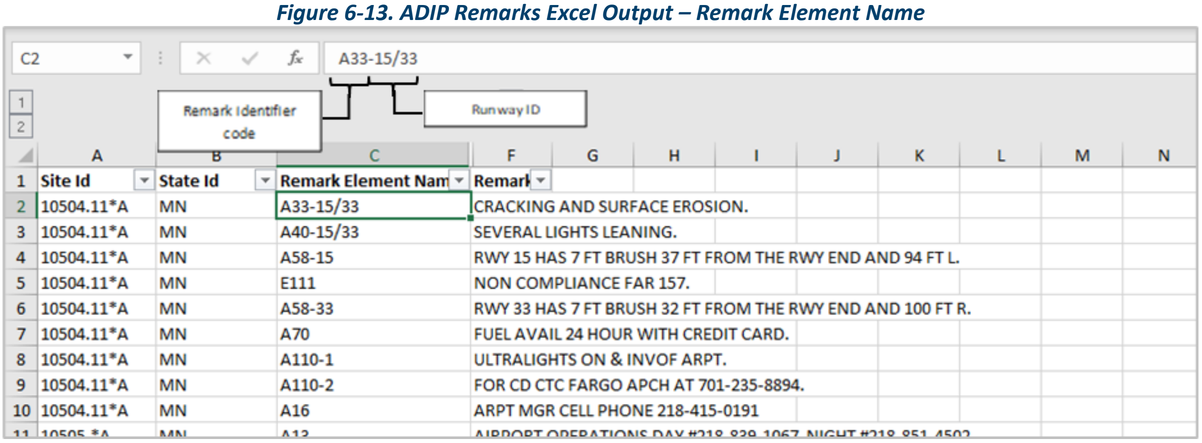
2) Locate and click "Go To Advanced Facility Search."

3) Using ADIP's advanced facility search, search for all the airports in the state aviation system and click "Execute Search" (as of 1/1/2022, this includes all publicly owned, public use airports in MN).

4) Download the Remarks dataset.

5) The Remarks dataset is categorized by type using the "Remark Element Name" field. According to the Airports Master Record Data Dictionary, the records with the remark element name starting with "A58" notes any close-in obstructions affecting a runway. Refer to **Figure 6-13** for a screenshot reference.

Figure 6-13. ADIP Remarks Excel Output – Remark Element Name

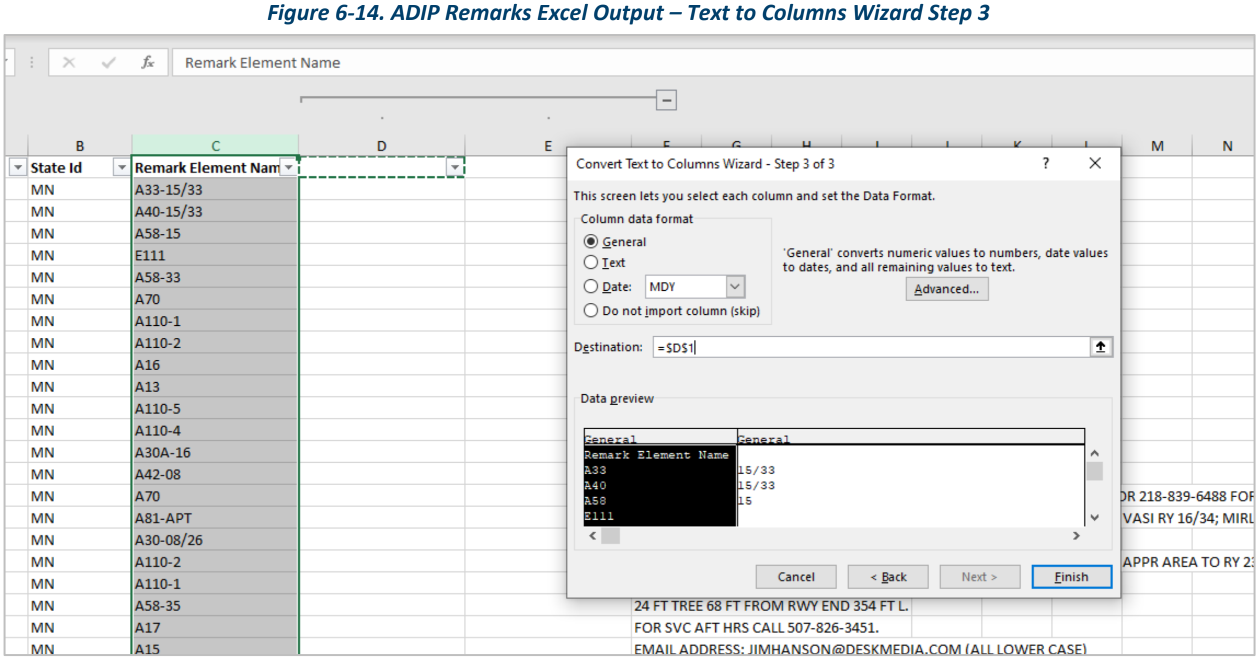


Source: Kimley-Horn, 2022

6) To filter the remarks by the element identifier code "A58", the remark element name column needs to be split by the element identifier code and the airport runway associated to the obstruction. This split information will be contained in two new columns, so create two columns adjacent to the remark element name column. To populate these new columns with the split data, select the remark element name column and use the "Text to Columns" function available in the data tab. Through the function's wizard setup, enter the following criteria:

- Step 1 of 3 (Original data type): "Delimited"
- Step 2 of 3 (Delimiters): Select "Other" and input a hyphen "-"
- Step 3 of 3: Specify the destination as the first cell in the new column (refer to for a screenshot reference in **Figure 6-14**)

Figure 6-14. ADIP Remarks Excel Output – Text to Columns Wizard Step 3



Source: Kimley-Horn, 2022

7) Filter the new remark identifier column to "A58" to isolate the obstruction-related remarks.

8) Use the site IDs and runway IDs to identify the close-in obstructions recorded at the airports. This data will need to be plugged into the Runway Data table included in the MnSASP Hub Airport Data feature layer in the MnSASP Hub. This is a manual process of switching back and forth between Runway Data table and the remarks dataset to populate the obstruction data points in the Runway Data table. Refer to the MnSASP Hub User's Guide for guidance on accessing the MnSASP Hub Airport Data feature layer and updating the Runway Data table.

The Airports Master Record Data Dictionary describes the construct of all the downloadable datasets in ADIP, including the remarks data. Refer to the following link to access the Data Dictionary: https://adip.faa.gov/agis/public/#/onlineAmrDataDictionary.

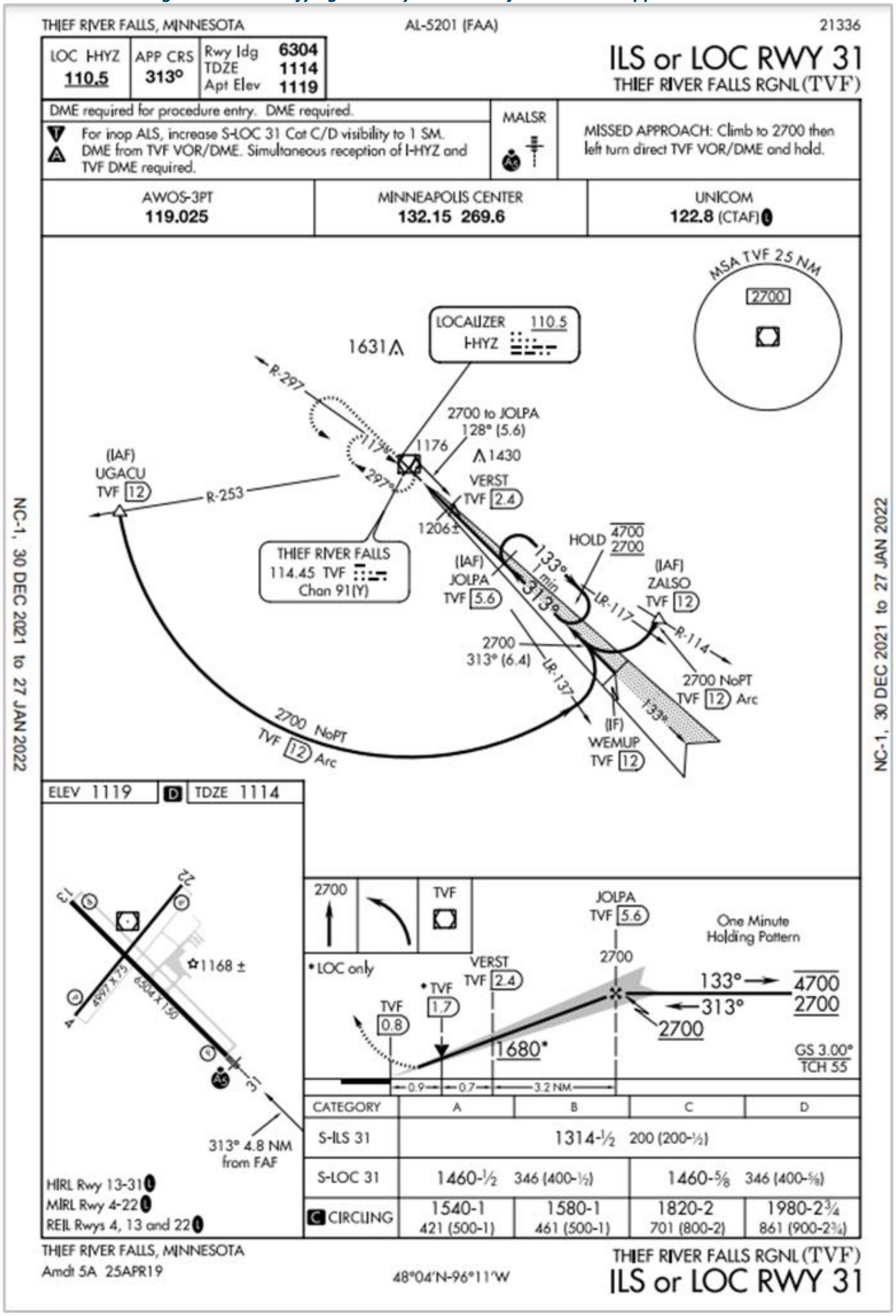
Note that ALPs can help identify other obstructions affecting Minnesota system airport runways and validate the 5010 remarks.

6.4.2.6. Runway Visibility Minimums

The following steps describe how to locate and review FAA-published approach plates to pull the most critical runway visibility minimums established.

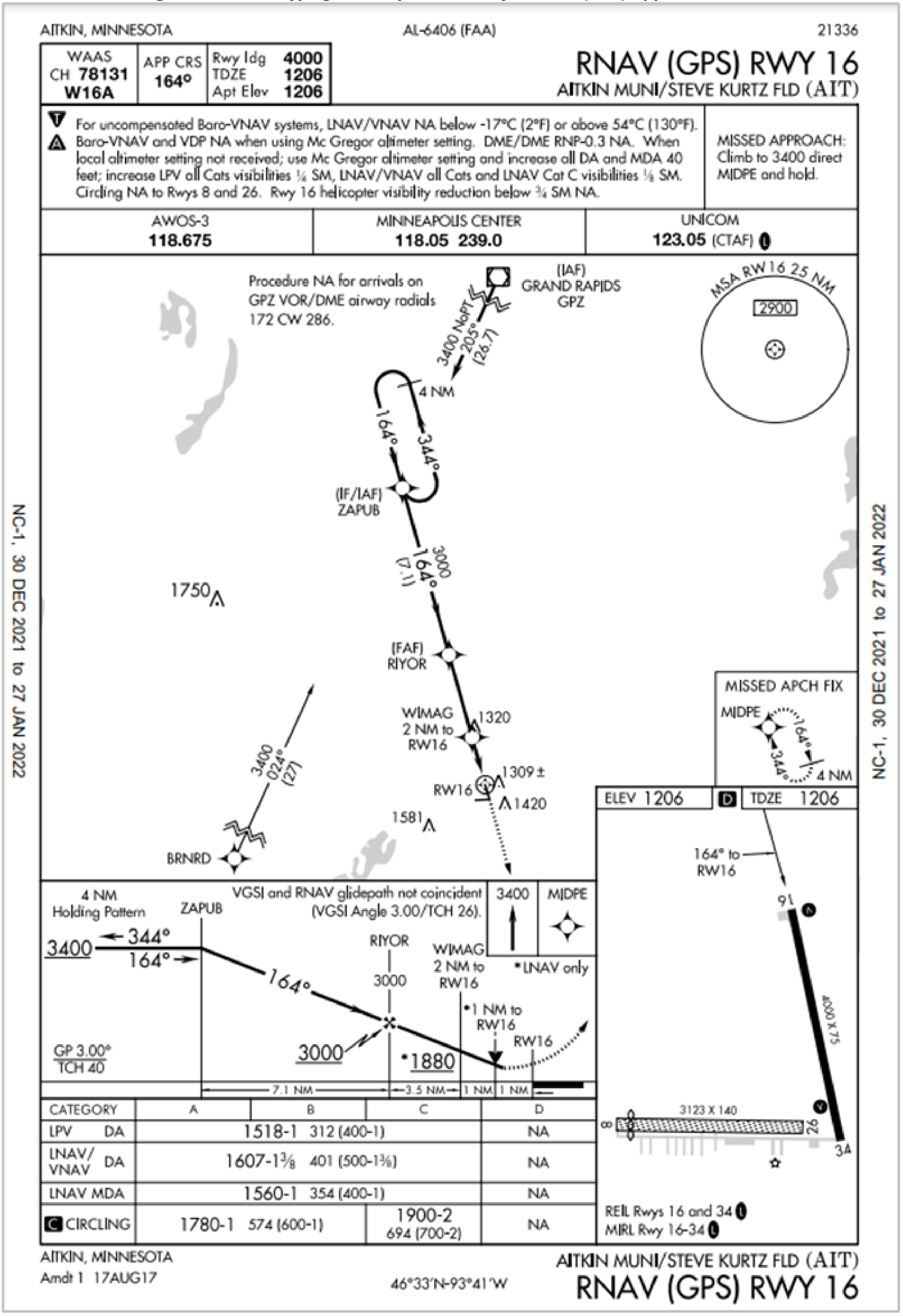
1) In ADIP's basic search query, search for the airport to review using the FAA three-letter identifier.
2) In the left-hand navigation window, locate and click "Charts."
   - If the window is titled "No Charts Found," the airport does not have any instrument approach plates published – there are only visual approach(es) equipped at the airport and the visibility minimums should be noted as "VISUAL."
3) Under the heading "Instrument Approach Procedure (IAP) Charts," there are links to access the approach plates for the runways that have at least one instrument approach. The review of these approach plates should be completed in the following order to pull the lowest possible visibility minimum associated with each runway end (where applicable): ILS or LOC, RNAV (GPS).
4) For the approach plate opened, review the approach categories listed at the bottom. Review the first category listed and identify the number listed after the hyphen. This is the lowest visibility minimum associated with that runway end. Refer to **Figure 6-15** and **Figure 6-16** for screenshot references.

Figure 6-15. Identifying Visibility Minimums for ILS or LOC Approach Plate



Source: FAA ADIP, 2022

Figure 6-16. Identifying Visibility Minimums for RNAV (GPS) Approach Plate



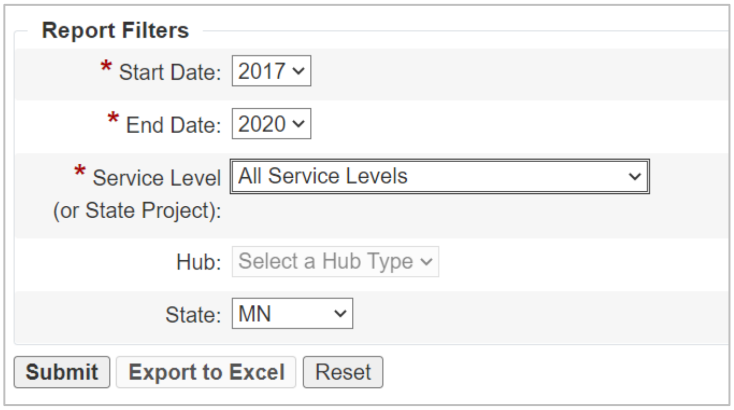
Source: FAA ADIP, 2022

6.4.2.7. *Federal Funding*

The following steps describe how to download FAA AIP grant history and calculate the average annual AIP funding across four years of data.

1) Navigate to the following website: https://www.faa.gov/airports/aip/grant_histories/lookup/.
2) Scroll down the page to the section titled "Report Filters" and input the intended search criteria. Refer to **Figure 6-17** for a screenshot reference.

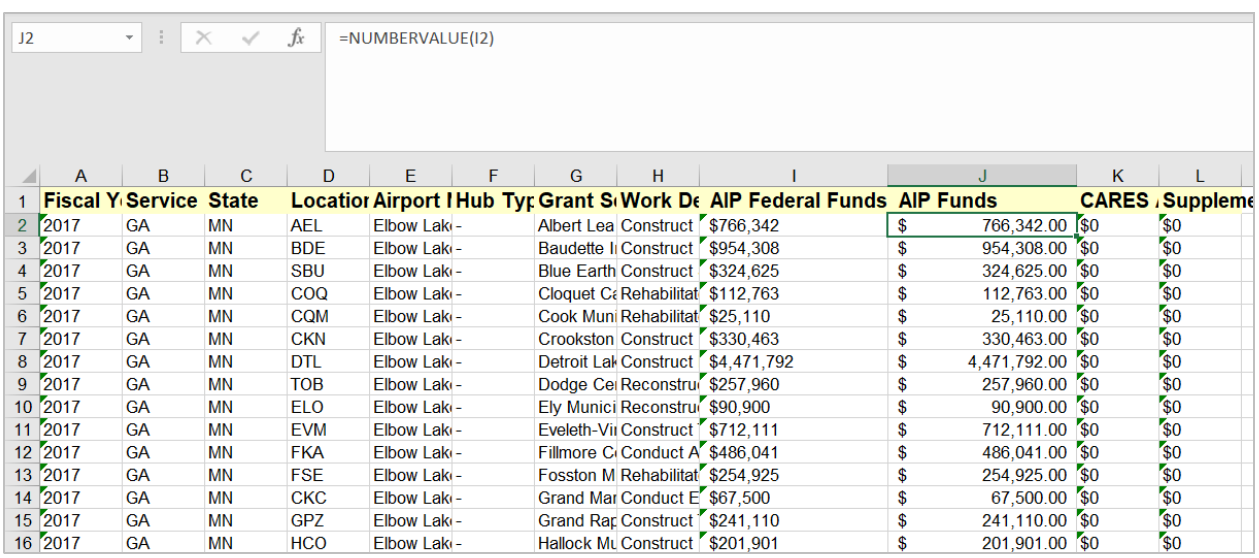
Figure 6-17. AIP Grant History Look-Up Tool



Sources: FAA AIP, 2022

3) Select "Submit" then "Export to Excel" to download an Excel-version of the AIP grant history for all Minnesota airports.
4) Open the downloaded Excel file. The column populated with AIP federal funding data by airport may be in an incompatible data format for analysis (i.e. text format). If this is the case, add a new column and convert the column to a number format. Make sure to title the new column to distinguish it from the raw AIP data column. Refer to **Figure 6-18** for a screenshot reference of the formula to use.

Figure 6-18. AIP Grant History Data – Convert to Number Format

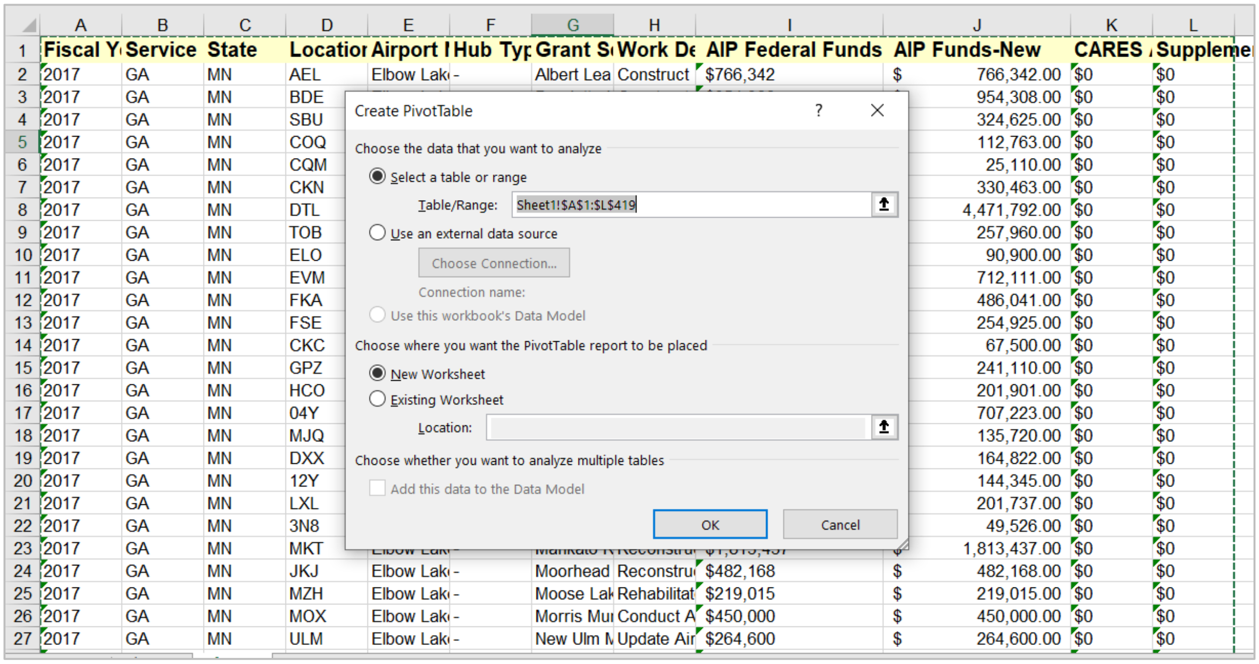

J2 =NUMBERVALUE(I2)

	A	B	C	D	E	F	G	H	I	J	K	L
1	Fiscal Y	Service	State	Locatior	Airport I	Hub Typ	Grant S	Work De	AIP Federal Funds	AIP Funds	CARES	Suppleme
2	2017	GA	MN	AEL	Elbow Lak	-	Albert Lea	Construct	$766,342	$ 766,342.00	$0	$0
3	2017	GA	MN	BDE	Elbow Lak	-	Baudette I	Construct	$954,308	$ 954,308.00	$0	$0
4	2017	GA	MN	SBU	Elbow Lak	-	Blue Earth	Construct	$324,625	$ 324,625.00	$0	$0
5	2017	GA	MN	COQ	Elbow Lak	-	Cloquet C	Rehabilitat	$112,763	$ 112,763.00	$0	$0
6	2017	GA	MN	CQM	Elbow Lak	-	Cook Muni	Rehabilitat	$25,110	$ 25,110.00	$0	$0
7	2017	GA	MN	CKN	Elbow Lak	-	Crookston	Construct	$330,463	$ 330,463.00	$0	$0
8	2017	GA	MN	DTL	Elbow Lak	-	Detroit Lak	Construct	$4,471,792	$ 4,471,792.00	$0	$0
9	2017	GA	MN	TOB	Elbow Lak	-	Dodge Ce	Reconstru	$257,960	$ 257,960.00	$0	$0
10	2017	GA	MN	ELO	Elbow Lak	-	Ely Munici	Reconstru	$90,900	$ 90,900.00	$0	$0
11	2017	GA	MN	EVM	Elbow Lak	-	Eveleth-Vi	Construct	$712,111	$ 712,111.00	$0	$0
12	2017	GA	MN	FKA	Elbow Lak	-	Fillmore C	Conduct A	$486,041	$ 486,041.00	$0	$0
13	2017	GA	MN	FSE	Elbow Lak	-	Fosston M	Rehabilitat	$254,925	$ 254,925.00	$0	$0
14	2017	GA	MN	CKC	Elbow Lak	-	Grand Mar	Conduct E	$67,500	$ 67,500.00	$0	$0
15	2017	GA	MN	GPZ	Elbow Lak	-	Grand Rap	Construct	$241,110	$ 241,110.00	$0	$0
16	2017	GA	MN	HCO	Elbow Lak	-	Hallock Mu	Construct	$201,901	$ 201,901.00	$0	$0

Source: Kimley-Horn, 2022

5) Create a Pivot Table from the full dataset. Refer to **Figure 6-19** for a screenshot reference.

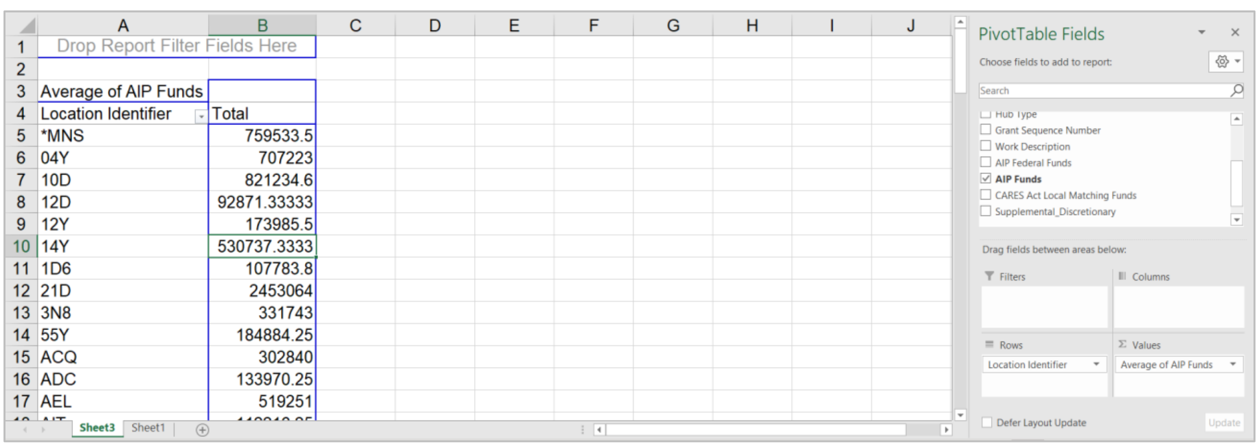
Figure 6-19. AIP Grant History Data – Create Pivot Table



Source: Kimley-Horn, 2022

6) Configure the new Pivot Table to have the average AIP funding by Location ID. The resulting table will have the average 4-year AIP funding by airport ID. Refer to **Figure 6-20** for a screenshot reference.

Figure 6-20. AIP Grant History Data – Configure Pivot Table



Source: Kimley-Horn, 2022

6.4.2.8. State and Local Funding

The Excel output[47] generated from the MnDOT ACE database includes seven labeled header categories, with the actual data occupying a maximum of five columns. The data are organized by three-letter identifiers, which are included as individual header rows, and include all of the airport's specific project funding data under each airport's header row. There are also blank rows that serve to separate each airport's project funding data. In total, there are five types of rows observed in the raw dataset. Given the complexity of the rows, which results in the data not being organized in an intuitive way to review the historical project data by airport, there are three major tasks to organize the data for easily pulling the state and local funding data aggregated by airport.

- Identify Types of Rows: Identify and denote each row with the type of data populated
- Reformat Data based on the Row Type: Reformat the data based on the row types populated in the previous step
- Filtering for Relevant Data: The reformatted data is pulled into another sheet and filtered by the relevant data rows to make the final dataset concise and setup for further analyses

Each of these steps is described in detail below. Figure 6-21 presents a comparison between a sample of the source data and the results of the data manipulation steps.

Figure 6-21. ACE Project Data Output vs Desired Format

Region	Ident	Municipality	Payment Date	Federal	State	Local
E						
6D1	BROOTEN					
>---- Brooten Airport ----<	05/28/1958	$0.00	$9,545.01	$0.00		
GRADING, PAVING, DRAINAGE	12/18/1978	$0.00	$162,641.62	$41,513.84		
LAND	12/14/1978	$0.00	$122,000.00	$36,882.44		
PAVEMENT CRACK REPAIR	10/19/1991	$0.00	$9,966.67	$4,983.33		

Sample of data export

Region	Ident	Municipality		Payment Date	Federal	State	Local
E	6D1	BROOTEN	>---- Brooten Airport ----<	05/28/1958	$0.00	$9,545.01	$0.00
E	6D1	BROOTEN	GRADING, PAVING, DRAINAGE	12/18/1978	$0.00	$162,641.62	$41,513.84
E	6D1	BROOTEN	LAND	12/14/1978	$0.00	$122,000.00	$36,882.44
E	6D1	BROOTEN	PAVEMENT CRACK REPAIR	10/19/1991	$0.00	$9,966.67	$4,983.33

Sample of desired format, where each row can be understood by itself.

Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Identify Types of Rows

There are five categories of rows observed in the output:

- Airport or category name
- Total rows
- Blank spacer rows

[47] *The data manipulation plan described in this section is based on the Excel output provided to Kimley-Horn on 04/08/2021 and is subject to change based on formatting changes to the output.*

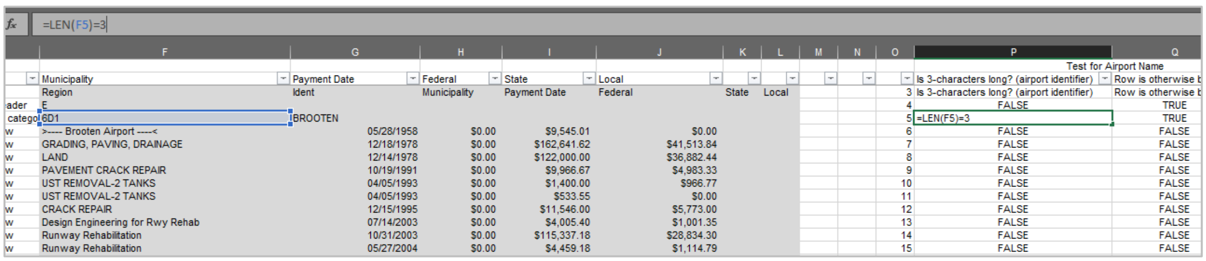
- Region header
- Normal row – project name and funding amounts

"Flags" for these categories were created in individual "helper columns" alongside the original data.

Airport or Category Name

Columns Q, R, and R: If the value in the first column is three characters long (column P) and the row had blank cells in the last three columns (Column Q), then it is a header for a new airport. Less than a dozen other rows identified should be treated in this manner, but which did not have the three-letter airport identifiers in the first column. These were identified by the pattern of blank and non-blank columns. Refer to **Figure 6-22**, **Figure 6-23**, and **Figure 6-24** for a screenshot reference for each column.

Figure 6-22. ACE Data Manipulation – Column P

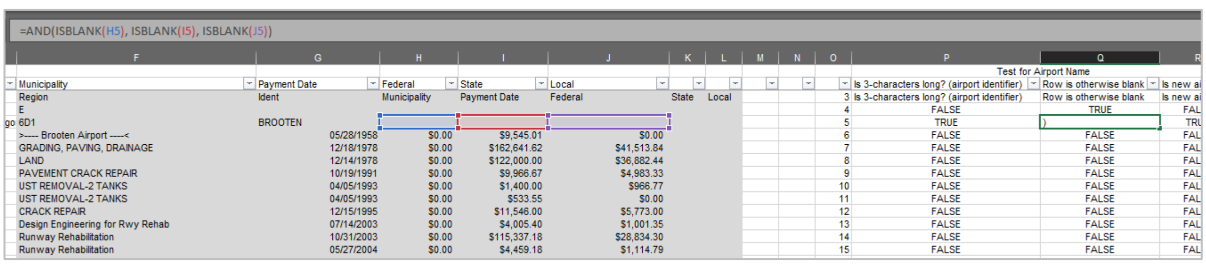


=LEN(F5)=3

	F	G	H	I	J	K	L	O	P	Q
									Test for Airport Name	
	Municipality	Payment Date	Federal	State	Local				Is 3-characters long? (airport identifier)	Row is otherwise b
	Region	Ident	Municipality	Payment Date	Federal	State	Local	3	Is 3-characters long? (airport identifier)	Row is otherwise b
ader	E							4	FALSE	TRUE
catego	6D1	BROOTEN						5	=LEN(F5)=3	TRUE
w	>---- Brooten Airport ----<	05/28/1958	$0.00	$9,545.01	$0.00			6	FALSE	FALSE
w	GRADING, PAVING, DRAINAGE	12/18/1978	$0.00	$162,641.62	$41,513.84			7	FALSE	FALSE
w	LAND	12/14/1978	$0.00	$122,000.00	$36,882.44			8	FALSE	FALSE
w	PAVEMENT CRACK REPAIR	10/19/1991	$0.00	$9,966.67	$4,983.33			9	FALSE	FALSE
w	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$1,400.00	$966.77			10	FALSE	FALSE
w	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$533.55	$0.00			11	FALSE	FALSE
w	CRACK REPAIR	12/15/1995	$0.00	$11,546.00	$5,773.00			12	FALSE	FALSE
w	Design Engineering for Rwy Rehab	07/14/2003	$0.00	$4,005.40	$1,001.35			13	FALSE	FALSE
w	Runway Rehabilitation	10/31/2003	$0.00	$115,337.18	$28,834.30			14	FALSE	FALSE
w	Runway Rehabilitation	05/27/2004	$0.00	$4,459.18	$1,114.79			15	FALSE	FALSE

Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Figure 6-23. ACE Data Manipulation – Column Q

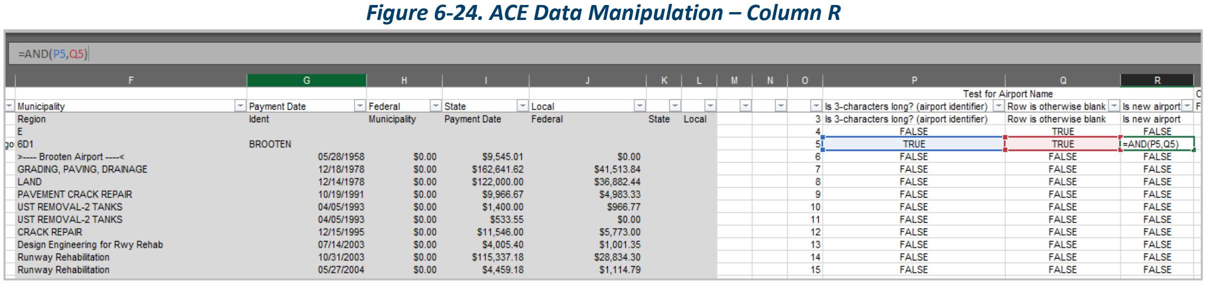


=AND(ISBLANK(H5), ISBLANK(I5), ISBLANK(J5))

	F	G	H	I	J	K	L	O	P	Q	R
									Test for Airport Name		
	Municipality	Payment Date	Federal	State	Local				Is 3-characters long? (airport identifier)	Row is otherwise blank	Is new ai
	Region	Ident	Municipality	Payment Date	Federal	State	Local	3	Is 3-characters long? (airport identifier)	Row is otherwise blank	Is new ai
	E							4	FALSE	TRUE	FAL
go	6D1	BROOTEN						5	TRUE	)	TRU
	>---- Brooten Airport ----<	05/28/1958	$0.00	$9,545.01	$0.00			6	FALSE	FALSE	FAL
	GRADING, PAVING, DRAINAGE	12/18/1978	$0.00	$162,641.62	$41,513.84			7	FALSE	FALSE	FAL
	LAND	12/14/1978	$0.00	$122,000.00	$36,882.44			8	FALSE	FALSE	FAL
	PAVEMENT CRACK REPAIR	10/19/1991	$0.00	$9,966.67	$4,983.33			9	FALSE	FALSE	FAL
	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$1,400.00	$966.77			10	FALSE	FALSE	FAL
	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$533.55	$0.00			11	FALSE	FALSE	FAL
	CRACK REPAIR	12/15/1995	$0.00	$11,546.00	$5,773.00			12	FALSE	FALSE	FAL
	Design Engineering for Rwy Rehab	07/14/2003	$0.00	$4,005.40	$1,001.35			13	FALSE	FALSE	FAL
	Runway Rehabilitation	10/31/2003	$0.00	$115,337.18	$28,834.30			14	FALSE	FALSE	FAL
	Runway Rehabilitation	05/27/2004	$0.00	$4,459.18	$1,114.79			15	FALSE	FALSE	FAL

Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Figure 6-24. ACE Data Manipulation – Column R



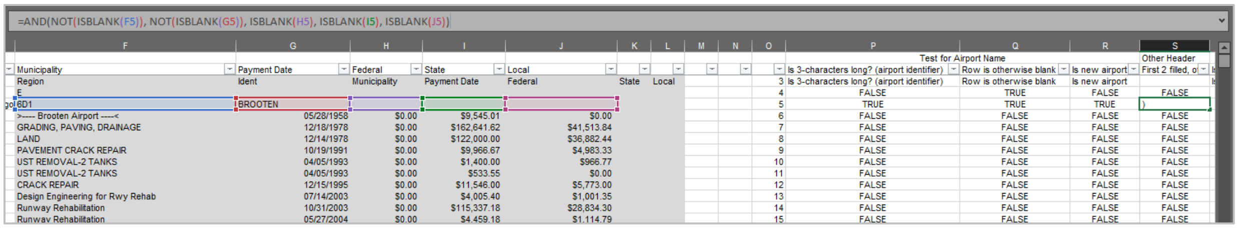
=AND(P5,Q5)

	F	G	H	I	J	K	L	O	P	Q	R
									Test for Airport Name		
	Municipality	Payment Date	Federal	State	Local				Is 3-characters long? (airport identifier)	Row is otherwise blank	Is new airport
	Region	Ident	Municipality	Payment Date	Federal	State	Local	3	Is 3-characters long? (airport identifier)	Row is otherwise blank	Is new airport
	E							4	FALSE	TRUE	FALSE
go	6D1	BROOTEN						5	TRUE	TRUE	=AND(P5,Q5)
	>---- Brooten Airport ----<	05/28/1958	$0.00	$9,545.01	$0.00			6	FALSE	FALSE	FALSE
	GRADING, PAVING, DRAINAGE	12/18/1978	$0.00	$162,641.62	$41,513.84			7	FALSE	FALSE	FALSE
	LAND	12/14/1978	$0.00	$122,000.00	$36,882.44			8	FALSE	FALSE	FALSE
	PAVEMENT CRACK REPAIR	10/19/1991	$0.00	$9,966.67	$4,983.33			9	FALSE	FALSE	FALSE
	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$1,400.00	$966.77			10	FALSE	FALSE	FALSE
	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$533.55	$0.00			11	FALSE	FALSE	FALSE
	CRACK REPAIR	12/15/1995	$0.00	$11,546.00	$5,773.00			12	FALSE	FALSE	FALSE
	Design Engineering for Rwy Rehab	07/14/2003	$0.00	$4,005.40	$1,001.35			13	FALSE	FALSE	FALSE
	Runway Rehabilitation	10/31/2003	$0.00	$115,337.18	$28,834.30			14	FALSE	FALSE	FALSE
	Runway Rehabilitation	05/27/2004	$0.00	$4,459.18	$1,114.79			15	FALSE	FALSE	FALSE

Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Column S: If the row had blank cells in the last three columns, and the first two columns were not blank, then it is a header that should be treated in a similar manner to an airport header. Refer to **Figure 6-25** for a screenshot reference of this column.

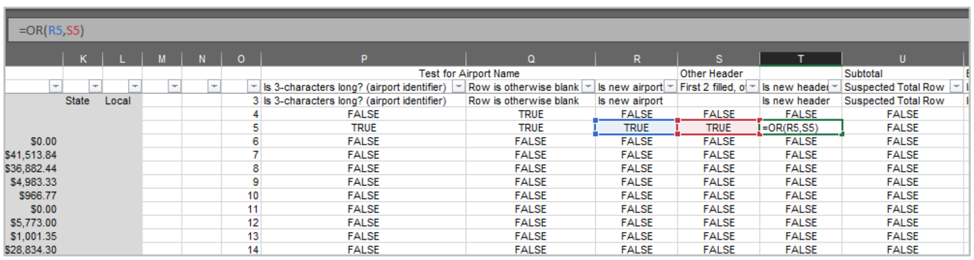
Figure 6-25. ACE Data Manipulation – Column S



Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Column T: If it is an airport header flagged in column R or a header flagged in column S, it is a new header. Refer to **Figure 6-26** for a screenshot reference of this column.

Figure 6-26. ACE Data Manipulation – Column T



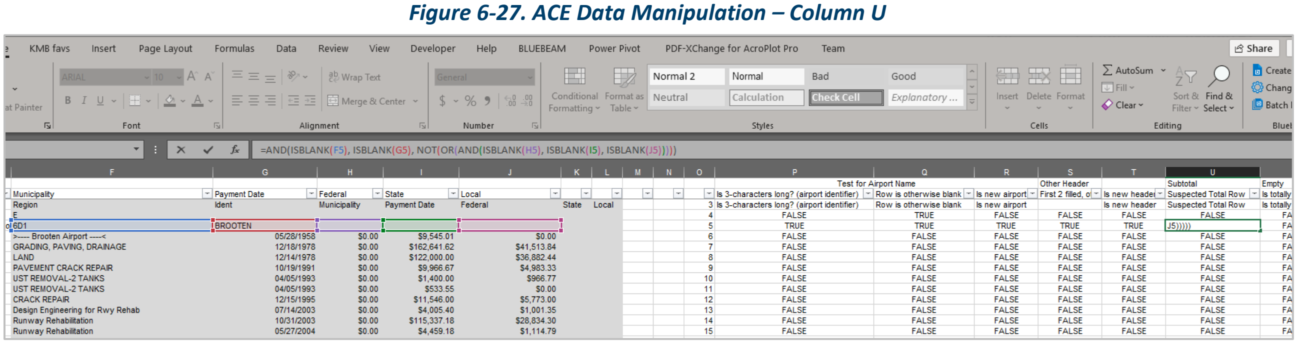
Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Total Row

Total rows do not have labels in the first two columns, but have values in all the last three columns.

Column U: If the first and second columns are both blank and none of the last three columns are blank, then it is a total row. Refer to **Figure 6-27** for a screenshot reference of this column.

Figure 6-27. ACE Data Manipulation – Column U



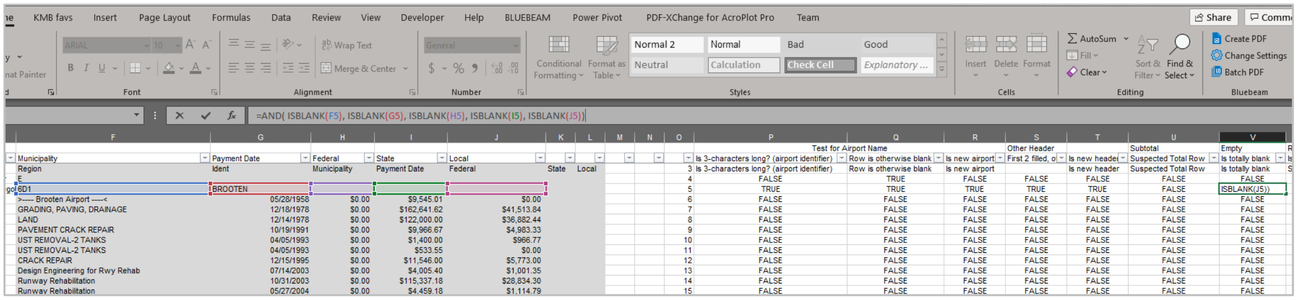
Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Blank Spacer Rows

Some rows were entirely blank, typically before a total row.

Column V: If all five columns are blank, it is a spacer row. Refer to **Figure 6-28** for a screenshot reference of this column.

Figure 6-28 - ACE Data Manipulation – Column V



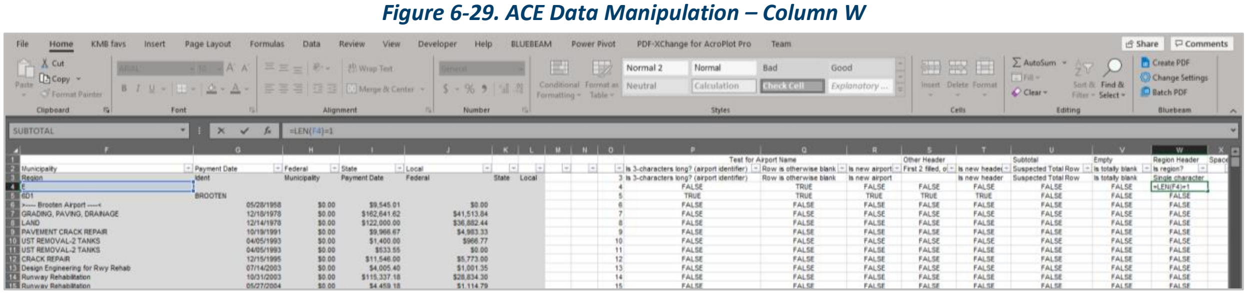
Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Region Header

Region header rows were observed to have a single character in the first column, such as "E."

Column W: If the value in the first column is one character long, it is a Region Header. Refer to **Figure 6-29** for a screenshot reference of this column.

Figure 6-29. ACE Data Manipulation – Column W



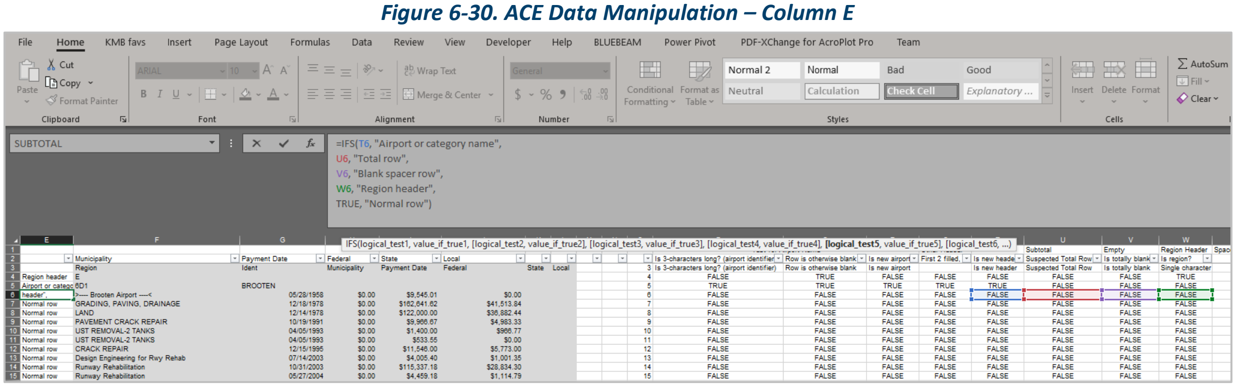
Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Normal Project Row

Having ruled out the other types of row data, anything remaining was considered a normal row.

Embedded in Column E: If none of the other patterns were found, label it a normal row. Refer to **Figure 6-30** for a screenshot reference of this column.

Figure 6-30. ACE Data Manipulation – Column E



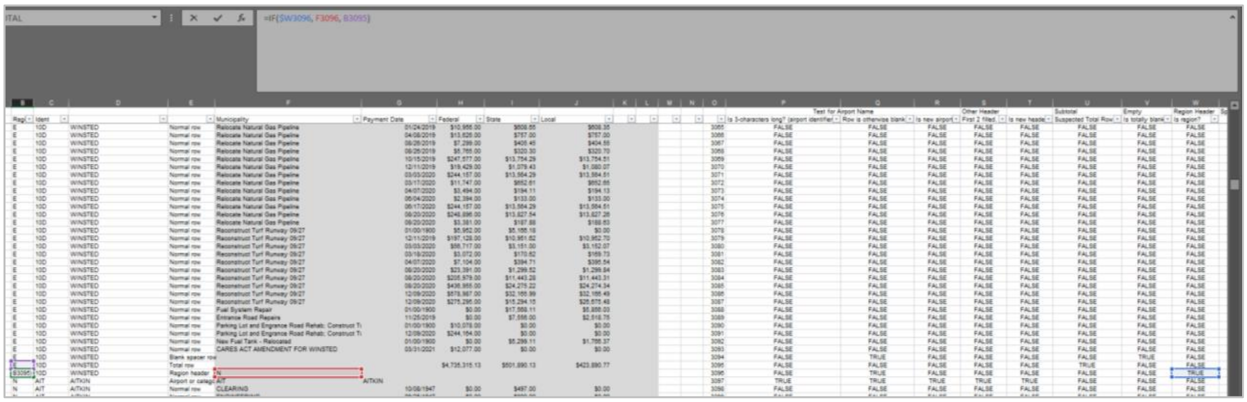
Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Reformatting Data Based on the Row Type

The next step is to list the heading information of Region, Airport Identifier, and Municipality for each row so that a single row identified a project, airport, and region, without needing to visually reference previous rows. Some "helper columns" were created to the left of the original data.

Region (Column B): If this row is flagged as a Region Header, list the current row's value for Region Header; otherwise, show the Region Header from this column in the previous row. Refer to **Figure 6-31** for a screenshot reference of this column.

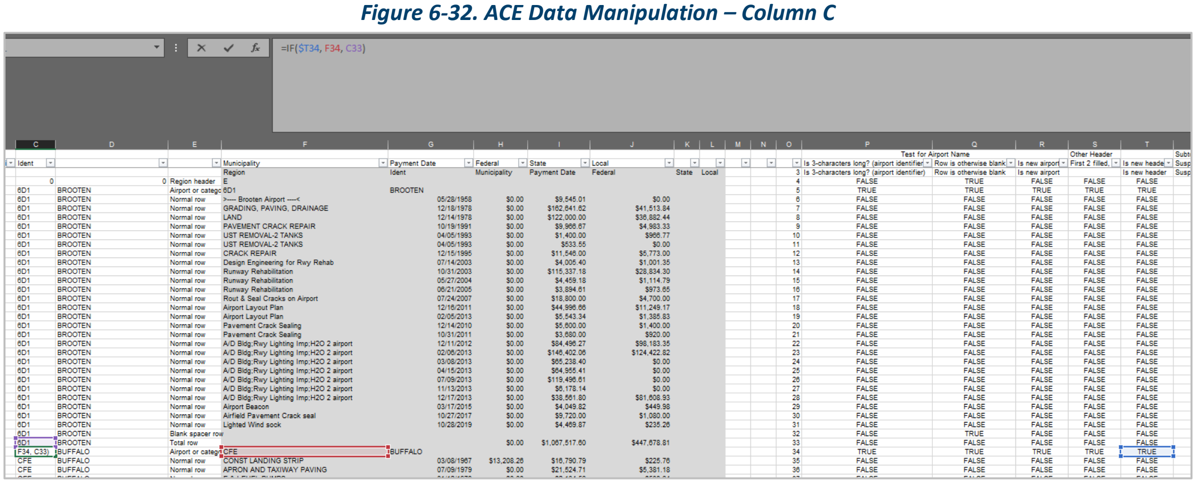
Figure 6-31. ACE Data Manipulation – Column B



Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Airport Identifier (Column C): If this row is flagged as an Airport or Category Name, list the current row's value from the first column of data; otherwise, show the Airport Identifier from this column in the previous row. Refer to **Figure 6-32** for a screenshot reference of this column.

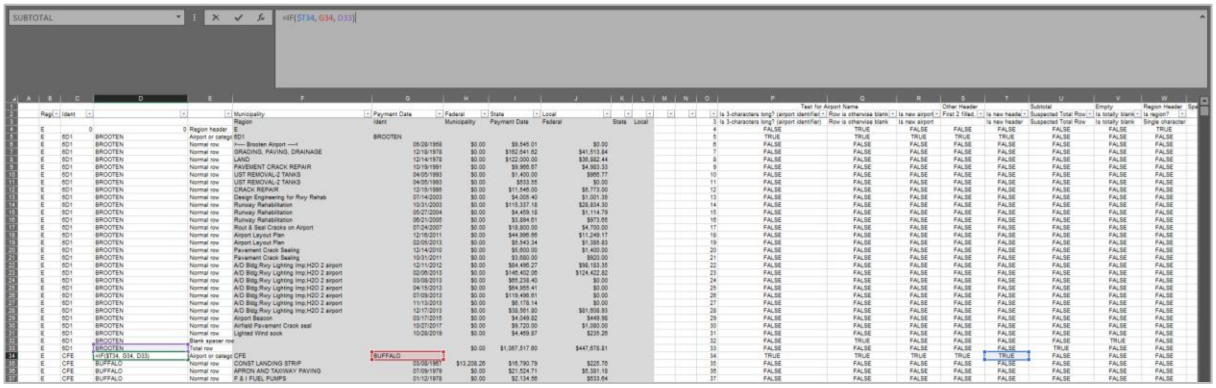
Figure 6-32. ACE Data Manipulation – Column C



Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Municipality (Column D): If this row is flagged as an Airport or Category Name, list the current row's value from the second column of data; otherwise, show the Municipality from this column in the previous row. Refer to **Figure 6-33** for a screenshot reference of this column.

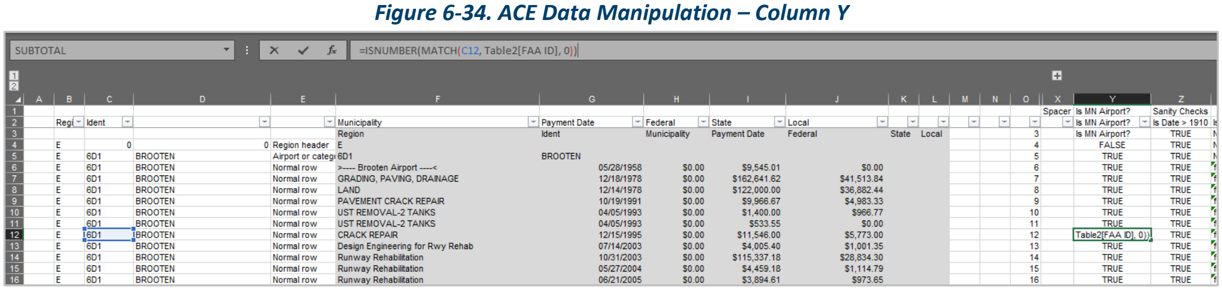
Figure 6-33. ACE Data Manipulation – Column D



Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Is MN Airport? (Column Y): Using the helper column with Airport Identifier for each row, this column checked for a match for a three-letter airport identifier was found in the list of Minnesota Airport's FAA IDs. Refer to **Figure 6-34** for a screenshot reference of this column.

Figure 6-34. ACE Data Manipulation – Column Y



Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

Filtering for Relevant Data

The data of interest in the reformatted data sheet are just those rows of project funding that are for airports in Minnesota. The airport and region header information had already been listed for each row, so rows containing just that information were no longer important. Spacer rows had never contained information, and total rows were unnecessary for an analysis in spreadsheet software.

To remove the extraneous rows described above, filter Row Category (Column E) to "Normal Row" and Is MN Airport (Column Y) to True. Copy this filtered result into a new worksheet to create a fresh dataset to conduct further analyses on (refer to **Figure 6-35** for a screenshot reference).

Figure 6-35. Relevant ACE Data

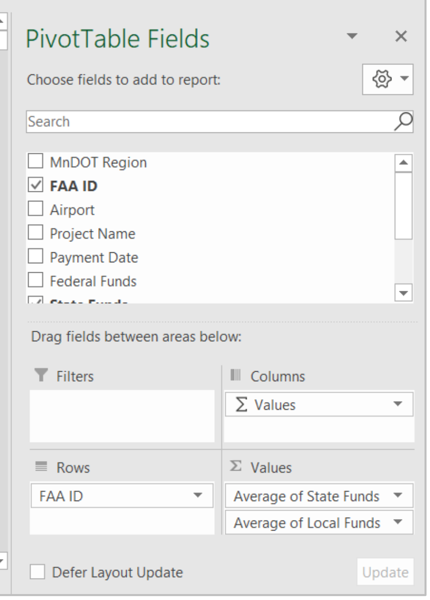
	A	B	C	D	E	F	G	H	I	J
1	Row Numb	Regi	Iden		Category	Municipality	Payment Da	Federal	State	Local
2	6	E	6D1	BROOTEN	Normal row	>---- Brooten Airport ----<	05/28/1958	$0.00	$9,545.01	$0.00
3	7	E	6D1	BROOTEN	Normal row	GRADING, PAVING, DRAINAGE	12/18/1978	$0.00	$162,641.62	$41,513.84
4	8	E	6D1	BROOTEN	Normal row	LAND	12/14/1978	$0.00	$122,000.00	$36,882.44
5	9	E	6D1	BROOTEN	Normal row	PAVEMENT CRACK REPAIR	10/19/1991	$0.00	$9,966.67	$4,983.33
6	10	E	6D1	BROOTEN	Normal row	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$1,400.00	$966.77
7	11	E	6D1	BROOTEN	Normal row	UST REMOVAL-2 TANKS	04/05/1993	$0.00	$533.55	$0.00
8	12	E	6D1	BROOTEN	Normal row	CRACK REPAIR	12/15/1995	$0.00	$11,546.00	$5,773.00
9	13	E	6D1	BROOTEN	Normal row	Design Engineering for Rwy Rehab	07/14/2003	$0.00	$4,005.40	$1,001.35
10	14	E	6D1	BROOTEN	Normal row	Runway Rehabilitation	10/31/2003	$0.00	$115,337.18	$28,834.30
11	15	E	6D1	BROOTEN	Normal row	Runway Rehabilitation	05/27/2004	$0.00	$4,459.18	$1,114.79
12	16	E	6D1	BROOTEN	Normal row	Runway Rehabilitation	06/21/2005	$0.00	$3,894.61	$973.65
13	17	E	6D1	BROOTEN	Normal row	Rout & Seal Cracks on Airport	07/24/2007	$0.00	$18,800.00	$4,700.00
14	18	E	6D1	BROOTEN	Normal row	Airport Layout Plan	12/16/2011	$0.00	$44,996.66	$11,249.17
15	19	E	6D1	BROOTEN	Normal row	Airport Layout Plan	02/05/2013	$0.00	$5,543.34	$1,385.83
16	20	E	6D1	BROOTEN	Normal row	Pavement Crack Sealing	12/14/2010	$0.00	$5,600.00	$1,400.00
17	21	E	6D1	BROOTEN	Normal row	Pavement Crack Sealing	10/31/2011	$0.00	$3,680.00	$920.00
18	22	E	6D1	BROOTEN	Normal row	A/D Bldg;Rwy Lighting Imp;H2O 2 airport	12/11/2012	$0.00	$84,496.27	$98,183.35
19	23	E	6D1	BROOTEN	Normal row	A/D Bldg;Rwy Lighting Imp;H2O 2 airport	02/06/2013	$0.00	$146,402.06	$124,422.82
20	24	E	6D1	BROOTEN	Normal row	A/D Bldg;Rwy Lighting Imp;H2O 2 airport	03/08/2013	$0.00	$65,238.40	$0.00
21	25	E	6D1	BROOTEN	Normal row	A/D Bldg;Rwy Lighting Imp;H2O 2 airport	04/15/2013	$0.00	$64,955.41	$0.00
22	26	E	6D1	BROOTEN	Normal row	A/D Bldg;Rwy Lighting Imp;H2O 2 airport	07/09/2013	$0.00	$119,496.61	$0.00
23	27	E	6D1	BROOTEN	Normal row	A/D Bldg;Rwy Lighting Imp;H2O 2 airport	11/13/2013	$0.00	$6,178.14	$0.00

Sources: MnDOT Aeronautics ACE Database, 2021; Kimley-Horn, 2022

To calculate the four-year average state and local project received by airport, create and configure a pivot table from this new dataset. Refer to **Figure 6-36** for a screenshot reference.

Figure 6-36. ACE Data Pivot Table Analysis

Row Labels	Average of State Funds	Average of Local Funds
04Y	8334.204298	4925.572807
05Y	11079.71486	3991.294286
06Y	19837.02885	5249.224231
07Y	18888.65667	1874.286667
10D	4647.130833	3924.914537
12D	11025.49363	6769.008901
12Y	13402.60436	10215.24574
13Y	11829.181	2911.646
14Y	8072.603182	8200.850152
16D	23116.19233	8413.665342
18Y	10528.66815	3240.961852
1D6	5527.057761	4778.997313
21D	50306.26959	32163.41247
23D	14725.435	1161.666667
25D	87079.51806	32702.50484
3G2	28364.40923	6881.400769
3N8	3604.310303	2360.916061
43Y	27681.70875	4613.21375
47Y	14034.97593	5346.108519
48Y	15536.88413	6980.234348
52Y	5691.863	1552.257



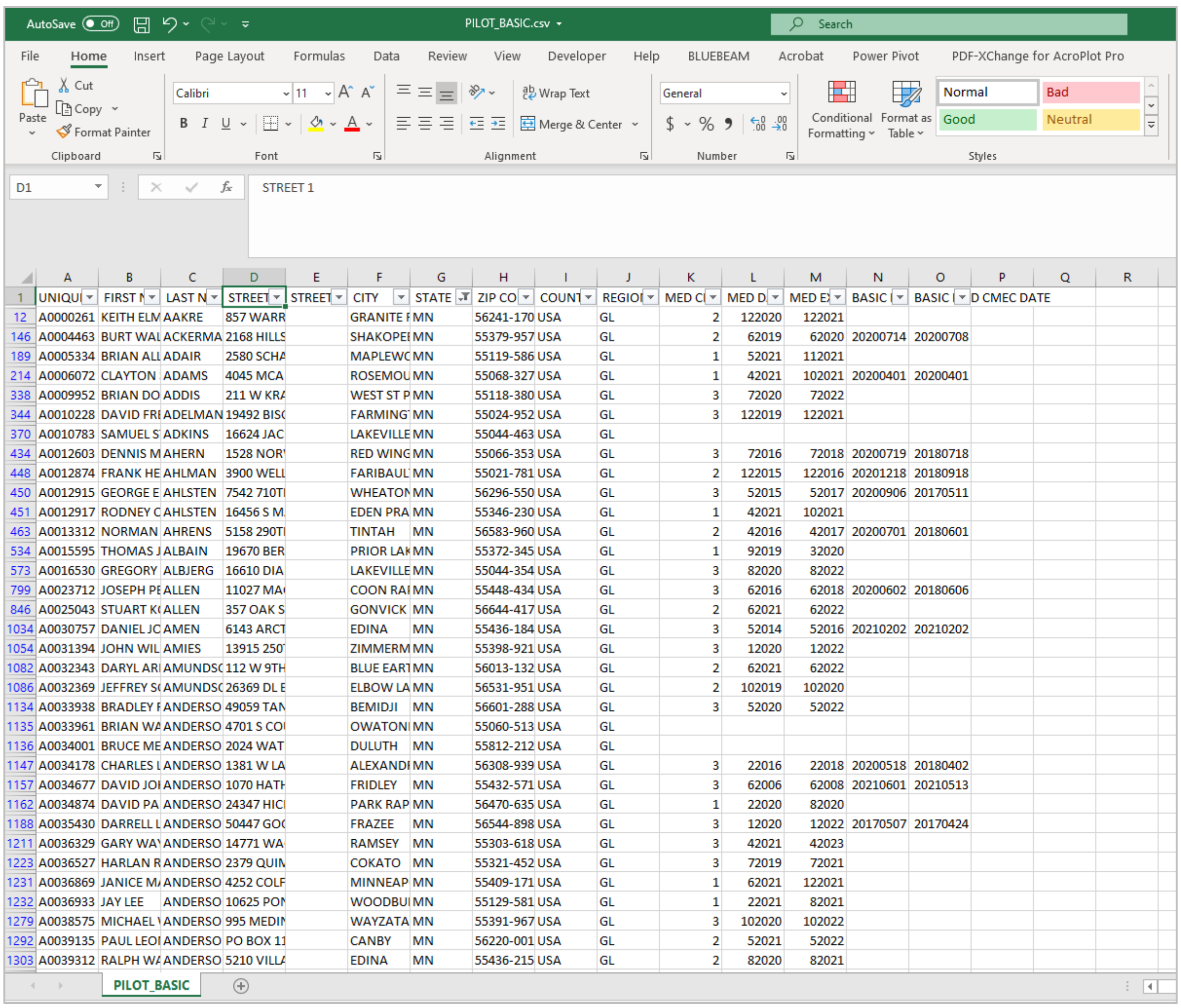
Source: Kimley-Horn, 2022

6.4.2.9. *Certified Pilots within 30 Nautical Miles*

The following steps describe the process for pulling the FAA's Airmen Certification Database and manipulating the data to conform with the MnSASP data parameters.

1) Navigate to the following website: https://www.faa.gov/licenses_certificates/airmen_certification/releasable_airmen_download/.
2) Download the full FAA Airmen Certification Database in comma separated format (CSV) and extract all the contents of the zip folder.
3) The "PILOT_BASIC.csv" file records all the certified pilots based in the United States. Open this file and ensure that the sheet contains the following information: street address, city, state, and zip code.
4) Add a filter to the header row of the data and use the dropdown for state to select "MN" only. Refer to **Figure 6-37** for a screenshot reference.

Figure 6-37. Filter Certified Pilot Data to Minnesota-Based Pilots Only

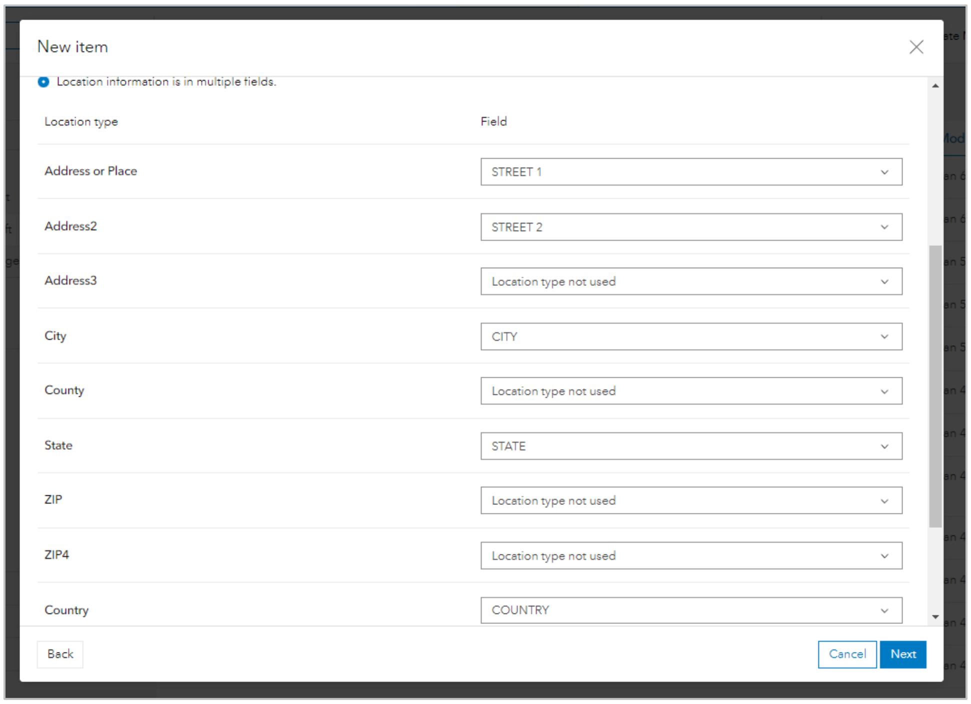


	UNIQU	FIRST N	LAST N	STREET	STREET	CITY	STATE	ZIP CO	COUNT	REGIO	MED C	MED D	MED E	BASIC	BASIC	D CMEC DATE
12	A0000261	KEITH ELM	AAKRE	857 WARR		GRANITE F	MN	56241-170	USA	GL	2	122020	122021			
146	A0004463	BURT WAL	ACKERMA	2168 HILLS		SHAKOPEI	MN	55379-957	USA	GL	2	62019	62020	20200714	20200708	
189	A0005334	BRIAN ALL	ADAIR	2580 SCHA		MAPLEWC	MN	55119-586	USA	GL	1	52021	112021			
214	A0006072	CLAYTON	ADAMS	4045 MCA		ROSEMOU	MN	55068-327	USA	GL	1	42021	102021	20200401	20200401	
338	A0009952	BRIAN DO	ADDIS	211 W KRA		WEST ST P	MN	55118-380	USA	GL	3	72020	72022			
344	A0010228	DAVID FRI	ADELMAN	19492 BISC		FARMING	MN	55024-952	USA	GL	3	122019	122021			
370	A0010783	SAMUEL S	ADKINS	16624 JAC		LAKEVILLE	MN	55044-463	USA	GL						
434	A0012603	DENNIS M	AHERN	1528 NOR		RED WING	MN	55066-353	USA	GL	3	72016	72018	20200719	20180718	
448	A0012874	FRANK HE	AHLMAN	3900 WELL		FARIBAUL	MN	55021-781	USA	GL	2	122015	122016	20201218	20180918	
450	A0012915	GEORGE E	AHLSTEN	7542 710TI		WHEATON	MN	56296-550	USA	GL	3	52015	52017	20200906	20170511	
451	A0012917	RODNEY C	AHLSTEN	16456 S M.		EDEN PRA	MN	55346-230	USA	GL	1	42021	102021			
463	A0013312	NORMAN	AHRENS	5158 290TI		TINTAH	MN	56583-960	USA	GL	2	42016	42017	20200701	20180601	
534	A0015595	THOMAS J	ALBAIN	19670 BER		PRIOR LAK	MN	55372-345	USA	GL	1	92019	32020			
573	A0016530	GREGORY	ALBJERG	16610 DIA		LAKEVILLE	MN	55044-354	USA	GL	3	82020	82022			
799	A0023712	JOSEPH PE	ALLEN	11027 MA		COON RAI	MN	55448-434	USA	GL	3	62016	62018	20200602	20180606	
846	A0025043	STUART K	ALLEN	357 OAK S		GONVICK	MN	56644-417	USA	GL	2	62021	62022			
1034	A0030757	DANIEL JC	AMEN	6143 ARCT		EDINA	MN	55436-184	USA	GL	3	52014	52016	20210202	20210202	
1054	A0031394	JOHN WIL	AMIES	13915 250		ZIMMERM	MN	55398-921	USA	GL	3	12020	12022			
1082	A0032343	DARYL ARI	AMUNDS(	112 W 9TH		BLUE EART	MN	56013-132	USA	GL	2	62021	62022			
1086	A0032369	JEFFREY S	AMUNDS(	26369 DL E		ELBOW LA	MN	56531-951	USA	GL	2	102019	102020			
1134	A0033938	BRADLEY F	ANDERSO	49059 TAN		BEMIDJI	MN	56601-288	USA	GL	3	52020	52022			
1135	A0033961	BRIAN WA	ANDERSO	4701 S CO		OWATONI	MN	55060-513	USA	GL						
1136	A0034001	BRUCE ME	ANDERSO	2024 WAT		DULUTH	MN	55812-212	USA	GL						
1147	A0034178	CHARLES L	ANDERSO	1381 W LA		ALEXANDI	MN	56308-939	USA	GL	3	22016	22018	20200518	20180402	
1157	A0034677	DAVID JOI	ANDERSO	1070 HATH		FRIDLEY	MN	55432-571	USA	GL	3	62006	62008	20210601	20210513	
1162	A0034874	DAVID PA	ANDERSO	24347 HICI		PARK RAP	MN	56470-635	USA	GL	1	22020	82020			
1188	A0035430	DARRELL L	ANDERSO	50447 GO(		FRAZEE	MN	56544-898	USA	GL	3	12020	12022	20170507	20170424	
1211	A0036329	GARY WA	ANDERSO	14771 WA		RAMSEY	MN	55303-618	USA	GL	3	42021	42023			
1223	A0036527	HARLAN R	ANDERSO	2379 QUIN		COKATO	MN	55321-452	USA	GL	3	72019	72021			
1231	A0036869	JANICE M	ANDERSO	4252 COLF		MINNEAP	MN	55409-171	USA	GL	1	62021	122021			
1232	A0036933	JAY LEE	ANDERSO	10625 PON		WOODBU	MN	55129-581	USA	GL	1	22021	82021			
1279	A0038575	MICHAEL	ANDERSO	995 MEDIN		WAYZATA	MN	55391-967	USA	GL	3	102020	102022			
1292	A0039135	PAUL LEOI	ANDERSO	PO BOX 11		CANBY	MN	56220-001	USA	GL	2	52021	52022			
1303	A0039312	RALPH WA	ANDERSO	5210 VILLA		EDINA	MN	55436-215	USA	GL	2	82020	82021			

Source: Kimley-Horn, 2022

5) Copy the filtered data to a new CSV file and save this new CSV file in a place where it can easily be retrieved. This new file will be imported into ArcGIS Online and geocoded.
6) Open ArcGIS Online, navigate to “Content,” select “New Item,” and search for the new CSV file.
7) In the next window, select the first option (“Add [name of CSV file] and create a hosted feature layer or table”) that will convert the CSV into a hosted feature layer or table.
8) The next window asks for the fields that should be included in the new feature layer/table. Ensure that street address, city, state, and zip code are all included in this list, and then click “Next.”
9) The next window asks for the fields that include the location information to specify. Under “Location Fields,” select “Location Information is in multiple fields.” This opens a list of dropdowns to specify the field corresponding to each location type. Refer to **Figure 6-38** for a screenshot reference.

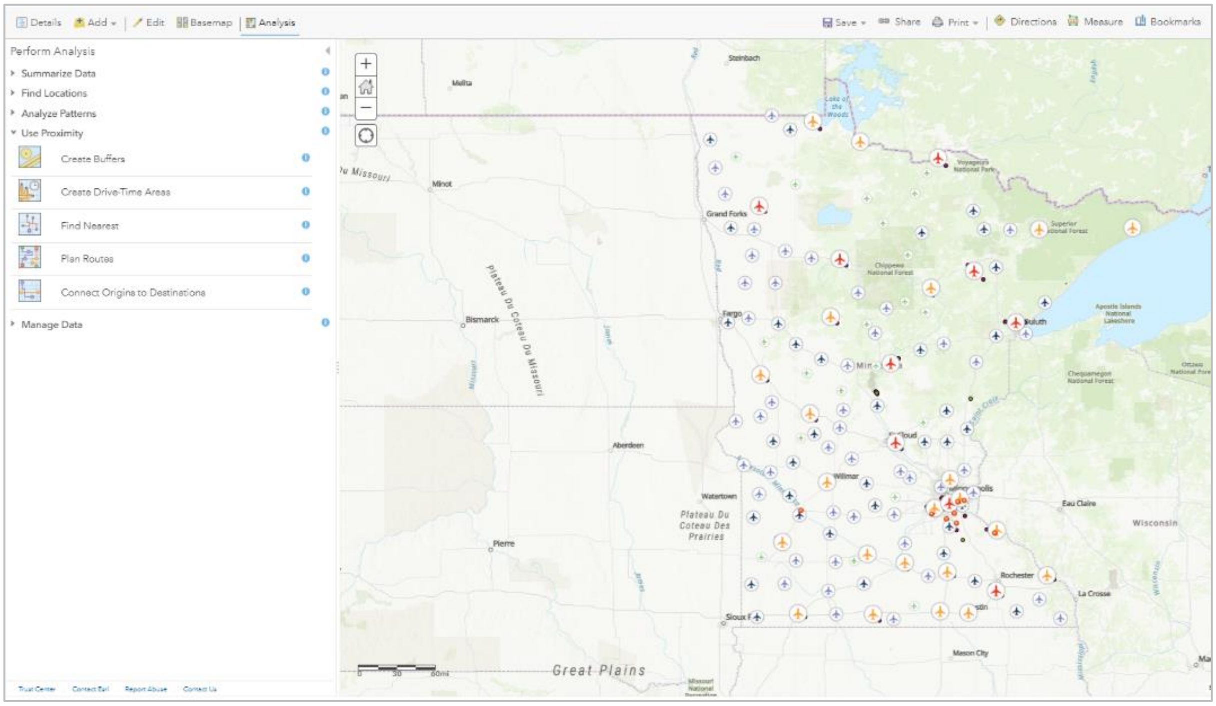
Figure 6-38. Map location Types to Data Table Fields



Sources: ArcGIS Online, 2022; Kimley-Horn, 2022

10) Review the number of credits that will be consumed by geocoding the addresses. Consult with your GIS administrator before running this service.
11) The final window asks for tags to add to the new feature layer and a summary. Per MnDOT’s GIS review guidelines (updated as of 10/4/21), the following tags are required: MnDOT, MnDOT Official, MN, Minnesota. The summary should accurately adequately describe the content and purpose of the new feature layer (refer to **Figure 6-39** below). Once all the information has been populated, click “Save.”

Figure 6-39. Certified Pilots Feature Layer Item Details



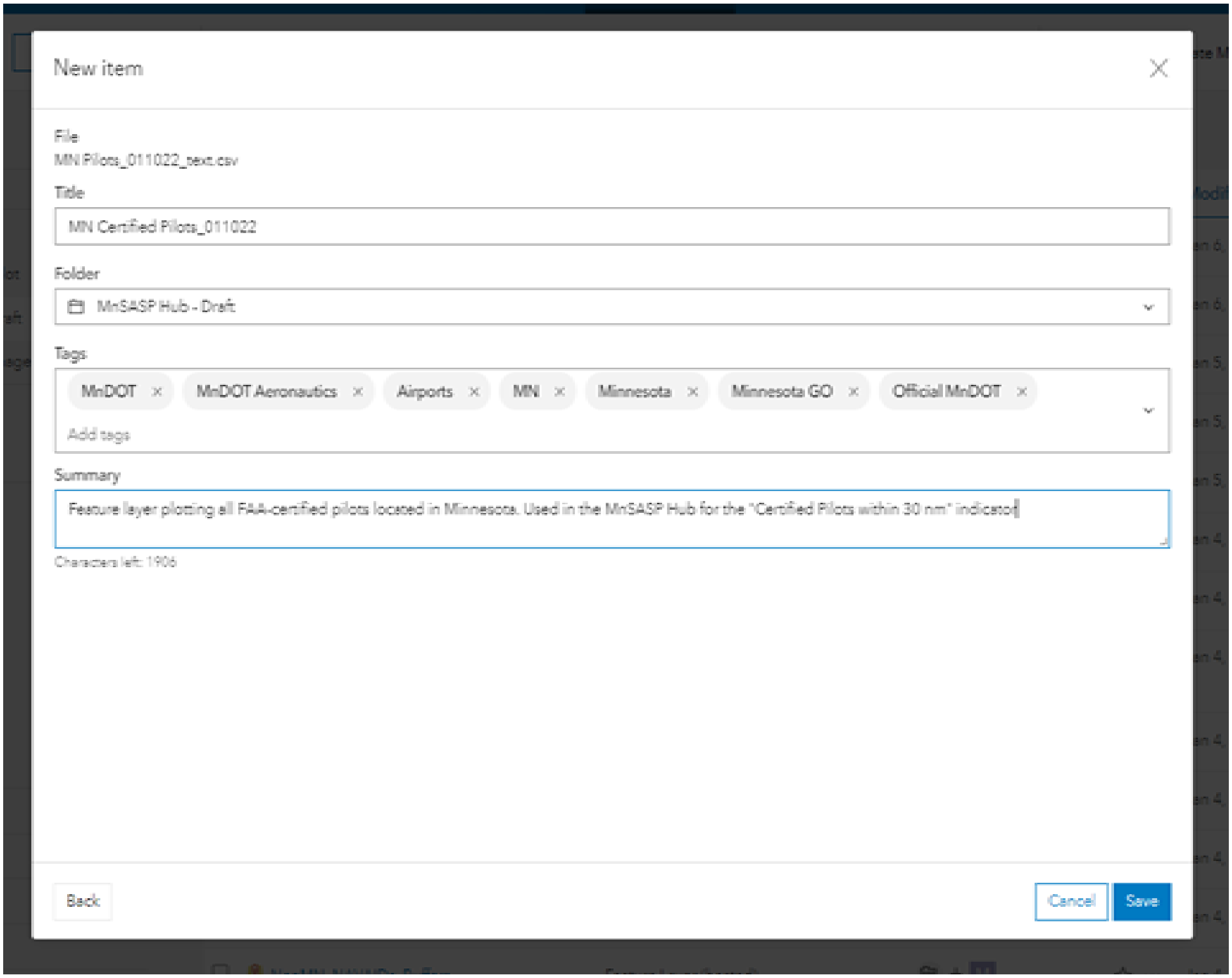
Sources: ArcGIS Online 2022; Kimley-Horn 2022

12) Once the new feature layer has been created, the item's detail page appears. To start the proximity analysis, locate and click "Open in Map Viewer Classic." Note that the proximity analysis can also be completed in "Map Viewer."

13) To complete the proximity analysis in the map viewer, 30nm buffers need to be created around each of the airports in the state aviation system. Add the "MnSASP Hub Airport Data" feature layer to the new web map (if it is not already populated in the map – this may have happened by default).

14) Locate the sublayer "MnSASP Hub Airport Data – Airport Background." To create the 30nm buffers, locate and click "Perform Analysis" -> "Use Proximity" -> "Create Buffers." Refer to **Figure 6-40** for a screenshot reference.

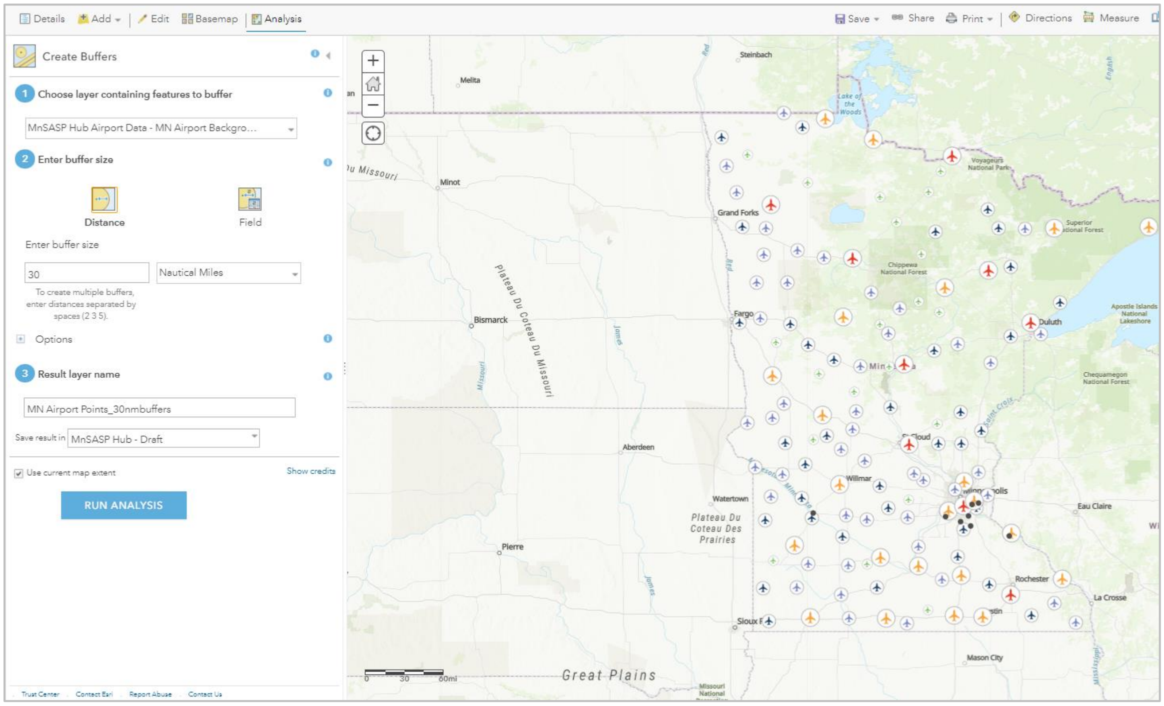
Figure 6-40. Locate Buffer Analysis Tool



Source: ArcGIS Online 2022; Kimley-Horn 2022

15) In the following window, specify a 30 nm buffer size and a distinct name for the new layer of buffers (e.g., MN Airport Points_30nmbuffers"). For saving the buffer layer, specify a location that can be easily retrieved from for future use. Once these parameters are specified, click "Run Analysis." Refer to **Figure 6-41** for a screenshot reference.

Figure 6-41. Buffer Analysis Parameter Selection

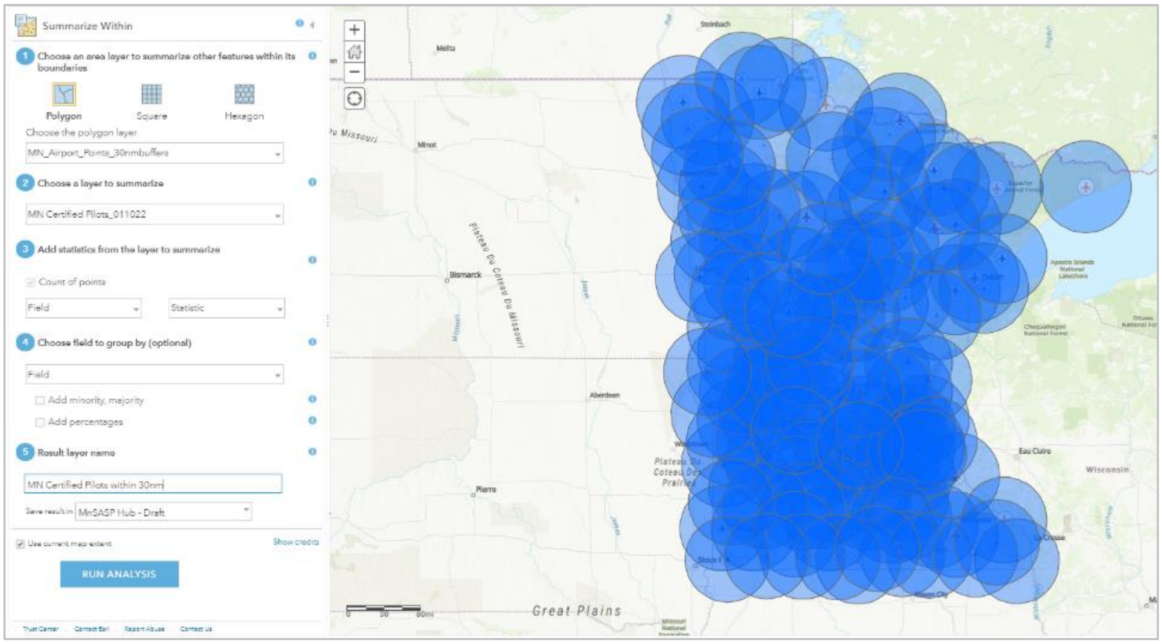


Sources: ArcGIS Online, 2022; Kimley-Horn, 2022

16) Once the analysis is complete, the new 30nm buffers should appear in the map for all airports. With the buffers created, the proximity analysis can now be completed. Locate the new buffer layer in the left-hand list and click “Perform Analysis” -> “Summarize Data” -> “Summarize Within.”

17) In the following criteria window, ensure that the buffer layer is selected as the “polygon layer” and the certified pilot feature layer is selected as the layer to summarize. For the remaining criteria, refer to **Figure 6-42** for a screenshot reference. Once all the criteria are set, click “Run Analysis.”

Figure 6-42. Proximity Analysis Criteria



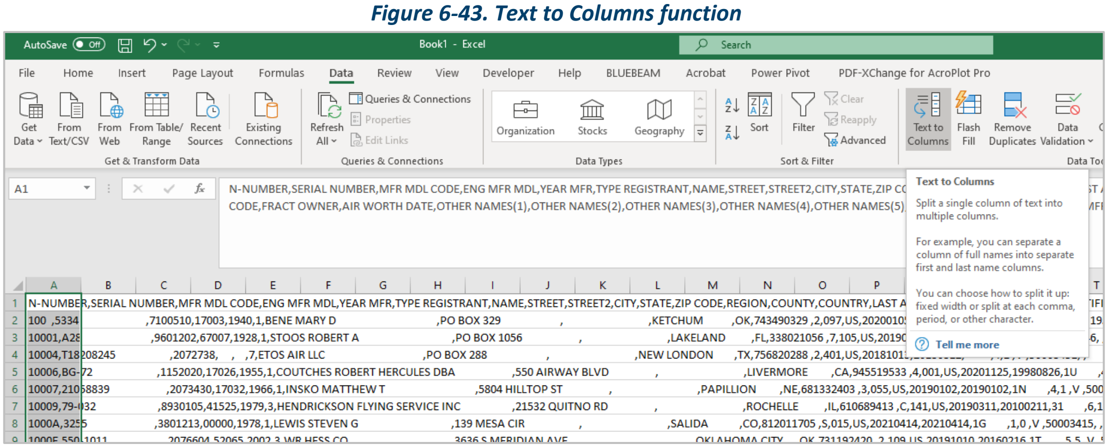
Source: ArcGIS Online, 2022, Kimley-Horn, 2022

18) A new feature layer will be created with the first field populating the number of certified pilots within each airport's 30 nm proximity buffer.

6.4.2.10. Registered Aircraft in Minnesota

1) Navigate to the following website: https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/releasable_aircraft_download/.
2) Download the full FAA Aircraft Registration Database and extract all the contents of the zip folder.
3) The download contains multiple text files and a PDF reference. The text file titled "MASTER" contains all the pertinent information for this task. Copy this data into a new Excel workbook.
4) To parse the data, locate and select the "Text to Columns" function to split the fields by commas. Refer to **Figure 6-43** for a screenshot reference.

Figure 6-43. Text to Columns function

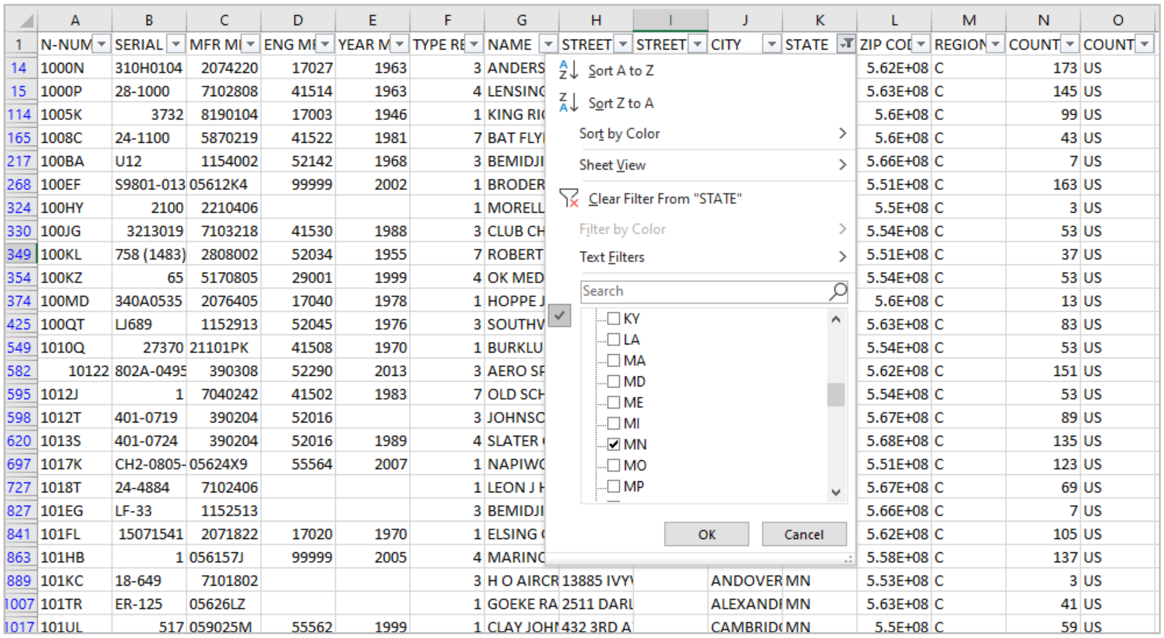


Source: Kimley-Horn, 2022

5) Convert the data into a table (Insert tab -> Table) to add filters throughout the dataset.

6) Use the state filter to only include the registered aircraft in Minnesota. Refer to **Figure 6-44** for a screenshot reference.

Figure 6-44. Registered Aircraft – Add State Filter

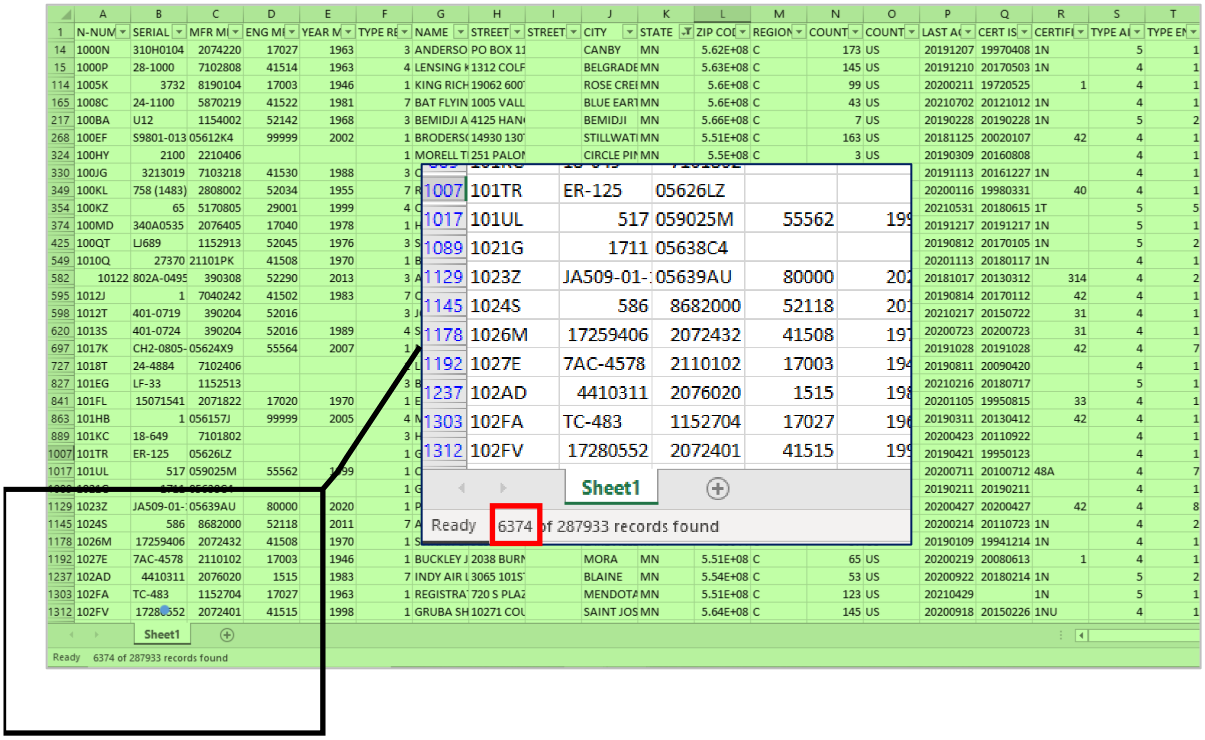


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	N-NUM	SERIAL	MFR MI	ENG MI	YEAR M	TYPE RE	NAME	STREET	STREET	CITY	STATE	ZIP COE	REGION	COUNT	COUNT
14	1000N	310H0104	2074220	17027	1963	3	ANDERS					5.62E+08	C	173	US
15	1000P	28-1000	7102808	41514	1963	4	LENSINC					5.63E+08	C	145	US
114	1005K	3732	8190104	17003	1946	1	KING RI					5.6E+08	C	99	US
165	1008C	24-1100	5870219	41522	1981	7	BAT FLY					5.6E+08	C	43	US
217	100BA	U12	1154002	52142	1968	3	BEMIDJI					5.66E+08	C	7	US
268	100EF	S9801-013	05612K4	99999	2002	1	BRODER					5.51E+08	C	163	US
324	100HY	2100	2210406			1	MORELL					5.5E+08	C	3	US
330	100JG	3213019	7103218	41530	1988	3	CLUB CH					5.54E+08	C	53	US
349	100KL	758 (1483)	2808002	52034	1955	7	ROBERT					5.51E+08	C	37	US
354	100KZ	65	5170805	29001	1999	4	OK MED					5.54E+08	C	53	US
374	100MD	340A0535	2076405	17040	1978	1	HOPPE J					5.6E+08	C	13	US
425	100QT	LJ689	1152913	52045	1976	3	SOUTHV					5.63E+08	C	83	US
549	1010Q	27370	21101PK	41508	1970	1	BURKLU					5.54E+08	C	53	US
582	10122	802A-0495	390308	52290	2013	3	AERO SF					5.62E+08	C	151	US
595	1012J	1	7040242	41502	1983	7	OLD SCH					5.54E+08	C	53	US
598	1012T	401-0719	390204	52016		3	JOHNSC					5.67E+08	C	89	US
620	1013S	401-0724	390204	52016	1989	4	SLATER					5.68E+08	C	135	US
697	1017K	CH2-0805-	05624X9	55564	2007	1	NAPIWC					5.51E+08	C	123	US
727	1018T	24-4884	7102406			1	LEON J H					5.67E+08	C	69	US
827	101EG	LF-33	1152513			3	BEMIDJI					5.66E+08	C	7	US
841	101FL	15071541	2071822	17020	1970	1	ELSING					5.62E+08	C	105	US
863	101HB	1	056157J	99999	2005	4	MARINC					5.58E+08	C	137	US
889	101KC	18-649	7101802			3	H O AIRCR	13885 IVY		ANDOVER	MN	5.53E+08	C	3	US
1007	101TR	ER-125	05626LZ			1	GOEKE RA	2511 DARL		ALEXANDI	MN	5.63E+08	C	41	US
1017	101UL	517	059025M	55562	1999	1	CLAY JOHI	432 3RD A		CAMBRID	MN	5.5E+08	C	59	US

Source: Kimley-Horn, 2022

7) The number of registered aircraft in this filtered dataset is located at the bottom left of the sheet. Refer to **Figure 6-45** for a screenshot reference.

Figure 6-45. Registered Aircraft – Number of Filtered Records



Source: Kimley-Horn, 2022

6.5. Summary

The MnSASP Hub offers an interactive and engaging platform to quickly view airport and system characterics, as well as reliably assess performance in terms of the metrics established by the MnSASP. The application also facilitates MnDOT Aeronautics' ability to conduct continuous system planning by supporting the identification and justification of airport improvement needs. However, MnSASP data will quickly become outdated as planning, design, and construction projects are completed; zoning is updated; land is acquired; and airport sponsors, users, and MnDOT Aeronautics continue to work on behalf of airports. Additionally, changing aviation activity levels generated by new and shifting aviation demands will too impact the accuracy of MnSASP data. As a result, it is imperative that MnSASP data be continusely monitored and updated to remain useful over time. Although MnDOT Aeronuatics is responsible for maintaining the MnSASP Hub, data updates must be a collaborative effort between airport sponsors, consultants, engineers, and other aviation stakeholders to support the accuracy of the MnSASP Hub for continuous aviation planning. Through dedication and partnership between the stakeholders primarily responsible for the preservation and expansion of Minnesota's state system airports, the MnSASP Hub offers an exciting, unique, and promising opportunity to align policy- and funding-related decisions with actual, data-driven needs within the state.

Appendix A. Operations Counting and Forecasting Detail Tables

The following appendix provides airport-specific baseline operations and forecasts prepared by the 2022 Minnesota State Aviation System Plan (MnSASP). The tables are as follows:

- Table A.1. 2022 MnSASP GA Airport Baseline Operations by State Classification
- Table A.2. 2022 MnSASP Forecast Alternative: Socioeconomic – Population Growth by County
- Table A.3. 2022 MnSASP Forecast Alternative: Socioeconomic – Per Capita Personal Income (PCPI)
- Table A.4. 2022 MnSASP Forecast Alternative: GA Flight Hours Flown
- Table A.5. 2022 MnSASP Forecast Alternative: Socioeconomic – GA Flight Hours Flown Blend
- Table A.6. 2022 MnSASP Forecast Alternative: Mixed Methodology
- Table A.7. 2022 MnSASP Forecast Terminal Area Forecast (TAF) versus Mixed Methodology
- Table A.8. Operational Threshold Analysis by Airport

Please note that all MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.

Chapter 3. Operations and Forecasting provides the full methodology and application of the data contained in these tables.

Table A.1. 2022 MnSASP GA Airport Baseline Operations by State Classification[3]

Associated City	Airport Name	FAA ID	MnSASP State Classification	5010 Data Year[1]	Total 5010 Operations	Baseline Operations	Percentage Difference from 5010
Albert Lea	Albert Lea Municipal	AEL	Key General Aviation	2020	26,175	18,523	-29%
Alexandria	Alexandria Municipal (Chandler Field)	AXN	Key General Aviation	2018	25,500	20,598	-19%
Austin	Austin Municipal	AUM	Key General Aviation	2018	25,420	21,505	-15%
Baudette	Baudette International	BDE	Key General Aviation	2018	12,825	7,503	-41%
Ely	Ely Municipal	ELO	Key General Aviation	2018	8,200	7,550	-8%
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	2018	9,400	9,267	-1%
Fergus Falls	Fergus Falls Municipal	FFM	Key General Aviation	2018	8,500	13,016	53%
Grand Marais	Grand Marais-Cook County	CKC	Key General Aviation	2019	3,200	3,762	18%
Grand Rapids	Grand Rapids-Itasca County	GPZ	Key General Aviation	2019	19,560	25,230	29%
Mankato	Mankato Municipal	MKT	Key General Aviation	2018	126,136	100,062	-21%
Marshall	Marshall - Southwest Minnesota Regional - Marshall/Ryan Field	MML	Key General Aviation	2019	22,848	15,926	-30%
Minneapolis	Minneapolis Anoka County/Blaine[2]	ANE	Key General Aviation	2018	70,202	71,740	2%
Minneapolis	Minneapolis Flying Cloud[2]	FCM	Key General Aviation	2018	75,842	104,405	38%
New Ulm	New Ulm Municipal	ULM	Key General Aviation	2018	15,510	7,792	-50%
Owatonna	Owatonna Degner Regional	OWA	Key General Aviation	2018	30,050	16,357	-46%
Park Rapids	Park Rapids Municipal	PKD	Key General Aviation	2018	15,833	19,476	23%
Red Wing	Red Wing Regional	RGK	Key General Aviation	2019	14,050	11,751	-16%
St Paul	Saint Paul Downtown[2]	STP	Key General Aviation	2018	66,475	40,934	-38%
Warroad	Warroad International (Swede Carlson Field)	RRT	Key General Aviation	2019	9,000	16,617	85%
Willmar	Willmar Municipal	BDH	Key General Aviation	2018	17,850	24,429	37%
Winona	Winona Municipal (Max Conrad Field)	ONA	Key General Aviation	2019	10,450	9,945	-5%
Worthington	Worthington Municipal	OTG	Key General Aviation	2019	10,140	11,078	9%
Aitkin	Aitkin Municipal	AIT	Intermediate Large	2018	16,000	13,733	-14%

Associated City	Airport Name	FAA ID	MnSASP State Classification	5010 Data Year[1]	Total 5010 Operations	Baseline Operations	Percentage Difference from 5010
Benson	Benson Municipal	BBB	Intermediate Large	2018	5,100	4,065	-20%
Bigfork	Bigfork Municipal	FOZ	Intermediate Large	2018	3,100	2,327	-25%
Cambridge	Cambridge Municipal	CBG	Intermediate Large	2018	16,850	9,821	-42%
Canby	Canby Municipal	CNB	Intermediate Large	2018	6,720	7,080	5%
Cloquet	Cloquet-Carlton County	COQ	Intermediate Large	2018	10,000	10,530	5%
Cook	Cook Municipal Airport	CQM	Intermediate Large	2018	5,950	5,022	-16%
Crookston	Crookston Municipal (Kirkwood Field)	CKN	Intermediate Large	2019	20,150	11,670	-42%
Detroit Lakes	Detroit Lakes	DTL	Intermediate Large	2018	16,200	16,690	3%
Dodge Center	Dodge Center Municipal	TOB	Intermediate Large	2019	5,000	4,017	-20%
Eveleth	Eveleth-Virginia Municipal	EVM	Intermediate Large	2018	17,700	8,137	-54%
Faribault	Faribault Municipal	FBL	Intermediate Large	2018	18,700	19,169	3%
Glenwood	Glenwood Municipal	GHW	Intermediate Large	2018	4,900	4,284	-13%
Granite Falls	Granite Falls Municipal	GDB	Intermediate Large	2018	7,000	7,544	8%
Hallock	Hallock Municipal	HCO	Intermediate Large	2018	17,700	13,380	-24%
Hutchinson	Hutchinson Municipal	HCD	Intermediate Large	2018	12,395	7,844	-37%
Litchfield	Litchfield Municipal	LJF	Intermediate Large	2019	7,000	4,008	-43%
Little Falls	Little Falls-Morrison County	LXL	Intermediate Large	2018	22,450	19,184	-15%
Luverne	Luverne Municipal (Quentin Aanenson Field)	LYV	Intermediate Large	2019	8,400	4,730	-44%
Minneapolis	Minneapolis Airlake	LVN	Intermediate Large	2018	34,174	21,055	-38%
Montevideo	Montevideo-Chippewa County	MVE	Intermediate Large	2018	11,520	7,058	-39%
Moorhead	Moorhead Municipal	JKJ	Intermediate Large	2018	9,000	8,867	-1%
Mora	Mora Municipal	JMR	Intermediate Large	2018	15,000	12,377	-17%
Morris	Morris Municipal	MOX	Intermediate Large	2018	5,906	9,366	59%
Orr	Orr Regional	ORB	Intermediate Large	2018	2,500	1,357	-46%
Perham	Perham Municipal	16D	Intermediate Large	2018	7,200	6,235	-13%
Pipestone	Pipestone Municipal	PQN	Intermediate Large	2019	8,200	4,675	-43%

Associated City	Airport Name	FAA ID	MnSASP State Classification	5010 Data Year[1]	Total 5010 Operations	Baseline Operations	Percentage Difference from 5010
Preston	Preston Fillmore County	FKA	Intermediate Large	2019	4,080	2,449	-40%
Princeton	Princeton Municipal	PNM	Intermediate Large	2018	13,300	7,548	-43%
Redwood Falls	Redwood Falls Municipal	RWF	Intermediate Large	2018	9,800	8,642	-12%
Roseau	Roseau Municipal (Rudy Billberg Field)	ROX	Intermediate Large	2018	18,300	14,103	-23%
Rush City	Rush City Municipal	ROS	Intermediate Large	2018	7,810	6,473	-17%
South St Paul	South St. Paul Municipal (Fleming Field)	SGS	Intermediate Large	2019	51,000	3,908	-29%
St James	Saint James Municipal	JYG	Intermediate Large	2018	5,485	49,331	-3%
Two Harbors	Two Harbors-Richard B. Helgeson	TWM	Intermediate Large	2018	7,000	4,429	-37%
Wadena	Wadena Municipal	ADC	Intermediate Large	2018	5,410	6,233	15%
Ada/Twin Valley	Ada-Norman County/Twin Valley	D00	Intermediate Small	2018	5,200	3,085	-41%
Appleton	Appleton Municipal	AQP	Intermediate Small	2018	2,400	2,034	-15%
Bagley	Bagley Municipal	7Y4	Intermediate Small	2018	2,400	434	-82%
Blue Earth	Blue Earth Municipal	SBU	Intermediate Small	2018	14,000	7,642	-45%
Brooten	Brooten Municipal	6D1	Intermediate Small	2019	2,510	1,248	-50%
Buffalo	Buffalo Municipal	CFE	Intermediate Small	2018	22,350	14,213	-36%
Caledonia	Caledonia-Houston County	CHU	Intermediate Small	2018	3,500	2,193	-37%
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	2020	13,900	11,472	-17%
Fertile	Fertile Municipal	D14	Intermediate Small	2018	9,600	6,691	-26%
Forest Lake	Forest Lake	25D	Intermediate Small	2020	8,000	7,851	-18%
Fosston	Fosston Municipal	FSE	Intermediate Small	2019	8,345	6,878	-14%
Glencoe	Glencoe Municipal (Vernon Perschau Field)	GYL	Intermediate Small	2018	10,615	5,715	-32%
Grant	Elbow Lake Municipal	Y63	Intermediate Small	2018	9,000	8,150	-23%
Hawley	Hawley Municipal	04Y	Intermediate Small	2019	8,600	5,225	-39%
Hector	Hector Municipal	1D6	Intermediate Small	2018	7,000	6,074	-13%

Associated City	Airport Name	FAA ID	MnSASP State Classification	5010 Data Year[1]	Total 5010 Operations	Baseline Operations	Percentage Difference from 5010
Herman	Herman Municipal	06Y	Intermediate Small	2018	2,200	2,006	-9%
Jackson	Jackson Municipal	MJQ	Intermediate Small	2018	19,000	14,623	-23%
Le Sueur	Le Sueur Municipal	12Y	Intermediate Small	2019	2,560	1,614	-37%
Long Prairie	Todd Field (Long Prairie Airport)	14Y	Intermediate Small	2018	5,730	5,343	-21%
Longville	Longville Municipal	XVG	Intermediate Small	2019	6,725	2,340	8%
Madison	Madison-Lac Qui Parle	DXX	Intermediate Small	2018	2,160	1,621	-2%
Mahnomen	Mahnomen County	3N8	Intermediate Small	2018	1,650	15,414	-26%
Maple Lake	Maple Lake Municipal	MGG	Intermediate Small	2018	20,800	987	-48%
Mc Gregor	McGregor-Isedor Iverson	HZX	Intermediate Small	2018	1,900	41,541	-2%
Minneapolis	Minneapolis Crystal[2]	MIC	Intermediate Small	2020	42,351	3,171	-35%
Moose Lake	Moose Lake-Carlton County	MZH	Intermediate Small	2018	4,900	4,688	0%
Olivia	Olivia Regional	OVL	Intermediate Small	2019	4,700	3,221	-36%
Ortonville	Ortonville Municipal	VVV	Intermediate Small	2019	5,000	2,984	-17%
Paynesville	Paynesville Municipal	PEX	Intermediate Small	2018	3,600	5,003	-22%
Pine River	Pine River Regional	PWC	Intermediate Small	2018	6,400	431	-86%
Pinecreek	Piney-Pinecreek Border	48Y	Intermediate Small	2018	3,000	11,345	-16%
Red Lake Falls	Red Lake Falls Municipal	D81	Intermediate Small	2018	13,500	1,374	-31%
Rushford	Rushford Municipal	55Y	Intermediate Small	2019	2,000	16,421	-38%
Sauk Centre	Sauk Centre Municipal	D39	Intermediate Small	2018	5,830	3,889	-33%
Slayton	Slayton Municipal	DVP	Intermediate Small	2018	3,300	3,300	0%
Springfield	Springfield Municipal	D42	Intermediate Small	2018	2,420	2,142	-11%
St Paul	Saint Paul-Lake Elmo	21D	Intermediate Small	2019	26,498	7,207	-25%
Staples	Staples Municipal	SAZ	Intermediate Small	2019	9,600	12,023	-20%
Stephen	Stephen Municipal	D41	Intermediate Small	2018	15,100	4,410	-23%
Tower	Tower Municipal	12D	Intermediate Small	2019	3,700	3,517	-5%
Tracy	Tracy Municipal	TKC	Intermediate Small	2018	3,040	1,217	-60%

Associated City	Airport Name	FAA ID	MnSASP State Classification	5010 Data Year[1]	Total 5010 Operations	Baseline Operations	Percentage Difference from 5010
Walker	Walker Municipal	Y49	Intermediate Small	2018	9,200	5,152	-44%
Warren	Warren Municipal	D37	Intermediate Small	2018	19,000	9,062	-52%
Waseca	Waseca Municipal	ACQ	Intermediate Small	2018	17,190	13,211	-23%
Wheaton	Wheaton Municipal	ETH	Intermediate Small	2018	3,900	3,056	-22%
Windom	Windom Municipal	MWM	Intermediate Small	2018	8,300	5,496	-34%
Backus	Backus Municipal	7Y3	Landing Strip Turf	2018	6,400	200	-50%
Big Falls	Big Falls Municipal	7Y9	Landing Strip Turf	2018	400	323	-19%
Bowstring	Bowstring	9Y0	Landing Strip Turf	2018	400	456	-45%
Clarissa	Clarissa Municipal	8Y5	Landing Strip Turf	2019	830	198	-80%
East Gull Lake	East Gull Lake	9Y2	Landing Strip Turf	2018	1,000	200	-50%
Grygla	Grygla Municipal	3G2	Landing Strip Turf	2018	400	1,517	-24%
Henning	Henning Municipal	05Y	Landing Strip Turf	2018	2,000	560	-44%
Hill City	Hill City-Quadna Mountain	07Y	Landing Strip Turf	2019	1,000	2,006	-55%
Karlstad	Karlstad Municipal	23D	Landing Strip Turf	2018	4,500	700	-30%
Littlefork	Littlefork Municipal	13Y	Landing Strip Turf	2018	1,000	5,006	-37%
Milaca	Milaca Municipal	18Y	Landing Strip Turf	2020	8,000	311	-48%
Northome	Northome Municipal	43Y	Landing Strip Turf	2018	600	1,664	-81%
Pelican Rapids	Pelican Rapids Municipal	47Y	Landing Strip Turf	2018	8,682	512	-49%
Remer	Remer Municipal	52Y	Landing Strip Turf	2019	1,000	5,000	-38%
Sleepy Eye	Sleepy Eye Municipal	Y58	Landing Strip Turf	2018	8,000	1,172	-27%
Starbuck	Starbuck Municipal	D32	Landing Strip Turf	2019	1,600	1,606	-27%
Tyler	Tyler Municipal	63Y	Landing Strip Turf	2019	2,200	1,006	-37%
Waskish	Waskish Municipal	VWU	Landing Strip Turf	2020	1,600	5,018	-16%

Associated City	Airport Name	FAA ID	MnSASP State Classification	5010 Data Year[1]	Total 5010 Operations	Baseline Operations	Percentage Difference from 5010
Wells	Wells Municipal	68Y	Landing Strip Turf	2019	6,000	1,217	-60%
Winsted	Winsted Municipal	10D	Landing Strip Turf	2018	13,545	9,986	-26%

Notes: (1) Baseline operations counts reflect the date of the airport's most recent 5010 Airport Safety Inspection at the time of analysis in May 2021. All data years range between 2018 and 2020 except Slayton Municipal Airport (6VP) which had its most recent 5010 inspection in 2017. (2) Airport has an air traffic control tower (ATCT). As such operational counts were obtained from the Federal Aviation Administration's (FAA) OpsNet database. In all other cases, baseline operations were calculated using the MnSASP baseline operations count methodology described in Chapter 3. (3) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.

Sources: 5010 Airport Master Record, Various Years; FAA Traffic Flow Management System Counts (TFMSC), 2018 – 2020 (accessed May 2021); Kimley-Horn, 2023

Table A.2. 2022 MnSASP Forecast Alternative: Socioeconomic – Population Growth by County[1]

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	18,523	18,523	18,316	18,066	17,736	17,321	-0.22%	-0.25%	-0.29%	-0.33%
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	20,598	7,503	7,837	8,166	8,469	8,737	0.87%	0.85%	0.81%	0.76%
Austin	Austin Municipal Airport	AUM	Key General Aviation	21,505	21,505	21,700	21,842	21,882	21,808	0.18%	0.16%	0.12%	0.07%
Baudette	Baudette International Airport	BDE	Key General Aviation	7,503	20,598	20,760	20,885	20,931	20,890	0.16%	0.14%	0.11%	0.07%
Ely	Ely Municipal Airport	ELO	Key General Aviation	7,550	24,429	24,730	24,996	25,168	25,234	0.25%	0.23%	0.20%	0.16%
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	9,267	3,762	3,723	3,675	3,610	3,528	-0.21%	-0.23%	-0.27%	-0.32%
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	13,016	7,550	7,718	7,870	7,988	8,065	0.44%	0.42%	0.38%	0.33%
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	3,762	13,016	13,536	14,056	14,538	14,975	0.79%	0.77%	0.74%	0.70%
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	25,230	9,267	9,410	9,541	9,637	9,693	0.31%	0.29%	0.26%	0.22%
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	100,062	25,230	26,387	27,528	28,583	29,524	0.90%	0.88%	0.84%	0.79%
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	15,926	16,357	16,685	16,978	17,195	17,323	0.40%	0.37%	0.33%	0.29%
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	71,740	71,740	77,353	83,198	89,063	94,846	1.52%	1.49%	1.45%	1.41%
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	104,405	104,405	106,712	108,800	110,405	111,453	0.44%	0.41%	0.37%	0.33%
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	7,792	100,062	100,255	100,196	99,664	98,623	0.04%	0.01%	-0.03%	-0.07%
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	16,357	15,926	16,528	17,109	17,628	18,069	0.74%	0.72%	0.68%	0.63%
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	19,476	9,945	10,307	10,655	10,964	11,223	0.72%	0.69%	0.65%	0.61%
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	11,751	11,078	11,492	11,891	12,247	12,548	0.74%	0.71%	0.67%	0.62%
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	40,934	19,476	19,874	20,230	20,496	20,657	0.41%	0.38%	0.34%	0.29%
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	16,617	11,751	11,848	11,926	11,959	11,940	0.16%	0.15%	0.12%	0.08%
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	24,429	16,617	17,285	17,935	18,522	19,028	0.79%	0.77%	0.73%	0.68%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	9,945	40,934	41,786	42,551	43,125	43,480	0.41%	0.39%	0.35%	0.30%
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	11,078	7,792	7,912	8,009	8,061	8,065	0.31%	0.28%	0.23%	0.17%
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	13,733	13,733	14,176	14,598	14,962	15,255	0.64%	0.61%	0.57%	0.53%
Benson	Benson Municipal Airport	BBB	Intermediate Large	4,065	4,065	3,976	3,879	3,767	3,639	-0.44%	-0.47%	-0.51%	-0.55%
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	2,327	2,327	2,363	2,396	2,420	2,434	0.31%	0.29%	0.26%	0.23%
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	9,821	9,821	10,569	11,346	12,122	12,885	1.48%	1.45%	1.41%	1.37%
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	7,080	7,080	6,938	6,783	6,598	6,386	-0.40%	-0.43%	-0.47%	-0.51%
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	10,530	10,530	10,728	10,914	11,060	11,161	0.37%	0.36%	0.33%	0.29%
Cook	Cook Municipal Airport	CQM	Intermediate Large	5,022	5,022	5,083	5,138	5,174	5,187	0.24%	0.23%	0.20%	0.16%
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	11,670	11,670	11,641	11,593	11,501	11,361	-0.05%	-0.07%	-0.10%	-0.13%
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	16,690	16,690	17,384	18,061	18,677	19,214	0.82%	0.79%	0.75%	0.71%
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	4,017	4,017	4,225	4,434	4,631	4,811	1.01%	0.99%	0.95%	0.91%
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	8,137	8,137	8,237	8,326	8,383	8,405	0.24%	0.23%	0.20%	0.16%
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	19,169	19,169	20,013	20,843	21,605	22,279	0.87%	0.84%	0.80%	0.75%
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	4,284	4,284	4,335	4,376	4,396	4,393	0.24%	0.21%	0.17%	0.13%
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	7,544	7,544	7,393	7,227	7,031	6,805	-0.40%	-0.43%	-0.47%	-0.51%
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	13,380	13,380	13,331	13,261	13,143	12,968	-0.07%	-0.09%	-0.12%	-0.16%
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	7,844	7,844	8,081	8,305	8,495	8,644	0.60%	0.57%	0.53%	0.49%
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	4,008	4,008	4,121	4,227	4,315	4,382	0.56%	0.53%	0.49%	0.45%
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	19,184	19,184	19,565	19,904	20,153	20,300	0.39%	0.37%	0.33%	0.28%
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	4,730	4,730	4,718	4,691	4,638	4,558	-0.05%	-0.08%	-0.13%	-0.19%
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	21,055	21,055	22,781	24,587	26,411	28,223	1.59%	1.56%	1.52%	1.48%
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	7,058	7,058	6,967	6,861	6,724	6,555	-0.26%	-0.28%	-0.32%	-0.37%
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	8,867	8,867	9,199	9,510	9,777	9,991	0.74%	0.70%	0.65%	0.60%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Mora	Mora Municipal Airport	JMR	Intermediate Large	12,377	12,377	12,966	13,549	14,092	14,581	0.93%	0.91%	0.87%	0.82%
Morris	Morris Municipal Airport	MOX	Intermediate Large	9,366	9,366	9,360	9,331	9,259	9,139	-0.01%	-0.04%	-0.08%	-0.12%
Orr	Orr Regional Airport	ORB	Intermediate Large	1,357	1,357	1,374	1,388	1,398	1,402	0.25%	0.23%	0.20%	0.16%
Perham	Perham Municipal Airport	16D	Intermediate Large	6,235	6,235	6,374	6,500	6,597	6,661	0.44%	0.42%	0.38%	0.33%
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	4,675	4,675	4,607	4,526	4,422	4,294	-0.29%	-0.32%	-0.37%	-0.42%
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	2,449	2,449	2,461	2,466	2,461	2,443	0.10%	0.07%	0.03%	-0.01%
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	7,548	7,548	7,941	8,332	8,702	9,041	1.02%	0.99%	0.95%	0.91%
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	8,642	8,642	8,509	8,356	8,168	7,943	-0.31%	-0.34%	-0.38%	-0.42%
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	14,103	14,103	14,218	14,313	14,352	14,329	0.16%	0.15%	0.12%	0.08%
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	6,473	6,473	6,927	7,395	7,857	8,304	1.36%	1.34%	1.30%	1.25%
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	49,331	49,331	53,374	57,605	61,879	66,124	1.59%	1.56%	1.52%	1.48%
St. James	Saint James Municipal Airport	JYG	Intermediate Large	3,908	3,908	3,872	3,827	3,765	3,684	-0.18%	-0.21%	-0.25%	-0.29%
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	4,429	4,429	4,490	4,544	4,582	4,599	0.27%	0.26%	0.23%	0.19%
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	6,233	6,233	6,371	6,497	6,594	6,658	0.44%	0.42%	0.38%	0.33%
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	Intermediate Small	3,085	3,085	3,032	2,969	2,892	2,800	-0.35%	-0.38%	-0.43%	-0.48%
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	2,034	2,034	1,989	1,941	1,885	1,821	-0.45%	-0.47%	-0.51%	-0.55%
Bagley	Bagley Municipal Airport	7Y4	Intermediate Small	434	434	442	449	453	456	0.37%	0.34%	0.29%	0.25%
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	7,642	7,642	7,469	7,283	7,067	6,823	-0.46%	-0.48%	-0.52%	-0.57%
Brooten	Brooten Municipal Airport	6D1	Intermediate Small	1,248	1,248	1,324	1,402	1,477	1,548	1.19%	1.17%	1.13%	1.08%
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	14,213	14,213	15,563	17,000	18,481	19,987	1.83%	1.81%	1.77%	1.72%
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	2,193	2,193	2,212	2,228	2,236	2,234	0.17%	0.16%	0.13%	0.09%
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	11,472	11,472	11,614	11,738	11,819	11,850	0.25%	0.23%	0.20%	0.16%
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	7,851	6,691	6,597	6,486	6,346	6,179	-0.28%	-0.31%	-0.35%	-0.40%
Fertile	Fertile Municipal Airport	D14	Intermediate Small	6,878	7,851	7,832	7,799	7,737	7,643	-0.05%	-0.07%	-0.10%	-0.13%
Forest Lake	Forest Lake Airport	25D	Intermediate Small	5,715	6,878	7,556	8,280	9,031	9,799	1.90%	1.87%	1.83%	1.79%
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	8,150	5,715	5,701	5,677	5,632	5,564	-0.05%	-0.07%	-0.10%	-0.13%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	6,691	8,150	8,397	8,629	8,827	8,981	0.60%	0.57%	0.53%	0.49%
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	5,225	5,225	5,420	5,604	5,761	5,887	0.74%	0.70%	0.65%	0.60%
Hector	Hector Municipal Airport	1D6	Intermediate Small	6,074	6,074	5,952	5,820	5,663	5,482	-0.40%	-0.43%	-0.47%	-0.51%
Herman	Herman Municipal Airport	06Y	Intermediate Small	2,006	2,006	1,977	1,944	1,902	1,852	-0.29%	-0.31%	-0.35%	-0.40%
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	14,623	14,623	14,527	14,395	14,197	13,931	-0.13%	-0.16%	-0.20%	-0.24%
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	1,614	1,614	1,669	1,721	1,767	1,804	0.67%	0.64%	0.61%	0.56%
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	4,410	4,410	4,469	4,517	4,545	4,549	0.27%	0.24%	0.20%	0.16%
Longville	Longville Municipal Airport	XVG	Intermediate Small	5,343	5,343	5,670	6,003	6,326	6,631	1.20%	1.17%	1.13%	1.09%
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	2,340	2,340	2,312	2,278	2,235	2,181	-0.24%	-0.27%	-0.31%	-0.35%
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	1,621	1,621	1,637	1,649	1,654	1,649	0.20%	0.17%	0.13%	0.09%
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	15,414	15,414	16,878	18,436	20,042	21,676	1.83%	1.81%	1.77%	1.72%
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	987	987	1,019	1,049	1,075	1,096	0.64%	0.61%	0.57%	0.53%
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	41,541	41,541	42,459	43,290	43,928	44,345	0.44%	0.41%	0.37%	0.33%
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	3,171	3,171	3,230	3,286	3,330	3,361	0.37%	0.36%	0.33%	0.29%
Olivia	Olivia Regional Airport	OVL	Intermediate Small	4,688	4,688	4,595	4,492	4,371	4,232	-0.40%	-0.43%	-0.47%	-0.51%
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	3,221	3,221	3,142	3,058	2,962	2,854	-0.50%	-0.52%	-0.56%	-0.60%
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	2,984	2,984	3,166	3,351	3,531	3,701	1.19%	1.17%	1.13%	1.08%
Pine River	Pine River Regional Airport	PWC	Intermediate Small	5,003	5,003	5,310	5,622	5,924	6,210	1.20%	1.17%	1.13%	1.09%
Pinecreek	Piney-Pinecreek Border Airport	48Y	Intermediate Small	431	431	434	437	438	438	0.14%	0.14%	0.11%	0.08%
Red Lake Falls	Red Lake Falls Municipal Airport	D81	Intermediate Small	11,345	11,345	11,409	11,457	11,460	11,412	0.11%	0.10%	0.07%	0.03%
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	1,374	1,374	1,381	1,384	1,381	1,371	0.10%	0.07%	0.03%	-0.01%
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	3,889	3,889	4,127	4,368	4,602	4,823	1.20%	1.17%	1.13%	1.08%
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	3,300	3,300	3,273	3,239	3,190	3,125	-0.16%	-0.19%	-0.23%	-0.27%
Springfield	Springfield Municipal Airport	D42	Intermediate Small	2,142	2,142	2,146	2,145	2,134	2,111	0.04%	0.01%	-0.02%	-0.07%
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	16,421	16,421	18,039	19,768	21,561	23,393	1.90%	1.87%	1.83%	1.79%
Staples	Staples Municipal Airport	SAZ	Intermediate Small	7,207	7,207	7,322	7,421	7,486	7,511	0.32%	0.29%	0.25%	0.21%
Stephen	Stephen Municipal Airport	D41	Intermediate Small	12,023	12,023	11,987	11,933	11,833	11,683	-0.06%	-0.08%	-0.11%	-0.14%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Tower	Tower Municipal Airport	12D	Intermediate Small	3,517	3,517	3,560	3,599	3,624	3,633	0.24%	0.23%	0.20%	0.16%
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	1,217	1,217	1,242	1,264	1,280	1,289	0.41%	0.38%	0.34%	0.29%
Walker	Walker Municipal Airport	Y49	Intermediate Small	5,152	5,152	5,468	5,789	6,100	6,394	1.20%	1.17%	1.13%	1.09%
Warren	Warren Municipal Airport	D37	Intermediate Small	9,062	9,062	9,035	8,995	8,919	8,806	-0.06%	-0.07%	-0.11%	-0.14%
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	13,211	13,211	13,361	13,480	13,535	13,520	0.23%	0.20%	0.16%	0.12%
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	3,056	3,056	3,023	2,981	2,928	2,860	-0.22%	-0.25%	-0.28%	-0.33%
Windom	Windom Municipal Airport	MWM	Intermediate Small	5,496	5,496	5,463	5,416	5,345	5,246	-0.12%	-0.15%	-0.19%	-0.23%
Backus	Backus Municipal Airport	7Y3	Landing Strip Turf	4,017	4,017	4,263	4,514	4,756	4,986	1.20%	1.17%	1.13%	1.09%
Big Falls	Big Falls Municipal Airport	7Y9	Landing Strip Turf	200	200	198	196	194	190	-0.20%	-0.20%	-0.20%	-0.26%
Bowstring	Bowstring Airport	9Y0	Landing Strip Turf	323	323	328	332	336	338	0.31%	0.28%	0.26%	0.23%
Clarissa	Clarissa Municipal Airport	8Y5	Landing Strip Turf	456	456	462	467	470	470	0.26%	0.24%	0.20%	0.15%
East Gull Lake	East Gull Lake Airport	9Y2	Landing Strip Turf	198	198	210	223	235	246	1.18%	1.20%	1.15%	1.09%
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	Landing Strip Turf	200	200	199	199	197	194	-0.10%	-0.05%	-0.10%	-0.15%
Henning	Henning Municipal Airport	05Y	Landing Strip Turf	1,517	1,517	1,551	1,581	1,605	1,620	0.44%	0.41%	0.38%	0.33%
Hill City	Hill City-Quadna Mountain Airport	07Y	Landing Strip Turf	560	560	578	595	610	622	0.63%	0.61%	0.57%	0.53%
Karlstad	Karlstad Municipal Airport	23D	Landing Strip Turf	2,006	2,006	1,998	1,988	1,970	1,944	-0.08%	-0.09%	-0.12%	-0.16%
Littlefork	Littlefork Municipal Hanover Airport	13Y	Landing Strip Turf	700	700	694	688	678	666	-0.17%	-0.17%	-0.21%	-0.25%
Milaca	Milaca Municipal Airport	18Y	Landing Strip Turf	5,006	5,006	5,266	5,526	5,772	5,997	1.02%	0.99%	0.95%	0.91%
Northome	Northome Municipal Airport	43Y	Landing Strip Turf	311	311	309	306	302	296	-0.13%	-0.16%	-0.20%	-0.25%
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	Landing Strip Turf	1,664	1,664	1,701	1,735	1,760	1,777	0.44%	0.42%	0.37%	0.33%
Remer	Remer Municipal Airport	52Y	Landing Strip Turf	512	512	543	575	606	636	1.18%	1.17%	1.13%	1.09%
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	Landing Strip Turf	5,000	5,000	5,010	5,007	4,980	4,928	0.04%	0.01%	-0.03%	-0.07%
Starbuck	Starbuck Municipal Airport	D32	Landing Strip Turf	1,172	1,172	1,186	1,197	1,203	1,202	0.24%	0.21%	0.17%	0.13%
Tyler	Tyler Municipal Airport	63Y	Landing Strip Turf	1,606	1,606	1,574	1,538	1,497	1,449	-0.40%	-0.43%	-0.47%	-0.51%
Waskish	Wells Municipal Airport	68Y	Landing Strip Turf	1,006	1,006	1,057	1,108	1,155	1,198	0.99%	0.97%	0.93%	0.88%
Waskish	Waskish Municipal Airport	VWU	Landing Strip Turf	5,018	5,018	4,905	4,782	4,641	4,480	-0.45%	-0.48%	-0.52%	-0.57%
Winsted	Winsted Municipal Airport	10D	Landing Strip Turf	9,986	9,986	10,289	10,573	10,815	11,005	0.60%	0.57%	0.53%	0.49%
N/A	STATEWIDE TOTAL (General Aviation [GA] ONLY)	N/A	N/A	**1,262,979**	**1,262,979**	**1,297,573**	**1,331,194**	**1,360,676**	**1,385,053**	**0.54%**	**0.53%**	**0.50%**	**0.46%**

*Note: *CAGR = Compound Annual Growth Rate. (1) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.*

Sources: Woods & Poole, 2021; Kimley-Horn, 2023

Table A.3. 2022 MnSASP Forecast Alternative: Socioeconomic – Per Capita Personal Income (PCPI)[1]

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	18,523	18,523	20,175	21,725	23,087	24,396	1.72%	1.61%	1.48%	1.39%
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	20,598	7,503	8,152	8,754	9,281	9,789	1.67%	1.55%	1.43%	1.34%
Austin	Austin Municipal Airport	AUM	Key General Aviation	21,505	21,505	23,322	25,048	26,591	28,111	1.64%	1.54%	1.43%	1.35%
Baudette	Baudette International Airport	BDE	Key General Aviation	7,503	20,598	22,239	23,705	24,865	25,897	1.54%	1.41%	1.26%	1.15%
Ely	Ely Municipal Airport	ELO	Key General Aviation	7,550	24,429	26,359	28,185	29,831	31,443	1.53%	1.44%	1.34%	1.27%
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	9,267	3,762	4,104	4,431	4,727	5,019	1.76%	1.65%	1.53%	1.45%
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	13,016	7,550	8,202	8,801	9,313	9,793	1.67%	1.54%	1.41%	1.31%
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	3,762	13,016	14,069	15,027	15,828	16,579	1.57%	1.45%	1.31%	1.22%
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	25,230	9,267	10,122	10,914	11,584	12,212	1.78%	1.65%	1.50%	1.39%
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	100,062	25,230	27,274	29,235	31,026	32,800	1.57%	1.48%	1.39%	1.32%
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	15,926	16,357	18,014	19,670	21,292	23,004	1.95%	1.86%	1.77%	1.72%
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	71,740	71,740	75,754	79,238	82,064	84,631	1.09%	1.00%	0.90%	0.83%
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	104,405	104,405	113,760	123,095	132,179	141,549	1.73%	1.66%	1.58%	1.53%
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	7,792	100,062	108,992	117,469	125,153	132,726	1.72%	1.62%	1.50%	1.42%
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	16,357	15,926	17,172	18,319	19,317	20,261	1.52%	1.41%	1.30%	1.21%
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	19,476	9,945	10,812	11,591	12,221	12,788	1.69%	1.54%	1.38%	1.27%
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	11,751	11,078	11,937	12,743	13,460	14,150	1.50%	1.41%	1.31%	1.23%
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	40,934	19,476	21,117	22,691	24,119	25,520	1.63%	1.54%	1.44%	1.36%
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	16,617	11,751	12,692	13,565	14,350	15,119	1.55%	1.45%	1.34%	1.27%
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	24,429	16,617	17,948	19,194	20,302	21,385	1.55%	1.45%	1.34%	1.27%
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	9,945	40,934	44,449	47,824	50,960	54,128	1.66%	1.57%	1.47%	1.41%
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	11,078	7,792	8,354	8,875	9,333	9,775	1.40%	1.31%	1.21%	1.14%
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	13,733	13,733	15,025	16,198	17,145	17,994	1.81%	1.66%	1.49%	1.36%
Benson	Benson Municipal Airport	BBB	Intermediate Large	4,065	4,065	4,445	4,801	5,113	5,413	1.80%	1.68%	1.54%	1.44%
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	2,327	2,327	2,541	2,740	2,909	3,066	1.78%	1.65%	1.50%	1.39%
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	9,821	9,821	10,504	11,112	11,608	12,056	1.35%	1.24%	1.12%	1.03%
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	7,080	7,080	7,754	8,396	8,978	9,548	1.84%	1.72%	1.60%	1.51%
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	10,530	10,530	11,360	12,145	12,852	13,545	1.53%	1.44%	1.34%	1.27%
Cook	Cook Municipal Airport	CQM	Intermediate Large	5,022	5,022	5,418	5,794	6,132	6,463	1.53%	1.44%	1.34%	1.27%
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	11,670	11,670	12,537	13,305	13,920	14,464	1.44%	1.32%	1.18%	1.08%
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	16,690	16,690	18,143	19,492	20,664	21,786	1.68%	1.56%	1.43%	1.34%
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	4,017	4,017	4,284	4,521	4,726	4,924	1.30%	1.19%	1.09%	1.02%
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	8,137	8,137	8,780	9,388	9,937	10,473	1.53%	1.44%	1.34%	1.27%
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	19,169	19,169	20,686	22,096	23,342	24,542	1.53%	1.43%	1.32%	1.24%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	4,284	4,284	4,703	5,112	5,499	5,894	1.88%	1.78%	1.68%	1.61%
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	7,544	7,544	8,263	8,946	9,567	10,174	1.84%	1.72%	1.60%	1.51%
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	13,380	13,380	14,454	15,444	16,301	17,107	1.56%	1.44%	1.33%	1.24%
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	7,844	7,844	8,497	9,106	9,646	10,170	1.61%	1.50%	1.39%	1.31%
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	4,008	4,008	4,345	4,654	4,925	5,186	1.63%	1.51%	1.38%	1.30%
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	19,184	19,184	20,797	22,278	23,538	24,721	1.63%	1.51%	1.37%	1.28%
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	4,730	4,730	5,112	5,467	5,779	6,078	1.57%	1.46%	1.34%	1.26%
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	21,055	21,055	22,519	23,894	25,158	26,419	1.35%	1.27%	1.19%	1.14%
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	7,058	7,058	7,771	8,465	9,122	9,792	1.94%	1.83%	1.72%	1.65%
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	8,867	8,867	9,511	10,108	10,624	11,116	1.41%	1.32%	1.21%	1.14%
Mora	Mora Municipal Airport	JMR	Intermediate Large	12,377	12,377	13,327	14,144	14,770	15,313	1.49%	1.34%	1.19%	1.07%
Morris	Morris Municipal Airport	MOX	Intermediate Large	9,366	9,366	10,226	11,062	11,854	12,655	1.77%	1.68%	1.58%	1.52%
Orr	Orr Regional Airport	ORB	Intermediate Large	1,357	1,357	1,464	1,566	1,657	1,747	1.53%	1.44%	1.34%	1.27%
Perham	Perham Municipal Airport	16D	Intermediate Large	6,235	6,235	6,774	7,269	7,691	8,088	1.67%	1.55%	1.41%	1.31%
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	4,675	4,675	5,126	5,569	5,991	6,425	1.86%	1.77%	1.67%	1.60%
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	2,449	2,449	2,648	2,829	2,984	3,130	1.57%	1.45%	1.33%	1.23%
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	7,548	7,548	8,139	8,660	9,063	9,411	1.52%	1.38%	1.23%	1.11%
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	8,642	8,642	9,419	10,155	10,823	11,477	1.74%	1.63%	1.51%	1.43%
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	14,103	14,103	15,232	16,279	17,222	18,144	1.55%	1.45%	1.34%	1.27%
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	6,473	6,473	6,916	7,309	7,635	7,934	1.33%	1.22%	1.11%	1.02%
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	49,331	49,331	52,760	55,982	58,943	61,897	1.35%	1.27%	1.19%	1.14%
St. James	Saint James Municipal Airport	JYG	Intermediate Large	3,908	3,908	4,231	4,527	4,779	5,015	1.60%	1.48%	1.35%	1.25%
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	4,429	4,429	4,835	5,216	5,544	5,853	1.77%	1.65%	1.51%	1.40%
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	6,233	6,233	6,771	7,265	7,688	8,084	1.67%	1.54%	1.41%	1.31%
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	Intermediate Small	3,085	3,085	3,367	3,635	3,875	4,108	1.76%	1.65%	1.53%	1.44%
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	2,034	2,034	2,224	2,402	2,558	2,708	1.80%	1.68%	1.54%	1.44%
Bagley	Bagley Municipal Airport	7Y4	Intermediate Small	434	434	474	511	541	569	1.78%	1.65%	1.48%	1.36%
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	7,642	7,642	8,342	9,004	9,598	10,175	1.77%	1.65%	1.53%	1.44%
Brooten	Brooten Municipal Airport	6D1	Intermediate Small	1,248	1,248	1,347	1,440	1,523	1,603	1.54%	1.44%	1.34%	1.26%
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	14,213	14,213	15,125	15,926	16,602	17,239	1.25%	1.14%	1.04%	0.97%
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	2,193	2,193	2,354	2,496	2,615	2,724	1.43%	1.30%	1.18%	1.09%
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	11,472	11,472	12,379	13,236	14,009	14,766	1.53%	1.44%	1.34%	1.27%
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	7,851	6,691	7,357	7,995	8,580	9,161	1.92%	1.80%	1.67%	1.58%
Fertile	Fertile Municipal Airport	D14	Intermediate Small	6,878	7,851	8,435	8,951	9,365	9,731	1.45%	1.32%	1.18%	1.08%
Forest Lake	Forest Lake Airport	25D	Intermediate Small	5,715	6,878	7,278	7,647	7,980	8,310	1.14%	1.07%	1.00%	0.95%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	8,150	5,715	6,140	6,516	6,817	7,084	1.44%	1.32%	1.18%	1.08%
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	6,691	8,150	8,829	9,462	10,023	10,567	1.61%	1.50%	1.39%	1.31%
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	5,225	5,225	5,604	5,956	6,260	6,550	1.41%	1.32%	1.21%	1.14%
Hector	Hector Municipal Airport	1D6	Intermediate Small	6,074	6,074	6,602	7,105	7,563	8,015	1.68%	1.58%	1.47%	1.40%
Herman	Herman Municipal Airport	06Y	Intermediate Small	2,006	2,006	2,205	2,396	2,572	2,746	1.91%	1.79%	1.67%	1.58%
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	14,623	14,623	16,028	17,413	18,744	20,110	1.85%	1.76%	1.67%	1.61%
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	1,614	1,614	1,732	1,836	1,926	2,012	1.42%	1.30%	1.19%	1.11%
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	4,410	4,410	4,787	5,125	5,400	5,649	1.65%	1.51%	1.36%	1.25%
Longville	Longville Municipal Airport	XVG	Intermediate Small	5,343	5,343	5,781	6,170	6,475	6,743	1.59%	1.45%	1.29%	1.17%
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	2,340	2,340	2,554	2,758	2,942	3,122	1.77%	1.66%	1.54%	1.45%
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	1,621	1,621	1,786	1,937	2,061	2,174	1.96%	1.80%	1.61%	1.48%
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	15,414	15,414	16,403	17,271	18,005	18,696	1.25%	1.14%	1.04%	0.97%
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	987	987	1,080	1,164	1,232	1,293	1.82%	1.66%	1.49%	1.36%
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	41,541	41,541	45,263	48,977	52,592	56,320	1.73%	1.66%	1.58%	1.53%
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	3,171	3,171	3,421	3,657	3,870	4,078	1.53%	1.44%	1.34%	1.27%
Olivia	Olivia Regional Airport	OVL	Intermediate Small	4,688	4,688	5,096	5,484	5,838	6,187	1.68%	1.58%	1.47%	1.40%
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	3,221	3,221	3,554	3,872	4,158	4,440	1.99%	1.86%	1.72%	1.62%
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	2,984	2,984	3,220	3,443	3,640	3,831	1.53%	1.44%	1.33%	1.26%
Pine River	Pine River Regional Airport	PWC	Intermediate Small	5,003	5,003	5,414	5,778	6,063	6,315	1.59%	1.45%	1.29%	1.17%
Pinecreek	Piney-Pinecreek Border Airport	48Y	Intermediate Small	431	431	465	497	526	554	1.53%	1.44%	1.34%	1.26%
Red Lake Falls	Red Lake Falls Municipal Airport	D81	Intermediate Small	11,345	11,345	12,111	12,768	13,280	13,723	1.32%	1.19%	1.06%	0.96%
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	1,374	1,374	1,486	1,588	1,675	1,757	1.58%	1.46%	1.33%	1.24%
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	3,889	3,889	4,197	4,487	4,745	4,994	1.54%	1.44%	1.34%	1.26%
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	3,300	3,300	3,591	3,866	4,117	4,365	1.70%	1.60%	1.49%	1.41%
Springfield	Springfield Municipal Airport	D42	Intermediate Small	2,142	2,142	2,333	2,515	2,679	2,841	1.72%	1.62%	1.50%	1.42%
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	16,421	16,421	17,375	18,258	19,053	19,839	1.14%	1.07%	1.00%	0.95%
Staples	Staples Municipal Airport	SAZ	Intermediate Small	7,207	7,207	7,921	8,589	9,147	9,660	1.91%	1.77%	1.60%	1.48%
Stephen	Stephen Municipal Airport	D41	Intermediate Small	12,023	12,023	12,933	13,730	14,383	14,976	1.47%	1.34%	1.20%	1.10%
Tower	Tower Municipal Airport	12D	Intermediate Small	3,517	3,517	3,795	4,058	4,295	4,527	1.53%	1.44%	1.34%	1.27%
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	1,217	1,217	1,341	1,464	1,585	1,712	1.96%	1.87%	1.78%	1.72%
Walker	Walker Municipal Airport	Y49	Intermediate Small	5,152	5,152	5,574	5,950	6,243	6,502	1.59%	1.45%	1.29%	1.17%
Warren	Warren Municipal Airport	D37	Intermediate Small	9,062	9,062	9,748	10,349	10,842	11,289	1.47%	1.34%	1.20%	1.10%
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	13,211	13,211	14,251	15,203	16,031	16,820	1.53%	1.41%	1.30%	1.21%
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	3,056	3,056	3,323	3,575	3,800	4,016	1.69%	1.58%	1.46%	1.38%
Windom	Windom Municipal Airport	MWM	Intermediate Small	5,496	5,496	5,991	6,457	6,871	7,272	1.74%	1.62%	1.50%	1.41%
Backus	Backus Municipal Airport	7Y3	Landing Strip Turf	4,017	4,017	4,347	4,639	4,868	5,070	1.59%	1.45%	1.29%	1.17%
Big Falls	Big Falls Municipal Airport	7Y9	Landing Strip Turf	200	200	217	233	245	256	1.64%	1.54%	1.36%	1.24%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Bowstring	Bowstring Airport	9Y0	Landing Strip Turf	323	323	352	380	403	425	1.73%	1.64%	1.49%	1.38%
Clarissa	Clarissa Municipal Airport	8Y5	Landing Strip Turf	456	456	495	530	558	584	1.65%	1.52%	1.35%	1.24%
East Gull Lake	East Gull Lake Airport	9Y2	Landing Strip Turf	198	198	215	229	240	250	1.66%	1.47%	1.29%	1.17%
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	Landing Strip Turf	200	200	215	228	239	249	1.46%	1.32%	1.19%	1.10%
Henning	Henning Municipal Airport	05Y	Landing Strip Turf	1,517	1,517	1,648	1,768	1,871	1,968	1.67%	1.54%	1.41%	1.31%
Hill City	Hill City-Quadna Mountain Airport	07Y	Landing Strip Turf	560	560	613	661	699	734	1.83%	1.67%	1.49%	1.36%
Karlstad	Karlstad Municipal Airport	23D	Landing Strip Turf	2,006	2,006	2,167	2,315	2,444	2,564	1.56%	1.44%	1.33%	1.23%
Littlefork	Littlefork Municipal Hanover Airport	13Y	Landing Strip Turf	700	700	761	816	859	898	1.69%	1.55%	1.37%	1.25%
Milaca	Milaca Municipal Airport	18Y	Landing Strip Turf	5,006	5,006	5,398	5,744	6,011	6,242	1.52%	1.38%	1.23%	1.11%
Northome	Northome Municipal Airport	43Y	Landing Strip Turf	311	311	339	363	382	399	1.74%	1.56%	1.38%	1.25%
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	Landing Strip Turf	1,664	1,664	1,808	1,940	2,052	2,158	1.67%	1.55%	1.41%	1.31%
Remer	Remer Municipal Airport	52Y	Landing Strip Turf	512	512	554	591	621	646	1.59%	1.45%	1.30%	1.17%
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	Landing Strip Turf	5,000	5,000	5,446	5,870	6,254	6,632	1.72%	1.62%	1.50%	1.42%
Starbuck	Starbuck Municipal Airport	D32	Landing Strip Turf	1,172	1,172	1,287	1,399	1,504	1,613	1.89%	1.79%	1.68%	1.61%
Tyler	Tyler Municipal Airport	63Y	Landing Strip Turf	1,606	1,606	1,769	1,929	2,078	2,230	1.95%	1.85%	1.73%	1.65%
Wells	Wells Municipal Airport	68Y	Landing Strip Turf	1,006	1,006	1,092	1,169	1,233	1,291	1.65%	1.51%	1.37%	1.25%
Waskish	Waskish Municipal Airport	VWU	Landing Strip Turf	5,018	5,018	5,478	5,912	6,303	6,682	1.77%	1.65%	1.53%	1.44%
Winsted	Winsted Municipal Airport	10D	Landing Strip Turf	9,986	9,986	10,818	11,594	12,281	12,948	1.61%	1.50%	1.39%	1.31%
N/A	STATEWIDE TOTAL (GA ONLY)	N/A	N/A	1,262,979	1,262,979	1,365,971	1,462,620	1,548,856	1,632,891	1.58%	1.48%	1.37%	1.29%

Notes: (1) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.

Sources: Woods & Poole (W&P), 2021; Kimley-Horn, 2023

Table A.4. 2022 MnSASP Forecast Alternative: GA Flight Hours Flown[1]

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	18,523	18,523	20,912	21,625	22,323	23,301	2.46%	1.56%	1.25%	1.15%
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	20,598	7,503	8,471	8,759	9,042	9,438	2.46%	1.56%	1.25%	1.15%
Austin	Austin Municipal Airport	AUM	Key General Aviation	21,505	21,505	24,279	25,106	25,916	27,051	2.46%	1.56%	1.25%	1.15%
Baudette	Baudette International Airport	BDE	Key General Aviation	7,503	20,598	23,255	24,048	24,823	25,910	2.46%	1.56%	1.25%	1.15%
Ely	Ely Municipal Airport	ELO	Key General Aviation	7,550	24,429	27,580	28,521	29,440	30,730	2.46%	1.56%	1.25%	1.15%
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	9,267	3,762	4,248	4,392	4,534	4,733	2.46%	1.56%	1.25%	1.15%
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	13,016	7,550	8,524	8,814	9,098	9,497	2.46%	1.56%	1.25%	1.15%
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	3,762	13,016	14,695	15,196	15,686	16,373	2.46%	1.56%	1.25%	1.15%
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	25,230	9,267	10,462	10,818	11,167	11,656	2.46%	1.56%	1.25%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	100,062	25,230	28,485	29,456	30,405	31,737	2.46%	1.56%	1.25%	1.15%
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	15,926	16,357	18,467	19,097	19,712	20,576	2.46%	1.56%	1.25%	1.15%
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	71,740	71,740	80,993	83,754	86,454	90,242	2.46%	1.56%	1.25%	1.15%
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	104,405	104,405	117,871	121,890	125,819	131,331	2.46%	1.56%	1.25%	1.15%
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	7,792	100,062	112,968	116,820	120,585	125,868	2.46%	1.56%	1.25%	1.15%
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	16,357	15,926	17,980	18,593	19,192	20,033	2.46%	1.56%	1.25%	1.15%
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	19,476	9,945	11,227	11,610	11,984	12,509	2.45%	1.56%	1.25%	1.15%
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	11,751	11,078	12,507	12,933	13,350	13,935	2.46%	1.56%	1.25%	1.15%
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	40,934	19,476	21,988	22,737	23,470	24,499	2.46%	1.56%	1.25%	1.15%
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	16,617	11,751	13,267	13,719	14,161	14,782	2.46%	1.56%	1.25%	1.15%
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	24,429	16,617	18,761	19,400	20,026	20,903	2.46%	1.56%	1.25%	1.15%
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	9,945	40,934	46,214	47,789	49,330	51,491	2.46%	1.56%	1.25%	1.15%
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	11,078	7,792	8,797	9,097	9,390	9,802	2.46%	1.56%	1.25%	1.15%
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	13,733	13,733	15,504	16,032	16,549	17,274	2.46%	1.56%	1.25%	1.15%
Benson	Benson Municipal Airport	BBB	Intermediate Large	4,065	4,065	4,590	4,746	4,899	5,114	2.46%	1.56%	1.25%	1.15%
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	2,327	2,327	2,627	2,716	2,804	2,927	2.45%	1.56%	1.25%	1.15%
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	9,821	9,821	11,088	11,466	11,835	12,354	2.46%	1.56%	1.25%	1.15%
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	7,080	7,080	7,993	8,266	8,532	8,906	2.46%	1.56%	1.25%	1.15%
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	10,530	10,530	11,888	12,293	12,690	13,246	2.46%	1.56%	1.25%	1.15%
Cook	Cook Municipal Airport	CQM	Intermediate Large	5,022	5,022	5,669	5,863	6,052	6,317	2.45%	1.56%	1.25%	1.15%
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	11,670	11,670	13,175	13,624	14,063	14,679	2.46%	1.56%	1.25%	1.15%
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	16,690	16,690	18,842	19,485	20,113	20,994	2.46%	1.56%	1.25%	1.15%
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	4,017	4,017	4,535	4,689	4,841	5,053	2.46%	1.56%	1.25%	1.15%
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	8,137	8,137	9,187	9,500	9,806	10,236	2.46%	1.56%	1.25%	1.15%
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	19,169	19,169	21,642	22,380	23,101	24,113	2.46%	1.56%	1.25%	1.15%
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	4,284	4,284	4,837	5,001	5,163	5,389	2.46%	1.56%	1.25%	1.15%
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	7,544	7,544	8,517	8,808	9,092	9,490	2.46%	1.56%	1.25%	1.15%
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	13,380	13,380	15,105	15,620	16,124	16,830	2.45%	1.56%	1.25%	1.15%
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	7,844	7,844	8,855	9,157	9,452	9,867	2.45%	1.56%	1.25%	1.15%
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	4,008	4,008	4,525	4,679	4,830	5,042	2.46%	1.56%	1.25%	1.15%
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	19,184	19,184	21,659	22,397	23,119	24,132	2.46%	1.56%	1.25%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	4,730	4,730	5,340	5,522	5,700	5,950	2.46%	1.56%	1.25%	1.15%
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	21,055	21,055	23,771	24,582	25,374	26,486	2.46%	1.56%	1.25%	1.15%
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	7,058	7,058	7,969	8,240	8,506	8,879	2.46%	1.56%	1.25%	1.15%
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	8,867	8,867	10,011	10,352	10,686	11,154	2.46%	1.56%	1.25%	1.15%
Mora	Mora Municipal Airport	JMR	Intermediate Large	12,377	12,377	13,973	14,450	14,916	15,569	2.46%	1.56%	1.25%	1.15%
Morris	Morris Municipal Airport	MOX	Intermediate Large	9,366	9,366	10,574	10,934	11,287	11,781	2.46%	1.56%	1.25%	1.15%
Orr	Orr Regional Airport	ORB	Intermediate Large	1,357	1,357	1,532	1,584	1,635	1,707	2.46%	1.56%	1.25%	1.15%
Perham	Perham Municipal Airport	16D	Intermediate Large	6,235	6,235	7,040	7,280	7,514	7,843	2.46%	1.56%	1.25%	1.15%
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	4,675	4,675	5,278	5,458	5,634	5,881	2.46%	1.56%	1.25%	1.15%
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	2,449	2,449	2,764	2,859	2,951	3,080	2.45%	1.56%	1.25%	1.15%
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	7,548	7,548	8,522	8,812	9,096	9,495	2.46%	1.56%	1.25%	1.15%
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	8,642	8,642	9,757	10,089	10,414	10,871	2.46%	1.56%	1.25%	1.15%
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	14,103	14,103	15,922	16,464	16,995	17,740	2.46%	1.56%	1.25%	1.15%
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	6,473	6,473	7,308	7,557	7,801	8,143	2.46%	1.56%	1.25%	1.15%
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	49,331	49,331	55,693	57,592	59,448	62,053	2.46%	1.56%	1.25%	1.15%
St. James	Saint James Municipal Airport	JYG	Intermediate Large	3,908	3,908	4,412	4,563	4,710	4,916	2.46%	1.56%	1.25%	1.15%
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	4,429	4,429	5,001	5,171	5,338	5,572	2.46%	1.56%	1.25%	1.15%
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	6,233	6,233	7,036	7,276	7,511	7,840	2.45%	1.56%	1.25%	1.15%
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	Intermediate Small	2,034	2,034	2,296	2,375	2,451	2,559	2.45%	1.56%	1.25%	1.15%
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	434	434	490	507	523	546	2.46%	1.57%	1.25%	1.15%
Bagley	Bagley Municipal Airport	7Y4	Intermediate Small	7,642	7,642	8,627	8,921	9,209	9,612	2.45%	1.56%	1.25%	1.15%
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	1,248	1,248	1,409	1,457	1,504	1,570	2.46%	1.56%	1.25%	1.15%
Brooten	Brooten Municipal Airport	6D1	Intermediate Small	14,213	14,213	16,046	16,593	17,128	17,878	2.46%	1.56%	1.25%	1.15%
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	2,193	2,193	2,475	2,560	2,642	2,758	2.45%	1.56%	1.25%	1.15%
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	11,472	11,472	12,952	13,394	13,825	14,431	2.46%	1.56%	1.25%	1.15%
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	7,851	6,691	7,554	7,812	8,064	8,417	2.46%	1.56%	1.25%	1.15%
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	6,878	7,851	8,864	9,166	9,461	9,876	2.46%	1.56%	1.25%	1.15%
Fertile	Fertile Municipal Airport	D14	Intermediate Small	5,715	6,878	7,765	8,030	8,289	8,652	2.46%	1.56%	1.25%	1.15%
Forest Lake	Forest Lake Airport	25D	Intermediate Small	8,150	5,715	6,452	6,672	6,887	7,189	2.46%	1.56%	1.25%	1.15%
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	6,691	8,150	9,201	9,515	9,822	10,252	2.46%	1.56%	1.25%	1.15%
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	5,225	5,225	5,899	6,100	6,297	6,572	2.46%	1.56%	1.25%	1.15%
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	6,074	6,074	6,857	7,091	7,319	7,640	2.45%	1.56%	1.25%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Hector	Hector Municipal Airport	1D6	Intermediate Small	2,006	2,006	2,264	2,342	2,417	2,523	2.45%	1.56%	1.25%	1.15%
Herman	Herman Municipal Airport	06Y	Intermediate Small	14,623	14,623	16,509	17,072	17,622	18,394	2.46%	1.56%	1.25%	1.15%
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	1,614	1,614	1,822	1,884	1,945	2,030	2.45%	1.56%	1.25%	1.15%
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	4,410	4,410	4,978	5,148	5,314	5,547	2.45%	1.56%	1.25%	1.15%
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	5,343	5,343	6,032	6,237	6,438	6,720	2.46%	1.56%	1.25%	1.15%
Longville	Longville Municipal Airport	XVG	Intermediate Small	2,340	2,340	2,642	2,732	2,820	2,943	2.46%	1.56%	1.25%	1.15%
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	1,621	1,621	1,830	1,892	1,953	2,039	2.46%	1.56%	1.25%	1.15%
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	15,414	15,414	17,402	17,995	18,575	19,389	2.46%	1.56%	1.25%	1.15%
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	987	987	1,114	1,152	1,189	1,242	2.45%	1.56%	1.25%	1.16%
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	14,103	14,103	15,922	16,464	16,995	17,740	2.46%	1.56%	1.25%	1.15%
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	41,541	41,541	46,899	48,498	50,061	52,254	2.46%	1.56%	1.25%	1.15%
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	3,171	3,171	3,580	3,702	3,821	3,988	2.46%	1.56%	1.25%	1.15%
Olivia	Olivia Regional Airport	OVL	Intermediate Small	4,688	4,688	5,293	5,474	5,650	5,898	2.46%	1.56%	1.25%	1.15%
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	3,221	3,221	3,636	3,760	3,881	4,051	2.45%	1.56%	1.25%	1.15%
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	2,984	2,984	3,368	3,483	3,596	3,753	2.45%	1.56%	1.25%	1.15%
Pine River	Pine River Regional Airport	PWC	Intermediate Small	5,003	5,003	5,648	5,841	6,029	6,293	2.45%	1.56%	1.25%	1.15%
Pinecreek	Piney-Pinecreek Border Airport	48Y	Intermediate Small	431	431	486	503	519	542	2.43%	1.56%	1.25%	1.15%
Red Lake Falls	Red Lake Falls Municipal Airport	D81	Intermediate Small	11,345	11,345	12,809	13,245	13,672	14,271	2.46%	1.56%	1.25%	1.15%
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	1,374	1,374	1,552	1,604	1,656	1,729	2.47%	1.56%	1.25%	1.16%
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	3,889	3,889	4,391	4,540	4,687	4,892	2.46%	1.56%	1.25%	1.15%
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	3,300	3,300	3,726	3,853	3,977	4,151	2.46%	1.56%	1.25%	1.15%
Springfield	Springfield Municipal Airport	D42	Intermediate Small	2,142	2,142	2,418	2,501	2,581	2,695	2.45%	1.56%	1.25%	1.15%
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	16,421	16,421	18,539	19,171	19,789	20,656	2.46%	1.56%	1.25%	1.15%
Staples	Staples Municipal Airport	SAZ	Intermediate Small	7,207	7,207	8,136	8,414	8,685	9,066	2.45%	1.56%	1.25%	1.15%
Stephen	Stephen Municipal Airport	D41	Intermediate Small	12,023	12,023	13,573	14,036	14,489	15,123	2.45%	1.56%	1.25%	1.15%
Tower	Tower Municipal Airport	12D	Intermediate Small	3,517	3,517	3,971	4,106	4,239	4,424	2.46%	1.56%	1.25%	1.15%
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	1,217	1,217	1,374	1,421	1,467	1,531	2.46%	1.56%	1.25%	1.15%
Walker	Walker Municipal Airport	Y49	Intermediate Small	5,152	5,152	5,816	6,014	6,208	6,480	2.45%	1.56%	1.25%	1.15%
Warren	Warren Municipal Airport	D37	Intermediate Small	9,062	9,062	10,231	10,580	10,921	11,400	2.46%	1.56%	1.25%	1.15%
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	13,211	13,211	14,915	15,424	15,921	16,619	2.46%	1.56%	1.25%	1.15%
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	3,056	3,056	3,451	3,568	3,683	3,845	2.46%	1.56%	1.25%	1.15%
Windom	Windom Municipal Airport	MWM	Intermediate Small	5,496	5,496	6,205	6,416	6,623	6,913	2.46%	1.56%	1.25%	1.15%
Backus	Backus Municipal Airport	7Y3	Landing Strip Turf	4,017	4,017	4,535	4,690	4,841	5,053	2.46%	1.56%	1.25%	1.15%
Big Falls	Big Falls Municipal Airport	7Y9	Landing Strip Turf	200	200	226	233	241	252	2.47%	1.54%	1.25%	1.16%
Bowstring	Bowstring Airport	9Y0	Landing Strip Turf	323	323	364	377	389	406	2.42%	1.56%	1.25%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Clarissa	Clarissa Municipal Airport	8Y5	Landing Strip Turf	456	456	515	532	550	574	2.46%	1.55%	1.26%	1.16%
East Gull Lake	East Gull Lake Airport	9Y2	Landing Strip Turf	198	198	224	232	239	249	2.50%	1.60%	1.26%	1.15%
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	Landing Strip Turf	200	200	226	233	241	252	2.47%	1.54%	1.25%	1.16%
Henning	Henning Municipal Airport	05Y	Landing Strip Turf	1,517	1,517	1,713	1,771	1,828	1,908	2.46%	1.56%	1.25%	1.15%
Hill City	Hill City-Quadna Mountain Airport	07Y	Landing Strip Turf	560	560	632	654	675	705	2.45%	1.56%	1.25%	1.16%
Karlstad	Karlstad Municipal Airport	23D	Landing Strip Turf	2,006	2,006	2,264	2,342	2,417	2,523	2.45%	1.56%	1.25%	1.15%
Littlefork	Littlefork Municipal Hanover Airport	13Y	Landing Strip Turf	700	700	790	817	844	881	2.45%	1.56%	1.25%	1.16%
Milaca	Milaca Municipal Airport	18Y	Landing Strip Turf	5,006	5,006	5,652	5,845	6,033	6,297	2.46%	1.56%	1.25%	1.15%
Northome	Northome Municipal Airport	43Y	Landing Strip Turf	311	311	351	363	375	392	2.45%	1.56%	1.26%	1.16%
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	Landing Strip Turf	1,664	1,664	1,879	1,943	2,005	2,093	2.46%	1.56%	1.25%	1.15%
Remer	Remer Municipal Airport	52Y	Landing Strip Turf	512	512	578	598	617	644	2.45%	1.56%	1.25%	1.15%
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	Landing Strip Turf	5,000	5,000	5,645	5,837	6,026	6,290	2.46%	1.56%	1.25%	1.15%
Starbuck	Starbuck Municipal Airport	D32	Landing Strip Turf	1,172	1,172	1,323	1,368	1,413	1,474	2.45%	1.56%	1.25%	1.15%
Tyler	Tyler Municipal Airport	63Y	Landing Strip Turf	1,606	1,606	1,813	1,875	1,935	2,020	2.45%	1.56%	1.25%	1.15%
Waskish	Wells Municipal Airport	68Y	Landing Strip Turf	1,006	1,006	1,136	1,175	1,213	1,266	2.46%	1.56%	1.26%	1.16%
Waskish	Waskish Municipal Airport	VWU	Landing Strip Turf	5,018	5,018	5,665	5,858	6,047	6,312	2.46%	1.56%	1.25%	1.15%
Winsted	Winsted Municipal Airport	10D	Landing Strip Turf	9,986	9,986	11,274	11,659	12,035	12,562	2.46%	1.56%	1.25%	1.15%
N/A	STATEWIDE TOTAL (GA ONLY)	N/A	N/A	1,262,979	1,262,979	1,425,877	1,474,486	1,522,019	1,588,707	2.46%	1.56%	1.25%	1.15%

Notes: (1) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.
Sources: FAA Aerospace Forecasts, 2021 – 2041; Kimley-Horn, 2023

Table A.5. 2022 MnSASP Forecast Alternative: Socioeconomic – GA Flight Hours Flown Blend[1]

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	18,523	18,523	19,801	20,472	21,049	21,673	1.34%	1.01%	0.86%	0.79%
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	20,598	7,503	8,153	8,560	8,931	9,321	1.68%	1.33%	1.17%	1.09%
Austin	Austin Municipal Airport	AUM	Key General Aviation	21,505	21,505	23,100	23,999	24,796	25,657	1.44%	1.10%	0.95%	0.89%
Baudette	Baudette International Airport	BDE	Key General Aviation	7,503	20,598	22,085	22,879	23,540	24,232	1.40%	1.06%	0.89%	0.82%
Ely	Ely Municipal Airport	ELO	Key General Aviation	7,550	24,429	26,223	27,234	28,146	29,136	1.43%	1.09%	0.95%	0.88%
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	9,267	3,762	4,025	4,166	4,290	4,427	1.36%	1.03%	0.88%	0.82%
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	13,016	7,550	8,148	8,495	8,800	9,118	1.54%	1.19%	1.03%	0.95%
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	3,762	13,016	14,100	14,760	15,351	15,976	1.61%	1.27%	1.11%	1.03%
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	25,230	9,267	9,998	10,424	10,796	11,187	1.53%	1.18%	1.02%	0.95%

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Mankato	Mankato Municipal Airport	MKT	Key General Aviation	100,062	25,230	27,382	28,740	30,005	31,354	1.65%	1.31%	1.16%	1.09%
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	15,926	16,357	17,722	18,582	19,400	20,301	1.62%	1.28%	1.14%	1.09%
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	71,740	71,740	78,033	82,063	85,860	89,906	1.70%	1.35%	1.21%	1.13%
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	104,405	104,405	112,781	117,928	122,801	128,111	1.56%	1.23%	1.09%	1.03%
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	7,792	100,062	107,405	111,495	115,134	119,072	1.43%	1.09%	0.94%	0.87%
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	16,357	15,926	17,227	18,007	18,712	19,454	1.58%	1.24%	1.08%	1.01%
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	19,476	9,945	10,782	11,285	11,723	12,173	1.63%	1.27%	1.10%	1.02%
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	11,751	11,078	11,979	12,522	13,019	13,544	1.58%	1.23%	1.08%	1.01%
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	40,934	19,476	20,993	21,886	22,695	23,559	1.51%	1.17%	1.02%	0.96%
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	16,617	11,751	12,602	13,070	13,490	13,947	1.41%	1.07%	0.92%	0.86%
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	24,429	16,617	17,998	18,843	19,617	20,439	1.61%	1.27%	1.11%	1.04%
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	9,945	40,934	44,150	46,055	47,805	49,700	1.52%	1.19%	1.04%	0.97%
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	11,078	7,792	8,354	8,660	8,928	9,214	1.40%	1.06%	0.91%	0.84%
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	13,733	13,733	14,902	15,609	16,219	16,841	1.65%	1.29%	1.12%	1.03%
Benson	Benson Municipal Airport	BBB	Intermediate Large	4,065	4,065	4,337	4,475	4,593	4,722	1.30%	0.97%	0.82%	0.75%
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	2,327	2,327	2,510	2,617	2,711	2,809	1.53%	1.18%	1.02%	0.95%
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	9,821	9,821	10,720	11,308	11,855	12,432	1.77%	1.42%	1.26%	1.19%
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	7,080	7,080	7,562	7,815	8,036	8,280	1.33%	0.99%	0.85%	0.79%
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	10,530	10,530	11,325	11,784	12,201	12,651	1.47%	1.13%	0.99%	0.92%
Cook	Cook Municipal Airport	CQM	Intermediate Large	5,022	5,022	5,390	5,598	5,786	5,989	1.42%	1.09%	0.95%	0.88%
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	11,670	11,670	12,451	12,841	13,161	13,501	1.30%	0.96%	0.80%	0.73%
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	16,690	16,690	18,123	19,013	19,818	20,665	1.66%	1.31%	1.15%	1.07%
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	4,017	4,017	4,348	4,548	4,733	4,929	1.60%	1.25%	1.10%	1.03%
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	8,137	8,137	8,735	9,071	9,375	9,705	1.43%	1.09%	0.95%	0.88%
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	19,169	19,169	20,780	21,773	22,683	23,645	1.63%	1.28%	1.13%	1.05%
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	4,284	4,284	4,625	4,830	5,019	5,225	1.54%	1.21%	1.06%	1.00%
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	7,544	7,544	8,058	8,327	8,563	8,823	1.33%	0.99%	0.85%	0.79%
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	13,380	13,380	14,297	14,775	15,189	15,635	1.33%	1.00%	0.85%	0.78%
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	7,844	7,844	8,478	8,856	9,198	9,560	1.57%	1.22%	1.07%	0.99%
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	4,008	4,008	4,330	4,520	4,690	4,870	1.56%	1.21%	1.05%	0.98%
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	19,184	19,184	20,674	21,526	22,270	23,051	1.51%	1.16%	1.00%	0.92%

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Luverne	Luverne Municipal Airport	LYV	Intermediate Large	4,730	4,730	5,057	5,227	5,372	5,529	1.34%	1.00%	0.85%	0.78%
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	21,055	21,055	23,024	24,354	25,648	27,043	1.80%	1.47%	1.32%	1.26%
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	7,058	7,058	7,569	7,855	8,117	8,409	1.41%	1.08%	0.94%	0.88%
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	8,867	8,867	9,574	9,990	10,362	10,754	1.55%	1.20%	1.04%	0.97%
Mora	Mora Municipal Airport	JMR	Intermediate Large	12,377	12,377	13,422	14,048	14,593	15,154	1.63%	1.27%	1.10%	1.02%
Morris	Morris Municipal Airport	MOX	Intermediate Large	9,366	9,366	10,053	10,442	10,800	11,192	1.43%	1.09%	0.95%	0.89%
Orr	Orr Regional Airport	ORB	Intermediate Large	1,357	1,357	1,457	1,513	1,563	1,619	1.43%	1.09%	0.95%	0.89%
Perham	Perham Municipal Airport	16D	Intermediate Large	6,235	6,235	6,729	7,016	7,267	7,531	1.54%	1.19%	1.03%	0.95%
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	4,675	4,675	5,004	5,184	5,349	5,533	1.37%	1.04%	0.90%	0.85%
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	2,449	2,449	2,624	2,718	2,799	2,884	1.39%	1.05%	0.89%	0.82%
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	7,548	7,548	8,201	8,601	8,954	9,316	1.67%	1.31%	1.15%	1.06%
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	8,642	8,642	9,228	9,533	9,802	10,097	1.32%	0.99%	0.84%	0.78%
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	14,103	14,103	15,124	15,685	16,190	16,738	1.41%	1.07%	0.92%	0.86%
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	6,473	6,473	7,050	7,420	7,764	8,127	1.72%	1.38%	1.22%	1.14%
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	49,331	49,331	53,942	57,060	60,090	63,358	1.80%	1.47%	1.32%	1.26%
St. James	Saint James Municipal Airport	JYG	Intermediate Large	3,908	3,908	4,172	4,306	4,418	4,538	1.31%	0.97%	0.82%	0.75%
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	4,429	4,429	4,775	4,977	5,155	5,341	1.52%	1.17%	1.02%	0.94%
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	6,233	6,233	6,726	7,013	7,264	7,527	1.53%	1.19%	1.03%	0.95%
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	Intermediate Small	3,085	3,085	3,294	3,402	3,495	3,596	1.32%	0.98%	0.84%	0.77%
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	2,034	2,034	2,170	2,239	2,298	2,363	1.30%	0.97%	0.82%	0.75%
Bagley	Bagley Municipal Airport	7Y4	Intermediate Small	434	434	469	489	506	524	1.55%	1.20%	1.02%	0.94%
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	7,642	7,642	8,146	8,403	8,625	8,870	1.29%	0.95%	0.81%	0.75%
Brooten	Brooten Municipal Airport	6D1	Intermediate Small	1,248	1,248	1,360	1,433	1,501	1,574	1.73%	1.39%	1.24%	1.17%
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	14,213	14,213	15,578	16,506	17,404	18,368	1.85%	1.51%	1.36%	1.29%
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	2,193	2,193	2,347	2,428	2,498	2,572	1.37%	1.02%	0.87%	0.80%
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	11,472	11,472	12,315	12,789	13,218	13,682	1.43%	1.09%	0.95%	0.88%
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	7,851	6,691	7,169	7,431	7,663	7,919	1.39%	1.05%	0.91%	0.85%
Fertile	Fertile Municipal Airport	D14	Intermediate Small	6,878	7,851	8,377	8,639	8,854	9,083	1.31%	0.96%	0.80%	0.73%
Forest Lake	Forest Lake Airport	25D	Intermediate Small	5,715	6,878	7,533	7,986	8,433	8,920	1.84%	1.50%	1.37%	1.31%
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	8,150	5,715	6,098	6,288	6,445	6,612	1.30%	0.96%	0.80%	0.73%
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	6,691	8,150	8,809	9,202	9,557	9,933	1.57%	1.22%	1.07%	0.99%
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	5,225	5,225	5,641	5,887	6,106	6,336	1.54%	1.20%	1.04%	0.97%
Hector	Hector Municipal Airport	1D6	Intermediate Small	6,074	6,074	6,470	6,672	6,848	7,046	1.27%	0.94%	0.80%	0.74%

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Herman	Herman Municipal Airport	06Y	Intermediate Small	2,006	2,006	2,149	2,227	2,297	2,374	1.38%	1.05%	0.91%	0.85%
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	14,623	14,623	15,688	16,293	16,854	17,478	1.42%	1.09%	0.95%	0.90%
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	1,614	1,614	1,741	1,814	1,879	1,949	1.53%	1.17%	1.02%	0.95%
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	4,410	4,410	4,745	4,930	5,086	5,248	1.47%	1.12%	0.96%	0.87%
Longville	Longville Municipal Airport	XVG	Intermediate Small	5,343	5,343	5,828	6,137	6,413	6,698	1.75%	1.39%	1.22%	1.14%
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	2,340	2,340	2,503	2,589	2,666	2,749	1.35%	1.02%	0.87%	0.81%
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	1,621	1,621	1,751	1,826	1,889	1,954	1.55%	1.20%	1.03%	0.94%
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	15,414	15,414	16,894	17,901	18,874	19,920	1.85%	1.51%	1.36%	1.29%
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	987	987	1,071	1,122	1,165	1,210	1.65%	1.29%	1.11%	1.03%
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	41,541	41,541	44,874	46,922	48,860	50,973	1.56%	1.23%	1.09%	1.03%
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	3,171	3,171	3,410	3,548	3,674	3,809	1.47%	1.13%	0.99%	0.92%
Olivia	Olivia Regional Airport	OVL	Intermediate Small	4,688	4,688	4,995	5,150	5,286	5,439	1.28%	0.94%	0.80%	0.75%
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	3,221	3,221	3,444	3,563	3,667	3,782	1.35%	1.02%	0.87%	0.81%
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	2,984	2,984	3,251	3,426	3,589	3,762	1.73%	1.39%	1.24%	1.16%
Pine River	Pine River Regional Airport	PWC	Intermediate Small	5,003	5,003	5,457	5,747	6,005	6,273	1.75%	1.40%	1.22%	1.14%
Pinecreek	Piney-Pinecreek Border Airport	48Y	Intermediate Small	431	431	462	479	494	511	1.38%	1.06%	0.92%	0.86%
Red Lake Falls	Red Lake Falls Municipal Airport	D81	Intermediate Small	11,345	11,345	12,110	12,490	12,804	13,135	1.31%	0.97%	0.81%	0.74%
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	1,374	1,374	1,473	1,525	1,571	1,619	1.40%	1.05%	0.90%	0.82%
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	3,889	3,889	4,238	4,465	4,678	4,903	1.74%	1.39%	1.24%	1.17%
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	3,300	3,300	3,530	3,653	3,761	3,880	1.36%	1.02%	0.88%	0.81%
Springfield	Springfield Municipal Airport	D42	Intermediate Small	2,142	2,142	2,299	2,387	2,465	2,549	1.42%	1.09%	0.94%	0.87%
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	16,421	16,421	17,984	19,066	20,134	21,296	1.84%	1.50%	1.37%	1.31%
Staples	Staples Municipal Airport	SAZ	Intermediate Small	7,207	7,207	7,793	8,141	8,439	8,746	1.58%	1.23%	1.06%	0.97%
Stephen	Stephen Municipal Airport	D41	Intermediate Small	12,023	12,023	12,831	13,233	13,568	13,927	1.31%	0.96%	0.81%	0.74%
Tower	Tower Municipal Airport	12D	Intermediate Small	3,517	3,517	3,775	3,921	4,053	4,195	1.43%	1.09%	0.95%	0.88%
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	1,217	1,217	1,319	1,383	1,444	1,511	1.62%	1.29%	1.15%	1.09%
Walker	Walker Municipal Airport	Y49	Intermediate Small	5,152	5,152	5,619	5,918	6,184	6,459	1.75%	1.40%	1.22%	1.14%
Warren	Warren Municipal Airport	D37	Intermediate Small	9,062	9,062	9,671	9,975	10,227	10,498	1.31%	0.96%	0.81%	0.74%
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	13,211	13,211	14,176	14,702	15,162	15,653	1.42%	1.08%	0.92%	0.85%
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	3,056	3,056	3,266	3,375	3,470	3,574	1.34%	1.00%	0.85%	0.79%
Windom	Windom Municipal Airport	MWM	Intermediate Small	5,496	5,496	5,886	6,096	6,280	6,477	1.38%	1.04%	0.89%	0.82%
Backus	Backus Municipal Airport	7Y3	Landing Strip Turf	4,017	4,017	4,382	4,614	4,822	5,036	1.75%	1.40%	1.22%	1.14%
Big Falls	Big Falls Municipal Airport	7Y9	Landing Strip Turf	200	200	214	221	227	233	1.33%	0.99%	0.84%	0.76%
Bowstring	Bowstring Airport	9Y0	Landing Strip Turf	323	323	348	363	376	390	1.50%	1.17%	1.02%	0.94%
Clarissa	Clarissa Municipal Airport	8Y5	Landing Strip Turf	456	456	491	510	526	543	1.48%	1.12%	0.96%	0.87%

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East Gull Lake	East Gull Lake Airport	9Y2	Landing Strip Turf	198	198	216	228	238	248	1.79%	1.42%	1.23%	1.14%
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	Landing Strip Turf	200	200	213	220	226	232	1.30%	0.96%	0.81%	0.74%
Henning	Henning Municipal Airport	05Y	Landing Strip Turf	1,517	1,517	1,637	1,707	1,768	1,832	1.54%	1.19%	1.03%	0.95%
Hill City	Hill City-Quadna Mountain Airport	07Y	Landing Strip Turf	560	560	608	637	661	687	1.65%	1.29%	1.11%	1.03%
Karlstad	Karlstad Municipal Airport	23D	Landing Strip Turf	2,006	2,006	2,143	2,215	2,277	2,344	1.33%	1.00%	0.85%	0.78%
Littlefork	Littlefork Municipal Hanover Airport	13Y	Landing Strip Turf	700	700	748	774	794	815	1.34%	1.01%	0.84%	0.76%
Milaca	Milaca Municipal Airport	18Y	Landing Strip Turf	5,006	5,006	5,439	5,705	5,939	6,179	1.67%	1.32%	1.15%	1.06%
Northome	Northome Municipal Airport	43Y	Landing Strip Turf	311	311	333	344	353	362	1.38%	1.01%	0.85%	0.77%
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	Landing Strip Turf	1,664	1,664	1,796	1,873	1,939	2,009	1.54%	1.19%	1.02%	0.95%
Remer	Remer Municipal Airport	52Y	Landing Strip Turf	512	512	558	588	615	642	1.75%	1.39%	1.23%	1.14%
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	Landing Strip Turf	5,000	5,000	5,367	5,571	5,753	5,950	1.43%	1.09%	0.94%	0.87%
Starbuck	Starbuck Municipal Airport	D32	Landing Strip Turf	1,172	1,172	1,265	1,321	1,373	1,430	1.54%	1.21%	1.06%	1.00%
Tyler	Tyler Municipal Airport	63Y	Landing Strip Turf	1,606	1,606	1,719	1,781	1,837	1,900	1.37%	1.04%	0.90%	0.84%
Waskish	Wells Municipal Airport	68Y	Landing Strip Turf	1,006	1,006	1,095	1,151	1,200	1,252	1.71%	1.35%	1.18%	1.10%
Waskish	Waskish Municipal Airport	VWU	Landing Strip Turf	5,018	5,018	5,349	5,517	5,664	5,825	1.29%	0.95%	0.81%	0.75%
Winsted	Winsted Municipal Airport	10D	Landing Strip Turf	9,986	9,986	10,794	11,275	11,710	12,172	1.57%	1.22%	1.07%	0.99%
N/A	STATEWIDE TOTAL (GA ONLY)	N/A	N/A	1,262,979	1,262,979	1,363,140	1,422,767	1,477,184	1,535,550	1.54%	1.20%	1.05%	0.98%

Notes: (1) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.
Sources: W&P, 2021; FAA Aerospace Forecasts, 2020 – 2040; Kimley-Horn, 2023

Table A.6. 2022 MnSASP Forecast Alternative: Mixed Methodology[1]

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	18,523	18,523	20,175	21,725	23,087	24,396	1.72%	1.61%	1.48%	1.39%
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	20,598	7,503	8,152	8,754	9,281	9,789	1.67%	1.55%	1.43%	1.34%
Austin	Austin Municipal Airport	AUM	Key General Aviation	21,505	21,505	23,322	25,048	26,591	28,111	1.64%	1.54%	1.43%	1.35%
Baudette	Baudette International Airport	BDE	Key General Aviation	7,503	20,598	22,239	23,705	24,865	25,897	1.54%	1.41%	1.26%	1.15%
Ely	Ely Municipal Airport	ELO	Key General Aviation	7,550	24,429	26,359	28,185	29,831	31,443	1.53%	1.44%	1.34%	1.27%
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	9,267	3,762	4,104	4,431	4,727	5,019	1.76%	1.65%	1.53%	1.45%
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	13,016	7,550	8,202	8,801	9,313	9,793	1.67%	1.54%	1.41%	1.31%
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	3,762	13,016	14,069	15,027	15,828	16,579	1.57%	1.45%	1.31%	1.22%
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	25,230	9,267	10,122	10,914	11,584	12,212	1.78%	1.65%	1.50%	1.39%
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	100,062	25,230	27,274	29,235	31,026	32,800	1.57%	1.48%	1.39%	1.32%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	15,926	16,357	18,014	19,670	21,292	23,004	1.95%	1.86%	1.77%	1.72%
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	71,740	71,740	75,754	79,238	82,064	84,631	1.09%	1.00%	0.90%	0.83%
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	104,405	104,405	113,760	123,095	132,179	141,549	1.73%	1.66%	1.58%	1.53%
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	7,792	100,062	108,992	117,469	125,153	132,726	1.72%	1.62%	1.50%	1.42%
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	16,357	15,926	17,172	18,319	19,317	20,261	1.52%	1.41%	1.30%	1.21%
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	19,476	9,945	10,812	11,591	12,221	12,788	1.69%	1.54%	1.38%	1.27%
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	11,751	11,078	11,937	12,743	13,460	14,150	1.50%	1.41%	1.31%	1.23%
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	40,934	19,476	21,117	22,691	24,119	25,520	1.63%	1.54%	1.44%	1.36%
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	16,617	11,751	12,692	13,565	14,350	15,119	1.55%	1.45%	1.34%	1.27%
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	24,429	16,617	17,948	19,194	20,302	21,385	1.55%	1.45%	1.34%	1.27%
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	9,945	40,934	44,449	47,824	50,960	54,128	1.66%	1.57%	1.47%	1.41%
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	11,078	7,792	8,354	8,875	9,333	9,775	1.40%	1.31%	1.21%	1.14%
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	13,733	13,733	15,504	16,032	16,549	17,274	2.46%	1.56%	1.25%	1.15%
Benson	Benson Municipal Airport	BBB	Intermediate Large	4,065	4,065	4,590	4,746	4,899	5,114	2.46%	1.56%	1.25%	1.15%
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	2,327	2,327	2,627	2,716	2,804	2,927	2.45%	1.56%	1.25%	1.15%
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	9,821	9,821	11,088	11,466	11,835	12,354	2.46%	1.56%	1.25%	1.15%
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	7,080	7,080	7,993	8,266	8,532	8,906	2.46%	1.56%	1.25%	1.15%
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	10,530	10,530	11,888	12,293	12,690	13,246	2.46%	1.56%	1.25%	1.15%
Cook	Cook Municipal Airport	CQM	Intermediate Large	5,022	5,022	5,669	5,863	6,052	6,317	2.45%	1.56%	1.25%	1.15%
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	11,670	11,670	13,175	13,624	14,063	14,679	2.46%	1.56%	1.25%	1.15%
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	16,690	16,690	18,842	19,485	20,113	20,994	2.46%	1.56%	1.25%	1.15%
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	4,017	4,017	4,535	4,689	4,841	5,053	2.46%	1.56%	1.25%	1.15%
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	8,137	8,137	9,187	9,500	9,806	10,236	2.46%	1.56%	1.25%	1.15%
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	19,169	19,169	21,642	22,380	23,101	24,113	2.46%	1.56%	1.25%	1.15%
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	4,284	4,284	4,837	5,001	5,163	5,389	2.46%	1.56%	1.25%	1.15%
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	7,544	7,544	8,517	8,808	9,092	9,490	2.46%	1.56%	1.25%	1.15%
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	13,380	13,380	15,105	15,620	16,124	16,830	2.45%	1.56%	1.25%	1.15%
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	7,844	7,844	8,855	9,157	9,452	9,867	2.45%	1.56%	1.25%	1.15%
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	4,008	4,008	4,525	4,679	4,830	5,042	2.46%	1.56%	1.25%	1.15%
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	19,184	19,184	21,659	22,397	23,119	24,132	2.46%	1.56%	1.25%	1.15%
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	4,730	4,730	5,340	5,522	5,700	5,950	2.46%	1.56%	1.25%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	21,055	21,055	23,771	24,582	25,374	26,486	2.46%	1.56%	1.25%	1.15%
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	7,058	7,058	7,969	8,240	8,506	8,879	2.46%	1.56%	1.25%	1.15%
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	8,867	8,867	10,011	10,352	10,686	11,154	2.46%	1.56%	1.25%	1.15%
Mora	Mora Municipal Airport	JMR	Intermediate Large	12,377	12,377	13,973	14,450	14,916	15,569	2.46%	1.56%	1.25%	1.15%
Morris	Morris Municipal Airport	MOX	Intermediate Large	9,366	9,366	10,574	10,934	11,287	11,781	2.46%	1.56%	1.25%	1.15%
Orr	Orr Regional Airport	ORB	Intermediate Large	1,357	1,357	1,532	1,584	1,635	1,707	2.46%	1.56%	1.25%	1.15%
Perham	Perham Municipal Airport	16D	Intermediate Large	6,235	6,235	7,040	7,280	7,514	7,843	2.46%	1.56%	1.25%	1.15%
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	4,675	4,675	5,278	5,458	5,634	5,881	2.46%	1.56%	1.25%	1.15%
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	2,449	2,449	2,764	2,859	2,951	3,080	2.45%	1.56%	1.25%	1.15%
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	7,548	7,548	8,522	8,812	9,096	9,495	2.46%	1.56%	1.25%	1.15%
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	8,642	8,642	9,757	10,089	10,414	10,871	2.46%	1.56%	1.25%	1.15%
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	14,103	14,103	15,922	16,464	16,995	17,740	2.46%	1.56%	1.25%	1.15%
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	6,473	6,473	7,308	7,557	7,801	8,143	2.46%	1.56%	1.25%	1.15%
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	49,331	49,331	55,693	57,592	59,448	62,053	2.46%	1.56%	1.25%	1.15%
St. James	Saint James Municipal Airport	JYG	Intermediate Large	3,908	3,908	4,412	4,563	4,710	4,916	2.46%	1.56%	1.25%	1.15%
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	4,429	4,429	5,001	5,171	5,338	5,572	2.46%	1.56%	1.25%	1.15%
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	6,233	6,233	7,036	7,276	7,511	7,840	2.45%	1.56%	1.25%	1.15%
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	Intermediate Small	3,085	3,085	3,483	3,602	3,718	3,881	2.46%	1.56%	1.25%	1.15%
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	2,034	2,034	2,296	2,375	2,451	2,559	2.45%	1.56%	1.25%	1.15%
Bagley	Bagley Municipal Airport	7Y4	Intermediate Small	434	434	490	507	523	546	2.46%	1.57%	1.25%	1.15%
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	7,642	7,642	8,627	8,921	9,209	9,612	2.45%	1.56%	1.25%	1.15%
Brooten	Brooten Municipal Airport	6D1	Intermediate Small	1,248	1,248	1,409	1,457	1,504	1,570	2.46%	1.56%	1.25%	1.15%
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	14,213	14,213	16,046	16,593	17,128	17,878	2.46%	1.56%	1.25%	1.15%
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	2,193	2,193	2,475	2,560	2,642	2,758	2.45%	1.56%	1.25%	1.15%
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	11,472	11,472	12,952	13,394	13,825	14,431	2.46%	1.56%	1.25%	1.15%
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	7,851	6,691	7,554	7,812	8,064	8,417	2.46%	1.56%	1.25%	1.15%
Fertile	Fertile Municipal Airport	D14	Intermediate Small	6,878	7,851	8,864	9,166	9,461	9,876	2.46%	1.56%	1.25%	1.15%
Forest Lake	Forest Lake Airport	25D	Intermediate Small	5,715	6,878	7,765	8,030	8,289	8,652	2.46%	1.56%	1.25%	1.15%
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	8,150	5,715	6,452	6,672	6,887	7,189	2.46%	1.56%	1.25%	1.15%
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	6,691	8,150	9,201	9,515	9,822	10,252	2.46%	1.56%	1.25%	1.15%
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	5,225	5,225	5,899	6,100	6,297	6,572	2.46%	1.56%	1.25%	1.15%
Hector	Hector Municipal Airport	1D6	Intermediate Small	6,074	6,074	6,857	7,091	7,319	7,640	2.45%	1.56%	1.25%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
Herman	Herman Municipal Airport	06Y	Intermediate Small	2,006	2,006	2,264	2,342	2,417	2,523	2.45%	1.56%	1.25%	1.15%
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	14,623	14,623	16,509	17,072	17,622	18,394	2.46%	1.56%	1.25%	1.15%
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	1,614	1,614	1,822	1,884	1,945	2,030	2.45%	1.56%	1.25%	1.15%
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	4,410	4,410	4,978	5,148	5,314	5,547	2.45%	1.56%	1.25%	1.15%
Longville	Longville Municipal Airport	XVG	Intermediate Small	5,343	5,343	6,032	6,237	6,438	6,720	2.46%	1.56%	1.25%	1.15%
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	2,340	2,340	2,642	2,732	2,820	2,943	2.46%	1.56%	1.25%	1.15%
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	1,621	1,621	1,830	1,892	1,953	2,039	2.46%	1.56%	1.25%	1.15%
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	15,414	15,414	17,402	17,995	18,575	19,389	2.46%	1.56%	1.25%	1.15%
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	987	987	1,114	1,152	1,189	1,242	2.45%	1.56%	1.25%	1.16%
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	41,541	41,541	46,899	48,498	50,061	52,254	2.46%	1.56%	1.25%	1.15%
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	3,171	3,171	3,580	3,702	3,821	3,988	2.46%	1.56%	1.25%	1.15%
Olivia	Olivia Regional Airport	OVL	Intermediate Small	4,688	4,688	5,293	5,474	5,650	5,898	2.46%	1.56%	1.25%	1.15%
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	3,221	3,221	3,636	3,760	3,881	4,051	2.45%	1.56%	1.25%	1.15%
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	2,984	2,984	3,368	3,483	3,596	3,753	2.45%	1.56%	1.25%	1.15%
Pine River	Pine River Regional Airport	PWC	Intermediate Small	5,003	5,003	5,648	5,841	6,029	6,293	2.45%	1.56%	1.25%	1.15%
Pinecreek	Piney-Pinecreek Border Airport	48Y	Intermediate Small	431	431	486	503	519	542	2.43%	1.56%	1.25%	1.15%
Red Lake Falls	Red Lake Falls Municipal Airport	D81	Intermediate Small	11,345	11,345	12,809	13,245	13,672	14,271	2.46%	1.56%	1.25%	1.15%
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	1,374	1,374	1,552	1,604	1,656	1,729	2.47%	1.56%	1.25%	1.16%
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	3,889	3,889	4,391	4,540	4,687	4,892	2.46%	1.56%	1.25%	1.15%
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	3,300	3,300	3,726	3,853	3,977	4,151	2.46%	1.56%	1.25%	1.15%
Springfield	Springfield Municipal Airport	D42	Intermediate Small	2,142	2,142	2,418	2,501	2,581	2,695	2.45%	1.56%	1.25%	1.15%
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	16,421	16,421	18,539	19,171	19,789	20,656	2.46%	1.56%	1.25%	1.15%
Staples	Staples Municipal Airport	SAZ	Intermediate Small	7,207	7,207	8,136	8,414	8,685	9,066	2.45%	1.56%	1.25%	1.15%
Stephen	Stephen Municipal Airport	D41	Intermediate Small	12,023	12,023	13,573	14,036	14,489	15,123	2.45%	1.56%	1.25%	1.15%
Tower	Tower Municipal Airport	12D	Intermediate Small	3,517	3,517	3,971	4,106	4,239	4,424	2.46%	1.56%	1.25%	1.15%
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	1,217	1,217	1,374	1,421	1,467	1,531	2.46%	1.56%	1.25%	1.15%
Walker	Walker Municipal Airport	Y49	Intermediate Small	5,152	5,152	5,816	6,014	6,208	6,480	2.45%	1.56%	1.25%	1.15%
Warren	Warren Municipal Airport	D37	Intermediate Small	9,062	9,062	10,231	10,580	10,921	11,400	2.46%	1.56%	1.25%	1.15%
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	13,211	13,211	14,915	15,424	15,921	16,619	2.46%	1.56%	1.25%	1.15%
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	3,056	3,056	3,451	3,568	3,683	3,845	2.46%	1.56%	1.25%	1.15%
Windom	Windom Municipal Airport	MWM	Intermediate Small	5,496	5,496	6,205	6,416	6,623	6,913	2.46%	1.56%	1.25%	1.15%
Backus	Backus Municipal Airport	7Y3	Landing Strip Surf	4,017	4,017	4,382	4,614	4,822	5,036	1.75%	1.40%	1.22%	1.14%
Big Falls	Big Falls Municipal Airport	7Y9	Landing Strip Surf	200	200	214	221	227	233	1.33%	0.99%	0.84%	0.76%
Bowstring	Bowstring Airport	9Y0	Landing Strip Surf	323	323	348	363	376	390	1.50%	1.17%	1.02%	0.94%
Clarissa	Clarissa Municipal Airport	8Y5	Landing Strip Surf	456	456	491	510	526	543	1.48%	1.12%	0.96%	0.87%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecast (No.) 2020	Operations Forecast (No.) 2025	Operations Forecast (No.) 2030	Operations Forecast (No.) 2035	Operations Forecast (No.) 2040	CAGR* 2020 - 2025	CAGR 2020 - 2030	CAGR 2020 - 2035	CAGR 2020 - 2040
East Gull Lake	East Gull Lake Airport	9Y2	Landing Strip Surf	198	198	216	228	238	248	1.79%	1.42%	1.23%	1.14%
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	Landing Strip Surf	200	200	213	220	226	232	1.30%	0.96%	0.81%	0.74%
Henning	Henning Municipal Airport	05Y	Landing Strip Surf	1,517	1,517	1,637	1,707	1,768	1,832	1.54%	1.19%	1.03%	0.95%
Hill City	Hill City-Quadna Mountain Airport	07Y	Landing Strip Surf	560	560	608	637	661	687	1.65%	1.29%	1.11%	1.03%
Karlstad	Karlstad Municipal Airport	23D	Landing Strip Surf	2,006	2,006	2,143	2,215	2,277	2,344	1.33%	1.00%	0.85%	0.78%
Littlefork	Littlefork Municipal Hanover Airport	13Y	Landing Strip Surf	700	700	748	774	794	815	1.34%	1.01%	0.84%	0.76%
Milaca	Milaca Municipal Airport	18Y	Landing Strip Surf	5,006	5,006	5,439	5,705	5,939	6,179	1.67%	1.32%	1.15%	1.06%
Northome	Northome Municipal Airport	43Y	Landing Strip Surf	311	311	333	344	353	362	1.38%	1.01%	0.85%	0.77%
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	Landing Strip Surf	1,664	1,664	1,796	1,873	1,939	2,009	1.54%	1.19%	1.02%	0.95%
Remer	Remer Municipal Airport	52Y	Landing Strip Surf	512	512	558	588	615	642	1.75%	1.39%	1.23%	1.14%
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	Landing Strip Surf	5,000	5,000	5,367	5,571	5,753	5,950	1.43%	1.09%	0.94%	0.87%
Starbuck	Starbuck Municipal Airport	D32	Landing Strip Surf	1,172	1,172	1,265	1,321	1,373	1,430	1.54%	1.21%	1.06%	1.00%
Tyler	Tyler Municipal Airport	63Y	Landing Strip Surf	1,606	1,606	1,719	1,781	1,837	1,900	1.37%	1.04%	0.90%	0.84%
Waskish	Wells Municipal Airport	68Y	Landing Strip Surf	1,006	1,006	1,095	1,151	1,200	1,252	1.71%	1.35%	1.18%	1.10%
Waskish	Waskish Municipal Airport	VWU	Landing Strip Surf	5,018	5,018	5,349	5,517	5,664	5,825	1.29%	0.95%	0.81%	0.75%
Winsted	Winsted Municipal Airport	10D	Landing Strip Surf	9,986	9,986	10,794	11,275	11,710	12,172	1.57%	1.22%	1.07%	0.99%
N/A	STATEWIDE TOTAL (GA ONLY)	N/A	N/A	1,262,979	1,262,979	1,396,855	1,468,623	1,535,328	1,611,311	2.04%	1.52%	1.31%	1.23%

Notes: (1) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.
Sources: W&P, 2021; FAA Aerospace Forecasts, 2021 – 2041; Kimley-Horn, 2023

Table A.7. 2022 MnSASP Forecast Terminal Area Forecast (TAF) versus Mixed Methodology[1]

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	2020 TAF	2020 MIXED	2025 TAF	2025 Mixed	2030 TAF	2030 Mixed	2035 TAF	2035 Mixed	2040 TAF	2040 Mixed	CAGR 2020 - 2040 TAF	CAGR 2020 - 2040 Mixed
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	18,523	26,175	18,523	26,175	20,175	26,175	21,725	26,175	23,087	26,175	24,396	0.00%	1.39%
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	7,503	25,500	7,503	26,965	8,152	28,522	8,754	30,177	9,281	31,934	9,789	1.13%	1.34%
Austin	Austin Municipal Airport	AUM	Key General Aviation	21,505	25,420	21,505	25,420	23,322	25,420	25,048	25,420	26,591	25,420	28,111	0.00%	1.35%
Baudette	Baudette International Airport	BDE	Key General Aviation	20,598	12,825	20,598	13,126	22,239	13,440	23,705	13,763	24,865	14,095	25,897	0.47%	1.15%
Ely	Ely Municipal Airport	ELO	Key General Aviation	24,429	8,200	24,429	8,200	26,359	8,200	28,185	8,200	29,831	8,200	31,443	0.00%	1.27%
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	3,762	9,400	3,762	9,400	4,104	9,400	4,431	9,400	4,727	9,400	5,019	0.00%	1.45%
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	7,550	8,500	7,550	8,500	8,202	8,500	8,801	8,500	9,313	8,500	9,793	0.00%	1.31%
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	13,016	3,200	13,016	3,200	14,069	3,200	15,027	3,200	15,828	3,200	16,579	0.00%	1.22%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	2020 TAF	2020 MIXED	2025 TAF	2025 Mixed	2030 TAF	2030 Mixed	2035 TAF	2035 Mixed	2040 TAF	2040 Mixed	CAGR 2020 - 2040 TAF	CAGR 2020 - 2040 Mixed
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	9,267	19,560	9,267	20,057	10,122	20,568	10,914	21,090	11,584	21,627	12,212	0.50%	1.39%
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	25,230	126,136	25,230	127,028	27,274	127,929	29,235	128,847	31,026	129,774	32,800	0.14%	1.32%
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	16,357	22,848	16,357	22,848	18,014	22,848	19,670	22,848	21,292	22,848	23,004	0.00%	1.72%
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	71,740	69,954	71,740	76,030	75,754	77,910	79,238	79,868	82,064	81,907	84,631	0.79%	0.83%
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	104,405	119,710	104,405	133,623	113,760	134,933	123,095	136,260	132,179	137,604	141,549	0.70%	1.53%
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	100,062	15,510	100,062	15,510	108,992	15,510	117,469	15,510	125,153	15,510	132,726	0.00%	1.42%
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	15,926	30,050	15,926	32,268	17,172	34,386	18,319	35,918	19,317	37,534	20,261	1.12%	1.21%
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	9,945	15,833	9,945	15,833	10,812	15,833	11,591	15,833	12,221	15,833	12,788	0.00%	1.27%
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	11,078	14,050	11,078	14,050	11,937	14,050	12,743	14,050	13,460	14,050	14,150	0.00%	1.23%
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	19,476	29,492	19,476	40,854	21,117	40,910	22,691	40,966	24,119	41,022	25,520	1.66%	1.36%
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	11,751	9,000	11,751	9,271	12,692	9,569	13,565	9,898	14,350	10,261	15,119	0.66%	1.27%
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	16,617	17,850	16,617	17,850	17,948	17,850	19,194	17,850	20,302	17,850	21,385	0.00%	1.27%
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	40,934	10,450	40,934	10,604	44,449	10,785	47,824	10,970	50,960	11,158	54,128	0.33%	1.41%
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	7,792	10,140	7,792	10,453	8,354	10,772	8,875	11,097	9,333	11,432	9,775	0.60%	1.14%
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	13,733	16,000	13,733	17,357	15,504	18,834	16,032	20,438	16,549	22,178	17,274	1.65%	1.15%
Benson	Benson Municipal Airport	BBB	Intermediate Large	4,065	5,100	4,065	5,100	4,590	5,100	4,746	5,100	4,899	5,100	5,114	0.00%	1.15%
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	9,821	16,850	9,821	18,253	11,088	19,763	11,466	21,405	11,835	23,163	12,354	1.60%	1.15%
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	7,080	6,720	7,080	6,720	7,993	6,720	8,266	6,720	8,532	6,720	8,906	0.00%	1.15%
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	10,530	10,000	10,530	10,225	11,888	10,455	12,293	10,688	12,690	10,925	13,246	0.44%	1.15%
Cook	Cook Municipal Airport	CQM	Intermediate Large	5,022	5,950	5,022	6,306	5,669	6,641	5,863	6,950	6,052	7,271	6,317	1.01%	1.15%
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	11,670	20,150	11,670	20,150	13,175	20,150	13,624	20,150	14,063	20,150	14,679	0.00%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	2020 TAF	2020 MIXED	2025 TAF	2025 Mixed	2030 TAF	2030 Mixed	2035 TAF	2035 Mixed	2040 TAF	2040 Mixed	CAGR 2020 - 2040 TAF	CAGR 2020 - 2040 Mixed
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	16,690	16,200	16,690	17,487	18,842	18,787	19,485	20,327	20,113	21,974	20,994	1.54%	1.15%
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	4,017	5,000	4,017	5,000	4,535	5,000	4,689	5,000	4,841	5,000	5,053	0.00%	1.15%
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	8,137	17,700	8,137	18,448	9,187	19,959	9,500	20,706	9,806	21,483	10,236	0.97%	1.15%
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	19,169	18,700	19,169	21,288	21,642	23,269	22,380	25,653	23,101	28,710	24,113	2.17%	1.15%
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	4,284	4,900	4,284	4,900	4,837	4,900	5,001	4,900	5,163	4,900	5,389	0.00%	1.15%
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	13,380	17,700	13,380	17,700	15,105	17,700	15,620	17,700	16,124	17,700	16,830	0.00%	1.15%
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	7,844	12,395	7,844	13,415	8,855	14,061	9,157	14,898	9,452	15,820	9,867	1.23%	1.15%
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	4,008	7,000	4,008	7,000	4,525	7,000	4,679	7,000	4,830	7,000	5,042	0.00%	1.15%
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	19,184	22,450	19,184	22,450	21,659	22,450	22,397	22,450	23,119	22,450	24,132	0.00%	1.15%
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	4,730	8,400	4,730	8,400	5,340	8,400	5,522	8,400	5,700	8,400	5,950	0.00%	1.15%
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	21,055	34,174	21,055	34,015	23,771	34,474	24,582	35,015	25,374	35,562	26,486	0.20%	1.15%
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	7,058	11,520	7,058	12,286	7,969	13,101	8,240	13,971	8,506	14,898	8,879	1.29%	1.15%
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	8,867	9,000	8,867	9,885	10,011	10,770	10,352	11,655	10,686	12,557	11,154	1.68%	1.15%
Mora	Mora Municipal Airport	JMR	Intermediate Large	12,377	15,000	12,377	15,000	13,973	15,000	14,450	15,000	14,916	15,000	15,569	0.00%	1.15%
Morris	Morris Municipal Airport	MOX	Intermediate Large	9,366	5,906	9,366	5,906	10,574	5,906	10,934	5,906	11,287	5,906	11,781	0.00%	1.15%
Orr	Orr Regional Airport	ORB	Intermediate Large	1,357	2,500	1,357	2,500	1,532	2,500	1,584	2,500	1,635	2,500	1,707	0.00%	1.15%
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	4,675	8,200	4,675	8,200	5,278	8,200	5,458	8,200	5,634	8,200	5,881	0.00%	1.15%
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	2,449	4,080	2,449	4,700	2,764	5,024	2,859	5,294	2,951	5,570	3,080	1.57%	1.15%
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	7,548	13,300	7,548	14,776	8,522	16,306	8,812	17,913	9,096	19,648	9,495	1.97%	1.15%
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	8,642	9,800	8,642	9,800	9,757	9,800	10,089	9,800	10,414	9,800	10,871	0.00%	1.15%
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	14,103	18,300	14,103	19,940	15,922	21,730	16,464	23,646	16,995	25,749	17,740	1.72%	1.15%
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	6,473	7,810	6,473	7,810	7,308	7,810	7,557	7,810	7,801	7,810	8,143	0.00%	1.15%
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	49,331	51,000	49,331	55,382	55,693	60,138	57,592	65,343	59,448	71,086	62,053	1.67%	1.15%
St. James	Saint James Municipal Airport	JYG	Intermediate Large	3,908	5,485	3,908	5,485	4,412	5,485	4,563	5,485	4,710	5,485	4,916	0.00%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	2020 TAF	2020 MIXED	2025 TAF	2025 Mixed	2030 TAF	2030 Mixed	2035 TAF	2035 Mixed	2040 TAF	2040 Mixed	CAGR 2020 - 2040 TAF	CAGR 2020 - 2040 Mixed
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	4,429	7,000	4,429	7,000	5,001	7,000	5,171	7,000	5,338	7,000	5,572	0.00%	1.15%
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	6,233	5,410	6,233	5,410	7,036	5,410	7,276	5,410	7,511	5,410	7,840	0.00%	1.15%
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	7,642	14,000	7,642	14,000	8,627	14,000	8,921	14,000	9,209	14,000	9,612	0.00%	1.15%
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	14,213	22,350	14,213	24,340	16,046	26,539	16,593	28,939	17,128	31,544	17,878	1.74%	1.15%
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	2,193	3,500	2,193	3,500	2,475	3,500	2,560	3,500	2,642	3,500	2,758	0.00%	1.15%
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	11,472	13,900	11,472	13,900	12,952	13,900	13,394	13,900	13,825	13,900	14,431	0.00%	1.15%
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	6,691	9,000	6,691	9,000	7,554	9,000	7,812	9,000	8,064	9,000	8,417	0.00%	1.15%
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	5,715	8,345	5,715	8,345	6,452	8,345	6,672	8,345	6,887	8,345	7,189	0.00%	1.15%
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	8,150	10,615	8,150	11,740	9,201	12,840	9,515	13,971	9,822	15,177	10,252	1.80%	1.15%
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	5,225	8,600	5,225	9,485	5,899	10,468	6,100	11,558	6,297	12,757	6,572	1.99%	1.15%
Hector	Hector Municipal Airport	1D6	Intermediate Small	6,074	7,000	6,074	7,000	6,857	7,000	7,091	7,000	7,319	7,000	7,640	0.00%	1.15%
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	14,623	19,000	14,623	20,502	16,509	22,734	17,072	24,411	17,622	26,289	18,394	1.64%	1.15%
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	1,614	2,560	1,614	2,626	1,822	2,691	1,884	2,756	1,945	2,821	2,030	0.49%	1.15%
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	4,410	5,730	4,410	5,730	4,978	5,730	5,148	5,730	5,314	5,730	5,547	0.00%	1.15%
Longville	Longville Municipal Airport	XVG	Intermediate Small	5,343	6,725	5,343	6,725	6,032	6,725	6,237	6,725	6,438	6,725	6,720	0.00%	1.15%
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	2,340	2,160	2,340	2,160	2,642	2,160	2,732	2,160	2,820	2,160	2,943	0.00%	1.15%
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	1,621	1,650	1,621	1,650	1,830	1,650	1,892	1,650	1,953	1,650	2,039	0.00%	1.15%
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	41,541	38,044	41,541	40,878	46,899	41,064	48,498	41,252	50,061	41,442	52,254	0.43%	1.15%
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	3,171	4,900	3,171	4,900	3,580	4,900	3,702	4,900	3,821	4,900	3,988	0.00%	1.15%
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	3,221	5,000	3,221	5,000	3,636	5,000	3,760	5,000	3,881	5,000	4,051	0.00%	1.15%
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	2,984	3,600	2,984	3,739	3,368	3,857	3,483	3,980	3,596	4,108	3,753	0.66%	1.15%
Pine River	Pine River Regional Airport	PWC	Intermediate Small	5,003	6,400	5,003	6,400	5,648	6,400	5,841	6,400	6,029	6,400	6,293	0.00%	1.15%
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	1,374	2,000	1,374	2,028	1,552	2,048	1,604	2,068	1,656	2,088	1,729	0.22%	1.16%
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	3,889	5,830	3,889	6,322	4,391	6,857	4,540	7,440	4,687	8,075	4,892	1.64%	1.15%
Springfield	Springfield Municipal Airport	D42	Intermediate Small	2,142	2,420	2,142	2,420	2,418	2,420	2,501	2,420	2,581	2,420	2,695	0.00%	1.15%

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	2020 TAF	2020 MIXED	2025 TAF	2025 Mixed	2030 TAF	2030 Mixed	2035 TAF	2035 Mixed	2040 TAF	2040 Mixed	CAGR 2020 - 2040 TAF	CAGR 2020 - 2040 Mixed
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	16,421	26,498	16,421	26,663	18,539	26,831	19,171	26,996	19,789	27,161	20,656	0.12%	1.15%
Staples	Staples Municipal Airport	SAZ	Intermediate Small	7,207	9,600	7,207	9,600	8,136	9,600	8,414	9,600	8,685	9,600	9,066	0.00%	1.15%
Tower	Tower Municipal Airport	12D	Intermediate Small	3,517	3,700	3,517	3,700	3,971	3,700	4,106	3,700	4,239	3,700	4,424	0.00%	1.15%
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	1,217	3,040	1,217	3,040	1,374	3,040	1,421	3,040	1,467	3,040	1,531	0.00%	1.15%
Walker	Walker Municipal Airport	Y49	Intermediate Small	5,152	9,200	5,152	9,200	5,816	9,200	6,014	9,200	6,208	9,200	6,480	0.00%	1.15%
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	13,211	17,190	13,211	18,559	14,915	20,019	15,424	21,592	15,921	23,286	16,619	1.53%	1.15%
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	3,056	3,900	3,056	3,900	3,451	3,900	3,568	3,900	3,683	3,900	3,845	0.00%	1.15%
Windom	Windom Municipal Airport	MWM	Intermediate Small	5,496	8,300	5,496	8,608	6,205	8,794	6,416	8,939	6,623	9,075	6,913	0.45%	1.15%
Winsted	Winsted Municipal Airport	10D	Landing Strip Turf	5,152	9,200	5,152	9,200	5,816	9,200	6,014	9,200	6,208	9,200	6,480	0.00%	1.15%
N/A	STATEWIDE TOTAL (National Plan of Integrated Airport Systems [NPIAS] GA ONLY)	N/A	N/A	1,134,614	1,347,805	1,262,979	1,414,764	1,396,855	1,453,010	1,468,623	1,491,890	1,535,328	1,533,997	1,611,311	0.65%	1.23%

Notes: (1) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.
Sources: W&P, 2021; FAA Aerospace Forecasts 2021 – 2041; Kimley-Horn, 2022; FAA TAF (accessed May 2021)

Table A.8. Operational Threshold Analysis by Airport[1]

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecasts (No.) 2020	Operations Forecasts (No.) 2025	Operations Forecasts (No.) 2030	Operations Forecasts (No.) 2035	Operations Forecasts (No.) 2040	Operational Thresholds: PAL 1 (Low)	Operational Thresholds: PAL 2 (Medium)	Operational Thresholds: PAL 3 (High)
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	18,523	18,523	20,175	21,725	23,087	24,396	2020	2020	X
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	20,598	7,503	8,152	8,754	9,281	9,789	2020	X	X
Austin	Austin Municipal Airport	AUM	Key General Aviation	21,505	21,505	23,322	25,048	26,591	28,111	2020	2020	X
Baudette	Baudette International Airport	BDE	Key General Aviation	7,503	20,598	22,239	23,705	24,865	25,897	2020	2020	X
Ely	Ely Municipal Airport	ELO	Key General Aviation	7,550	24,429	26,359	28,185	29,831	31,443	2020	2020	X
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	9,267	3,762	4,104	4,431	4,727	5,019	2021	X	X
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	13,016	7,550	8,202	8,801	9,313	9,793	2020	X	X
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	3,762	13,016	14,069	15,027	15,828	16,579	2020	2021	X
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	25,230	9,267	10,122	10,914	11,584	12,212	2020	X	X
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	100,062	25,230	27,274	29,235	31,026	32,800	2020	2020	X

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecasts (No.) 2020	Operations Forecasts (No.) 2025	Operations Forecasts (No.) 2030	Operations Forecasts (No.) 2035	Operations Forecasts (No.) 2040	Operational Thresholds: PAL 1 (Low)	Operational Thresholds: PAL 2 (Medium)	Operational Thresholds: PAL 3 (High)
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	15,926	16,357	18,014	19,670	21,292	23,004	2020	2020	X
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	71,740	71,740	75,754	79,238	82,064	84,631	2020	2020	2020
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	104,405	104,405	113,760	123,095	132,179	141,549	2020	2020	2020
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	7,792	100,062	108,992	117,469	125,153	132,726	2020	2020	2020
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	16,357	15,926	17,172	18,319	19,317	20,261	2020	2020	X
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	19,476	9,945	10,812	11,591	12,221	12,788	2020	X	X
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	11,751	11,078	11,937	12,743	13,460	14,150	2020	2032	X
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	40,934	19,476	21,117	22,691	24,119	25,520	2020	2020	X
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	16,617	11,751	12,692	13,565	14,350	15,119	2020	2027	X
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	24,429	16,617	17,948	19,194	20,302	21,385	2020	2020	X
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	9,945	40,934	44,449	47,824	50,960	54,128	2020	2020	2021
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	11,078	7,792	8,354	8,875	9,333	9,775	2020	X	X
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	13,733	13,733	15,504	16,032	16,549	17,274	2020	2020	X
Benson	Benson Municipal Airport	BBB	Intermediate Large	4,065	4,065	4,590	4,746	4,899	5,114	2020	X	X
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	2,327	2,327	2,627	2,716	2,804	2,927	2020	X	X
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	9,821	9,821	11,088	11,466	11,835	12,354	2020	2022	X
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	7,080	7,080	7,993	8,266	8,532	8,906	2020	X	X
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	10,530	10,530	11,888	12,293	12,690	13,246	2020	2021	X
Cook	Cook Municipal Airport	CQM	Intermediate Large	5,022	5,022	5,669	5,863	6,052	6,317	2020	X	X
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	11,670	11,670	13,175	13,624	14,063	14,679	2020	2020	X
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	16,690	16,690	18,842	19,485	20,113	20,994	2020	2020	X
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	4,017	4,017	4,535	4,689	4,841	5,053	2020	X	X
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	8,137	8,137	9,187	9,500	9,806	10,236	2020	X	X
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	19,169	19,169	21,642	22,380	23,101	24,113	2020	2020	2023
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	4,284	4,284	4,837	5,001	5,163	5,389	2020	X	X
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	7,544	7,544	8,517	8,808	9,092	9,490	2020	X	X
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	13,380	13,380	15,105	15,620	16,124	16,830	2020	2020	X
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	7,844	7,844	8,855	9,157	9,452	9,867	2020	X	X
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	4,008	4,008	4,525	4,679	4,830	5,042	2020	X	X
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	19,184	19,184	21,659	22,397	23,119	24,132	2020	2020	2023

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecasts (No.) 2020	Operations Forecasts (No.) 2025	Operations Forecasts (No.) 2030	Operations Forecasts (No.) 2035	Operations Forecasts (No.) 2040	Operational Thresholds: PAL 1 (Low)	Operational Thresholds: PAL 2 (Medium)	Operational Thresholds: PAL 3 (High)
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	4,730	4,730	5,340	5,522	5,700	5,950	2020	X	X
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	21,055	21,055	23,771	24,582	25,374	26,486	2020	2020	2021
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	7,058	7,058	7,969	8,240	8,506	8,879	2020	X	X
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	8,867	8,867	10,011	10,352	10,686	11,154	2020	2033	X
Mora	Mora Municipal Airport	JMR	Intermediate Large	12,377	12,377	13,973	14,450	14,916	15,569	2020	2020	X
Morris	Morris Municipal Airport	MOX	Intermediate Large	9,366	9,366	10,574	10,934	11,287	11,781	2020	2025	X
Orr	Orr Regional Airport	ORB	Intermediate Large	1,357	1,357	1,532	1,584	1,635	1,707	2021	X	X
Perham	Perham Municipal Airport	16D	Intermediate Large	6,235	6,235	7,040	7,280	7,514	7,843	2020	X	X
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	4,675	4,675	5,278	5,458	5,634	5,881	2020	X	X
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	2,449	2,449	2,764	2,859	2,951	3,080	2020	X	X
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	7,548	7,548	8,522	8,812	9,096	9,495	2020	X	X
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	8,642	8,642	9,757	10,089	10,414	10,871	2020	2037	X
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	14,103	14,103	15,922	16,464	16,995	17,740	2020	2020	X
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	6,473	6,473	7,308	7,557	7,801	8,143	2020	X	X
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	49,331	49,331	55,693	57,592	59,448	62,053	2020	2020	2020
St. James	Saint James Municipal Airport	JYG	Intermediate Large	3,908	3,908	4,412	4,563	4,710	4,916	2020	X	X
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	4,429	4,429	5,001	5,171	5,338	5,572	2020	X	X
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	6,233	6,233	7,036	7,276	7,511	7,840	2020	X	X
Ada/Twin Valley	Ada-Norman County/Ada/Twin Valley Airport	D00	Intermediate Small	3,085	3,085	3,483	3,602	3,718	3,881	2020	X	X
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	2,034	2,034	2,296	2,375	2,451	2,559	2020	X	X
Bagley	Bagley Municipal Airport	7Y4	Intermediate Small	434	434	490	507	523	546	2020	X	X
Blue Earth	Blue Earth Municipal Airport	SBU	Intermediate Small	7,642	7,642	8,627	8,921	9,209	9,612	2020	2022	X
Brooten	Brooten Municipal Airport	6D1	Intermediate Small	1,248	1,248	1,409	1,457	1,504	1,570	2020	X	X
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	14,213	14,213	16,046	16,593	17,128	17,878	2020	2020	2029
Caledonia	Caledonia-Houston County Airport	CHU	Intermediate Small	2,193	2,193	2,475	2,560	2,642	2,758	2020	X	X
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	11,472	11,472	12,952	13,394	13,825	14,431	2020	2020	X
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	7,851	6,691	7,554	7,812	8,064	8,417	2020	2037	X
Fertile	Fertile Municipal Airport	D14	Intermediate Small	6,878	7,851	8,864	9,166	9,461	9,876	2020	2021	X
Forest Lake	Forest Lake Airport	25D	Intermediate Small	5,715	6,878	7,765	8,030	8,289	8,652	2020	2033	X
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	8,150	5,715	6,452	6,672	6,887	7,189	2020	X	X

Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecasts (No.) 2020	Operations Forecasts (No.) 2025	Operations Forecasts (No.) 2030	Operations Forecasts (No.) 2035	Operations Forecasts (No.) 2040	Operational Thresholds: PAL 1 (Low)	Operational Thresholds: PAL 2 (Medium)	Operational Thresholds: PAL 3 (High)
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	6,691	8,150	9,201	9,515	9,822	10,252	2020	2021	X
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	5,225	5,225	5,899	6,100	6,297	6,572	2020	X	X
Hector	Hector Municipal Airport	1D6	Intermediate Small	6,074	6,074	6,857	7,091	7,319	7,640	2020	X	X
Herman	Herman Municipal Airport	06Y	Intermediate Small	2,006	2,006	2,264	2,342	2,417	2,523	2020	X	X
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	14,623	14,623	16,509	17,072	17,622	18,394	2020	2020	2025
Le Sueur	Le Sueur Municipal Airport	12Y	Intermediate Small	1,614	1,614	1,822	1,884	1,945	2,030	2020	X	X
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	4,410	4,410	4,978	5,148	5,314	5,547	2020	X	X
Longville	Longville Municipal Airport	XVG	Intermediate Small	5,343	5,343	6,032	6,237	6,438	6,720	2020	X	X
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	2,340	2,340	2,642	2,732	2,820	2,943	2020	X	X
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	1,621	1,621	1,830	1,892	1,953	2,039	2020	X	X
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	15,414	15,414	17,402	17,995	18,575	19,389	2020	2020	2022
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	987	987	1,114	1,152	1,189	1,242	2020	X	X
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	41,541	41,541	46,899	48,498	50,061	52,254	2020	2020	2020
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	3,171	3,171	3,580	3,702	3,821	3,988	2020	X	X
Olivia	Olivia Regional Airport	OVL	Intermediate Small	4,688	4,688	5,293	5,474	5,650	5,898	2020	X	X
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	3,221	3,221	3,636	3,760	3,881	4,051	2020	X	X
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	2,984	2,984	3,368	3,483	3,596	3,753	2020	X	X
Pine River	Pine River Regional Airport	PWC	Intermediate Small	5,003	5,003	5,648	5,841	6,029	6,293	2020	X	X
Pinecreek	Piney-Pinecreek Border Airport	48Y	Intermediate Small	431	431	486	503	519	542	2021	X	X
Red Lake Falls	Red Lake Falls Municipal Airport	D81	Intermediate Small	11,345	11,345	12,809	13,245	13,672	14,271	2020	2020	X
Rushford	Rushford Municipal Airport	55Y	Intermediate Small	1,374	1,374	1,552	1,604	1,656	1,729	2020	X	X
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	3,889	3,889	4,391	4,540	4,687	4,892	2020	X	X
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	3,300	3,300	3,726	3,853	3,977	4,151	2020	X	X
Springfield	Springfield Municipal Airport	D42	Intermediate Small	2,142	2,142	2,418	2,501	2,581	2,695	2020	X	X
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	16,421	16,421	18,539	19,171	19,789	20,656	2020	2020	2021
Staples	Staples Municipal Airport	SAZ	Intermediate Small	7,207	7,207	8,136	8,414	8,685	9,066	2020	2026	X
Stephen	Stephen Municipal Airport	D41	Intermediate Small	12,023	12,023	13,573	14,036	14,489	15,123	2020	2020	X
Tower	Tower Municipal Airport	12D	Intermediate Small	3,517	3,517	3,971	4,106	4,239	4,424	2020	X	X
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	1,217	1,217	1,374	1,421	1,467	1,531	2020	X	X
Walker	Walker Municipal Airport	Y49	Intermediate Small	5,152	5,152	5,816	6,014	6,208	6,480	2020	X	X
Warren	Warren Municipal Airport	D37	Intermediate Small	9,062	9,062	10,231	10,580	10,921	11,400	2020	2020	X
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	13,211	13,211	14,915	15,424	15,921	16,619	2020	2020	2039
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	3,056	3,056	3,451	3,568	3,683	3,845	2020	X	X

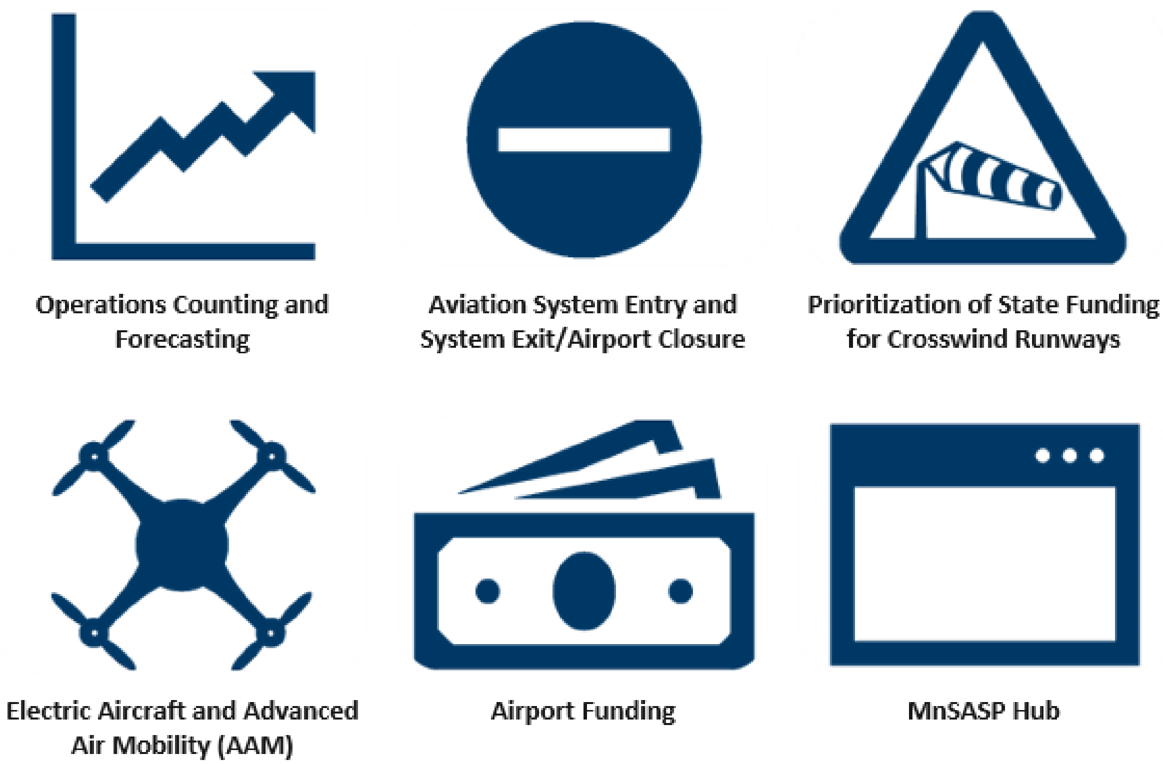
Associated City	Airport Name	FAA ID	MNSASP Airport Classification	Baseline Operations	Operations Forecasts (No.) 2020	Operations Forecasts (No.) 2025	Operations Forecasts (No.) 2030	Operations Forecasts (No.) 2035	Operations Forecasts (No.) 2040	Operational Thresholds: PAL 1 (Low)	Operational Thresholds: PAL 2 (Medium)	Operational Thresholds: PAL 3 (High)
Windom	Windom Municipal Airport	MWM	Intermediate Small	5,496	5,496	6,205	6,416	6,623	6,913	2020	X	X
Backus	Backus Municipal Airport	7Y3	Landing Strip Turf	4,017	4,017	4,382	4,614	4,822	5,036	2020	2020	2020
Big Falls	Big Falls Municipal Airport	7Y9	Landing Strip Turf	200	200	214	221	227	233	2020	X	X
Bowstring	Bowstring Airport	9Y0	Landing Strip Turf	323	323	348	363	376	390	2020	X	X
Clarissa	Clarissa Municipal Airport	8Y5	Landing Strip Turf	456	456	491	510	526	543	2020	X	X
East Gull Lake	East Gull Lake Airport	9Y2	Landing Strip Turf	198	198	216	228	238	248	2021	X	X
Grygla	Grygla Municipal Airport (Mel Wilkens Field)	3G2	Landing Strip Turf	200	200	213	220	226	232	2020	X	X
Henning	Henning Municipal Airport	05Y	Landing Strip Turf	1,517	1,517	1,637	1,707	1,768	1,832	2020	2020	X
Hill City	Hill City-Quadna Mountain Airport	07Y	Landing Strip Turf	560	560	608	637	661	687	2020	X	X
Karlstad	Karlstad Municipal Airport	23D	Landing Strip Turf	2,006	2,006	2,143	2,215	2,277	2,344	2020	2020	2021
Littlefork	Littlefork Municipal Hanover Airport	13Y	Landing Strip Turf	700	700	748	774	794	815	2020	2021	X
Milaca	Milaca Municipal Airport	18Y	Landing Strip Turf	5,006	5,006	5,439	5,705	5,939	6,179	2020	2020	2020
Northome	Northome Municipal Airport	43Y	Landing Strip Turf	311	311	333	344	353	362	2020	X	X
Pelican Rapids	Pelican Rapids Municipal Airport	47Y	Landing Strip Turf	1,664	1,664	1,796	1,873	1,939	2,009	2020	2020	2040
Remer	Remer Municipal Airport	52Y	Landing Strip Turf	512	512	558	588	615	642	2020	X	X
Sleepy Eye	Sleepy Eye Municipal Airport	Y58	Landing Strip Turf	5,000	5,000	5,367	5,571	5,753	5,950	2020	2020	2020
Starbuck	Starbuck Municipal Airport	D32	Landing Strip Turf	1,172	1,172	1,265	1,321	1,373	1,430	2020	2020	X
Tyler	Tyler Municipal Airport	63Y	Landing Strip Turf	1,606	1,606	1,719	1,781	1,837	1,900	2020	2020	X
Waskish	Wells Municipal Airport	68Y	Landing Strip Turf	1,006	1,006	1,095	1,151	1,200	1,252	2020	2020	X
Waskish	Waskish Municipal Airport	VWU	Landing Strip Turf	5,018	5,018	5,349	5,517	5,664	5,825	2020	2020	2020
Winsted	Winsted Municipal Airport	10D	Landing Strip Turf	9,986	9,986	10,794	11,275	11,710	12,172	2020	2020	2020

Notes: (1) MnSASP airport operations estimates and forecasts shall not be used for individual airport planning or funding decisions.
Sources: W&P, 2021; FAA Aerospace Forecasts, 2021 – 2041; Kimley-Horn, 2023

Appendix B. Public Involvement

The 2022 Minnesota State Aviation System Plan (2022 MnSASP or MnSASP) established six Focus Area Working Groups (or Working Groups) to provide continuous guidance on several components of the plan. The Working Groups offered insight into the scope of each issue; details regarding how they may affect MnDOT Aeronautics, Minnesota airports, and the air traveling public; and valuable feedback applied during the development of final recommendations. The Focus Area Working Groups of the 2022 MnSASP are presented in **Figure B.1**.

Figure B.1. 2022 MnSASP Focus Area Working Groups



Source: Kimley-Horn, 2022

A wide range of stakeholders participated in the Working Groups, allowing the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) to gather a diverse array of input from those who support, utilize, maintain, or are otherwise involved with the Minnesota state aviation system. Stakeholders represented the following types of organizations (list is not all-inclusive):

- Airport sponsors
- Airport consultants
- Academic professors/researchers
- Pilot advocacy groups
- Municipalities
- Federal Aviation Administration (FAA)

Each Working Group was convened at least twice in a virtual meeting format through Microsoft Teams. All meetings were guided by a Power Point and provided several engagement opportunities, including open discussion topics and live polling questions to collect input on various specific topics and draft project deliverables. **Table B.1** summarizes each Working Group's schedule through the 2022 MnSASP organized by calendar year and quarter. The following appendix compiles all Power Point presentations prepared for the Working Groups.

Table B.1. 2022 MnSASP Focus Area Working Group Meeting Schedule

Working Group	2021				2022
	Q1	Q2	Q3	Q4	Q1
Prioritization of State Funding for Crosswind Runways	**Yes**	**Yes**	**Yes**	No	No
Aviation System Entry and System Exit/Airport Closure	No	**Yes**	No	**Yes**	No
Operations Counting and Forecasting	No	**Yes**	No	**Yes**	**Yes**
MnSASP Hub	No	**Yes**	No	**Yes**	**Yes**
Electric Aircraft and AAM	**Yes**	No	No	**Yes**	No
Airport Funding	No	No	**Yes**	No	**Yes**

Source: Kimley-Horn, 2022

Table B.2 documents the outcomes on each Working Group and where the deliverable is organized within the 2022 MnSASP Technical Report.

Table B.2. 2022 MnSASP Focus Area Working Group Deliverables

Working Group	Deliverable
Prioritization of State Funding for Crosswind Runways	Attachment 5. Prioritization of State Funding for Crosswind Runways
Aviation System Entry and System Exit/Airport Closure	- Attachment 3. State Aviation System Exit and Airport Closure Guidance Statement - Attachment 4. State Aviation System Entry Guidance Statement
Operations Counting and Forecasting	Chapter 3. Operations Counting and Forecasting
MnSASP Hub	MnSASP Hub (https://mnsasp-mndot.hub.arcgis.com/)
Electric Aircraft and AAM	Appendix B. Public Involvement (see final Power Point presentation)
Airport Funding	Chapter 4. Systemwide Costs & Implementation Plan

Source: Kimley-Horn, 2022

Appendix C. Minnesota Navigational Aids

C.1. Introduction

The Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) maintains the largest systems of state-owned and/or -managed navigational aids (NAVAIDs) and weather reporting stations (Automated Weather Observing Systems [AWOS]/Automated Surface Observing Systems [ASOS]) in the United States (U.S.). This equipment provides critical information to pilots flying at night or during inclement weather conditions during which time specialized instrumentation is required. While helpful to pilots flying for any purpose, the ability to fly with navigational assistance can be pivotal for medical air transport, search and rescue operations, and other types of potentially life-saving activities. During outreach conducted during the 2022 Minnesota State Aviation System Plan (2022 MnSASP or MnSASP), several air medical transport providers reported that the availability of Instrument Approach Procedures (IAPs) and on-site weather reporting were required to operate at an airport. Additionally, NAVAIDs and weather reporting stations often support economic actives including scheduled and unscheduled commercial service, air cargo, and aerial agriculture. Minnesota Statute 360.013 §39 offers a key foundation for MnDOT Aeronautics' ongoing support for NAVAIDS and weather reporting equipment by recognizing that the "operation and maintenance of airports is an essential public service."

MnDOT Aeronautics annually allocates approximately $3.0 million via the NAVAIDs Program to operate and maintain this equipment, including the utility costs required for their operation. Host airport sponsors are only responsible for a small portion of maintenance and capital improvement needs. The MnSASP conducted several tasks to support MnDOT Aeronautics' NAVAIDs Program to provide additional details about the existing system, including its relationship with the federal NAVAID program managed by the Federal Aviation Administration (FAA). This chapter is organized into the following sections:

- Minnesota NAVAIDs (Section C.2)
- Instrument Landing System Location Details (Section C.3
- Automated Weather Station Visual Assessment (Section C.4)

C.2. Minnesota NAVAIDs

MnDOT Aeronautics is responsible for over 450 NAVAIDs and 80 AWOS located at Minnesota airports, hospital heliports, and seaplane bases owned by public and private entities. The system dates back several decades, with initial installation conducted by a variety of operators and managers over that time. MnDOT Aeronautics maintains an inventory of this equipment that was used to conduct several tasks associated with assessing their role in supporting aircraft operations in Minnesota.

C.2.1. NAVAIDS COVERAGE AREA VISUALIZATION

NAVAIDs provide details about the precise location of aircraft in space as well as information to support safe maneuvering during aircraft operations. The broadcast range of equipment can vary based on a variety of factors including the location in which is installed (e.g., terrain, obstacles), performance characteristics inherent to the equipment itself (e.g., age, type, condition), and the physical distance between the NAVAID and aircraft. This task looked specifically at the latter two factors by depicting the statewide coverage provided by equipment at various altitudes. A statewide map was generated using a geographic information system (GIS) to model coverage by equipment class and type at various altitudes. The map is provided as a spatial layer within the MnSASP Hub (referred to as the Minnesota NAVAIDs service buffer spatial layer).[1] **Table C.1** summarizes the service buffers analyzed by class; **Table 3** describes the NAVAIDs included in the scope of the assessment by type.

Table C.1. VOR/VORTAC/TACAN NAVAIDS: Normal Usable Altitudes and Radius Distances

Class	Normal Usable Altitude	Radius Distance (Miles)
T	12,000 at ground level (AGL) and below	25
L	Below 18,000 AGL	40
H	Below 14,500 AGL	40
H	14,500 – 17,999 AGL	100
H	18,000 AGL - flight level (FL) 450	130
H	Above FL 450	100

Source: FAA Order JO 7110.65Z (change 1), Air Traffic Control (effective December 2, 2021)

Table C.2. VOR/VORTAC/TACAN NAVAIDS Description

Type	Definition	Purpose
TACAN	Tactical air navigation system	A system of navigation that uses ultrahigh frequency signals to determine the distance and bearing of an aircraft from a transmitting station
VOR/DME	Very high frequency omni-directional range/Distance measuring equipment	VOR/DME is a radio beacon that combines a VHF omnidirectional range (VOR) with a distance measuring equipment (DME). The VOR allows the receiver to measure its bearing to or from the beacon, while the DME provides the slant distance between the receiver and the station.
VORTAC	Co-located VOR and TACAN	See definitions above

Source: Kimley-Horn, 2022

The full list of attributes provided in the Hub's Minnesota NAVAIDs service buffer spatial layer is as follows:

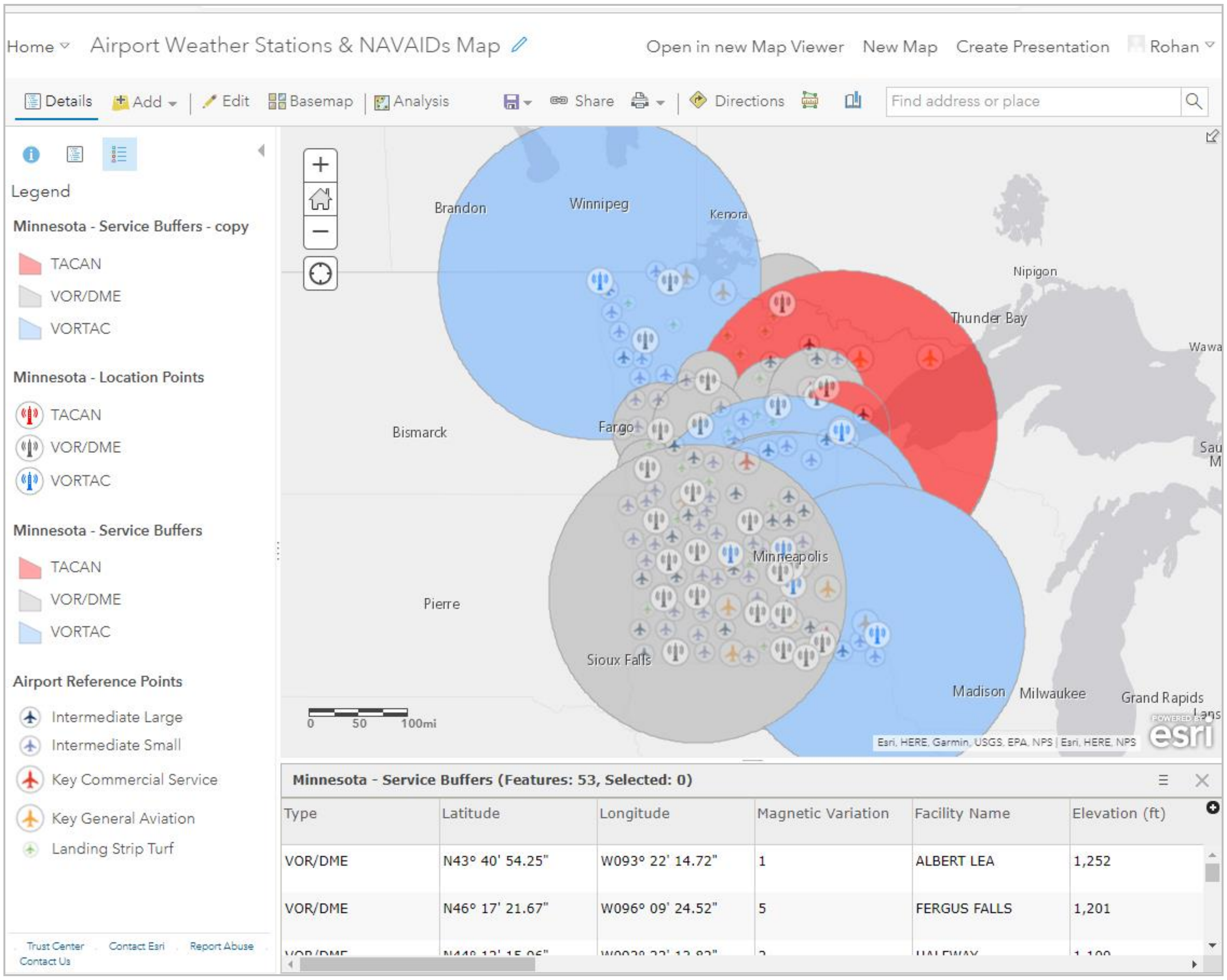
- Type
- Latitude
- Longitude
- Magnetic variation
- Facility name
- Elevation (feet)
- City
- Validation Data
- FAA Region
- Owner[2]

*[1] The Hub is an ArcGIS platform serving as a comprehensive online data repository of key tabular and spatial data inventoried and analyzed as part of the 2022 MnSASP. The Hub can be accessed at https://mnsasp-mndot.hub.arcgis.com/ with full details provided in **Chapter 6. Continuous Aviation Planning**.*
[2] Minnesota NAVAIDs are owned by the state, FAA, municipalities, and the U.S. Air Force (USAF).

- Class
- Hours of operation
- Air Route Traffic Control Center (ARTCC)
- Channel
- Frequency
- Status[3]
- Buffer distance (nm)
- Minimum elevation (feet)
- Maximum elevation (feet)
- Ownership type (i.e., city, state, federal, military)

An example screenshot of the Hub's Minnesota NAVAIDs service buffer spatial layer is provided in **Figure C.1**. Reference Hub at https://mnsasp-mndot.hub.arcgis.com/ to view the full application.

Figure C.1. Minnesota NAVAID Surface Buffers (Example Screenshot with Attribute Table)



Sources: MnDOT Aeronautics, 2021; Kimley-Horn, 2021; FAA, 2021

[3] *Status is defined in terms of "Restriction" or "IFR." IFR means that the equipment has been certified for IFR operations. Restricted means the equipment has coverage limitations. For example, a mountain could impede VOR coverage between a wedge of radials below a certain altitude.*

C.2.2. FEDERAL MINIMAL OPERATION NETWORK

In addition to MnDOT Aeronautics' state-managed NAVAIDs Program, the FAA maintains equipment within the VOR Minimum Operational Network (MON) Program. The MON Program represents the FAA's efforts to streamline the VOR system while still allowing for continuous coverage; as such, the MON Program makes recommendations for facilities to either remain active or be decommissioned due to overlapping coverage or other factors. The FAA is transitioning the National Airspace System (NAS) away from ground-based NAVAIDs to Performance Based Navigation (PBN). PBN relies on Global Positioning Systems (GPS) to provide precise spatial information to pilots. The VOR MON Program maintains conventional VOR infrastructure to provide backup navigational service in the case of a GPS outage, enabling aircraft to land via ground-based NAVAIDs should GPS service be unavailable.

The network provides VOR signal coverage at 5,000 feet AGL anywhere within the contiguous U.S.; coverage may exist but may not be continuous at lower altitudes. Airports within the VOR MON Program are located within 100 nautical miles (nm) of one another. The network is designed to provide pilots with access to an airport where aircraft can land under Instrument Flight Rules (IFR) without the use of GPS within 100 nm of any point within the contiguous U.S. [4]

Federally-owned VOR at airports not included in the MON are being discontinued, with the goal of decommissioning approximately 34 percent of existing VORs in the contiguous U.S. by fiscal year 2030. The final MON is anticipated to comprise 509 VOR configurations including 16 VOR, 215 VOR/DME, and 359 VORTAC. Minnesota airports currently in the MON include:[5]

- Chandler Field (AXN) – Alexandria, MN
- Austin Municipal Airport (AUM) – Austin, MN
- Hibbing/Range Regional Airport (HIB) – Hibbing, MN
- Falls International Airport (INL) – International Falls, MN
- Airlake (LVN) – Minneapolis, MN
- Thief River Falls Regional Airport (TVF) – Thief River Falls, MN

Airports in Minnesota with a VOR that has been or will be decommissioned in the near future include:[6]

- Worthington Municipal Airport (OTG) – Worthington, MN (scheduled for March 2022)
- Park Rapids Municipal Airport (PKD) – Park Rapids, MN (February 2021)
- Baudette International Airport (BDE) – Baudette, MN (September 2020)
- Ely Municipal Airport (ELO) – Ely, MN (March 2020)
- Fairmont Municipal Airport (FRM) – Fairmont (June 2019)
- Brainerd Lakes Regional Airport (BRD) – Brainerd (July 2018)

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[4] *FAA VOR MON Program Update (October 26, 2021). "Presentation to the Aeronautical Charting Meeting." Available online at https://www.faa.gov/air_traffic/flight_info/aeronav/acf/media/Presentations/21-02-VOR-MON-Program-Etienne.pdf (accessed March 2022).*
[5] *FAA (March 2022). "Chart Supplement, North Central U.S: Effective 0901Z, 24 Mar 2022, to 9091Z, 19 May 2022," p. 429. Available online at https://www.faa.gov/air_traffic/flight_info/aeronav/Digital_Products/dafd/ (accessed March 2022).*
[6] *Ibid.*

C.2.3. IDENTIFICATION OF APPROACHES THAT REQUIRE NAVAIDS

The FAA MON is designed to provide resiliency and redundancy by providing aid to pilots seeking to land using instrumentation in the event of a GPS outage. The 100-nm coverage radius at 5,000 feet AGL is established to effectively provide a safe and viable option for pilots to land their aircraft regardless of where they are flying in the contiguous 48 states. However, the MON does not consider factors that may require ground-based NAVAIDs. The MON provides the ability to safely transition aircraft from the sky to the ground, but it does not mean that pilots and their passengers will always arrive at their destination airport of choice. A pilot may need to land at a specific facility due to economic, emergency service, or other reasons. For example, a flight school may want VOR coverage at their facility to offer students the opportunity to practice landing using this type of technology. An air medical operator may want the redundancy offered by a VOR due to the importance of landing near specialized medical facilities. In these cases, NAVAIDs owned and/or operated by state or local authorities may ensure a specific facility can fulfill its role in the community and/or region in which it is located.

As a related issue, IAPs may require the use of a NAVAID that is not designated within the federal MON. The MnSASP reviewed IAPs at all Minnesota state system airports to identify NAVAIDs utilized in approach procedures regardless of MON inclusion. The results of this evaluation are presented in **Table C.3**. Details about the methodology used to conduct this evaluation are presented in **Chapter 6. Continuous Aviation Planning**. Two Minnesota NAVAIDs are not used in the published approach procedures of any state system airport:

- Eveleth-Virginia Municipal Airport (EVM) – Eveleth, MN
- Fairmont Municipal Airport (FRM) – Fairmont, MN

These facilities may be used by military aircraft, important for an airspace designation, or used in the International Civil Aviation Organization (ICAO) Air Navigation Plans. Further evaluation may be warranted to identify how various user groups may rely on equipment located at these facilities.

Table C.3. IAPs Dependent on Minnesota NAVAIDs by Airport

Type of Equipment	Airport Location of Equipment: FAA ID[1]	Name of Equipment	Location of Equipment: City	Owner of Equipment	Operator of Equipment	Operational Status of Equipment	Dependent Airports for VOR Approaches	Dependent Airports for Instrument Landing System (ILS)/ Localizer (LOC) Approaches	Standard Terminal Arrival (STAR) Procedures for Airports Dependent on Approach	IFR Chart
VOR/ DME	AEL	Albert Lea	Albert Lea	State of Minnesota	FAA	IFR	- Albert Lea Municipal Airport (AEL)	- Austin Municipal Airport (AUM)	- None	No
VOR/ DME	AXN	Alexandria	Alexandria	FAA	FAA	Restricted	- Alexandria Municipal Airport (Chandler Field) (AXN) - Glenwood Municipal Airport (GHW) - Morris Municipal Airport (MOX)	- Alexandria Municipal Airport (Chandler Field) (AXN) - Fergus Falls Municipal Airport (Einar Mickelson Field) (FFM) - Saint Cloud Regional Airport (STC)	- ANE (Minneapolis Anoka County/Blaine Airport (Janes Field)) - MIC (Minneapolis Crystal Airport) - FCM (Minneapolis Flying Cloud Airport) - MSP (Minneapolis/St. Paul International Airport) - STP (Saint Paul Downtown Airport (Holman Field))	Yes
DME	BDE	Baudette	Baudette	FAA	FAA	Restricted	- None	- Baudette International Airport (BDE)	- None	Yes
VOR/ DME	BDH	Wilmar	Wilmar	City of Wilmar	FAA	IFR	- Wilmar Municipal Airport (BDH)	- Wilmar Municipal Airport (BDH)	- None	No
VORTAC	DWN	Darwin	Darwin	FAA	FAA	IFR	- Hutchinson Municipal Airport (Butler Field) (HCD) - Litchfield Municipal Airport (LJF) - Maple Lake Municipal Airport & Seaplane Base (MGG) - Willmar Municipal Airport (BDH)	- Willmar Municipal Airport (BDH)	- None	Yes
VOR/ DME	DTL	Detroit Lakes	Detroit Lakes	State of Minnesota	FAA	IFR	- Detroit Lakes Airport (Wething Field) (DTL)	- Detroit Lakes Airport (Wething Field) (DTL)	- None	No
VORTAC	DLH	Duluth	Duluth	FAA	FAA	Restricted	- Duluth International Airport (DLH)	- Duluth International Airport (DLH)	- STP (Saint Paul Downtown Airport (Holman Field))	Yes
DME	ELO	Ely	Ely	FAA	FAA	Restricted	- None	- None	- None	None
VOR/ DME	EVM	Eveleth	Eveleth	State of Minnesota	FAA	IFR	- None	- None	- None	No
VOR/ DME	FCM	Flying Cloud	Minneapolis	FAA	FAA	Restricted	- Minneapolis Airlake Airport (LVN) - Minneapolis Flying Cloud Airport (FCM)	- Minneapolis Flying Cloud Airport (FCM) - Saint Paul Downtown Airport (Holman Field) (STP)	- Glencoe Municipal Airport (Vernon Perschau Field) (GYL) - Maple Lake Municipal Airport & Seaplane Base (MGG) - Minneapolis Anoka County/Blaine Airport (Janes Field) (ANE) - MIC (Minneapolis Crystal Airport) - Minneapolis Flying Cloud Airport (FCM) - Minneapolis/St. Paul International Airport (MSP) - Saint Paul Downtown Airport (Holman Field) (STP) - Saint Paul-Lake Elmo Airport (21D) - South St. Paul Municipal Airport (Fleming Field) (SGS)	No
VOR/ DME	FFM	Fergus Falls	Fergus Falls	State of Minnesota	State of Minnesota	Restricted	- Fergus Falls Municipal Airport (Einar Mickelson Field) (FFM)	- Fergus Falls Municipal Airport (Einar Mickelson Field) (FFM)	- None	No

Type of Equipment	Airport Location of Equipment: FAA ID[1]	Name of Equipment	Location of Equipment: City	Owner of Equipment	Operator of Equipment	Operational Status of Equipment	Dependent Airports for VOR Approaches	Dependent Airports for Instrument Landing System (ILS)/ Localizer (LOC) Approaches	Standard Terminal Arrival (STAR) Procedures for Airports Dependent on Approach	IFR Chart
VORTAC	FGT	Farmington	Farmington	FAA	FAA	IFR	- Minneapolis Airlake Airport (LVN)	- Minneapolis Airlake Airport (LVN) - Minneapolis/St. Paul International Airport (MSP) - Owatonna Degner Regional Airport (OWA) - Red Wing Regional Airport (RGK) - Saint Paul Downtown Airport (Holman Field) (STP)	- Glencoe Municipal Airport (Vernon Perschau Field) (GYL) - Maple Lake Municipal Airport & Seaplane Base (MGG) - Minneapolis Anoka County/Blaine Airport (Janes Field) (ANE) - Minneapolis Crystal Airport (MIC) - Minneapolis Flying Cloud Airport (FCM) - Minneapolis/St. Paul International Airport (MSP) - Saint Paul Downtown Airport (Holman Field) (STP) - Saint Paul-Lake Elmo Airport (21D) - South St. Paul Municipal Airport (Fleming Field) (SGS)	Yes
VOR/ DME	FOW	Halfway	Morristown	State of Minnesota	FAA	Restricted	- Faribault Municipal Airport (FBL) - Mankato Municipal Airport (MKT) - Owatonna Degner Regional Airport (OWA)	- Mankato Municipal Airport (MKT) - Owatonna Degner Regional Airport (OWA)	- Minneapolis/St. Paul International Airport (MSP)	No
DME	FRM	Fairmont	Fairmont	FAA	FAA	IFR	- None	- Fairmont Municipal Airport (FRM)	- None	Yes
VORTAC	GEP	Gopher	Minneapolis	FAA	FAA	IFR	- Buffalo Municipal Airport (CFE) - Maple Lake Municipal Airport & Seaplane Base (MGG) - Minneapolis Anoka County/Blaine Airport (Janes Field) (ANE) - Minneapolis Flying Cloud Airport (FCM) - Saint Cloud Regional Airport (STC)	- Minneapolis Anoka County/Blaine Airport (Janes Field) (ANE) - Minneapolis Flying Cloud Airport (FCM) - Red Wing Regional Airport (RGK) - Saint Cloud Regional Airport (STC) - Saint Paul Downtown Airport (Holman Field) (STP)	- Minneapolis Anoka County/Blaine Airport (Janes Field) (ANE) - Minneapolis Crystal Airport (MIC) - Minneapolis Flying Cloud Airport (FCM) - Minneapolis/St. Paul International Airport (MSP) - Saint Paul Downtown Airport (Holman Field) (STP)	Yes
VOR/ DME	GPZ	Grand Rapids	Grand Rapids	FAA	FAA	Restricted	- Grand Rapids-Itasca County Airport (Gordon Newstrom Field) (GPZ)	- Grand Rapids-Itasca County Airport (Gordon Newstrom Field) (GPZ)	- None	Yes
VOR/ DME	HIB	Hibbing	Hibbing	FAA	FAA	Restricted	- Eveleth-Virginia Municipal Airport (EVM) - Grand Rapids-Itasca County Airport (Gordon Newstrom Field) (GPZ)	- Duluth International Airport (DLH) - Grand Rapids-Itasca County Airport (Gordon Newstrom Field) (GPZ) - Hibbing-Chisholm-Hibbing Municipal Airport (HIB)	- None	Yes
VORTAC	HML	Humboldt	Humboldt	FAA	FAA	IFR	- Hallock Municipal Airport (HCO)	- None	- None	Yes
VOR/ DME	INL	International Falls	International Falls	FAA	FAA	IFR	- Falls International Airport (INL)	- Baudette International Airport (BDE) - Falls International Airport (INL)	- None	Yes
VOR/ DME	IDJ	Lake Bemidji	Bemidji	State of Minnesota	State of Minnesota	IFR	- Bemidji Regional Airport (BJI)	- Bemidji Regional Airport (BJI)	- None	No
VOR/ DME	JAY	Austin	Austin	City of Austin	City of Austin	IFR	- Austin Municipal Airport (AUM)	- Austin Municipal Airport (AUM)	- None	No

Type of Equipment	Airport Location of Equipment: FAA ID[1]	Name of Equipment	Location of Equipment: City	Owner of Equipment	Operator of Equipment	Operational Status of Equipment	Dependent Airports for VOR Approaches	Dependent Airports for Instrument Landing System (ILS)/ Localizer (LOC) Approaches	Standard Terminal Arrival (STAR) Procedures for Airports Dependent on Approach	IFR Chart
VOR/ DME	MKT	Mankato	Mankato	FAA	FAA	IFR	- Mankato Municipal Airport (MKT)	- Mankato Municipal Airport (MKT)	- Minneapolis Anoka County/Blaine Airport (Janes Field) (ANE) - Minneapolis Crystal Airport (MIC) - Minneapolis Flying Cloud Airport (FCM) - Minneapolis/St. Paul International Airport (MSP) - Saint Paul Downtown Airport (Holman Field) (STP)	No
VOR/ DME	MML	Marshall	Marshall	State of Minnesota	FAA	IFR	- Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field (MML)	- Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field (MML)	- None	
VOR/ DME	MSP	Minneapolis	Minneapolis	FAA	FAA	Restricted	- None	- Minneapolis/St. Paul International Airport (MSP) - Saint Paul Downtown Airport (Holman Field) (STP)	- Glencoe Municipal Airport (Vernon Perschau Field) (GYL) - Maple Lake Municipal Airport & Seaplane Base (MMG) - Minneapolis Anoka County/Blaine Airport (Janes Field) (ANE) - Minneapolis Crystal Airport (MIC) - Minneapolis Flying Cloud Airport (FCM) - Minneapolis/St. Paul International Airport (MSP) - Saint Paul Downtown Airport (Holman Field) (STP) - Saint Paul-Lake Elmo Airport (21D) - South St. Paul Municipal Airport (Fleming Field) (SGS)	No
VOR/ DME	MVE	Montevideo	Montevideo	State of Minnesota	FAA	Restricted	- Granite Falls Municipal Airport (Lenzen-Roe Memorial Field) (GDB) - Montevideo-Chippewa County Airport (MVE)	- None	- None	No
VOR/ DME	MOX	Morris	Morris	State of Minnesota	FAA	IFR	- Glenwood Municipal Airport (GHW) - Morris Municipal Airport (MOX)	- None	- None	No
VORTAC	ODI	Nodine	Nodine	FAA	FAA	IFR	- Caledonia-Houston County Airport (CHU) - Rushford Municipal Airport (55Y)	- Winona Municipal Airport (Max Conrad Field) (ONA)	- Minneapolis/St. Paul International Airport (MSP)	Yes
VOR/ DME	OTG	Worthington	Worthington	FAA	FAA	Restricted	- Worthington Municipal Airport (OTG)	- Worthington Municipal Airport (OTG)	- None	Yes
VOR/ DME	PKD	Park Rapids	Park Rapids	FAA	FAA	IFR	- None	- Park Rapids Municipal Airport (PKD)	- None	No
VOR/ DME	RWF	Redwood Falls	Redwood Falls	FAA	FAA	Restricted	- Granite Falls Municipal Airport (Lenzen-Roe Memorial Field) (GDB) - Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field (MML) - Olivia Regional Airport (OVL)	- Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field (MML)	- Minneapolis/St. Paul International Airport (MSP)	Yes

Type of Equipment	Airport Location of Equipment: FAA ID[1]	Name of Equipment	Location of Equipment: City	Owner of Equipment	Operator of Equipment	Operational Status of Equipment	Dependent Airports for VOR Approaches	Dependent Airports for Instrument Landing System (ILS)/ Localizer (LOC) Approaches	Standard Terminal Arrival (STAR) Procedures for Airports Dependent on Approach	IFR Chart
							- Redwood Falls Municipal Airport (RWF) - Springfield Municipal Airport (D42)			
VOR/ DME	RST	Rochester	Rochester	FAA	FAA	IFR	- Austin Municipal Airport (AUM) - Dodge Center Municipal Airport (TOB)	- Austin Municipal Airport (AUM) - Owatonna Degner Regional Airport (OWA) - Rochester International Airport (RST) - Winona Municipal Airport (Max Conrad Field) (ONA)	- Minneapolis/St. Paul International Airport (MSP)	Yes
VOR/ DME	ROX	Roseau	Roseau	FAA	FAA	Restricted	- Roseau Municipal Airport (Rudy Billberg Field) (ROX)	- None	- None	Yes
VOR/ DME	STC	St. Cloud	St. Cloud	State of Minnesota	FAA	IFR	- Maple Lake Municipal Airport & Seaplane Base (MGG) - Saint Cloud Regional Airport (STC)	- Saint Cloud Regional Airport (STC)	- None	No
VOR/ DME	TVF	Thief River Falls	Thief River Falls	FAA	FAA	Restricted	- Thief River Falls Regional Airport (TVF)	- Thief River Falls Regional Airport (TVF)	- None	Yes

Note: (1) Some NAVAIDs included in the scope of this analysis are not located at a Minnesota state system airport. Accordingly, the FAA ID and NAVAID name may not correspond with an airport facility referenced in other MnSASP tasks. Sources: Kimley-Horn, 2021; ADIP, 2021

C.2.4. NEXT STEPS

MnDOT Aeronautics manages the largest network of non-federal NAVAIDs in the country. In many cases, the state is responsible for ongoing maintenance needs, including the cost of utilities required for their operation. Much of the equipment is past its useful life and replacement parts are becoming increasingly unavailable. The state must rely on parts obtained from decommissioned equipment located across the U.S.

In summary, the maintenance and operation of state-managed NAVAIDs in Minnesota is a costly endeavor in terms of equipment and specialized labor. Coupled with the nationwide shift to PBN, MnDOT Aeronautics may consider decommissioning equipment to “right-size” the state NAVAIDs system and optimally allocate state resources across the entire air transportation system.

There are many factors that should be considered when making decisions about maintaining versus decommissioning equipment, such as remaining lifespan, availability of parts, and level of service provided to various user groups. While the MnSASP did develop service coverage thresholds, this analysis applied assumptions based on equipment type and class. Individual pieces of equipment may under- or over-perform these assumed thresholds depending on condition, age, placement relative to terrain/obstacles, and other variables. When a NAVAID fails in the future, equipment-specific factors should be considered to better gauge the long-term value to the air traveling public versus the cost to repair/maintain. The NAVAID’s role at local and/or regional scales is also an important decision-making factor in a resource-constrained environment.

Should MnDOT Aeronautics decide to decommission a state-managed NAVAID, the state is required to follow FAA Order JO 7400.2, *Procedures for Handling Airspace Matters* (see Section 6. Discontinuance of Military and Non-federal NAVAIDs). This process determines if one of the following criteria applies:

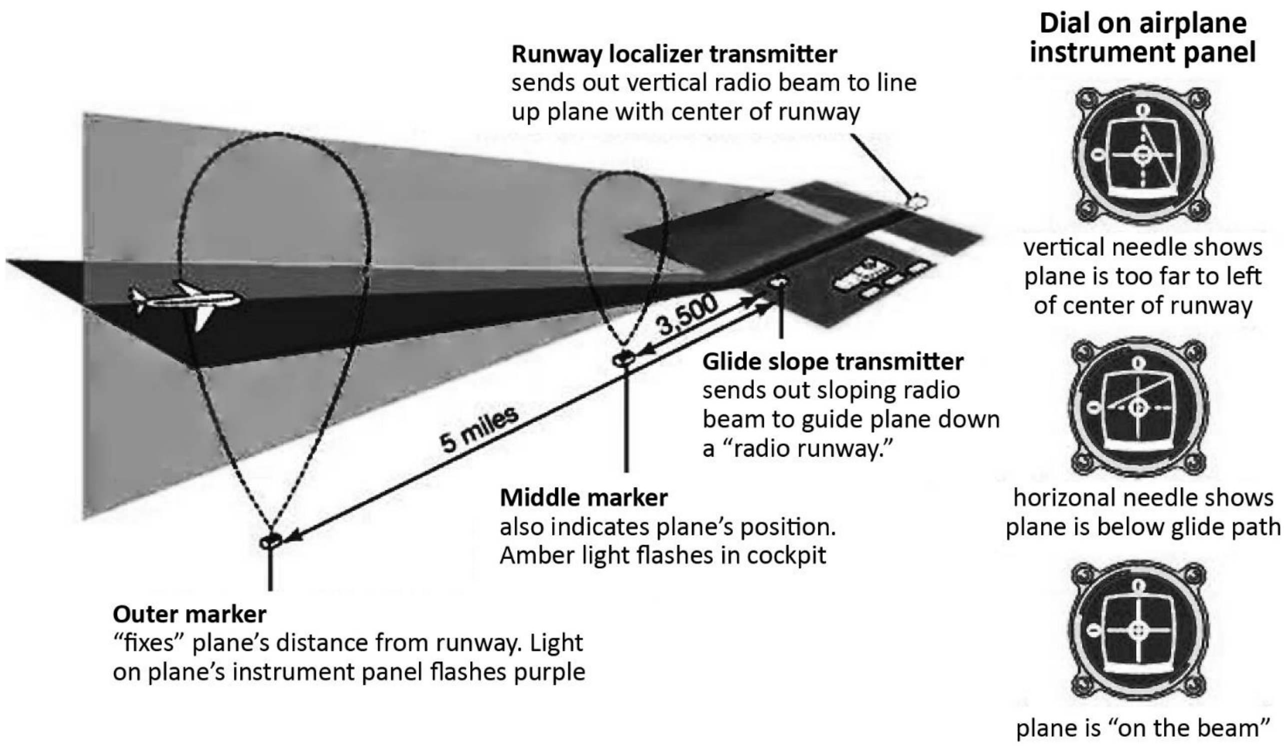
- The NAVAID forms part of the Federal airway/route system
- An airspace designation is predicated upon the NAVAID
- The NAVAID is used for a published civil instrument procedure

If the above criteria are determined to not apply, the FAA air traffic office will notify user groups of the discontinuation without initiating the nonrulemaking process. If one or more criteria do apply, the nonrulemaking process will be initiated and the FAA will consider the feasibility of an FAA takeover. If the NAVAID is ultimately discontinued, the FAA will ensure the airspace designated or IAP predicated on the NAVAID is revoked, modified, or canceled. Additional discontinuation processes are also required for NAVAIDs included in ICAO Air Navigation Plans.

C.3. Instrument Landing System Location Details

The Hub also depicts all equipment associated with ILS in Minnesota. ILS are ground-based NAVAIDs composed of a LOC to provide azimuth guidance and a glideslope (GS) to define the correct vertical descent profile. These two radio beams work together to provide precise vertical and horizonal guidance during landing and are a key element of having a precision runway approach.[7] A depiction of an ILS is provided in Figure C.2.

Figure C.2. Depiction of an ILS Functionality

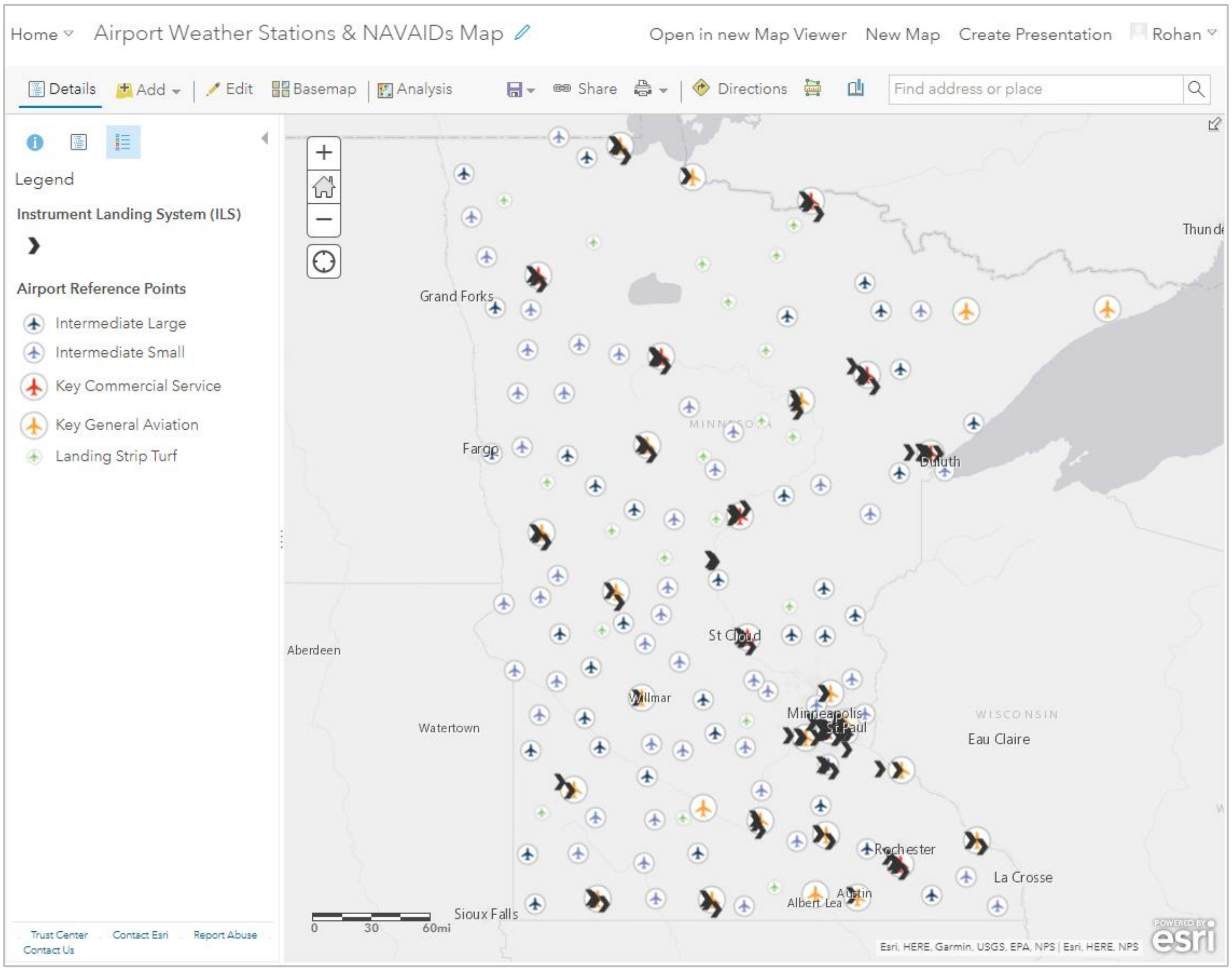


Source: Encyclopedia Britannica, 2009

Airports with an ILS are depicted on a spatial layer in the Hub, as shown in Figure C.3.

[7] *Additional components of having a precision approach including proper runway lighting and marketing and an approach lighting system (ALS). Runway visual range (RVR) and marker beacons or LPDME may also be required. The components of an ILS depend, in part, on how precision the approach is (i.e., approaches with lower weather minimums/visibility). For additional information about components of an ILS, visit the FAA's Ground-based Navigation – ILS website.*

Figure C.3. ILS Equipment at Minnesota Airports (Example Screenshot)



Sources: MnDOT Aeronautics, 2021; Kimley-Horn, 2021; FAA, 2021

Additional attributes provided by this spatial layer include:

- Type (i.e., LOC versus GS, with the LOC indicated solely as "ILS" in the attribute table)
- Latitude
- Longitude
- Magnetic variation
- Elevation (feet)
- Facility name
- City
- State
- Owner
- Operator
- Ownership type (i.e., city, state, federal, military)
- Facility Identifier (ID)

C.4. Automated Weather Station Visual Assessment

Having accurate and up-to-date weather is a critical factor of safe flying. Temperature, wind, and moisture work together to create the meteorological conditions that determine ceiling and visibility, create turbulence, and affect aircraft performance. These factors work in combination to influence the pilot and aircraft based on skill, available equipment, and performance characteristics.[8] Approximately 100 Minnesota airports host an on-site weather station (AWOS/ASOS) to provide accurate weather data to the pilots who rely on their facilities.[9] These AWOS/ASOS may also provide data to pilots operating at nearby airports if on-site equipment is unavailable.

The accuracy of the data reported by an AWOS/ASOS is, in part, affected by its placement at the airport. Natural or manmade obstacles and proximity to the runway threshold and centerline can impact equipment's ability to accurately report temperature, wind, and moisture—which, under the right conditions—can have serious consequences for pilots and their passengers. FAA Order JO 6560.20C, *Siting Criteria for Automated Weather Observing Systems*, details the siting criteria for weather reporting systems at airports. To ensure the observations are representative of the meteorological conditions affecting an airport, AWOS/ASOS should comply with the following criteria:

- The preferred siting of the cloud height, visibility, and wind sensors is:
  - Adjacent to the runway 1,000 feet to 3,000 feet from the primary runway threshold
  - Between 500 and 1,000 feet from the primary runway centerline.
- The wind sensor requires a 500-foot clear area where all obstructions must be at least 15 feet lower than the height of the sensor.

The MnSASP team conducted a desktop review of all existing weather stations (AWOS/ASOS) to determine compliance with the FAA's siting criteria. A visual assessment using Google Earth was completed to identify any potential incompatibilities in terms of obstructions and placement in relationship to the primary runway. A summary of the methodology used in this analysis and the key findings are provided in the following subsections.

C.4.1. METHODOLOGY

As the first step in the AWOS/ASOS visual assessment, MnDOT Aeronautics provided a list of Minnesota airports with an on-site weather reporting station. These data did not indicate the precise location of the equipment at the airport, but instead provided the latitude and longitude of the Airport Reference Point (ARP).[10] Several additional databases were then reviewed to obtain exact location details and equipment type by airport (as available).

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[8] Parson, Susan (March/April 2015). "I've Got Weather! (…Now What Do I Do with It?). FAA Safety Briefing." Available online at https://www.faa.gov/news/safety_briefing/2015/media/MarApr2015.pdf (accessed March 2022).

[9] This includes 99 airports within the Minnesota state aviation system and four airports not included in the state system. Non-state system airports with on-site weather reporting include Ray S Miller AAF (RYM), Scotts (Crane Lake) Seaplane Base, (CDD), Field of Dreams (04W), and Silver Bay Municipal Airport (BFW). Silver Bay Municipal Airport had been in the state aviation system until its closure in 2019.

[10] The ARP is the approximate geometric center of all usable runways at an airport.

Supplemental data sources are summarized in **Table C.4**. These sources were also used to confirm the list of weather reporting stations in the analysis was comprehensive.

Table C.4. Data Sources Reviewed During AWOS/ASOS Visual Assessment

Name	URL	Data Obtained
FAA Surface Weather Observation Stations ASOS/AWOS	https://www.faa.gov/air_traffic/weather/asos/?state=MN	AWOS/ASOS location and type details
FAA ADIP	https://adip.faa.gov/agis/public/#/public	AWOS/ASOS location details
FAA Validated UDDF Files	https://nfdc.faa.gov/nfdcApps/services/publicData/uddfList.jsp	AWOS/ASOS location details
Iowa State University – IOWA Environmental Mesonet	https://mesonet.agron.iastate.edu/request/download.phtml?network=MN_ASOS	AWOS/ASOS location details include latitude and longitude and elevation

Source: Kimley-Horn, 2022

Once all other potential databases had been reviewed to obtain as many additional details as possible, the project team used Google Earth as follows:

- When precision position information was known, the point was plotted to determine if the type of system anticipated could be visually confirmed.
- When precision position information was unknown, the ARP was plotted, and the airport was scanned to attempt to locate and identify the type of system anticipated at the airport.

Where a positive identification was made, the latitude/longitude was documented in MnDOT Aeronautics' AWOS/ASOS inventory sheet provided as **Table C.5**. Airports that were identified to have a weather reporting system but equipment could not be located were similarly noted. All identified weather reporting stations were then evaluated to determine if they were sited in accordance with the FAA's criteria relative to the airport's primary runway.

C.4.2. KEY FINDINGS

The full results of AWOS/ASOS visual assessment are presented in **Table C.5**, with the key findings summarized as follows:

- One-hundred and three ASOS/AWOS were positively identified in Minnesota
- Five systems reported by MnDOT Aeronautics could not be cross-referenced in the supplemental data sources nor visually confirmed in Google Earth[11]
- Possible siting issues were identified at 66 locations

[11] *Airports that MnDOT Aeronautics reported as having an on-site weather reporting station that could not be cross-referenced in external data source nor visually confirmed include Bemidji Regional Airport (BJI), Bigfork Municipal Airport (FOZ), Scotts (Crane Lake) (CDD), Fosston Municipal Airport (FSE), and Walker Municipal Airport (Y49). MnDOT Aeronautics also reported stations at three locations that could not be identified as airports in any federal database (9MN, FGN, GNA).*

It is important to recognize that the visual assessment could only measure the proximity of objects relative to one another. Equipment's distance from the runway threshold and centerline could be evaluated; however, the height of objects cannot be determined using Google Earth. The siting criteria states that the wind sensor requires a 500-foot clear area *where all obstructions must be at least 15 feet lower than the height of the sensor*. Therefore, additional investigation is warranted in cases where objects are located within a 500-foot radius of the wind sensor to determine if a height obstacle is present. Furthermore, this visual assessment is only intended to provide a high-level overview of potential siting issues. Additional on-site evaluations are warranted to confirm findings prior to applying to funding or other policy-related decisions.

C.4.3. AWOS/ASOS VISUAL ASSESSMENT RESULTS BY AIRPORT

Table C.5 provides the findings of the AWOS/ASOS siting assessment by airport. The results of this analysis are also depicted in the Hub in the Minnesota NAVAIDs spatial layer.

Table C.5. AWOS/ASOS Siting Assessment Findings by Airport

Associated City	Airport Name	FAA ID	State Classification	Located on Airport	Latitude	Longitude	Equipment Type	Primary RWY	Remarks	Siting Comments
Aitkin	Aitkin Municipal Airport	AIT	Intermediate Large	Yes	46°32'54.03"N	93°40'31.71"W	AWOS III	16/34	None	Objects w/in 500'
Albert Lea	Albert Lea Municipal Airport	AEL	Key General Aviation	Yes	43°40'56.22"N	93°22'19.75"W	AWOS III	17/35	None	Objects w/in 500'
Alexandria	Alexandria Municipal Airport (Chandler Field)	AXN	Key General Aviation	Yes	45°52'4.93"N	95°23'38.29"W	ASOS	13/31	Found in ADIP/UDDF	No issues identified
Appleton	Appleton Municipal Airport	AQP	Intermediate Small	Yes	45°13'29.61"N	96° 0'14.92"W	AWOS III	13/31	None	Objects w/in 500'
Austin	Austin Municipal Airport	AUM	Key General Aviation	Yes	43°40'7.71"N	92°55'55.47"W	AWOS III	17/35	None	5000' from RWY 35 that has ILS
Baudette	Baudette International Airport	BDE	Key General Aviation	Yes	48°43'33.79"N	94°36'43.72"W	ASOS	12/30	Found in ADIP/UDDF	3250' from RWY 12, Objects w/in 500'
Bemidji	Bemidji Regional Airport	BJI	Key Commercial Service	Unknown	Unknown	Unknown	AWOS III	13/31	Cannot locate	N/A
Benson	Benson Municipal Airport	BBB	Intermediate Large	Yes	45°19'51.51"N	95°38'48.96"W	AWOS III	14/32	None	No issues identified
Bigfork	Bigfork Municipal Airport	FOZ	Intermediate Large	Unknown	Unknown	Unknown	AWOS III P/T	15/33	Cannot locate	N/A
Brainerd	Brainerd-Crow Wing County Regional Airport	BRD	Key Commercial Service	Yes	46°24'7.06"N	94° 7'38.41"W	ASOS	05/23	Found in ADIP/UDDF	5500' from RWY 05 and 6000' from Rwy 16, Trees w/in 500' to the SE
Buffalo	Buffalo Municipal Airport	CFE	Intermediate Small	Yes	45° 9'36.27"N	93°50'45.61"W	AWOS III	18/36	Found in ADIP/UDDF	700' from RWY CL, buildings/trees w/in 500' all around
Cambridge	Cambridge Municipal Airport	CBG	Intermediate Large	Yes	45°33'45.81"N	93°15'51.71"W	AWOS III	16/34	None	3800' from RWY 34, buildings w/in 500' to the E/NE
Camp Ripley	Ray S Miller Army Airfield (AAF)	RYM	Not in the State System	Yes	46° 5'16.25"N	94°21'10.90"W	Unknown	13/31	None	No issues identified
Canby	Canby Municipal Airport (Myers Field)	CNB	Intermediate Large	Yes	44°43'46.80"N	96°15'44.19"W	AWOS III	12/30	None	3200' from RWY 12
Cloquet	Cloquet-Carlton County Airport	COQ	Intermediate Large	Yes	46°41'55.17"N	92°30'12.34"W	AWOS III	17/35	None	No issues identified
Cook	Cook Municipal Airport	CQM	Intermediate Large	Yes	47°49'11.83"N	92°40'54.01"W	AWOS III	13/31	None	4000' from RWY 13, Buildings and Trees w/in 500'
Crane Lake	Scotts (Crane Lake)	CDD	Not in the State System	No	Unknown	Unknown	AWOS III	07W/ 25W	Cannot locate. ARP in a lake	N/A
Crookston	Crookston Municipal Airport (Kirkwood Field)	CKN	Intermediate Large	Yes	47°50'25.51"N	96°37'12.46"W	AWOS III	13/31	None	Building w/in 500'
Detroit Lakes	Detroit Lakes Airport (Wething Field)	DTL	Intermediate Large	Yes	46°49'42.99"N	95°53'8.62"W	AWOS III P/T	14/32	Found in ADIP/UDDF	Building w/in 500', 3100' from RWY 31
Dodge Center	Dodge Center Municipal Airport	TOB	Intermediate Large	Yes	44° 1'13.01"N	92°49'46.31"W	AWOS III	16/34	None	No issues identified
Duluth	Duluth International Airport	DLH	Key Commercial Service	Yes	46°50'36.52"N	92°11'11.79"W	ASOS	09/27	None	No issues identified
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Intermediate Small	Yes	46°43'28.18"N	92° 2'40.12"W	AWOS III	14/32	Found in ADIP/UDDF	Buildings and Trees w/in 500'
Elbow Lake	Elbow Lake Municipal Airport	Y63	Intermediate Small	Yes	45°59'20.68"N	95°59'40.57"W	AWOS III	14/32	Found in ADIP/UDDF	Hanger w/in 500', 3300' from RWY 32
Ely	Ely Municipal Airport	ELO	Key General Aviation	Yes	47° 49' 43.31" N	091° 50' 13.56" W	AWOS III	12/30	None	5300' from RWY 30, Buildings and Trees w/in 500'
Eveleth	Eveleth-Virginia Municipal Airport	EVM	Intermediate Large	Yes	47°25'38.66"N	92°29'49.98"W	AWOS III	09/27	None	1400' from RWY centerline, Trees w/in 500' to east
Fairmont	Fairmont Municipal Airport	FRM	Key General Aviation	Yes	43°38'43.72"N	94°25'0.53"W	AWOS III P/T	13/31	Found in ADIP/UDDF	No issues identified
Faribault	Faribault Municipal Airport	FBL	Intermediate Large	Yes	44°19'47.36"N	93°18'42.74"W	AWOS III	12/30	None	No issues identified

Associated City	Airport Name	FAA ID	State Classification	Located on Airport	Latitude	Longitude	Equipment Type	Primary RWY	Remarks	Siting Comments
Fergus Falls	Fergus Falls Municipal Airport (Einar Mickelson Field)	FFM	Key General Aviation	Yes	46°17'11.58"N	96° 9'12.44"W	AWOS III	13/31	None	Buildings w/in 500'
Fosston	Fosston Municipal Airport	FSE	Intermediate Small	No	Unknown	Unknown	AWOS III	16/34	Cannot locate	N/A
Glencoe	Glencoe Municipal Airport (Vernon Perschau Field)	GYL	Intermediate Small	Yes	44°45'31.73"N	94° 5'25.86"W	AWOS III	13/31	None	1025' from RWY 13, Buildings w/in 500'
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	Yes	45°38'44.32"N	95°19'7.55"W	AWOS III	15/33	None	No issues identified
Grand Marais	Grand Marais-Cook County Airport	CKC	Key General Aviation	Yes	47°50'11.92"N	90°23'11.16"W	AWOS III	10/28	Found in ADIP/UDDF	Trees w/in 500'
Grand Rapids	Grand Rapids-Itasca County Airport (Gordon Newstrom Field)	GPZ	Key General Aviation	Yes	47°12'10.55"N	93°30'25.35"W	AWOS III P/T	16/34	Found in ADIP/UDDF	Trees w/in 500' to the east
Granite Falls	Granite Falls Municipal Airport (Lenzen-Roe Memorial Field)	GDB	Intermediate Large	Yes	44°45'7.61"N	95°33'32.82"W	AWOS III	15/33	None	Buildings w/in 500'
Hallock	Hallock Municipal Airport	HCO	Intermediate Large	Yes	48°45'8.77"N	96°56'15.36"W	AWOS III	13/31	None	Buildings w/in 500'
Hibbing	Hibbing-Chisholm-Hibbing Municipal Airport	HIB	Key Commercial Service	Yes	47°22'49.45"N	92°49'56.88"W	ASOS	13/31	None	Trees w/in 500' to the west
Hick	Field of Dreams	04W	NA	Yes	46° 1'27.69"N	92°53'56.55"W	AWOS III	06/24	None	Objects w/in 500'
Hutchinson	Hutchinson Municipal Airport (Butler Field)	HCD	Intermediate Large	Yes	44°51'34.55"N	94°23'8.01"W	AWOS III	15/33	None	Yes
International Falls	Falls International Airport	INL	Key Commercial Service	Yes	48° 33' 34.19"N	093° 23' 44.16" W	ASOS	13/31	None	Trees w/in 500' to the west
Jackson	Jackson Municipal Airport	MJQ	Intermediate Small	Yes	43° 38' 59.99"N	094° 59' 11. 40" W	AWOS III	13/31	None	Crops w/in 500'
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	Yes	45° 5'41.57"N	94°30'30.15"W	AWOS III	13/31	None	Buildings and Trees w/in 500'
Little Falls	Little Falls-Morrison County Airport	LXL	Intermediate Large	Yes	45°57'3.35"N	94°20'38.69"W	AWOS III	13/31	Found in ADIP/UDDF	Buildings and Trees w/in 500'
Long Prairie	Long Prairie Airport (Todd Field)	14Y	Intermediate Small	Yes	45°54'6.16"N	94°52'21.94"W	AWOS III	16/34	None	Objects w/in 500'
Longville	Longville Municipal Airport	XVG	Intermediate Small	Yes	46°59'38.38"N	94°12'21.48"W	AWOS III	13/31	Found in ADIP/UDDF	Trees w/in 500'
Luverne	Luverne Municipal Airport	LYV	Intermediate Large	Yes	43°37'17.97"N	96°12'50.21"W	AWOS III	18/36	None	1050' from RWY Centerline, Buildings and Trees w/in 500', 4000' from RWY 36
Madison	Madison-Lac Qui Parle Airport	DXX	Intermediate Small	Yes	44°59'1.90"N	96°10'44.16"W	AWOS III	14/32	None	Yes
Mahnomen	Mahnomen County Airport	3N8	Intermediate Small	Yes	47°15'35.45"N	95°55'58.03"W	AWOS III P/T	17/35	None	Objects w/in 500'
Mankato	Mankato Municipal Airport	MKT	Key General Aviation	Yes	44°13'6.38"N	93°55'4.20"W	AWOS III P/T	15/33	Found in ADIP/UDDF	5600' from RWY 15
Maple Lake	Maple Lake Municipal Airport & Seaplane Base	MGG	Intermediate Small	Yes	45°14'7.36"N	93°59'22.83"W	AWOS III	10/28	None	Trees w/in 500' to South
Marshall	Marshall-Southwest Minnesota Regional Airport-Marshall/Ryan Field	MML	Key General Aviation	Yes	44°27'1.16"N	95°49'17.08"W	AWOS III P/T	12/30	None	Yes
McGregor	McGregor-Isedor Iverson Airport	HZX	Intermediate Small	Yes	46°37'8.20"N	93°18'46.04"W	AWOS III	14/32	None	Buildings w/in 500'
Minneapolis	Minneapolis Anoka County/Blaine Airport (Janes Field)	ANE	Key General Aviation	Yes	45° 8'33.28"N	93°12'45.84"W	AWOS III	09/27	None	3100' from RWY 27, 3300' from RWY 18
Minneapolis	Minneapolis Flying Cloud Airport	FCM	Key General Aviation	Yes	44°49'55.73"N	93°28'13.82"W	ASOS	10R/28L	UDDF but not correct	1100' from RWY centerline

Associated City	Airport Name	FAA ID	State Classification	Located on Airport	Latitude	Longitude	Equipment Type	Primary RWY	Remarks	Siting Comments
Minneapolis	Minneapolis Airlake Airport	LVN	Intermediate Large	Yes	44°37'30.78"N	93°13'38.20"W	AWOS III	12/30	Found in ADIP/UDDF	No issues identified
Minneapolis	Minneapolis Crystal Airport	MIC	Intermediate Small	Yes	45° 03' 43.91" N	093° 21' 03.96" W	ASOS	14/32	Found in ADIP/UDDF	No issues identified
Minneapolis	Minneapolis/St. Paul International Airport	MSP	Key Commercial Service	Yes	44°53' 07.43"N	093°13' 2.68"W	ASOS	12R/30L	None	No issues identified
Montevideo	Montevideo-Chippewa County Airport	MVE	Intermediate Large	Yes	44°58'2.88"N	95°42'41.76"W	AWOS III	14/32	None	No issues identified
Moorhead	Moorhead Municipal Airport	JKJ	Intermediate Large	Yes	46°50'17.08"N	96°39'48.90"W	AWOS III	12/30	None	No issues identified
Moose Lake	Moose Lake-Carlton County Airport	MZH	Intermediate Small	Yes	46°25'9.58"N	92°48'5.65"W	AWOS III	04/22	None	Buildings and Trees w/in 500'
Mora	Mora Municipal Airport	JMR	Intermediate Large	Yes	45°53'18.71"N	93°16'8.45"W	AWOS III	17/35	Found in ADIP/UDDF	Buildings and Trees w/in 500'
Morris	Morris Municipal Airport	MOX	Intermediate Large	Yes	45°34'3.77"N	95°57'57.43"W		14/32	Found in ADIP/UDDF	Buildings w/in 500'
New Ulm	New Ulm Municipal Airport	ULM	Key General Aviation	Yes	44°19'21.75"N	94°30'8.73"W	AWOS III	15/33	None	Buildings w/in 500'
Olivia	Olivia Regional Airport	OVL	Intermediate Small	Yes	44°46'45.05"N	95° 1'49.25"W	AWOS III	11/29	None	1 building w/in 500' to the southeast
Orr	Orr Regional Airport	ORB	Intermediate Large	Yes	48° 1'1.29"N	92°51'13.62"W	AWOS III	13/31	Found in ADIP/UDDF	Trees w/in 500'
Ortonville	Ortonville Municipal Airport (Martinson Field)	VVV	Intermediate Small	Yes	45°17'57.61"N	96°25'32.10"W	AWOS III	16/34	None	Prior to threshold, Building and Trees w/in 500'
Owatonna	Owatonna Degner Regional Airport	OWA	Key General Aviation	Yes	44° 7'8.71"N	93°15'24.80"W	AWOS III	12/30	None	No issues identified
Park Rapids	Park Rapids Municipal Airport	PKD	Key General Aviation	Yes	46°53'58.89"N	95° 4'0.57"W	ASOS	13/31	None	Buildings w/in 500'
Paynesville	Paynesville Municipal Airport	PEX	Intermediate Small	Yes	45°22'20.87"N	94°44'19.57"W	AWOS III P/T	11/29	None	Buildings w/in 500'
Pine River	Pine River Regional Airport	PWC	Intermediate Small	Yes	46°43'35.37"N	94°23'5.42"W	AWOS III	16/34	Found in ADIP/UDDF	Buildings w/in 500'
Pipestone	Pipestone Municipal Airport	PQN	Intermediate Large	Yes	43°59'7.44"N	96°17'51.59"W	AWOS III	18/36	None	Buildings w/in 500'
Preston	Preston Fillmore County Airport	FKA	Intermediate Large	Yes	43°40'37.11"N	92°10'27.38"W	AWOS III	11/29	None	Buildings w/in 500'
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	Yes	45°33'51.38"N	93°36'29.00"W	AWOS III	15/33	None	No issues identified
Red Wing	Red Wing Regional Airport	RGK	Key General Aviation	Yes	44°35'33.32"N	92°29'3.82"W	AWOS III	09/27	None	1200' from RWY centerline
Redwood Falls	Redwood Falls Municipal Airport	RWF	Intermediate Large	Yes	44°32'53.74"N	95° 4'49.53"W	ASOS	12/30	None	No issues identified
Rochester	Rochester International Airport	RST	Key Commercial Service	Yes	92°29'31.43"W	43°54'14.50"N	ASOS	13/31	Found in ADIP/UDDF	No issues identified
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	Yes	48°51'21.59"N	95°41'41.41"W	AWOS III	16/34	Found in ADIP/UDDF	No issues identified
Rush City	Rush City Municipal Airport	ROS	Intermediate Large	Yes	45°41'46.56"N	92°57'15.37"W	AWOS III	16/34	Found in ADIP/UDDF	Buildings and Trees w/in 500'
Sauk Centre	Sauk Centre Municipal Airport	D39	Intermediate Small	Yes	45°42'20.26"N	94°55'50.94"W	AWOS III	14/32	Found in ADIP/UDDF	Buildings and Trees w/in 500'
Silver Bay*	Silver Bay Municipal	BFW	Not in the system	Yes	47°15'07.55"N	091° 24' 35.28" W	AWOS III P/T	07/23	None	Within distances but prior to threshold. 3300' from RWY 07. Trees and buildings withing 500'

Associated City	Airport Name	FAA ID	State Classification	Located on Airport	Latitude	Longitude	Equipment Type	Primary RWY	Remarks	Siting Comments
Slayton	Slayton Municipal Airport	DVP	Intermediate Small	No	43°59'25.32"N	95°46'51.83"W	AWOS III	17/35	None	Buildings w/in 500'. Less than 400' from threshold.
South St. Paul	South St. Paul Municipal Airport (Fleming Field)	SGS	Intermediate Large	Yes	44°51'36.17"N	93° 1'55.25"W	AWOS III	16/34	None	Buildings w/in 500'
St. Cloud	Saint Cloud Regional Airport	STC	Key Commercial Service	Yes	45°32'39.00"N	94° 3'5.73"W	ASOS	13/31	None	Trees w/in 500'
St. James	Saint James Municipal Airport	JYG	Intermediate Large	Yes	43°59'8.10"N	94°33'10.82"W	AWOS III	15/33	None	Buildings w/in 500'
St. Paul	Saint Paul-Lake Elmo Airport	21D	Intermediate Small	Yes	45° 0'0.76"N	92°51'17.73"W	AWOS III	14/32	None	1250' from Primary, 624' from 04/22
St. Paul	Saint Paul Downtown Airport (Holman Field)	STP	Key General Aviation	Yes	44°55'56.46"N	93° 3'21.13"W	ASOS	14/32	None	No issues identified
Stanton	Stanton Airfield	SYN	NA	Yes	44°28'25.04"N	93° 0'52.04"W	AWOS III	Turf	None	Buildings w/in 500'
Staples	Staples Municipal Airport	SAZ	Intermediate Small	Yes	46°22'42.44"N	94°48'5.97"W	AWOS III	14/32	Found in ADIP/UDDF	Buildings w/in 500'
Thief River Falls	Thief River Falls Regional Airport	TVF	Key Commercial Service	Yes	48° 3'35.07"N	96°10'43.98"W	AWOS III P/T	13/31	Found in ADIP/UDDF	No issues identified
Tracy	Tracy Municipal Airport	TKC	Intermediate Small	Yes	44°14'58.27"N	95°36'42.84"W	AWOS III	11/29	None	Buildings and Trees w/in 500'
Two Harbors	Two Harbors-Richard B. Helgeson Airport	TWM	Intermediate Large	Yes	47° 3'6.90"N	91°44'43.69"W	AWOS III	06/24	None	Buildings and Trees w/in 500'
Wadena	Wadena Municipal Airport	ADC	Intermediate Large	Yes	46°27'0.84"N	95°12'48.69"W	AWOS III P/T	16/34	None	Building w/in 500'
Walker	Walker Municipal Airport	Y49	Intermediate Small	No	Unknown	Unknown	AWOS III P/T	15/33	Cannot locate	N/A
Warroad	Warroad International Airport (Swede Carlson Field)	RRT	Key General Aviation	Yes	48°55'54.51"N	95°20'25.87"W	AWOS III	13/31	None	Buildings w/in 500'
Waseca	Waseca Municipal Airport	ACQ	Intermediate Small	Yes	44° 4'12.75"N	93°33'12.40"W	AWOS III	15/33	Found in ADIP/UDDF	No issues identified
Waskish	Waskish Municipal Airport	VWU	Landing Strip Turf	Yes	48° 9'0.72"N	94°30'43.30"W	AWOS III	02/20	None	No issues identified
Wheaton	Wheaton Municipal Airport	ETH	Intermediate Small	Yes	45°46'58.14"N	96°32'45.90"W	AWOS III	16/34	None	No issues identified
Willmar	Willmar Municipal Airport	BDH	Key General Aviation	Yes	45° 6'40.05"N	95° 7'32.93"W	AWOS III	13/31	Found in ADIP/UDDF	3600' from RWY 13, Objects w/in 500', Can't validate obj lower than 15' (buildings)
Windom	Windom Municipal Airport	MWM	Intermediate Small	Yes	43°54'36.01"N	95° 6'26.12"W	AWOS III	17/35	Found in ADIP/UDDF	Buildings w/in 500'
Winona	Winona Municipal Airport (Max Conrad Field)	ONA	Key General Aviation	Yes	44° 4'34.43"N	91°42'20.64"W	AWOS III	12/30	None	No issues identified
Worthington	Worthington Municipal Airport	OTG	Key General Aviation	Yes	43°39'8.91"N	95°34'32.71"W	AWOS III P/T	11/29	Found in ADIP/UDDF	No issues identified
N/A	Unknown	9MN	Not in the system	No	Unknown	Unknown	Unknown	Unknown	Cannot identify airport	N/A
N/A	Unknown	FGN	Not in the system	No	Unknown	Unknown	Unknown	Unknown	Cannot identify airport	N/A
N/A	Unknown	GNA	Not in the system	No	Unknown	Unknown	Unknown	Unknown	Cannot identify airport	N/A

**Note: Silver Bay Municipal Airport closed in 2019 and is no longer part of the state airport system. Sources: MnDOT Aeronautics, 2021; Kimley-Horn, 2021; FAA ADIP, 2021; FAA Validated UDDF Files, 2021; Iowa State University – IOWA Environmental Mesonet, 2021; Google Earth, 2021; FAA JO 6560.20C, Siting Criteria for Automated Weather Observing Systems (effective 09/06/2017)*

Appendix D. MnSASP Hub Data Matrix

Table D.1 summarizes all the data included in the 2022 Minnesota State Aviation System Plan (2022 MnSASP) Hub (or MnSASP Hub). Refer to the key below for a description of the fields related to the Hub:

- **Feature Layer, Table/Layer:** The backend data for the Hub is organized in feature layers and tables. Refer to the MnSASP Hub User's Guide for the organization of the backend data.
- **Data Point:** Lists all the data points included in the MnSASP data. These are also the field aliases that are displayed in the Hub.
- **Field Name:** Corresponding field name used to code each data point in the Hub. These names are referenced in the backend coding scripts configured in the Hub.
- **Data Parameters:** Identifies the data points in the Hub that are configured with strict parameters to make the categorical data consistent and make the dynamic performance evaluations more robust (i.e., with Yes/No fields, only allowing the users to input "Yes" or "No").[1]

The column entitled, "Update Cycle (as applicable)" refers to continues updates that should occur at predetermined interval (annual, biennial, etc.). The column, "Trigger Points for Evaluation" refers to updates that should occur in addition to regularly scheduled updates beyond the predetermined update cycle.

[1] The matrix only indicates if there are parameters configured to the data points (yes/no). Refer to the MnSASP Hub User's Guide for guidance on reviewing data parameters configured (where applicable, see section on "domains"). The MnSASP Hub User's Guide was prepared for MnDOT Aeronautics as a compendium to this document. The MnSASP Hub User's Guide provides detailed instructions on how to update the MnSASP data within the Hub. This document is for internal MnDOT Aeronautics purposes only and not distributed in conjunction with other 2022 MnSASP deliverables. It is referenced here for Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) staff responsible for ensuring the Hub remains current over time.

Table D.1. Hub Data Points Matrix

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	On Site Manager	OnSiteManager	Yes	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Manager Name	ManagerName	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Manager Title	ManagerTitle	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Manager Phone	ManagerPhone	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Manager Cell	ManagerCell	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Manager Email	ManagerEmail	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Other Contact Name	OtherContactName	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Other Contact Title	OtherContactTitle	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Other Contact Phone	OtherContactPhone	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Other Contact Cell	OtherContactCell	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Contact Information	Other Contact Email	OtherContactEmail	No	MnSASP Airport Inventory	6/2/2021	Annually	Airport staffing changes
MnSASP Hub Airport Data	MN Airport Background	Airport Coordinates	Latitude	Latitude	No	FAA ADIP	10/20/2020	None	Major airfield geometry update or airport relocation
MnSASP Hub Airport Data	MN Airport Background	Airport Coordinates	Longitude	Longitude	No	FAA ADIP	10/20/2020	None	Major airfield geometry update or airport relocation
MnSASP Hub Airport Data	MN Airport Background	Airport Coordinates	Airport Elevation (ft)	Elevation	No	FAA ADIP	10/20/2020	None	Major airfield geometry update or airport relocation
MnSASP Hub Airport Data	MN Airport Background	Airport Identification	FAA ID	FAAID	No	FAA ADIP	11/1/2020	None	FAA ID change
MnSASP Hub Airport Data	MN Airport Background	Airport Identification	Airport Name	AirportName	No	MnDOT Aeronautics	11/1/2020	None	Airport name change
MnSASP Hub Airport Data	MN Airport Background	Airport Physical/Mailing Address	Physical Address	PhysicalAddress	No	FAA ADIP	10/20/2020	Annually	Airport relocation
MnSASP Hub Airport Data	MN Airport Background	Airport Physical/Mailing Address	Owner/Mailing Address	MailingAddress	No	FAA ADIP	10/20/2020	Annually	Airport sponsor relocation
MnSASP Hub Airport Data	MN Airport Background	Airport Planning Jurisdiction	MnDOT District	MnDOTDist	Yes	MnDOT Aeronautics	12/16/2020	None	Jurisdictional boundary changes
MnSASP Hub Airport Data	MN Airport Background	Airport Planning Jurisdiction	Aeronautics Planning Region	AeroPlgReg	Yes	MnDOT Aeronautics	12/16/2020	None	Jurisdictional boundary changes
MnSASP Hub Airport Data	MN Airport Background	Airport Planning Jurisdiction	Congressional District	CongressDist	Yes	MnDOT Aeronautics	6/18/2021	None	Jurisdictional boundary changes
MnSASP Hub Airport Data	MN Airport Background	Airport Sponsor	Airport Sponsor	Sponsor	No	FAA ADIP	11/1/2020	None	Change in airport sponsorship
MnSASP Hub Airport Data	MN Airport Background	NPIAS	NPIAS Inclusion	NPIAS_Incl	Yes	FAA NPIAS Report	11/1/2020	Biennially	None
MnSASP Hub Airport Data	MN Airport Background	NPIAS	NPIAS Primary/ Nonprimary	NPIAS_PNP	Yes	FAA NPIAS Report	11/1/2020	Biennially	None
MnSASP Hub Airport Data	MN Airport Background	NPIAS	NPIAS Category	NPIAS_Cat	Yes	FAA NPIAS Report	11/1/2020	Biennially	None
MnSASP Hub Airport Data	MN Airport Background	NPIAS	NPIAS Hub	NPIAS_Hub	Yes	FAA NPIAS Report	11/1/2020	Biennially	None
MnSASP Hub Airport Data	MN Airport Background	NPIAS	NPIAS Role	NPIAS_Role	Yes	FAA NPIAS Report	11/1/2020	Biennially	None
MnSASP Hub Airport Data	MN Airport Background	State Classification	State Classification	StateClas	Yes	FAA ADIP	11/11/2020	None	Runway extension project, runway paving project, or new Part 139 certification
MnSASP Hub Airport Data	Airport Activity	Based Aircraft	Single Engine Based Aircraft	SingleEngineBA	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Based Aircraft	Multi Engine Based Aircraft	MultiEngineBA	No	MnSASP Airport Inventory	6/2/2021	Annually	None

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Airport Activity	Based Aircraft	Jet Turboprop Based Aircraft	JetTurboBA	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Based Aircraft	Helicopter Based Aircraft	HeliBA	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Based Aircraft	Other Based Aircraft	OtherBA	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Based Aircraft	Military Based Aircraft	MilitaryBA	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Based Aircraft	Total Based Aircraft	TotalBACount	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Baseline Operations Counts	Total Baseline Operations Count	Baseline_Ops_Count	No	2022 MnSASP Baseline Operations Estimation Tool, FAA OpsNet	11/18/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Baseline Operations Counts	Baseline Operations Count Year	Baseline_Ops_Count	No	2022 MnSASP Baseline Operations Estimation Tool, FAA OpsNet	11/18/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Baseline Operations Counts	Baseline Operations Count Source	Baseline_Ops_Count	No	2022 MnSASP Baseline Operations Estimation Tool, FAA OpsNet	11/18/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Drone/UAV Programs	UAV Program Participation - LAANC	LAANC	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Airport Activity	Drone/UAV Programs	UAV Program Participation - Other	UAVOtherProgramDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Medical Aircraft – Fixed Wing	MedACFixedWing	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Medical Aircraft – Rotorcraft	MedACRotorcraft	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Medical Aircraft – Other Aircraft	MedACOther	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Medical Ops Other Aircraft Description	MedOpsOtherAC	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Ambulance Operator 1	AmbulanceOp1	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Operator 1 Based?	AmbulanceBased1	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Ambulance Operator 2	AmbulanceOp2	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Operator 2 Based?	AmbulanceBased2	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Ambulance Operator 3	AmbulanceOp3	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Operator 3 Based?	AmbulanceBased3	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Ambulance Operator 4	AmbulanceOp4	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Operator 4 Based?	AmbulanceBased4	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Airport Activity	Emergency Medical Response	Medical Evacuation Activity	MedEvacActivity	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Flight ID Number	ID_Num	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Route – Airport to State	RT_APT_STATE	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Route – State to State	ROUTE_STATE	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Departure Date	DPT_DATE	Yes	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Departure Airport Code	DPT_AIRPORT_ID	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Departure Country	DPT_COUNTRY	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Departure State	DPT_STATE	Yes	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Departure Latitude	DPT_LAT	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Departure Longitude	DPT_LONG	No	FAA TFMSC	9/17/2021	Biennially	None

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Arrival Date	ARR_DATE	Yes	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Arrival Airport Name	ARR_AIRPORT_NAME	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Arrival Airport Code	ARR_AIRPORT_ID	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Arrival Country	ARR_COUNTRY	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Arrival State	ARR_STATE	Yes	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Arrival Latitude	ARR_LAT	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Arrival Longitude	ARR_LONG	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Number of Flights	FLIGHTS	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Departure or Arrival	DPT_ARR	No	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Query Airport State	QUERY_STATE	Yes	FAA TFMSC	9/17/2021	Biennially	None
FAA Filed Flight Plan Data	All Flight Plan Details	FAA Filed Flight Plans	Query Airport Code	QUERY_CODE	Yes	FAA TFMSC	9/17/2021	Biennially	None
MnSASP Hub Airport Data	Airport Activity	Part 139 Certification	Part 139 Certification	Part139	Yes	FAA ADIP	9/30/2021	None	Part 139 certification
MnSASP Hub Airport Data	Facilities and Services	Air Traffic Control Tower	Air Traffic Control Tower (ATCT)	ATCT	Yes	FAA ADIP	9/30/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Aircraft Rental	Aircraft Rental	ACRental	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Airfield Facilities	Beacon	Beacon	Yes	FAA ADIP	9/30/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Airfield Facilities	Wind Cone	WindCone	Yes	FAA ADIP	9/30/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	ARC	Existing Airport Reference Code (ARC)	ExistingARC	Yes	ALPs	6/2/2021	None	Completion of a new ALP and/or Master Plan
MnSASP Hub Airport Data	Facilities and Services	ARC	Future Airport Reference Code (ARC)	UltimateARC	Yes	ALPs	6/2/2021	None	Completion of a new ALP and/or Master Plan
MnSASP Hub Airport Data	Facilities and Services	Courtesy Car	Courtesy Car	CourtesyCar	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Courtesy Car	Courtesy Car Make	CourtesyCarMake	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Courtesy Car	Courtesy Car Model	CourtesyCarModel	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Courtesy Car	Courtesy Car Year	CourtesyCarYear	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Courtesy Car	Courtesy Car Owner	CourtesyCarOwner	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Courtesy Car	Courtesy Car Condition Grade	KBBGrade	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	FBO	Fixed-Base Operator (FBO) 1 Name	FBOName1	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	FBO	Fixed-Base Operator (FBO) 1 Ownership	FBO1Ownership	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	FBO	Fixed-Base Operator (FBO) 2 Name	FBOName2	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	FBO	Fixed-Base Operator (FBO) 2 Ownership	FBO2Ownership	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	FBO	Fixed-Base Operator (FBO) 3 Name	FBOName3	No	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	FBO	Fixed-Base Operator (FBO) 3 Ownership	FBO3Ownership	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Fencing	Security Fencing	SecurityFence	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Fencing improvement project
MnSASP Hub Airport Data	Facilities and Services	Fencing	Wildlife Fencing	WildlifeFence	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Fencing improvement project
MnSASP Hub Airport Data	Facilities and Services	Fencing	Controlled Vehicle Access	VehicleAcc	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Fencing improvement project

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Facilities and Services	Fencing	Other Airport Fencing	AirportFenceOther	No	MnSASP Airport Inventory	6/2/2021	Biennially	Fencing improvement project
MnSASP Hub Airport Data	Facilities and Services	Fuel	Jet A Available	JetAAvailable	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	Jet A Available 24/7	JetAAvailable247	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	Jet A Provider	JetAProvider	No	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	100LL Available	100LLAvailable	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	100LL Available 24/7	100LLAvailable247	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	100LL Provider	100LLProvider	No	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	Sustainable Aviation Fuel (SAF) Available	SAFAvailable	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	Sustainable Aviation Fuel (SAF) Available 24/7	SAFAvailable247	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	Other Fuel Provider	OtherFuelProvider	No	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	Other Fuel Available 24/7	OtherFuelAvailable247	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	Fuel	Other Fuel Available	OtherFuelAvailable	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Installation of a new fuel farm or provision of a new fuel type
MnSASP Hub Airport Data	Facilities and Services	GA Terminal Building	General Aviation (GA) Terminal	GATerminal	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Terminal improvement project (renovation/addition or new construction)
MnSASP Hub Airport Data	Facilities and Services	GA Terminal Building	General Aviation (GA) Terminal Comments	GATermIssues	No	MnSASP Airport Inventory	6/2/2021	Biennially	Terminal improvement project (renovation/addition or new construction)
MnSASP Hub Airport Data	Facilities and Services	GA Terminal Building	Restroom	Restroom	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Terminal improvement project (renovation/addition or new construction)
MnSASP Hub Airport Data	Facilities and Services	GA Terminal Building	Pilot Lounge	PilotLounge	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Terminal improvement project (renovation/addition or new construction)
MnSASP Hub Airport Data	Facilities and Services	GA Terminal Building	Car Parking	AutoParking	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Terminal improvement project (renovation/addition or new construction)

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Facilities and Services	GA Terminal Building	Public Phone	PublicPhone	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Terminal improvement project (renovation/addition or new construction)
MnSASP Hub Airport Data	Facilities and Services	MRO and Other Aircraft Support Services	Avionics Repair	AvionicsRepair	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	MRO and Other Aircraft Support Services	Maintenance Repair	MaintenanceRepair	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	MRO and Other Aircraft Support Services	Engine Overhaul	EngineOverhaul	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	MRO and Other Aircraft Support Services	Other Aircraft Service(s)	OtherACServices	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	MRO and Other Aircraft Support Services	Other Aircraft Service(s) Details	OtherACServicesDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	Rental Car	Rental Car On-site	RentCarOnsite	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Rental Car	Rental Car Off-site	RentCarOffsite	Yes	MnSASP Airport Inventory	6/2/2021	Annually	None
MnSASP Hub Airport Data	Facilities and Services	Through the Fence	Through the Fence (TTF) Operations	TTFOps	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	Through the Fence	Residential Through the Fence (TTF) Operations	ResTTFOps	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	Through the Fence	Commercial Through the Fence (TTF) Operations	ComTTFOps	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	Through the Fence	Through the Fence (TTF) Operations Description	TTFOpsDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Facilities and Services	Wind Coverage	Wind Coverage	WindCoverage	No	ALPs	6/2/2021	None	Completion of a new/ updated ALP or new runway construction/realignment project
MnSASP Hub Airport Data	Runway/Taxiway Data	Primary Runway	Primary Runway	PrimaryRwy	Yes	MnSASP Airport Inventory	6/2/2021	None	Runway improvement projects
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Approach Type	Base End Approach Type	Base_AppType	Yes	FAA ADIP	9/30/2021	None	Development of a new or modification of an existing runway approach
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Approach Type	Reciprocal End Approach Type	Recip_AppType	Yes	FAA ADIP	9/30/2021	None	Development of a new or modification of an existing runway approach
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Coordinates	Base End Latitude	Base_Lat	No	FAA ADIP	9/30/2021	None	Runway extension, relocation, or realignment project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Coordinates	Base End Longitude	Base_Long	No	FAA ADIP	9/30/2021	None	Runway extension, relocation, or realignment project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Coordinates	Reciprocal End Latitude	Recip_Lat	No	FAA ADIP	9/30/2021	None	Runway extension, relocation, or realignment project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Coordinates	Reciprocal End Longitude	Recip_Long	No	FAA ADIP	9/30/2021	None	Runway extension, relocation, or realignment project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Runway ID	RwyID	No	FAA ADIP	9/30/2021	None	Completion of an ALP update

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Base End ID	Base_ID	No	FAA ADIP	9/30/2021	None	Completion of an ALP update or any type of reorientation
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Reciprocal End ID	Recip_ID	No	FAA ADIP	9/30/2021	None	Completion of an ALP update or any type of reorientation
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Runway Length	Length	No	FAA ADIP	9/30/2021	None	Applicable runway improvement project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Runway Width	Width	No	FAA ADIP	9/30/2021	None	Applicable runway improvement project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Surface Type/Condition	SurfaceType	Yes	FAA ADIP	9/30/2021	None	Runway construction projects
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Edge Light Intensity	EdgeLight	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Base End Visual Glide Slope Indicator (VGSI)	Base_VGSI	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Base End Approach Lighting System (ALS)	Base_ALS	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Base End Runway End Identifier Lights (REILs)	Base_REIL	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Base End Centerline Lights	Base_Ctrline	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Base End Touchdown Lights	Base_Tdwn	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Reciprocal End Visual Glide Slope Indicator (VGSI)	Recip_VGSI	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Reciprocal End Approach Lighting System (ALS)	Recip_ALS	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Reciprocal End Runway End Identifier Lights (REILs)	Recip_REIL	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Reciprocal End Centerline Lights	Recip_CtrLine	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Reciprocal End Touchdown Lights	Recip_Tdwn	Yes	FAA ADIP	9/30/2021	Annually	Runway lighting project
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Base End Minimums	Base_Minim	Yes	FAA ADIP	9/30/2021	None	Development of a new or modification of an existing runway approach
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Background Data	Reciprocal End Minimums	Recip_Minim	Yes	FAA ADIP	9/30/2021	None	Development of a new or modification of an existing runway approach
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Obstruction Data	Base End Obstructions	Base_Obstruct	No	FAA ADIP	9/30/2021	Annually	Completion of a runway obstruction removal project or comprehensive obstruction evaluation study
MnSASP Hub Airport Data	Runway/Taxiway Data	Runway Obstruction Data	Reciprocal End Obstructions	Recip_Obstruct	No	FAA ADIP	9/30/2021	Annually	Completion of a runway obstruction removal project or comprehensive obstruction evaluation study
MnSASP Hub Airport Data	Runway/Taxiway Data	Taxiway	Taxiway Type	TaxiwayType	Yes	MnSASP Airport Inventory	6/2/2021	Annually	Taxiway improvement project

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Runway/Taxiway Data	Taxiway	Taxiway Width	TaxiwayWidth	No	MnSASP Airport Inventory	6/2/2021	Annually	Taxiway improvement project
MnSASP Hub Airport Data	Aircraft Storage	Hangars	T-Hangar Total Spaces	THangarNumSpaces	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	T-Hangar Spaces Occupied	THangarOccupied	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar - Based Aircraft Total Spaces	CorpBoxBasedACNumSpaces	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar - Based Aircraft Heat	CorpBoxBasedACHeat	Yes	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar - Based Aircraft Occupied	CorpBoxBasedACOccup	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar - Based Aircraft Square Footage	CorpBoxBasedACSqft	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar - Transient Aircraft Total Spaces	CorpBoxTransACNumSpaces	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar - Transient Aircraft Heating	CorpBoxTransACHeat	Yes	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar - Transient Aircraft Square Footage	CorpBoxTransACSqft	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Total Hangar Spaces	TotHangarSpaces	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Total Hangar Spaces Occupied	TotOccupied	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	T-Hangar Shortage	THangarShort	Yes	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Box Hangar Shortage	CorpBoxShort	Yes	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Hangar Shortage Description	HangarShortageDesc	No	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Hangars	Hangar Waitlist	HangarWaitlist	Yes	MnSASP Airport Inventory	6/2/2021	Annually	New hangar construction
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Paved Tiedown - Based Aircraft Spaces	TieDownPavedBANum	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Paved Tiedown - Based Aircraft Spaces Occupied	TieDownPavedBAOcc	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Paved Tiedown - Transient Aircraft Spaces	TieDownPavedTransACNum	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Grass Tiedown - Based Aircraft Spaces	TieDownGrassBANum	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Grass Tiedown - Based Aircraft Spaces Occupied	TieDownGrassBAOcc	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Grass Tiedown - Transient Aircraft Spaces	TieDownGrassTransACNum	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Total Tiedown Spaces	TotTiedownNum	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Aircraft Storage	Tiedowns	Total Tiedown Spaces Occupied	TotTiedownOcc	No	MnSASP Airport Inventory	6/2/2021	Annually	Addition of new tiedown spaces or apron improvement project
MnSASP Hub Airport Data	Planning and Special Studies	Clear Zone Information	Clear Zone Depicted on ALP	ClearZoneALP	Yes	MnSASP Airport Inventory	6/2/2021	None	ALP approval process
MnSASP Hub Airport Data	Planning and Special Studies	Clear Zone Information	Clear Zone Ownership	OwnClearZone	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Clear zone acquisition
MnSASP Hub Airport Data	Planning and Special Studies	Clear Zone Information	Clear Zone Ownership Description	ClearZoneOwnDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	Clear zone acquisition
MnSASP Hub Airport Data	Planning and Special Studies	Clear Zone Information	Clear Zone Maintenance Description	ClearZoneMaintDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	Clear zone acquisition or obstruction removal project
MnSASP Hub Airport Data	Planning and Special Studies	Economic Impact	Economic Impact - Total Employment	TotalEmployment	No	MnDOT Aeronautics Statewide Airport Economic Impact Study	10/28/2021	None	Completion of a new Statewide Airport Economic Impact Study
MnSASP Hub Airport Data	Planning and Special Studies	Economic Impact	Economic Impact - Total Payroll	TotalPayroll	No	MnDOT Aeronautics Statewide Airport Economic Impact Study	10/28/2021	None	Completion of a new Statewide Airport Economic Impact Study
MnSASP Hub Airport Data	Planning and Special Studies	Economic Impact	Economic Impact - Total Spending	TotalSpending	No	MnDOT Aeronautics Statewide Airport Economic Impact Study	10/28/2021	None	Completion of a new Statewide Airport Economic Impact Study
MnSASP Hub Airport Data	Planning and Special Studies	Economic Impact	Total Annually Economic Activity	TotalAnnuallyImpact	No	MnDOT Aeronautics Statewide Airport Economic Impact Study	10/28/2021	None	Completion of a new Statewide Airport Economic Impact Study
MnSASP Hub Airport Data	Planning and Special Studies	Economic Impact	Economic Impact Brochure Link	EconomicImpactBrochure	No	MnDOT Aeronautics Statewide Airport Economic Impact Study	12/1/2021	None	Completion of a new Statewide Airport Economic Impact Study
MnSASP Hub Airport Data	Planning and Special Studies	Federal Funding	Federal Funds	FederalFunds	No	FAA AIP Grant Histories	3/15/2021	Annually	None
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Available Land for Development	LandDevelop	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	ALP and/or master plan updates
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Available Land for Development Description	LandDevelopDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	ALP and/or master plan updates
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Available Land for Development - Water Available	LandDevelopWater	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	ALP and/or master plan updates
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Available Land for Development - Gas Available	LandDevelopGas	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	ALP and/or master plan updates
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Available Land for Development - Electric Available	LandDevelopElectric	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	ALP and/or master plan updates
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Available Land for Development - Sewer Available	LandDevelopSewer	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	ALP and/or master plan updates
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Available Land for Development - ALP Indicated	LandDevelopALP	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	ALP and/or master plan updates
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Limitations for Development	LimitDevelop	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Limitations for Development Description	LimDevelopDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Land Use or Transportation Planning	LandUsePlanning	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Planning and Special Studies	Land Development and Use	Land Use or Transportation Planning Description	LandUsePlanningDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	None
MnSASP Hub Airport Data	Planning and Special Studies	Local Obstruction Study	Local Obstruction Study	LocObsStudy	Yes	MnSASP Airport Inventory	6/2/2021	None	Completion of a local obstruction study or ALP with AGIS survey
MnSASP Hub Airport Data	Planning and Special Studies	Local Obstruction Study	Local Obstruction Study Year	LocObsStudyYear	No	MnSASP Airport Inventory	6/2/2021	None	Completion of a local obstruction study or ALP with AGIS survey
MnSASP Hub Airport Data	Planning and Special Studies	Master Plan/ALP	Master Plan	MasterPlan	Yes	MnSASP Airport Inventory	6/2/2021	None	Completion and MnDOT approval of a master plan, ALP, and/or narrative report
MnSASP Hub Airport Data	Planning and Special Studies	Master Plan/ALP	Master Plan Year	MasterPlanYear	No	MnSASP Airport Inventory	6/2/2021	None	Completion and MnDOT approval of a master plan, ALP, and/or narrative report
MnSASP Hub Airport Data	Planning and Special Studies	Master Plan/ALP	Airport Layout Plan (ALP) Narrative	ALPNarrative	Yes	MnSASP Airport Inventory	6/2/2021	None	Completion and MnDOT approval of a master plan, ALP, and/or narrative report
MnSASP Hub Airport Data	Planning and Special Studies	Master Plan/ALP	Airport Layout Plan (ALP) Narrative Year	ALPNarrYear	No	MnSASP Airport Inventory	6/2/2021	None	Completion and MnDOT approval of a master plan, ALP, and/or narrative report
MnSASP Hub Airport Data	Planning and Special Studies	Master Plan/ALP	Airport Layout Plan (ALP) No Narrative	ALPNoNarrative	Yes	MnSASP Airport Inventory	6/2/2021	None	Completion and MnDOT approval of a master plan, ALP, and/or narrative report
MnSASP Hub Airport Data	Planning and Special Studies	Master Plan/ALP	Airport Layout Plan (ALP) No Narrative Year	ALPNoNarrYear	No	MnSASP Airport Inventory	6/2/2021	None	Completion and MnDOT approval of a master plan, ALP, and/or narrative report
MnSASP Hub Airport Data	Planning and Special Studies	Minimum Standards	Minimum Standards	MinStandards	Yes	MnSASP Airport Inventory	6/2/2021	Biennially	Adoption of new minimum standards
MnSASP Hub Airport Data	Planning and Special Studies	Minimum Standards	Minimum Standard Description	MinStandardDesc	No	MnSASP Airport Inventory	6/2/2021	Biennially	Adoption of new minimum standards
MnSASP Hub Airport Data	Planning and Special Studies	Part 150	Part 150	Part150	Yes	MnSASP Airport Inventory	6/2/2021	None	Completion and approval of a Part 150 study
MnSASP Hub Airport Data	Planning and Special Studies	Part 150 Year	Part 150 Year	Part150Year	No	MnSASP Airport Inventory	6/2/2021	None	Completion and approval of a Part 150 study
MnSASP Hub Airport Data	Planning and Special Studies	Pavement Condition Report	Pavement Condition Report	PCILink	No	MnDOT Aeronautics Airport Pavement Management System	12/1/2021	Annually for a third of the airports in each system cycle	Completed pavement inspection
MnSASP Hub Airport Data	Planning and Special Studies	State and Local Funding	State Funds	StateFunds	No	MnDOT Aeronautics ACE database	4/1/2021	Annually	None
MnSASP Hub Airport Data	Planning and Special Studies	State and Local Funding	Local Funds	LocalFunds	No	MnDOT Aeronautics ACE database	4/1/2021	Annually	None
MnSASP Hub Airport Data	Aviation Weather Stations	Weather Station Type	Type	Type	No	2022 MnSASP Weather Stations Visual Assessment	9/1/2021	None	Installation or decommissioning of an AWOS/ASOS

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Aviation Weather Stations	Weather Stations Coordinates	Latitude	Latitude	No	MnDOT Aeronautics	9/1/2021	None	Installation or decommissioning of an AWOS/ASOS
MnSASP Hub Airport Data	Aviation Weather Stations	Weather Stations Coordinates	Longitude	Longitude	No	MnDOT Aeronautics	9/1/2021	None	Installation or decommissioning of an AWOS/ASOS
MnSASP Hub Airport Data	Aviation Weather Stations	Live Weather Station Data	METAR Data Link	METAR Data Link	No	NOAA Aviation Weather Center	12/1/2021	None	Installation or decommissioning of an AWOS/ASOS
MnSASP Hub Airport Data	Aviation Weather Stations	Weather Station Visual Assessment	Validation	Validation	No	2022 MnSASP Weather Stations Visual Assessment	9/1/2021	Triennially	Installation or decommissioning of an AWOS/ASOS
MnSASP Hub Airport Data	Aviation Weather Stations	Weather Station Visual Assessment	On Airport?	On_Airport	Yes	2022 MnSASP Weather Stations Visual Assessment	9/1/2021	Triennially	Installation or decommissioning of an AWOS/ASOS
MnSASP Hub Airport Data	Aviation Weather Stations	Weather Station Visual Assessment	Remarks	Remarks	No	2022 MnSASP Weather Stations Visual Assessment	9/1/2021	Triennially	Installation or decommissioning of an AWOS/ASOS
MnSASP Hub Airport Data	Aviation Weather Stations	Weather Station Visual Assessment	Sighting Assessment	Sighting_Assessment	No	2022 MnSASP Weather Stations Visual Assessment	9/1/2021	Annually	Installation or decommissioning of an AWOS/ASOS
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	FAA ID	FAAID	No	MnDOT Aeronautics Airport Pavement Management System	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Branch ID	BranchID	No	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Section ID	SectionID	No	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Pavement Use	PavementUse	No	MnDOT APMS, Excel analysis	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	FOD Index	FOD_Index	No	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Pavement Condition Index (PCI)	PCI	No	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Assessment	Assessment	No	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Surface Area (sqft)	SurfaceArea	No	MnDOT Aeronautics APMS, ArcGIS analysis	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Foreign Object Debris (FOD) Inspection Date	FOD_Inspection	Yes	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Pavement Condition Index (PCI) Inspection Date	PCI_Inspection	Yes	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
MnSASP Hub Airport Data	Airfield Pavement	Airfield Pavement	Shape	Shape	No	MnDOT Aeronautics APMS	11/22/2020	Triennially	Airfield pavement improvement project
NAVAIDs	Instrument Landing System (ILS)	ILS	Type	Type	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	NAVAID Name	Navaidname	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
NAVAIDs	Instrument Landing System (ILS)	ILS	Latitude	Latitude	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	Longitude	Longitude	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	Magnetic Variation	Magvar	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	Elevation (ft)	Elev_ft	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	City	City	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	State	State	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	Owner	Owner	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	Operator	Operator	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	Ownership Type	OwnerType	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
NAVAIDs	Instrument Landing System (ILS)	ILS	Facility ID	facID	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Type	type	Yes	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Latitude	latitude	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Longitude	longitude	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Magnetic Variation	magVar	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Facility Name	facName	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Database	sourceName	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Elevation (ft)	elev_ft	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Facility ID	FacilityID	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	NAVAID Name	navaidName	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	City	city	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Validation Date	validDate	Yes	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	FAA Region	region	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Owner	owner	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Operator	operator	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Class	nClass	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Service Coverages (nm)	range_mi	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Hours of Operation	hrOperat	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Air Route Traffic Control Center (ARTCC)	artcc	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Channel	channel	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Frequency	frequency	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Status	status	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Location Points	N/A	VOR/DME/TACAN/VORTAC Location Points	Ownership Type	OwnershipType	Yes	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Database	Database_	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Type	type	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Latitude	latitude	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Longitude	longitude	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Magnetic Variation	magVar	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Facility Name	facName	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Elevation (ft)	elev_ft	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Facility ID	FacilityID	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	NAVAID Name	navaidName	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	City	city	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Validation Date	validDate	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	FAA Region	region	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Owner	owner	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
VOR/DME/TACAN/ VORTAC Service Buffers	N/A	VOR/DME/TACAN/VORTAC Service Buffers	Operator	operator	No	MnDOT Aeronautics Airport Development Staff ArcGIS analysis	8/4/2021	None	Completion of NAVAID-related project, Equipment decommissioning
MnSASP Hub Airport Data	Airport Zoning	Zoning	Zone Type	Zone_Type	No	MnDOT Aeronautics Zoning Information Warehouse	8/17/2021	None	Updates to airport zoning ordinance, Airport land acquisition
MnSASP Hub Airport Data	Airport Zoning	Zoning	Shape Area (acres)	Shape__Area	No	MnDOT Aeronautics Zoning Information Warehouse	8/17/2021	None	Updates to airport zoning ordinance, Airport land acquisition

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Hub Airport Data	Airport Zoning	Zoning	Shape	Shape	No	MnDOT Aeronautics Zoning Information Warehouse	8/17/2021	None	Updates to airport zoning ordinance, Airport land acquisition
MnSASP Hub Airport Data	Airport Zoning	Zoning	Year	Year	No	MnDOT Aeronautics Zoning Information Warehouse	8/17/2021	None	Updates to airport zoning ordinance, Airport land acquisition
Airport Safety Areas	Clear Zones (Existing)	Clear Zones	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Completion of a ALP or master plan; Updates to runway category, visibility minimums, or approach type
Airport Safety Areas	Clear Zones (Ultimate)	Clear Zones	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Completion of a ALP or master plan; Updates to runway category, visibility minimums, or approach type
Airport Safety Areas	Primary Surface (Existing)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	Primary Surface (Ultimate)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	Horizontal Surface (Existing)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	Horizontal Surface (Ultimate)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	Conical Surface (Existing)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	Conical Surface (Ultimate)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	Approach Surface (Existing)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	Approach Surface (Ultimate)	Part 77 Surfaces	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable Part 77 surface dimensions
Airport Safety Areas	RPZ (Existing)	RPZs	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable RPZ dimensions
Airport Safety Areas	RPZ (Ultimate)	RPZs	None	None	No	Airports (via ALPs and ArcGIS analyses)	12/15/2021	None	Changes to applicable RPZ dimensions
MnSASP Indicator Data	N/A	Aviation-Related Accidents	Aviation Accidents	AviationAccidents	No	NTSB CAROL	1/24/2022	Annually	Aviation-related fatality in Minnesota
MnSASP Indicator Data	N/A	Aviation Fatalities	Aviation Fatalities	Fatalities	No	NTSB CAROL	1/24/2022	Annually	Aviation-related accident leading to at least one fatality
MnSASP Hub Airport Data	Airport Activity	Certified Pilots within 30 miles of an Airport	Certified Pilots within 30nm	CertifiedPilots30nm	No	FAA Civil Airmen Statistics, ArcGIS analyses	8/18/2021	Annually	None
MnSASP Indicator Data	N/A	Fuel Availability at Airports	Fuel Proximity	FuelProximity	No	MnSASP Airport Inventory, ArcGIS analyses	8/18/2021	None	Addition or removal of Jet A or 100LL fuel at any system airport
MnSASP Indicator Data	N/A	Population Access to an Airline Service Airport	CS Airport Proximity	CSAirportProximity	No	ArcGIS Analyses, ESRI Business Analyst	8/18/2021	None	Part 139 certification changes or a new US Census release

Feature Layer	Table/Layer (if applicable)	Data Category	Data Point	Field Name (AGOL)	Data Parameters	Source(s)	Date of Data Collection	Update Cycle (if applicable)	Trigger Points for Evaluation
MnSASP Indicator Data	N/A	Population Access to an Airline Service Airport	Total MN Population	TotalMNPopulation	No	ArcGIS Analyses, ESRI Business Analyst	8/18/2021	None	Part 139 certification changes or a new US Census release
MnSASP Indicator Data	N/A	Registered Aircraft in Minnesota	Registered AC	RegisteredAC	No	FAA Aircraft Registry	8/24/2021	Annually	None
MnSASP Indicator Data	N/A	Runway Incursions	Runway Incursions	RunwayIncursions	No	NASA ASRS, NTSB CAROL	10/11/2021	Annually	Runway incursion at a towered airport in Minnesota
MnSASP Indicator Data	N/A	Systemwide Maintenance and Repair Availability	MRO Proximity	MROAirportProximity	No	MnSASP Airport Inventory, ArcGIS proximity analyses	8/18/2021	Annually	Addition or removal of MRO service availability at any system airport

Source: Kimley-Horn, 2022

Appendix E. Implementation Plan

The 2022 Minnesota State Aviation System Plan (2022 MnSASP or MnSASP) was developed based on feedback obtained during a rigorous, two-year-long public engagement process conducted as Phase I of the MnSASP. The Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) gathered input via written, online, and in-person outreach methods with the explicit goal of the MnSASP being, "More relevant to more people more of the time." Accordingly, Phase I of the MnSASP was used to develop the scope of Phase II.

The 2022 MnSASP work plans, in turn, identify future work plans and studies recommendations for implementation following the state system plan. Guidance is based on information gathered during the 2022 MnSASP to support its ongoing implementation, as well as the overall multimodal transportation system in the state. This provides offers a framework and process to engage in continuous system planning – bringing the 2022 MnSASP to life and offering MnDOT Aeronautics and Minnesota airports with the information they need to better meet the state's ever-evolving aviation demands over the 20-year planning horizon.

E.1. Future Work Plans

The 2022 MnSASP identified five focused studies or projects to support MnDOT Aeronautics' ability to achieve its vision of creating an air transportation system that enable safe, fast, and reliable air transportation for the citizens and businesses of Minnesota.

E.1.1. COMPREHENSIVE CAPITAL IMPROVEMENT PLAN (CIP) AND GRANT MANAGEMENT PROGRAM

As discussed in **Chapter 4. System Costs and Implementation Plan**, MnDOT Aeronautics' existing Airport System Manager (ASM) is outdated and no longer meets the grant management needs of MnDOT Aeronautics nor airport sponsors. The 2022 MnSASP recommends that MnDOT Aeronautics procure an effective MnDOT grant management program that comprehensively administers the statewide CIP in conjunction with grant selection, contract execution, invoices, reimbursements/payments, inspection procedures, contract close-out, and other workflow tasks. The grant management program should serve as a "one stop shop" for MnDOT Airport Development staff to easily track and manage all phases of state-funded projects. Additionally, the software should provide robust functionality to analyze historic expenditures to guide future improvements and support the agency's need for transparency.

E.1.2. MINNESOTA AIRPORT FUNDING MANUAL

Chapter 4 discussed the need to revise the grant prioritization methodology used to award Airport Development Grants. The 2022 MnSASP revealed that the current methodology fails to reflect the priorities of MnDOT Aeronautics and system airport. The methodology is loosely based on the national prioritization formula used to award discretionary grants via the Airport Improvement Program (AIP), and it has not been comprehensively revised in many years. Additionally, the state maintains significant discretion in terms of how the formula is applied.

It is strongly recommended that MnDOT Aeronautics continue the work initiated during the 2022 MnSASP to develop and ultimately adopt a revised prioritization methodology that is:

- Reflective of the philosophy and priorities of the air traveling public
- Transparent to airport sponsors and Minnesota taxpayers
- Supportive of long-term system viability

The process should be data-driven and implementable by MnDOT Airport Development staff. Once the prioritization methodology is finalized, associated funding policies and procedures must be documented in a grants manual that has been formally approved and adopted by MnDOT. An adopted manual would be an important tool and ally for MnDOT Aeronautics to more effectively manage the statewide CIP and communicate requirements to airports sponsors and internal staff. A grants manual affords the opportunity to implement a more structured program with better defined eligibility and decision-making guidelines while making the agency more accountable for its funding decisions.

E.1.3. AIRPORT COMPATIBILITY MANUAL UPDATE

Airport land use compatibility practices are designed to promote the safety of aircraft, their passengers, and the people and property on the ground, as well as mitigate the potential nuisance associated with overhead aircraft operations. MnDOT Aeronautics considers airport land use compatibility as one of its highest priorities, and the state has taken an active role in ensuring Minnesota's airports are developed and operated in consideration of land use best practices.

Notably, Minnesota Administrative Rules 8800.2400, *Airport Zoning Standards*, contain minimum standards for the zoning of public airports addressing issues of airspace, land use safety, and noise sensitivity. State rules are based on federal airspace requirements established by Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* (49 United States Code [U.S.C.] 106[g]). Additionally, the MnDOT Aeronautics clear zone guidance indicates that airport sponsors must own or otherwise demonstrate adequate control over 100 percent of land off each runway end configuration based on maximum build-out conditions to be eligible for state funding.[1]

To help airport sponsors understand airport land use compatibility as well as navigate the various applicable federal, state, and local requirements, MnDOT Aeronautics published the *Airport Compatibility Manual* in 2005. This report is now significantly outdated. Since the document was first released, more Minnesota airports are facing issues of land use compatibility due to urban encroachment. Additionally, the FAA's Draft Advisory Circular (AC) 150/5190-4B, *Airport Land Use Compatibility Planning*, may be published in the near future. The 2005 *Airport Compatibility Manual* does not include any information about clear zones. MnDOT Aeronautics clarified and updated its position and requirements associated with clear zones during the 2022 MnSASP.

The Airport Cooperative Research Program (ACRP) has also published several applicable reports since 2005. For example, ACRP Synthesis 117: *Agricultural Operations on Airport Grounds* was published in March 2022. This report contains valuable information regarding how to manage agricultural operations

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[1] *See* ***Attachment 6. Clear Zone Guidance Statement*** *of the 2022 MnSASP Technical Report for details regarding state clear zone requirements.*

on and near airport property in consideration of land use best practices (e.g., acceptable crop height, machinery placement, etc.). ACRP Report 27*: Enhancing Airport Land Use Compatibility, Volume 1: Land Use Fundamentals and Implementation Resources* and *Volume 2: Land Use Survey and Case Study Summaries* were published in 2010.

For these and other reasons, the 2022 MnSASP recommends MnDOT Aeronautics fully update the *Airport Compatibility Manual* to reflect current laws, regulations, and other requirements and best practices. Such a document will help airport sponsors, land use planners, and aviation users understand the importance of airport compatibility land use planning and its potential impacts on aircraft operations and local communities. The updated manual could also provide state recommendations identifying airport compatible land use development tools that could be implemented by Minnesota airports.

E.1.4. MINNESOTA GENERAL AVIATION AIRPORT BUSINESS PLANNING GUIDEBOOK

Chapter 4. System Costs and Implementation Plan reports that Minnesota airports have a total investment need of approximately $4.1 billion through 2030. During that same period, federal and state sources can offer an estimated $1.0 billion in aid – leaving a funding gap of $3.0 billion. In order for all needs to be met, local airport sponsors and private entities will need to significantly invest into the state's aviation assets. At a minimum, local sponsors are responsible for matching state and/or federal grants awarded through the State Airports Fund and/or AIP (respectively). Local sponsors can invest into their airports using tax dollars; however, such sources are almost always highly constrained and must be prioritized against other municipal functions such as local roads, schools, public healthcare institutions, and other public benefits.

Nearly all airports can engage in on-airport commercial activities to enhance their abilities to be financially self-sufficient to meet their own development and maintenance needs. Financial self-sufficiency offers airports independence, resiliency against unexpected decreases in public funding, and a level of self-determination unavailable to facilities wholly reliant on external funding sources. Airports can generate revenues through fuel sales; charging rent for hangars, business and advertising space, agricultural production, and other airport-compatible commercial activities; fees for landing and transient storage; and other strategies. Airport-generated income can be used to support hangar development and other types of revenue-producing projects generally ineligible for federal or state support. In that way, airports that produce revenue can further invest in their facilitates to optimally meet the needs of their users, making them an attractive place to base aircraft and do business. Additionally, revenue earned by an airport must be invested back into aviation. There is no risk in airport-generated revenues being swept for other municipal needs.

To assist Minnesota airport sponsors understand the benefits and opportunities associated with on-airport revenue generation, identify strategies most applicable to their facilities, and navigate potentially complex legal processes, the 2022 MnSASP recommends that MnDOT Aeronautics develop a Minnesota-specific airport business planning guidebook. It is recommended that the guidebook focus specifically on Minnesota's general aviation (GA) airports. Commercial service airports are significantly different in terms of operating requirements and ability to generate on-airport revenue. The guidebook should limit its target audience to ensure recommendations are germane and available to a large percentage of readers.

In addition to revenue generation, the Minnesota airport business planning guidebook could address airport management and operations more broadly. That could encompass state licensure, reporting, and regulatory requirements, as well as a general overview of airport management best practices. The guidebook would serve as a helpful resource for new airport managers and staff. Notably, many small GA airports in Minnesota do not have dedicated staff members and the manager may have little to no experience in aviation. In fact, several airport managers reported that they were unfamiliar with MnDOT Aeronautics processes and had no experience managing an airport during the MnSASP data collection effort.

The Minnesota airport business planning guidebook could build-off existing work on this topic including ACRP Report 77: *Guidebook for Developing GA Airport Business Plans*; Report 16: *Guidebook for Managing Small Airports*; and Report 121: *Innovative Revenue Strategies – An Airport Guide*. The Florida Department of Transportation also produced a state-specific business planning guidebook in 2014.

E.1.5. MNDOT AERONAUTICS STAFF TRAINING MANUAL

MnDOT Aeronautics is composed of over 40 staff members performing diverse roles associated with regulatory compliance and enforcement; aviation workforce development; system maintenance, operations, and development; administrative functions; and air transportation. The state aviation system is also complex – encompassing 124 GA and nine commercial service airports ranging from small, rural turf airstrips to one of the busiest commercial service airports in the United States.

In consideration of the intricacy of functions within the agency and the airport system it administers, the 2022 MnSASP recommends that MnDOT Aeronautics develop a comprehensive staff training manual for existing and new staff members. This manual would help ensure all staff members are familiar with the responsibilities of MnDOT Aeronautics and their coworkers. This may be particularly helpful to staff members participating in MnDOT's Employee Resource Group Rotation Program. These staff members hold temporary positions at MnDOT for various periods lasting from a few weeks to 12 months. A comprehensive staff training manual would help participants quickly learn about the roles and functions of MnDOT Aeronautics to expedite training periods.

E.2. Summary of MnSASP Recommendations

In addition to the five specific projects discussed in the section above, the 2022 MnSASP identified additional issue-specific recommendations for MnDOT Aeronautics, airport sponsors, and other airport stakeholders. Each of these topics is comprehensively discussed in various sections of the 2022 MnSASP Technical Report, with cross-references provided in each subsection to learn more.

E.2.1. PRIORITIZATION OF STATE AIRPORTS FUNDS

The distribution of the State Airports Fund in support of Minnesota system airports and meet other aviation-related needs is one of the primary tasks of MnDOT Aeronautics, and arguably the most impactful in terms of guiding future aviation development. **Chapter 4. System Costs and Implementation Plan** addresses system investment needs and identifies key recommendations to improve MnDOT Aeronautics' ability to award funding in a transparent, data-driven, and uniform manner. The following section summarizes the 2022 MnSASP recommendations associated with state aviation funding.

- Apply the findings of the Airport Pavement Management System (APMS) in the prioritization of state funding in a manner that maximizes the value of each dollar spend by:
  - Supporting pavements most in-need of maintenance or rehabilitation/reconstruction
  - Focusing on pavement preservation to minimize pavement lifecycle costs

  This issue is discussed in **Section 4.3**.
- Revise the Airport Development Grant prioritization methodology to align with the current needs of Minnesota's aviation stakeholders, enhance agency transparency, and improve the ability to conduct internal analyses of historic funding decisions and procedures.

  This issue is discussed at length in **Section 4.5.2**.

In addition to the guidance identified by the 2022 MnSASP directly, the Airport Funding Focus Area Working Group offered valuable guidance as MnDOT Aeronautics revaluates its funding-related policies and procedures. The primary feedback offered by the Airport Funding Working Group is summarized as follows:

- The three primary airport assistance programs (i.e., Airport Development Grants, Maintenance & Operations [M&O] Grant Program, State Navigational Aids [NAVAIDs] Program) should be retained as-is, and funding allocations between programs should not be a major focus area for revision in the future.
- The prioritization of capital improvement projects requested via the Airport Development Program no longer meets stakeholder needs. Updating the project prioritization methodology should be of top precedence for MnDOT Aeronautics.
- Participants indicated a preference for establishing pots of funding to prioritize peer projects or airports relative to one another instead of evaluating all projects at the statewide level.
  - Project needs by classification are inherently different. The recommended funding amounts by classification do not significantly differ relative to historic funding values.
  - If MnDOT Aeronautics adopts a methodology that establishes pots of funding by classification, airports would retain the total amount of funds they are accustomed to receiving. However, they may be more likely to receive funds for the projects of highest value to them by aligning project priority scores by airport classification.
- Top criteria for project prioritization include preservation versus expansion, airport classification, regional economic impact, and a project's ability to fill an airport or system measure gap as identified by the 2022 MnSASP.
- MnDOT Aeronautics should reevaluate its existing process of matching all federal grants first, potentially instituting a percent total investment cap for federal projects.

A comprehensive discussion of feedback obtained from the Airport Funding Focus Area Working Group is provided in Section 4.5.1.

E.2.2. HANGAR AVAILABILITY AND STATE FUNDING RECOMMENDATIONS

Attachment 2 of the 2022 MnSASP include the Hangar Availability Evaluation and State Funding Recommendations. Key recommendations associated with hangar development and funding are as follows:

- MnDOT Aeronautics should:
  - Include provision in the terms of the Hangar Revolving Loan Program requiring all existing publicly owned hangars be used for aeronautical purposes prior to offering state loans for the development of new hangar facilities
  - Require that airport sponsors justify need for additional aircraft storage in conjunction with state funding requests for the development of new hangar facilities
  - Establish a formal prioritization structure for the award of Hangar Revolving Loans in lieu of the existing process of distributing loans on a "first-come, first-serve" basis
- Airport sponsors should:
  - Establish minimum standards that address airport-owned hangars, the enforcement of which should be a requirement to receive a Hangar Revolving Loan
  - Establish appropriate hangar lease rates per the guidance provided by the ACRP Report 213: *Estimating Market Value and Establishing Market Rent at Small Airports*, the assessment of which should be a requirement to receive a Hangar Revolving Loan

E.2.3. LAST-MILE CONNECTIVITY AND COURTESY CARS

Attachment 7 of the 2022 MnSASP Technical Report provides the Last-mile Connectivity and Courtesy Car Evaluation. The key recommendations identified by this task are provided below.

- MnDOT Aeronautics should:
  - Add courtesy car maintenance as an eligible expense for M&O Grant funding
  - Require that airport sponsors establish trip agreements prior to offering state assistance for the acquisition and maintenance of courtesy cars
- Airport sponsors should:
  - Acquire vehicles through MnDOT's used fleet equipment program or the Minnesota Department of Administration Fleet and Surplus Services
  - Partner with local businesses to sponsor courtesy cars vehicles to cover operating expenses
  - Leverage the insurance offerings provided by governmental trusts in Minnesota
  - Require airport users to hold their own auto coverage to serve as the primary policy during use
  - Establish a trip agreement with courtesy car users for detailing the terms of use and documenting driver information
  - Promote and educate community partners about the economic activity generated by courtesy car users (e.g., allowing transient GA pilots and passengers to visit local businesses)
  - Request that courtesy car users complete a trip tracker to document the business(es) supported during their visits

Attachment 1. Through-the-Fence Operations Introduction and MnDOT Guidance

Introduction

Through-the-fence (TTF) operations are broadly defined as aircraft that can access an airport's airside facilities from land adjacent to – but not part of – airport property. TTF operations can be conducted to engage in commercial or non-commercial activities by business enterprises; private individuals; or federal, state, or local government entities. If properly administered, some types of TTF operations can be mutually beneficial for both the operator and the airport by providing an additional means of revenue generation while overcoming certain challenges potentially affecting airports. While TTF operations can generate new opportunities for airports in terms of economic development and community relationships, TTF operators can also incite issues for airports and conventional on-airport tenants and users. TTF operations at federally-obligated airports are of particular interest due to federal grant assurances under the Airport Improvement Program (AIP).

Recognizing both the opportunities and challenges associated with TTF operations, the Federal Aviation Administration (FAA) allows TTF operations in certain circumstances and provides guidance to airport sponsors regarding structuring and administering such operations. Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) has historically prohibited TTF operations at airports under its jurisdiction, although this historical precedence is not codified in Minnesota Statutes, Administrative Rules, or formal policies.

As such, this component of the 2022 Minnesota State Aviation System Plan (2022 MnSASP or MnSASP) provides structured, uniform, and transparent guidance to airport sponsors, existing and potential future TTF operators, MnDOT Aeronautics, and other stakeholders regarding TTF operations at Minnesota state system airports. State system airports comprise 133 publicly owned, public-use airports eligible to receive state funding through the State Airports Fund. This includes 124 general aviation (GA) and nine commercial service facilities.

This objective is achieved by first summarizing existing literature and guidance on TTF operations, identifying state system airports with existing TTF operations, and presenting the pros and cons of such arrangements in Minnesota. This information is used to guide the development of MnDOT Aeronautics' official position on residential and commercial TTF operations (referred to as MnDOT's TTF Position Statement). Airports must follow the processes, requirements, and standards established in MnDOT's TTF Position Statement to remain eligible for state investment. Most fundamentally, airports must obtain FAA or MnDOT Aeronautics' approval prior to executing a TTF access agreement to ensure operations:

- Provide a net positive social or economic benefit to the airport and community
- Are structured, operated, and administered in compliance with state and federal obligations
- Mitigate the potential for conflicts with existing/future airport tenants and other authorized users
- Do not limit or restrict airport development potential or airport/aircraft operations due to airport land use compatibility issues, height restrictions, or other potential negative impacts

MnDOT Aeronautics strongly recommends airport sponsors consider potential development alternatives and carefully weigh the advantages and disadvantages of TTF operations prior to engaging in this type of activity. Once established, TTF access agreements are often difficult, costly, and complex to terminate and should only be entered into with full recognition of all potential implications for the airport and community. This paper is structured as follows:

Existing Literature and Guidance Review

The following subsection provides an overview of existing guidance available to state departments of transportation (DOTs), municipalities, and airport sponsors regarding TTF operations. This section also includes information regarding the FAA's position on TTF operations, which is applicable to federally-obligated airports due to grant assurances and/or surplus or non-surplus land conveyances.

ACRP REPORT 114: *GUIDEBOOK FOR THROUGH-THE-FENCE OPERATIONS*

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Summary: Commercial service and GA airports across the country host TTF operations associated with a variety of commercial, residential, and governmental/military activities. At the time of publishing in 2014, objective guidance regarding the management of existing activities and structuring of future agreements was unavailable. As such, the ACRP developed a guidebook to discuss the financial, operational, regulatory, legal, and other issues associate with TTF operations. The guidebook also provides several worksheets to assess proposed TTF operations and a presentation template for airport sponsors to present to TTF operators.

The tools, guidance, and best practices documented in ACRP Report 114 have been used extensively in the development of this MnSASP paper. Appropriate citations are provided in all cases. It is recommended that airport sponsors consult ACRP Report 114 if considering establishing a new or renewing an existing TTF agreement.

FEDERAL LAW, POLICY, AND GUIDANCE

FAA Order 5190.6B, *Airport Compliance Manual*, recognizes that there may be times that an airport enters into agreements to permit access by aircraft located on land adjacent to, but not part of, airport property. Historically, the FAA has strongly discouraged these types of arrangements, citing the likelihood of conflicts with federal obligations and Transportation Security Administration (TSA) security requirements. FAA Order 5190.6B notes, "As a general principle, the FAA does not support agreements that grant access to the public landing area by aircraft stored and serviced off-site on adjacent property." However, the FAA recognizes that TTF agreements can play an important role in airport economic self-sufficiency and the provision of aviation services to the general public in certain circumstances. TTF agreements may also be long-standing or deeded in perpetuity. Because of these and other reasons, the FAA provides specific guidance and federal requirements associated with commercial and residential TTF operations. The FAA is careful to specify that the agency has no obligation to permit access to any airport by aircraft from adjacent property, and TTF agreements are a privilege granted under certain circumstances and when particular conditions have been met.

The FAA primarily discourages TTF operations because of the high risk for conflict with federal grant assurances (or obligations). Federal obligations are triggered when an airport accepts funding through a federal airport assistance program, including the Airport Improvement Program (AIP) or land conveyances. In most – but not all – cases, an airport must be included in the National Plan of Integrated Airport Systems (NPIAS) to be eligible to receive federal assistance. Federal obligations remain active through the useful life of the funded improvement project or in perpetuity in cases of land acquisition or conveyances. Airports that are not compliant with federal grant assurances risk losing future federal investment and may be required to pay back previously awarded dollars.

The following section provides an overview of the FAA's Airport Compliance Program and highlights the specific grant assurances that may be impeded by TTF operations. The FAA's position and requirements associated with commercial and residential operations are then presented in turn.

FAA COMPLIANCE PROGRAM

The FAA has clearly indicated that TTF operations may negatively impact an airport's ability to remain compliant with grant assurances. Issues of noncompliance can have major implications for airport sponsors; most notably, airports may lose access to federal investment or be required to pay back funds that were previously received. This could create serious financial hardship for small communities and place other municipal priorities at-risk. As such, airport sponsors should carefully consider all grant assurances in relation to existing or proposed TTF operations. ACRP Report 114 identifies eight grant assurances with the highest potential to place airport sponsors in conflict with federal obligations. The report also notes that, "The FAA has stated clearly that a TTF entity is not entitled to certain protections provided by the assurances to on-airport operators, tenants, and users" (p. 23).

Grant Assurance 5, Preserving Rights and Powers

This assurance stipulates that an airport sponsor must not permit any action that would deprive its ability to perform or fulfill the obligations associated with the AIP grant agreement. The FAA amended Grant Assurance 5 in 2012 for compliance with the FAA Modernization and Reform Act of 2012 (Public Law [P.L.] 112-95) as follows:

- Prohibits TTF agreements at commercial service airports
- Requires that GA airports comply with P.L. 112-95 and all grant assurances

P.L. 112-95 is discussed in significantly more detail later in this attachment (see Federal Residential TTF Policies).

Grant Assurance 19, Operation and Maintenance

Airport sponsors must ensure that airport facilities are always operated in a safe and serviceable condition.

Grant Assurance 20, Hazard Removal and Mitigation

Airport sponsors must protect the airspace surrounding the airport in compliance with 14 Code of Federal Regulations (CFR) Part 77 – Safe, Efficient Use, and Preservation of Navigable Airspace (Part 77).

Grant Assurance 21, Compatible Land Use

Airport sponsors must take appropriate action to protect land in the vicinity of airports from incompatible uses.

Grant Assurance 22, Economic Nondiscrimination

Airport sponsors must make the airport equally available to all types of aeronautical activities offering services to the public.

Regarding TTF agreements, this means that airports must develop a schedule of rates and charges that does not unjustly discriminate against on-airport entities by charging lower rates for similar facilities/services located off-airport property.

Grant Assurance 23, Exclusive Rights

Airport sponsors must not allow "exclusive right for the use of the airport by any person providing, or intending to provide, aeronautical services to the public."

Grant Assurance 24, Fee and Rental Structure

Airport sponsors must establish rate and fee schedules that make the airport as self-sustaining as possible, "under the circumstances existing at the particular airports, taking into account such factors as the volume of traffic and economy of collection."

Grant Assurance 29, Airport Layout Plan (ALP)

The ALP must be kept up-to-date at all times and minimally depict airport boundaries as well as all existing and proposed future airport facilities, structures, and non-aeronautical-related areas. Any airport that has an outdated ALP may be ineligible to receive AIP funds until the ALP is compliant with Grant Assurance 29.

This Grant Assurance was amended in 2012 to specially require the depiction of, "all proposed and existing access points used to taxi aircraft across the airport's property boundary" in compliance with P.L. 112-95.

Additional information about federal grant assurances including the full text is available online at https://www.faa.gov/airports/aip/grant_assurances/.

FEDERAL COMMERCIAL TTF POLICIES

Commercial TTF operations occur when an off-airport business enterprise requires the use of on-airport airside facilities to conduct commercial business activities. Examples of such activities could include a fixed base operator (FBO) providing fuel, inspection, maintenance, or storage facilities or a Specialized Aviation Services Provider (SASO) offering aircraft cleaning, painting, or upholstery services. Flight schools, crop dusting outfits, aerial sightseeing, or other aeronautical businesses may also store aircraft and operate their business adjacent to – but not physically on – airport property.

Based on research conducted for ACRP Report 114, the FAA is strongly opposed to commercial aeronautical TTF activities. Such operations can threaten the viability of other on-airport businesses, particularly when TTF agreements and rates and charges schedules are not carefully crafted to ensure economic parity between on- and off-airport users. However, the FAA recognizes that TTF operations may offer a viable alternative at airports with development constraints unable to otherwise expand.

Thus, while the FAA discourages commercial TTF activities, they are not prohibited. Commercial TTF operators are governed by FAA Order 5190.6B, *Airport Compliance Manual*, and Advisory Circular (AC) 150/5190-7, *Minimum Standards for Commercial Aeronautical Activities*. Both documents specify that airports must be careful to ensure that TTF operations do not threaten the airport's ability to meet its federal obligations now or in the future. AC 150/5190-7 specifically states that airports should:

> *[Establish] requirements to ensure operating safety and equitable compensation for use of the airport. Special safety and operational requirements should be incorporated into any access agreement to ensure that the TTF access does not complicate the control of vehicular and aircraft traffic or compromise the security of the airfield operations area.*[1]

To obtain FAA approval for a proposed commercial TTF operation, airport sponsors must depict current and potential future TTF development and access points on their ALP and submit a description of the proposed TTF operations and TTF access agreement to the FAA Regional Office (see page 7 for specific requirements). FAA Order 5190.6B adds that TTF access agreements should specify that TTF operators do not have the right to grant access to the airfield through their property. If the TTF operator decides to sell its property, TTF access privileges do not convey with the sale of the property without the express written consent of the airport sponsor.

FEDERAL RESIDENTIAL TTF POLICIES

The FAA's current position on residential TTF operations is defined by the FAA Modernization and Reform Act of 2012 (P.L. 112-95), Section 136, Agreements Granting TTF Action to General Aviation Airports, and the FAA Reauthorization Act of 2018 (P.L. 115-254). Section 136 of the FAA Modernization and Reform Action of 2012 specifies that a GA airport will not be in violation of its grant assurance or otherwise be deemed noncompliant with any federal obligations solely because it has executed a new residential TTF agreement. However, the airport sponsor must sign an agreement with the property owners "that prescribes the rights, responsibilities, charges, duration, and other terms the airport sponsor determines

[1] *AC 150/5190-7, p.7.*

are necessary to establish and manage the airport sponsor's relationship with the property owner" (Section 136, Subpart 2a). Under this agreement, the property owner must (Section 136, Subpart 2b):

- Pay access charges comparable to those charged to on-airport tenants and operations making similar use of the airport
- Be responsible for the cost of building and maintaining the infrastructure necessary to provide access to the airport from the adjacent property
- Maintain the property for residential, noncommercial use for the duration of the agreement[2]
- Prohibit aircraft refueling from occurring on the adjacent property[3]
- Prohibit access to the airport from other properties through the property of the owner with whom the agreement has been signed[4]

Section 185 of the FAA Reauthorization Act of 2018 exempts certain residential TTF agreements from these terms and conditions if they were signed prior to the FAA Modernization and Reform Act of 2012 and are considered perpetual and cannot be readily changed. Section 185 does not apply if the agreements can be modified.

On July 21, 2021, the FAA published Compliance Guidance Letter (CGL) 2021-03, *FAA Review of Existing and Proposed Residential Through-the-Fence Access Agreements*. This CGL provides the FAA's current interpretation and guidance regarding existing and proposed new residential TTF agreements based on federal statutes and several associated policy statements published in the Federal Registrar (FR). According to CGL 2021-03, airports with existing residential TTF agreements had to demonstrate compliance with Section 136 of P.L. 112-95 no later than October 1, 2014. GA airports proposing to establish new agreements must also comply with the terms and conditions established by P.L. 112-95, and the FAA will not waive these terms for new agreements. In addition to providing additional clarification regarding the FAA's interpretation of P.L. 112-95, CGL 2021-03 notes the following key points regarding the statute's implementation:

Airports with Existing Residential TTF Access Agreements

- The FAA was required to notify airports regarding the statutory requirements associated with P.L. 112-95 no later than August 20, 2013. (In response, airports were required to demonstrate compliance no later than October 1, 2014.)
- All proposed and existing residential TTF access agreements must be depicted on the ALP. A temporary designation through a pen and ink change is acceptable until the ALP is updated via the master planning process.
- The FAA will undertake the following procedures to review and accept access plans as submitted by the airport sponsor:

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[2] The FAA interprets this term to specify that commercial aeronautical-related activities are prohibited, even if those activities are not currently offered on-airport property. The FAA will not concern itself with non-aeronautical-related commercial activities.

[3] The FAA interprets this term to specify that the commercial sale of aviation fuel is prohibited. The FAA will not concern itself with self-fueling activities that may be permitted by local regulations.

[4] The FAA interprets this term to specify that access agreement holders are prohibited from allowing unauthorized users from accessing the airport. The FAA encourages airport sponsors to limit the number of access points in a manner that is consistent with good airport planning practices.

  - For GA and privately owned Reliever airports, proposed access agreements will be reviewed for compliance with P.L. 112-95 by the Airports District Office (ADO) and Regional Office. Access agreements must be approved by the Regional Office.[5]
  - For commercial service airports, proposed access agreements will be reviewed for compliance with P.L. 112-95 and sponsor grant assurances by the ADO, Regional Office, and the Airport Compliance Division (ACO-100). Access agreements must be approved by ACO-100. Commercial service airports seeking to renew or extend existing agreements are also required to comply with the FAA's Policy on Existing Through-the-Fence Access to Commercial Service Airports from a Residential Property contained in CGL 2021-03 as Appendix I.[6,7]
- FAA review and acceptance are valid for a period of 20 years or until a triggering event occurs.

Airports Proposing New Residential Access Agreements

- GA airports proposing a new residential TTF agreement must submit its updated ALP and a copy of the draft access agreement with a copy of the FAA's access agreement review sheet.[8]
  - The FAA strongly encourages airport sponsor to consider how a proposed TTF operation may impact its ability to meet current or potential future grant assurances.
- Commercial service airports and privately owned Reliever airports may not enter into new residential TTF agreements.[9]

In all cases, costs associated with residential TTF operations are ineligible for AIP funding. This includes costs associated with the development and preservation of on-airport infrastructure and facilities used primarily to support residential TTF users. Additionally, pen and ink ALP revisions to depict existing TTF access points and costs associated with the development of access agreements are ineligible for AIP funding. ALP updates proposing new access are allowable costs for AIP funding only if they are incidental costs associated with an AIP-funded master plan and ALP update. The FAA will not pay to relocate, soundproof, or mitigate noise at any homes with residential TTF access. Airports that are not compliant with P.L. 112-95 are ineligible to receive federal AIP funding.

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[5] See Appendix C of CGL 2021-03 for the applicable FAA Access Agreement Review Sheet and Appendix D for the checklist used by the FAA to evaluate compliance with P.L. 112-95.

[6] See Appendix E of CGL 2021-03 for the applicable FAA Access Agreement Review Sheet and Appendix F for the checklist used by the FAA to review existing documentation. The FAA's review of existing residential TTF operations at commercial service airports considers compliance with P.L. 112-95; adequacy of submitted airport and access drawing, summary table, and narrative; airport sponsor's level of control of airport land and access points; safety of airport operations; rates and charges; protection of airspace; and airport compatible land use.

[7] See Appendix J of CGL 2021-03 for the FAA's checklist for reviewing a commercial service airport's application for renewing or extending existing access agreements.

[8] See Appendix G of CGL 2021-03 for required documentation from GA airports proposing new access and Appendix H for the FAA's checklist for reviewing submitted documentation.

[9] There are no privately owned Reliever airports in Minnesota.

SUMMARY OF FAA POSITION ON TTF OPERATIONS

The FAA maintains stringent requirements associated with existing and proposed new TTF operations. In most cases, the FAA discourages such agreements – citing serious concerns about the agency's and local sponsors' abilities to maintain the highest level of control over airport safety, security, operations, and efficiency. Additionally, the FAA has the obligation to protect billions of dollars in federal investment at airports. These investments may be threatened by the interests of current or future inhabitants of homes or businesses located adjacent to airport property.

To mitigate against such concerns, federal statutes and associated FAA interpretations and enforcement activities are designed to provide the highest level of protection for airport sponsors and on-airport operators, tenants, and users. Federal grant assurances are the primary mechanism for the FAA to ensure that AIP-eligible airports follow federal statutes, regulations, and guidelines. Airports that do not comply with their grant assurances risk eligibility to receive federal entitlement and discretionary grants and may open themselves to federal administrative and judicial penalties. Airport sponsors seeking to establish commercial or residential TTF agreements should coordinate with their FAA ADO early and often to ensure all federal mandates and best practices are met to protect the airport and preserve its ability to receive federal investment for preservation and improvement needs.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

Author: Bill Dunn

Summary: In response to member interest in residential TTF operations at publicly owned, public-use airports, the Aircraft Owners and Pilots Association (AOPA) published a policy whitepaper entitled, "Airport 'Through the Fence' Operations and Residential Airparks at Publicly Funded Airports" (2008).[10] While the whitepaper was published over a decade ago, the issues addressed and discussions regarding the issues remain largely the same as today. Author Bill Dunn notes,

> *Association members are squarely on both sides of this issue. Some favor TTF access to the airport (most of those are members who own off-airport property or existing structures off-airport) while members who are located on the airport paying the airport's current rates and charges, do not necessarily favor off-airport access to the airport since they believe the TTF operator is not adequately funding the airport; especially in cases with the TTF access is legally deeded with little or no access fee paid to the airport.*[11]

The AOPA whitepaper first presents information regarding the statutory and regulatory context of residential through the fence operations at airports eligible to receive AIP funding. The whitepaper then notes that AOPA strongly encourages the FAA and airport sponsors to work together to resolve TTF issues on a case-by-case basis – recognizing that each airport and situation is unique. As the whitepaper concisely states, "Each identified TTF issue should be negotiated and resolved on an airport-by-airport

[10] *Dunn, Bill (2008) "Airport 'Through the Fence' Operations and Residential Airparks at Publicly Funded Airports." AOPA ePilot Volume 10: Issue 10. Available online at https://www.aopa.org/-/media/Files/AOPA/Home/News/All-News/2008/AOPA-ePilot-Volume-10-Issue-9/airportOps0712.pdf (accessed November 2021) p. 1.*
[11] *Dunn, Bill (2008) p. 2.*

basis. One size does not fit all." Based on this principal, AOPA provides several strategies that can be employed by airports to resolve or mitigate FAA concerns. These strategies are summarized below:

- Discontinue airport eligibility to receive federal AIP airport development funding [in order to allow for TTF operations]
- Establish economic uniformity between TTF and on-airport users
- Modify existing access agreements and/or deeded access easements to bring parity between on-airport and TTF operators, including airport procedures, rules, policies, minimum standards, and access fees. Additionally, AOPA recommends that residential property sales should include avigation easements recorded on property deeds named in favor of the airport[12]
- Avoid any expansion of TTF access and facilities to not cause new issues to arise for existing operators and the airport
- Remove any obstacles resulting a Part 77 obstruction

AOPA also states that the FAA could seek a legislative change to Grant Assurance 21, Compatible Land Use. However, this would likely threaten the agency's ability to object to residential developments in the vicinity of airports without airport access (i.e., existing or future developments that are near or adjacent to airport property but not seeking TTF access). Additionally, some states and jurisdictions have local statutes and zoning ordinances that prohibit or discourage residential development in the vicinity of airports. In these cases, any revisions to Grant Assurance 21 would not alleviate the fundamental concern – that is, residential TTF operations are in inherent conflict with federal, state, and/or local statutes, regulations, and ordinances designed to protect airport land use compatibility.

AVIATION BUSINESS JOURNAL

Author: Shelley A. Ewalt

Summary: Published in the Aviation Business Journal, a 2019 article entitled, "Through-the-Fence Maintenance: Which Side of the Fence Are You On?" discusses the differences between, and specific issues associated with, "true" TTF operators and independent contractors. As discussed throughout this attachment, TTF operators refer to easements or similar agreements that allow aircraft to taxi between land adjacent to an airport and airport property. Independent contractors are businesses that engage in commercial aeronautical activities at a specific airport without a physical base or operating permit to conduct business at that airport. For example, independent contractors could include an airframe and powerplant mechanic, flight instructor, or mobile repair unit.

Airports that host TTF operators and/or independent contractors (either knowingly or unknowingly) are responsible for meeting federal grant assurances. Author Shelley Ewalt highlights the pertinence of Grant Assurance 23, Exclusive Rights, and Grant Assurance 22, Economic Nondiscrimination. She also observes that most airports fail to implement well-drafted minimum standards that "serve to protect users from unauthorized products and services, encourage the availability of services for all airport users, promote

[12] *Dunn, Bill (2008) p. 5.*

the utilization of airport property, and ensure efficient operations."[13] To comply with FAA requirements, minimum standards must be reasonable and applied fairly to all on- and off-airport service providers. Finally, airports must consider requirements specific to their airport including insurance, indemnification, fees, and security.

OTHER STATE GUIDANCE

Federal requirements associated with TTF operations are limited to federally-obligated airports. In limited cases, individual state DOT and local governments also publish guidance, ordinances, or mandates applicable to airports and/or TTF operators within their jurisdictions.[14] While a comprehensive review of all state and local statutes and other policy-related documents potentially affecting TTF operations was not included in the scope of the MnSASP, only Oregon and Idaho were identified to have specific TTF guidance for airport sponsors potentially applicable to the topics addressed by this paper. The Michigan Department of Transportation (MDOT) effectively adopts the federal policy on TTF operations at airports within its state system. The agency's website notes, [15]

> *[TTF] agreements are discouraged by MDOT and FAA as they can create a problem controlling aviation activities on or near the airport. However, FAA recognizes the advantages to offering a variety of proposals to prospective tenants and therefore provides guidance in FAA Order 5190.6B.*

As such, the following subsections present the Oregon and Idaho policies and programs associated with TTF operations.

OREGON

In response to a Senate Bill passed in 2005 and revised in 2009, the Oregon Department of Aviation (ODA) was tasked with establishing a pilot program at up to six rural airports "designed to promote economic development by creating family wage jobs, by increasing local tax bases, and by increasing financial support for rural airports."[16] This statute was codified in Oregon Administrative Rules (OARs) Chapter 738-014-0010 through -0060.[17]

Airports proposing TTF operations under this program are required to develop a "TTF Operating Plan" to accompany their ALP that includes the following elements:[18]

- Identify current operating costs and revenues for the pilot site airport. Describe how the TTF operations will provide financial support to the pilot sites in compliance with FAA regulations.

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[13] *Ewalt, Shelley A (Spring 2009). "Through-the-Fence Maintenance: Which Side of the Fence Are You On?" Business Aviation Journal, Q1. Available online at https://www.mklawnyc.com/sites/default/files/Through%20the%20Fence%20Maintenance%20by%20Shelley%20Ewalt%201st%20Qtr%20Airport%20Business%20Journal-1.pdf (accessed November 2021).*

[14] *ACRP Report 114 (2014) similarly noted that few states and local governments publish statutes or rules associated with TTF operations.*

[15] *MDOT Aeronautics (2021). "Airport Property Land Use: Through the Fence." Available online at https://www.michigan.gov/aero/0,4533,7-352-79281_84369---,00.html (accessed November 2021).*

[16] *Oregon Revised Statutes (ORS) 836.640 and 836.642.*

[17] *OAR Volume 60, No. 11, November 1, 2021. Note the ORS states up to six airports for inclusion in the pilot program; however, this was amended prior to inclusion in the OAR to encompass three airports.*

[18] *OAR 738-014-0050*

- Require each TTF operation to submit a facility site plan for its own property to the airport sponsor. The TTF operation, in cooperation with the airport sponsor, then may proceed to seek any necessary land use approval from the appropriate local government. Any such approval must be made in compliance with statewide land use planning requirements. If the facility site plan is approved by the appropriate local government in compliance with applicable statewide land use planning requirements, the facility site plan shall be incorporated into the local government's airport plan and airport boundary.
- Require that each TTF facility only be permitted to operate through a written contract with the airport sponsor that includes specific provisions indicated within the ORS

According to ODA's *Fiscal Year 2018 Annual Report*, the state hosts eight "TTF airports" (more recent data are unavailable; it is also unknown if six of these eight airports were part of the original six pilot program). The Department's Commercial Leasing Policy also states that ODA must have a written agreement with commercial operators located at any of the 28 GA airports owned and operated by ODA. Aircraft owners/operators with aircraft hangered adjacent to these state-owned and -operated airports must submit an "Application for Through-the-Fence Airport Access."

IDAHO

The Idaho Administrative Code Title 39 – Idaho Transportation Department (ITD) establishes the rules governing TTF operations at state-owned airports.[19] According to Idaho Administrative Code (IDAPA) 39.04.06, any entity wishing to establish a private or commercial aviation facility adjacent to a state-owned airport must make a formal application to the Idaho Division of Aeronautics (ITD Aeronautics). At a minimum, this application must include:

- Sketch showing the location of the proposed facilities
- Description, sketch, manufacturer's brochure, etc. of the proposed facilities
- Description of the proposed operation

Upon review and approval by the State Aeronautics Board, ITD Aeronautics negotiates a TTF operational agreement with the applicant. At a minimum, this agreement must include:

- Lease fee
- Term
- Operational limits as appropriate

The IDAPA emphasizes that aviation safety is paramount during the evaluation of any TTF applications. ITD Aeronautics carefully considers the number of access points proposed as part of the development plan to ensure the highest standard of safety is maintained.

[19] *IDAPA 39.04.01, Rules Governing Aeronautics and Aviation, Subchapter C – Rules Governing Commercial and TTF Operations and Hangar Construction at State Airports*

PROS AND CONS OF TTF OPERATIONS

TTF operations can provide new opportunities for airports in terms of meeting aviation demands and generating revenue for the airport, along with enhanced economic impact in the surrounding community. At the same time, such arrangements can present challenges associated with impacts to airports' efficiency, safety, and security. Additionally, while federal grant assurances are not directly applicable to the 37 non-NPIAS airports in Minnesota, many of the topics they address – such as land use compatibility, economic nondiscrimination, and ALPs – are considered best practices for all facilities, regardless of federal obligation.

Table 1 summarizes some of the most common pros and cons associated with residential and commercial TTF activities at airports. Airport sponsors are strongly encouraged to carefully weigh these considerations to determine if allowing a TTF operation is the best choice for their airport. Such assessments must carefully evaluate airports' current needs while considering how a TTF operation may impact the airport's ongoing ability to develop in response to future aviation demands. Once established, TTF agreements are difficult and complex to discontinue – meaning any agreements must be cautiously crafted and prudently signed in full awareness of the potential implications for the airports through the term of the contract.

Table 1. Pros and Cons Associated with TTF Operations

	Pros
✓	Commercial aviation activities often create sustainable and high-paying jobs. Wages in aviation/aeronautics-related industries are typically significantly higher than the average wage across all industries. Additional jobs increase the economic impact of the airport, which may ultimately lead to greater community support and higher local investment into the airport.
✓	Commercial and residential TTF activities can generate additional tax revenues for local and county governments.
✓	For airports with limited airport property available for development (due to space availability or environmental constraints), TTF operations may be the only feasible means to expand to meet aeronautical-related demands including but not limited to hangar storage.
✓	Residential TTF communities are typically inhabited by aviation enthusiasts who can serve as "champions" for the airport, promote the aviation industry, and facilitate additional local investment for preservation and expansion projects.
✓	Multiple aviation-related businesses (such as FBOs and SASOs) can increase competition for various aviation-related services, resulting in lower prices and higher levels of service for customers.
✓	Residential and commercial operators generally bring additional based aircraft to an airport to mitigate concerns about falling below the 10 based aircraft minima associated with inclusion in the NPIAS.
✓	Residential TTF developments can bring new life and energy to rural airports.
✓	TTF operators can attract new based and transient aircraft, which may support other types of airport revenue generation such as fuel sales, aircraft landing/tie-down fees, and sales commissions.
✓	TTF operations that attract transient users may generate additional economic activity in the local community due to visitor spending in hospitality-related industries such as restaurants, retail, and lodging.

Cons
× Residential TTF activities can cause serious land use compatibility conflicts, as residential developments are deemed inherently incompatible with airports. These types of developments open the airport to safety, noise, emission, and other nuisance complaints which could ultimately lead to flight curfews and other mitigation measures that limit aeronautical activities.
× Development can cause obstruction to air navigation, which may cause safety hazards and/or result in higher approach minimums.
× Fueling, deicing, and other routine maintenance activities may cause environmental issues that can be more difficult to control when conducted off-airport property.
× TTF operators may result in conflicts with conventional on-airport users due to economic discrimination, competition for customers, increased aircraft operations, and other issues. In some cases, existing on-airport operators, tenants, and other users may decide to relocate elsewhere or deter potential users from conducting operations at that facility.
× Self-fueling activities on property adjacent to the airport can pose fire risks to people and property on- and off-airport.
× Enforcement of TTF agreements is difficult for most airport sponsors, causing a host of issues including but not limited to inadvertent or unknown issues of grant noncompliance.
× For federally-obligated airports, the risk of losing AIP funding due to noncompliance with grant assurances can outweigh economic and social benefits potentially associated with TTF operations.
× TTF access points increase the potential of unauthorized personnel accessing the airfield, causing security concerns for authorized airport users.
× Once established, TTF operations can be difficult, expensive, and timely to prohibit – even if an operator fails to comply with the terms of a signed TTF agreement.
× Airport sponsors may become liable to issues associated with insurance and indemnification should an incident occur even with an established TTF agreement.

Sources: Kimley-Horn, 2021; ACRP Report 114, 2014

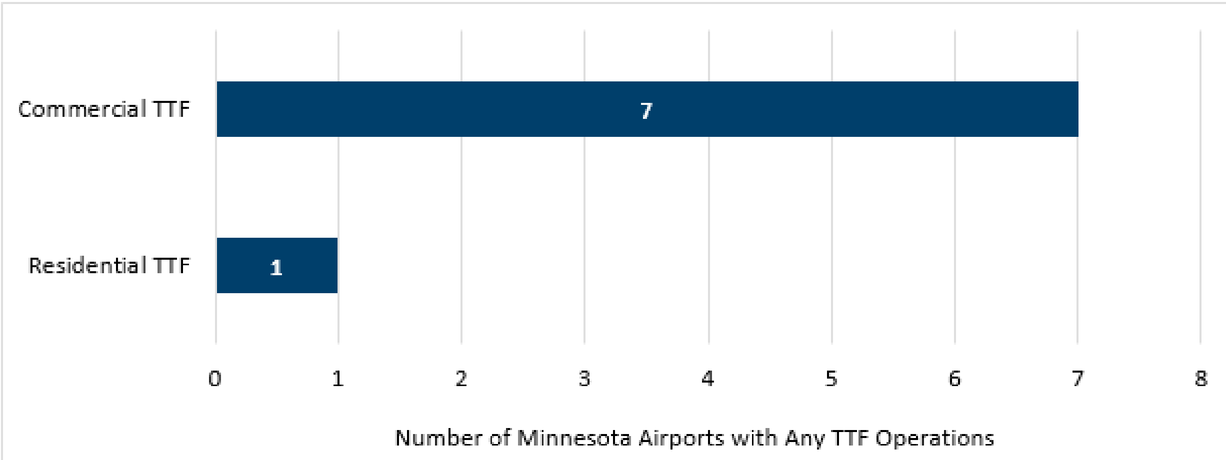
Existing TTF Operations in Minnesota

To guide the development of recommendations to enhance MnDOT Aeronautics' position on TTF operations, the study team collected data about existing residential and commercial TTF operations in Minnesota. The MnSASP Airport Inventory Form asked all 133 study airports to indicate if their airport hosted any TTF operator and, if yes, to specify if operations were commercial or residential. Six Minnesota airports reported hosting any TTF operations during the data collection effort, including five Intermediate airports and one Landing Strip Turf facility. MnDOT Aeronautics also identified Litchfield Municipal Airport (LJF) as having commercial TTF operations during the study process.

Although not reported during the data collection process, ACRP Report 114 (2014) identified three Minnesota state system airports with residential TTF operations: Glenwood Municipal Airport (GHW), Paynesville Municipal Airport (PEX), and Worthington Municipal Airport (OTG). Of these airports, only Glenwood Municipal Airport appears to currently have a residential TTF operation located north of airport property (based on a visual review using Google Earth).

Figure 1 presents the findings of these research efforts. In total, this represents 5.2 percent of the total Minnesota state aviation system. **Table 2** lists the Minnesota airports with TTF operations, provides details regarding airport-reported operators, and indicates if TTF operations are depicted on the ALP on-file with MnDOT Aeronautics (as available).

Figure 1. Number of Minnesota Airports Supporting TTF Operations by Type[1]



Note: (1) One airport reported a TTF operation during data collection. However, the ALP appears to depict this operator on-airport property. As such, Minnesota may host only five TTF commercial operators. Sources: MnSASP Airport Inventory Form, 2021; ACRP Report 114, 2014; MnDOT Aeronautics, 2022

Table 2. Existing TTF Operations in Minnesota

Associated City	Airport Name	FAA ID	State Classification	TTF Details	Depicted on ALP?
Backus	Backus Municipal Airport	7Y3	Landing Strip Turf	There are two hangar buildings located adjacent to the airfield and an unoccupied house. While the hangars are occupied by airworthy aircraft that regularly use the air strip, the airport does not collect any access fees. The airport manager is currently working to establish a TTF agreement with associated TTF fees.	ALP not provided (N/P)
Benson	Benson Municipal Airport	BBB	Intermediate Large	One aerial sprayer operates from a hangar located adjacent to the airfield. A TTF agreement is not in place.	No
Glenwood	Glenwood Municipal Airport	GHW	Intermediate Large	Residential TTF operator located to the north of the airfield. The airport appears to be accessible via one taxiway that crosses the main arterial roadway north of airport property.	Yes – Visually depicted on satellite imagery but the development nor any controlled access points are depicted.
Hawley	Hawley Municipal Airport	04Y	Intermediate Small	The Rapat Corporation owns three hangars adjacent to the airfield administered via a perpetual lease established in 1973. No fees are assessed for this agreement. Multiple aircraft are housed in these storage facilities although the exact number is unknown.	Yes
Litchfield	Litchfield Municipal Airport	LJF	Intermediate Large	The airport hosts commercial and noncommercial hangars to the west of the runway. Existing and ultimate access points are depicted on the ALP (2015).	Yes
Princeton	Princeton Municipal Airport	PNM	Intermediate Large	Kruse Aviation is a maintenance, repair, and overhaul (MRO) shop. Flight Expo, Inc. is an affiliated enterprise that builds aircraft with local youth. It is unknown whether fees are assessed for this agreement. Issues have been reported regarding who is responsible for maintaining a private taxiway used to access the airfield.	Yes

Associated City	Airport Name	FAA ID	State Classification	TTF Details	Depicted on ALP?
Roseau	Roseau Municipal Airport (Rudy Billberg Field)	ROX	Intermediate Large	A commercial agricultural spraying operation was reported as having a TTF agreement with the Roseau Municipal Airport. This operation has a signed access agreement with the city and leases a 7,500-square-foot hangar for $100 per year.	Yes[1]
South St. Paul	South St. Paul Municipal Airport	SGS	Intermediate Large	Wipaire, Inc., an aircraft supply store and FBO, is located on the northeast portion of Runway 16/34. While the facility is depicted on the ALP, it is not indicated as TTF nor are access points shown.	No

Note: (1) Aerial applicator and private taxiway depicted on ALP. However, this operator appears to be within the existing airport property line.

Sources: MnSASP Airport Inventory Form, 2021; ACRP Report 114, 2014; Google Earth, 2021

MnDOT Aeronautics TTF Guidance to Airports

Residential, commercial, and noncommercial aeronautical TTF operations can offer new energy and vitality to struggling airports, as well as an economic boost to the communities in which they are located.[20] Commercial or noncommercial operations involved in aeronautical activities may support high-paying jobs in the aviation industry and provide aviation-related services to based and transient pilots unavailable on-airport property due to space constraints, environmental issues, and variety of other reasons. TTF operations can generate additional taxes for municipalities and enhance an airport's ability to be financially self-sufficient while providing a stable customer base for on-airport tenants.

While there are numerous benefits potentially associated with TTF operations, these arrangements can result in a host of major challenges for airport sponsors, on-airport tenants, and other authorized airport users. In addition to potential issues of safety and security, airports may inadvertently limit their future development potential and access to federal and state investment. Airports may also place themselves in conflict with existing tenants in cases of economic discrimination, resulting to costly, time-consuming, and contentious court battles. Due to the number and scope of potential negative impacts to airports and aircraft operations, airports must enter into TTF arrangements with extreme caution and only after all other development alternatives have been explored. Such arrangements must be pre-approved by MnDOT Aeronautics or the FAA (as applicable), and contractual terms and conditions must address specific conditions established by the department.

Airport sponsors in violation of MnDOT Aeronautics' TTF position and associated guidance may lose eligibility to receive funding via the State Airports Fund until compliance is reestablished. Airport sponsors ineligible for state funding but hold an airport license issued by MnDOT Aeronautics are strongly encouraged to follow the recommendations provided henceforth. However, compliance is not a condition of holding a public airport license as long as all other licensure requirements are met in accordance with Minnesota Administrative Rules Part 8800.1400 through 8800.2300.

MINNESOTA STATUTES AND RULES POTENTIALLY IMPACTED BY TTF OPERATIONS

An overview of key airport-related Minnesota Statutes and Administrative Rules associated with TTF operations are provided below. Note it is ultimately the responsibility of the airport sponsor to ensure compliance will all local, state, and federal requirements; the information here is for guidance only. All state system airports must meet these legal requirements in addition to guidelines established by the MnDOT TTF Position Statement that follows.

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[20] It is assumed that all proposed commercial TTF activities are aeronautical in nature. Nonaeronautical commercial entities shall not be granted TTF access to any state system airport. A nonaeronautical commercial entity may be co-located with a commercial aeronautical entity; however, TTF access shall only be granted to the aeronautical commercial entity. For example, a commercial warehouse may be co-located with an aircraft paint shop with TTF access. Employees, customers, and other users associated with the commercial warehouse are not considered authorized airport users and may not access the airport via the TTF access point. The presence of the commercial warehouse, however, will not preclude the aircraft paint shop with gaining TTF access to airport facilities.

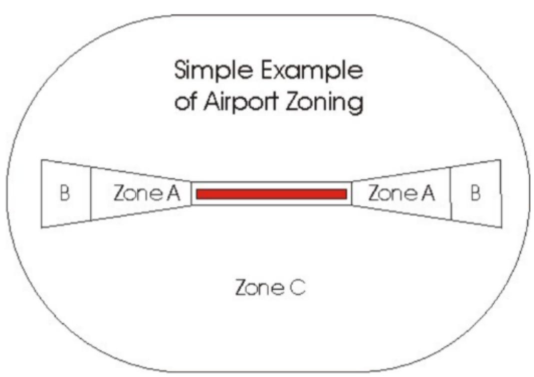
AIRPORT COMPATIBLE LAND USE ZONING

TTF operations must be established in a manner that promote the safety of aircraft in the sky and people and property on the ground while mitigating potential issues of noise, risks to human health, and other nuisance concerns. Residential TTF activities inherently conflict with airport compatible land use guidelines, and the federal government has made significant investments in sound-proofing homes, relocating residents, and otherwise deconflicting airports with incompatible uses in their vicinities.

This is a particularly important issue in Minnesota, as the state has established airport compatible zoning requirements as a condition of holding a public airport license. As prescribed in Minnesota Statutes Chapter 360.061 through 360.074 (airport zoning) and implemented in Minnesota Administrative Rules Part 8800.2400 (airport zoning standards), Minnesota has three minimum safety zones (A, B, and C). These zones are intended to restrict land uses that may be hazardous to aircraft using the airport and maintain the highest level of safety for people and property on the ground. Zones A, B, and C are depicted in Figure 2. Commercial and residential TTF operations are expressly prohibited in Zones A and B. Aircraft and people and property below them are most at-risk should an incident occur due to the height at which aircraft operate in these areas. Additionally, noise and other nuisance issues are most acute in Zones A and B. For these and other reasons, TTF operations are only permitted in Zone C with the following prohibitions:

- Uses that cause interference with:
  - Radio or electronic facilities on the airport
  - Radio or electronic communications between the airport and aircraft
- Lighting that:
  - Makes it difficult for pilots to distinguish between airport lights and other lights
  - Results in glare in pilot's eyes
  - Impairs visibility in the airport vicinity

Figure 2. MnDOT Safety Zones A, B, and C



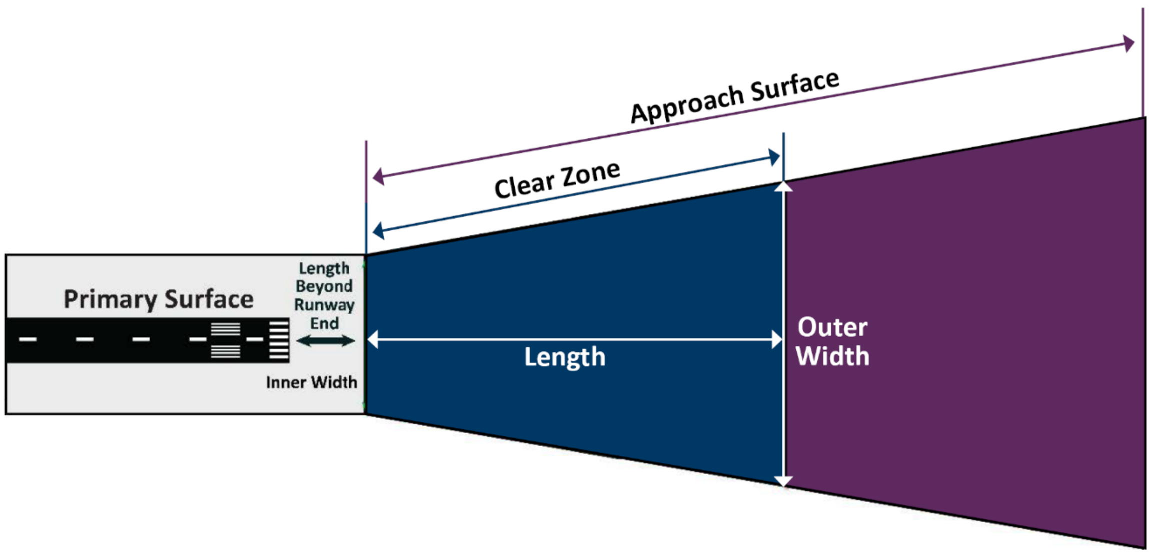
Source: MnDOT Aeronautics, 2021

All other uses are acceptable in Zone C if structures do not exceed height restrictions. Additional implementing guidelines are established in Minnesota Administrative Rules Part 8800.2400 (airport zoning standards). Provisions should also be established in TTF access agreements or other compliance mechanism that hold the airport harmless should a safety or nuisance issue arise now or in the future due to an issue of airport land use incompatibility.

MNDOT CLEAR ZONES

Clear zones are trapezoidal shapes off each runway end. The specific dimensions are based on the runway category and approach types, as depicted in Figure 3. In accordance with the MnDOT Clear Zone Guidance Statement (2022), airport sponsor must own 100 percent of clear zones off all runway ends in fee simple or develop a Clear Zone Acquisition Plan (CZAP) approved by the Commissioner of Transportation. In no cases shall TTF operations be permitted within clear zones.

Figure 3. MnDOT Clear Zone Example



Sources: Kimley-Horn, 2022; MnDOT Aeronautics, 2022

AIRPORT LICENSURE REQUIREMENTS

All airports in Minnesota must obtain the appropriate airport license to operate. The licensure requirements established for a public-use airport are provided in the Minnesota Administrative Rules Parts 8800.1400 through 8800.1600. These requirements do not change for airports with a TTF property, and TTF operations shall be held to the same standards as property owned by the airport sponsor (as applicable).

MNDOT POSITION STATEMENT

This Position Statement defines MnDOT Aeronautics' official position on residential, commercial, and noncommercial aeronautical TTF operations at publicly owned, public-use airports eligible to receive state investment via the State Airports Fund.[21] The purpose of this guidance is to define when each type (i.e., commercial, noncommercial aeronautical, residential) of TTF access is permitted at state system airports, establish MnDOT's responsibilities for reviewing and/or approving proposed/existing developments, and

[21] *It is assumed that all proposed commercial TTF activities are aeronautical in nature.*

provide guidance to MnDOT personnel when conducting review and/or approval processes (as applicable).

As its guiding principles, MnDOT Aeronautics has established this Position Statement to ensure all TTF operations in Minnesota:

- Comply with all applicable Minnesota State Statutes and Administrative Rules
- Provide a benefit to civil aviation
- Maintain or enhance the long-term viability, safety, security, efficiency, utilization, and economic well-being of the airport and airport sponsor

MnDOT Aeronautics has adopted specific guidance for (1) federally-obligated airports, and (2) facilities only eligible to receive state investment (also referred to as "state-only airports"), each of which is presented in the sections that follow. MnDOT Aeronautics shall limit its approval to proposed new developments; however, existing developments must still comply with the **MnDOT TTF Standards** (see page 34) for the airport to remain eligible to receive state funding. Airports with existing TTF operations must establish a compliant TTF access agreement as soon as feasible, either immediately if no TTF access agreement exists or upon contract renegotiation at airports with executed TTF access agreements in-place.

FEDERALLY-OBLIGATED AIRPORTS

MnDOT Aeronautics shall limit its review of proposed new residential, commercial, and noncommercial aeronautical TTF access agreements to non-federally-obligated airports (airports may be federally-obligated due active grant obligations or surplus/non-surplus property conveyances). This is because the FAA maintains stringent policies associated with existing and proposed new TTF access agreements at federally-obligated airports developed in accordance with applicable federal laws and regulations. As such, MnDOT Aeronautics will not issue any recommendation that differs from the FAA as to not place airports potentially in-conflict with existing grant assurances and/or at-risk for losing future federal investment.

While MnDOT Aeronautics will support the FAA's decision to permit or deny TTF access at federally-obligated airports, access agreements, rates and charges, and other provisions must meet or exceed the state-specific standards established in the **MnDOT TTF Standards** (see page 34). Additionally, airports must comply with all applicable state and local laws, regulations, and ordinances including but not limited to:

- Minnesota Statutes Chapter 360.061 through 360.074 (airport zoning)
- Minnesota Administrative Rules Parts 8800.1400 through 8800.2300 (airport licensing)
- Minnesota Administrative Rules Parts 8800.2400 (airport zoning standards)

Commercial TTF operators providing any services on-airport property must hold applicable licenses as defined in Minnesota Administrative Rules Parts 8800.3100 through 8800.3950.

A summary of federal statutes and the FAA's implementing regulations and policies associated with TTF operations follows below.

RESIDENTIAL TTF

The FAA strongly discourages the development of residential TTF operations at federally-obligated airports due to potential conflicts with federal grant assurances as defined in 85 Federal Registrar 12048 (current as of December 2021).[22] Such conflicts may hinder an airport's ability to receive federal investment via the AIP, either now or in the future.

- General Aviation Airports
  - While discouraged, the FAA permits residential TTF development at GA airports under of Section 136 of the FAA Modernization and Reform Action of 2012 (P.L. 112-95). Agreements must comply with specific terms and conditions contained in the law.
  - Section 185 of the FAA Reauthorization Act of 2018 (P.L. 115-254) grandfathers in certain residential TTF operations established prior to 2012 that do not comply with Section 136 that are considered perpetual and cannot readily be changed. Section 185 does not apply if an existing agreement can be modified.
  - New and existing residential TTF agreements at GA airports must be reviewed by the applicable FAA ADO and Regional Office.
- Commercial Service Airports
  - New residential TTF agreements are prohibited at commercial service airports in accordance with Grant Assurance 5(g).
  - Existing TTF agreements at commercial service airports may be permitted if grandfathered under Section 185 of P.L. 115-254. Access plans must address the terms and conditions contained in P.L. 112-95 and be consistent with sponsor assurances. Existing TTF agreements must be reviewed by the applicable FAA ADO, Regional Office, and ACO-100. Section 185 does not apply if an existing agreement can be modified.

COMMERCIAL AND NONCOMMERCIAL AERONAUTICAL TTF

Commercial and noncommercial aeronautical TTF access agreements are permitted at GA and commercial service airports. Such agreements must comply with all applicable provisions of FAA Order 5190.6B, *Airport Compliance Manual*, and AC 150/5190-7, *Minimum Standards for Commercial Aeronautical Activities*.

STATE-ONLY AIRPORTS

State-only airports represent those facilities that are not deemed significant to the National Airspace System (NAS) but can play a valuable role in their local communities, regions, and statewide. State-only airports in Minnesota exclusively support GA activities, and many are in the state's most rural areas. Because TTF operations can provide a valuable economic opportunity for airports and the communities in which they are located, MnDOT Aeronautics permits TTF access agreements after undergoing stringent review processes. The review process will be conducted with the highest standard of care due to the

[22] *More information about grant assurances is available at https://www.faa.gov/airports/aip/grant_assurances/ (accessed December 2021).*

inherent risks to the airport sponsor, existing or future on-airport tenants, and the surrounding population.

MnDOT Aeronautics shall follow the detailed process described in **Process for Reviewing Proposed TTF Operations** (below) to review proposed TTF developments at state-only airports. Access agreements must address the provisions established in the **MnDOT TTF Standards** (see page 34). Airports with TTF operations in violation of these standards may lose eligibility to receive state investment through the State Airports Fund. Violations may occur without the airport sponsor's knowledge or awareness; however, this does not eliminate nor negate responsibility. The airport sponsor retains full responsibility for enforcing the terms and conditions of signed TTF access agreements to maintain eligibility to receive state investment.

PROCESS FOR REVIEWING PROPOSED TTF OPERATIONS

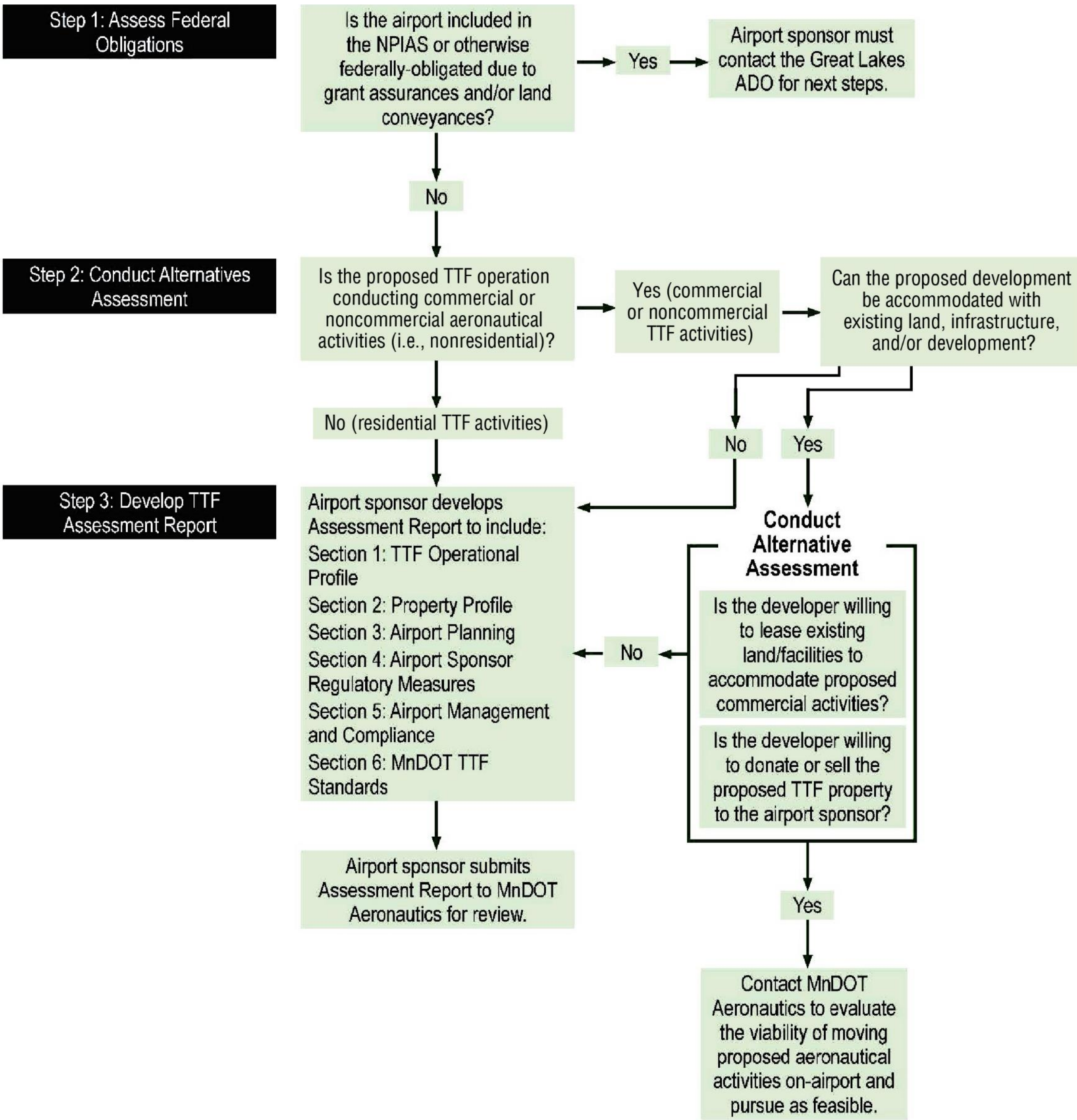
MnDOT Aeronautics will work closely with airport sponsors to ensure proposed residential and commercial TTF operations are in the best interest of their airport; existing and potential future airport tenants, operators, and users; and the air traveling public. MnDOT Aeronautics will maintain focused attention to support the long-term viability of the airport throughout the review and approval processes.

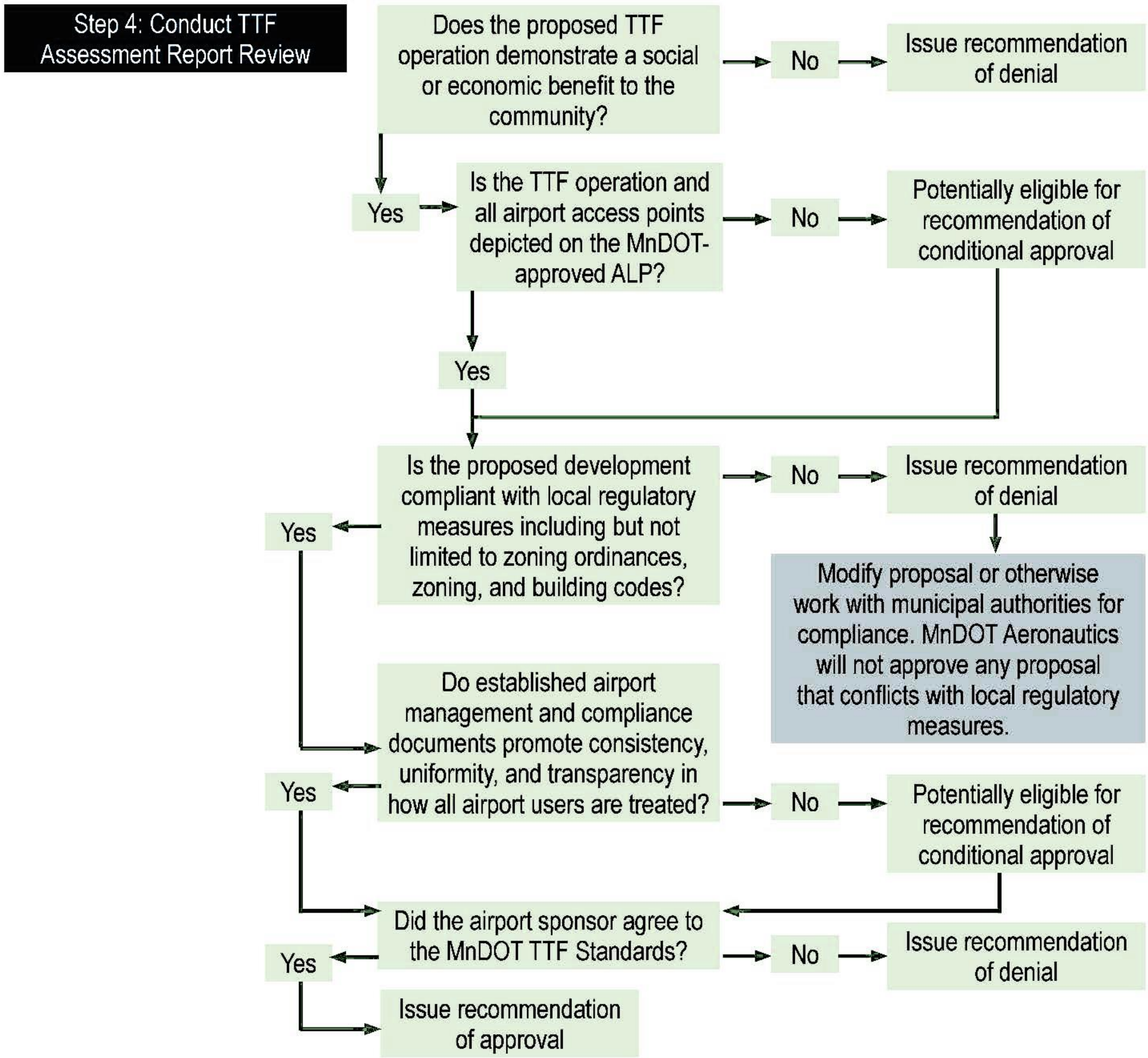
Receiving final MnDOT Aeronautics approval for the development of a TTF operation is a multistage process. In the first step, airport sponsors evaluate potential alternative development options. Airport sponsors then development an Assessment Report, which documents compliance with all state and local laws and broadly collects the information needed to make an informed decision regarding permitting or restricting TTF operations. If MnDOT Aeronautics issues an initial recommendation of approval based on the information provided in the Assessment Report, the airport sponsor and TTF operator develop a TTF access agreement agreeable to all parties. The TTF access agreement is presented to MnDOT Aeronautics for comments and to ensure the agreement minimally adheres to the MnDOT TTF Standards. However, MnDOT Aeronautics is not responsible for approving the specific agreement. The TTF access agreement is a legal contract between the airport sponsor and TTF entity that should:

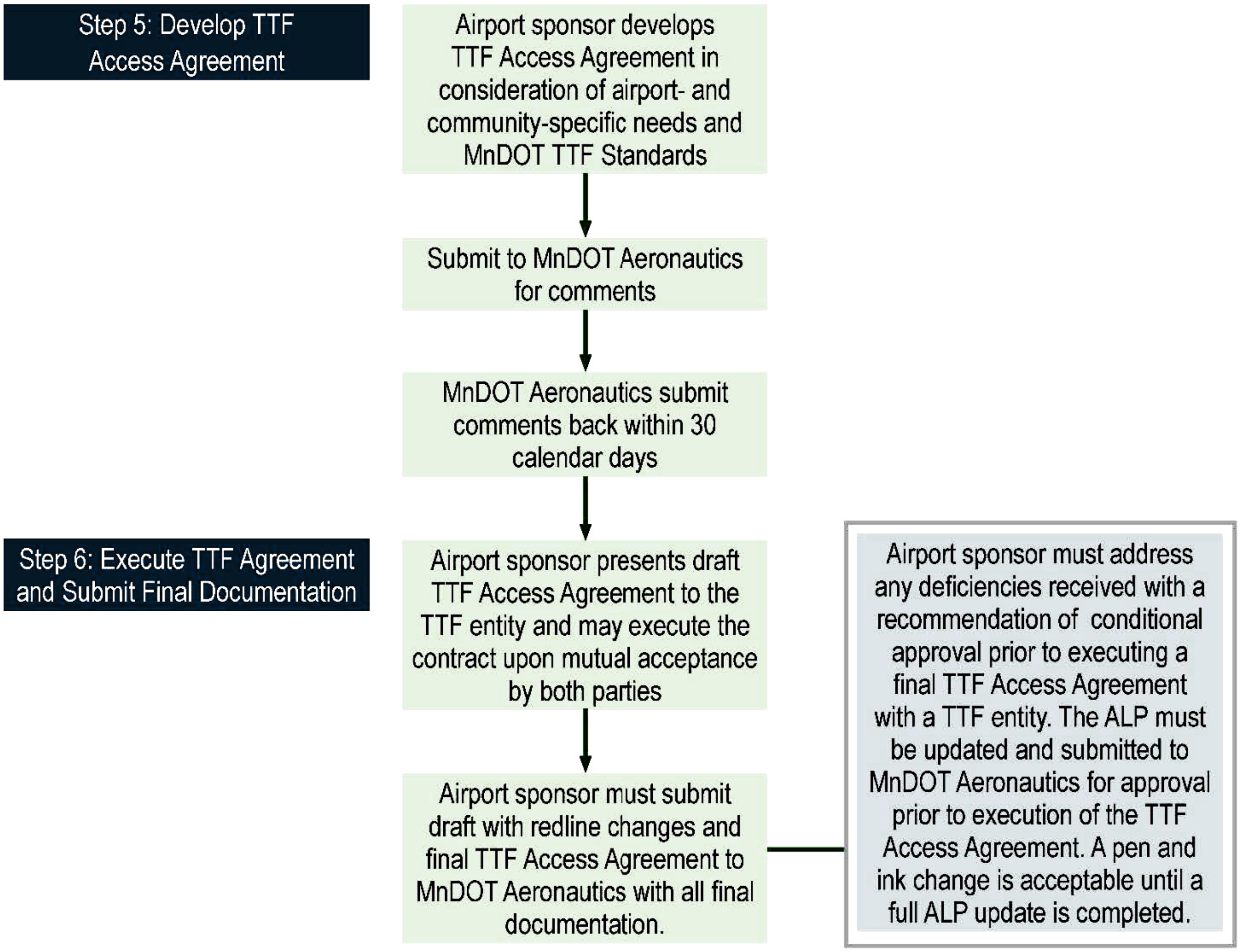
- Comply with all state and federal laws
- Clearly outlines the responsibilities, rights, and obligations of all parties
- Establish an equitable schedule of rates and charges
- Otherwise protect the airport sponsor and on-airport operators, tenants, and other users

Because a TTF access agreement should specifically reflect the situation at-hand, the airport sponsor is ultimately responsible for its contents, execution, and enforcement through the terms of the agreement. Each of these steps is discussed in detail in this section, with the overall decision-making process depicted in **Figure 4**. Airport sponsors are strongly encouraged to review the guidance provided in ACRP Report 114: *Guidebook for Through-the-Fence Operations*. Chapter 5: Assessing TTF Operations provides details about how to identify the advantages and disadvantages of TTF access agreements, best practices associated with the assessment processes, and detailed worksheets including a comprehensive list of data that may be valuable in assessing existing or new TTF operations.

Figure 4. Process for Reviewing Proposed TTF Operations




Step 4: Conduct TTF Assessment Report Review
Does the proposed TTF operation demonstrate a social or economic benefit to the community?
No
Issue recommendation of denial
Yes
Is the TTF operation and all airport access points depicted on the MnDOT-approved ALP?
No
Potentially eligible for recommendation of conditional approval
Yes
Is the proposed development compliant with local regulatory measures including but not limited to zoning ordinances, zoning, and building codes?
No
Issue recommendation of denial
Modify proposal or otherwise work with municipal authorities for compliance. MnDOT Aeronautics will not approve any proposal that conflicts with local regulatory measures.
Yes
Do established airport management and compliance documents promote consistency, uniformity, and transparency in how all airport users are treated?
Yes
No
Potentially eligible for recommendation of conditional approval
Did the airport sponsor agree to the MnDOT TTF Standards?
Yes
No
Issue recommendation of denial
Issue recommendation of approval



Source: Kimley-Horn, 2021

Step 1: Assess Federal Obligations

As discussed in the MnDOT Position Statement, MnDOT Aeronautics is only responsible for conducting a comprehensive review and approval of TTF operations at state-only airports. Federally-obligated airports (due to active grant obligations or surplus/non-surplus property conveyances) are required to follow federal statutes and implementing regulations. As such, these airports should coordinate with the FAA Great Lakes Regional Office to evaluate the potential for developing TTF access agreements. MnDOT Aeronautics will permit any proposed development in accordance with the FAA's recommendations (i.e., approval or denial). Federally-obligated airports must meet or exceed all state and local laws and regulations as well as the minimum requirements established by the MnDOT TTF Standards to maintain eligibility for state investment. An overview of FAA compliance procedures is provided in Federally-obligated Airports starting on 20.

Step 2: Conduct Alternatives Assessment (Commercial and Noncommercial Aeronautical TTF Only)

Before evaluating the feasibility and efficacy of developing a commercial or noncommercial aeronautical TTF operation at a specific airport, airports sponsors should work closely with the proposed developer to determine if such operations would be better suited on-airport property. By promoting on-airport aeronautical development, airport sponsors mitigate some risks in terms of conflicts with existing or future operators, tenants, and other users; may allow for greater control over on-airport activities and airport access; and may maintain greater flexibility over future airport development. ACRP Report 114 recommends carefully considering the following development alternatives (p. 64):

- Assess existing on-airport land, infrastructure, and improvements to identify if the proposed development could be accommodated using existing facilities. If yes, the airport sponsor should work with the proposed developer to understand if they would be willing to relocate all or some of the development on-airport.
- Assess the ability of the airport sponsor to acquire the proposed TTF property and effectively "move the fence." Note any purchases would likely require state support via the State Airports Fund and should be closely coordinated with MnDOT Aeronautics.

If neither of these alternative scenarios are viable or if the airport sponsor or developer are unwilling to consider on-airport activities, proceed to Step 3.

Step 3: Develop TTF Assessment Report

The TTF Assessment Report is a comprehensive document that provides airport sponsors and MnDOT Aeronautics with the information necessary to make an informed decision regarding a proposed commercial or residential TTF operation. The airport sponsor is required to develop the TTF Assessment Report in full, which is then transmitted to MnDOT Aeronautics for review. The TTF Assessment Report cannot be funded by state dollars, and its development if the full responsibility of the airport sponsor. The TTF Assessment Report must provide the following data in the order presented.

Section 1: TTF Operation Profile

Section 1 of the TTF Assessment Report provides a summary of the basic characteristics of the proposed TTF entity and operation by completing the following table. Airports may provide additional narrative regarding why the proposed operation provides a net positive benefit to the airport and community and the steps the airport has taken or will take to mitigate against the major issues generally associated with TTF operations.

TTF Characteristic	Response
Type of TTF Activity	☐ Residential (commonly referred to as "hangar homes") ☐ Commercial Aeronautical (aeronautical activities for profit) ☐ Aeronautical Noncommercial (aeronautical activities for not for profit)
Summary of Proposed Activity[1]	
Number and Type of Aircraft	
Estimated Operations per Month Anticipated by Type[2]	☐ Single-engine: _____ / month ☐ Multi-engine: _____ / month ☐ Jet: _____ / month ☐ Helicopter: _____ / month
Number of Jobs Supported by Type[3]	
Economic Impacts (Total Airport)[4]	This section should include four metrics for the current conditions (2018) and for the proposed new TTF operation: Employment (number), Payroll ($), Spending ($), and Total Economic Impact ($).
Summary of Benefits to Civil Aviation	
Summary of Social Benefits to the Community, such as Emergency Services or Access to Aviation Services for Underserved Communities	

Notes: (1) If residential, this should include the number of homes at initial and maximum build-out (if development is to be phased). If commercial/noncommercial aeronautical, this should specify the type of activities to be performed. (2) An operation

is defined as a take-off and a landing. (3) e.g., Aircraft mechanic [2]. Annual compensation: $35,000. (4) Using the MnDOT Aviation Economic Impact Calculator, provided the current [2018] and anticipated future economic impacts of the airport based on the inclusion of the proposed TTF operation. Consider jobs, capital improvements, and visitors when preparing your response. The MnDOT Aviation Economic Impact Calculator is accessible online at http://www.dot.state.mn.us/airport-economic-study/.
Sources: Kimley-Horn, 2021; ACRP Report 114, 2014

Section 2: Property Profile

Section 2 of the TTF Assessment Report shall provide a narrative and visual depiction of existing airport land and facilities in relation to the TTF development. Airport sponsors should complete the following table and submit a map in sufficient detail to depict each item (as applicable) in Appendix A.

Property Attribute	On-Airport	TTF Property
Size (acres)		
Existing/Proposed Structure(s)	N/A	
Proximity of Existing/Proposed TTF Structure(s) to Airport Infrastructure	N/A	
Access Points		
Available Utilities		
Known Environmental Issues		

Sources: ACRP Report 114, 2014; Kimley-Horn, 2021

Section 3: Airport Planning

Airport planning documents provide the framework for future airport development. In various ways, these tools define the airport's vision, goals, and objectives, as well as outline actionable steps to achieve a desired future state. Documents such as master plans or ALP narratives also help the airport maintain compliance with applicable laws, regulations, and design standards. The TTF Assessment Report should identify the availability of planning documents including but not limited to:

- ALP with narrative
- Master plan
- Business plan

Copies of all planning documents should already be on-file with MnDOT Aeronautics. As such, indicate the year(s) of all current planning documents in the TTF Assessment Report so MnDOT Aeronautics can confirm that the agency has the most current copies on-file for review.

Provide a narrative highlighting the specific reasons why the proposed TTF operation supports the airport sponsor's long-term goals. In areas where the proposed development fails to align with existing planning documents, the airport sponsor should provide justification for why the deviation is acceptable. In such cases, it is recommended that the airport sponsor revise its planning documents to ensure clarity of purpose and a coordinated strategy in achieving the airport's long-term goals.

Section 4: Airport Sponsor Regulatory Measures

Airport sponsors have two primary mechanisms to regulate the planning, development, operation, management, and use of an airport: (1) municipal ordinances, zoning codes, and building codes and (2) land use and other plans established as the landowner.[23] In general, such regulatory mechanisms are developed to protect the safety, security, economic well-being, and welfare of the people and property under their jurisdictions. This section of the TTF Assessment Report should provide the information necessary to evaluate if the proposed TTF development would comply with existing regulatory mechanisms established by local governments, including but not limited to:

- Ordinances
- Zoning codes
- Building codes
- Land use plan
- Local/regional comprehensive plan
- Local/regional transportation plan

The information provided in this section of the TTF Assessment Report must clearly indicate if the proposed development complies with all applicable local regulatory measures. This information should be provided in a table format using the following template (add more rows as required).

Regulation/ Plan[1]	Type[2]	Jurisdiction[3]	Summary	Will the TTF Operation Be Compliant with this regulation? (Yes/No)

Notes: (1) Indicate chapter and subsection number and title [as applicable]. (2) Indicate ordinance, local zoning code, building code, or other [specify]. (3) Indicate municipality, county, or airport-specific. Source: Kimley-Horn, 2021

It is the full responsibility of the airport sponsor to identify and review municipal, county, and airport-specific regulatory measures including planning documents to determine pertinence to TTF operations. MnDOT Aeronautics will not conduct an independent review of local measures to ensure the information submitted in the TTF Assessment Report is accurate and complete. If current regulatory measures do not

[23] *ACRP Report 114 (2014), p. 72.*

address TTF operations, it is recommended that airport sponsor develop new or amend existing regulations to address permitting TTF operations.[24]

This section of the TTF Assessment Report must also indicate compliance with the restrictions associated with MnDOT Zones A, B, and C and clear zones. Zoning and clear zones must be depicted on the airport vicinity map submitted as Appendix A of the TTF Assessment Report.

Section 5: Airport Management and Compliance

Airport management and compliance documents generally establish the terms and conditions by which airport users must abide and the policies that govern airport sponsor and user activities. Documents promote consistency, uniformity, and transparency in the way that airport users are treated, and the fees assessed to them. Additionally, documentation serves as an important mechanism for ensuring that the airport remains compliant with Minnesota airport licensing standards and state grant obligations (as applicable). Airport management and compliance documents may include:

- Leasing/rents and fees policy: Framework for leasing airport land for commercial and noncommercial purposes including the process for setting and adjusting rents and fees
- Minimum standards: Qualifications and standards that must be met as a condition of using the airport for commercial and non-commercial purposes
- Rules and regulations: Policies applicable to all airport users (e.g., operators, tenants, users, guest, TTF entities) "designed to protect the health, safety, and general welfare of the public and ensure the safety, utility, and efficiency of the airport for the benefit of the public."[25]
- Development standards: Standards and procedures governing the development of all aeronautical- and non-aeronautical land, infrastructure, and improvements affecting airport property

At a minimum, airport sponsor must develop a leasing/rents and fees policy, minimum standards, and rules and regulations specifically tailored to address TTF operators.[26] The TTF Assessment Report must include these documents as Appendix B. All terms and conditions established in airport management and compliance documents must address the provisions of the MnDOT TTF Standards provided on page 34.

Section 6: MnDOT TTF Standards

MnDOT TTF Standards must be adhered to at all airports with residential, commercial aeronautical, and noncommercial aeronautical TTF operations. Section 6 of the Assessment Report must include a specific acknowledgement that the airport sponsor understands and accepts all MnDOT requirements associated with TTF operations and management. This certifies that the airport sponsor understands the expectations established as a condition of MnDOT Aeronautics' approval of a TTF access agreement. It is

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[24] ACRP Report 114 provides guidance and best practices regarding municipal and airport-specific mechanisms for managing TTF operations in Chapter 6: Structing TTF Operations and Chapter 7: Managing TTF Operations.

[25] ACRP Report 114 (2014), p. 56.

[26] While development standards are an effective way to protect on- and off-airport investment, maintain the preferred appearance of airport facilities, and support sustainability goals through "green" building practices, this document is not mandatory. Development standards are considered a "best practices" for Minnesota state system airports but are neither a condition of state funding nor considered during MnDOT's TTF review/approval process.

important to note that MnDOT TTF Standards do not provide comprehensive terms and conditions appropriate for all types of TTF operations at all state system airports. Airport sponsors must execute a specific TTF access agreement with each TTF entity reflective of the needs of their unique circumstances.

Airport sponsors knowingly or unknowingly in violation of the MnDOT TTF Standards risk losing eligibility for state investment. It is strongly recommended that airport sponsor's legal counsel review the MnDOT TTF Standards and airport management and compliance documents (described in Section 5 on preceding page) to ensure enforceability and compliance with local laws and regulations. Any MnDOT TTF Standards not compliant with local statutes/regulations may be waived by MnDOT Aeronautics, although such exceptions are anticipated to be rare.[27]

Appendices

Include all required documentation as follows:

- Appendix A: Airport Vicinity Map
- Appendix B: Airport Management and Compliance Documents

Airport sponsors should submit the completed TTF Assessment Report and all required appendices/documents to MnDOT Aeronautics for review.

Step 4: Conduct TTF Assessment Report Review

Documentation should be submitted to the appropriate MnDOT Regional Planner via email. MnDOT Aeronautics will review the TTF Assessment Report and associated appendices/documentation in consideration of the evaluation components outlined in Table 3.

Table 3. MnDOT Aeronautics Evaluation Components for Proposed TTF Access Agreement

Evaluation Components	Requirements/Compliance Guidance
Benefit to the airport and community	- Proposed TTF operations must provide a demonstrable benefit to the airport and/or sponsor. In many cases, this benefit is financial in terms of revenue generation, job creation, expansion of the tax base, etc. - Other benefits may include an increase in aircraft operations or based aircraft; the provision of aviation/aeronautical services, products, or facilities; or the availability of emergency services such as air medical transport, search and rescue, and aerial firefighting activities for the local community.
Compliance with all existing airport planning documents	- All properties with TTF access and airport access points must be depicted on the MnDOT-approved ALP. MnDOT Aeronautics may grant conditional approval if proposed developments are not yet depicted on the ALP; however, the ALP must be updated prior to executing a TTF access agreement. - ALP updates triggered exclusively by proposed TTF access agreements are not eligible for state funding. However, the inclusion of a TTF entity/access point may be eligible for state funding as a component of an ALP update otherwise eligible for state funding.

[27] *Waiver requests will be evaluated on a case-by-case basis. Contact the airport's regional planner for further instructions about requesting a MnDOT TTF Standards waiver.*

Evaluation Components	Requirements/Compliance Guidance
	- TTF access agreements that negatively impact future airport expansion will not be approved by MnDOT Aeronautics.
Compliance with all local and state regulatory measures	- MnDOT Aeronautics will not approve any proposed developments in conflict with existing state or local regulations. - TTF entities are not permitted in MnDOT Zone A or Zone B and must comply with the height restrictions associated with Zone C. - Airport sponsors must comply with the MnDOT Clear Zone Guidance (2021) through 100 percent fee simple ownership of all clear zones based on ultimate build-out conditions or by having a MnDOT-approved CZAP.
Established airport management and compliance documents that promote consistency, uniformity, and transparency in how all airport users are treated	- Airport sponsors must establish a leasing/rents and fees policy, minimum standards, and rules and regulations that address TTF access and entities. - All compliance documents must promote consistency, uniformity, and transparency between conventional airport operators, tenants, and users and TTF entities. This is particularly important for on- and off-airport providers of commercial aeronautical activities. - The standards established in all airport management and compliance documents must meet or exceed state requirements as provided in the MnDOT TTF Standards. - MnDOT Aeronautics may grant conditional approval of a proposed TTF access agreement prior to having final airport management and compliance documents; however, these documents must be developed and approved by MnDOT Aeronautics prior to executing a TTF access agreement.

Source: Kimley-Horn, 2021

In addition to the evaluation components outlined in Table 3, airport sponsors must specifically acknowledge the MnDOT TTF Standards. Airport sponsors that cannot comply with a specific provision due to conflict(s) with local regulations may still receive MnDOT Aeronautics approval if adequate justification is provided.

Based on the evaluated noted above, MnDOT Aeronautics will issue one of the following findings based on the data submitted in the Assessment Report:

- **Preliminary recommendation of approval:** MnDOT Aeronautics deems that the proposed TTF operation will have a positive impact on the airport and/or community and is in full compliance with the requirements established in the MnDOT TTF Guidance to Airports.
- **Conditional recommendation of approval:** MnDOT Aeronautics deems that the proposed TTF operation will have a positive impact on the airport and/or community but is otherwise in conflict with at least one requirement of the MnDOT TTF Guidance to Airports. Airport sponsors that receive a conditional approval may proceed with drafting a TTF access agreement, but any deficiency must be addressed prior to executing that agreement.
- **Recommendation of denial:** MnDOT deems that the proposed TTF operation will not positively impact the airport and/or community or is otherwise in conflict with the requirements established in the MnDOT TTF Guidance to Airports that cannot be easily rectified.

If denied, the airport sponsor may revise its application for reconsideration for a maximum of two reviews per proposed TTF development.

Step 5: Develop TTF Access Agreement

Airport sponsors that have received a preliminary or conditional recommendation of approval are permitted to draft a TTF access agreement. Section 136 of P.L. 112-95 states that an access agreement for residential TTF activities shall "prescribe the rights, responsibilities, charges, duration, and other terms" the airport sponsor deems necessary. MnDOT Aeronautics requires that such an agreement be extended to include all types of TTF activities (i.e., residential and commercial/noncommercial aeronautical). Chapter 6 of ACRP Report 114 provides best practices associated with structuring TTF agreements and offers insight into common topics for inclusion.[28] It is recommended that airport sponsors review this guidance prior to drafting a TTF agreement. Additionally, terms and conditions provided in the TTF access agreement must meet or exceed those established in the MnDOT TTF Standards; however, these standards are not designed to serve as or replace all terms and conditions that should be included in a well-crafted TTF access agreement. Instead, MnDOT's TTF Standards provide minimum guidance on select topics important for all state system airports. Each airport's TTF access agreement should be developed in consideration of airport-specific needs and requirements and address topics such as (but not limited to):

- Terms of the agreement
- TTF access rights
- Permitted TTF activities
- Specific rents and fees
- Terms and responsibilities associated with infrastructure improvements and maintenance
- Hold harmless, indemnification, and insurance requirements

In addition to these specific topics, TTF access agreement should include copies of all applicable airport management and compliance documents including:

- Leasing/rents and fees policy
- Minimum standards
- Rules and regulations

The draft TTF access agreement shall be submitted to MnDOT Aeronautics prior to execution. While MnDOT Aeronautics has the option of reviewing and commenting upon the TTF access agreement, the airport is fully responsible for the terms established therein. As such, MnDOT Aeronautics is not responsible for approving the TTF access agreement beyond ensuring it reflects the MnDOT TTF Standards. It is strongly advised that the TTF access agreement be reviewed by the sponsor's legal counsel prior to submission to MnDOT Aeronautics. MnDOT Aeronautics has a period of 30 calendar days to submit comments on the TTF access agreement back to the airport sponsor.

Step 6: Execute TTF Agreement and Submit Final Documentation

[28] *ACRP Report 114 (2014), pgs. 94 – 119.*

Once the 30-day MnDOT review/comment period has elapsed, the airport sponsor can present the TTF access agreement to the proposed TTF entity for execution. Any changes that occur during the contract negotiation process should be submitted with redlines/track changes to MnDOT Aeronautics so they can be easily identified by the department. Any issues identified in a conditional recommendation of approval must be addressed and approved by MnDOT Aeronautics prior to contract execution.

The executed TTF access agreement and any final documentation associated with the contract shall be submitted to MnDOT Aeronautics for record-keeping purposes.

MNDOT TTF STANDARDS

MnDOT Aeronautics has established a set of conditions required to conduct TTF activities at airports eligible to receive state investment via the State Airports Fund. The MnDOT TTF Standards are not comprehensive terms and conditions associated with the planning, development, and management of TTF operations at publicly owned, public-use airports. Instead, these standards are minimum, baseline requirements for all state system airports hosting a commercial/noncommercial aeronautical or residential TTF entity. Airport sponsors must develop their own TTF access agreements that meet the needs of their airport and the community in which it is located. Airport sponsors must explicitly confirm their acceptance of the MnDOT TTF Standards to receive MnDOT's approval to host a TTF entity unless these standards conflict with local regulations.

The MnDOT TTF Standards were developed recognizing that airports benefit from having a vested user base, and TTF operations can offer significant economic and social benefits to communities and airports. However, such operations come with some risks associated with conflicts with other existing or future users; airport sponsor/TTF entity responsibilities, obligations, and rights; grant obligations; and other potential issues. It is strongly recommended that airports enter into TTF access agreements only after carefully weighing the advantages and disadvantages at their airport with their stakeholders.

In order for airports with residential or commercial TTF operations to remain eligible to receive state support, airport sponsors must abide by the following principles:

- Airport sponsor must adopt or amend minimum standards to dictate the parameters for conducting TTF operations. MnDOT Aeronautics has developed a minimum standards template for airports available online at http://www.dot.state.mn.us/aero/operations/airportminimumstandards.html. These minimum standards should be amended to specifically reflect TTF entities at the airport.
- Airport sponsors must have an executed TTF access agreement with each TTF entity tailored to the needs of their community and airport. MnDOT Aeronautics has developed some guidance to Minnesota Airports in Step 5 of the Process for Reviewing Proposed TTF Operations; however, this guidance is not comprehensive to all topics that should be addressed in a well-crafted TTF access agreement.
- All parties (i.e., TTF entity and the airport sponsor) must agree to a deed restriction recorded with the County Clerk and Recorder certifying that TTF property shall be developed in accordance with the airport compatible land use and height restrictions established by Minnesota Statutes Chapter 360.061 through 360.074 (airport zoning) and implemented by Minnesota Administrative Rules Part 8800.2400 (airport zoning standards). Note that TTF access should not

be deeded, especially into perpetuity, as this instrument is highly restrictive and difficult to unilaterally terminate should circumstances change over time.

- Airport sponsor shall develop strong access restrictions that protect against unauthorized users' accessing airport property. This may include full perimeter fencing (recommended) and controlled access points using gate codes, access cards, or other security measures (required). All users entering the airport via TTF access points must be preauthorized by the airport sponsor.[29] Authorized TTF entities are not permitted to grant the owners/users of other properties access to the airport via the subject TTF property.
- TTF access should be provided using the minimum number of access points and taxiways to provide reasonable access to the airport from adjacent properties. In many cases, this means that access should be provided through one controlled access point. In no cases shall individual "hangar homes" have individual access to airport property.
- The TTF entity is fully responsible for developing and maintaining the infrastructure necessary to provide access to the airport from the adjacent property. Under no circumstances shall public money be used on maintenance or improvement projects specifically used for the benefit of TTF users, unless such responsibilities are clearly defined in the TTF access agreement with commensurate fees established.
- Specific leases, rents, and fees, as well as the policies that govern those structures, must be the same (required) or higher (preferred) as those assessed to on-airport operators, tenants, and other users conducting similar activities. TTF entities must also be subject to commensurate insurance, hold harmless, indemnification, and security requirements as on-airport users to ensure a "level playing field."
- Commercial TTF operators providing any services on-airport property must hold applicable licenses as defined in Minnesota Administrative Rules Parts 8800.3100 through 8800.3950.

Airport sponsors must specifically acknowledge their understanding and acceptance of the MnDOT TTF Standards in Section 6 of the Assessment Report. Any standards that cannot be adhered to due to local regulations may be waived by MnDOT Aeronautics should appropriate justification be provided. Such waivers are anticipated to be rare.

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[29] The airport sponsor may grant TTF access rights to a Homeowners Association (HOA). In such cases, the airport sponsor is responsible for reviewing the community's covenants, conditions, and restrictions (CC&Rs) to ensure this regulatory mechanism is consistent with the airport's management and compliance documents. As applicable, the CC&Rs should clearly specify TTF access rights such as method of access and control; aircraft, vehicle, and pedestrian access rights; and periods of access. Homeowners who do not abide by the CC&Rs may lose TTF access rights permanently or for a specific duration.

Summary

Throughout this document, the significant pros and cons of TTF operations have been highlighted repeatedly. With carefully crafted contracts, ongoing communication, and clear lines of responsibilities, residential and commercial TTF operations can offer new vitality to the airports and the communities where they are located. This is particularly true of some of the state's smallest and more rural airports, which have been hard-hit by concurrent trends of urbanization and an overall decline of GA activity levels.

A residential TTF development may provide a new tax base for municipal and county governments as well as a stable customer base for fuel sales and on-airport aeronautical service providers such as FBOs and MROs. Commercial TTF operations can also meet aviation-related demands at airports where development constraints exist including, but not limited to, providing aircraft storage facilities at airports where the need is most acute. Conversely, airports with poorly structured administrative documents or a lack of enforcement of written policies can find themselves in major conflicts with on-airport operators, tenants, and other users as well as public funding agencies.

Because of the long-term implications of executing a TTF access agreement, airport sponsors, stakeholders, and the community should carefully reflect on their visions for the airport. TTF operations must help advance that vision and not impede its ability to grow and develop to meet the needs of the on-airport users and the community. MnDOT Aeronautics TTF Guidance to Airports and associated review/approval processes are designed to provide the agency and airport sponsors with the information needed to make an informed and well-considered choice regarding TTF operations at specific airports and in specific communities. Like so many topics in aviation, electing to permit or prohibit TTF operations is rarely a "one-size-fits-all" solution but requires careful reflection by all stakeholders involved in the decision-making process.

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.

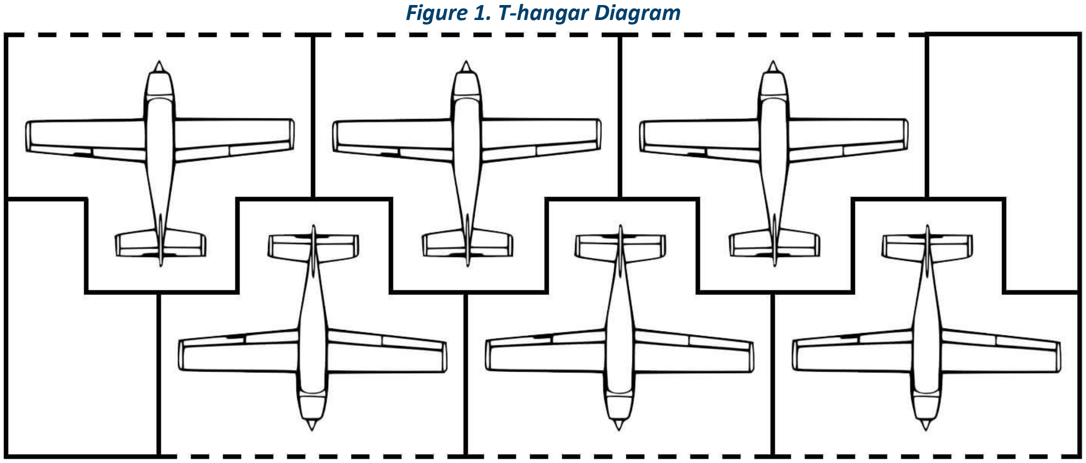
[1] *FAA (2021). "Aircraft Registration." Available online at https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/releasable_aircraft_download/ (accessed July 22, 2021).*

1.2.1. INVENTORY REVIEW

As a part of the 2022 MnSASP, a comprehensive airport inventory was completed across the Minnesota state airport system. The inventory process primarily included collecting data through the MnSASP Airport Inventory Form. Disseminated to all 133 airports in the system during the data collection in the spring of 2021, this form requested information about airport facilities, services, and activities, among other topics. Airport managers were asked to provide detailed information about available hangar facilities, current occupancy levels, and rates and charges established for airport-owned hangars.[2]

Two types of hangars were assessed as a part of the MnSASP inventory effort: T-hangars and conventional (box) hangars. T-hangars typically enclose multiple spaces that are nested in a "T" shape to store small general aviation (GA) aircraft such as a Cessna 150 or Beechcraft Bonanza. Box hangars are typically standalone facilities that store larger aircraft including business and commercial jets. Airports were also asked to provide box hangar capacity by based and transient aircraft usage. Figure 1 and Figure 2 illustrate examples of the two most common hangar types.

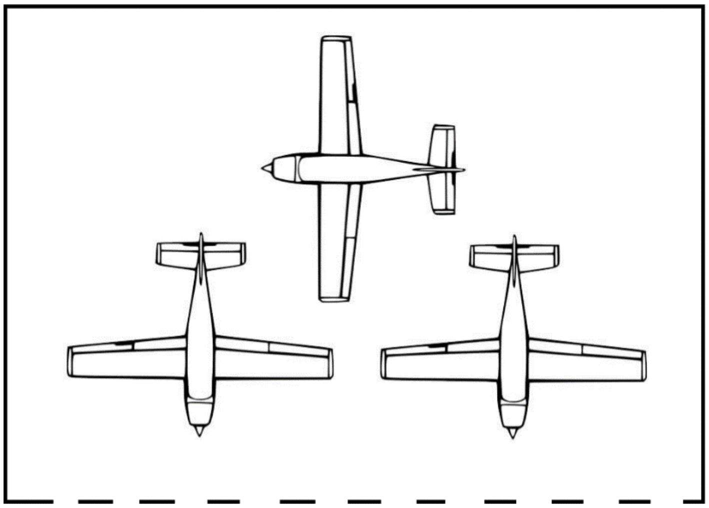
Figure 1. T-hangar Diagram



Source: TechSpan Building, 2021

[2] *Some hangars on airport property are privately owned on land leases. While the MnSASP did request information regarding land leases, this assessment focuses on available public infrastructure for aircraft storage.*

Figure 2. Box Hangar Diagram



Source: TechSpan Building, 2021

The following subsections provide a summary of the hangar capacity, occupancy, and established rates and charges assessed for airport-owned hangars across the state aviation system.

1.2.1.1. Total Hangar Capacity

Data obtained on the MnSASP Airport Inventory Form identified 4,998 hangar spaces distributed among 130 airports in the state.[3] As shown in **Table 1**, this includes 2,150 T-hangar spaces, 2,749 box hangar spaces for based aircraft, and 99 box hangar spaces for transient aircraft.[4]

Table 1. Total Hangar Capacity by Type[5]

State Classifications	Number of Airports	T-Hangar	Box Hangar – Based Aircraft	Box Hangar – Transient Aircraft	Total Hangar Capacity
Key Commercial Service	9	313	174	35	522
Key General Aviation	22	597	1,066	30	1,693
Intermediate Large	36	537	711	12	1,260
Intermediate Small	45	682	676	22	1,380
Landing Strip Turf	18	21	122	0	143
Total	**130**	**2,150**	**2,749**	**99**	**4,998**

Source: MnSASP Inventory Data, 2021

3 Three airports in the state aviation system do not currently have any hangar capacity: Grygla Municipal Airport (3G2), Piney-Pinecreek Border Airport (48Y), and East Gull Lake Airport (9Y2).
4 Airport managers were asked to provide an estimated number of spaces based on the type of aircraft that typically use their facilities.
5 Ibid.

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 Classification [6]

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 are 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 Classification[7]

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 airports[9] 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 Condition[10]

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 airports[11] 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 additional 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, 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.

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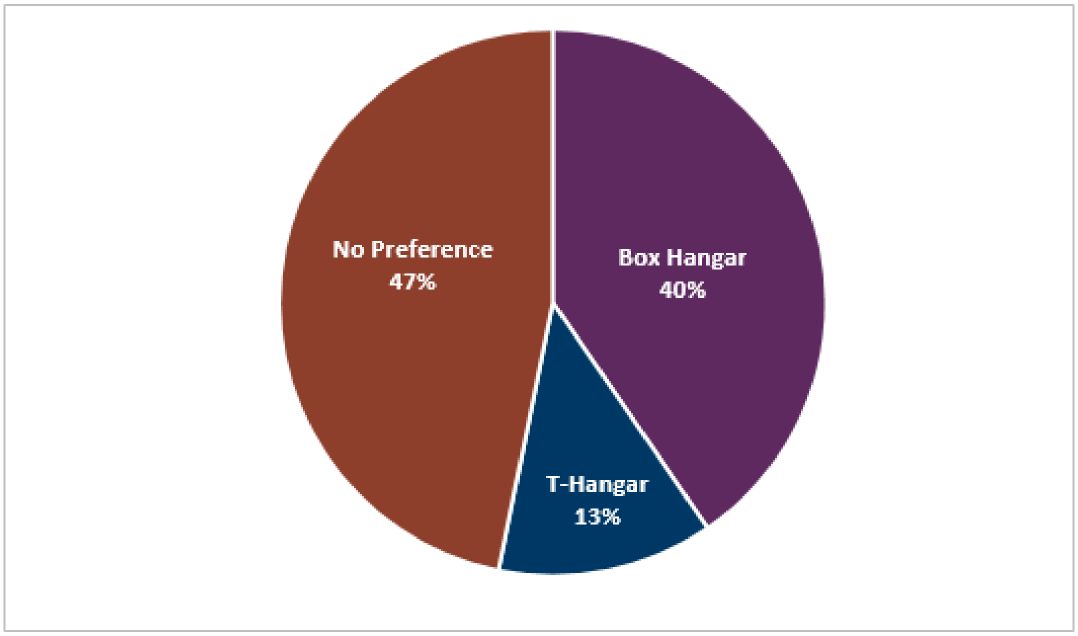
[13] All airports were asked to provide hangar waitlist information to the project team for surveying current hangar demand. However, many airports did not provide a waitlist, as this information is either not maintained or the airport did not come forth with the information due to privacy and other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

Figure 3. Requested Hangar Type



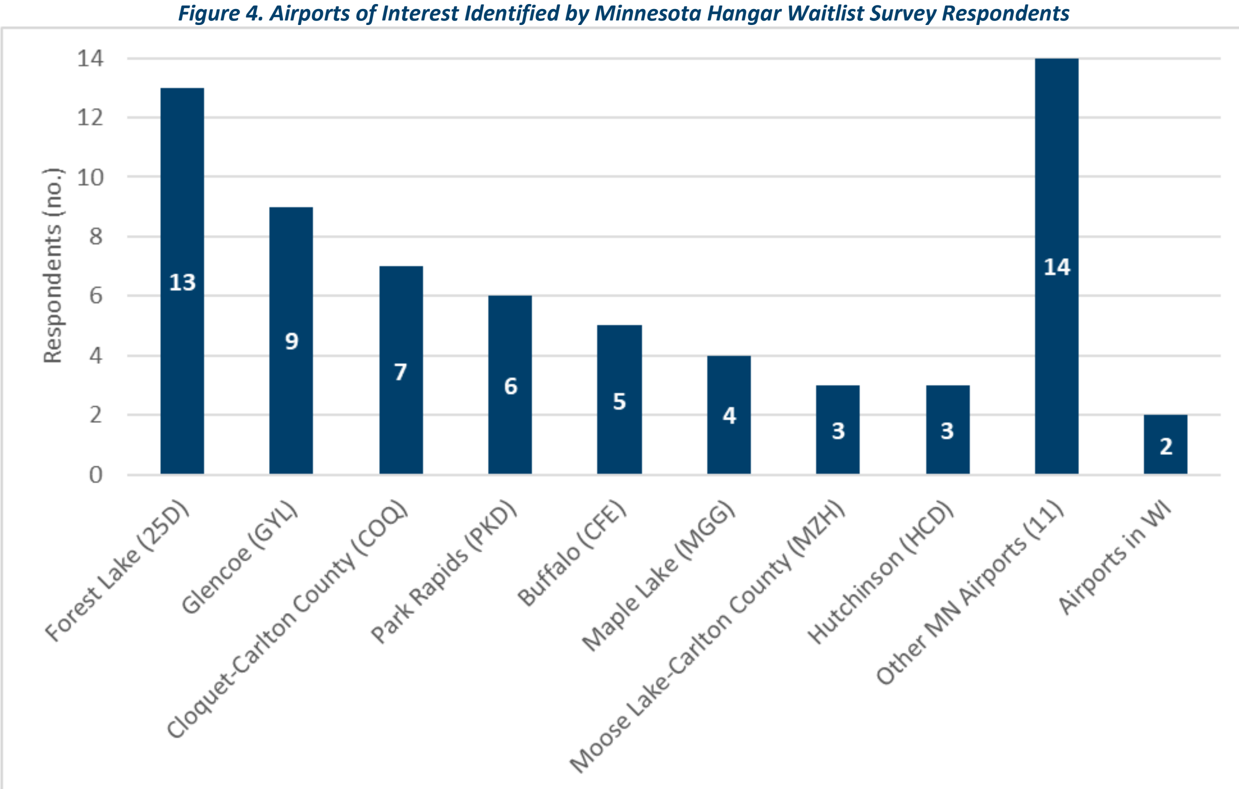
Source: MnSASP Hangar Waitlist Survey, 2021

Respondents were also asked to share which airport(s) they are currently waitlisted at for hangar space. It was found that the demand for hangar space is present across Minnesota, but largely centered around the Minneapolis-St. Paul metropolitan area (Twin Cities). The most popular airport indicated in the survey was Forest Lake Airport (25D), an Intermediate Small airport approximately 20 miles north of Minneapolis.

Many respondents described Forest Lake Airport (25D) to be a more appealing alternative to the MAC airports due to lower storage costs, operating expenses, favorable rules, and proximity to the Twin Cities area. These reasons were also cited for airport users seeking hangar space at Glencoe Municipal Airport (GYL) and Buffalo Municipal Airport (CFE), both Intermediate Small airports approximately 40 miles from Minneapolis. All the reasons cited by pilots and owners for basing an aircraft at a certain airport are presented in Figure 5.

The survey results also found that there is a concentrated demand for hangar space in and around the city of Duluth, including Cloquet-Carlton County Airport (COQ), Duluth Sky Harbor Airport & Seaplane Base (DYT), and Moose Lake-Carlton County Airport (MZH). Figure 4 presents a breakdown of the most common waitlisted airports indicated by respondents. It is important to reiterate that hangar waitlists with contact details were only received from 24 airports; as such, the results of this analysis do not equitably represent statewide needs.

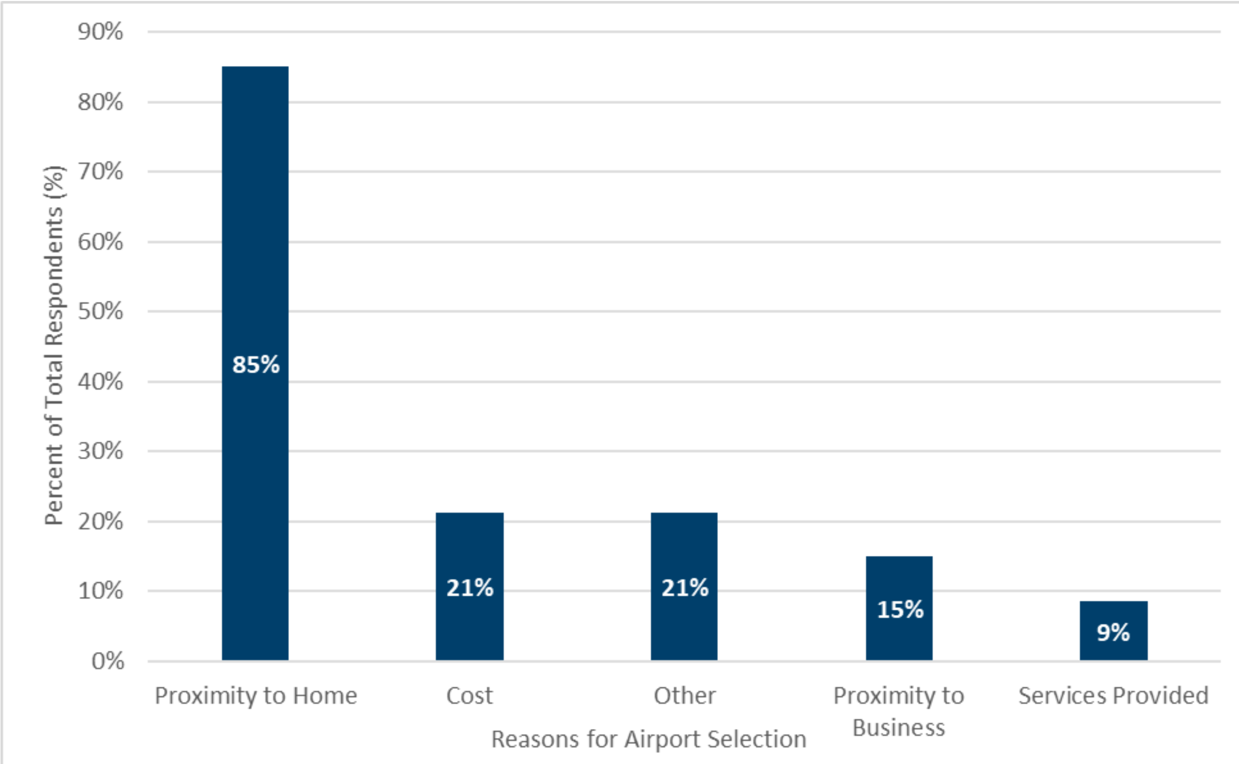
Figure 4. Airports of Interest Identified by Minnesota Hangar Waitlist Survey Respondents



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.

Figure 5. Reasons for Airport Selection Among Survey Respondents



Source: MnSASP Hangar Waitlist Survey, 2021

1.2.3. OTHER INSIGHTS FROM OUTREACH EFFORT

Along with collecting waitlist information, participants were also asked to provide additional insight to MnDOT Aeronautics on the availability of hangars across the state. These insights provide additional clarity related to aircraft hangar shortages in Minnesota and the decision-making process of airport users seeking hangar space.

Several respondents noted they have observed hangars being used to store large non-aeronautical items such as boats and recreational vehicles (RVs) rather than aircraft. This is likely due to hangar lease rates generally being less expensive than non-aeronautical, off-airport storage options. A review was completed of five cities in Minnesota to present a comparison between aircraft hangar lease rates and off-airport storage facilities used to store household goods, RVs, and many other non-aeronautical related items. The findings of this review are presented in Table 7. Airports that are marked with an asterisk did not provide specific T-hangar sizes in the MnSASP Inventory; as such, this analysis utilized a standard T-hangar size of 1,100 SF to calculate the unit costs presented.

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 polices. 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.

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[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

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[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 resources to leverage
- 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 promotes 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 identify 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

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[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 Regulations[23]

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:

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[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 priority[28]:

- 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

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[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.

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[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	- Approach obstruction removal - Marking/lighting obstructions - Displaced threshold - Airfield light replacement/repair	- Relocate roads, P-lines, buildings - Airport beacons - Airside security improvements - Lighted windsocks - Painting of airside markings	- 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	- Segmented circle - Airfield signage - Runway edge identifier lights	- Runway surface sensors
Preservation of Existing System	- Pavement reconstruction - Drainage & culverts - Earthwork & grading - Crack filling - Seal/fog costs	- Realignments - Pavement overlays - Runway/taxiway extensions - Regrade & smoothen turfs - Reseed & fertilize turfs	- Heliport areas - Access roads - Terminals – air service - SRE building	- X-wind runway/taxiway - Runway grooving - Auto parking - Terminals – GA - Fuel facilities	- Storage buildings - Airport signage - Community hangars
Planning	- Emergency grants - Federal grants - TSA requirements	- Project engineering/design - New construction	- Air service/air cargo studies - Master plan studies - Airport layout plan studies	- Other special plans (economic, air service, etc.)	- None
Land Easements and Acquisition	- Zoning implementation - Land acquisition for obstruction removal	- Land acquisition for Runway Protection Zones (RPZ) - Land acquisition for new airport	- Land acquisition for operational capacity	- Land acquisition for future expansion	- None
Environmental	- None	- Environmental assessments - Environmental impact statements	- Wetlands delineation/mitigation - Stormwater Pollution Prevention Plan (SWPPP)/Spill Prevention Control and Countermeasure (SPCC), Stormwater Management (SWM), etc.	- FAA Part 150 studies Other special studies	- None
Airfield Equipment	- Aircraft Rescue and Firefighting (ARFF) equipment	- None	- Mower unit - Snow removal equipment	- Tractors - Operations vehicles - Turf rollers/sweepers	- 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 anticipates 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 supports 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)

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[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	- Consider other alternative funding strategies - Address any potential non-aeronautical use of hangars
Non-Aeronautical Use of Hangars	- 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	- Establish appropriate hangar lease rates per guidance provided by the ACRP Report 213
Hangar Loan Revolving Account Program Does Not Evaluate True Hangar Needs	- 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	- 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 ensue 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)

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[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 equitability.

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 under-charging 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.

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

Table 14. ACRP Suggested Market Rent Adjustments[39]

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,

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[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 airports that show a true hangar demand. This demonstrates the MnDOT's objective of good stewardship of public funds.

MnDOT Aeronautics could require airports to document their eligibility and justification for state hangar development funding in the form of a business plan, even if simple in format to show return on investment over time. In this way, airport sponsors must carefully consider their requested project and its financial implications for MnDOT Aeronautics and other funding entities. A business plan can include the following:

- Need for hangars (provide waitlist information)
- Ties the need towards the impetus for starting hangar development plans
- Details on the proposed hangar development plans
- Maintenance plan of the facility
- Financial assessment in the form of a proforma (described in Section 1.4.2)

This will help demonstrate to MnDOT Aeronautics that the airport needs the hangar, has adequately planned on the design and construction of the facility, commits to support it through the life of the facility, and can show a return on investment. Figure 6 presents the structure of a business plan proposed by AOPA that airports could follow that captures all important considerations of hangar development.

Figure 6. AOPA Suggested Business Plan Components

PARTS OF A COMPELLING BUSINESS CASE	QUESTIONS TO ASK TO DEVELOP EACH PART OF THE BUSINESS CASE
PART 1: Description of the project	• What is the current situation? Describe what will be targeted in the project. • What is currently going well that can be built on? • What has been done to confirm the need for new hangars? • Who authorized/initiated the project?
PART 2: Description of the project importance	• Why are the hangars needed? • What is the motivation of airport users for new hangars? Do they perceive: - An opportunity – a situation leading to future success? - A need – a current shortage of hangar space? - A discomfort – an existing problem requiring a solution? - Pain – a severe problem requiring immediate response? • What situation demonstrated the current need?
PART 3: Description of benefits of the new hangars	• How will stakeholders benefit in the short run? • How will stakeholders benefit in the long run? • How will the airport, local community and owner benefit in the short/long run? • What are the consequences of not doing the project? • What resources will be available to complete the project?
PART 4: Description of the costs associated with the project	• What will it cost in terms of money, time, and effort? • How will stakeholders be impacted by these costs? • What is the cost/benefit analysis (project proforma)?
PART 5: Measures for success	• How will success be measured? What is the monitoring system? • What does success look like? • How will stakeholders recognize success?

Source: AOPA Aircraft Hangar Development Guide, 2006

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 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-steam 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 primarily 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.*

Attachment 3. Airport Closure Guidance Statement

The Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) has developed this Guidance Statement (or Guidance) to establish and implement the Airport Closure Standard Operating Procedure (SOP). The SOP provides a standardized process for airports seeking release from the state aviation system. This includes details regarding how an airport sponsor (or sponsor) initiates the process of requesting release from the state aviation system and MnDOT Aeronautics' responsibilities associated with responding to that request.

The SOP involves a comprehensive evaluation of the potential financial implications of an airport's closure, as well as an assessment of the potential impacts to the sponsor, surrounding community, aviation users, and the state aviation system. The SOP provides MnDOT Aeronautics and sponsors with a uniform process for handling release and/or closure requests that abides by all applicable state and federal requirements. The process ensures that MnDOT Aeronautics has the information required to make an informed decision that considers the interests of all applicable stakeholders.

Reason for Guidance

MnDOT Aeronautics established the Airport Closure Guidance to detail a formal and consistent process for airports seeking to be released from the state aviation system and/or requesting closure, as well as outline the responsibilities of MnDOT Aeronautics and sponsors within this process. The Guidance is enacted via the Airport Closure SOP, which is triggered when a municipality is no longer able and/or willing to meet the legal, financial, and/or other obligations associated with airport sponsorship. In such cases, the sponsors may request release from the state aviation system to close the facility.

Airport closures can result in immediate implications for the sponsor, aviation-related users, and the community in which the airport is located. Airports serve as a driver of economic activity and contribute to the safety, security, and social wellbeing of populations within its vicinity, as well as provide other benefits to aviation and non-aviation users. These benefits include, but are not limited to, supporting commercial passenger service, general aviation activities, air cargo, and military operations. Airport closures may also negatively impact the capability of the state aviation system to provide comprehensive air connectivity and access throughout Minnesota.

The Airport Closure SOP details the comprehensive and uniform evaluation that MnDOT Aeronautics must complete to examine these and other potential impacts that may result from an airport's exit from the state system and/or closure. Documented through the "Impact Evaluation," this assessment is generally designed to support the Commissioner of Transportation's (Commissioner) ability to make an informed decision about an airport's continued inclusion in the state aviation system.

The Impact Evaluation documents the following information:

- Cost of closing the airport for the sponsor and state (as applicable)
- Potential impacts to the state aviation system and air-traveling public
- Active grant assurances
- Public input

Additionally, sponsors and MnDOT Aeronautics are required to abide by all applicable state and federal requirements associated with the transfer of ownership or closure and decommissioning of airport facilities. The Airport Closure Guidance supports MnDOT Aeronautics' role as good stewards of public funds and commitment to responsible and transparent decision-making.

Applicability

Key stakeholders affected by this Guidance include:

- Commissioner
- Sponsors operating a publicly owned, public-use airport in Minnesota recognized as part of the state aviation system
- MnDOT Aeronautics Aviation Planning Director
- MnDOT Aeronautics Airport Planning Staff

Definitions

Airport sponsor (or sponsor) – A sponsor is a public agency or tax-supported organization such as an airport authority or local government authorized to own and operate an airport; obtain property interests; obtain funds; and otherwise be responsible for meeting all applicable legal and financial requirements of current laws, regulations, and other obligations associated with that airport.

State aviation system (or system) – The system encompasses all publicly owned, public use airports in the state of Minnesota eligible to receive funding through the State Airports Fund in accordance with Minnesota Statutes Chapter 360.305.

Municipal airport – An airport owned by a county, city, town, or joint powers board within the meaning of Minnesota Statutes Chapter 360.042, exclusive of an airport formed and operated by the Metropolitan Airports Commission (MAC). This is in accordance with Minnesota Statutes Chapter 360.046.

National Plan for Integrated Airport Systems (NPIAS) – The NPIAS identifies airports deemed critical to the National Airspace System (NAS), 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 five years. The NPIAS contains all commercial service and reliver airports and selected publicly owned general aviation airports. The NPIAS is published every two years. Federal Aviation Administration (FAA) Order 5090.5 establishes the guidelines for managing and maintaining the NPIAS and the Airport Capital Improvement Program (ACIP).

Impact Evaluation – The Impact Evaluation is a comprehensive evaluation completed by MnDOT Aeronautics of an airport that has submitted their intent to be released from the system or close. It includes details of the estimated cost to close for the sponsor and the likely impacts that will occur to the state airport system. Upon completion of this report, it will be made available to the municipality associated with the airport and the public in accordance with Minnesota Statutes Chapter 360.046.

Airport Vulnerability Assessment – The Airport Vulnerability Assessment is a quantitative evaluation of state system airports' vulnerability and susceptibility to closure. The evaluation takes the form of a scoring mechanism that quantifies nine different types of airport-related considerations to generate a composite score for each airport, with lower scores indicating a higher vulnerability. The Airport Vulnerability Assessment was developed as a component of the 2022 Minnesota State Aviation System Plan (2022 MnSASP or MnSASP).

Responsibilities

Commissioner

- Receives the formal written notice from sponsors indicating the intent to be released from the system and/or close
- Issues the final determination regarding an airport's release from the system and/or closure

MnDOT Legal Team

- Receives the request from MnDOT Aeronautics Airport Planning Director regarding releasing an airport from active state grant assurances (if applicable)
- Determines whether an airport can be released from active state grant assurances (if applicable)

Sponsor

- Communicates with the applicable MnDOT Aeronautics planner to initially discuss the intent to be released from the system or close
- Provides a written notice to the Commissioner of their intent to be released from the system and/or close. This notice must include all information detailed in the Airport Closure SOP (refer to page 7).
- Corrects any issues identified with the Impact Evaluation and resubmits to the Commissioner (as applicable)
- Schedules and hosts a public hearing to receive input/feedback regarding an airport's proposed release from the system and/or closure
- Provides public notice of the public hearing within 30 days prior to the event
- Provides a summary of the key findings and trends observed in the public hearing to the MnDOT Aeronautics Planning Director
- Addresses any comments made by Commissioner regarding the denied release determination (if applicable)
- Coordinates with the FAA's Great Lakes Region Airport District Office (ADO) to initiate and follow the process for requesting release from the NPIAS and/or federal obligations (if applicable)
- Completes the final steps to closure of the airport once all state/federal obligations have been fulfilled (refer to page 10 for details)

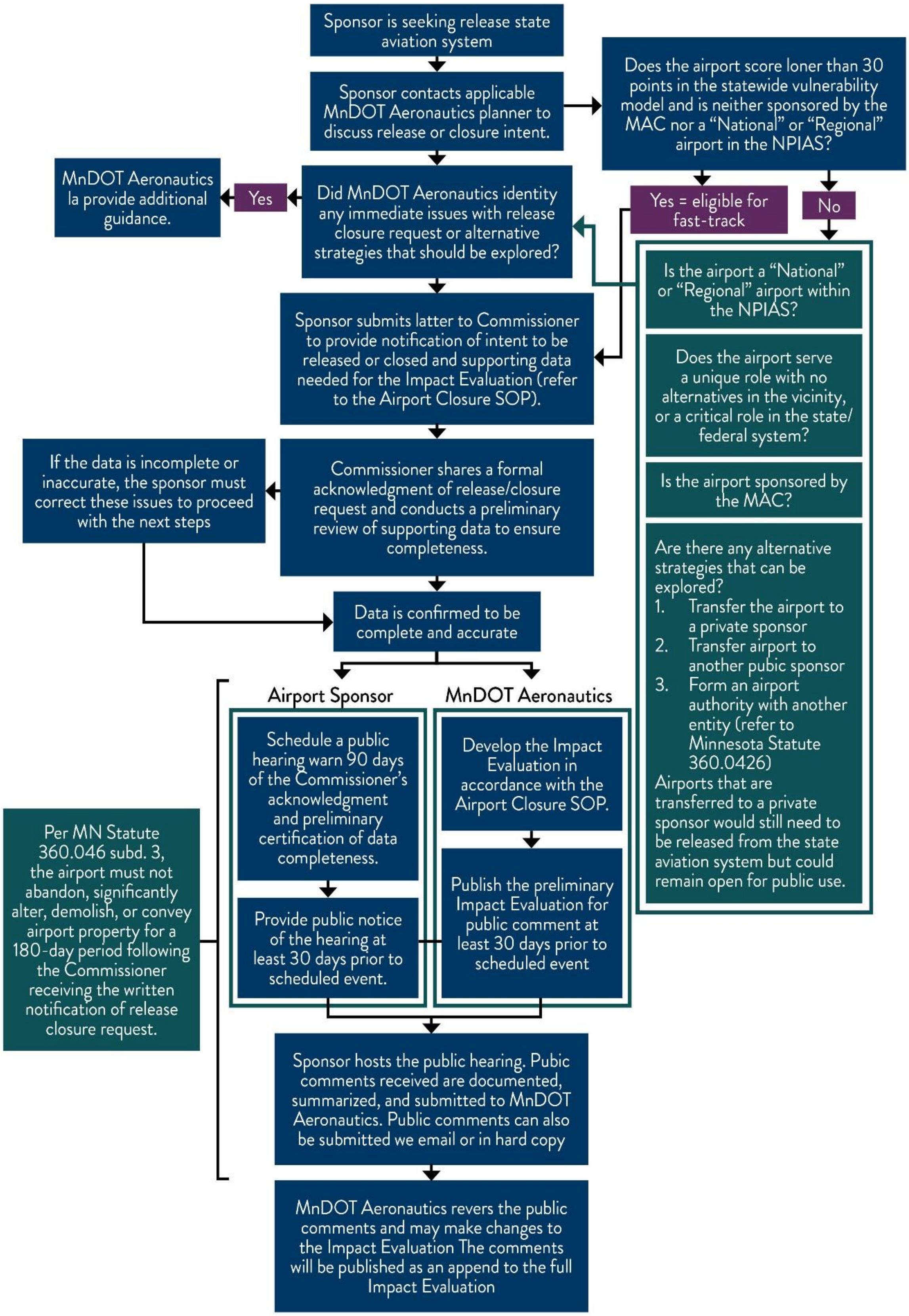
MnDOT Aeronautics Airport Development Staff

- Submits a request to the MnDOT legal team requesting that an airport is released from active state grant assurances (if applicable)
- Distributes the written notice of proposed system exit and/or closure and supplemental data provided by the airport sponsor to airport planning staff
- Communicates requirements to sponsors and other stakeholders
- Publishes the preliminary Impact Evaluation at least 30 days prior to the scheduled public hearing
- Transmits the final Impact Evaluation to the Commissioner for the final determination
- Maintains and references the Airport Closure Vulnerability Assessment for identifying airports eligible for the "fast-track" option
- Responds to initial requests received from sponsors that are seeking to be released from the system and/or close
- Develops the preliminary Impact Evaluation
- Incorporates the public hearing comments to the Impact Evaluation to develop a final version
- Publishes the final Impact Evaluation

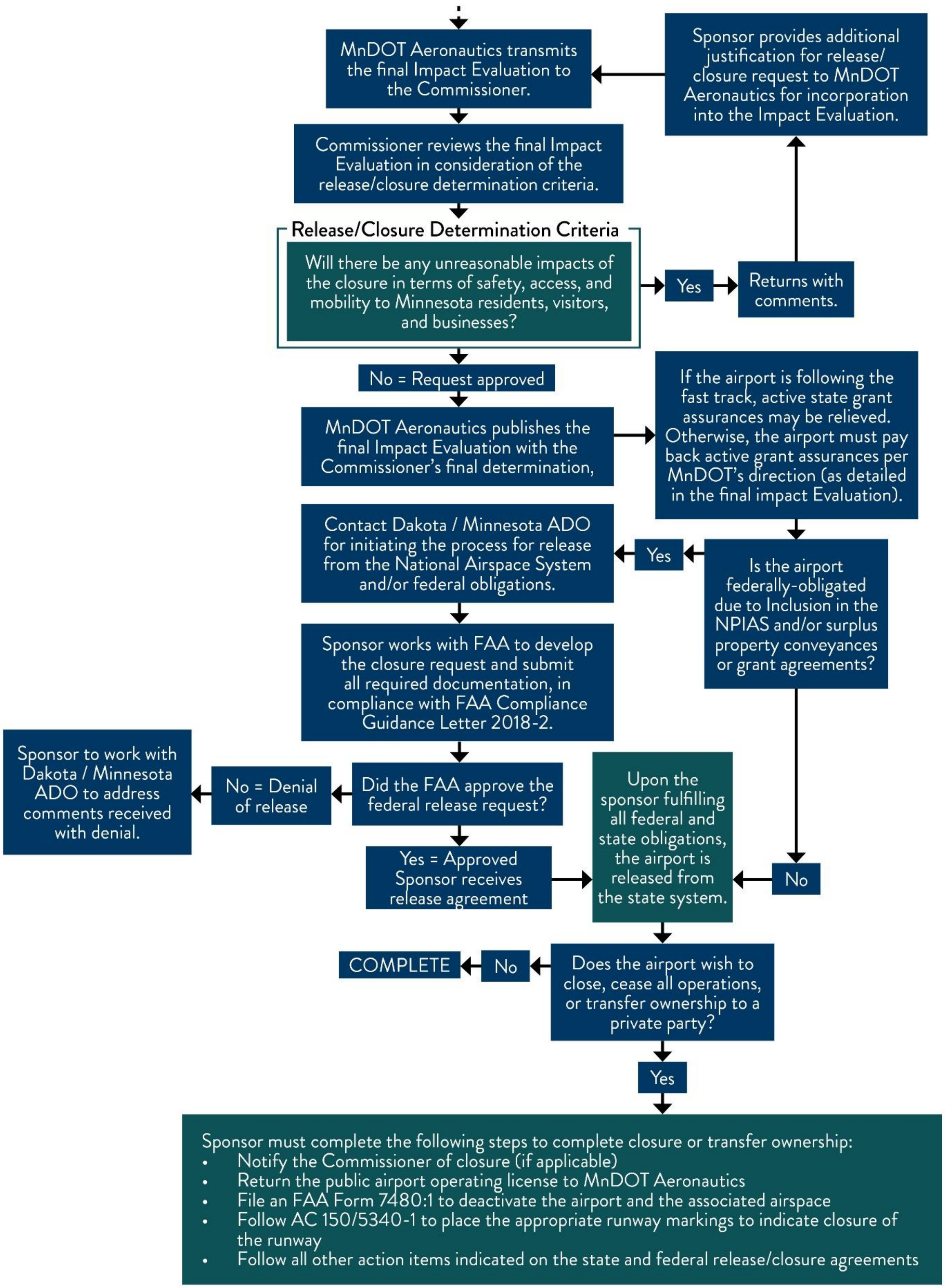
Airport Closure Process

Figure 1 depicts the MnDOT Aeronautics system exit and airport closure SOP.

Figure 1. MnDOT Aeronautics System Exit/Airport Closure SOP



Sources: Kimley-Horn, 2022; MnDOT Aeronautics, 2022



Airport Closure Standard Operating Procedure

The impetus of developing this Guidance Statement was to formalize a consistent process for sponsors seeking to be released from the system and/or close. As such, the Airport Closure SOP was developed within the Airport Closure Guidance for sponsors and MnDOT to follow. For the airport closure SOP to be triggered, a sponsor must contact their assigned MnDOT Aeronautics Planner to discuss the circumstances and facts leading to the decision to request release from the system and/or closure. MnDOT will determine eligibility for the fast-track process and whether there are alternative strategies to release/closure that could be pursued.

If no alternatives are identified, MnDOT Aeronautics will instruct the sponsor to provide the necessary documentation to the Commissioner to formally start the closure process. In accordance with state statute, the airport must hold a public hearing to allow public comment. In preparation for this meeting, MnDOT Aeronautics will develop an Impact Evaluation to summarize all impacts that the airport closure are anticipated to have on the system. Amended with public comments received, the Impact Evaluation then receives a final determination from the Commissioner for release from the system.

The following subsections detail the process for sponsors and MnDOT Aeronautics for releasing an airport from the system.

Initial MnDOT Review and Developing Written Notice

As the first step in this process, airport sponsors and MnDOT Aeronautics shall work together to determine if the airport is eligible for the "fast-track" process. This process provides a more streamlined path to release or closure for facilities with limited aviation activity levels, economic impact, support for critical services, community access, and other factors. Airports eligible for the fast-track process must meet the following criteria:

- Receive a score less than 30 on the Airport Vulnerability Assessment that evaluates airports across nine different consideration categories
- Not included in the NPIAS
- Not an airport operated by the MAC

If all criteria above are met, MnDOT Aeronautics initiates the fast-track process and does not consider alternative strategies for release/closure. Airports that do not meet all fast-track criteria shall work with MnDOT to consider alternative strategies including transfer of ownership to a public or private sponsor or the formulation of an airport authority. Additional details about both paths are provided in the following subsections.

FAST-TRACK PROCESS

This process is reserved for airports with a limited role in their communities, region, and/or the state and may cause an undue burden on their airport sponsors due to the support required to maintain existing aviation facilities. Airports that meet the three fast-track criteria may immediately proceed in developing a written notice of intent for release/close for submission to the Commissioner.

The written notice of intent must include all components below to initiate the formal release process:

- Statement of intent to be released from the system and/or close
- Brief description of reason for initiating the request to be released and/or close
- Current (at the time of the request) economic impact in terms of annual economic activity, employment, payroll, and spending calculated using the Airport Economic Impact Calculator available from the MnDOT website at https://jviation.tfaforms.net/423579.

CONSIDER ALTERNATIVE STRATEGIES

For airports that are ineligible for the fast-track process, the MnDOT Aeronautics Planner must explore alternative strategies to release or closure in close collaboration with the airport sponsor. This preliminary review shall include but not necessarily be limited to the following components:

- Confirmation that the airport is not: (1) a "National" or "Regional" airport in the NPIAS, (2) serving a critical role in the state/federal aviation system or a unique role with no alternatives in the vicinity, and (3) sponsored by the MAC
- Evaluation of potential alternative strategies that the sponsor could pursue to avoid system release or closure of the airport including: (1) transfer the airport to a private sponsor,[1] (2) transfer the airport to another public sponsor, (3) establishment of an airport authority with another entity (refer to Minnesota Statutes Chapter 360.0426)

If the discussion with the sponsor does not identify any significant restrictions (bullet 1 above) nor alternative paths to release or closure, the sponsor prepares a written notice of intent to close for submission to the Commissioner. This should include the following information:

- Statement of intent to be released for the system and/or close
- Description of the reason(s) for initiating the request to be released and/or close
- Supporting data required to develop the Impact Evaluation that cannot be obtained from federal or state sources (i.e., can only be obtained directly from the airport sponsor) including:
  - Value of all airport assets
  - Aviation activities including number of based aircraft by type, annual operations in previous three years by type, type(s) and frequencies of time-sensitive and safety/security-related aviation activities, critical aircraft
  - Known environmental issues
  - Current (at the time of request) economic impacts in terms of annual economic activity, employment, payroll, and spending as calculated using the Airport Economic Impact Calculator available from the MnDOT website at https://jviation.tfaforms.net/423579.

[1] Airports transferred to a private sponsor would still need to be released from the state aviation system but could remain open for public use.

Develop Impact Evaluation

The Commissioner will provide a formal acknowledgement of receiving the intent to close request and conducts a preliminary review of the supporting data. If the data are found to be incomplete or inaccurate, the sponsor must correct these issues and provide updated data.

Upon the Commissioner deeming the release/closure request is complete and accurate, the Commissioner will forward the release/closure request to the MnDOT Aeronautics Planning Director for the Airport Planning Staff to develop the preliminary Impact Evaluation. This will include the following:

- NPIAS classification or role, as applicable (obtained from the most current NPIAS report)
- Economic impact of the airport, as provided in the airport's release/closure request (current annual economic impact, employment, payroll, spending)
- Public investment and all active grant obligations at federal and state levels
- Current value of all airport assets
- Airport Vulnerability Assessment score
- Assessment of impacts to the system
  - Aviation activities as provided in the airport's release/closure request
  - Fuel availability (type and hours)
  - Review of a 30 nautical mile service area to potentially identify other airports where activity could be accommodated
- Current environmental issues
- If the sponsor is seeking to close the airport, indicate the estimated costs of closure including paybacks of state, federal, or other public funds

The Impact Evaluation will be a working document through the subsequent steps of the Airport Closure SOP and may be modified prior to final evaluation.

Public Involvement

To comply with Minnesota Statutes Chapter 360.046, the sponsor must schedule a public hearing within 90 days of the Commissioner's certification that the release/closure request is complete and accurate. The sponsor is responsible for hosting the public meeting to present information concerning the airport's reasoning to close, including the Impact Evaluation developed by MnDOT Aeronautics. At this time, the public will have an opportunity to comment. The public can also submit comments via email or in hard copy. Following the public hearing/comment period, the sponsor shall document, summarize, and submit any notable patterns or recurring comments received from the public to the MnDOT Aeronautics Planning Director within 30 days of the hearing.

MnDOT Aeronautics planning staff must review the public comments and may revise the Impact Evaluation based on the feedback received. All public comments must be published as an appendix. Once these steps are complete, the MnDOT Aeronautics Planning Director transmits the final Impact Evaluation to the Commissioner.

Commissioner Review

The Commissioner will review the Impact Evaluation to make the final determination for release from the system. The following question will drive the decision-making process:

Will there be any unreasonable impacts of the closure in terms of safety, access, and mobility to Minnesota residents, visitors, and businesses?

If the Commissioner deems that the airport can be released from the system, the sponsor can proceed with next steps. If the Commissioner deems that release may cause unreasonable impacts in terms of safety, access, and mobility, the Commissioner will reject the request and provide comments regarding that decision to the airport sponsor. The airport sponsor may provide additional justification for release or closure to MnDOT Aeronautics to initiate another review of the request.

Next Steps

Once the Commissioner determines that an airport can be released from the system, the airport sponsor may need to address active grant obligations. These obligations will be defined in the Impact Evaluation. MnDOT Aeronautics may release airport sponsors undergoing the fast-track process from active state grant assurances at its discretion. Airports that are not within the fast-track process are responsible for repaying state dollars as defined within project-specific contractual terms and conditions prior to release. Airport sponsors are also responsible for addressing all active federal obligations due to inclusion in the NPIAS, surplus property conveyances, and/or grant agreements (as applicable). Airport sponsors with active federal obligations must contact the FAA Great Lakes Region ADO for further instructions. Airports with active federal obligations shall not be released from the state system and/or close.

Airports seeking closure may proceed with the final steps below once the Commissioner has approved the closure and all federal and state grant assurances have been addressed. The final steps to airport closure are outlined below (note the deadlines associated with each step):

- At least 90 days prior to closure, the sponsor must file an FAA Form 7480-1 to deactivate the airport with the FAA and remove it from aeronautical charts and future aviation publications.
- If the state (or federal) release/closure agreements include any additional conditions for closure, the airport must complete those action items prior to closure.
- To comply with Minnesota Administrative Rules Part 8800.1400, the sponsor must notify the Commissioner of final airport closure and return its state airport operating license to MnDOT Aeronautics.
- At the time of closure, the sponsor must coordinate with MnDOT Aeronautics to ensure compliance with closure procedures. This includes, but is not limited to, placing markings on the runway to indicate closure of the runway. Refer to FAA AC 150/5340-1 for the appropriate marking.

Airports seeking release from the state aviation system should work with MnDOT Aeronautics to ensure proper state licensure and compliance with any specific terms and conditions outlined in state or federal grant agreements that may be impacted by a transfer of ownership.

Resources and Related Information

- Minnesota Statutes Chapter 360.046, *Requirements for Closure of Municipal Airport*
- Minnesota Administrative Rules Part 8800.1400, *General Airport Licensing Provisions*
- Minnesota Statute Chapter 360.0426, *Creation of an Airport Authority; Dissolution*
- FAA Compliance Guidance Letter 2018-2, *The Process for the Release and Permanent Closure of Federally-Obligated Airports*
- FAA Advisory Circular 150/5340-1, *Standards for Airport Markings*
- FAA Form 7480-1, *Notice for Construction, Alteration and Deactivation of Airports*

History and Updates

Title: *MnDOT Airport Closures Guidance Statement*

Revision	Year	Comments
Initial	2022	Guidance adopted

Attachment 4. State Aviation System Airport Entry Guidance Statement

The Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) has established the State Aviation System Entry Guidance Statement (or Guidance) to provide a standardized process for airports seeking to enter the state aviation system. This Guidance takes the form of a Standard Operating Procedure (SOP), which details how an airport sponsor (or sponsor) initiates the licensure process and requests entry into the system.

The SOP also provides directions to MnDOT Aeronautics for responding to that request through a formalized evaluation process. This evaluation process includes a comprehensive assessment of the proposed airport's ability to enhance the system in terms of access, mobility, safety, economic development, and other potential factors as well as consideration of potential impacts to the sponsor, MnDOT Aeronautics, the surrounding community, aviation users, and the system.

The SOP provides MnDOT Aeronautics and sponsors with a uniform process for handling System Entry Requests compliant with all applicable state requirements. The Airport Entry SOP ensures that MnDOT Aeronautics has established formal processes and the data required to make informed decisions regarding system inclusion in consideration of the interests of all stakeholders in Minnesota.

Reason for Guidance

MnDOT Aeronautics established an Airport Entry SOP to define a consistent process for airports to enter the system and to outline the responsibilities of MnDOT Aeronautics and sponsors within this process. The SOP is triggered when a potential sponsor contacts MnDOT Aeronautics to request inclusion into the system. The Guidance is applicable to existing airport facilities that are not currently within the system as well as new airports proposed for construction. Note all airports in the system must be owned by a municipality in accordance with Minnesota Statutes Chapter 360.031 and open for public use.[1]

Airports serve as a driver of economic activity and offer safety, security, social, and other benefits to aviation and non-aviation users. These benefits are realized only when a sponsor is willing and able to proactively maintain the airport's facilities, provide administrative support, and fulfill other legal and financial responsibilities associated with the ownership of a publicly owned, public-use airport. While many airports generate some revenue through fuel sales, lease agreements, and other revenue-producing activities, most publicly owned airports in Minnesota require some level of public investment to support ongoing airport operations, development, air service marketing, and other needs. Airports must be included in the system to receive financial assistance from the State of Minnesota via the State Airports Fund per Minnesota Statutes Chapter 360.015, §13.

[1] *For the purposes of Chapter 360.031 to 360.045 of Minnesota Statutes, "municipality" means any county, city, town, or airport authority of this state in accordance with Minnesota Statute Chapter 360.03.*

It is important to note that access to the State Airports Fund can enhance a sponsor's ability to maintain and develop aviation-related infrastructure and services; however, local sponsors that accept state funds are subject to grant assurances per Minnesota Statutes Chapter 360.305, §4. Sponsors should carefully consider the long-term implications of state grant agreements for their communities. More generally, the sponsor must understand the ongoing legal, financial, operational, and other obligations of system inclusion prior to submitting an Entry Request to MnDOT Aeronautics.

At the same time, MnDOT Aeronautics is responsible for allocating the State Airports Fund in a manner that best serves the needs of Minnesota airports and the air traveling public. As stewards of public funds, MnDOT Aeronautics must evaluate how an airport's inclusion may impact the system, including its ability to optimally serve the needs of all aviation users in Minnesota. This aligns with MnDOT's 50-year strategic plan known as Minnesota GO, which directs the agency to orient investment through right-sizing the system. As such, it is important for MnDOT Aeronautics to review prospective system entrants against a set of criteria designed to evaluate if the proposed system airport closes a gap within the existing system or otherwise fulfills a critical aviation need in Minnesota. In accordance with these objectives, the Airport Entry Guidance details how MnDOT Aeronautics evaluates airports requesting inclusion in the system via a comprehensive and uniform SOP. This evaluation centers upon the development of a System Entry Evaluation Report. The Evaluation Report provides the data necessary for the Commission of Transportation to make an informed decision regarding the composition and size of the system, as well as its ability to support Minnesota's air traveling public.

Applicability

Key stakeholders affected by the Guidance include:

- Commissioner of Transportation (Commissioner)
- Sponsors operating an existing or proposed publicly owned, public-use airport in Minnesota identified for potential inclusion in the system
- MnDOT Aeronautics Aviation Planning Director
- MnDOT Aeronautics Staff

Definitions

Airport sponsor (or sponsor) – A sponsor is a public agency or tax-supported organization such as an airport authority, joint powers, airport commission or local government authorized to own and operate an airport; obtain property interests; obtain funds; and otherwise be responsible for meeting all applicable legal and financial requirements of current laws, regulations, and other obligations associated with that airport.

Airport Layout Plan (or ALP) – An ALP is a graphical depiction of existing and proposed future airport boundaries and facilities thereon. An ALP must show the boundaries of and proposed additions to all areas owned or controlled by the airport sponsor for aeronautical purposes, as well as any non-aviation-related land uses and structures within those boundaries. ALP drawing sets may also include numerous other components depending on the size and complexity of the airport and its long-term development plans.

State aviation system (or system) – The system encompasses all publicly owned, public-use airports in the state of Minnesota eligible to receive funding through the State Airports Fund in accordance with Minnesota Statutes Chapter 360.305.

Municipal airport – An airport owned by a county, city, town, or joint powers board within the meaning of Minnesota Statutes Chapter 360.042, exclusive of an airport formed and operated by the Metropolitan Airports Commission. This is in accordance with Minnesota Statutes Chapter 360.046.

Commissioner's Order (or Order) – An Order is an official act of determination of the Commissioner of Transportation pursuant to Minnesota Statutes Chapter 360.015 for MnDOT Aeronautics.

Conditional Use Permit (CUP) – A CUP is an ordinance designation for certain types of developments, including planned unit developments, and certain land development activities as conditional uses under zoning regulations. This is in accordance with Minnesota Statutes Chapter 462.3595.

System Entry Request (or Entry Request) – The Entry Request details a prospective airport's interest in inclusion in the system. This letter is submitted to the Commissioner to initiate the system entry process.

Airport Entry Evaluation Report (or Evaluation Report) – Completed by MnDOT Aeronautics, the Evaluation Report comprehensively evaluates an airport's proposed inclusion in the system. The Evaluation Report documents the proposed airport's fulfillment of the system entry criteria, ability to maintain the airport in conformance with state public airport licensing requirements, estimated cost of inclusion to MnDOT Aeronautics and the sponsor, and other associated components.

Clear Zone Acquisition Plan (CZAP) – The MnDOT Aeronautics Clear Zone Policy states that airports must own 100 percent of clear zones based off ultimate runway configurations to be eligible to receive state funding. Existing airport sponsors (i.e., airports already in the state system) that do not currently own 100 percent of clear zones based on ultimate build-out conditions are eligible to complete a CZAP to document their future acquisition plan and/or provide an alternative clear zone control strategy in accordance with the Clear Zone Guidance Statement (effective 01 June 2022). Sponsors that have an ALP approved by MnDOT prior to this date must comply with clear zone dimensional standards effective at the time MnDOT approved their ALP to be eligible to receive state support. Prospective new airport sponsors (i.e., those seeking entry into the system) are not eligible to complete a CZAP to comply with the MnDOT Clear Zone Guidance Statement. New system entrants must own 100 percent of clear zones based on ultimate build-out conditions prior to receiving a public airport license. Additionally, clear zone acquisition is not eligible for an Airport Planning Grant awarded in accordance with Minnesota Statutes Chapter 360.017, §1.

Responsibilities

Commissioner

- Receives the Entry Request from sponsors formally requesting inclusion in system

- Forwards the Entry Request to the MnDOT Aeronautics Airport Planning Director to develop the Evaluation Report
- Assesses the draft and final Evaluation Report in terms of potential impacts to the existing aviation system and the air traveling public, as well as other factors outlined in the Airport Entry SOP
- Makes the final determination to approve or deny an airport's entry into the system and issues an Order to formalize entry, as applicable
- Issues a public airport license

MnDOT Aeronautics Airport Planning Director

- Distributes the Entry Request and supplemental data provided by the sponsor to MnDOT Aeronautics Staff
- Communicates requirements associated with inclusion in the system to sponsors and other stakeholders, as applicable

MnDOT Aeronautics Staff

- Responds to Entry Requests received from sponsors seeking to enter the system
- Develops the Evaluation Report as detailed in the Airport Entry SOP for submission to the Commissioner
- Receives and approves ALPs developed by airports
- Receives and processes all applicable licensure forms to establish the airport as a new landing area
- Completes an airport inspection to ensure compliance with public airport licensure requirements per Minnesota Administrative Rules Part 8800.1600

Sponsor

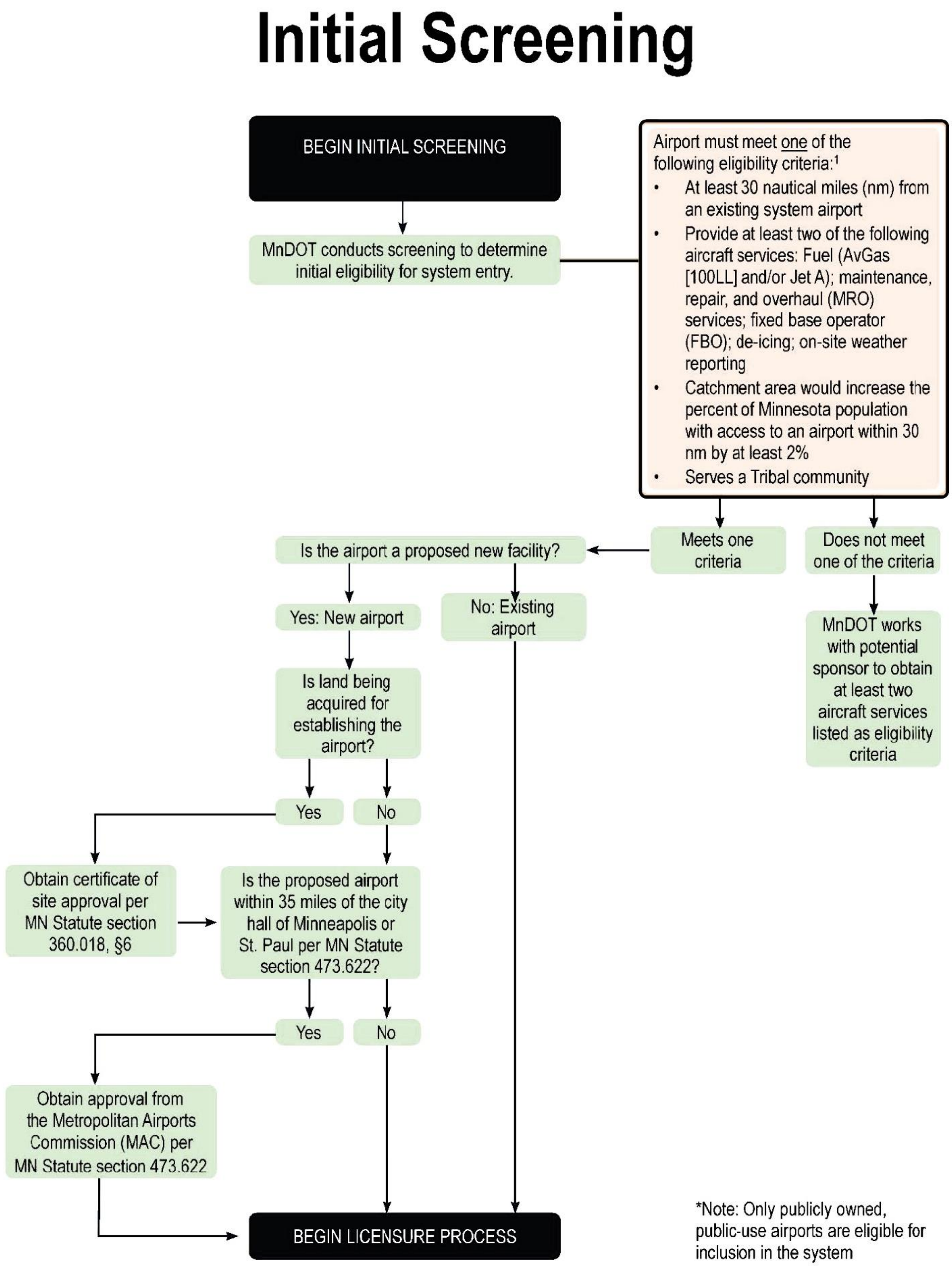
- Submits an Entry Request to the Commissioner requesting to enter the system, including all supplemental data detailed in the Airport Entry SOP
- Works with MnDOT Aeronautics Staff to develop the Evaluation Report and addresses comments received from the Commissioner during report development
- Fulfills the following responsibilities once system inclusion has been approved by the Commissioner:
  - Submits all required documents and fees to the MnDOT Office of Aeronautics to initiate the public airport licensure process (Application for a New Landing Area, Landing Area Location Form, airport diagram, license fee)
  - Works with local planning/zoning authority to establish airport zoning in accordance with Minnesota Administrative Rules Part 8800.2400 and for inclusion in all applicable local/regional comprehensive and/or transportation planning efforts
  - Develops the airport layout, typically in the form of an ALP
  - Submits an Federal Aviation Administration (FAA) Form 7480 and Landing Area Location Form to the FAA Great Lakes Airport District Office (ADO) to initiate an airspace study (applicable to new airport construction only)

- Request site approval from MnDOT Aeronautics (applicable to new airport construction only)
- Submits an FAA Form 5010-3 to establish a new public-use airport with the FAA
- Completes all public airport licensure requirements per Minnesota Administrative Rules Part 8800.1600
- Requests that MnDOT Aeronautics complete an airport inspection and corrects any discrepancies identified prior to licensure
- Acquires 100 percent of clear zones in fee simple or develops a CZAP for MnDOT Aeronautics approval
- Fulfills all ongoing legal, financial, operational, and other obligations associated with inclusion in the system and the operation of a publicly owned, public-use airport

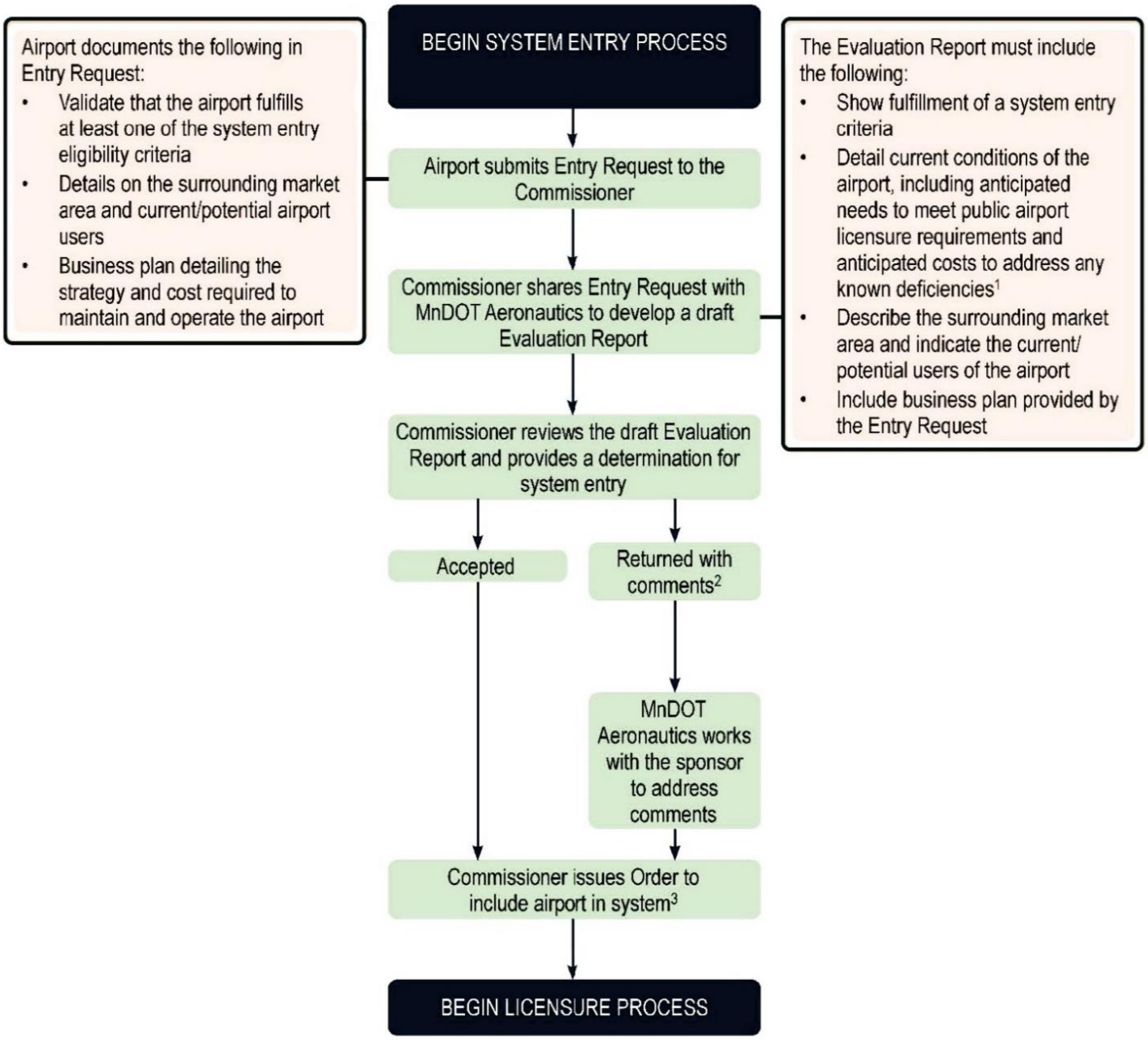
Airport Entry Process

Figure 1 depicts the airport entry SOP.

Figure 1. Airport Entry SOP



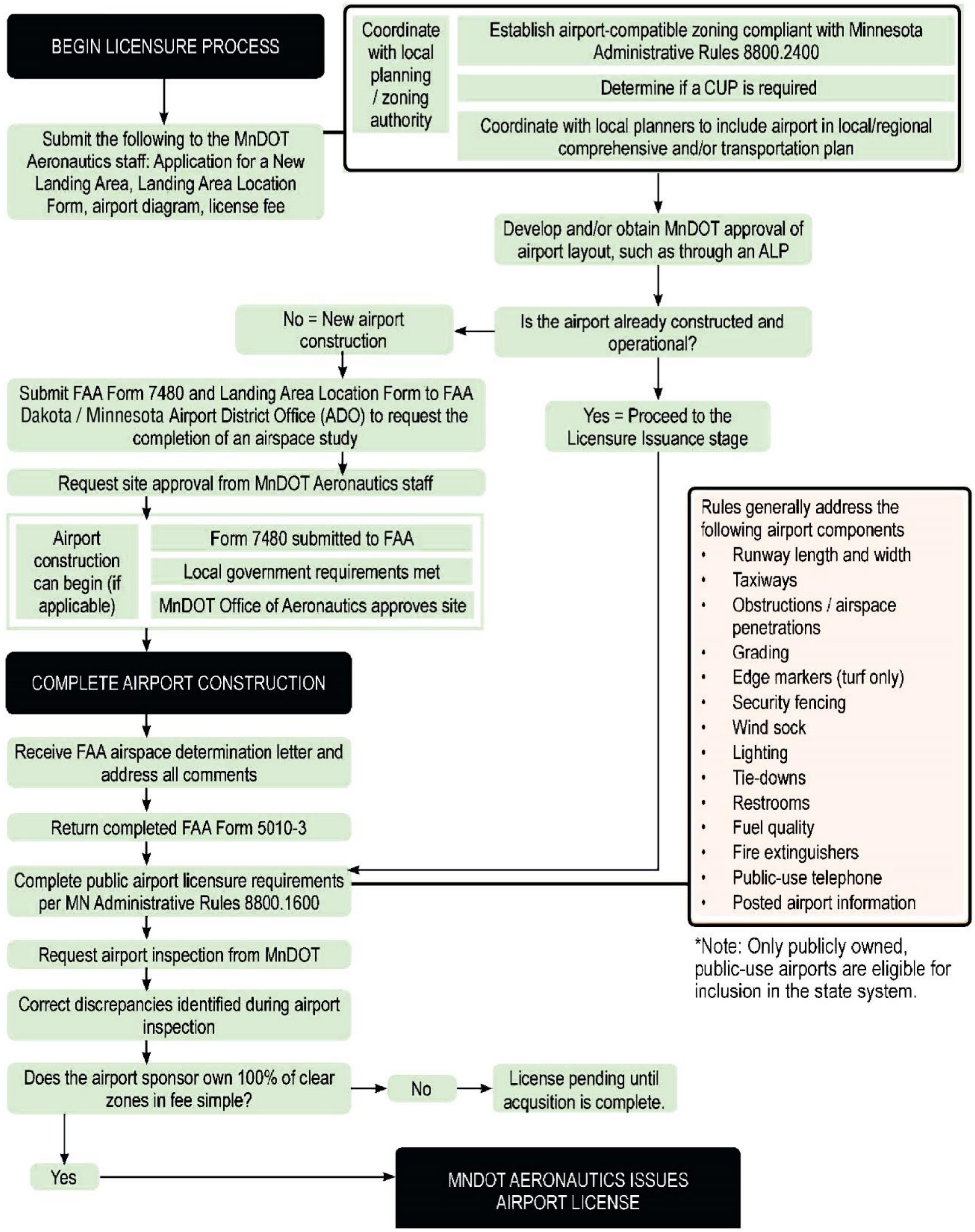
System Entry



Notes:

1) Additional costs may be required to address discrepancies identified during the airport licensure inspection noted in the Licensure Issuance process.
2) Prospective airport sponsors are permitted two rounds of review before the request is formally denied.
3) Once the Commissioner issues an Order to include the airport in the system, the airport sponsor may be eligible to receive a state Airport Planning Grant in accordance with Minnesota Statutes section 360.017. The "System Entry" section of the Airport Entry Guidance Document provides additional details about eligible project types and other state requirements associated with Airport Planning Grants.

Licensure and Licensure Issuance



Sources: Kimley-Horn, 2022; MnDOT Aeronautics, 2022

Airport Entry Standard Operating Procedure

The impetus for this Guidance is to formalize a consistent and thorough process for prospective sponsors to request entry into the system and for MnDOT Aeronautics to evaluate these requests. As detailed in this Airport Entry SOP, this process and include four key stages:

- Initial Screening
- System Entry
- Licensure
- Licensure Issuance

Before the entry process starts, the sponsor works with MnDOT Aeronautics Staff to complete an initial screening to confirm that the airport currently meets or can meet one of the system eligibility requirements. Upon confirming this, the sponsor can move onto the system entry process by submitting an Entry Request which triggers MnDOT Aeronautics to complete an evaluation of the airport via the Evaluation Report. If the Commissioner deems that the airport can enter the system, the sponsor must work with MnDOT Aeronautics to fulfill all state and federal requirements to be issued a public airport license. The following subsections details these four key stages of the Airport Entry SOP.

Initial Screening

1. New and existing sponsors seeking to enter the system should contact the MnDOT Aeronautics Planner assigned to the geographic region where the airport is located.[2] MnDOT Aeronautics will work with the sponsor to complete a screening determining that initial eligibility criteria are met.[3] For airports to be eligible for entry into the system, at least one of the following criteria must be met:
    a. Located at least 30 nautical miles (nm) from an existing state system airport
    b. Provides at least two of the following aircraft services: fuel (Jet A and/or Avgas [100LL] provided by the sponsor or a third-party); maintenance, repair, and overhaul (MRO) services; fixed-base operator (FBO); de-icing; on-site weather reporting
    c. Airport catchment area increases the percent of Minnesota population with access to an airport within 30 nm by at least 2 percent
    d. Serves a Tribal community
2. If the airport fulfills one of the above criteria, is owned by a public sponsor in accordance with Minnesota Statutes Chapter 360.031, and is open for public use, the next steps are based off the current state of the airport. If the airport is an existing airport facility, the sponsor proceeds directly to the System Entry stage (below). In the cases of a proposed new airport, MnDOT and the prospective sponsor must evaluate the following:

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[2] A regional map and contact information can be found on the MnDOT Aeronautics website at the following link: www.dot.state.mn.us/aero/planning/contacts.html.
[3] Only publicly owned, public-use airports are eligible for inclusion in the system.

a. Is land being acquired for establishing the airport? If so, the sponsor must work with MnDOT to obtain a certificate of site approval per Minnesota Statutes Chapter 360.108.

b. Is the proposed airport within 35 miles of the city hall of Minneapolis or St. Paul per Minnesota Statutes Chapter 473.22? If so, the Sponsor must obtain approval from the Metropolitan Airports Commission (MAC).

System Entry

1. To initiate this process, the sponsor must submit an Entry Request to the Commissioner documenting the following:
   a. Validation that the airport fulfills at least one of the system entry eligibility criteria
   b. Detail the surrounding market catchment area and anticipated airport users. Letter(s) of intent from potential airport users are recommended, including individuals and businesses currently or interesting in basing an aircraft at the facility. A 30 nm service buffer is recommended to define the airport catchment area.
   c. Business plan detailing the strategy and cost required to maintain the facilities/services for (1) licensure compliance and (2) system eligibility criteria, as applicable. This could include the plan to maintain at least two of the applicable aircraft services detailed in the previous section. Business plan must detail funding strategy to operate the airport for five years after acceptance into the system.
   d. Known airport deficiencies based on airport licensure requirements outlined in Minnesota Administrative Rules Part 8800.1600 and the proposed plan to address those deficiencies including source(s) of funding and timeline(s). This could include but not be limited to airport zoning; obstruction removal; and required aviation-related airside and landside facilities such as runway length/width, public restroom facilities, and tiedowns.
2. The Commissioner will share the Entry Request with the MnDOT Aeronautics Planning Director, which will be used to develop the Evaluation Report. This Evaluation Report must document the following items based on data submitted with the Entry Request and supplemental research, as feasible and required:
   a. Demonstrate fulfillment of at least one system eligibility criteria
   b. Detail current conditions of the airport, including anticipated needs to meet public airport licensure requirements in accordance with Minnesota Administrative Rules Part 8800.1600 and anticipated costs to address any known deficiencies[4]
   c. Describe the surrounding catchment area and indicate the potential users of the airport

[4] *Additional costs may be required to address discrepancies identified during the airport licensure inspection noted in the Licensure Process section.*

   d. Include the business plan provided in the Entry Request, including any letters of intent submitted by current and/or anticipated future airport users

3. The MnDOT Aeronautics Planning Director will transmit the draft Evaluation Report to the Commissioner for evaluating proposed entry into the system.
   a. If the Commissioner does not approve the request, MnDOT Aeronautics will work with the prospective airport sponsor to address the comments received. Sponsors are limited to two rounds of review before the request is formally denied.
4. Once all comments have been adequately addressed, the Commissioner will issue an Order declaring the airport is approved for inclusion in the system. Once the Order has been issued, the airport may be eligible to receive an Airport Planning Grant in accordance with Minnesota Statutes Chapter 360.017, §1(2).
   a. Expenditures related to Airport Planning Grants are expected to be related with airport planning only. This is broadly defined as undertaking studies, surveys, and other analyses associated with developing guidance related to the extent, kind, location, timing, and need for airport development projects to meet the aviation-related needs and goals of the airport sponsor and Minnesota state aviation system. ALPs are eligible for state support under an Airport Planning Grant. State funding participation rates for Airport Planning Grants shall not exceed those established for system airports (and may be lower). Airport Planning Grants shall be awarded in compliance with the state funding prioritization model as established by the 2022 Minnesota State Aviation System Plan (MnSASP).
   b. Maintenance and Operations (M&O) expenses; land acquisition including for clear zones; zoning-related expenses; and design- and construction-related work, including work associated with compliance with state licensure requirements, are ineligible for state funding assistance.

Licensure

1. The sponsor will submit the documents below to the MnDOT Aeronautics Staff. These forms are published at the following link: https://www.dot.state.mn.us/aero/licensing/airportlicensing.html.
   a. Application for a New Landing Area
   b. Landing Area Location Form
   c. Airport Diagram
   d. License Fee
2. Once MnDOT Aeronautics receives the documents noted in items a – d above, the sponsor must coordinate with the local planning/zoning authority to complete the following:
   a. Establish airport-compatible zoning in compliance with Minnesota Administrative Rules Part 8800.2400
   b. Determine if a CUP is required

   c. Coordinate with local planners to include the airport in local/regional comprehensive and/or transportation plans (if applicable)

3. The sponsor must establish an airport layout depicted through an ALP. This must be submitted to the MnDOT Aeronautics Staff and approved by MnDOT Aeronautics.
4. Newly constructed airports must complete the following steps (existing airports can move to the following section):
   a. The prospective sponsor must submit an FAA Form 7480-1 and Landing Area Location Form to the FAA Great Lakes Region ADO to request the completion of an airspace study.
   b. The sponsor must request a site approval from MnDOT Aeronautics.
   c. Airport construction may commence once FAA Form 7480-1 has been submitted to the FAA, MnDOT Aeronautics approves the site, and all local government requirements are met.

Licensure Issuance

1. For new airports, the FAA will issue an airspace determination letter. The sponsor should address any comments received from the airspace determination letter and complete the FAA Form 5010-3 attached to the letter. Form 5010-3 must be returned to the FAA to be registered in the federal airports database.
2. To be issued a public airport license, the airport must comply with all licensure requirements per Minnesota Administrative Rules Part 8800.1600. Accordingly, the sponsor must request an airport inspection from MnDOT Aeronautics. The sponsor must correct any discrepancies identified during the airport inspection.
3. New airports entering the system must own 100 percent of clear zones in fee simple based on ultimate build-out conditions to receive a public airport license. New entrants may not develop a CZAP for compliance with this state requirement. The State Airports Fund cannot be used to support land acquisition for clear zones for new system entrants.
4. The Commissioner will issue a Minnesota public airport license when all licensure requirements are met. Airports must all have a MnDOT-approved ALP, be appropriately zoning in accordance with Minnesota State Statutes, and own 100 percent of clear zones in fee simple based on ultimate build-out conditions.

Resources and Related Information

- Minnesota Statutes Chapter 360.015, *Commissioner; Powers and Duties*
- Minnesota Statutes Chapter 360.018, *Regulating Aircraft, Airmen, Airports, Instructors*
- Minnesota Statutes Chapter 360.021, *State Airport*
- Minnesota Statutes Chapter 360.031, *Definitions of Municipality*
- Minnesota Statutes Chapter 360.305, *Expenditures for Airports and Navigation*
- Minnesota Statutes Chapter 462.3595, *Conditional Use Permits*

- Minnesota Statutes Chapter 473.622, *Existing Airports; Control, Jurisdiction*
- Minnesota Administrative Rules Part 8800.1400, *General Airport Licensing Provisions*
- Minnesota Administrative Rules Part 8800.1600, *Public Airport Licensing*

History and Updates

Title: *State Aviation System Entry Guidance Statement*

Revision	Year	Comments
Initial adoption	2022	Guidance adopted

Attachment 5. Crosswind Runway Guidance Statement

To guide the prioritization of state investment into airports, Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) shall limit state support for crosswind runways to those airports that are both eligible for such support and justified in their requested need. Eligibility and justification are determined as follows:

- To be eligible for state funding, an airport must receive a score greater than or equal to 1.5 using the Minnesota Crosswind Runway Eligibility Model (MCREM). Airports not meeting this eligibility threshold may submit an Exception Request to waive this requirement.
- To be justified to receive state funding, an airport must demonstrate that the presence of a crosswind runway meaningfully enhances the airport's ability to safely and efficiently accommodate the type and frequency of aviation activities typically occurring there or provides significant public benefit. MnDOT Aeronautics will evaluate if an airport's funding request is justified based on the documentation provided in the Crosswind Runway Justification Report (CRJR), the contents of which are specified in this Guidance Statement.

The allocation of state funding for crosswind runways is ultimately at the discretion of the Commissioner of Transportation (Commissioner). The Commissioner has the responsibility of determining if the maintenance or development of a crosswind runway is in the best interest of the state aviation system and the various constituencies that rely upon it.

All airports must submit a CRJR to justify state investment regardless of their MCREM scores (i.e., above or below the 1.5 funding eligibility threshold). Airports that score below the 1.5 threshold can develop an Exception Request for submission to the Commission to meet the eligibility criteria. Pending Commissioner approval, the airport must then develop a CRJR. Figure 1 on page 7 of this Guidance Statement details the crosswind runway eligibility and justification process.

Reason for Guidance

MnDOT Aeronautics is responsible for allocating the State Airports Fund through various grant and loan programs. Most state dollars are awarded through the Airport Development Grant Program, which distributes funding through a competitive process aimed at optimally benefitting the air-traveling public. Between fiscal years (FY) 2016 – 2019, MnDOT Aeronautics annually distributed an average of $12.3 million to support capital improvement projects at Minnesota's system airports. Because airport capital improvement needs nearly always exceed available funding, MnDOT Aeronautics must prioritize funding requests in a manner that aligns with the goals and objectives of the agency as well as the needs of Minnesota's airports and the air-traveling public.

MnDOT Aeronautics established the Crosswind Funding Guidance Statement (or Guidance) to provide standard and uniform selection procedures in the allocation of state funding for the maintenance of existing and development of new crosswind runways. The need for this Guidance has been precipitated by several related trends. Demand for many types of air transportation is on the rise. To meet these new demands, airports must expand airside and landside facilities to support additional aircraft and the pilots/passengers that they serve. While investment needs are increasing, fund appropriations have been relatively flat for the previous 20 FYs. The *Aviation Tax Report for State FYs 2016 - 2019* (released June 30, 2020) reports that the buying power of fund appropriations has decreased over time when inflation is considered.

The Federal Aviation Administration (FAA) is experiencing a similar gap between investment need and available funding. As a result, the FAA generally limits federal support to primary runways only. According to the Airport Improvement Program (AIP) Handbook, Change 1 (February 26, 2019),

> *Per FAA policy, the Airport District Office (ADO) can only fund a single runway at an airport unless the ADO has made a specific determination that one or more crosswind or secondary runways are justified.* (Appendix G-2. Secondary, Crosswind, and Additional Runways)

Table G-1 in the AIP Handbook identifies specific criteria for when a crosswind runway may be eligible for federal support. In general, airports are eligible to receive AIP funding if the orientation of the primary runway provides less than 95 percent wind coverage for the critical aircraft. The FAA's guidance on the assembly and analysis of wind data is provided in Appendix C of FAA Advisory Circular (AC) 150/5300-13A (Consolidated Change 1), *Airport Design*. Wind analyses are typically conducted using weather data for the previous 10-consecutive-year period to develop an accurate weather profile for the airport. Wind coverage can be evaluated based on the predominant use period of the airport, including evaluating coverage for less than a 24-hour day (e.g., daytime versus nighttime) and/or seasonal usage (e.g., winter versus summer). Wind data can also be assembled to reflect other factors that may affect wind coverage such as instrument weather conditions and regularly occurring gusts.

In addition to meeting the less than 95 percent wind coverage eligibility threshold, airports must also justify their need for federal support. This justification may be based on improving and maximizing operational flows, deconflicting different types of operators, and supporting military and other first responder operations. Due to these strict eligibility and justification requirements, airports are often challenged in obtaining FAA funding for any runway except the primary. FAA support for existing and new crosswind runways is uncommon, with most general aviation (GA) and many small commercial service airports unable to meet the standards established.

Because of the inability of most airports to access federal AIP support for crosswind runways, MnDOT Aeronautics developed the Crosswind Runway Guidance to determine when state support should be provided. This Guidance also applies to airports not included in the National Plan of Integrated Airport Systems (NPIAS), as these airports are never eligible to receive federal AIP funds. Similar in format to the FAA methodology, MnDOT Aeronautics established state-specific eligibility and justification requirements for state crosswind runway support. As such, this Guidance Statement formally adopts the following key elements of the State Crosswind Runway Guidance, each of which is described in more detail in the sections that follow:

- MnDOT Aeronautics shall determine an airport's eligibility to receive state support for the maintenance of an existing or development of a new crosswind runway using the MCREM. Eligibility is defined as receiving a score of 1.5 points or above.

    - Airports not meeting the 1.5-point threshold can submit an Exception Request to document how the MCREM does not adequately reflect current or forecasted future conditions affecting the need for an existing or new crosswind runway. The Exception Request must be submitted to the Commissioner for review, and their approval is required to be deemed eligible for state support.
- Once an airport is deemed eligible (either through the MCREM or Commissioner-approved Exception Request), the airport shall develop a CRJR to justify its request for state funding. This report documents the type and frequency of aviation activities occurring at the airport and explains why a crosswind runway is important in terms of safety, security, access, mobility, or other public benefit. The CRJR must be approved by the Commissioner to receive state funding.

This Guidance Statement also establishes key responsibilities for MnDOT in maintaining the MCREM, developing and evaluating the Exception Request and CRJR, and recommending state funding based on the outcome of these processes.

Note that state grant funding is neither guaranteed nor approved once eligibility and justification are confirmed. Proposed projects must be depicted on the airport's MnDOT Aeronautics-approved Airport Layout Plan (ALP) and included in MnDOT Aeronautics' statewide Capital Improvement Program (CIP). Airport Development Grants are awarded based on the state funding prioritization model, which evaluates all project requests in terms of alignment with the priorities of MnDOT Aeronautics. Further, available state investment varies from year to year, project participant rates/funding limits apply, and State Airport Funds are not committed until a grant is fully executed.

Applicability

Key stakeholders affected by the Guidance Statement include:

- Commissioner
- Aviation Planning Director, MnDOT Aeronautics
- Airport sponsors operating a publicly owned, public-use airport in Minnesota recognized as part of the state aviation system
- MnDOT Aeronautics Airport Planning staff

Definitions

Airport sponsor – An airport sponsor is a public agency or tax-supported organization such as an airport authority or local government authorized to own and operate an airport; obtain property interests; obtain funds; and otherwise be responsible for meeting all applicable legal and financial requirements of current laws, regulations, and other obligations associated with that airport.

Allowable crosswind component – The allowable crosswind component is the wind speed at which wind coverage is analyzed based on the airport's Runway Design Code (RDC). The FAA's 95 percent wind coverage threshold is computed on the basis of the crosswind component not exceeding the allowable value per RDC, as provided in **Table 1**. The table also provides example aircraft within each RDC.

Table 1. Allowable Crosswind Component per RDC

Runway Design Code	Example Aircraft	Allowable Crosswind Component
A-I and B-I, including A-I and B-I small aircraft	Beech Bonanza, Cessna 172, Beech King Air 100, Cessna 421, Piper Cheyanne	10.5 knots
A-II and B-II	DHC Twin Otter, Super King Air 200, Cessna Citation II	13 knots
A-III, B-III C-I through C-III D-I through D-III	DHC Dash 8, Beech 400, Learjet 25, Embraer ERJ-170, Gulfstream 500, Bombardier Q-400	16 knots
A-IV and B-IV C-IV through C-VI D-IV through D-VI	Boeing 757, Boeing 767, Boeing 777, Lockheed C-130 Hercules	20 knots
E-I through E-VI	Special military use only	20 knots

Source: FAA AC 150/5300-13A (Consolidated Change 1), Airport Design (Table 3-1)

Crosswind Runway Justification Report (CRJR) – The CRJR documents an airport sponsor's justification for receiving state support for the maintenance of an existing or development of a new crosswind runway, the specific components of which are outlined in the Crosswind Runway Guidance Statement (see page 9).

Minnesota Crosswind Runway Eligibility Model (MCREM) – The MCREM is an Excel-based model that quantitatively evaluates the importance of an existing or proposed new crosswind runway within its community and the state aviation system. The MCREM is used to determine eligibility to receive state funding.

Runway Design Code (RDC) – A code signifying the design standards to which the runway is to be built. The RDC is based on the most demanding aircraft forecasted to use the airport on a regular basis (at least 500 operations per year excluding touch-and-go operations).

State aviation system – The state aviation system encompasses all publicly owned, public-use airports in the state of Minnesota eligible to receive funding through the State Airports Fund in accordance with Minnesota Statutes Chapter 360.305.

Exemption Request – The Exception Request documents how the eligibility threshold established by the MCREM inadequately reflects the current or anticipated future conditions affecting an airport's need for an existing or new crosswind runway. The specific components of the Exception Request are outlined in the Crosswind Runway Guidance Statement (see page 9). The Commissioner is responsible for approving or denying an Exception Request. Airports that have received an approved Exception Request are also required to prepare and submit a CRJR to justify funding.

Responsibilities

Commissioner

- Review Exception Requests to determine if the request clearly documents how the MCREM inadequately categorizes an airport's need for an existing or new crosswind runway
  - If approved, issue a written statement of approval to the Aviation Planning Director indicating the funding eligibility requirement established by the Crosswind Runway Guidance has been waived, as applicable.
  - If denied, issue a written statement of denial to the airport sponsor indicating that the eligibility threshold identified by the MCREM (i.e., score below 1.5 points) will be maintained. This indicates that the airport is not eligible to receive state support for a crosswind runway.
- Evaluate the CRJR submitted by the airport/airport sponsor. Additional details regarding the content and form of the CRJR are provide within the Crosswind Runway Guidance Statement (see page 9)
- Determine if the CRJR demonstrates that the maintenance or development of a crosswind runway meaningfully enhance safety, security, access, or mobility within Minnesota or provides another public benefit
- Issue a written recommendation to the Aviation Planning Director for state funding support. Note the Commissioner's recommendation does not guarantee that funding will be available or approved.

Aviation Planning Director

- Update the MCREM on a two-year cycle
- Maintain a list of airports eligible for state crosswind runway support
- Communicate Guidance requirements to airports, airport sponsors, and other stakeholders

Airport Planning Staff

- Distribute MnDOT Aeronautics' State Crosswind Runway Guidance Statement to all airports within the Minnesota state aviation system
- Respond to airport inquiries regarding crosswind runway funding policies, including but not limited to the purpose and application of the MCREM; preparation of an Exception Request; purpose, process, and contents of the CRJR; and steps to obtain state funding once eligibility and justification has been confirmed via the Commission's recommendation
- Inform airports of their crosswind runway eligibility based on their MCREM scores
- Evaluate all proposed projects (including but not limited to crosswind runways) on the statewide CIP using the state funding prioritization model

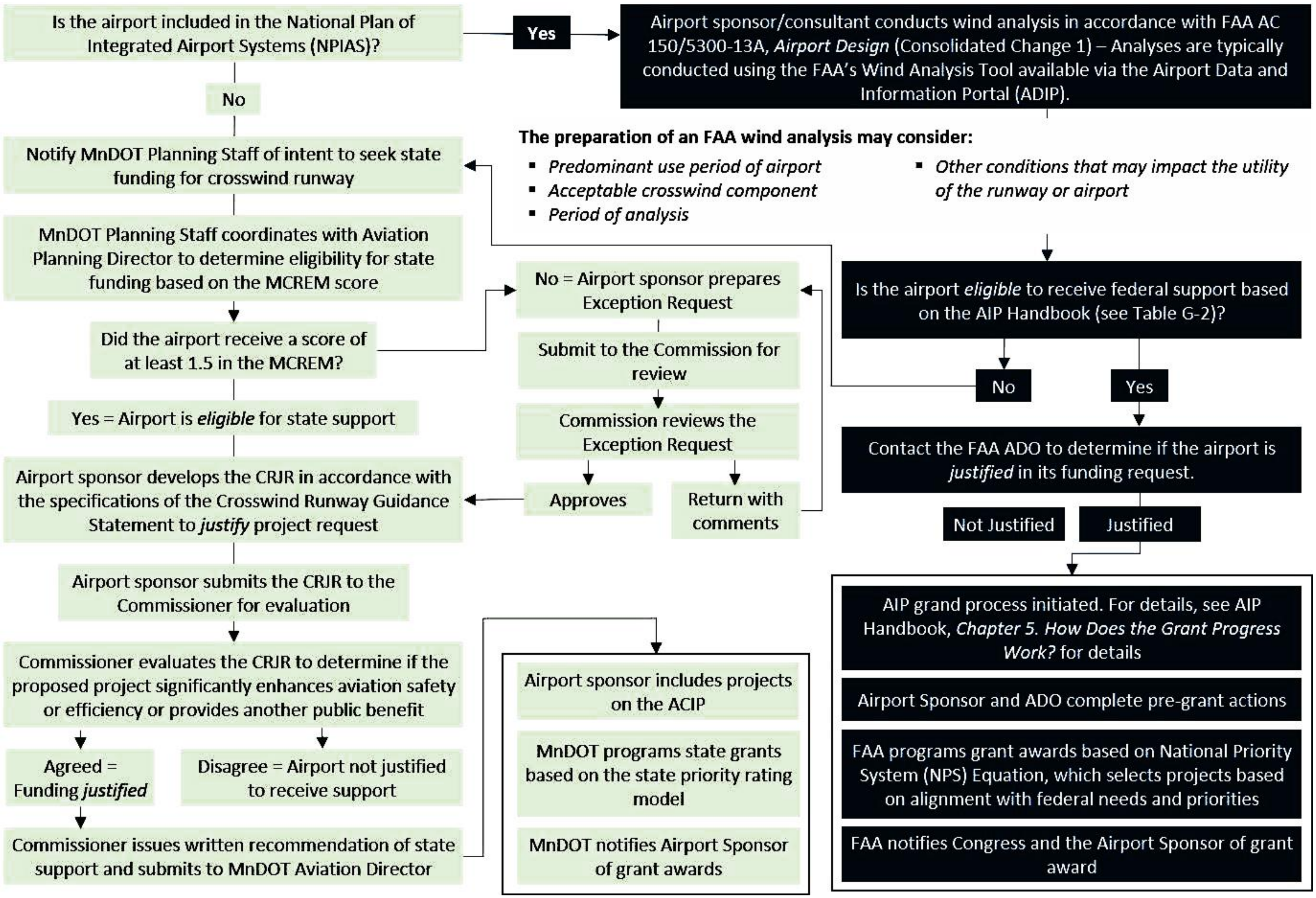
Airport Sponsor

- Work with the FAA ADO to determine if proposed crosswind runway project is eligible and justified for support through the AIP (NPIAS airports only)
- If the proposed project is ineligible for AIP funding due to FAA eligibility criteria or inclusion in the NPIAS, contact MnDOT Aeronautics to determine eligibility for state support (i.e., having received a MCREM score of 1.5 points or above)
- If the proposed project is ineligible for state support due to receiving a score of less than 1.5 points in the MCREM, prepare an Exception Request to document that the model inadequately reflect current or forecasted future conditions (see page 9 for the required contents of this document)
  - Submit the Exception Request to the Commission for review
  - Respond to the Commissioner's requests for additional information, as applicable
- If the proposed project is eligible for state support, develop the CRJR in accordance with the specification provided within the Crosswind Runway Guidance Statement (see page 9)
  - Submit the CRJR to the Commissioner for review
  - Respond to the Commissioner's requests for additional information, as applicable
  - If the Commissioner deems that the proposed project is justified for state support, the airport sponsor must:
    - Ensure the proposed project is included on the MnDOT Aeronautics-approved ALP
    - Incorporate the proposed project on the statewide CIP

Crosswind Runway Guidance Compliance Process

Figure 1 depicts the process by which airport sponsors, MnDOT Aeronautics, and the Commissioner determine if the state may support the maintenance of an existing or construction of a new crosswind runway. The mechanisms to evaluate eligibility and justification are described in the sections that follow.

Figure 1. Crosswind Runway Guidance Compliance Process



Notes: The proposed project must be depicted on the airport's current ALP to receive federal and/or state investment. The Commissioner's recommendation of project support does not guarantee grant funding. Source: Kimley-Horn, 2022

MCREM

Eligibility to receive state funding support is determined by the MCREM, an Excel-based model that quantitatively evaluates the importance of an existing or proposed new crosswind runway within its community and the state aviation system. The model also helps align MnDOT Aeronautics' funding decisions with the agency's priorities. The four criteria, as well as the scoring methodology, relative weighting against one another, and relevancy are described in **Table 2**. Airports receive points based on their performance against each evaluation criteria, with 5, 3, or 1 point(s) awarded respectively for high, medium, and low. Scores are then weighted based on their relative importance within the model. Scores are totaled, and airports are ranked against one another. Airports receiving a total weighted score of 1.5 or above are deemed eligible to receive state funding support. All criteria, scores, and weights were vetted, validated, and approved through a Focus Area Working Group comprised of stakeholders from across the state convened specifically for this Guidance Statement.

Table 2. MCREM Criteria and Evaluation Methodology

Criteria (Percent Weighting)	Scoring Methodology*	Relevancy
Least Favorable Percent Wind Coverage (41%)	High < 90% Med = 90 to 95% Low > 95%	Prioritizes state funding to airports with poor wind coverage. Wind coverage was evaluated by airport for the winter and summer seasons. Scoring was based on the season with the least percent wind coverage to increase the airport's period of operability.
State Classification (23%)	High = Key Med = Intermediate Low = Landing Strip	Prioritizes state funding to airports generally capable of supporting a wider range of aircraft. These airports typically also offer more services such as fuel and maintenance to support aircraft and the pilots/passengers they serve.
Presence of an Existing Crosswind (18%)	High = Paved Med = Turf Low = None	Prioritizes state funding to airports that currently have a crosswind runway, as maintaining an existing facility is nearly always more cost-effective than new construction. Paved runways are also prioritized, as these facilitates support a broader range of aircraft, such as those used for corporate/business and safety- and security-related aviation activities.
Proximity to a Paved Crosswind (18%)	High > 50 nautical miles (nm) Med = 30 – 50 nm Low < 30 nm	Prioritizes state funding to airports that may fill a gap in the statewide aviation system. This provides for air access and mobility across Minnesota while minimizing the duplication of facilities.

**Note: Airports receive the following scores for each criterion: High = 5, Medium = 3, Low = 1. Source: Kimley-Horn, 2021*

EXCEPTION REQUEST

Airports receiving a score of less than 1.5 in the MCREM can submit an Exception Request to MnDOT Aeronautics to document how the results of the model do not adequately reflect the current or forecasted future conditions. For example, the variance request could document:

- Wind coverage based an alternative predominant-use period (note the model evaluates coverage based on the least favorable coverage provided by seasonal winter or summer daytime conditions)
- Application of a lower allowable crosswind component based on frequent operations conducted by aircraft less demanding than the airport's critical or design aircraft (see Table 1 for the allowable crosswind component by RDC)
- Proposed crosswind runway project fills a gap within the state aviation system insufficiently identified using a geographical buffer (i.e., the proposed project is 25 nm from a paved crosswind runway. This may not address the need for a turf crosswind runway within the region, or ground transportation connectivity between the two facilities severely limits access for some Minnesota communities.)

Exception Requests must be submitted in writing to the Commissioner. The Commissioner will evaluate if the request demonstrates that the MCREM does not adequately reflect current or forecasted future conditions. If the Commissioner approves the Exception Request, the eligibility standard is waived. The airport sponsor then must develop and submit a CRJR to demonstrate justification in accordance with the standards and processes of the MnDOT Crosswind Runway Guidance Statement.

Crosswind Runway Justification Report

The CRJR outlines the specific documentation to be provided to MnDOT Aeronautics to justify project support. Justification should be sought only when the following two conditions have been met:

- Airport sponsor cannot access AIP funding to maintain an existing or develop a new crosswind runway due to federal eligibility/justification thresholds or inclusion in the NPIAS
- Airport has been deemed eligible to receive state support for a crosswind runway based on receiving a score greater than or equal to 1.5 in the MCREM or having a Commissioner-approved Exception Request

The CRJR is designed to achieve the following objectives:

- Provide brief overview of proposed project
- Document wind coverage provided by existing runways
- Provide project justification clearly demonstrating that state support will meaningfully enhance the airport's ability to safely and efficiently accommodate the type and frequency of aviation activities typically occurring there or provide significant public benefit

In consideration of these objectives, the CRJR must provide the following information in the order presented below.

SECTION 1: DOCUMENTATION OF PROPOSED PROJECT

Complete the following table to provide a brief overview of the project request.

Data	Response
Briefly describe the support requested from MnDOT Aeronautics (e.g., Crack/seal coat of existing crosswind runway 09/27.)	
Runway orientation	
Surface type	
Maintenance or new construction?	
Is the proposed project shown on the MnDOT-approved ALP?	
Eligibility score as obtained from the MCREM	

SECTION 2: DOCUMENTATION OF EXISTING WIND COVERAGE

This section should comprehensively document the wind coverage provided by the primary runway. This section must address:

- Provide coverage for aircraft flying under visual flight rules (VFR), instrument flight rules (IFR), and all-weather conditions
- The allowable crosswind component should be based on the RDC of the primary runway unless an Exception Request applying a lower allowable crosswind component was submitted and approved by the Commissioner
    - All airport sponsors may also analyze wind coverage using a smaller RDC if such aircraft are currently or forecasted to conduct at least 500 operations annually. The allowable crosswind component by RDC is provided in Table 1. In such cases, analyses must be provided for both the RDC of the primary runway and an alternative (i.e., lower) RDC.
- Airport sponsors may analyze coverage based on the predominant use period of the airport (seasonal, daytime vs. nighttime, etc.). Indicate the predominant use period of the airport, and if that period was used to analyze coverage. Note that if a seasonal period is used in this analysis, the airport sponsor must maintain airport operability during that season if funding is awarded (e.g., mowing in the summer or snow removal in the winter).
- Indicate the time period for which wind data was assembled (10 consecutive years of data recommended)
- Indicate if the weather reporting system from which data were obtained is physically located at the airport. If no, indicate where the system is located.

This section should also document the wind coverage provided by the existing crosswind runway and/or any other runway facilities to provide the cumulative total.

SECTION 3: DOCUMENTATION OF JUSTIFICATION

This section offers airport sponsors with the opportunity to explain specific benefits provided by the proposed crosswind runway project. Items of consideration may include (but are not limited to):

- Type and frequency of operations that currently or are forecasted to use the crosswind facility
- Aviation-related activities regularly occurring at the airport that may benefit from the presence of a crosswind runway including (but not limited to) commercial passenger service and air cargo
- Public benefit(s) associated with the proposed project, such a local employer that relies on the airport to conduct business activities, uninterrupted mail service, or access
- Proximity to the nearest alternative crosswind runway. The airport sponsor should consider if the proximate facility can support the same or similar aviation activities based on runway length, surface type, fuel availability, and other aviation support services.

Airport sponsors may also append letters of support from local aviation users, elected officials, and the community. This section should clearly explain how support will enhance the statewide aviation system in terms of advancing the vision of MnDOT Aeronautics, the goals of the 2022 Minnesota State Aviation System Plan (2022 MnSASP), or both.

Resources and Related Information

- FAA AC 150/5300-13A (Consolidated Change 1), *Airport Design*

History and Updates

Title: Crosswind Runway Guidance Statement

Revision	Year	Comments
Initial adoption	2022	Guidance adopted

Attachment 6. Clear Zone Guidance Statement

In order to restrict land uses which may be hazardous to the operational safety of aircraft and protect life and property in runway approach areas, it is the position of the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics), that state funding be limited to airports with fee simple ownership of MnDOT-approved clear zones based on the ultimate development of the airport.[1] Clear zones must be maintained free of airspace obstructions and in a manner that prevents congregations of people. An airport must be in full compliance with the Clear Zone Guidance effective at the time when the Airport Layout Plan (ALP) was or is signed and approved by MnDOT Aeronautics to be eligible for state funding. This includes the depiction of clear zones of the dimensions effective at the time of MnDOT ALP approval. Compliance with the current Clear Zone Guidance Statement (or Guidance) is required for all new or updated ALPs signed on or after the effective date of 01 June 2022. Actual property interests to be acquired will be determined upon consideration of land lines, availability of property, severance, terrain limitations, unusual cost affecting the safety and convenience of the public, and other like factors affecting airport compatibility of land uses surrounding the airport as defined by the Commissioner of Transportation (Commissioner).

Clear zone configurations are primarily based on primary and approach surfaces as defined by Federal Aviation Regulations (FAR) Part 77, *Safe, Efficient Use, and Preservation of Navigable Airspace*.[2] Clear zone dimensions are based on runway category,[3] visibility minimums (as applicable), and most critical approach type. Clear zone configurations are depicted in **Figure 1,** with associated dimensions provided in **Table 1**. Clear zones begin at the end of the primary surface. The primary surface extends 200 feet beyond each runway end for all paved runways. The primary surface ends at each runway end for all turf runways. Inner widths align with width of the primary surface as prescribed by the runway's most precise approach for either end of the runway. Outer widths are determined by the width of the approach surface at the applicable clear zone length. Clear zones do not have associated slopes, as clear zones are lands to be acquired and/or controlled, as well as maintained in accordance with applicable airport compatible zoning ordinance and regulations.

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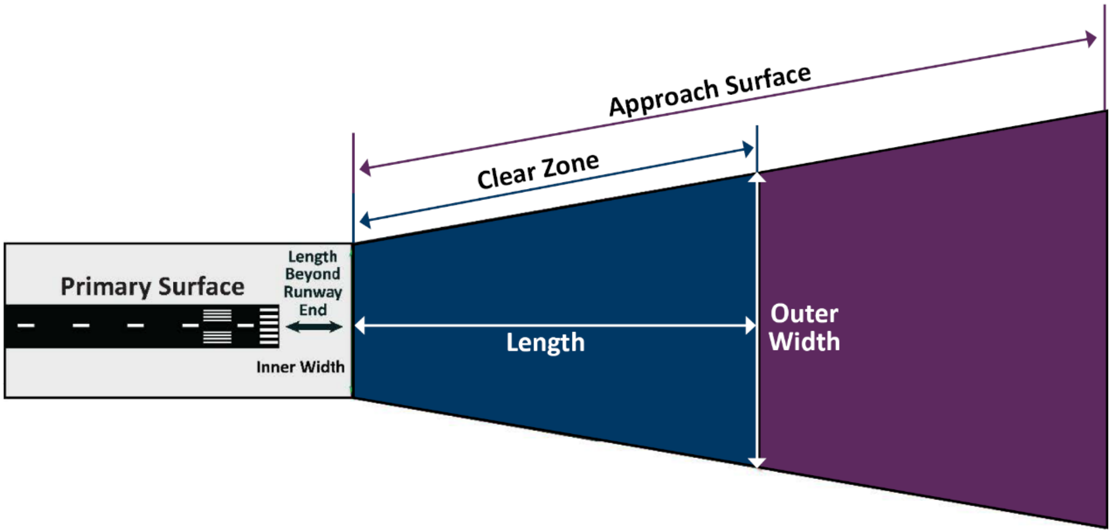
[1] Note: State funding can be awarded for the acquisition of clear zones pursuant to Minnesota Statutes Chapter 360.305, subd. 4(a), Costs allocated; local contribution; hangar construction account.

[2] MnDOT Aeronautics' clear zone dimensions differ from those established by FAR Part 77 for airports with a non-precision instrument approach (NP) by providing separate dimensions for runway ends with visibility minimums greater than ¾ mile (referred to as "D1") and visibility minimums of ½ mile (referred to as "D"2). FAR Par 77 only provides one dimensional standard for NP(D) for visibility minimums as low as ¾ mile. Part 77 surfaces are defined in Title 14, Chapter I, Subchapter E, Part 77 of the Code of Federal Regulations (https://www.ecfr.gov/current/title-14/part-77)

[3] Runway categories are defined in terms of surface type (i.e., turf versus paved) and utility versus other-than-utility.

Figure 1. MnDOT Clear Zone Configurations



**Note: When the runway has a specially prepared hard surface (e.g., paved), the primary surface extends 200 feet beyond both ends of the runway. The primary surface ends at the physical ends of the runway when it has no specially prepared hard surface (e.g., turf). Sources: MnDOT Aeronautics, 2022; FAR Part 77*

Table 1. MnDOT Clear Zone Dimensions

Approach Type (Runway Category) – Visibility Minimum, As Applicable	Length of Surface (feet)	Length Beyond Runway End	Inner Width	Outer Width
Turf	1,000	End of the primary surface as prescribed by surface type	Width of primary surface as prescribed by the runway's most precise approach for either end of the runway	Outer width of approach surface at clear zone length of surface
A(V)	1,000			
B(V)	1,000			
NP(A)	1,000			
NP(C) – Visibility minimums greater than ¾ mile	1,700			
*NP(D1) – Greater than or equal to ¾ - mile visibility	1,700			
*NP(D2) – ½ - mile visibility	2,500			
PIR	2,500			

**Note: Clear zone dimensions differ from those established by FAR Part 77 for airports with a non-precision instrument approach (NP) by providing separate dimensions for runway ends with visibility minimums greater than ¾ mile (referred to as D1) and visibility minimums of ½ mile (referred to as D2). FAR Par 77 only provides one dimensional standard for NP(D) for visibility minimums as low as ¾ mile. Definitions: A = Utility runways. B = Runways larger than utility. C = Visibility minimums greater than ¾ mile. D1 = Visibility minimums greater or equal to ¾ mile. D2 = Visibility minimums of ½ mile. V = Visual approach. NP = Non-precision instrument approach. PIR = Precision instrument approach. Sources: MnDOT Aeronautics, 2022; FAR Part 77*

Reason for Guidance

MnDOT Aeronautics established this Guidance to promote the protection of people and property near airports from safety hazards and nuisance associated with aircraft operations, as well as the safety of those in the air. Clear zones are trapezoidal shaped areas off each runway end, the size of which is determined by the runway category (paved/turf, utility/other-than-utility), visibility minimums (as applicable), and most critical approach ultimately planned for each runway configuration. Due to the altitude at which aircraft operate within the airspace above clear zones, maintaining clear zones free of obstructions is paramount to safe operations. Clear zones are subject to all applicable Minnesota Administrative Rules Part 8800 and Minnesota Statutes Chapter 360.

Because of the critical role of clear zones in enhancing airport safety, MnDOT Aeronautics determined that these areas must be acquired in fee to receive state participation (i.e., funding) in airport projects.[4] Fee simple ownership provides airports and airport sponsors with the greatest level of control over land uses, including the height of objects within clear zones. Understanding that fee simple ownership is not feasible in some cases, the Guidance also provides for exceptions in certain defined cases and the procedures for obtaining an exception. Airport sponsors must document Guidance exceptions in a Clear Zone Acquisition Plan (or CZAP) approved by the Aviation Planning Director.

This Guidance defines the following:

- Clear zone dimensional standards by runway category (paved/turf and utility/other-than-utility), visibility minimums (as applicable), and most critical approach planned for each runway end (i.e., inner and outer widths, length, and distance from primary surface end)
- Purpose, process, and components of the Clear Zone Acquisition Plan, which is used to determine actual property interest to be acquired if 100 percent fee simple ownership is not feasible
- Responsibilities of the Aviation Planning Director associated with approving actual property interest for acquisition and clear zone Guidance exceptions as documented in the CZAP

Applicability

Key stakeholders affected by the Guidance include:

- Aviation Planning Director, MnDOT Aeronautics
- Airport sponsors operating a publicly owned, public-use airport in Minnesota recognized as part of the state aviation system
- MnDOT Aeronautics Airport Planning staff

[4] Note: state funding can be awarded for the acquisition of clear zones pursuant to Minnesota Statutes Chapter 360.305, subd. 4(a), Costs allocated; local contribution; hangar construction account.

Definitions

Airport compatible land use – Airport compatible land uses are those that do not hinder the operations of aircraft or the airport, negatively impact safety, nor cause unreasonable nuisance impacts to surrounding populations, as defined by the Commissioner. Airport compatible land use is used interchangeably with airport compatibility within the context of the Clear Zone Guidance.

Air navigation obstructions – An obstruction is any existing or proposed object, terrain, or structure, including a mobile object, that is of greater height than those established in Minnesota Administrative Rules chapter 8800.1200.

Airport sponsor – An airport sponsor is a public agency or tax-supported organization such as an airport authority or local government authorized to own and operate an airport; obtain property interests; obtain funds; and otherwise be responsible for meeting all applicable legal and financial requirements of current laws, regulations, and other obligations associated with that airport.

Clear Zone Acquisition Plan (CZAP) – The CZAP documents an airport sponsor's plan for acquiring its clear zones in fee simple and/or formally requests an exemption to MnDOT Aeronautics' Clear Zone Guidance by providing justification regarding why the airport is unable to fully comply with this Guidance. Full compliance is defined as owning 100 percent of clear zones off all existing and planned runway ends at ultimate build-out. Clear Zone Acquisition Plans must be prepared in accordance with the specifications provided by this Clear Zone Guidance Statement and submitted to the Aviation Planning Director for review and approval. Airport sponsors that have a MnDOT-approved ALP as of 01 June 2022 are required to develop and submit a CZAP in conjunction with their next ALP update.

Maintained – Clear zones shall be managed in a manner that supports airport compatible land use and prohibits height obstructions.

Ownership – Ownership is defined as possession in fee simple. The airport has full and irrevocable ownership of the land and any buildings on located on it.

State aviation system – The state aviation system encompasses all publicly owned, public use airports in the state of Minnesota eligible to receive funding through the State Airports Fund in accordance with Minnesota Statutes Chapter 360.305.

Ultimate – Ultimate conditions reflect existing and planned airport build-out as depicted on a MnDOT-approved ALP.

Responsibilities

Airport Sponsor

- Acquire in fee simple clear zones associated with each runway end in accordance with the standards established by the MnDOT Clear Zone Guidance
- If an exception to these standards is requested, the airport sponsor must develop a CZAP in accordance with the specifications provided as follows:

- Submit the proposed CZAP to the Aviation Planning Director for review
- Respond to Aviation Planning Director requests for additional information
- If the Aviation Planning Director deems the exception(s) requested within the CZAP do not provide for a reasonable level of safety for aircraft and surrounding populations, the airport sponsor must:
  - Acquire all property within clear zone in fee simple, or
  - Revise the CZAP and resubmit to the Aviation Planning Director for reevaluation

Aviation Planning Director

- Maintain a list of grant-eligible airports based on compliance with the Clear Zone Guidance
- Communicate Guidance requirements to airports, airport sponsors, and other stakeholders
- Issue a written record of determination (i.e., approval) for clear zones that are owned in accordance with MnDOT Aeronautics’ Clear Zone Guidance
- If an airport sponsor requests an exception to the MnDOT clear zone dimensional standards via a Clear Zone Acquisition Plan, the Aviation Planning Director must:
  - Examine CZAP submitted by airport/airport sponsor. Additional details regarding the content and form of the CZAP are provided within the MnDOT Clear Zone Guidance Statement.
  - Determine if proposed clear zone exemptions provide for a reasonable level of safety for airport users and surrounding populations in consideration of airport-specific constraints and requirements
  - Issue a written record of determination documenting approval or denial of proposed Clear Zone Acquisition Plan

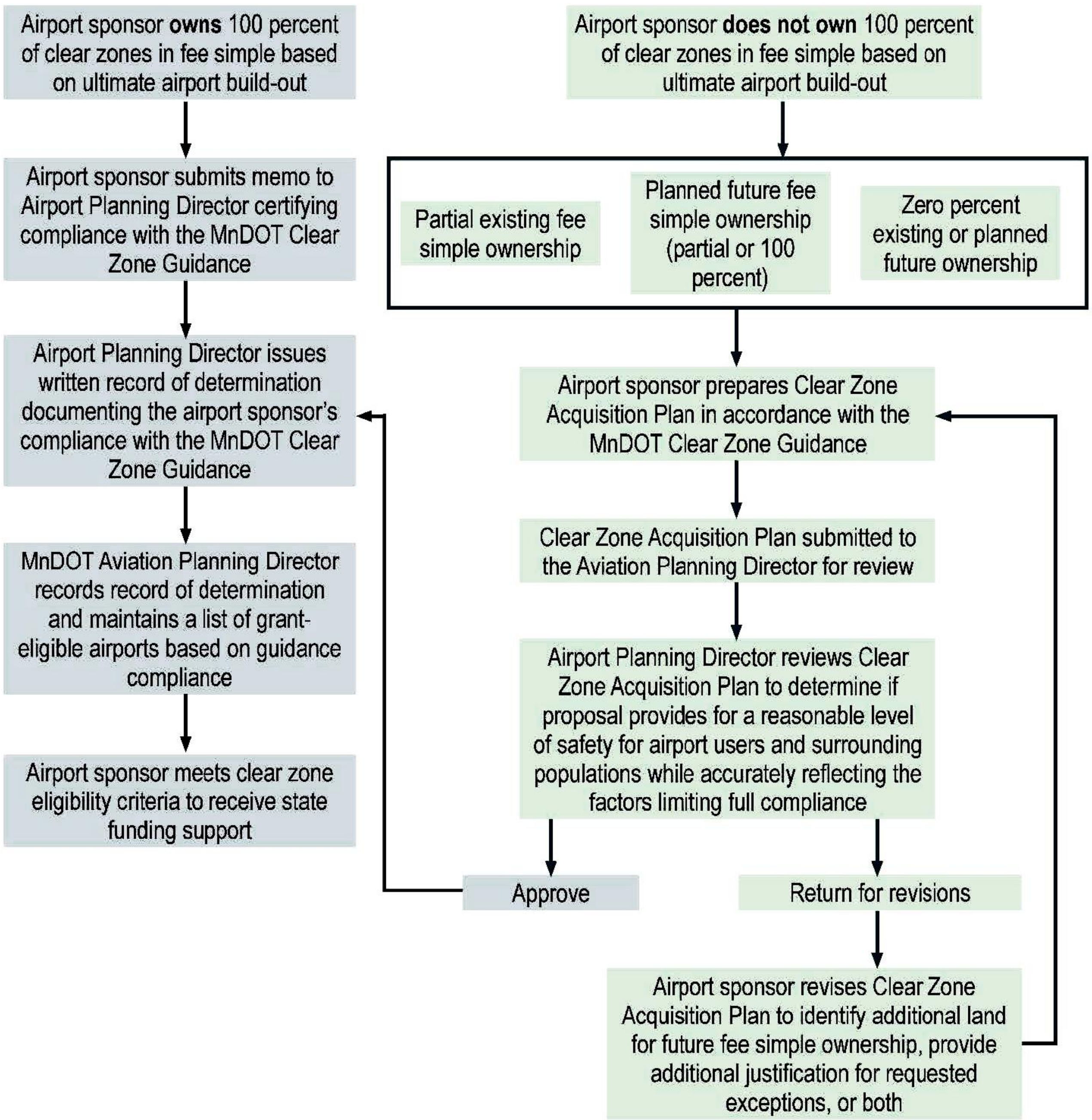
Airport Planning Staff

- Distribute MnDOT Aeronautics’ Clear Zone Guidance including diagrams to all airports with the Minnesota state aviation system
- Respond to airport inquiries regarding clear zone policies including, but not limited to, required documentation and processes related to Clear Zone Acquisition Plans and state funding requests for the acquisition of clear zones in fee
- Coordinate Aviation Planning Director approval process for airports that have acquired clear zones in fee or are requesting an exemption via a Clear Zone Acquisition Plan

Clear Zone Guidance Compliance Process

Figure 2 depicts the process by which an airport sponsor complies with the MnDOT Clear Zone Guidance Statement and the primary responsibilities of key stakeholders.

Figure 2. Clear Zone Guidance Compliance Process



Sources: MnDOT Aeronautics, 2022; Kimley-Horn, 2022

Clear Zone Acquisition Plan

The CZAP outlines the specific documentation to be provided to MnDOT Aeronautics if an airport sponsor does not fully comply with the MnDOT Clear Zone Guidance effective at the time when MnDOT Aeronautics approves and signs its ALP. Full compliance is defined as fee simple ownership of clear zones off all runway ends based on ultimate build-out conditions. Dimensional standards are established by the effective Clear Zone Guidance. As such, Clear Zone Acquisition Plans are required when the airport sponsor holds:

- Partial clear zone fee simple ownership (less than 100 percent of property interest is owned by the airport sponsor)
- Planned future clear zone acquisition but clear zones not owned on the date when the ALP is signed by MnDOT Aeronautics
- Fee simple ownership is not feasible now or in the anticipated future due to airport-specific constraints including, but not limited to, undue cost burdens for the airport sponsor, terrain, and severability

In these cases, the airport sponsor is required to develop a detailed analysis that achieves the following objectives:

- Documents the proposed clear zone property interest to be acquired in fee (if any)
- Provides justification regarding why some or all clear zones cannot be acquired in fee
- Identifies existing or proposed alternative land use control mechanisms enacted or pursued to enhance safety and reduce nuisances associated with aircraft operations

In consideration of these objectives, the CZAP must provide the following information in the order presented below.

SECTION 1: AIRPORT AND SURROUNDING VICINITY MAP

This map is designed to provide a graphic depiction of the airport and surrounding vicinity. All features within and adjacent to clear zones relevant to airport land use compatibility must be shown including:

- Clear zone dimensions as established by the MnDOT Clear Zone Guidance Statement (inner/outer width and length based on approach type)
- Existing land ownership within clear zones, including parcels owned by the airport sponsor in fee simple
- Property interests proposed for future fee simple ownership
- Property interests neither proposed nor designated for future fee simple ownership
- Natural and manmade features, structures, and objects pertaining to the airport compatibility of land uses within and in the vicinity of clear zones, including those that may result in congregations of people or exceed height standards defined by Minnesota Administrative Rules Part 8800.1200
    - Denote mitigation measures that have been enacted to protect people and property, including all marked and/or lighted obstructions (see Minnesota Administrative Rules Part 8800.1200, subpart 7, *Obstruction Marking and Lighting*).
- Existing airport property boundary
- Part 77 approach surface at ultimate airport build-out

SECTION 2: NARRATIVE REPORT

The narrative report provides a clear explanation of each factor contributing to the exception request that answers the question of why the airport sponsor is unable to comply with the MnDOT Clear Zone Guidance (i.e., 100 percent ownership of clear zones in fee simple). These factors include, but are not limited to, land lines, terrain, severability, unusual cost, and current ownership status.

- Factors limiting current or future ownership must be depicted on the airport map presented in Section 1, as feasible.
- Existing or proposed alternative land use control strategies to support airport compatible land uses within clear zones should be described in the narrative report. Alternative strategies may include aviation or conservation easements, transfer or purchase of development rights, non-suit covenants and hold harmless agreements, and disclosure notices. Airport sponsors should describe any steps that have been taken or are currently underway to enact alternative land use control strategies, even if those steps did not result in implementation.

SECTION 3: PROPERTY OWNERSHIP TABLE

The property ownership table must provide the following information for each parcel within the airport's clear zones:

- Owner
- Estimated market value
- Existing land use (e.g., residential, light industrial, commercial, etc.)
- Distance of all buildings from extended runway centerline (if applicable)
- Height of all buildings (if applicable)
- When the parcel is anticipated to be acquired and proposed funding source(s) (if applicable)

ATTACHMENT

Attach the following supporting documentation to the Clear Zone Acquisition Plan.

- Attachment A: Legal documentation of alternative land use control strategies currently in-place (as available)

Resources and Related Information

- Minnesota Statutes Chapter 360.061 to 360.074, *Airport Zoning*
- Minnesota Statutes Chapter 360.81 to 360.915, *Regulation of Structure Heights*
- Minnesota Administration Rules Part 8800.1100, *Regulation of Structure Height*
- Minnesota Administration Rules Part 8800.1200, *Criteria for Determining Air Navigation Obstructions*
- Minnesota Administration Rules Part 8800.1600, *Public Airport Licensing*
- Minnesota Administration Rules Part 8800.2400, *Airport Zoning Standards*

History and Updates

Title: *Clear Zone Guidance Statement*

Revision	Year	Comments
Initial adoption	1978	Guidance adopted
1st revision	2005	Guidance revisions adopted
2nd revision	2022	Guidance revisions adopted including clarification associated with Guidance compliance

Source: MnDOT Aeronautics, 2022

Attachment 7. Last-mile Connectivity and Courtesy Car Evaluation and Recommendations

Introduction

Minnesota relies on a robust and diverse multimodal network to establish an environment conducive to economic development and a good quality of life. Airports serve as one critical component of this network by allowing people and goods to quickly travel regionally, nationally, and globally. Airport users rely on a variety of ground transportation options to travel between the airport and to their next destinations. At commercial service airports, users traveling via scheduled passenger flights typically expect public transit, rental car, taxi, transportation network companies (TNCs, also known as rideshares), and shuttle services. Some general aviation (GA) airports may also provide these connectivity options, particularly those that support scheduled or unscheduled passenger service.

Multimodal connectivity is often more limited at smaller GA airports, which may hinder aviation activities. The Aircraft Owners and Pilots Association (AOPA) estimates that 65 percent of GA flights operate for business and public services, two activities heavily reliant on the availability of ground transportation options to connect users to and from the airport.[1] Pilots and passengers may overlook certain GA airports in favor of those that offer greater connectivity. In some cases, pilots select the airport(s) they fly into/out of based on the ground transportation options available, as suggested in following quote:

"I fly for business and desire to land as close as I can to my customers. I determine which airport to utilize based on rental car and courtesy car availability. If neither exist at the local airport, I bypass that airport and land at another one close by with those options." – Travis Johnson, Multiengine Commercial Instrument, and CFII Pilot, St. Paul Airport (STP), Minnesota[2]

Minnesota's 124 publicly owned, public-use GA airports contributed nearly $1.2 billion in total economic activity to the state in 2019.[3] The ability for these GA airports to contribute to local and statewide economies is tied in part with the availability of ground transportation options. Airports with greater ground transportation connectivity often support more aviation-related activities in terms of number of operations and, in some cases sophistication of activities and aircraft type. These activities may then translate to higher demands for facilities and services such as fuel, aircraft storage, and aircraft maintenance.

[1] AOPA (2019). "State of General Aviation." Available online at https://download.aopa.org/hr/Report_on_General_Aviation_Trends.pdf (accessed October 2021).
[2] Airport Cooperative Research Program (ACRP, 2020). "Synthesis 111: Last Mile in General Aviation Courtesy Vehicles and Other Forms of Ground Transportation." Available online at https://www.trb.org/Main/Blurbs/181448.aspx (accessed October 2021).
[3] MnDOT Aeronautics (2019). "Statewide Airport Economic Impact Study." Available online at http://www.dot.state.mn.us/airport-economic-study/ (accessed October 2021).

Surrounding communities also benefit from airports providing the means for non-local visitors to travel off property and spend money in hospitality-related industries such as food, retail, lodging, and entertainment. Additionally, air cargo is heavily reliant on ground transportation modes to move goods to and from the airport.

One of the most common transportation options available at GA airports is courtesy cars provided by the airport sponsor or a fixed base operator (FBO). Phase I of the Minnesota State Aviation System Plan (MnSASP or 2022 MnSASP) identified the availability and condition of courtesy cars across Minnesota's GA airports as a key issue affecting the system. In particular, aviation stakeholders in Minnesota reported that inadequate access to well-maintained courtesy cars may be hindering the ability of airports and communities to fully realize the potential business and quality-of-life benefits associated with aviation. While courtesy cars can play a pivotal role in aviation activity levels and associated economic impacts generated by non-local visitors and on-airport activities (e.g., fuel sales, landing and ramp fees, etc), some public airport sponsors are challenged with acquiring, maintaining, and insuring these vehicles. Courtesy cars are ineligible for capital and maintenance and operations (M&O) funding through the Minnesota Department of Transportation, Office of Aeronautics (MnDOT Aeronautics) – forcing airport sponsors to take full financial responsibility for these valuable airport assets.

Phase II of the 2022 MnSASP conducted a comprehensive effort to better understand the availability of ground transportation options at Minnesota system airports. This endeavor placed particular emphasis on courtesy cars, which serve as the primary intermediary between an airport and the community in which it is located at many GA airports. Recognizing both the value of courtesy cars and the funding challenges potentially associated with them, the 2022 MnSASP reviewed other states' funding policies related to courtesy cars.

This review also assessed other states' policies addressing state investment in "rolling stock." Rolling stock is generally defined as ground support and maintenance equipment with wheels, such as certain types of snow removal equipment (SRE), airport rescue and firefighting (ARFF) trucks, and maintenance vehicles. This review was designed to identify best practices and innovative ideas that could be employed in Minnesota to improve airports' abilities to access funds for courtesy cars and other rolling stock through state investment or other means. Informed by the 2022 MnSASP's assessment of multimodal connectivity in Minnesota and guided by key takeaways identified during the review of other states' funding mechanisms, this document concludes by offering recommendations to address "last-mile" connectivity issues as Minnesota airports. Recommendations are generally targeted at GA airports, but may also be applicable to commercial service facilities. This information is summarized in the following sections:

- Existing Multimodal Network
- Current Courtesy Car and Rolling Stock Funding Mechanisms
- MnSASP Recommendations

Tables summarizing the modal options available by Minnesota airport and example trip agreements used to document courtesy car use at GA airports are provided at the end of the document.

Existing Multimodal Network

The framework for the MnSASP stems from the Minnesota GO, a continuous and comprehensive planning effort led by MnDOT across all transportation modes. Minnesota GO directs each modal-specific department to evaluate the multimodal connectivity of its respective form of transportation in Minnesota. The results of these analyses are used to inform recommendations to improve Minnesota's transportation system.[4] For MnDOT Aeronautics, this includes reviewing all existing multimodal options available at state system airports to identify multimodal connectivity deficiencies. This, in turn, is applied to inform recommendations to enhance people and goods' abilities to travel to and from airports. The following subsections describe the Minnesota GO and present the findings of the airport multimodal data collection effort.

MINNESOTA GO

In 2011, MnDOT initiated a comprehensive multimodal study to provide a 50-year vision for the state's transportation network. This is a continuous planning effort facilitated by MnDOT to review and evaluate the state's transportation network across all modal options. The overarching vision of this study is to "maximize the health of people, the environment, and [the] economy." There are three thematic components that provide the foundation to reaching this vision:

- Quality of life
- Environmental health
- Economic competitiveness

As a part of Minnesota GO, each mode completes an investment planning effort to document current conditions, evaluates these conditions against performance metrics in terms of the components listed above, and identifies investment needs to reach established performance targets. Together, all mode-specific plans comprise the Minnesota GO "Family of Plans." The MnSASP is included within the Minnesota GO Family of Plans to inform investment needs across the Minnesota state aviation system. As part of the MnSASP, a review of the other modal plans developed for the Minnesota GO was completed to understand the issues present among other modal options relating to airport connectivity. The following subsections examine each of these plans to identify other planning efforts completed for Minnesota's multimodal transportation network directly or indirectly related to airports. More information on the Minnesota GO and the Family of Plans can be found at the following website: https://minnesotago.org/.

[4] *As directed by MnDOT's Statewide Multimodal Transportation Plan (summarized on page 3)*

STATEWIDE MULTIMODAL TRANSPORTATION PLAN

In 2017, MnDOT developed the *Statewide Multimodal Transportation Plan* to review the current transportation system in Minnesota, summarize trends impacting the system, and establish the framework for MnDOT to evaluate system capabilities. This plan defines the framework for how each modal planning effort should be completed, including the MnSASP. According to the *Statewide Multimodal Transportation Plan*, each modal plan should identify socioeconomic trends in Minnesota that may impact the state's transportation system in terms of demand and presenting new opportunities and challenges. These include demographic shifts, economic fluctuations, aging infrastructure, and environmental changes. Each specific modal plan should examine these trends to show how they have and may in the future impact the transportation capabilities of Minnesota. The following sections describe the trends/issues observed across each transportation mode relating to the state aviation system. More information on the *Statewide Multimodal Transportation Plan* can be found at the following website: https://minnesotago.org/final-plans/smtp-final-plan.

20-YEAR STATE HIGHWAY INVESTMENT PLAN

A robust and comprehensive highway system is critical for seamless ground connectivity, including an airport's ability to provide last-mile connection to users via public bus transit, rental cars, courtesy cars, taxis, and TNCs. In 2017, MnDOT updated the *20-Year State Highway Investment Plan* (MnSHIP) to review the existing infrastructure and capabilities of Minnesota's highway system, identify present and future needs of the system, and detail MnDOT's investment plans. These plans are largely focused on maintaining existing state highway infrastructure while also making some capacity improvements within the system. Figure 1 illustrates the highway network in Minnesota, which includes the National Highway System (NHS) and non-NHS roadways.

Figure 1. Minnesota Highway System

Source: MnSHIP, 2017

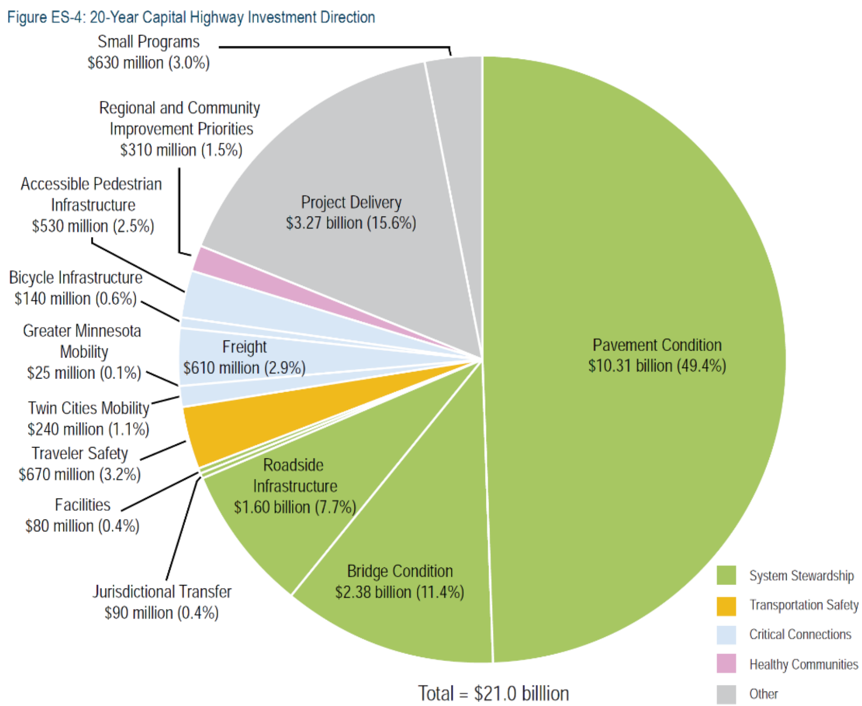
The MnSHIP extensively reviews the current condition of the highway system and identifies current/future issues that need to be addressed. Aging pavement, bridge, and roadside infrastructure was cited as a major issue with Minnesota's highway system. As such, a significant portion of MnDOT's investment ($14.29 billion, or 68.5 percent of total investment) is directed towards addressing this issue.

MnDOT's remaining investment is directed to several other areas supporting the modal systems including, but not limited to:

- Traveler safety enhancements
- Accessible pedestrian infrastructure[5]
- Freight connectivity[6]

Figure 2 illustrates the breakdown of MnDOT's investment towards the state's highway system, which totals to $21.0 billion between 2018 – 2037. More information on the MnSHIP can be found at https://minnesotago.org/final-plans/mnship-final-plan.

Figure 2. MnSHIP 20-Year Capital Highway Investment Direction



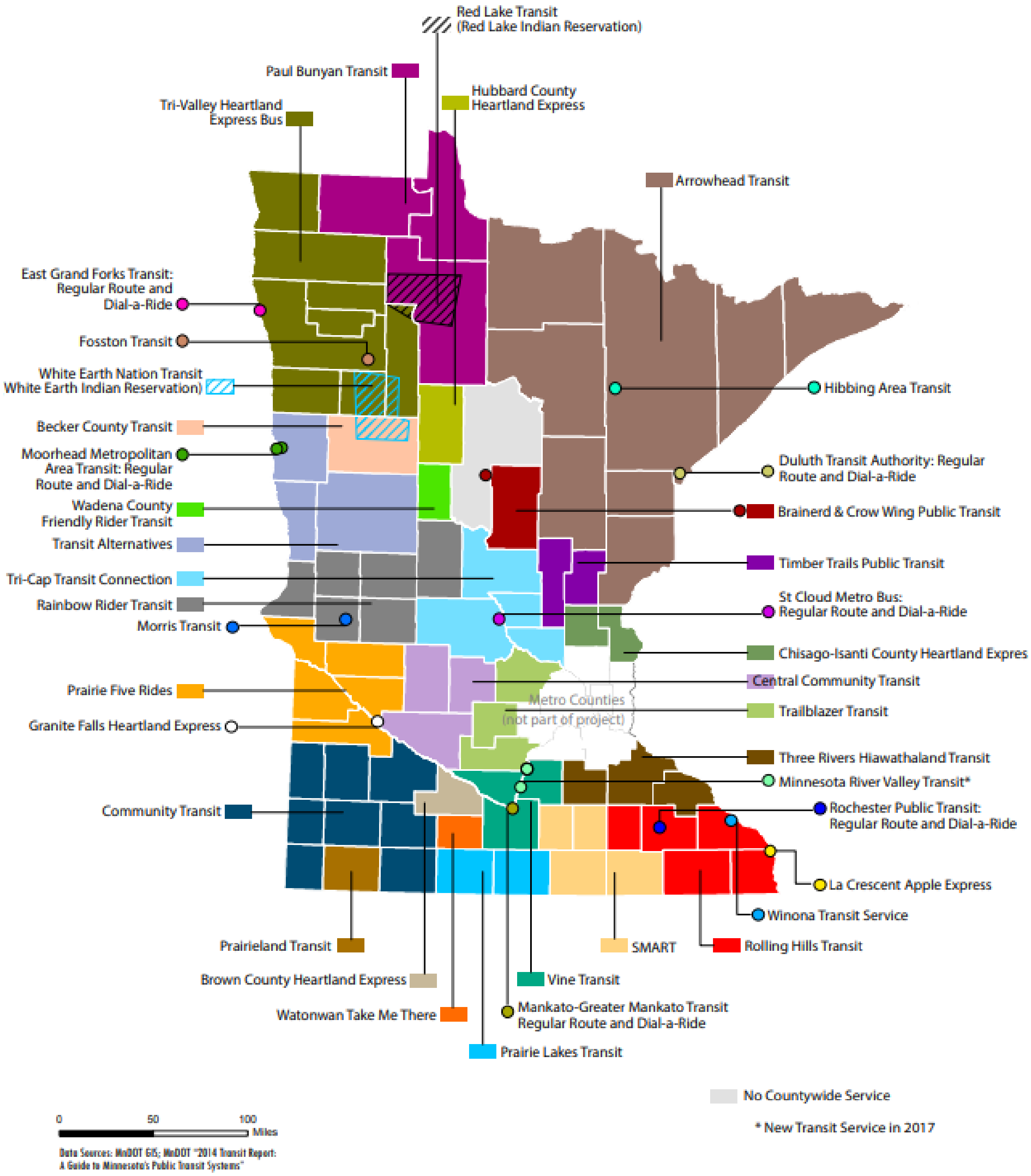
Source: MnSHIP, 2017

GREATER MINNESOTA TRANSIT INVESTMENT PLAN

In 2017, the MnDOT Office of Transit updated the *Greater Minnesota Transit Investment Plan* (GMTIP). The GMTIP reviews the current state of public transit systems in Greater Minnesota to inform the development a new 20-year strategic and investment plan. This plan only examines public transit in the Greater Minnesota region, which is identified as 80 Minnesota counties outside the Twin Cities area and includes 40 public transit systems.[7] **Figure 3** illustrates all the public transit systems operating in Greater Minnesota.

[5] The Statewide Pedestrian System Plan describes MnDOT's expanded investment into pedestrian infrastructure beyond meeting the compliance standards with the Americans with Disability Act (ADA).
[6] The Minnesota Statewide Freight System and Investment Plan expands upon Minnesota's current freight system and the areas that freight-related investment will be directed.
[7] As of June 2016

Figure 3. Greater Minnesota Public Transit Systems



Source: GMTIP, 2017

This plan refines MnDOT's investment priorities to preserve, grow, and, in some cases, reduce transit service to align with future state and federal funding investment levels anticipated for Greater Minnesota. Additionally, the investment plan directs MnDOT to meet 90 percent of identified transit needs by 2025 to align with the goals of the state legislature. Transit needs in the GMTIP are measured by total ridership across all public transit systems in Greater Minnesota. Meeting the legislative target of 90 percent translates to all public transit in Greater Minnesota handing 17.0 million rides by 2025. As of 2015, ridership was measured at 12.2 million. To close the gap in ridership, the GMTIP details service improvements that add capacity (measured by operating hours and coverage) across all the transit systems, including connecting unserved urban areas and adding more regional routes.

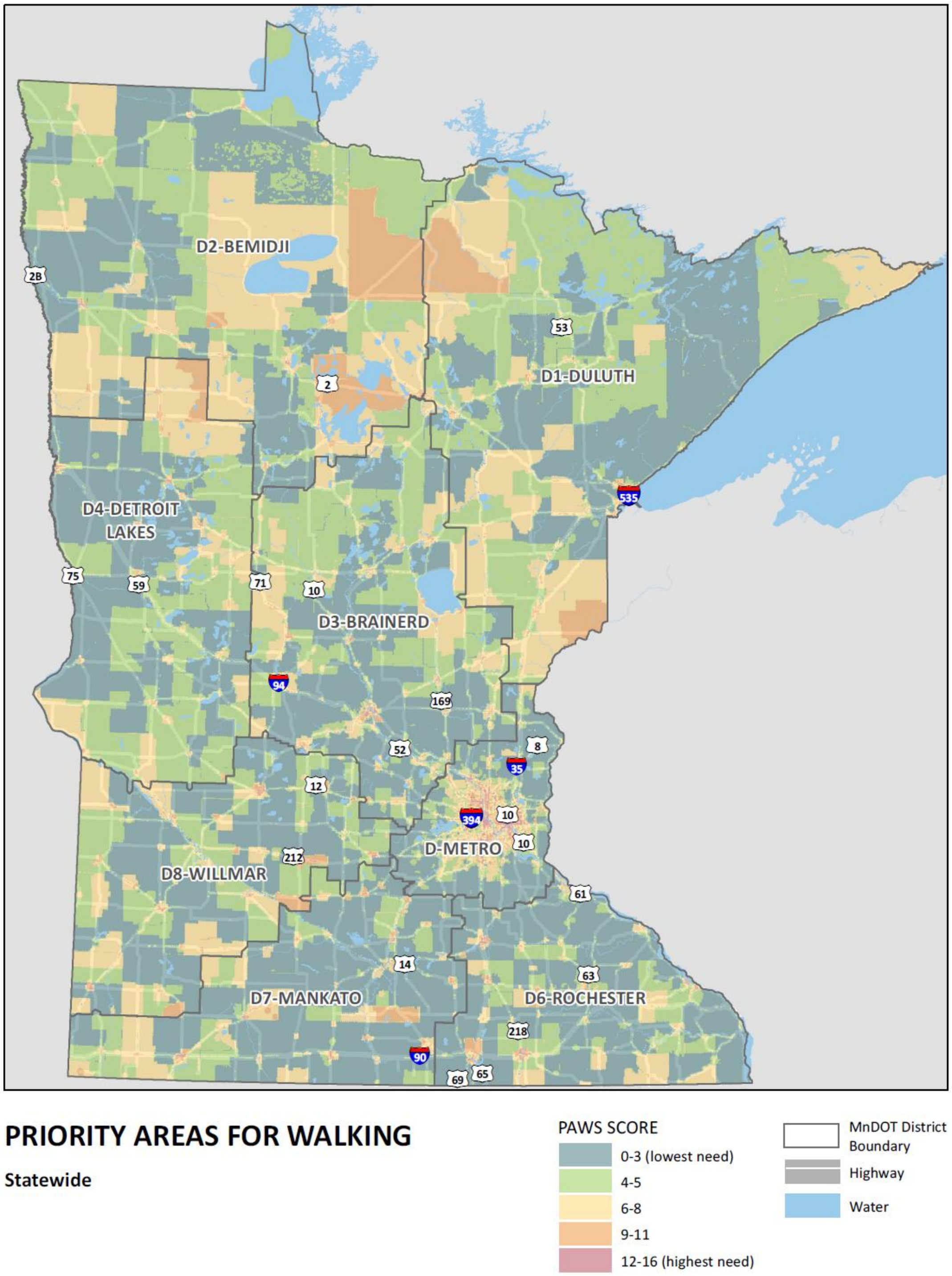
All the service improvements described in the GMTIP are anticipated to increase ridership by 3.5 to 6.3 million riders in Greater Minnesota. This could provide connectivity options for passengers and airport/airline staff traveling to and from an airport. However, the service improvements could reduce the use of Minnesota's Nonprimary Commercial Service airports (e.g., passengers may choose public transit between Duluth/Rochester and the Twin Cities area rather than taking a commuter flight). More information on the GMTIP can be found at https://minnesotago.org/index.php?cID=435.

STATEWIDE PEDESTRIAN SYSTEM PLAN

In 2021, MnDOT completed the first *Statewide Pedestrian System Plan* to review current pedestrian activity and support walking as a safe, encouraging, and efficient means of movement in Minnesota. Currently, MnDOT's investment into pedestrian movement is primarily focused on meeting Americans with Disabilities Act (ADA) compliance standards. This is reflected in the MnSHIP's latest investment plan, with $530 million directed towards accessible pedestrian infrastructure between 2018 - 2037 (as shown in **Figure 2**). However, investment into pedestrian infrastructure has typically placed the focus around vehicle traffic, rather than the pedestrian users who are the most vulnerable to harm should an incident occur.

The *Statewide Pedestrian System Plan* reflects a change in perspective to emphasize that all transportation investments should consider potential impacts on and infrastructure for pedestrians. To facilitate this evaluation, the Priority Areas for Walking Study (PAWS) was completed to identify priority areas for pedestrian facilities along and across trunk highways in Minnesota by considering safety, land use, health, infrastructure, and equity impacts. The statewide results generated from PAWS are illustrated in **Figure 4**. The information from PAWS helps inform MnDOT of walking-specific investment needs that can mitigate pedestrian-involved vehicle crashes. Additionally, PAWS identifies areas for increased pedestrian infrastructure that could lower the dependance on vehicles producing carbon emissions. The investment strategies identified in PAWS are intended to be included in the next MnSHIP update and may improve pedestrian access to the state's airports. More information on the *Statewide Pedestrian System Plan* can be found at https://www.dot.state.mn.us/minnesotawalks/index.html.

Figure 4. Statewide PAWS Investment Priority Map



Source: MnDOT Statewide Pedestrian System Plan, 2021

STATEWIDE BICYCLE SYSTEM PLAN

MnDOT developed the *Statewide Bicycle System Plan* in 2016 to describe how MnDOT can address the needs of the state's bicycle system. This plan was largely informed by a statewide public engagement effort to collect user feedback on the current bicycle experience in Minnesota. The results indicated that more bicycle routes should be physically separated from motor vehicle traffic and additional investment should be placed into local and regional bicycle travel. In response, MnDOT outlined plans to invest in infrastructure to enhance the bicycle system.

Additionally, MnDOT will direct funding towards developing state bicycle routes to encourage more inter-community travel across the state. Many of these routes will be eligible to become part of the United States (U.S.) Bicycle Route System, enabling users to connect with a national network of bicycle facilities. Figure 5 illustrates the proposed state corridors for enhancing the Mississippi River Trail, one of the state's existing bikeway system for inter-community travel. Funding planned for bicycle infrastructure identified in the MnSHIP investment plan totals $140 million between 2018 - 2037 (as shown in Figure 2). For some GA airports in Minnesota that support bike connectivity, this investment can help pilots more safely and efficiently access their local airports. Bicycles can also provide a low-cost and low-risk modal option for airports without courtesy car located in the vicinity of restaurants and other hospitality-related businesses. More information on the *Statewide Bicycle System Plan* can be found at https://www.dot.state.mn.us/bike/statewide-bicycle-system-plan.html.

MINNESOTA STATEWIDE FREIGHT SYSTEM AND INVESTMENT PLAN

MnDOT updated the *Minnesota Statewide Freight System and Investment Plan* in 2017 to provide an updated snapshot of the state's current freight system and develop a new outlook on investment needs. The plan was developed in partnership with freight stakeholders in the public and private sectors to be best informed on current and future system needs. Minnesota's freight system utilizes nearly all forms of transportation including air, water, rail, and trucking to provide an intermodal approach for delivering freight.[8] Figure 6 illustrates the modal facilities and routes included in Minnesota's freight network.

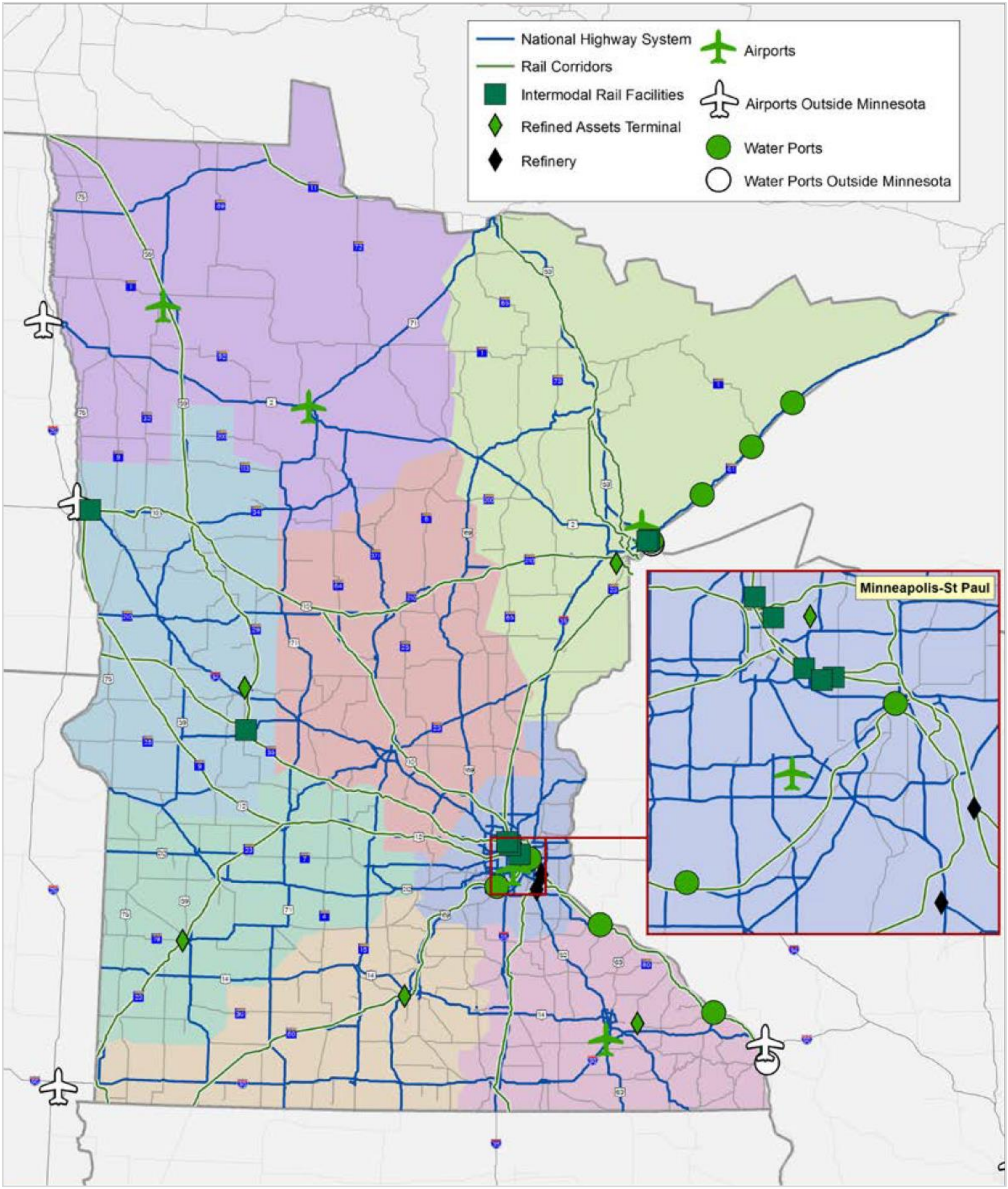
The 2017 *Minnesota Statewide Freight System and Investment Plan* conducted public outreach and a comprehensive performance assessment to identify needs across the system. These needs ranged across all transportation modes that support the state freight network to enhance asset management, critical connections, traveler safety, and system security. Air cargo represents one critical component of the state's freight network by providing quick transport of time-sensitive goods. Currently, 12 airports support the majority of air cargo activity in Minnesota (depicted in Figure 7) as reported by the Bureau of Transportation Statistics (BTS, 2019). The circles represent the relative number of final destinations reached by cargo enplaned at each airport.

[8] *Intermodal transportation refers to movement of containerized goods using a combination of air, water, truck, and/or rail service.*

Figure 5. State Bicycle Route Network Priority Corridors

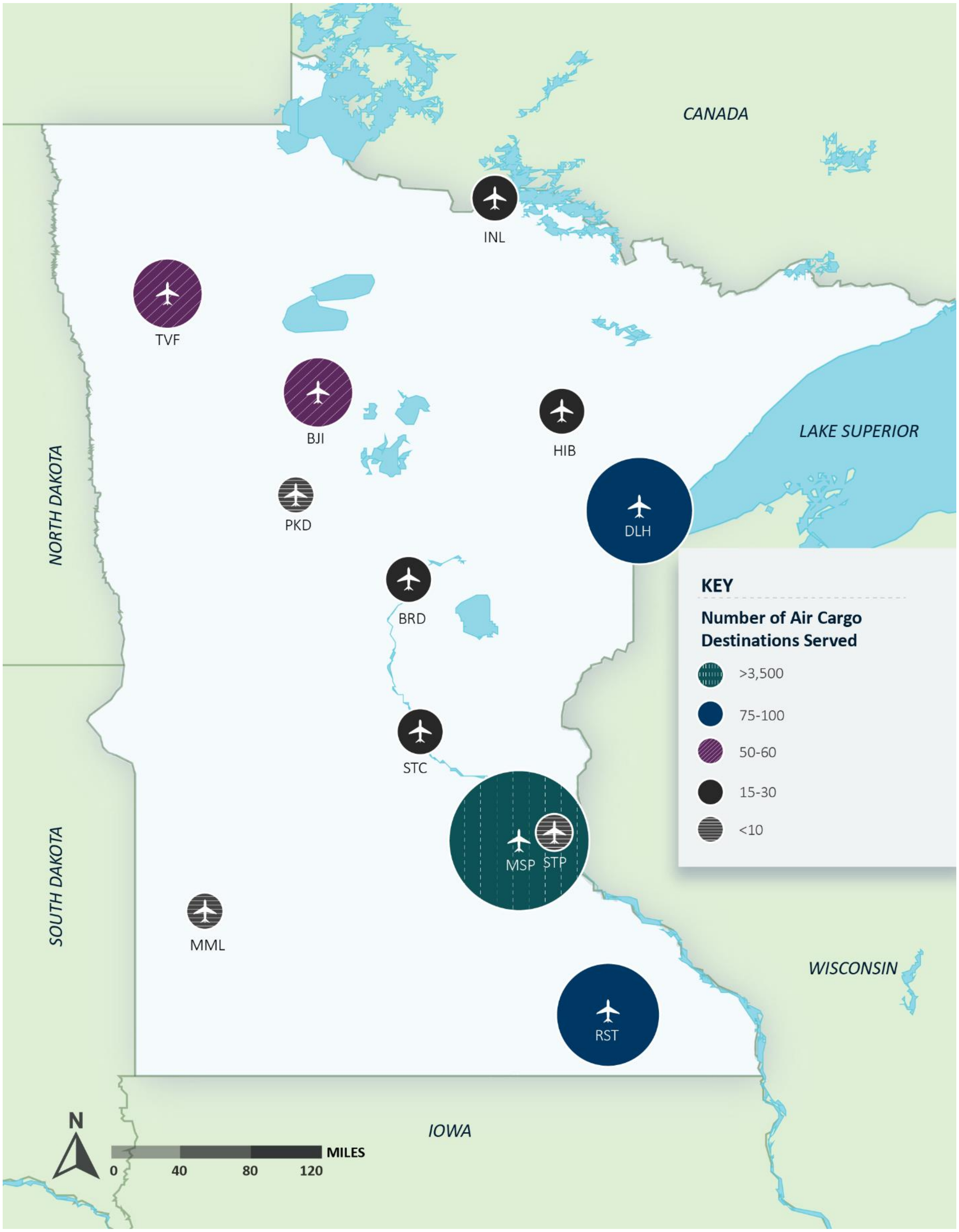
Source: MnDOT Statewide Bicycle System Plan, 2016

Figure 6. Minnesota's Principal Freight Network



Source: MnDOT Statewide Freight System and Investment Plan, 2017

Figure 7. Minnesota Airports Supporting Air Cargo by Number of Destinations Served



Sources: BTS T-100, 2019; Kimley-Horn, 2021

The *Minnesota Statewide Freight System and Investment Plan* identified several enhancements that are needed at airports to optimally support the needs of air cargo:

- Airfield infrastructure, including pavement condition and expansion
- Landside roadway connections for better first-/last- mile connections
- Air cargo facilities
- Communication, navigation, and surveillance systems

These enhancements will not only improve the 12 state aviation system airports that currently support the majority of Minnesota's air cargo activity but will also improve other aviation activities that also rely on adequate airfield infrastructure and the other improvements. Additionally, as Minnesota's freight system utilizes a combination of modal options including highway, water, air, and rail transportation, the investment and strategic direction cited across the MnDOT Family of Plans will most likely support the state's freight capabilities. More information on the *Minnesota Statewide Freight System and Investment Plan* can be found at https://minnesotago.org/final-plans/statewide-freight-system-investment-plan.

STATEWIDE PORTS AND WATERWAYS PLAN

MnDOT's Office of Freight and Commercial Vehicle Operations developed the *Statewide Ports and Waterways Plan* in 2014 to identify challenges and opportunities for the state's ports and waterways. Minnesota's ports and waterways system has four public ports along two major navigable waterways (Mississippi River System and the Great Lakes-Saint Lawrence Seaway) for passenger and freight transportation. Figure 8 illustrates this state system and the overall connectivity provided domestically and internationally. Several infrastructure and safety improvements are identified in the Statewide Ports and Waterways Plan including road/rail access enhancements. This improvement will help support the role of maritime in the multimodal movement of goods, which can increase the efficiency of air cargo across the state aviation system. More information on the *Statewide Ports and Waterways Plan* can be found at https://www.dot.state.mn.us/ofrw/waterways/pwp.html.

Figure 8. Minnesota's Ports and Waterways Systems

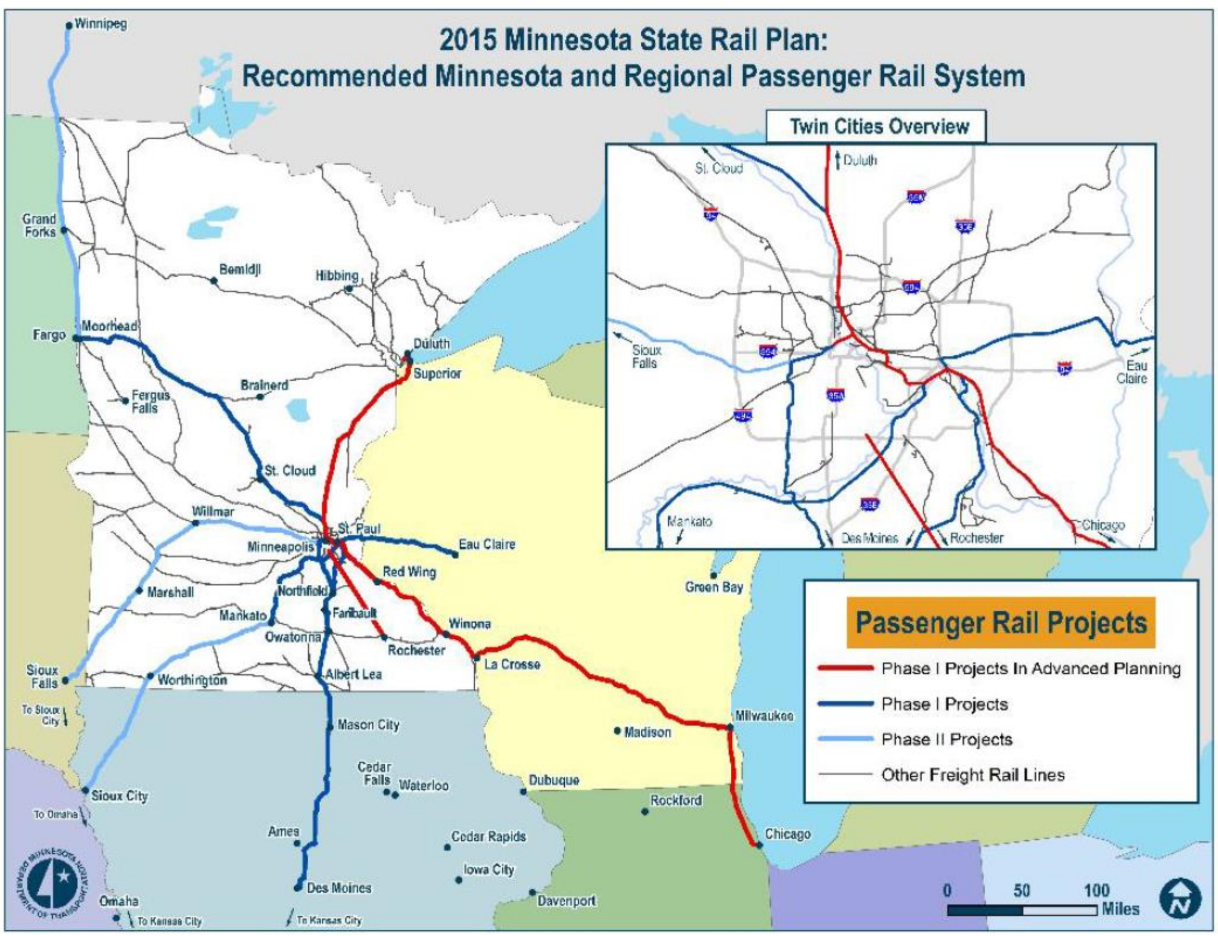
Source: MnDOT Statewide Ports and Waterways Plan, 2014

STATE RAIL PLAN

MnDOT developed the *State Rail Plan* in 2015 to evaluate the current rail capabilities in Minnesota and identify improvements to enable greater multimodal connectivity with other transportation modes. Currently, passenger rail service is centralized to the Twin Cities area to accommodate the large urban population. However, there is a lack of intrastate connectivity from the urban rail network to other parts of the state. This can inhibit airport users flying into or out of the Twin Cities via Minneapolis/St. Paul International Airport (MSP) or one of the GA airports in the area to quickly connect with other regions of the state. The *State Rail Plan* directs MnDOT to develop an intrastate/intercity passenger rail network to connect the Twin Cities area with other regional centers including Duluth and Rochester, as shown in Figure 9.

MnDOT Aeronautics should consider potential impacts to passenger and cargo demand at Rochester International Airport (RST) and Duluth International Airport (DLH) should rail capacity be enhanced. The two modes (i.e., rail and aviation) could coordinate efforts to provide an efficient and "right-sized" multimodal network that provides flexibility and efficiency while recognizing the functions of and need for both types of transportation. More information on the *State Rail Plan* can be found at https://www.dot.state.mn.us/planning/railplan/.

Figure 9. State Rail Plan Recommended Passenger Rail Projects



Source: State Rail Plan, 2015

SUMMARY

The recommendations in other modal plans enable greater multimodal capabilities for the state aviation system. Robust and comprehensive multimodal connections in Minnesota are critical to reaching the Minnesota GO vision of maximizing the health of people, the environment, and the economy. Establishing this type of network would enhance accessibility by allowing residents, visitors, and goods to efficiently travel between points of interest – supporting robust economic activity and a prosperous quality of life. Multimodal connectivity facilitates business by allowing products to move seamlessly along the supply chain and business travelers to remain mobile, keeping Minnesota competitive in national and global markets. Airports are a vital component of Minnesota's transportation network by moving people and goods within and outside of Minnesota. To understand the current multimodal capabilities of the state aviation system, a review of existing multimodal options was completed, as summarized in the following section.

AIRPORT MULTIMODAL AVAILABILITY

As a part of the MnSASP, a comprehensive data collection effort was completed across the state aviation system. Airport managers were asked to provide details about their airports' available facilities and services, completed planning efforts, established rates and charges, and the priority needs/issues currently affecting their airport or aviation in Minnesota more broadly, as well as other topics. Specific to transportation connectivity, airport managers were asked to identify the availability of the following multimodal options:

- Public transit (scheduled bus service)
- Taxis
- Rental cars
- TNCs
- Airport shuttles
- Bike and pedestrian paths
- Other transportation options

Additionally, airports provided details on courtesy car(s) offered to users including the vehicle(s)' year, make, model, condition,[9] and ownership (i.e., airport sponsor, FBO, or other third-party). The following subsections describe each multimodal option and their availability across the state aviation system.

PUBLIC TRANSIT (SCHEDULED BUS SERVICE)

Public transit can involve multiple modal options including bus, light-rail, subway, and/or railcar services. In Minnesota, most public transit is solely provided by scheduled bus service. Cities and municipalities routinely provide public transit services to connect airports users with surrounding suburbs, city centers, tourist attractions, business districts, and other points of interest, as well as other modal hubs such as rail terminals. **Figure 3** illustrates all the transit authorities established in the Greater Minnesota region,[10] many of which connect with the airports in their service areas. Other public transit modes cited by airport managers during the 2022 MnSASP data collection effort included bus services operating on an on-demand basis, light rail (established in the Twin Cities region), and a county transit bus.

[9] Airports were asked to note the condition of the vehicles based on the grades established by the Kelley Blue Book (KBB). Details on each condition tier can be found at the following link: https://auto.howstuffworks.com/buying-selling/kelley-blue-book4.htm
[10] Greater Minnesota is identified as 80 Minnesota counties outside the Twin Cities area

Across the 133 airports in the state aviation system, 19 percent of airports reported scheduled bus service. Among the 124 GA airports, 18 percent indicated scheduled bus service. A review of scheduled bus service availability completed across each state classification found that availability was more concentrated at Key Commercial Service airports (33 percent) and Intermediate airports (22 percent of Intermediate Large and Intermediate Small airports, each). **Table 1** indicates the availability of bus service across the state aviation system by state classification.

Table 1. Scheduled Bus Service Availability by State Classification

State Classification	Total No. of Airports	No. of Airports Providing Scheduled Bus Service	% Availability by State Classification
Key Commercial Service	9	3	33%
Key General Aviation	22	4	18%
Intermediate Large	36	8	22%
Intermediate Small	46	10	22%
Landing Strip Turf	20	0	0%
GA Airports	**124**	**22**	**18%**
All Airports	**133**	**25**	**19%**

Source: MnSASP Inventory, 2020

TAXIS

Despite rising popularity in TNC services, taxis are still widely used as a point-to-point transportation option for many airport users. In fact, taxis are more commonly available across the state aviation system than TNCs. Across all 133 airports, 35 percent reported having taxi service available to users. Among GA airports, 31 percent of airports indicated having taxi service accessible to users. When examined by state classification (see **Table 2**), all Key Commercial Service (100 percent), most Key GA (68 percent), and over one-third of Intermediate Large (39 percent) airports reported available taxi service. Intermediate Small (13 percent) and Landing Strip Turf (15 percent) airports have significantly lower availability.

Table 2. Taxi Service Availability by State Classification

State Classification	Total No. of Airports	No. of Airports Providing Taxi Service	% Availability by State Classification
Key Commercial Service	9	9	100%
Key General Aviation	22	15	68%
Intermediate Large	36	14	39%
Intermediate Small	46	6	13%
Landing Strip Turf	20	3	15%
GA Airports	**124**	**38**	**31%**
All Airports	**133**	**47**	**35%**

Source: MnSASP Inventory, 2020

RENTAL CARS

Rental car service is a popular connectivity option for many airport users, but particularly with commercial service passengers and GA passengers travelling for business. Time, routing, destination changes, and vehicle type are all at the user's discretion to allow for the greatest amount of travel flexibility. In some cases, rental car companies place their operations on airport property to enable passengers to quickly connect from deplaning their aircraft. Other rental car providers station their operations off-site due to airport property constraints or where demands are limited. For collecting information about both rental car options, airports were asked to denote the availability of each form of service.

Across the state aviation system, 35 percent of airports reported having some form of rental car service (i.e., on- or off-airport). Thirteen airports reported on-airport rental car service: seven being Key Commercial Service airports (89 percent) and five being Key GA airports (82 percent). Among the 124 GA airports, 31 percent reported providing at least one form of rental car service; nearly all these airports (90 percent) reported offering the rental car services off-site. Table 3 indicates the availability of rental car service by state classification.

Table 3. On- and Off-site Rental Car Availability by State Classification

State Classification	Total Number of Airports	On-site Rental Car Service (Number of Airports)	On-site Rental Car Service (Percent of Airports)	Off-site Rental Car Service (Number of Airports)	Off-site Rental Car Service (Percent)	Any On- or Off-Site Rental Car Service (Number of Airports)	Any On- or Off-Site Rental Car Service (Percent)
Key Commercial Service	9	7	78%	5	56%	8	89%
Key General Aviation	22	6	27%	14	64%	17	82%
Intermediate Large	36	0	0%	15	42%	15	42%
Intermediate Small	46	0	0%	5	11%	5	11%
Landing Strip Turf	20	0	0%	1	5%	1	5%
GA Airports	**124**	**6**	**5%**	**35**	**28%**	**39**	**31%**
All Airports	**133**	**13**	**10%**	**40**	**30%**	**46**	**35%**

Source: MnSASP Inventory, 2020

TRANSPORTATION NETWORK COMPANIES

As a relatively new form of ground transportation, TNCs (also known as rideshares) combine the flexibility of rental cars with the minimal user effort associated with taxis and public transit. The concept of TNCs is based on crowdsourcing drivers from the public to provide on-demand rides to residents and visitors. Common TNCs such as Uber and Lyft connect drivers with prospective riders via mobile apps for a quick travel option to and from airports. In some cases, airports partner with TNCs to set-up signage and dedicated curbside space for TNC passenger drop-off and pick-up.

Across the state aviation system, 23 percent of airports host TNC services. Most availability can be found at the Key airports in Minnesota, as 67 percent of Key Commercial Service and 41 percent of Key General Aviation airports reported having TNC service available. Because TNCs rely on crowdsourced drivers, the relatively low populations in the vicinity of many Minnesota GA airports likely results in limited TNC service availability. Among GA airports, only 19 percent reported having TNC availability. However, this would be expected to increase if rural communities grow in population and airport demands concurrently increase. Table 4 shows the availability of TNC across the state aviation system by state classification.

Table 4. TNC Availability by State Classification

State Classification	Total No. of Airports	No. of Airports Providing TNC Service	% Availability by State Classification
Key Commercial Service	9	6	67%
Key General Aviation	22	9	41%
Intermediate Large	36	7	19%
Intermediate Small	46	7	15%
Landing Strip Turf	20	1	5%
GA Airports	**124**	**24**	**19%**
All Airports	**133**	**30**	**23%**

Source: MnSASP Inventory, 2020

AIRPORT SHUTTLES

Airport shuttles typically provide direct access between points of interest, including on-site airport terminals, FBOs, and other airport facilities, and off-site rental car operations, parking lots, hotels, and convention centers. Many shuttle services are complementary to allow their customers to have a seamless travel experience to and from a commercial service or GA flight. In the state aviation system, 19 percent of all airports reported at least one form of shuttle service. Most availability is found at Minnesota's commercial service airports, as 78 percent of Key Commercial Service airports reported having at least one form of shuttle service for passengers. Among the GA airports, only 15 percent provide shuttle service due to the variable type and frequency of air traffic activity at these airports. Table 5 highlight the availability of shuttle service across the state aviation system by state classification.

Table 5. Shuttle Availability by State Classification

State Classification	Total No. of Airports	No. of Airports Providing Shuttle Service	% Availability by State Classification
Key Commercial Service	9	7	78%
Key General Aviation	22	6	27%
Intermediate Large	36	5	14%
Intermediate Small	46	4	9%
Landing Strip Turf	20	3	15%
GA Airports	**124**	**18**	**15%**
All Airports	**133**	**25**	**19%**

Source: MnSASP Inventory, 2020

BIKE AND PEDESTRIAN PATHS

For some airports in Minnesota, bike and pedestrian paths are available as a connectivity option for aviation users. In certain cases, this is due to airports supporting local pilots who live or work close to the airport. Bike and pedestrian paths allow for easy access to aircraft for recreational purposes. Across the state aviation system, 25 percent of airports reported users accessing the airport via a bike and pedestrian path. Specifically, with GA airports, 22 percent reported having a bike and pedestrian path available to users. This is concentrated around Intermediate Small (22 percent) and Landing Strip Turf (40 percent) airports, as shown in Table 6.

Table 6. Bike and Pedestrian Path Connectivity by State Classification

State Classification	Total No. of Airports	No. of Airports Providing Bike/Pedestrian Connectivity	% Availability by State Classification
Key Commercial Service	9	2	22%
Key General Aviation	22	7	32%
Intermediate Large	36	4	11%
Intermediate Small	46	10	22%
Landing Strip Turf	20	8	40%
GA Airports	**124**	**29**	**22%**
All Airports	**133**	**31**	**25%**

Source: MnSASP Inventory, 2020

COURTESY CARS

Airport courtesy cars are a popular ground transportation option, particularly at GA airports. Typically, airports acquire these vehicles from local auctions or a pool of used fleet vehicles from local governments to repurpose as courtesy cars. With the variable flying schedules by which many GA users operate, airport sponsors and FBOs make courtesy cars available on-demand for visitors to travel to and from close points of interest. Like rental cars, courtesy cars provide the greatest amount of travel flexibility for users.

However, this service is often limited, as most airports only provide one or two vehicles available on a first-come, first-serve basis. The availability of courtesy cars was identified to be an issue in Phase I of the MnSASP. As such, a more comprehensive data collection effort was completed in conjunction with the airport inventory process during the 2022 MnSASP to understand details about courtesy cars currently available at Minnesota airports, as well as common issues preventing airports from acquiring and/or maintaining these vehicles. These issues, as well as recommended best practices to overcome common challenges, are explored more fully in the **Current Courtesy Car and Rolling Stock Funding Mechanisms** section beginning on page 29.

Across the state aviation system, 85 airports reported providing at least one courtesy car with 101 total cars available. The greatest availability is seen across the Key Commercial Service (89 percent), Intermediate Large (82 percent), and Key General Aviation (81 percent) airports. Across the GA airports, 71 percent reported providing courtesy cars to users, which are largely concentrated at Key General Aviation (81 percent) and Intermediate Large and Small (82 percent and 63 percent, respectively) airports. Only one Landing Strip Turf airport indicated having courtesy car service available (5 percent). **Table 7** highlight the availability of courtesy car service across the state aviation system by state classification.

Table 7. Courtesy Car Availability by State Classification

State Classification	Total No. of Airports	No. of Airports with Courtesy Cars	No. of Courtesy Cars	% Availability by State Classification
Key Commercial Service	9	8	13	89%
Key General Aviation	22	18	24	81%
Intermediate Large	36	29	32	82%
Intermediate Small	46	29	31	63%
Landing Strip Turf	20	1	1	5%
GA Airports	**124**	**77**	**88**	**71%**
All Airports	**133**	**85**	**101**	**64%**

Source: MnSASP Inventory, 2020

Airports were also asked to provide the year and condition of the courtesy car(s) offered by their airport. Due to limited courtesy car data provided by some airports, the year and condition data reviewed are not reflective of all airports with courtesy cars cited in **Table 7**. The average vehicle year of courtesy cars among all 77 airports that provided data was 2007. The newest vehicles are generally present at Key Commercial Service airports (2013), Key General Aviation airports (2009), and Landing Strip Turf airports (2009). The average age of courtesy cars at all GA airports is 2006, with Intermediate Small airports reporting the oldest average vehicle year (2004). This information is presented in **Table 8**.

Table 8 also presents the condition of courtesy cars by state classification based on the Kelley Blue Book (KBB) grading scale.[11] There are four tiers that are included in this scale, which are defined below:

- **Excellent:** The vehicle looks new, is in perfect mechanical condition, and requires no reconditioning for reselling. This vehicle has never had any paint or body work, free of rust, and has a clean title history. There are complete and verifiable service records. Less than five percent of all used vehicles fall within this category.
- **Good:** The vehicle is free of any major defects and has a clean title history. There may be minor paint, body, and interior blemishes, but there are no major mechanical issues. There may need some reconditioning for reselling. Most vehicles fall within this category.
- **Fair:** The vehicle has some mechanical and cosmetic defects but is still in reasonable running condition. There is a clean title history, but any paint, body, or interior work would need a professional. There may be some repairable rust damage, and the tires may need replacing.
- **Poor:** The vehicle has severe mechanical and cosmetic issues. There may be irreversible damage to the frame and rust on the body work. The vehicle could have a branded title or an unverified mileage.

Across the state aviation system, most courtesy cars are in good or fair condition. **Table 8** presents the condition data by state classification.

[11] Airports were asked to note the condition of the vehicles based on the grades established by KBB. However, there is some subjectivity in the vehicle condition(s) being reported. Details on each condition tier established by KBB can be found at the following link: https://auto.howstuffworks.com/buying-selling/kelley-blue-book4.htm.

Table 8. Courtesy Car Year and Condition[12]

State Classification	No. of Airports that Provided Car Details[13]	Average Year of Courtesy Car	Excellent	Good	Fair	Poor	Unknown
Key Commercial Service	9	2013	2	11	0	0	0
Key General Aviation	17	2009	4	10	4	4	2
Intermediate Large	24	2005	2	13	13	0	4
Intermediate Small	27	2004	2	15	13	0	1
Landing Strip Turf	20	2009	0	0	1	0	0
GA Airports	69	2006	8	38	31	4	7
All Airports	77	2007	10	49	31	4	7

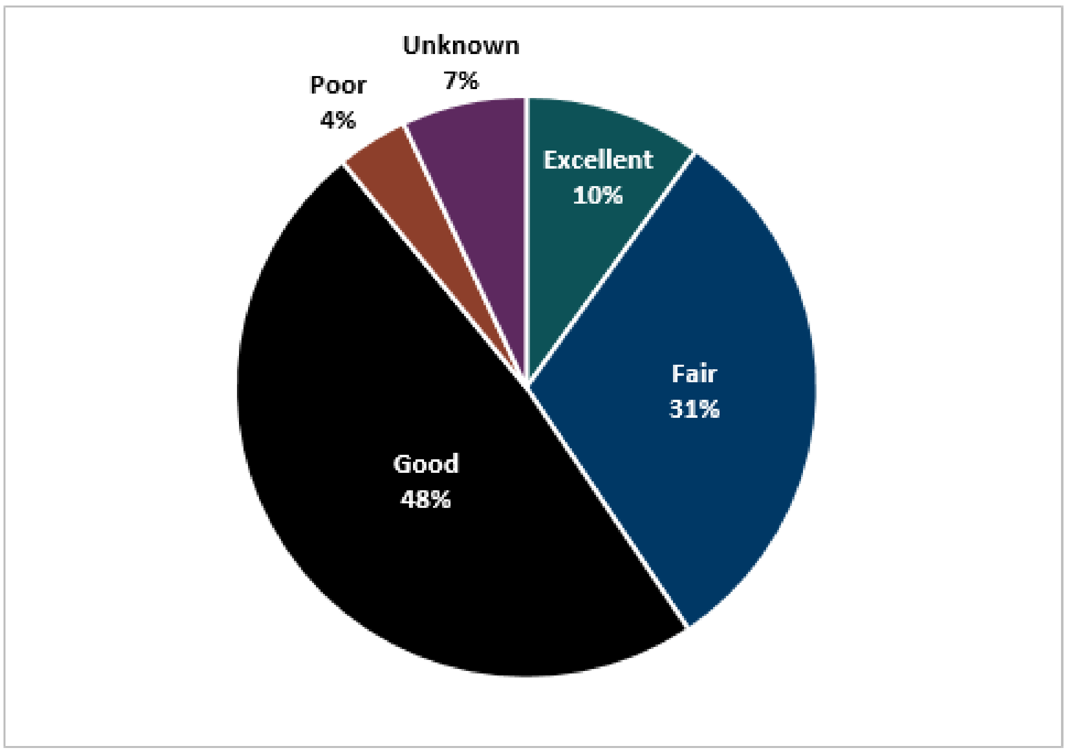
Source: MnSASP Inventory, 2020

[12] *The values presented under the vehicle conditions in **Table 8** are the number of airports that have courtesy cars that match a certain KBB condition.*
[13] *With the limited courtesy car data provided by airports, the data in **Table 8** are not reflective of all airports with courtesy cars cited in **Table 7**. This column details the number of airports that provided adequate condition data.*

Figure 10 shows the statewide courtesy car condition breakdown by the KBB grading scale. Statewide, 48 percent of airports provide one or more courtesy cars in good condition. This is followed by 31 percent of airports having a courtesy car in fair condition, and four percent having vehicles in poor condition. With the used and repurposed nature of these vehicles, only 10 percent of airports have at least one courtesy car in excellent condition. Seven percent of airports reported the condition of their courtesy car as "unknown."

Given the lack of courtesy cars among Landing Strip Turf airports – reinforcing the findings from Phase I of the MnSASP – the following section examines the current funding mechanisms available to Minnesota airports for supporting courtesy cars and other rolling stock (e.g., mowers, SRE, etc.). This assessment was complemented by a desktop review of other states' funding of courtesy cars and rolling stock to provide recommendations for enhancing MnDOT Aeronautics' funding strategies for the acquisition and maintenance of these valuable airport assets.

Figure 10. Statewide Airport Courtesy Car Condition



Source: MnSASP Inventory, 2020

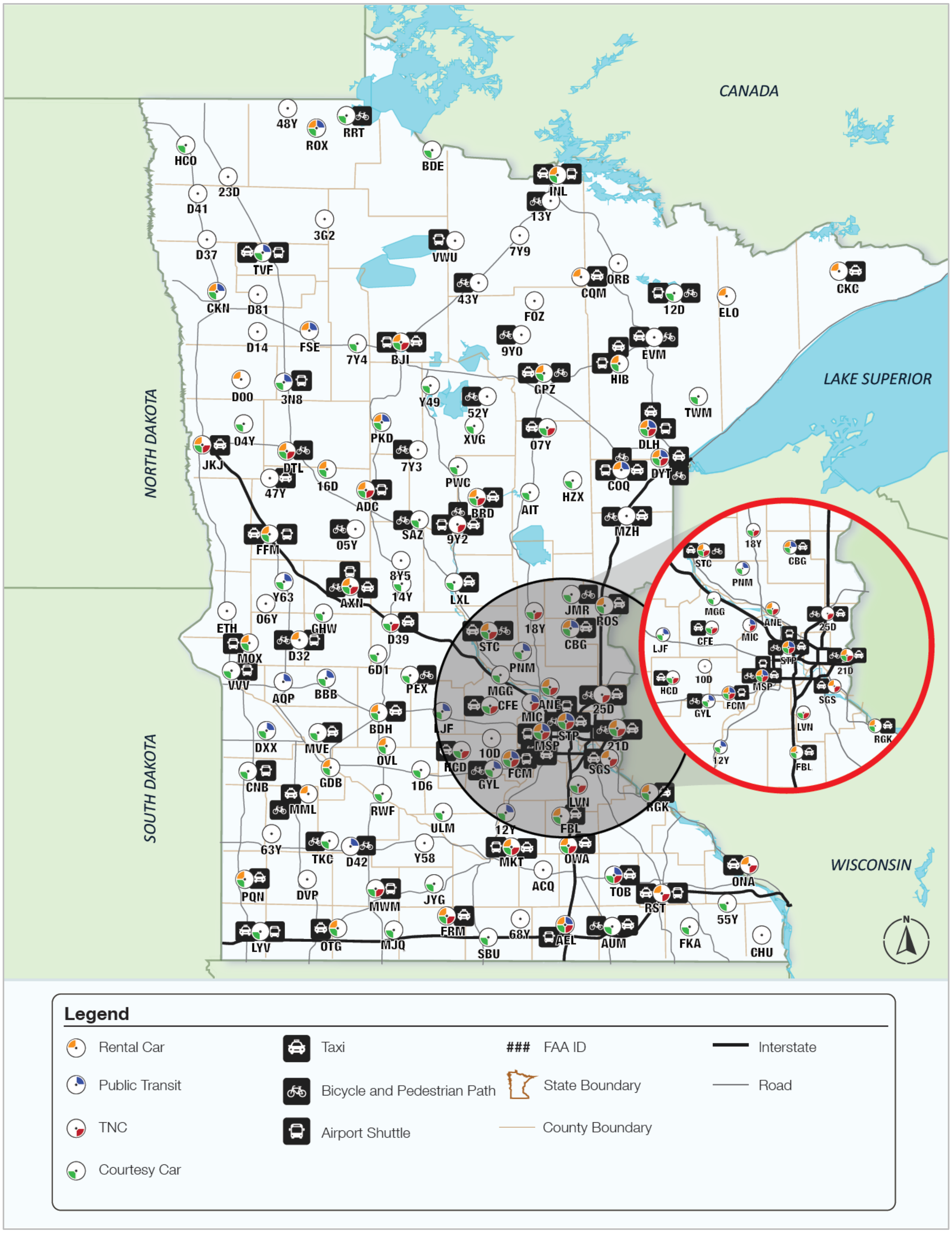
SUMMARY

The state aviation system has a wide array of multimodal connectivity options available for users, with some options more centralized to Key Commercial Service and Key General Aviation airports and others more common at Intermediate Large, Intermediate Small, and Landing Strip Turf airports. Rental cars, taxis, TNCs, and shuttle service are more common at Key airports, likely due to the more consistent stream of commercial service and GA activities that rely on these ground transportation options.

Courtesy cars are more popular at Key and Intermediate Large GA airports to accommodate a higher number of on-demand visitors. There is a noticeable lack of courtesy car availability among Landing Strip Turf airports, a topic which will be addressed more fully in the following section.

Figure 11 illustrates all ground connectivity options available across the state aviation system. For a more detailed list of all available ground connectivity options by airport, refer to the individual airport detail tables provided at the end of this paper (see page 48).

Figure 11. Statewide Airport Multimodal Connectivity Options Map



Sources: MnDOT Inventory, 2020; Kimley-Horn, 2021

Current Courtesy Car and Rolling Stock Funding Mechanisms

Upon evaluating the multimodal connectivity options available across the state aviation system, it was discovered that nearly all Landing Strip Turf airports lack a courtesy car. As presented in Table 7, only one of the 20 Landing Strip Turf airports indicated having a courtesy car available to users. Additionally, three Landing Strip Turf airports (Wells Municipal [68Y], Backus Municipal [7Y3], and Starbuck Municipal [D32] airports) explicitly shared the need for a courtesy car. Challenges cited by these airports include lack of available funds for acquisition and maintenance, as well as difficulty in obtaining insurance for courtesy cars. Local businesses in the vicinity of these airports could benefit from more visitor interest with the availability of a courtesy car to connect travelers with local points of interest, stimulating economic activity associated with off-airport visitor spending.

In response to these issues, potential federal and state funding mechanisms to support the acquisition and maintenance of courtesy cars are presented below. A desktop review was conducted of other states' funding of courtesy cars. This review also included reviewing state funding mechanisms to support other rolling stock (e.g., lawn mowers, tractors, SRE) to identify best practices that could be considered by MnDOT Aeronautics. This complete analysis was used to guide the development of recommendations to enhance MnDOT Aeronautics' ability to address the need for courtesy cars and other airport rolling stock, as appropriate. The following subsections summarize this research and provide suggestions to enhance MnDOT's current funding strategies.

FEDERAL AVIATION ADMINISTRATION

The Federal Aviation Administration (FAA) facilitates the Airport Improvement Program (AIP) as a federal funding program available to airports in the National Plan for Integrated Airport Systems (NPIAS).[14] There are 96 NPIAS airports in Minnesota eligible for AIP funding, including 87 GA airports. The main goals of the program are to enhance airport safety, capacity, and security, as well as address environmental concerns. The funding level awarded to AIP-eligible projects are largely based on the airport's NPIAS category and hub type, as described below:

- Large and Medium Hub airports: 75 percent of eligible costs
- Small Hub, Reliever, and GA airports: 90 to 95 percent of eligible costs (based on statutory requirements)

AIP funding can be utilized towards equipment required for Part 139 certification, including ARFF vehicles and SRE.[15] Courtesy cars are not eligible for AIP funding and are unlikely to be supported by federal AIP dollars in the future unless the FAA adopts a major policy shift.

[14] *FAA (2021). "Overview: What is AIP?". Available online at https://www.faa.gov/airports/aip/overview/ (accessed November 2021).*

[15] *FAA (2019). Airport Improvement Program Handbook. Available online at https://www.faa.gov/airports/aip/aip_handbook/media/AIP-Handbook-Order-5100-38D-Chg1.pdf (accessed November 2021).*

NPIAS airports may also be able to leverage the Airport Zero Emissions Vehicle (ZEV) and Infrastructure Pilot Program to use federal funds to acquire ZEV ground support equipment (GSE) and the infrastructure required to operate them (e.g., charging units).[16]

The ZEVs must be for on-airport use only, including airport maintenance, airport parking lot shuttle service, and airport security. The funding level for submitted airport projects follows the AIP cost-sharing model outlined above. Between 2015 and fall 2021, over $47 million has been awarded via the Airport ZEV and Infrastructure Pilot Program.

MNDOT AERONAUTICS

MnDOT Aeronautics has several funding programs to cover many types of airport capital improvement and ongoing maintenance and operations projects. However, at the time of this writing, courtesy cars are not eligible for any state funding programs. Airports can leverage the Airport Development Grant Program to acquire equipment and the M&O Grant Program to support to maintain and ensure equipment (including rolling stock but excluding courtesy cars). However, through the comprehensive data collection completed across the state aviation system, several airports indicated that equipment purchases are a low priority for MnDOT Aeronautics funding. As such, despite rolling stock being eligible for state funding, some equipment needs remain unmet. Additional information about MnDOT Aeronautics' funding programs, including eligibility requirements, are provided below.

AIRPORT DEVELOPMENT GRANT PROGRAM

Airports can utilize the State Airport Development Grant Program to acquire maintenance equipment including rolling stock.[17] Airports included in the state aviation system are eligible for funding, and the program can cover between 75 and 90 percent of equipment costs, depending on the surrounding population level and NPIAS inclusion. Projects must be submitted into the state's capital improvement program (CIP) to be considered for funding. Equipment purchases are prioritized in accordance with the state's funding prioritization methodology.

M&O GRANT PROGRAM

The M&O Grant Program is intended to support airport's routine maintenance expenses to sustain the highest level of safety. Acquiring courtesy cars and rolling stock are ineligible for funding through the M&O Grant Program, but the program can cover maintenance equipment rentals, lease fees, and insurance.[18] Up to 75 percent of eligible item costs are covered through the program. Additionally, the program can support liability insurance for airport sponsor-owned items, excluding courtesy cars. In state fiscal year (SFY) 2022, the M&O Grant Program awarded a total of $5.0 million across all 133 airports in the state aviation system. Individual awards are based on the airport facility, with airport awards ranging from $3,819 (Waskish Municipal Airport [VWU]) to $207,385 (Rochester International Airport [RST]).

[16] FAA (2021). "Airport Zero Emissions Vehicle and Infrastructure Pilot Program." Available online at https://www.faa.gov/airports/environmental/zero_emissions_vehicles/ (accessed November 2021).
[17] MnDOT Aeronautics (2021). "Frequently Asked Questions." Available online at http://www.dot.state.mn.us/aero/airportdevelopment/frequentlyaskedquestions.html#purchaseEquipment (accessed November 2021).
[18] MnDOT Aeronautics (2021). "Maintenance and Operations (M and O)." Available online at https://www.dot.state.mn.us/aero/airportdevelopment/mando.html (accessed November 2021).

OTHER STATES' FUNDING MECHANISMS

To identify best practice related to funding of courtesy cars and other rolling stock, a desktop review was completed of other states' funding mechanisms. Table 9 summarizes the eight states examined as a part of this review.

Table 9. Other State's Funding of Courtesy Cars and Rolling Stock

State	Agency Name	Name of Program(s)	Type	Courtesy Car/ Rolling Stock	Eligible Applicants	Eligible Projects	State Funding Level	Prioritization
California	California Department of Transportation (Caltrans) Division of Aeronautics	Annual Credit Grant	Grant	Rolling stock	Publicly owned/ public-use airports	Service vehicles	Accrual basis per airport of $10,000, up to five years can be claimed	Unknown
Idaho	Idaho Transportation Department (ITD) Division of Aeronautics	Courtesy Car Program	Surplus	Courtesy car	ITD-owned and operated airports	Courtesy cars	N/A (surplus program)	Unknown
Kansas	Kansas Department of Transportation (KDOT) Division of Aviation	Kansas Airport Improvement Program (KAIP)	Grant	Rolling stock	Public-use airports	Equipment such as SRE and mowers	50 percent contribution. Maximum of $800,000 per project	Objective priority system ranks the applications across all categories. See page 36 for details.
Massachusetts	Massachusetts Department of Transportation (MassDOT) Aeronautics Division	Airport Safety and Maintenance Program (ASMP)	Grant	Rolling stock	Public-use airports	SRE and maintenance equipment	Up to 80 percent of total project cost	Maintenance projects as recommended by annual state airport inspections are often prioritized
Montana	Montana Department of Transportation	MDT Courtesy Car Program	Grant / Surplus	Courtesy car	Public-use airport without public	Courtesy cars	Up to $2,000 per vehicle purchase, two cars per year	Unknown

State	Agency Name	Name of Program(s)	Type	Courtesy Car/ Rolling Stock	Eligible Applicants	Eligible Projects	State Funding Level	Prioritization
	(MDT) Aeronautics Division				transportation 24/7, year-round			
New Hampshire	New Hampshire Department of Transportation (NHDOT) Bureau of Aeronautics	New Hampshire Airport Improvement & Maintenance Program (NH AIM)	Grant	Rolling stock	Public-use airports	SRE, mowing equipment	Up to 80 percent of project costs	Numerical-based priority rating scale by project type (see page 37)
North Dakota	North Dakota Aeronautics Commission (NDAC)	Airport Grant Funding	Grant	Rolling stock	Publicly owned and operated airports	Airfield equipment (ARFF vehicles, mower unit, SRE, tractors, operations vehicles, turf rollers/ sweepers)	50 percent of project costs. Airport sponsors can request higher funding levels with justification during application process.	Numerical-based priority rating scale indicates varied importance with rolling stock by type (e.g., 50 points for ARFF, 20 points for tractors). **Table 11** presents the full priority rating scale.
Wyoming	Wyoming Department of Transportation Aeronautics Commission (WAC)	Grants-In-Aid	Grant	Rolling stock	Public-use airports	Equipment including SRE, mowers, and tractors	Unknown	Unknown

Sources: Caltrans, 2019; Caltrans, 2021; ACRP, 2020; KDOT, 2016; MassDOT, 2021; NHDOT, 2018; NHDOT, 2021; NDAC, 2021; WYDOT, 2021

CALIFORNIA

Caltrans Division of Aeronautics provides airports with discretionary funding for "service vehicles" through the Annual Credits Grant program.[19] Airports that are owned by a public entity and meet the following requirements are eligible for this discretionary grant program:

- Have a valid state permit for a public-use airport
- 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 payments received and expenditures related to California Aid to Airports Program (CAAP) funds
- Annually certify eligibility by submitting Form DOA-0007, California Aid to Airports Program Certification each fiscal year
- Not designated as a Reliever or Commercial Service airport in the NPIAS

The project eligibility list for the Annual Credits Grant Program is extensive and includes "service vehicles" for supporting operations and maintenance activities at the airport. This includes nearly all rolling stock typically available at airports but does not include courtesy cars. Eligible airports accumulate $10,000 per year, with up to five-years' worth of funds able to be claimed through the program. Airports that close are obligated to pay back a portion of funds received via the Annual Credits Program during the past 20 years.[20] Repayment is set at the original amount with a five percent reduction every year.

If MnDOT Aeronautics establishes courtesy cars as eligible for state funding, there can be a similar stipulation in place to account for closing airports. Additionally, MnDOT Aeronautics could adopt a similar accrual system for airports to receive a certain amount of money each year up to a certain cap limit that could be used for equipment purchases.

IDAHO

The ITD Division of Aeronautics provides surplus cars to ITD-owned airports as a part of the ITD Courtesy Car Program.[21] This surplus program currently has four airports participating in the program, all being small airports with no public transportation available within 25 miles. As a part of the program, ITD provides a Trip Agreement to airports for collecting user background information and tracking accountability for damages. The Trip Agreement also stipulates that users must provide gas and are charged a combination of a flat fee, per mile fee, and an overnight rate (when applicable). Insurance is the responsibility of the user to cover any loss or damage to the vehicle and any third-party claims submitted. Upon the user returning the vehicle, the designated vehicle caretaker calculates the total rate to assessed to the user. Figure 12 presents a copy of a Trip Agreement used at Idaho airports.

[19] Caltrans Division of Aeronautics (2021). "Annual Credit Grant." Available online at https://dot.ca.gov/programs/aeronautics/annual-credit-grant (accessed November 2021).

[20] Caltrans Division of Aeronautics (April 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 November 2021).

[21] ACRP (2020). "Synthesis 111: Last Mile in General Aviation Courtesy Vehicles and Other Forms of Ground Transportation." Available online at https://www.trb.org/Main/Blurbs/181448.aspx (accessed November 2021).

MnDOT Aeronautics could develop a trip agreement template for airports to adopt when providing courtesy cars, especially for vehicles supported by public funds. Additionally, MnDOT Aeronautics can require that the user holds car insurance that will serve as the primary policy during use of the vehicle. Airports should still ensure courtesy vehicles to cover other usage, as well as uninsured drivers who use the vehicle without authorization. This type of coverage can be provided through governmental trusts available to public entities (profiles two potential insurance providers for airports are provided starting on page 44).

It is recommended that MnDOT Aeronautics confirm the legality of requiring users to hold their own insurance as a condition of using an airport courtesy car in Minnesota, as well as appropriate contractual language for a trip agreement. Additionally, airports without on-site managers or caretakers could request that drivers leave the signed trip agreement and payment with a designated partner business, city hall, or other government entity. An online form and payment system could also be developed. While these latter options operate to some degree on an "honor system," any payments received would offset the cost of insurance. A sign should also be clearly posted in the vehicle indicating that a signed trip agreement with payment must be remitted to the airport sponsor as a condition of use.

Figure 12. ITD Courtesy Car Trip Agreement

Your Safety • Your Mobility
Your Economic Opportunity

ITD 2572 (Rev 12-19
itd.idaho.gov

Idaho Airport Courtesy Car Trip Agreement

This car is the property of the Idaho Transportation Department, Division of Aeronautics. The user agrees that their insurance shall be primary over all other policies or contracts. The user is responsible for, and will reimburse, airport management promptly for all loss or damage to vehicle, as well as for any claims made by third parties in case of bodily injury, wrongful death, or property damage due to driver negligence or misuse.

Without limitation of any general obligations or responsibilities imposed by this agreement, the user shall comply with all motor vehicle laws. They shall be solely liable and responsible for all fines, penalties and forfeitures imposed for parking or traffic violations while vehicle is held, used, operated, or driven pursuant to this user agreement.

The courtesy car shall be used only between this airport and the local trading area. Travel across the state line or beyond local trading area is explicitly prohibited. Fees will be ***1-6 hours = $7.50, 6-12 hours = $15 & 12-24 hours = $30.***

The caretaker is not obligated to provide transient airport users with ground transportation to the local trade area, rather, courtesy cars are provided as a convenience.

Vehicle must be returned with fuel tank full.

Driver Information - All Fields Must Be Completed

Driver's Name	Phone	Email	
Address	City	State	Zip
Driver's License Number	State Issued	Auto Insurance Company	Ins. Policy Number
Aircraft Make	Model	N-Number	

By signing below, the user certifies they have read and agree to the above terms and conditions of this user agreement.

User Signature	Date

OFFICE USE ONLY

Airport	City	Car License Number
Date Out	Time Out ☐ a.m ☐ p.m.	Mileage Out
Date In	Time In ☐ a.m ☐ p.m.	Mileage In / Total Mileage

1-6 Hour Use Fee = ______
6-12 Hour Use Fee = ______
12-24 Hour Use Fee = ______
Mileage ______ x .60 Per Mile = ______
TOTAL = ______

PAID = ______
Change =
Donation Box =
Cash on Hand =

Caretaker Signature	Date

Distribution: White – Aeronautics Yellow – Caretaker Pink – User

Source: ITD, 2019

KANSAS

The KDOT Division of Aeronautics provides funding for equipment through the KAIP.[22] This grant program is intended to preserve and enhance the Kansas airport system by supporting runway pavement condition, minimizing surface travel time to air ambulance pick-up locations, improving safety, and enhancing economic development opportunities for public-use airports in Kansas. The eligible project list includes equipment purchases, such as SRE and mowers. Maximum state participation for equipment is set at 50 percent and up to $800,000 per project. Upon projects being submitted for consideration into the KAIP, the evaluation team use a priority rating system incorporating the following factors:

- Safety
- System preservation
- Kansas Airport System Plan recommendations
- Geographic remoteness
- Discretionary factors

MnDOT Aeronautics could consider adopting a priority rating system for the M&O Grant Program in lieu of the entitlement funding methodology currently employed (where each airport receives a set amount regardless of project-specific needs). This would help align awarded funding with actual needs.

MASSACHUSETTS

The MassDOT Aeronautics Division supports acquisition of maintenance equipment through the ASMP.[23] This grant program is only available to public-use airports included in the Massachusetts Statewide Airport System Plan (MSASP) and that submit projects through the state's CIP. ASPM funding is intended to support airport planning and development projects not supported by federal funding. Security improvement projects are funded at 100 percent and other projects are funded at 80 percent of total project costs. Equipment such as SRE and mowers are considered airport development projects and are eligible for ASPM funding. However, routine maintenance projects recommended in annual state airport inspections are often given a higher priority than equipment.

MnDOT Aeronautics could adopt a similar prioritization methodology for the M&O Grant Program that first awards funding to safety and security projects recommended in state airport inspections that are ineligible for FAA funding.

MONTANA

The MDT Aeronautics Division supports airports with courtesy car funding and surplus vehicles through the MDT Courtesy Car Program. Public-use airports with no continuous public transportation (24/7, 365 days a year) are eligible for the program. Eligible airports can request up to $2,000 per vehicle purchase, up to two cars per year. Additionally, MDT is currently working with the Montana State Legislature to repurpose vehicles from the MDT Motor Pool for use as courtesy cars with an estimated value of $5,000.

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[22] KDOT Division of Aeronautics (2016). "KAIP Program Guidance." Available online at https://www.ksdot.org/Assets/wwwksdotorg/bureaus/divAviation/pdf/KAIPProgramGuidelines2016.pdf (accessed November 2021).
[23] MassDOT Aeronautics Division (2021) "ASMP." Available online at https://www.mass.gov/airport-safety-and-maintenance-program-asmp-funding (accessed November 2021).

Airports that acquire vehicles through the MDT Courtesy Car Program are required to license, insure, and maintain the vehicles. If MnDOT Aeronautics chooses to fund courtesy cars, there should be an assurance requiring airport sponsors to keep the vehicles licensed, insured, and maintained. Vehicle standards should comply with Minnesota Statutes Chapters 169 and 65B, which details vehicle attributes and insurance requirements. Additionally, MnDOT Aeronautics could work with MnDOT's Office of Maintenance to acquire and repurpose used fleet equipment as airport courtesy cars, making these vehicles available to airports.

NEW HAMPSHIRE

The NHDOT Bureau of Aeronautics supports airports with equipment funding through the NH AIM.[24] This grant program aims to support the state's aviation system by maintaining safety, airspace access, economic development, and capacity. Public-use airports in New Hampshire are eligible to use the NH AIM to support a wide range of projects,[25] including the acquisition of SRE, mowers, and other equipment. Up to 80 percent of project costs are covered by the program.

Prioritization of projects submitted into the NH AIM is defined in a numerical scoring system, with each project being assigned a score determined by the project type (airport planning, airside development, landside development) and federal classification of the airport. Scores for non-NPIAS airports range from 100 for pavement crack sealing to 25 for landside signage construction. In general, higher prioritization is set for airside development projects, with pavement repair projects assigned the highest priority. Table 10 presents the specific prioritization of acquiring equipment relative to other project categories. SRE and mowing equipment is assigned a score of 55 or 27.5 of 100 possible points (non-NPIAS and NPIAS airports, respectively). MnDOT Aeronautics could adopt a similar prioritization model for the Minnesota's M&O Grant Program.

Table 10. Abridged NH AIM Project Prioritization

Project Category	Non-NPIAS Airport Ranking	NPIAS Airport Ranking
Airside Development	45-100	22.5-50
Airport Planning	30-60	30
Landside Development	25-55	12.5-27.5
Acquire SRE	55	27.5
Acquire mowing equipment	55	27.5
Acquire other equipment	30	15

Source: NHDOT, 2015

[24] NHDOT Bureau of Aeronautics (2021). "New Hampshire Airport Improvement and Maintenance Program." Available online at https://www.nh.gov/dot/org/aerorailtransit/aeronautics/programs/aim.htm (accessed November 2021).

[25] NHDOT Bureau of Aeronautics (2018). "New Hampshire Airport Improvement and Maintenance Program." Available online at https://www.nh.gov/dot/org/aerorailtransit/aeronautics/programs/documents/NHAIMProgramprojectrankings-2018.pdf (accessed November 2021).

NORTH DAKOTA

The NDAC supports funding for airfield equipment through Airport Grant Funding.[26] Publicly owned and operated airports in North Dakota can use the grant program to cover 50 percent of expenses to acquire airfield equipment, including SRE, ARFF vehicles, tractors, operations vehicles, and turf rollers/sweepers. Courtesy cars are not specifically included as eligible under this program. Project prioritization is based on priority rating system that classifies the projects into six different categories including:

- Obstructions, navigation, and lighting
- Preservation of existing system
- Planning
- Land easements and acquisition
- Environmental
- Airfield equipment

These categories are delineated further into five scoring tiers, ranging from low (10) to high (50). Table 11 details the scoring tiers of specific airfield equipment projects relative to other project categories, which can receive a maximum of 50 points (applicable to ARFF equipment) and a minimum of 20 points (tractors, operations vehicles, and turf rollers/sweepers). MnDOT could consider enhancing its existing priority rating system for the Airport Development Grant Program and implementing a priority rating system for the M&O Grant Program.

Table 11. Abridged NDAC Airport Grant Funding Prioritization Rating Scale - Airfield Equipment

Project Categories	Prioritization Score
Obstructions, Navigation, and Lighting	10-50
Preservation of Existing System	10-50
Planning	20-50
Land Easements and Acquisition	20-50
Environmental	20-40
Airfield Equipment (overall score range)	20-50
ARFF equipment	50
Mower unit, SRE	30
Tractors, operations vehicles, turf rollers/sweepers	20

Source: NDAC, 2016

WYOMING

WAC funds airport equipment through the Grants-In-Aid program.[27] This grant program is directed towards the construction and development of nearly all public entities in Wyoming including airports. Equipment that can receive grant funding include SRE, mowers, tractors, and front-end loaders. Courtesy cars are not included as a specific line-item eligible for funding.

Prioritization of projects submitted to the Grants-In-Aid program follows a formal priority rating model.[28] This model incorporates seven different criteria to numerically rank projects for funding. Each project is

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[26] *NDAC (2021). "Airport Grant Funding." Available online at https://aero.nd.gov/airports/airport-grant-funding/ (accessed November 2021).*
[27] *WYDOT Aeronautics Commission (2021). "State Grants General Information." Available online at https://www.dot.state.wy.us/home/aeronautics/planning--programming-program/grant_info.html (accessed November 2021).*
[28] *WYDOT Aeronautics Commission (2018). "Wyoming Priority Rating Model for Project Evaluation." Available online at https://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Aeronautics/Planning/PRM/2018%20Final%20PRM%20Document_Approved_061918.pdf (accessed November 2021).*

assigned individual scores and weighted by each criterion to calculate a composite score out of 105 possible points. The model assigns the highest priority to airside safety projects, which includes SRE. Table 12 presents the priority rating model utilized by WAC for ranking projects for funding.

Table 12. WAC Priority Rating Model Scoring

Category	Category Weight	Maximum Points Available	Percent of Total Points Available
Purpose of Project	5	20	19%
Project Component	2	12	11.5%
Type of Federal Funding	5	20	19%
System Impact	4	12	11.5%
Project Timing	4	20	19%
Airport Usage	3	12	11.5%
Status of Airport Protection	1	9	8.5%
Total	N/A	105	100%

Source: WYDOT Aeronautics Commission, 2018

The “Purpose of Project” category of the priority rating model awards different scores to equipment based on the purpose at the airport, which is defined below:

- Safety-related equipment such as SRE and ARFF vehicles is awarded the highest score (20 points).
- Maintenance equipment is awarded a score of 15 out of 20 possible points in the category
- Other equipment purchases not intended for safety or maintenance purposes is awarded a score of 10 out of 20 possible points in the category.

Additionally, the “Project Component” category of the priority rating model evaluates equipment based on the usage at the airport.

- Projects that improve the use of the primary runways and taxiways are awarded the highest score in this category (12 points), which can include SRE, ARFF equipment, and any safety-related equipment.
- Equipment that directly supports aviation traffic is awarded a score of 6 out of 12 possible points in this category.
- Operations and administrative vehicles are awarded a score of 3 out of 12 possible points in this category.

KEY FINDINGS FROM OTHER STATES

After a review of eight states' funding mechanisms for courtesy cars and rolling stock, there are several practices that MnDOT Aeronautics could adopt to better support these airport assets:

- If MnDOT Aeronautics makes courtesy cars eligible for state funding, there could be an assurance for paying back a certain portion of the funding if the airport closes within a certain timeframe of disbursing the funds. This can help account for smaller airports that could be susceptible to closure in the future. Repayment can be set at the original amount with a certain percent reduction every year.
- MnDOT Aeronautics could develop a trip agreement template for airports to adopt when providing courtesy cars, especially for the vehicles potentially supported by state funds in the future. Refer to Figure 12 for a sample agreement implemented at Idaho airports owned by the state.
- If MnDOT Aeronautics chooses to fund courtesy cars via the M&O Grant Program or Airport Development Grant Program, there should be an assurance in place requiring airport sponsors to keep the vehicles registered, insured, and maintained while in use. Vehicle standards should comply with Minnesota Statutes Chapter 169 and 65B, which details vehicle attributes and insurance requirements (minimum insurance coverages are detailed in). Potential insurance options for airports are presented starting on page 44, and information regarding supporting state funding for insurance coverage through MnDOT's M&O Grant Program and/or local sponsorships begins on page 42.
- MnDOT Aeronautics could work with MnDOT's Office of Maintenance to acquire and repurpose used fleet equipment as airport courtesy cars, making these vehicles available to airports. More information about this potential strategy is provided on page 42.

MnSASP Recommendations

Throughout Phase I of the MnSASP and the airport data collection effort completed in Phase II of the 2022 MnSASP, several issues were uncovered regarding courtesy car availability and maintenance. These issues were commonly cited by airports as challenges associated with courtesy cars, as well as identified by MnDOT Aeronautics during Phase II of the MnSASP. Table 13 summarizes these issues and the recommended actions that MnDOT Aeronautics and airports could take to address them. Each is described further in the subsections identified in the right column.

Table 13. Summary of Courtesy Car Issues and 2022 MnSASP Recommendations

Key Issues	Recommendations	Reference Subsections
Lack of Available Courtesy Cars at GA Airports	- Acquire vehicles through MnDOT's used fleet equipment program or the Minnesota Department of Administration Fleet and Surplus Services - Add courtesy car maintenance as an eligible expense for M&O grant funding - Partner with local businesses to sponsor courtesy cars vehicles to cover operating expenses	- State Surplus Programs - M&O Funding Eligibility - Partnership with Local Businesses for Sponsorship

Key Issues	Recommendations	Reference Subsections
Obtaining Insurance for Airport Courtesy Cars	- Leverage the insurance offerings provided by governmental trusts in Minnesota - Require airport users to hold their own auto coverage that will serve as the primary policy during use	- Auto Insurance through Government Trusts - Establish Trip Agreements
Concern Regarding Airport Sponsor Liability	- Establish a trip agreement with courtesy car users for detailing the terms of use and documenting driver information	- Local Trip Agreements
Lack of Public Acceptance and Political Support	- Promote and educate community partners about the economic activity generated by courtesy car users (i.e., visiting GA pilots and passengers) - Request that courtesy car users complete a trip tracker to document the business(es) supported during their visits	- Local Promotion and Education - Trip Tracker

Source: Kimley-Horn, 2021

STATE SURPLUS PROGRAMS

Purchasing airport courtesy cars can be a large expense for Landing Strip Turf and other airports with limited financial resources from the airport sponsor or state/federal sources. In November 2021, the average cost of a sedan with similar characteristics to the courtesy cars found in Minnesota (2004 - 2008 sedan in fair to good condition) was between $5,000 - $7,000.[29] Fortunately, airports can acquire used vehicles through state surplus programs that make repurposed state and federal property available to public entities.[30] At the time of writing in fall 2021, all airports in the state aviation system are publicly owned and thus are eligible to acquire property through the state surplus program. Through an outreach effort, more information was gathered on state programs airports can leverage to acquire courtesy cars at a relatively affordable cost compared to conventional buying options. These are described in the following subsections.

STATE AUCTION

The Minnesota Department of Administration oversees surplus property across all state entities and prepares the property for sale and eventual reuse. Some of the surplus property is sold through live and/or online auctions. Auctions are open to the public, including local municipal governments, and allow airports to acquire used vehicles to serve as courtesy cars. Live auctions are conducted routinely throughout the year and in different locations in Minnesota. Additionally, there is an official state auction website to provide on-demand access to the state's available surplus property, which provides the opportunity to bid on vehicles in real-time.

[29] *This average vehicle costs were identified from a desktop review completed in November 2021 of the 12 sedans posted on Autotrader.com for sale in Minnesota.*
[30] *Minnesota Department of Administration (2021). "Fleet and Surplus Services." Available online at https://mn.gov/admin/about/contact-us/fss.jsp (accessed November 2021).*

To visit the official auction website, visit https://www.minnbid.org/Mobile/Default. More information about the state's auctions can be found at https://mn.gov/admin/government/surplus-property/auctions/.

MNDOT'S USED FLEET EQUIPMENT PROGRAM

In addition to the state auctions, publicly owned airports in the state aviation system can directly purchase surplus property through individual state entities. In particular, MnDOT has a Used Fleet Equipment Program to allow other facets of the organization to acquire surplus property through direct sales. More information about this program and a current list of used fleet equipment for sale can be found at https://www.dot.state.mn.us/maintenance/fleet.html.

M&O FUNDING ELIGIBILITY

Like aircraft, courtesy cars must be continuously maintained and insured for airport users to legally, safely, and adequately connect to/from the airport. Proactive maintenance of courtesy cars is key for airports to ensure a high safety standard beyond the air travel experience. Additionally, as one of the first points of contact for many GA visitors to an area, courtesy cars can serve as the "face" of the airport and surrounding area. As such, it is important for airport sponsors to upkeep the condition of their vehicles.

The M&O Grant Program facilitated by MnDOT Aeronautics is summarized on page 30. At the time of writing in fall 2021, the eligibility guidelines for the program explicitly state that "non-maintenance vehicle expenses (courtesy car, etc.)" are ineligible for funding. With the lack of any reliable ground transportation options at some GA airports and the challenge for smaller airports to cover the cost of maintaining courtesy cars, MnDOT Aeronautics should amend funding eligibility to include courtesy cars. More specifically, this could include maintenance and insurance for the vehicle(s) to align with the purpose of the M&O Grant Program. Based on discussions with MnDOT Aeronautics, this change neither require a statutory nor regulatory change, as project eligibility is determined at the office level.

Should MnDOT fund courtesy cars through the M&O or other state program, a grant assurance should be implemented that requires airport authorities to comply with the vehicle standards established by Minnesota Statutes Chapters 169 and 65B, which details vehicle attributes and insurance requirements. More information on insuring courtesy cars is described in the applicable subsection below. Additionally, MnDOT Aeronautics grant assurances should include a requirement for airports to track the condition of the vehicles through trip agreements.

A study completed by the ACRP across 60 GA airports revealed that airports generally incur between $500 to $1,000 in annual courtesy car maintenance expenses.[31] The exact figure is dependent on the type of vehicle, amount of use, age, weather conditions etc. Based on the range of M&O funding allocations to Minnesota airports for SFY 2022, airports may be able to cover courtesy car maintenance expenses using current entitlement levels, although it is recognized that airports generally spend 100 percent of allocated M&O funding on other needs. MnDOT could award additional funding to GA airports with courtesy cars by changing the funding allocation methodology and/or increasing the percent share of total state investment into the M&O Program. This latter proposal would reduce funding allocated to

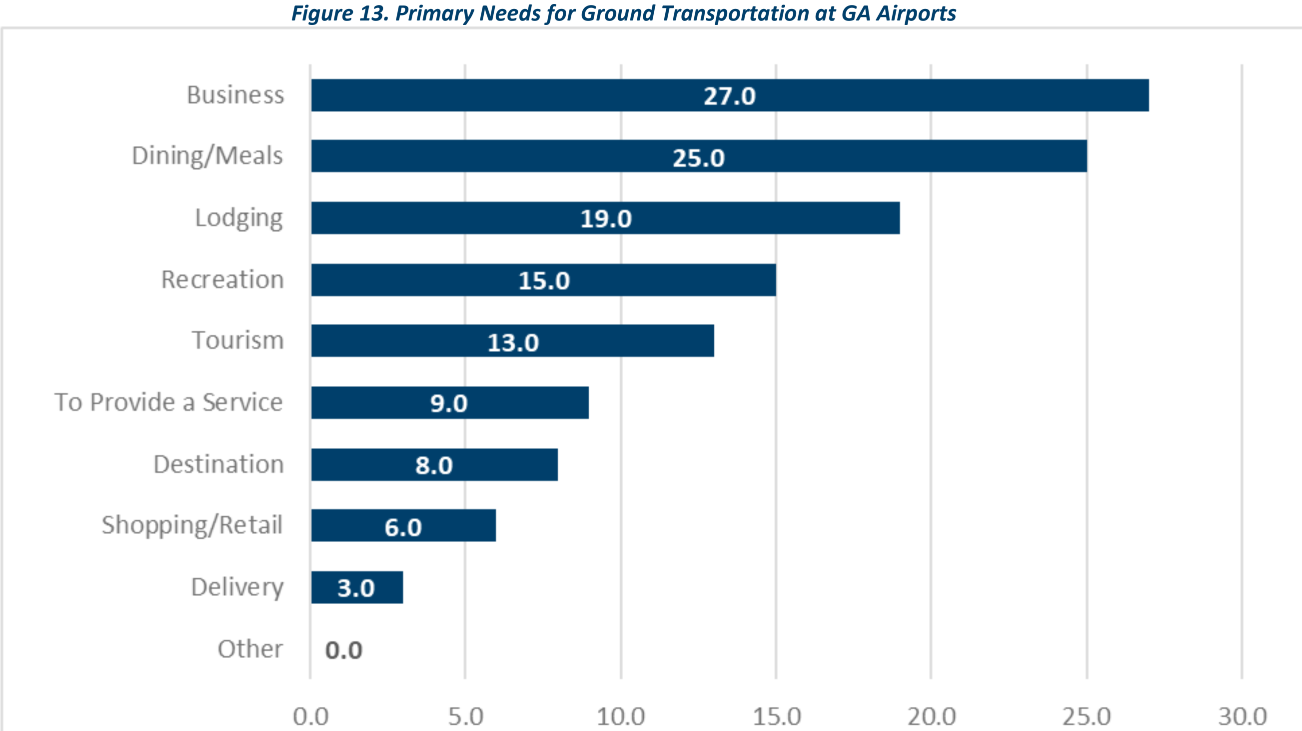
[31] ACRP (2020). "Synthesis 111: Last Mile in General Aviation Courtesy Vehicles and Other Forms of Ground Transportation." Available online at https://www.trb.org/Main/Blurbs/181448.aspx (accessed November 2021).

other state programs (e.g., Airport Development Grant Program, Navigational Aids (NAVAIDs) Program, etc.), necessitating further reflection on the priority of courtesy cars relative to other airport development needs.

PARTNERSHIP WITH LOCAL BUSINESS FOR SPONSORSHIP AND ADVERTISING

Airport courtesy cars can be one of the first contact points for visitors to an airport. In Minnesota, there were an estimated 562,000 out-of-state visitors arriving via GA airports recorded in 2019.[32] Local restaurants, lodging, and other points of interest are looking to market to this audience, as they generate direct, indirect, and induced economic impacts that flow through broader economies. According to the ACRP, most airport users need ground transportation for either business purposes or dining/meals (as shown in **Figure 13**).[33] As such, courtesy cars could also act as marketing platforms for local businesses. In return, local businesses could sponsor the courtesy car by supporting the acquisition, maintenance, and/or insurance costs to operate a vehicle. Local businesses sponsoring courtesy cars can raise awareness for points of interest within driving distance of an airport, helping to stimulate off-airport visitor spending.

Figure 13. Primary Needs for Ground Transportation at GA Airports



Source: ACRP Synthesis 111, 2020 (survey conducted by AirportAdmin, LLC)

[32] *MnDOT Aeronautics (2019). "Statewide Airport Economic Impact Study." Available online at http://www.dot.state.mn.us/airport-economic-study/ (accessed November 2021).*
[33] *ACRP (2020).*

To complement this sponsorship, local businesses could add promotional advertising to their products/services to encourage courtesy car use. Partner businesses could have the opportunity to advertise inside the vehicle through signs, flyers, menus, or businesses cards or by adding magnetic signage to the outside body of the car. For example, a restaurant could run a promotional advertisement providing a meal discount to customers using an airport courtesy car. Additionally, local businesses could place advertisements on the outside of courtesy cars and/or promotional coupons inside the vehicles to make visitors aware and interested in local points of interest.

AUTO INSURANCE THROUGH GOVERNMENT TRUSTS

Airport courtesy cars need to be insured to protect the airport from major liability issues should an incident occur during use. In fact, auto insurance is mandatory for all vehicles in Minnesota per Minnesota Statutes Chapter 65B. Table 14 presents the minimum coverage requirements for all vehicles in Minnesota.

Table 14. Minnesota Auto Insurance Minimum Coverage Requirements

Type of Coverage	Minimum Amount Required
Personal Injury Protection (PIP)	- $40,000 per person per accident ($20,000 for hospital/medical expenses and $20,000 for non-medical expenses such as lost wages, replacement services, etc.)
Liability	- $30,000 for injuries to one person - $60,000 for injuries to two or more people - $10,000 for physical damage to the other driver's vehicle or for damage to property
Uninsured	- $25,000 for injuries to one person - $50,000 for injuries to two or more people
Underinsured	- $25,000 for injuries to one person - $50,000 for injuries to two or more people

Source: Minnesota Statutes Chapter 65B, 2021

Airports could require courtesy car users to hold the minimum coverage requirements with their personal auto policy and assume the role as the primary policy holder for the time of use. This can protect airports from taking on any of the major liability issues that could arise from accidents/incidents with other drivers. A formalized trip agreement (described on page 45) could detail the minimum coverage required for users and prompt for policy details (provider, policy number). Although the airport can require users to hold auto coverage, airports should also establish auto insurance for the courtesy car vehicles to cover other uses (e.g., driving the vehicle to an auto shop for maintenance or to a gas station for fuel).

Through the airport data collection effort, some airports cited issues with establishing auto insurance as a reason for not being able to support courtesy cars. As such, a research effort was completed to identify potential auto insurance offerings available to all airports in the state aviation system. This research yielded two organizations that provide insurance for airport sponsors that are counties and cities, respectively: Minnesota Counties Intergovernmental Trust (MCIT) and the League of Minnesota Cities (LMC).

MINNESOTA COUNTIES INTERGOVERNMENTAL TRUST

MCIT is a joint powers entity that connects Minnesota counties and associated public entities to share resources, allowing for a wide range of insurance offerings to be provided.[34] Operating on a membership structure, membership primarily comprises Minnesota counties; other public organizations that support counties can also become members. MCIT provides auto coverage to members that includes all required coverages per the Minnesota Statutes Chapter 65B (refer to **Table 14**). Minnesota counties and other member organizations should coordinate directly with MCIT to determine specific courtesy care eligibility requirements and associated costs.

LEAGUE OF MINNESOTA CITIES

LMC is a membership-based organization of over 800 city governments to pool resources together for advocacy, education, training, risk management, policy development, and other services. Membership to this organization is limited to cities only, with some exceptions. Nearly all cities in Minnesota are members of this organization.

The LMC established the League of Minnesota Cities Insurance Trust (LMCIT) as a self-insured membership cooperative to provide members with insurance to protect against city operation and developmental risks.[35] Typically, the LMCIT offers the insurance in a package that includes auto, property, and municipal liability insurance (i.e., general liability insurance). The auto insurance provides liability coverage of $2.0 million with the option to increase to $5.0 million, along with physical damage coverage. Additionally, no-fault PIP and uninsured/underinsured coverage ($200,000 coverage limit) is included with all member vehicles. As it relates to airports, member cities that serve as airport sponsors can elect for the insurance coverage, with one limitation being that airports with scheduled flights are ineligible for coverage. The cost of the insurance depends on the characteristics of the courtesy cars, airport property, and facilities to be insured in the package. For more details on the auto coverage provided by LMCIT, please visit the following website: https://www.lmc.org/insurance-trust/coverages/auto/.

ESTABLISH TRIP AGREEMENTS

Before the courtesy car is offered for use, there should be a trip agreement established between the airport and the prospective user detailing the terms of use. These terms of use can include, but are not limited to:

- Requirement for the driver to hold a valid driver's license
- Maximum mileage of the vehicle during use
- Maximum time of use
- Gas and maintenance responsibilities
- Insurance requirements (aligning with minimum coverage amounts presented in **Table 14**)
- Rates and charges for use and the acceptable form(s) of payment

[34] MCIT (2021). "2021 Coverage Review." Available online at https://www.mcit.org/wp-content/uploads/2021/01/2021-Coverage-Review-Booklet.pdf (accessed November 2021).
[35] LMC (2021). "About the Trust." Available online at https://www.lmc.org/insurance-trust/about-the-trust/ (accessed November 2021).

Once these terms are set, the trip agreement should prompt the user to provide contact information (name, phone number, email address) and license details (license number, state, expiration date, photocopy/photo of license) for contacting and tracking the driver. Users could take a photo of their license and send the required details to an email set-up specifically for this purpose using their smartphone. Additionally, the trip agreement should ask the expected duration of use and auto insurance information (provider name, policy number) if the airport is requiring users to assume the role as the primary policy holder. By signing the trip agreement, the airport can adequately track their vehicles during use and mitigate some potential liability issues that could arise should an incident occur. Examples of trip agreements established at airports are presented at the end of this paper starting on page 56.

LOCAL PROMOTION AND EDUCATION

In some cases, airports in Minnesota lack support and/or initiative from the sponsor and/or surrounding community to purchase and maintain courtesy cars. This could be the result of local citizens and businesses not being familiar with the utility and local economic activity that airports can generate if courtesy cars are available. As many airport sponsors are public entities funded in part by local tax dollars, it is imperative that the general public understands airports' economic benefits, which are most easily realized if a clean, well-maintained courtesy car is available. A survey conducted by the ACRP indicated that airport sponsors can generate this support by promoting the economic impact generated by off-airport visitor spending.[36] Economic impacts include direct off-airport employment and payroll in hospitality-related industries, as well as successive waves of impacts generated by supplier purchases (indirect impacts) and the re-spending of worker income (induced impacts). MnDOT Aeronautics' Airport Economic Impact Calculator is a great resource for airport managers to present economic impact estimates resulting from visitor spending.[37] Additionally, visiting pilots are likely to purchase fuel and pay other fees assessed by the airport sponsor and/or FBO. These revenues support an airport's financial self-sufficiency and can, in part, offset costs associated with a courtesy car.

Engaging with the community through public meetings and social media can help raise awareness and support for an airport. More information about airport promotion techniques and tools are provided by the University of Minnesota's Airport Technical Assistance Program at http://www.airtap.umn.edu/guide/promotion/index.html.

The airport sponsor can also generate more public support by following the recommendations explained in this section for creatively acquiring and maintaining courtesy cars. This includes acquiring repurposed cars through MnDOT and partnering with local businesses for sponsoring courtesy cars to cover maintenance/insurance expenses. This shows that airports provide a net benefit to the community while off-setting some or all the cost of associated with operating a publicly owned, public-use airport.

[36] *ACRP (2020).*

[37] *MnDOT Aeronautics (2019). "Airport Economic Impact Calculator." Available online at https://jviation.tfaforms.net/423579 (accessed November 2021).*

TRIP TRACKER

In-car trip trackers can be a valuable tool in quantifying the number of visitors reliant on airport courtesy cars, as well as the businesses they supported during their stay. Public engagement is more impactful if specific details about how an airport courtesy car is being used can be citied instead of generalities or anecdotal stories. Trip trackers can be “guest books” inside of cars or submitted with trip agreements discussed above. These books can also offer pilots and passengers the opportunity to recommend favorite local restaurants or unique attractions to other visitors.

MnDOT could also work with airports to develop a passport program. In these types of programs, participating pilots receive booklets that are stamped at airports involved with the program. Pilots who fly into a certain number of airports earn small rewards such as patches and pins and, for some pilots, bragging rights. The Minnesota program could have local partner restaurants and other businesses provide stamps or stickers in passports, which would require visitors to check-in with a local representative. The restaurant or visitor could record visitor details, and then submit to the airport sponsor at some specified interval (i.e., monthly, quarterly, biannually, etc.). While the development of such a program does take some up-front coordination to establish, ongoing work is minimal – particularly in consideration of the value the data can provide about the courtesy car’s role in facilitating visitor spending. The Washington State Department of Transportation (WSDOT) helps facilitate the Fly Washington Passport Program. Details about this program are provided at https://www.flywashington.org.

Summary

The lack of courtesy cars across some GA airports could be hindering communities from attracting aviation activity. As one pilot shared to an airport staff member:

> *“If I fly into your airport but can’t get to your community, I might as well be on an island.”*[38]

More broadly, airports without adequate ground connectivity options are not able to fully realize their potential in supporting their communities. Unlike commercial service airports where scheduled passenger service supports comprehensive ground connectivity options, some GA airports struggle to provide any level of reliable ground transportation. This is likely driving some GA users to fly into other airports and spend their money in other communities, not only in off-airport visitor spending but also on-airport via fuel sales and other fees charged by the airport sponsor and the FBO. By implementing the recommendations described in this document, MnDOT Aeronautics and GA airports in the state aviation system can expand ground connectivity to more parts of the state, which can better position communities to attract leisure and business aviation users looking to engage with local points of interest with an on-demand ground transportation option.

[38] *ACRP (2020).*

Individual Airport Detail Tables

Table 15 details all the multimodal connectivity options available at each airport in the state aviation system, including any unique options found at specific airports (noted in the "Other" column). The first nine entries in the table are Minnesota's commercial service airports, followed by Minnesota's GA airports.

Table 15. Multimodal Connectivity Options by Airport

Associated City	Airport Name	FAA ID	Bus [39]	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
Bemidji	Bemidji Regional	BJI	No	Yes	Yes	No	Yes	Yes	No	Yes	None
Brainerd	Brainerd Lakes Regional	BRD	No	Yes	Yes	No	Yes	No	No	Yes	None
Duluth	Duluth International	DLH	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	None
International Falls	Falls International	INL	No	Yes	Yes	Yes	No	Yes	No	Yes	None
Minneapolis	Minneapolis/St. Paul International	MSP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Light rail
Hibbing	Range Regional	HIB	No	Yes	Yes	No	No	Yes	No	Yes	None
Rochester	Rochester International	RST	No	Yes	Yes	Yes	Yes	Yes	No	No	None
Saint Cloud	Saint Cloud Regional	STC	No	Yes	No	Yes	Yes	No	Yes	Yes	None
Thief River Falls	Thief River Falls Regional	TVF	Yes	Yes	No	No	No	Yes	No	Yes	None
Ada	Ada-Norman County/Twin Valley	D00	No	No	No	Yes	No	No	No	No	None
Aitkin	Aitkin Municipal	AIT	No	No	No	No	No	No	No	Yes	None
Albert Lea	Albert Lea Municipal	AEL	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	None
Alexandria	Alexandria Municipal (Chandler Field)	AXN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	None
Appleton	Appleton Municipal	AQP	Yes	No	No	No	No	No	No	No	None

[39] *This data field is specifically evaluating airport-reported scheduled bus service availability. Any on-demand bus services (dial-ride) are noted as other connectivity options.*

Associated City	Airport Name	FAA ID	Bus [39]	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
Austin	Austin Municipal	AUM	No	Yes	No	No	No	No	Yes	Yes	Used car dealership provides cars to users upon request
Backus	Backus Municipal	7Y3	No	No	No	No	No	No	Yes	No	None
Bagley	Bagley Municipal	7Y4	No	No	No	No	No	No	No	Yes	On-call bus
Baudette	Baudette International	BDE	No	No	No	No	No	No	No	Yes	On-call bus, airport, employee provides personal vehicle in some cases
Benson	Benson Municipal	BBB	Yes	No	No	No	No	No	No	Yes	Airport loans out personal cars on occasion
Big Falls	Big Falls Municipal	7Y9	No	No	No	No	No	No	No	No	None
Bigfork	Bigfork Municipal	FOZ	No	No	No	No	No	No	No	No	None
Blue Earth	Blue Earth Municipal	SBU	No	No	No	No	No	No	No	Yes	None
Bowstring	Bowstring	9Y0	No	No	No	No	No	No	Yes	No	None
Brooten	Brooten Municipal	6D1	No	No	No	No	No	No	No	Yes	None
Buffalo	Buffalo Municipal	CFE	No	Yes	No	No	Yes	No	No	Yes	None
Caledonia	Caledonia-Houston County	CHU	No	No	No	No	No	No	No	No	None
Cambridge	Cambridge Municipal	CBG	Yes	Yes	No	Yes	No	No	No	Yes	None
Canby	Canby Municipal	CNB	No	No	No	No	No	Yes	No	Yes	None
Clarissa	Clarissa Municipal	8Y5	No	No	No	No	No	No	No	No	City staff picks people up upon request
Cloquet	Cloquet-Carlton County	COQ	Yes	Yes	No	Yes	No	Yes	Yes	No	None

Associated City	Airport Name	FAA ID	Bus 39	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
Cook	Cook Municipal	CQM	No	Yes	No	Yes	No	No	No	No	None
Crookston	Crookston Municipal (Kirkwood Field)	CKN	Yes	No	No	Yes	No	No	No	Yes	None
Detroit Lakes	Detroit Lakes	DTL	No	No	No	Yes	Yes	No	Yes	Yes	None
Dodge Center	Dodge Center Municipal	TOB	Yes	Yes	No	No	Yes	No	No	Yes	None
Duluth	Duluth-Sky Harbor Airport & Seaplane Base	DYT	Yes	Yes	No	Yes	Yes	No	Yes	Yes	None
East Gull Lake	East Gull Lake	9Y2	No	Yes	No	No	Yes	Yes	Yes	No	None
Elbow	Elbow Lake Municipal	Y63	Yes	No	No	No	No	No	No	Yes	None
Ely	Ely Municipal	ELO	No	No	Yes	No	No	No	No	No	None
Eveleth	Eveleth-Virginia Municipal	EVM	No	Yes	No	No	No	No	Yes	No	Car dealership brings cars to the airport upon request
Fairmont	Fairmont Municipal Airport	FRM	No	Yes	No	Yes	Yes	No	No	Yes	None
Faribault	Faribault Municipal	FBL	No	Yes	No	Yes	No	No	No	Yes	None
Fergus Falls	Fergus Falls Municipal	FFM	No	Yes	No	Yes	No	Yes	No	Yes	None
Fertile	Fertile Municipal	D14	No	No	No	No	No	No	No	No	None
Forest Lake	Forest Lake	25D	No	Yes	No	No	Yes	No	Yes	No	None
Fosston	Fosston Municipal	FSE	Yes	No	No	Yes	No	No	No	No	None
Glencoe	Glencoe Municipal (Vernon Perschau Field)	GYL	Yes	No	No	No	No	No	Yes	Yes	None
Glenwood	Glenwood Municipal	GHW	No	No	No	No	No	No	No	Yes	None
Grand Marais	Grand Marais-Cook County	CKC	No	Yes	No	Yes	No	No	No	No	None

Associated City	Airport Name	FAA ID	Bus [39]	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
Grand Rapids	Grand Rapids-Itasca County	GPZ	No	Yes	No	Yes	No	No	Yes	Yes	None
Granite Falls	Granite Falls Municipal	GDB	No	No	No	Yes	No	No	No	Yes	None
Grygla	Grygla Municipal	3G2	No	No	No	No	No	No	No	No	None
Hallock	Hallock Municipal	HCO	No	No	No	No	No	No	No	Yes	None
Hawley	Hawley Municipal	04Y	No	No	No	No	No	No	No	Yes	None
Hector	Hector Municipal	1D6	No	No	No	No	No	No	No	Yes	None
Henning	Henning Municipal	05Y	No	No	No	No	No	No	Yes	No	None
Herman	Herman Municipal	06Y	No	No	No	No	No	No	No	No	None
Hill City	Hill City-Quadna Mountain	07Y	No	Yes	No	No	Yes	No	No	Yes	None
Hutchinson	Hutchinson Municipal	HCD	No	Yes	No	No	Yes	No	No	Yes	Dial-a-ride for bus
Jackson	Jackson Municipal	MJQ	No	No	No	No	No	No	No	Yes	None
Karlstad	Karlstad Municipal	23D	No	No	No	No	No	No	No	No	None
Le Sueur	Le Sueur Municipal	12Y	Yes	No	No	No	No	No	No	Yes	None
Litchfield	Litchfield Municipal	LJF	Yes	No	No	No	No	No	No	Yes	None
Little Falls	Little Falls-Morrison County	LXL	No	Yes	No	No	No	No	No	Yes	None
Littlefork	Littlefork Municipal	13Y	No	No	No	No	No	No	Yes	No	None
Longville	Longville Municipal	XVG	No	No	No	No	No	No	No	Yes	None
Luverne	Luverne Municipal (Quentin Aanenson Field)	LYV	No	Yes	No	No	No	Yes	No	Yes	None
Madison	Madison-Lac Qui Parle	DXX	Yes	No	No	No	No	No	No	Yes	None
Mahnomen	Mahnomen County	3N8	Yes	No	No	No	No	Yes	No	Yes	None
Mankato	Mankato Municipal	MKT	No	Yes	No	Yes	Yes	Yes	No	Yes	Landline bus service to MSP
Maple Lake	Maple Lake Municipal	MGG	No	No	No	No	No	No	No	Yes	None

Associated City	Airport Name	FAA ID	Bus 39	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
Marshall	Marshall-Southwest Minnesota Regional - Marshall/Ryan Field	MML	No	Yes	No	Yes	No	No	Yes	No	None
McGregor	McGregor-Isedor Iverson	HZX	No	No	No	No	No	No	No	Yes	None
Milaca	Milaca Municipal	18Y	No	No	No	No	Yes	No	No	Yes	Dial-a-ride bus
Minneapolis	Minneapolis Airlake	LVN	No	No	No	No	Yes	No	No	Yes	None
Minneapolis	Minneapolis Anoka County/Blaine	ANE	No	No	No	Yes	Yes	No	No	Yes	None
Minneapolis	Minneapolis Crystal	MIC	Yes	Yes	No	No	Yes	No	Yes		None
Minneapolis	Minneapolis Flying Cloud	FCM	Yes	No	No	Yes	Yes	Yes	No	Yes	None
Montevideo	Montevideo-Chippewa County	MVE	No	Yes	No	No	No	No	No	Yes	None
Moorhead	Moorhead Municipal	JKJ	No	Yes	No	Yes	Yes	No	No	Yes	None
Moose Lake	Moose Lake-Carlton County	MZH	No	Yes	No	No	No	No	Yes	No	None
Mora	Mora Municipal	JMR	No	No	No	No	No	No	Yes	Yes	None
Morris	Morris Municipal	MOX	No	No	No	Yes	No	Yes	No	Yes	None
New Ulm	New Ulm Municipal	ULM	No	No	No	No	No	No	No	Yes	None
Northome	Northome Municipal	43Y	No	No	No	No	No	No	Yes	No	None
Olivia	Olivia Regional	OVL	No	No	No	Yes	No	No	No	Yes	None
Orr	Orr Regional	ORB	No	No	No	No	No	No	No	No	On-demand bus available
Ortonville	Ortonville Municipal	VVV	No	No	No	No	No	Yes	No	Yes	None
Owatonna	Owatonna Degner Regional	OWA	No	Yes	No	Yes	Yes	No	No	Yes	None
Park Rapids	Park Rapids Municipal	PKD	Yes	No	No	Yes	No	No	No	Yes	None
Paynesville	Paynesville Municipal	PEX	No	No	No	No	No	No	Yes	Yes	None

Associated City	Airport Name	FAA ID	Bus 39	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
Pelican Rapids	Pelican Rapids Municipal	47Y	No	Yes	No	No	No	No	No	No	None
Perham	Perham Municipal	16D	No	No	No	Yes	No	No	No	Yes	None
Pine River	Pine River Regional	PWC	No	No	No	No	No	No	No	Yes	None
Pinecreek	Piney-Pinecreek Border	48Y	No	No	No	No	No	No	No	No	None
Pipestone	Pipestone Municipal	PQN	No	Yes	No	Yes	No	No	No	Yes	None
Preston	Preston Fillmore County	FKA	No	No	No	No	No	No	No	Yes	None
Princeton	Princeton Municipal	PNM	Yes	No	No	No	No	No	No	Yes	None
Red Lake Falls	Red Lake Falls Municipal	D81	No	No	No	No	No	No	No	No	City staff will pick users up upon request
Red Wing	Red Wing Regional	RGK	No	Yes	No	Yes	No	No	No	Yes	None
Redwood Falls	Redwood Falls Municipal	RWF	No		No	No	No	No	No	Yes	None
Remer	Remer Municipal	52Y	No	No	No	No	No	No	Yes	No	None
Roseau	Roseau Municipal (Rudy Billberg Field)	ROX	Yes	No	No	Yes	No	No	No	Yes	None
Rush City	Rush City Municipal	ROS	No	Yes	No	Yes	No	No	No	Yes	None
Rushford	Rushford Municipal	55Y	No	No	No	No	No	No	No	Yes	None
St. James	Saint James Municipal	JYG	No	No	No	No	No	No	No	Yes	None
St. Paul	Saint Paul Downtown	STP	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	None
St. Paul	Saint Paul-Lake Elmo	21D	No	No	No	Yes	Yes	No	No	Yes	None
Sauk Centre	Sauk Centre Municipal	D39	No	Yes	No	No	Yes	No	No	Yes	None
Slayton	Slayton Municipal	DVP	No	No	No	No	No	No	No	No	Dial-ride-bus
Sleepy Eye	Sleepy Eye Municipal	Y58	No	No	No	No	No	No	No	No	Airport manager provides rides as needed

Associated City	Airport Name	FAA ID	Bus[39]	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
South St. Paul	South St. Paul Municipal (Fleming Field)	SGS	No	Yes	No	Yes	Yes	No	No	No	
Springfield	Springfield Municipal	D42	Yes	No	No	No	No	No	Yes	No	City vehicles available upon request, bikeshare
Staples	Staples Municipal	SAZ	No	No	No	No	No	No	Yes	Yes	Friendly Rider (call-out bus service)
Starbuck	Starbuck Municipal	D32	No	No	No	Yes	No	Yes	Yes	No	Flying club will loan car
Stephen	Stephen Municipal	D41	No	No	No	No	No	No	No	No	Manager provides rides in personal vehicle for pilots needing transport from the airport
Thief River Falls	Todd Field (Long Prairie Airport)	14Y	No	No	No	No	No	No	No	Yes	None
Tower	Tower Municipal	12D	No	No	No	No	No	Yes	Yes	Yes	None
Tracy	Tracy Municipal	TKC	No	No	No	No	No	No	Yes	Yes	None
Two Harbors	Two Harbors-Richard B. Helgeson	TWM	No	No	No	No	No	No	No	Yes	None
Tyler	Tyler Municipal	63Y	No	No	No	No	No	No	No	No	County transit bus connecting off-site
Wadena	Wadena Municipal	ADC	No	No	No	Yes	Yes	Yes	No	Yes	None
Walker	Walker Municipal	Y49		No	No	No	No	No	No	Yes	None
Warren	Warren Municipal	D37	No	No	No	No	No	No	No	No	Sheriff provides transport for users
Warroad	Warroad International (Swede Carlson Field)	RRT	No	No	No	No	No	No	Yes	Yes	None

Associated City	Airport Name	FAA ID	Bus 39	Taxi	On-Site Rental Car	Off-Site Rental Car	TNC	Shuttle	Bike or Pedestrian Path	Courtesy Car	Other
Waseca	Waseca Municipal	ACQ	No	No	No	No	No	No	No	No	None
Waskish	Waskish Municipal	VWU	No	No	No	No	No	Yes	No	No	None
Wells	Wells Municipal	68Y	No	No	No	No	No	No	No	No	Wells Aviation FBO provides rides into town as necessary
Wheaton	Wheaton Municipal	ETH	No	No	No	No	No	No	No	No	None
Willmar	Willmar Municipal	BDH	No	Yes	No	Yes	No	No	No	Yes	FBO gives rides
Windom	Windom Municipal	MWM	No	No	No	No	Yes	Yes	No	Yes	None
Winona	Winona Municipal (Max Conrad Field)	ONA	No	Yes	No	Yes	Yes	No	No	No	None
Winsted	Winsted Municipal	10D	No	No	No	No	No	No	No	No	None
Worthington	Worthington Municipal	OTG	No	Yes	No	Yes	No	No	No	Yes	FBO allows use of personal vehicle as needed

Source: MnSASP Inventory, 2020

Sample Courtesy Car Trip Agreements

Figure 14 and Figure 15 present sample courtesy car trip agreements used at two GA airports.

Figure 14. Alexandria Municipal Airport (AXN) Courtesy Car Agreement

Courtesy Car Sign-Out Agreement

Vehicle #1 - Green 2000 Buick LeSabre ________

Vehicle #2 - Red Ford Pick-up Truck ________

(Circle one and initial)

The undersigned hereby agrees to return the above-mentioned vehicle in the same condition as when checked out. There will be NO SMOKING in the vehicle. If an incident or mechanical problem does occur, the undersigned agrees to notify Alexandria Aviation, Inc. as soon as possible at (320)-762-2111. The undersigned also agrees to have said vehicle returned to Alexandria Aviation, Inc. within the specified time limitations, unless otherwise notification has been made and approved.

The undersigned is responsible for the insurance while this vehicle is in his/her possession. By signing this agreement you are hereby holding Alexandria Aviation, Inc. harmless from any accident that may occur while using this and will indemnify Alexandria Aviation, Inc. for any expense, which may incur as a result of an incident.

Drivers Signature Date Print Name

Phone Number ________________

Time Out ________ Time Due Back ________

Aircraft Tail # ________

Drivers license # ________________

Please Limit Use to 2 Hours
Thank You!

Source: ACRP Synthesis 111, 2020

Figure 15. Livingston County Spencer J. Hardy Airport Courtesy Car Use Agreement

Livingston County Spencer J. Hardy Airport
Courtesy Car Use Agreement

The Livingston County Spencer J. Hardy Airport provides an Airport Courtesy Vehicle for use by visiting pilots. In consideration for the use of the vehicle, the Driver agrees to the following Terms and Conditions:

1. Drivers. Only people who have signed this or a similar agreement may operate the Vehicle. The Driver, by his/her signature below, presents that he/she possesses a valid driver's license not subject to any restrictions or suspensions.

2. Use of Vehicle. At no time shall there be more than five (5) people in the vehicle. At no time shall the vehicle be further than thirty (30) miles from the Livingston County Spencer J. Hardy Airport unless prior arrangements have been made with the Airport Manager. At no time while the Vehicle is in the Driver's possession, shall the Driver consume any alcoholic beverages or illegal drugs.

3. Return of Vehicle. The vehicle shall be returned to the Livingston County Spencer J. Hardy Airport within three (3) hours unless another time is specifically indicated, or upon any demand for return by the Airport.

4. Signature. By his/her signature below, the Driver agrees he/she is responsible for any and all injury to any person or damage to any property arising from the use of the Vehicle, regardless of fault. This includes responsibility for damage to the vehicle arising from, but not limited to, collision, theft, vandalism, towing, and/or storage charges. To the extent allowed by the Driver's insurance policy, the Driver waives any rights of subrogation against the County for loss or injury or damage arising from use of the Vehicle.

   If someone other than the undersigned Driver is driving the vehicle, the undersigned Driver is responsible for all acts, including damages, that involve the vehicle.

5. Gasoline and Maintenance. The Driver is responsible to fill the fuel tank upon return of the Vehicle. Donations to the vehicle maintenance funds are welcome, as there are no rental or mileage charges for the use of the Vehicle. The Driver agrees to be responsible for all fines, court costs, and recovery expenses for parking, traffic and other violations.

6. Insurance. All parties operating the Vehicle shall have valid automobile insurance coverage for any and all use of the vehicle while it is entrusted to them, and that the Driver currently maintains a personal policy, with limits not less than $100,000 per occurrence combined single limit.

7. Hold Harmless and Indemnification. The Driver agrees to hold Livingston County (including its elected and appointed officials, employees and agents) harmless and indemnify it from any and all claims, liability, and/or expenses, including attorney's fees, arising out of the use of the Vehicle, while it is entrusted to Driver.

Source: ACRP Synthesis 111, 2020

8. Changes. No change or modification to this agreement may be made except in writing and signed by the Airport Manager or designee.

9. Condition of Vehicle. Livingston County and the Livingston County Spencer J. Hardy Airport do not guarantee the condition of the vehicle. In the event of breakdown, the County has no obligation to provide an alternative vehicle or alternative transportation. Prior to taking control of the vehicle, the vehicle is to be inspected by the Driver and all damages noted.

CAUTION: I ACKNOWLEDGE THAT I MUST PROVIDE THE PRIMARY INSURANCE COVERAGE IN THE EVENT OF DAMAGE TO THE VEHICLE OR OTHER PROPERTY WHILE THE VEHICLE IS ENTRUSTED TO ME. ANY INSURANCE MAINTAINED BY THE COUNTY OF LIVINGSTON AND THE LIVINGSTON COUNTY SPENCER J. HARDY AIRPORT SHALL BE SECONDARY TO MY COVERAGE.

Signature ______________________ Date ________

Printed Name ______________________

Address ______________________

Driver's License # ______________________

State ________ Date of Expiration ________

Cell Phone # ______________________

Insurance Carrier ______________________

Insurance Agency / Policy # ______________________

Livingston County Spencer J. Hardy Airport:

____
By

Source: ACRP Synthesis 111, 2020

DEPARTMENT OF
TRANSPORTATION

For more information about the MnSASP, please visit the MnSASP Hub at **https://mnsasp-mndot.hub.arcgis.com/**.
The MnSASP Hub includes the full 2022 MnSASP Technical Report detailing all components of the plan.