

# PORTLAND TROUTDALE 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. Figures TR-1A and TR-1B show the records review results. These figures identify 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. Figures TR-1A and TR-1B 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 TR-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 Portland Troutdale Airport in July 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 TR-1A. Airport Layout, Dimensions and Pavement Cross-Sections - Aprons.  
Portland Troutdale Airport

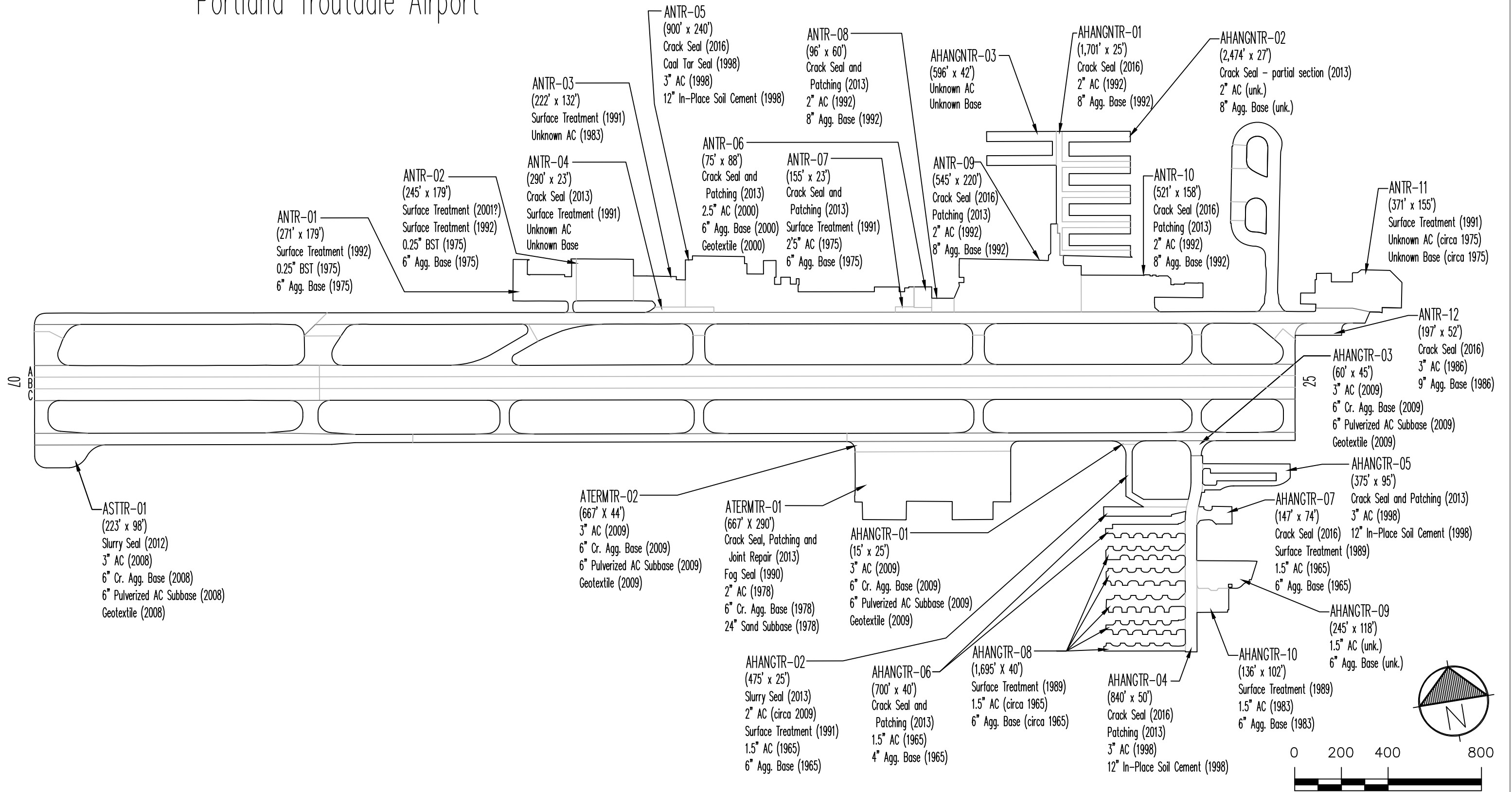
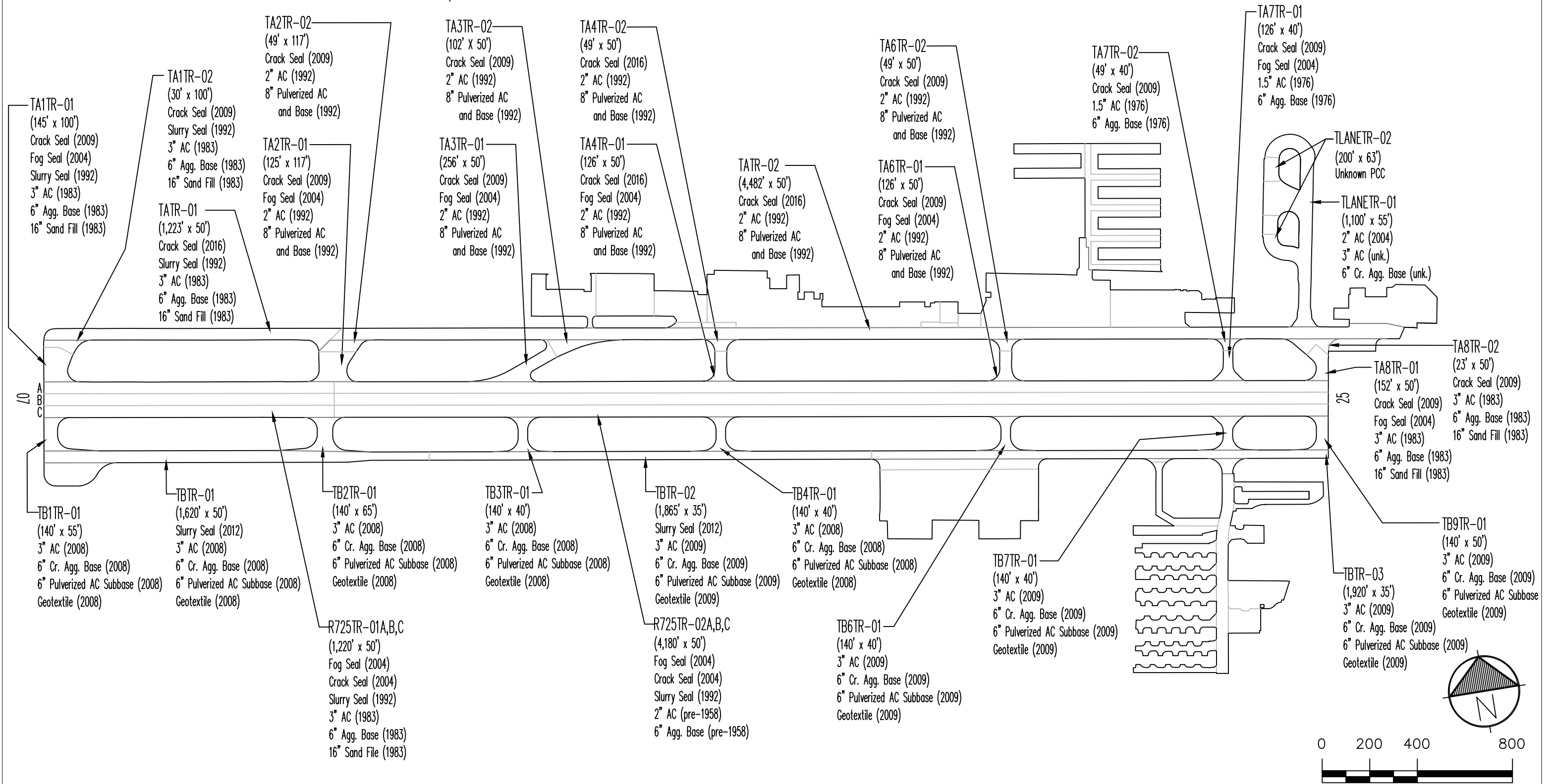
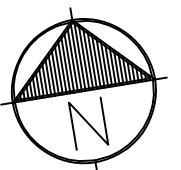
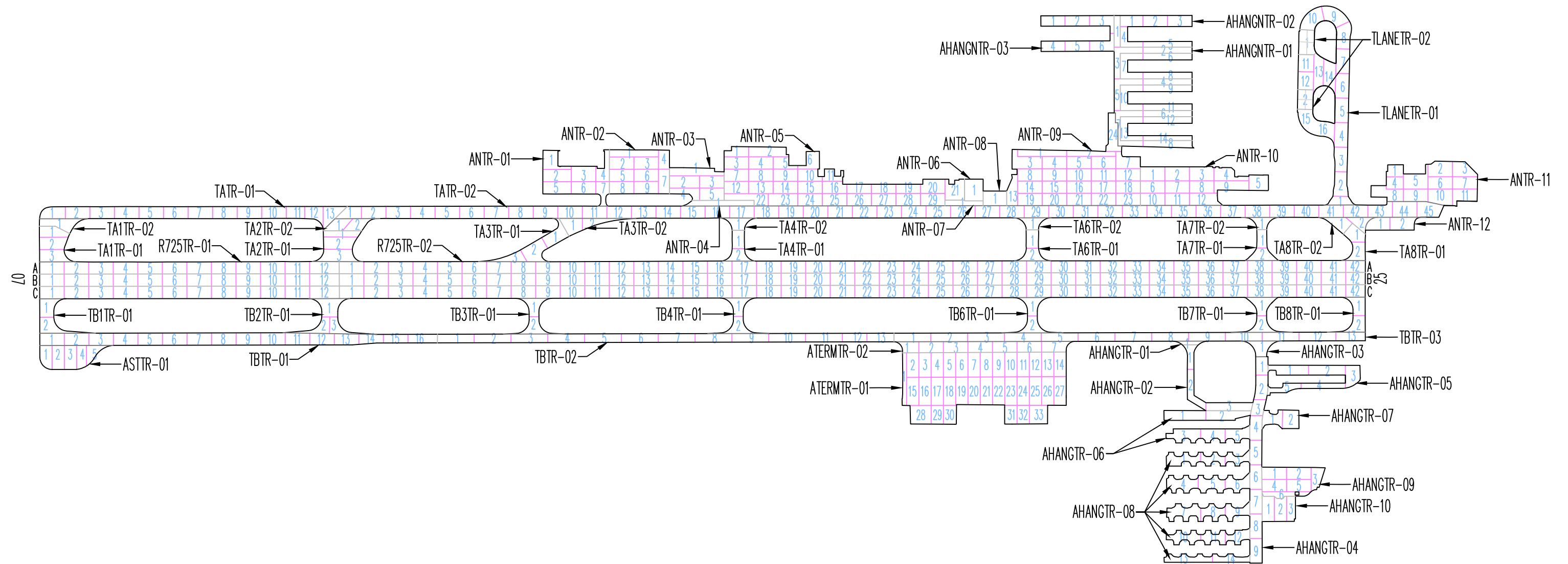


Figure TR-1B. Airport Layout, Dimensions and Pavement Cross-Sections – Runway and Taxiways.  
Portland Troutdale Airport



Drawing Date: September 2018

Figure TR-2. Pavement Branch, Section and Sample Unit Layout.  
Portland Troutdale 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 TR-3.

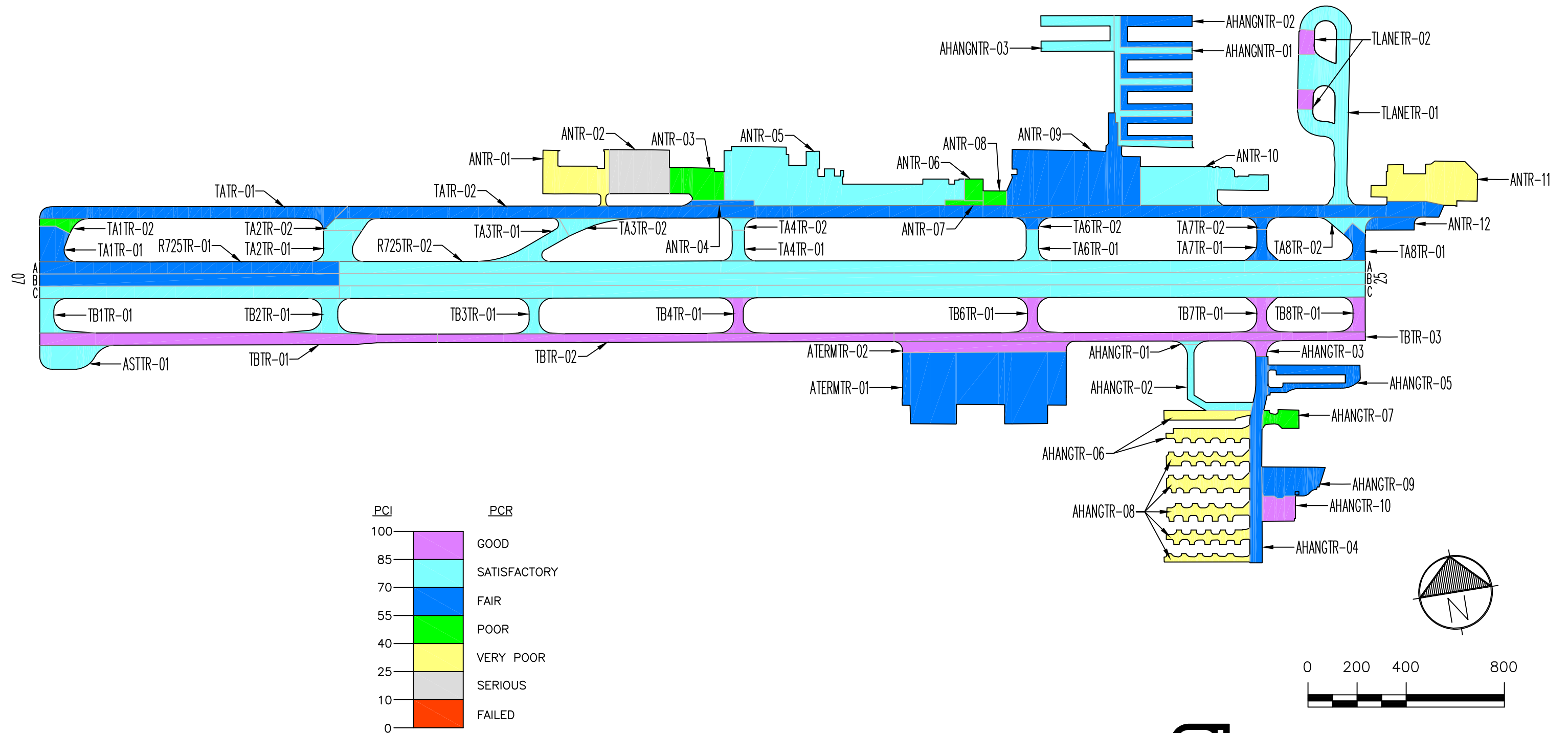
**Table 1. Past, Present and Future Pavement Condition Indices.**

Branch	Section	Inspections			Forecast	
		2012	2015	2018	2023	2028
AHANGNTR	01	93	86	80	76	72
AHANGNTR	02	66	50	60	54	49
AHANGNTR	03	95	94	84	78	74
AHANGTR	01	94	76	71	67	62
AHANGTR	02	100	97	83	77	74
AHANGTR	03	100	100	94	83	77
AHANGTR	04	77	75	70	66	60
AHANGTR	05	74	75	62	56	51
AHANGTR	06	54	46	34	22	3
AHANGTR	07	64	53	47	44	41
AHANGTR	08	46	50	32	18	0
AHANGTR	09	69	59	65	60	54
AHANGTR	10	---	---	100	85	78
ANTR	01	54	47	31	16	0
ANTR	02	---	36	25	7	0
ANTR	03	47	47	42	39	33
ANTR	04	59	76	69	64	59
ANTR	05	83	82	78	74	71
ANTR	06	63	61	47	44	41
ANTR	07	50	58	46	43	40
ANTR	08	71	77	51	47	43
ANTR	09	80	65	63	57	52
ANTR	10	62	78	71	67	62
ANTR	11	47	47	35	24	6

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

Branch	Section	Inspections			Forecast	
		2012	2015	2018	2023	2028
ANTR	12	82	79	69	64	59
ASTTR	01	89	95	78	74	71
ATERMTR	01	51	60	60	54	49
ATERMTR	02	100	99	89	80	76
R725TR	01A	84	78	64	49	35
R725TR	01B	77	73	62	47	33
R725TR	01C	85	80	71	55	40
R725TR	02A	87	86	81	77	77
R725TR	02B	81	83	77	77	76
R725TR	02C	85	84	76	64	49
TA1TR	01	64	64	63	50	36
TA1TR	02	64	59	54	40	28
TA2TR	01	84	86	76	69	57
TA2TR	02	90	85	72	62	48
TA3TR	01	91	88	82	79	79
TA3TR	02	91	81	73	63	50
TA4TR	01	92	89	77	71	60
TA4TR	02	76	80	72	62	48
TA6TR	01	91	86	73	63	50
TA6TR	02	84	78	63	50	36
TA7TR	01	64	64	59	45	32
TA7TR	02	64	63	61	48	34
TA8TR	01	69	87	70	59	45
TA8TR	02	83	82	81	79	79
TATR	01	69	64	67	55	41
TATR	02	77	79	59	45	32
TB1TR	01	100	98	85	80	79
TB2TR	01	96	91	77	71	60
TB3TR	01	97	89	82	79	79
TB4TR	01	100	100	90	83	79
TB6TR	01	94	100	90	83	79
TB7TR	01	97	100	91	83	79
TB8TR	01	94	100	92	84	80
TBTR	01	99	99	91	83	79
TBTR	02	100	98	89	82	79
TBTR	03	---	92	89	82	79
TLANETR	01	97	84	83	77	74
TLANETR	02	100	92	88	81	77

Figure TR-3. Pavement Condition in July 2018.  
Portland Troutdale Airport



Drawing Date: September 2018

Section PCIs at Portland Troutdale Airport range from a low of 25 (a PCR of “Serious”) to a high of 100 (a PCR of “Good”). The area-weighted average PCI for all airport pavements is 69, corresponding to an overall PCR of “Fair”. Figure TR-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 distresses observed in the asphalt concrete sections during the inspection were: longitudinal and transverse cracking, weathering, block cracking, alligator cracking, patching, raveling and depressions. Joint seal damage was observed in the concrete section.

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

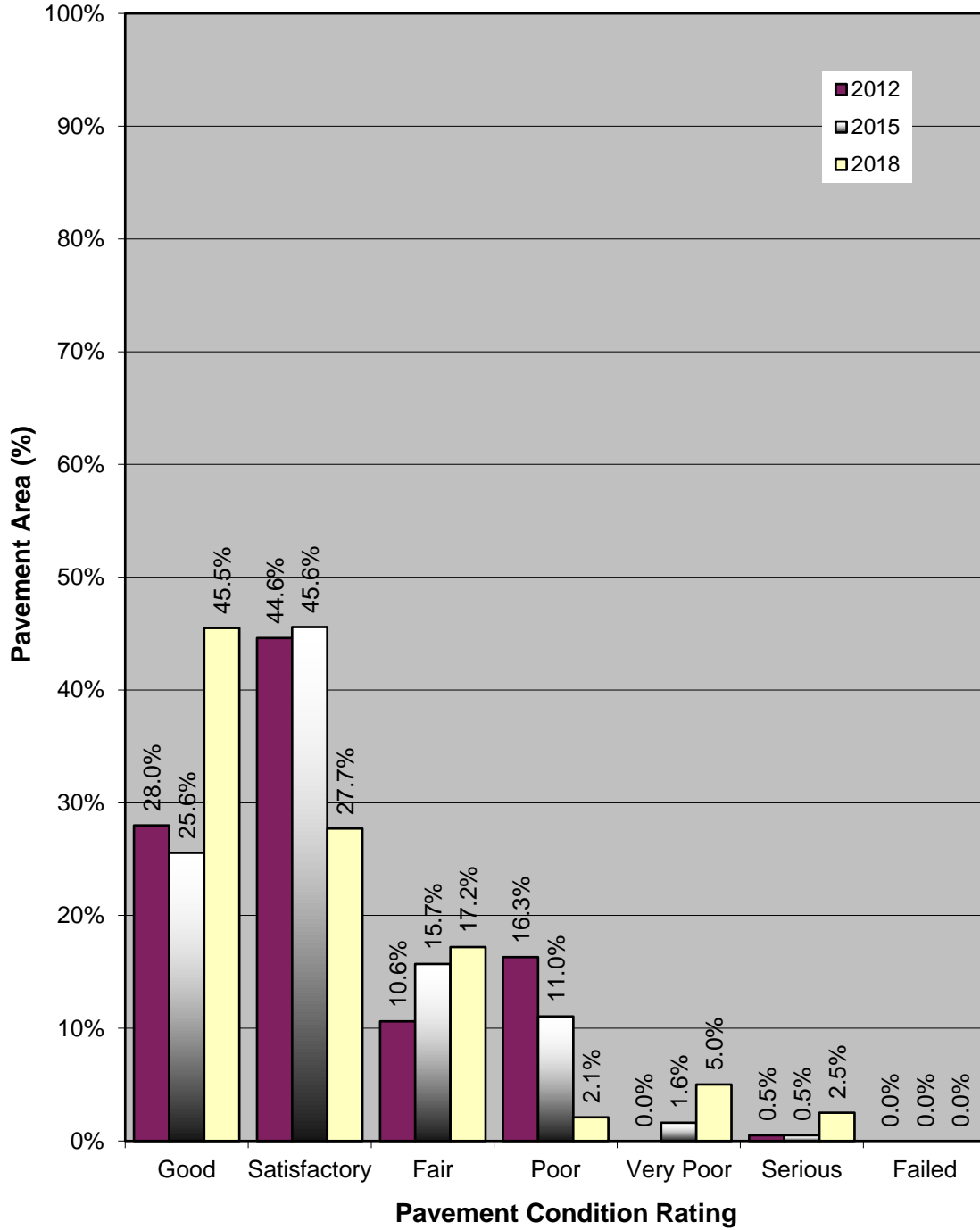
The recommended localized maintenance activities to be applied are selected by the PAVER software based on a Distress Maintenance Policy established for the Oregon airport system. The report results indicate that, over your entire airport, the following quantities of localized maintenance are needed:

- 126,735 linear feet of asphalt concrete crack sealing
- 15 linear feet of asphalt wide crack sealing/repair.

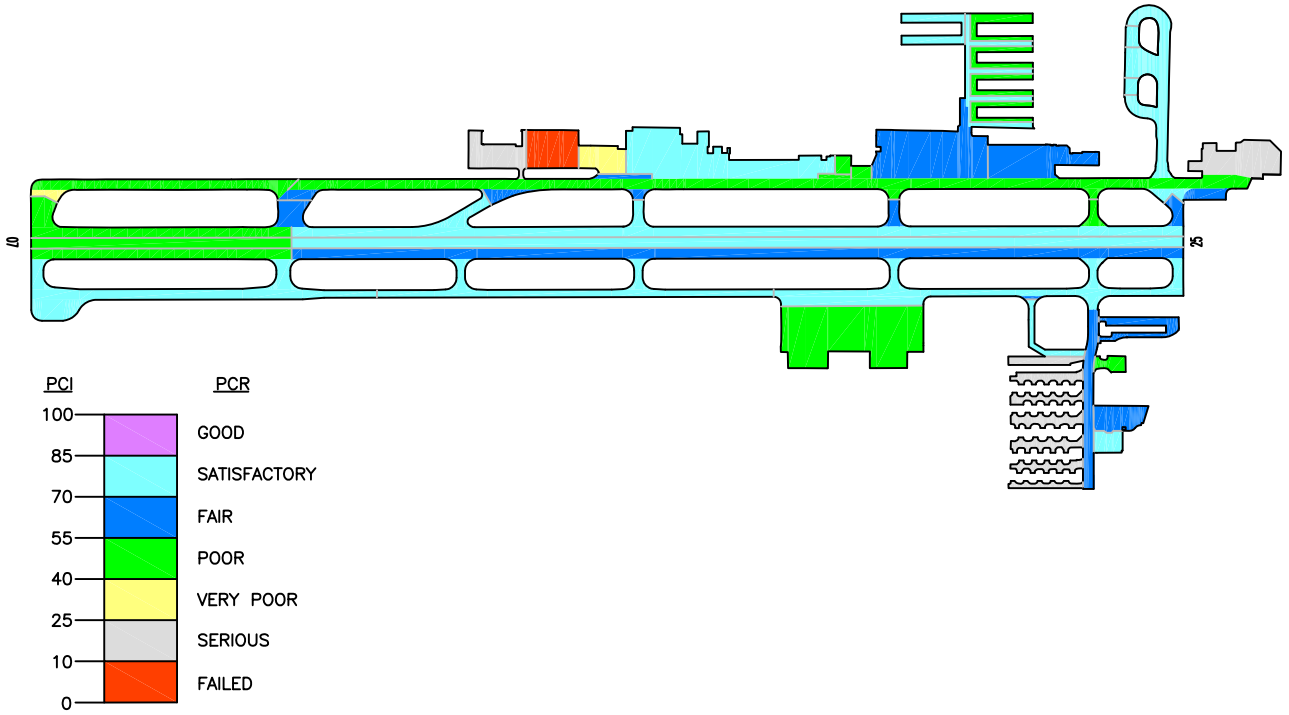
The PAVER software can also identify and schedule recommended global (applied over an entire section) maintenance activities such as fog seals, slurry seals and other surface treatments, as well as major rehabilitation activities such as asphalt concrete overlays and complete reconstruction. PAVER schedules 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.



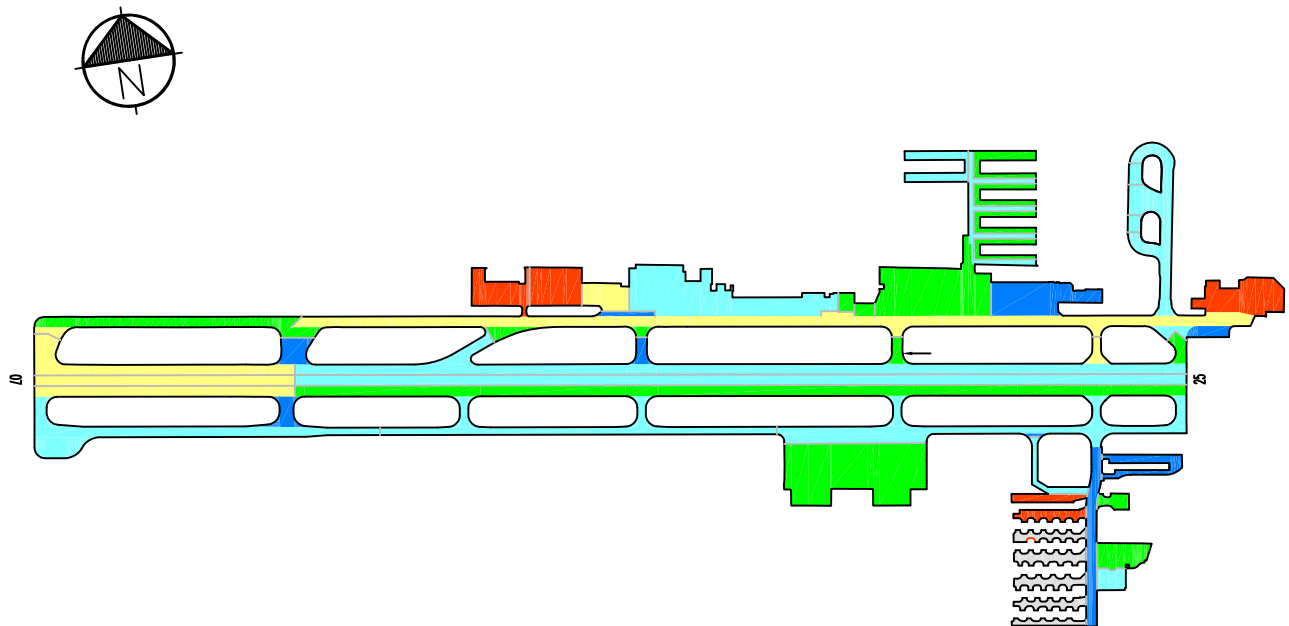
**Figure TR-4. Pavement Condition Distribution  
Portland Troutdale Airport**



**Predicted Condition in 2023.**



**Predicted Condition in 2028.**



Drawing Date: September 2018

 PAVEMENT CONSULTANTS INC.

**Figure TR-5. Future Pavement Condition.**

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 TR-6.

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

Year	Branch	Section	Action	Area (sf)	Unit Cost (\$/sf)	Total Cost (\$)
2019	AHANGNTR	01	Slurry Seal	41,229	\$0.31	\$12,781
2019	AHANGNTR	02	Slurry Seal	71,594	\$0.31	\$22,194
2019	AHANGNTR	03	Slurry Seal	26,112	\$0.31	\$8,095
2019	AHANGTR	01	Slurry Seal	1,364	\$0.31	\$423
2019	AHANGTR	02	Slurry Seal	14,464	\$0.31	\$4,484
2019	AHANGTR	03	Slurry Seal	4,416	\$0.31	\$1,369
2019	AHANGTR	04	Slurry Seal	41,960	\$0.31	\$13,008
2019	AHANGTR	05	Slurry Seal	24,252	\$0.31	\$7,518
2019	AHANGTR	06	3" AC over 6" Crushed Aggregate Base over 6" Aggregate Subbase	28,423	\$7.95	\$225,963
2019	AHANGTR	07	2" AC Overlay	9,475	\$2.50	\$23,688
2019	AHANGTR	08	3" AC over 6" Crushed Aggregate Base over 6" Aggregate Subbase	68,422	\$7.95	\$543,955
2019	AHANGTR	09	Slurry Seal	27,550	\$0.31	\$8,541
2019	ANTR	01	3" AC over 6" Crushed Aggregate Base over 6" Aggregate Subbase	36,871	\$7.95	\$293,124
2019	ANTR	02	3" AC over 6" Crushed Aggregate Base over 6" Aggregate Subbase	43,735	\$7.95	\$347,693
2019	ANTR	03	2" AC Overlay	26,476	\$2.50	\$66,190
2019	ANTR	04	Slurry Seal	6,178	\$0.31	\$1,915
2019	ANTR	05	Slurry Seal	140,759	\$0.31	\$43,635
2019	ANTR	06	2" AC Overlay	6,693	\$2.50	\$16,733
2019	ANTR	07	2" AC Overlay	3,330	\$2.50	\$8,325
2019	ANTR	08	Slurry Seal	5,700	\$0.31	\$1,767
2019	ANTR	09	Slurry Seal	123,076	\$0.31	\$38,154
2019	ANTR	10	Slurry Seal	64,194	\$0.31	\$19,900

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

Year	Branch	Section	Action	Area (sf)	Unit Cost (\$/sf)	Total Cost (\$)
2019	ANTR	11	3" AC over 6" Crushed Aggregate Base over 6" Aggregate Subbase	57,318	\$7.95	\$455,678
2019	ANTR	12	Slurry Seal	10,021	\$0.31	\$3,107
2019	ASTTR	01	Slurry Seal	21,234	\$0.31	\$6,583
2019	ATERMTR	01	Slurry Seal	170,767	\$0.31	\$52,938
2019	ATERMTR	02	Slurry Seal	29,892	\$0.31	\$9,267
2019	R725TR	01A	2" AC Overlay	61,000	\$2.50	\$152,500
2019	R725TR	01B	2" AC Overlay	61,000	\$2.50	\$152,500
2019	R725TR	01C	2" AC Overlay	61,000	\$2.50	\$152,500
2019	R725TR	02A	Slurry Seal	209,000	\$0.31	\$64,790
2019	R725TR	02B	Slurry Seal	209,000	\$0.31	\$64,790
2019	R725TR	02C	Slurry Seal	209,000	\$0.31	\$64,790
2019	TA1TR	01	Slurry Seal	15,558	\$0.31	\$4,823
2019	TA1TR	02	2" AC Overlay	5,978	\$2.50	\$14,945
2019	TA2TR	01	Slurry Seal	16,818	\$0.31	\$5,214
2019	TA2TR	02	Slurry Seal	7,550	\$0.31	\$2,341
2019	TA3TR	01	Slurry Seal	15,798	\$0.31	\$4,897
2019	TA3TR	02	Slurry Seal	8,431	\$0.31	\$2,614
2019	TA4TR	01	Slurry Seal	7,306	\$0.31	\$2,265
2019	TA4TR	02	Slurry Seal	3,650	\$0.31	\$1,132
2019	TA6TR	01	Slurry Seal	7,392	\$0.31	\$2,292
2019	TA6TR	02	Slurry Seal	3,553	\$0.31	\$1,101
2019	TA7TR	01	2" AC Overlay	7,294	\$2.50	\$18,235
2019	TA7TR	02	2" AC Overlay	3,020	\$2.50	\$7,550
2019	TA8TR	01	Slurry Seal	8,782	\$0.31	\$2,722
2019	TA8TR	02	Slurry Seal	7,440	\$0.31	\$2,306
2019	TATR	01	Slurry Seal	61,268	\$0.31	\$18,993
2019	TATR	02	2" AC Overlay	225,100	\$2.50	\$562,750
2019	TB1TR	01	Slurry Seal	10,266	\$0.31	\$3,182
2019	TB2TR	01	Slurry Seal	13,666	\$0.31	\$4,236
2019	TB3TR	01	Slurry Seal	8,813	\$0.31	\$2,732
2019	TB4TR	01	Slurry Seal	8,764	\$0.31	\$2,717
2019	TB6TR	01	Slurry Seal	8,756	\$0.31	\$2,714
2019	TB7TR	01	Slurry Seal	9,454	\$0.31	\$2,931
2019	TB8TR	01	Slurry Seal	8,473	\$0.31	\$2,627
2019	TBTR	01	Slurry Seal	75,484	\$0.31	\$23,400
2019	TBTR	02	Slurry Seal	65,070	\$0.31	\$20,172

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

<b>Year</b>	<b>Branch</b>	<b>Section</b>	<b>Action</b>	<b>Area (sf)</b>	<b>Unit Cost (\$/sf)</b>	<b>Total Cost (\$)</b>
2019	TBTR	03	Slurry Seal	67,224	\$0.31	\$20,839
2019	TLANETR	01	Slurry Seal	108,696	\$0.31	\$33,696
<b>2019 Total</b>						<b>\$3,662,320</b>
2022	AHANGTR	10	Fog Seal	13,628	\$0.19	\$2,589
<b>2022 Total</b>						<b>\$2,589</b>
<b>5-Year Total</b>						<b>\$3,664,910</b>

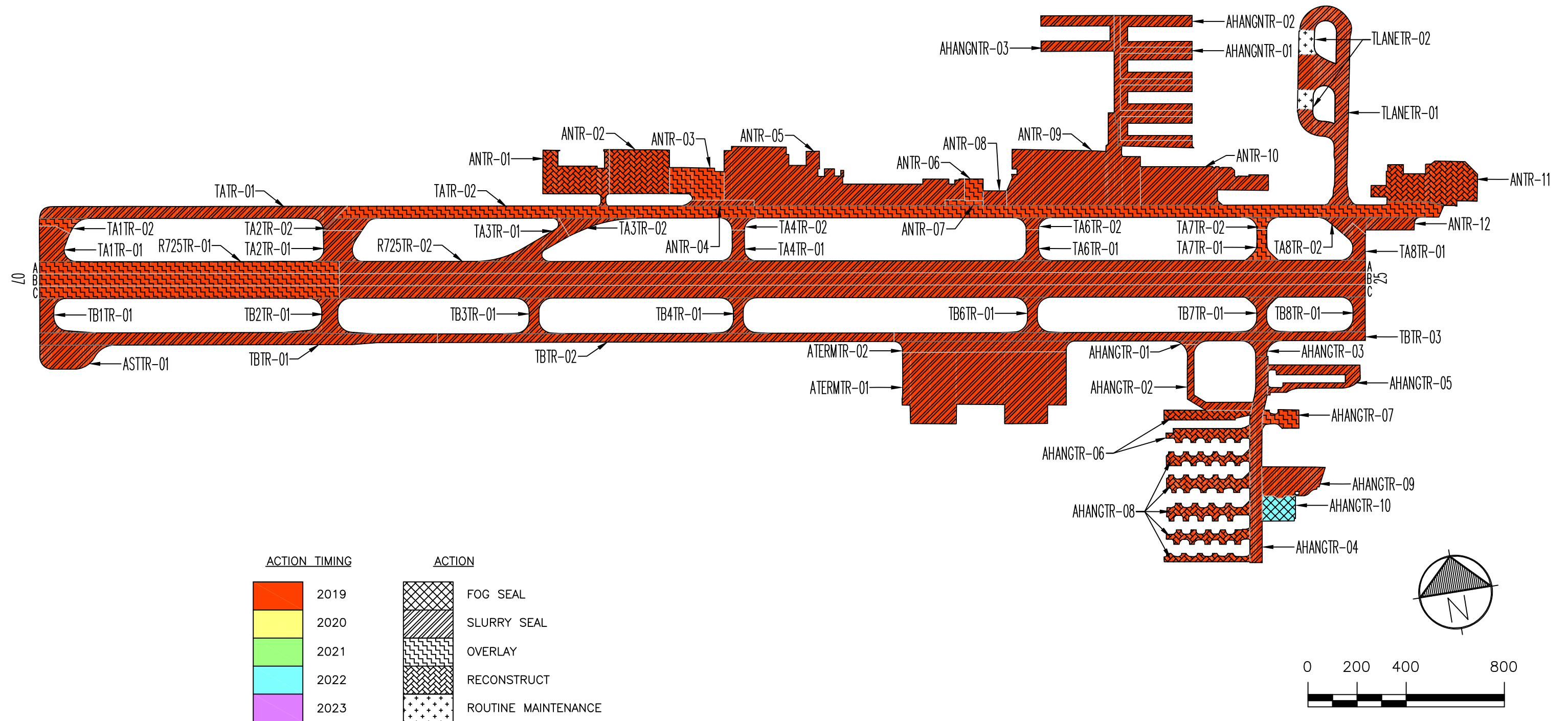
If the global maintenance and/or rehabilitation activities recommended in Table 2 are not completed, the localized maintenance activities identified in the Network Maintenance Report (Appendix 3) for that section should be done. Additionally, for those sections not listed in Table 2 as requiring global 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 TR-6. Five-Year Pavement Management Plan.  
Portland Troutdale Airport



Drawing Date: September 2018