AGENDA ITEM: 11

TRUCKEE TAHOE AIRPORT DISTRICT

BOARD OF DIRECTOR STAFF REPORT

AGENDA TITLE: **Review and Approval of the 2021 Update to the District Pavement Maintenance/Management Plan (PMMP)**

MEETING DATE: **December 1, 2021**

PREPARED BY: **Kevin Smith, General Manager**

RECOMMENDATION: Review and approve the 2021 update to the District Pavement Maintenance and Management Plan.

BACKGROUND: As part of our regular airport maintenance and management program, the District keeps and maintains various maintenance and management plans. These include the Facilities Maintenance Plan, the Land Management Plan, and the Pavement Maintenance /Management plan (PMMP). The PMMP was last updated in 2014. As the condition of pavement changes (sometimes rapidly), it is vital to update this plan every 5 to 7 years. The FAA asks that airports who receive federal funds update their plans on a regular basis to be eligible for Federal Airport Improvement Program (AIP) grants. The District receives these funds annually.

At the August 10, 2021 and September 22, 2021 Board of Directors meeting the Board considered the updated and revised pavement maintenance plan. The Board requested additional information at that meeting, specifically current pavement conditions and their associated strength and load bearing to ascertain what the goals and program planning metrics should be for their future pavement maintenance and reconstruction. Answers to these questions were provided in the Memo from Brandley Engineering in Attachment 1 to this staff report and were reviewed at the September 22, 2021 Board Meeting.

POLICY INSTRUCTION ESTABLISHING A STRICTER LOAD BEARING STANDARD: After review of the Brandley Memo the Board directed staff, based on a staff recommendation, to research and consider a policy instruction establishing a stricter load bearing standard, restricting Maximum

Take Off Weight (MTOW) to 50,000 pounds single wheel and 80,000 dual wheel (50/80) for runway 11/29 and 35,000 pounds single wheel and 50,000 dual wheel for runway 2/20.

Recommendation on possible MTOW Policy Instruction: Based on staff research and engineering reviews, staff does not see a viable path forward for an MTOW based weight restriction. Our analysis is based on how much the remaining life of the east end of 11-29 is affected by allowing aircraft >80,000 lbs to use it. The data below is based on allowing operations of an aircraft that has an actual operating weight of 96,000 lbs. As is illustrated in the information below and based on current and future projected aircraft usage, current runway conditions do not warrant or permit a usage restriction that would have any measurable effect. 96,000 lbs. as it is slightly below the MTOW of some of the bigger Global Express or G650 sized aircraft. Staff and District Engineer feels this provides a good baseline for this analysis. Runway 11-29 (East) – Weakest portion of the runway, anticipated to fail before the western portion that was reconstructed in 2012.

With this in mind, the following is the useful life of Runway 11-29 with the PMMP forecast traffic mix[1] with the additional operations of 96,000 lb. aircraft as follows:

- PMMP Forecast Traffic (max. aircraft actual operating weight at 80,000 lbs): Remaining Life = 11 years
- PMMP Forecast Traffic + 13 annual ops of 96,000 lbs actual operating weight aircraft): Remaining Life = 11 years
- PMMP Forecast Traffic + 130 annual ops of 96,000 lbs actual operating weight aircraft): Remaining Life = 10 years
- PMMP Forecast Traffic + 215 annual ops of 96,000 lbs actual operating weight aircraft): Remaining Life = 9 years
- PMMP Forecast Traffic + 322 annual ops of 96,000 lbs actual operating weight aircraft): Remaining Life = 8 years
- PMMP Forecast Traffic + 448 annual ops of 96,000 lbs actual operating weight aircraft): Remaining Life = 7 years
- PMMP Forecast Traffic + 637 annual ops of 96,000 lbs actual operating weight aircraft): Remaining Life = 6 years

Based on this data, the District will lose about 1 year of structural life of the pavement section for every 100 to 120 annual operations of an aircraft that is loaded at 96,000 lbs on dual gear. 120 is an average of the increase of annual ops in the above table. The change is not linear as the Brandley Fatigue Analysis model has logarithmic functions that determine the remaining life of the pavement structure.

This analysis demonstrates that any policy we adopt to establishing a stricter load bearing standard will not materially affect the useful like of the runway. In order to enact a stricter load bearing standard, it is necessary to have a solid engineering analysis that shows that higher

[1] The PMMP Forecast Traffic Mix can be found on page 2-10, Table No. 2-2. A textual description of this Traffic Forecast Table with additional explanation of the Forecast Traffic can be found on page 2-5.

loadings than the proposed limits would be detrimental to the pavements. In this case, the engineering analysis shows a decrease in life if heavier aircraft operate, but not a significant reduction in life, and the life is only reduced if the airport has operations of aircraft that are heavier than the current fleet mix and forecast. It is important to note that FAA has plans to reconstruct the eastern portion of Runway 11/29 in 2029. With this in mind and considering the data above, a weight-based restriction will not achieve a meaningful outcome of preserving pavement life.

CONTROLLING FACTORS REGARDING AIRCRAFT SIZE: It is important to note that while runway load bearing is a consideration regarding the size of aircraft that use the Truckee Tahoe Airport, it is not the determining factor. The Airport Reference Code (ARC) and Runway Design Code (RDC) are the biggest factors that determine the size and type of aircraft that use the airport. The Truckee Tahoe Airport is currently a B-II classified airport (ARC). This classification is established by our Master Plan and Airport Layout Plan. This ARC and RDC maintains design standards based on aircraft with a wingspan of 49-78 feet with an approach speed of 91 to 120 knots. This does not limit the size of aircraft that can use the airport, if a larger aircraft can safely operate at the airport, it is allowed to. Typically, aircraft larger than the ARC and RDC will not choose to operate at an airport that is designed for a smaller ARC, but there is not a set rule against these operations. The FAA does require us to allow various aircraft per year that are larger than this standard based on Grant Assurance commitments. This is illustrated in the information above in the Load Bearing Standard and it should be noted that some operations of larger aircraft will not significantly affect the pavement remaining life. It is important to consider that the Pavement Maintenance Plan is not the governing or determining document over RDC and ARC. The District Master Plan, specifically the Airport Layout Plan establishes this standard. The District B-II classification can be reviewed in the upcoming District Master Plan update in Winter and Spring of 2022. The PMMP is a guiding tool for the District's use to properly maintain their pavements in a good, safe condition and should be utilized along with the Master Plan / Airport Layout Plan. The PMMP does not establish the minimum pavement design thicknesses and bearing capacity standards for pavement design. The minimum design and construction standards for FAA funded projects are established in AC 150/5320-6 (See Brandley Engineering Memo, 9/16/21, Item 2e for further explanation of FAA minimum pavement design standards for federally funded projects).

OVERVIEW AND REVIEW OF PMMP DOCUMENT: Having considered all of the above Staff, is hopeful the Board will accept the proposed PMMP allowing staff to implement it as a planning tool. As a planning tool, no specific projects are approved. Each year staff will submit projects as part of the annual budget process for Board consideration and approval.

This PMMP is a full update to our previous 2014 Plan. This is a valuable tool used by staff frequently to plan ahead for pavement projects, apply for FAA grant funding, build our 5-year FAA Airport Capital Improvement Program, and use for our annual budgeting process. The Plan contains 5 Chapters, each with important information. As it is a somewhat large document,

please see the following guide to highlight these chapter as well as important sections to review:

Chapter 1 - Introduction. Pages 1-1 to 1-2.

Chapter 2 – Data Collection. This provides background on what data was collected and how it was collected. Additionally, there is some forecasting in this section too. It is approximately 10 pages long and a bit technical but gives a good background. An important summary of this info is found in Plates 2-1, 2-2, 2-3 at the end of this section. (plate numbers are in the bottom left-hand corner of the larger fold out maps within the plan) These maps give an indication of the overall condition of our pavements over time between 2011 and 2020. The first plate is 2011 and the last is 2020. The PMMP uses an index called PCI or Pavement Condition Index which is a scale between 1 and 100. 1 is the poorest condition of pavement with 100 being brand new pavement. Plate 2-3 is our current condition. The areas that are "Fair" to "Poor" on that Plate are now under construction or will be paved within the next few years.

Chapter 3 – Pavement Classification Numbers (PCN). This chapter goes into detail regarding PCN. This chapter is a required analysis to be included in FAA funded pavement maintenance plans. The calculations it includes are provided per FAA Advisory Circular 150/5335-5C. As this plan is self-funded by the District it is not required to be included in this plan.

Chapter 4 – Analysis and Evaluation. This section contains more detail on how Brandley Engineering analyzed our pavements and the methodology they used to forecast remaining life of pavement. Page 4-10 to 4-11 are interesting in that they give average cost per sq. foot to rehabilitate pavements. That then creates a rehabilitation Code which is used to assess cost on a pavement rehabilitation project. Plates 4-1 and 4-2 are interesting in that they show the remaining pavement life related to deep seated distress between our regular forecast of traffic vs. an enhanced forecast which forecasted higher use of aircraft over 40,000 lbs. The 'enhanced' traffic analysis is provided to give the District an idea of how the pavement life would be affected if higher volumes of the heavier aircraft in the current fleet mix operated at the airport. The District is not planning to modify or change to the enhanced forecast but recognizes this is a typical comparison in PMMPs to give perspective on remaining pavement life.

Chapter 5 – Conclusions and Rehabilitation Plan and Schedule. Section 5-1 is a good overview of this chapter. It reviews the various rehabilitation techniques and recommendations of projects we need to do to keep our PCI index at an appropriate level. Typically, we want to keep our pavements above a 60 PCI. Section 5-3 (page 5-10) starts the Recommended Rehab Schedule. That is a valuable section of Chapter 5 to review. Pages 5-14 to 5-17 are of high importance for review to gain understanding of recommendations of the PMMP. These pages contain the schedule and proposed costs

to maintain our pavements projecting out to 2040. This information is then depicted graphically starting on Plates 5-3 to Plate 5-7. Staff use these Plates frequently.

FISCAL IMPACT: Cost to implement this plan vary from less than $200,000 to approximately $5,000,000 depending on the year and project. It is important to note that the majority of these projects will be eligible to be funded by the FAA's Federal AIP program. The PMMP cost $90,000 which was funding in Fiscal year 2020 and 2021.

MOTION: I move to accept the 2021 District Pavement Maintenance and Management Plan as provided and recommended by Staff.

Note: The Board should accept the plan rather than approve. Each year the Board and staff use the PMMP to create our annual Airport Capital Improvement Program which is submitted to the FAA. The Board will annually have an opportunity to approve projects as found in the plan.

ATTACHMENTS:

2021 Pavement Maintenance/Management Plan

Memo from Brandley Engineering