

MULINO STATE AIRPORT

This report describes how your Pavement Maintenance Management Program (PMMP) was developed. Your Program was developed as part of the Oregon Continuous Aviation System Plan sponsored in part by the Oregon Department of Aviation and the Federal Aviation Administration (FAA). The information and data contained in this report ensures you comply with the requirements of FAA Grant Assurance Number 11 which states that any airport requesting federal funds for pavement improvement projects must have implemented a pavement maintenance management program.

DATA COLLECTION

To determine how your pavements were constructed and their age, a records review was conducted. Figure MU-1 shows the records review results. This figure identifies pavement boundaries, dimensions, pavement layer types, thicknesses and dates of construction. The most recent construction date for each pavement can also be found in the Section Condition Report in Appendix 2. Figure MU-1 and the information contained in Appendices 1, 2 and 4 ensure that your airport complies with the “pavement inventory” requirement of FAA’s PMMP guidelines.

The pavements at your airport were divided into branches, sections and sample units in accordance with the methodology outlined in the current edition of ASTM D5430, *Standard Test Method for Airport Condition Index Surveys*. The branches, sections and sample units established at your airport are shown in Figure MU-2. A Branch Condition Report showing all branches, their associated areas, and their area-weighted average condition is provided in Appendix 1. Additionally, the Appendix 2 Section Condition Report provides information used to define each branch and section in the PAVER database.

Using the branch, section and sample unit divisions established, a visual condition survey was conducted at Mulino State Airport in May 2018. During the inspection, pavement defects were identified and measured in accordance with the methodology outlined in ASTM D5430. This inspection ensures your airport complies with the “detailed inspection” requirement of FAA’s PMMP guidelines. After collection, the data were entered into the PAVER software for analysis. These data are reproduced in the Re-Inspection Report attached as Appendix 4.

The PAVER database updated during this project ensures your airport complies with the “record keeping and information retrieval” requirements of FAA’s PMMP guidelines.

Figure MU-1. Airport Layout, Dimensions and Pavement Cross-Sections.
Mulino State Airport

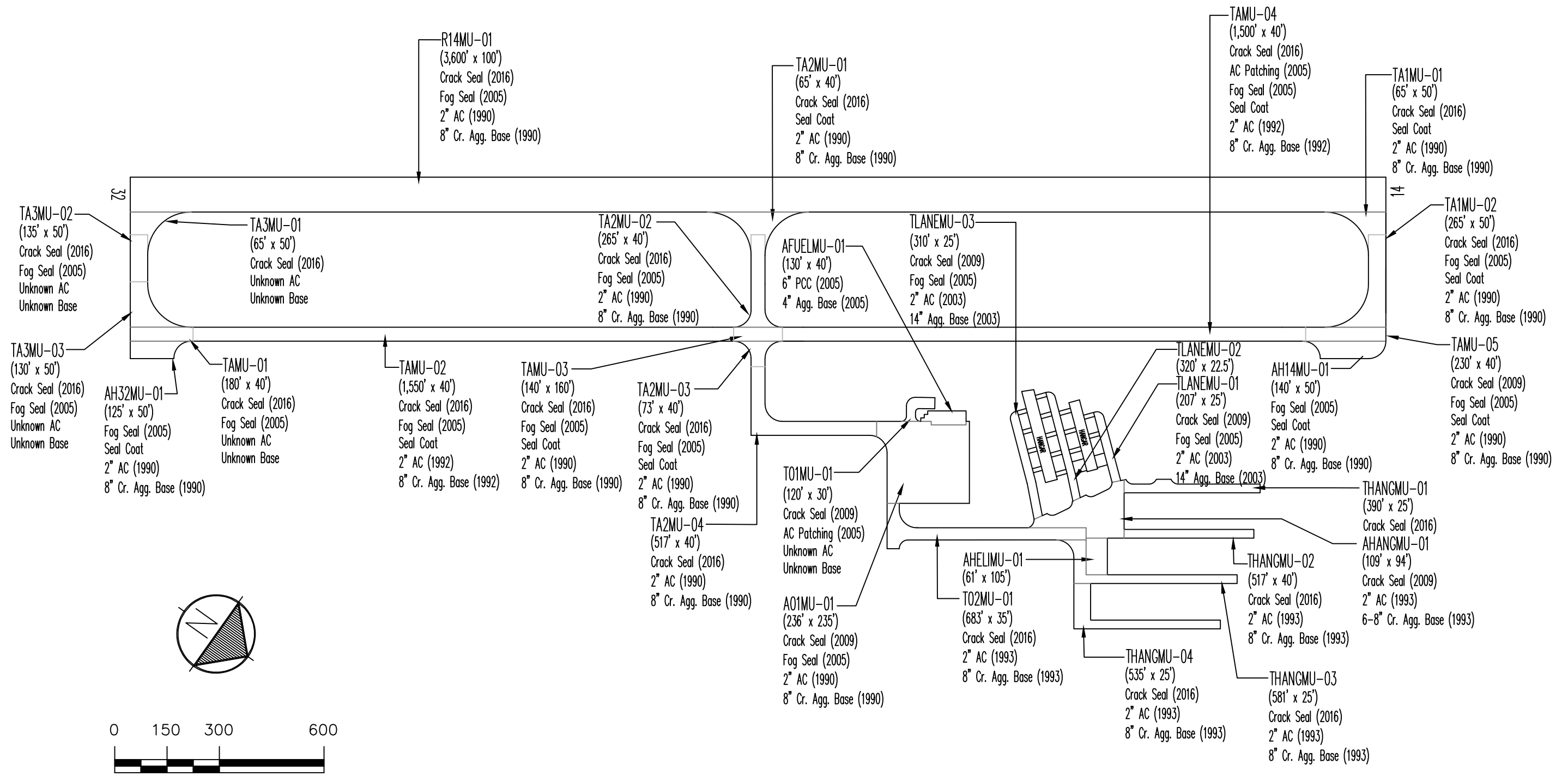
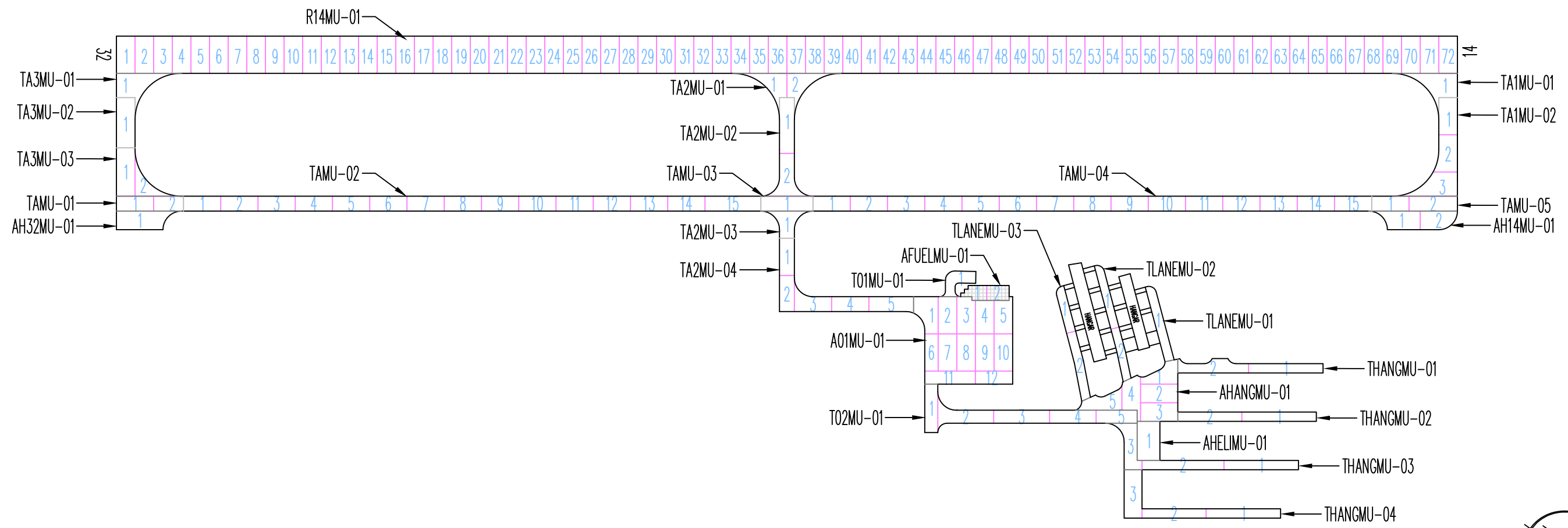


Figure MU-2. Pavement Branch, Section and Sample Unit Layout.
 Mulino State Airport



RESULTS

Using the data collected during the visual inspection, the PAVER software was used to calculate an area-weighted average Pavement Condition Index (PCI) for each pavement section inspected using the sample units evaluated. Using each section’s PCI, a Pavement Condition Rating (PCR) was assigned. The PCIs measured during this inspection are shown in Table 1. The table also contains PCIs from past inspections as well as projected PCIs for 2023 and 2028. The projections were based on pavement deterioration models developed by PAVER using the inspection data from other pavements in the same airport category as your airport, located in the same climatic region, and with the same surface type and use.

The Branch Condition Report in Appendix 1 summarizes current pavement condition by branch while the Section Condition Report in Appendix 2 lists pavement condition by section. The current Pavement Condition Rating (PCR) is shown graphically in Figure MU-3.

Table 1. Past, Present and Future Pavement Condition Indices.

Branch	Section	Inspections			Forecast	
		2012	2015	2018	2023	2028
A01MU	01	90	88	67	60	54
AFUELMU	01	100	100	100	100	99
AH14MU	01	99	98	98	90	85
AH32MU	01	100	100	100	91	86
AHANGMU	01	95	79	76	71	64
AHELIMU	01	86	77	78	73	67
R14MU	01	83	86	84	79	68
T01MU	01	79	78	66	52	34
T02MU	01	84	83	87	83	82
TA1MU	01	94	81	94	87	83
TA1MU	02	91	92	84	82	82
TA2MU	01	94	83	90	85	83
TA2MU	02	100	88	95	88	84
TA2MU	03	93	90	89	84	82
TA2MU	04	86	95	84	82	82
TA3MU	01	95	83	95	88	84
TA3MU	02	88	93	92	86	83
TA3MU	03	95	91	95	88	84
TAMU	01	91	89	91	85	83
TAMU	02	70	79	74	64	49
TAMU	03	87	89	90	85	83
TAMU	04	79	82	73	62	47
TAMU	05	91	88	82	81	76
THANGMU	01	89	83	80	75	65

Table 1. Past, Present and Future Pavement Condition Indices.

Branch	Section	Inspections			Forecast	
		2012	2015	2018	2023	2028
THANGMU	02	82	81	74	64	49
THANGMU	03	80	82	78	71	59
THANGMU	04	79	77	79	73	62
TLANEMU	01	90	77	75	65	51
TLANEMU	02	88	75	75	65	51
TLANEMU	03	88	76	79	73	62

Section PCIs at Mulino State Airport range from a low of 66 (a PCR of “Fair”) to a high of 100 (a PCR of “Good”). The area-weighted average PCI for all airport pavements is 81, corresponding to an overall PCR of “Satisfactory”. Figure MU-4 shows how much pavement area is associated with each Pavement Condition Rating category and also shows pavement condition distribution from the inspections conducted in 2012 and 2015.

The primary distress observed during the inspection was longitudinal and transverse cracking with isolated occurrences of raveling and patching.

A graphical representation of the projected PCIs listed in Table 1 is shown in Figure MU-5.

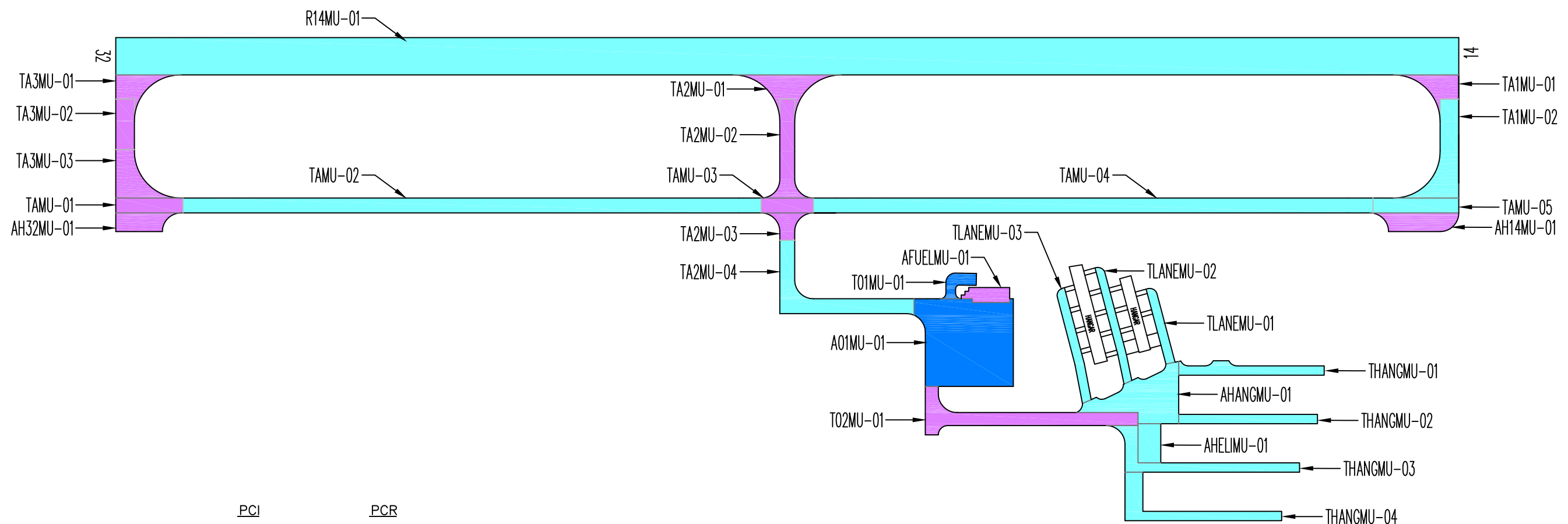
RECOMMENDATIONS

Data collected during the visual condition survey were used by the PAVER software to generate the Network Maintenance Report contained in Appendix 3. This report identifies, for each pavement section, the recommended localized maintenance activities (i.e.-crack sealing, patching) that should be completed to repair the defects observed during the visual inspection. The repair quantities identified in the report were extrapolated to cover the entire pavement section, based on the distresses measured in the inspected sample units. If the repair activities identified are completed, the pavement deterioration rate will be slowed.

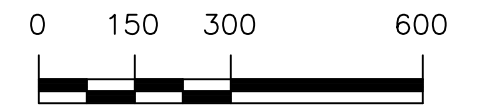
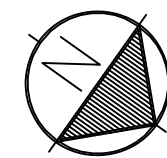
The recommended localized maintenance activities to be applied are selected by the PAVER software based on a Distress Maintenance Policy established for the Oregon airport system. The report results indicate that, over your entire airport, the following quantities of localized maintenance are needed:

- 20,296 linear feet of asphalt concrete crack sealing
- 4 linear feet of asphalt concrete wide crack sealing/repair.

Figure MU-3. Pavement Condition in May 2018.
Mulino State Airport

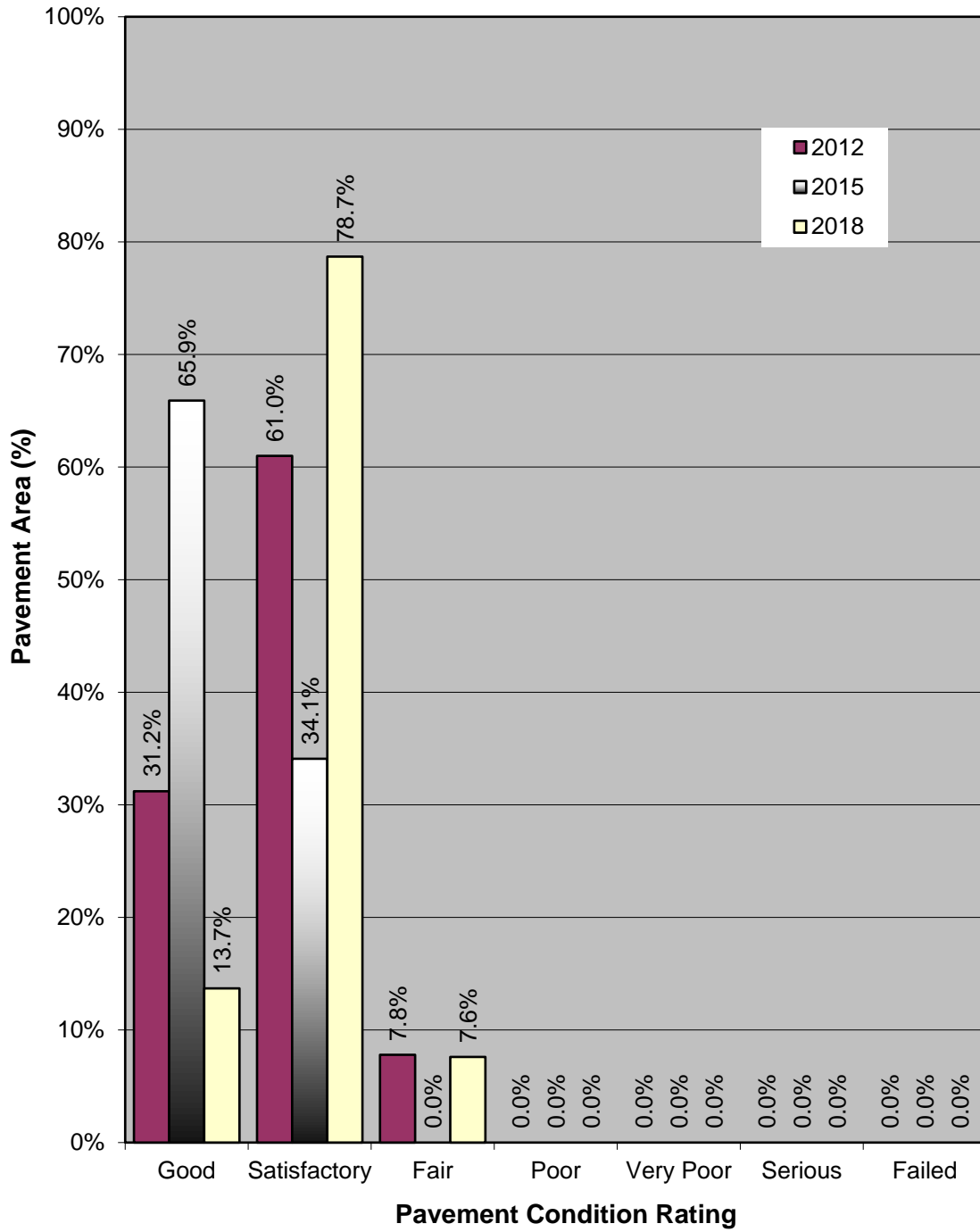


PCI	PCR
100	GOOD
85	SATISFACTORY
70	FAIR
55	POOR
40	VERY POOR
25	SERIOUS
10	FAILED
0	

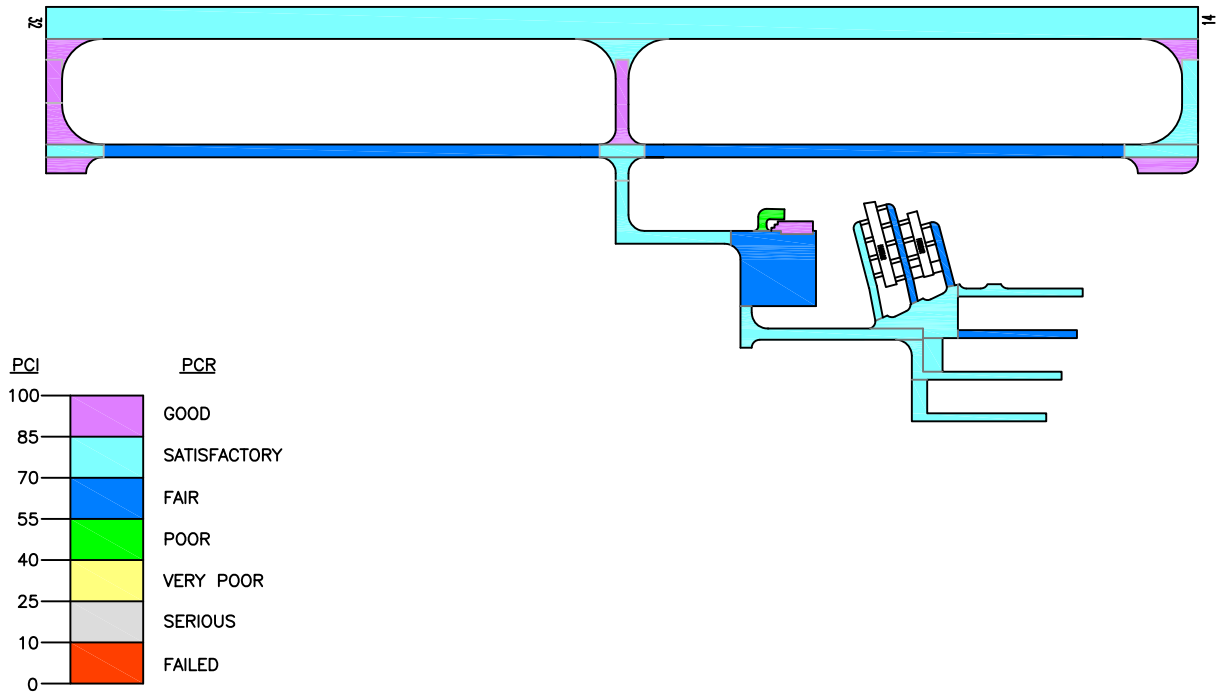


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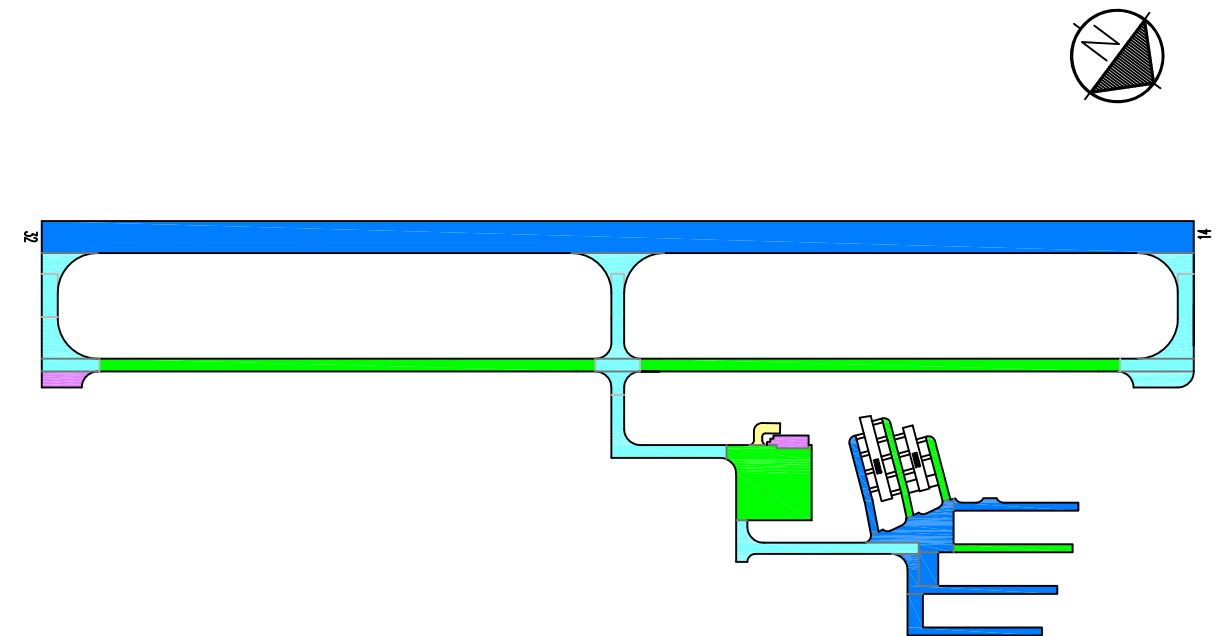
**Figure MU-4. Pavement Condition Distribution
Mulino State Airport**



Predicted Condition in 2023.



Predicted Condition in 2028.



Drawing Date: September 2018

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Figure MU-5. Future Pavement Condition.

The PAVER software can also identify and schedule recommended global (applied over an entire section) maintenance activities such as fog seals, slurry seals and other surface treatments, as well as major rehabilitation activities such as asphalt concrete overlays and complete reconstruction. PAVER schedules global maintenance on a user-defined interval. To schedule major rehabilitation PAVER uses pavement deterioration models developed during this project. These models are used to estimate future pavement condition and to schedule rehabilitation based on a trigger PCI.

During this project a 5-year program outlining recommended global maintenance and rehabilitation was developed. The program begins in the year 2019 to allow time for project development. These recommendations are presented in Table 2, which identifies the pavement section requiring rehabilitation, the year the action should be completed, the type of action, and an associated cost. This information is also presented graphically in Figure MU-6.

Table 2. Five-Year Global Maintenance and Rehabilitation Plan.

Year	Branch	Section	Action	Area (sf)	Unit Cost (\$/sf)	Total Cost (\$)
2019	A01MU	01	Slurry Seal	57,169	\$0.31	\$17,722
2019	AHANGMU	01	Slurry Seal	23,231	\$0.31	\$7,202
2019	AHELIMU	01	Slurry Seal	6,405	\$0.31	\$1,986
2019	R14MU	01	Slurry Seal	360,000	\$0.31	\$111,600
2019	T01MU	01	Slurry Seal	3,555	\$0.31	\$1,102
2019	T02MU	01	Slurry Seal	23,936	\$0.31	\$7,420
2019	TA1MU	02	Slurry Seal	16,603	\$0.31	\$5,147
2019	TA2MU	01	Slurry Seal	9,306	\$0.31	\$2,885
2019	TA2MU	03	Slurry Seal	3,993	\$0.31	\$1,238
2019	TA2MU	04	Slurry Seal	21,244	\$0.31	\$6,586
2019	TAMU	01	Slurry Seal	7,200	\$0.31	\$2,232
2019	TAMU	02	Slurry Seal	62,000	\$0.31	\$19,220
2019	TAMU	03	Slurry Seal	5,600	\$0.31	\$1,736
2019	TAMU	04	Slurry Seal	60,000	\$0.31	\$18,600
2019	TAMU	05	Slurry Seal	9,200	\$0.31	\$2,852
2019	THANGMU	01	Slurry Seal	10,638	\$0.31	\$3,298
2019	THANGMU	02	Slurry Seal	9,300	\$0.31	\$2,883
2019	THANGMU	03	Slurry Seal	15,735	\$0.31	\$4,878
2019	THANGMU	04	Slurry Seal	15,540	\$0.31	\$4,817
2019	TLANEMU	01	Slurry Seal	5,117	\$0.31	\$1,586
2019	TLANEMU	02	Slurry Seal	7,100	\$0.31	\$2,201
2019	TLANEMU	03	Slurry Seal	7,683	\$0.31	\$2,382
2019 Total						\$229,572

Table 2. Five-Year Global Maintenance and Rehabilitation Plan.

Year	Branch	Section	Action	Area (sf)	Unit Cost (\$/sf)	Total Cost (\$)
2022	AH14MU	01	Slurry Seal	9,405	\$0.31	\$2,916
2022	TA1MU	01	Slurry Seal	6,603	\$0.31	\$2,047
2022	TA2MU	02	Slurry Seal	8,720	\$0.31	\$2,703
2022	TA3MU	01	Slurry Seal	6,517	\$0.31	\$2,020
2022	TA3MU	02	Slurry Seal	6,750	\$0.31	\$2,093
2022	TA3MU	03	Slurry Seal	9,868	\$0.31	\$3,059
2022 Total						\$14,838
5-Year Total						\$244,410

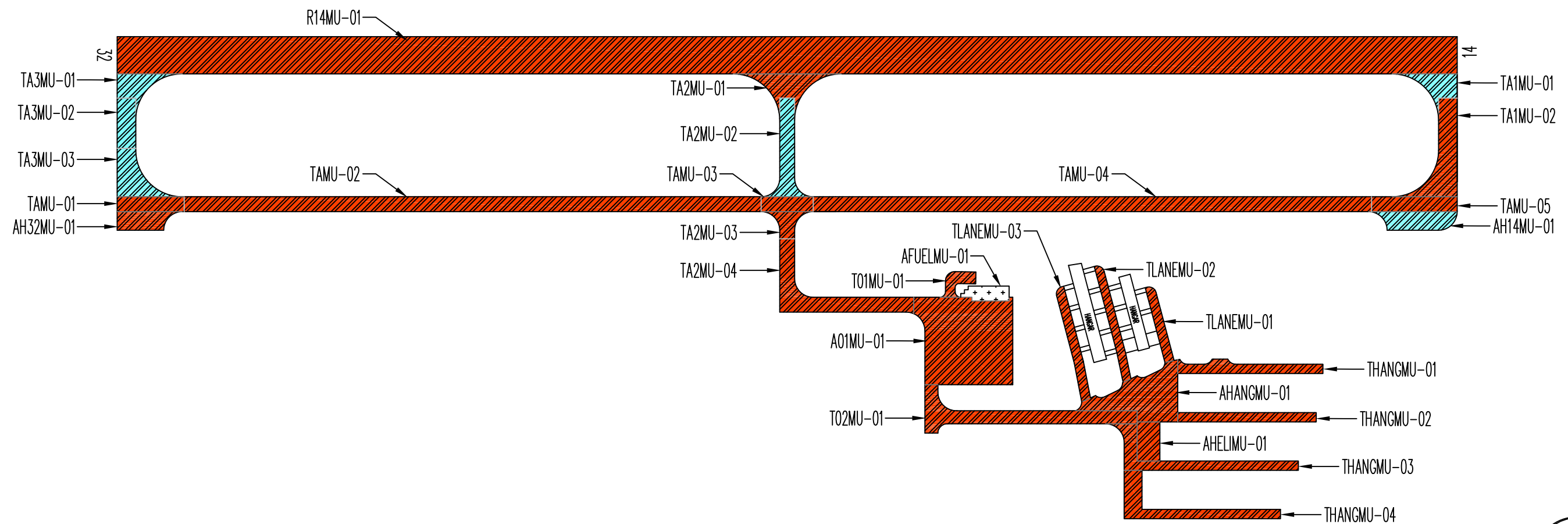
If the global maintenance and/or rehabilitation activities recommended in Table 2 are not completed, the localized maintenance activities identified in the Network Maintenance Report (Appendix 3) for that section should be done. Additionally, for those sections not listed in Table 2 as requiring global maintenance or rehabilitation, the localized maintenance activities outlined in the Network Maintenance Report should be completed. By completing the localized maintenance activities, pavement condition is improved, life is extended, deterioration is slowed and the length of time until major repair or rehabilitation is required is increased.

INSPECTION SCHEDULE

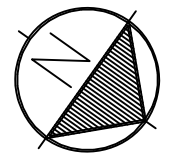
To comply with the inspection schedule requirement of FAA Grant Assurance Number 11, a detailed visual inspection should be conducted every 3 years using the methodology described in ASTM D5430. The next scheduled detailed visual inspection should take place in 2021.

In addition, the FAA requires that a drive-by inspection be conducted monthly to detect unforeseen changes in pavement condition. The results of each drive-by inspection should be recorded and kept in a file. At a minimum, the date of the inspection and an indication of any maintenance performed since the last drive-by inspection should be recorded.

Figure MU-6. Five-Year Pavement Management Plan.
Mulino State Airport



ACTION TIMING		ACTION	
	2019		FOG SEAL
	2020		SLURRY SEAL
	2021		OVERLAY
	2022		RECONSTRUCT
	2023		ROUTINE MAINTENANCE



Drawing Date: September 2018