



CLACKAMAS COUNTY: EXPANDING A PAVEMENT MANAGEMENT SYSTEM

**Northwest Pavement Management Association
October 24, 2023**

INTRODUCTIONS



Jon Sparks | Project Manager

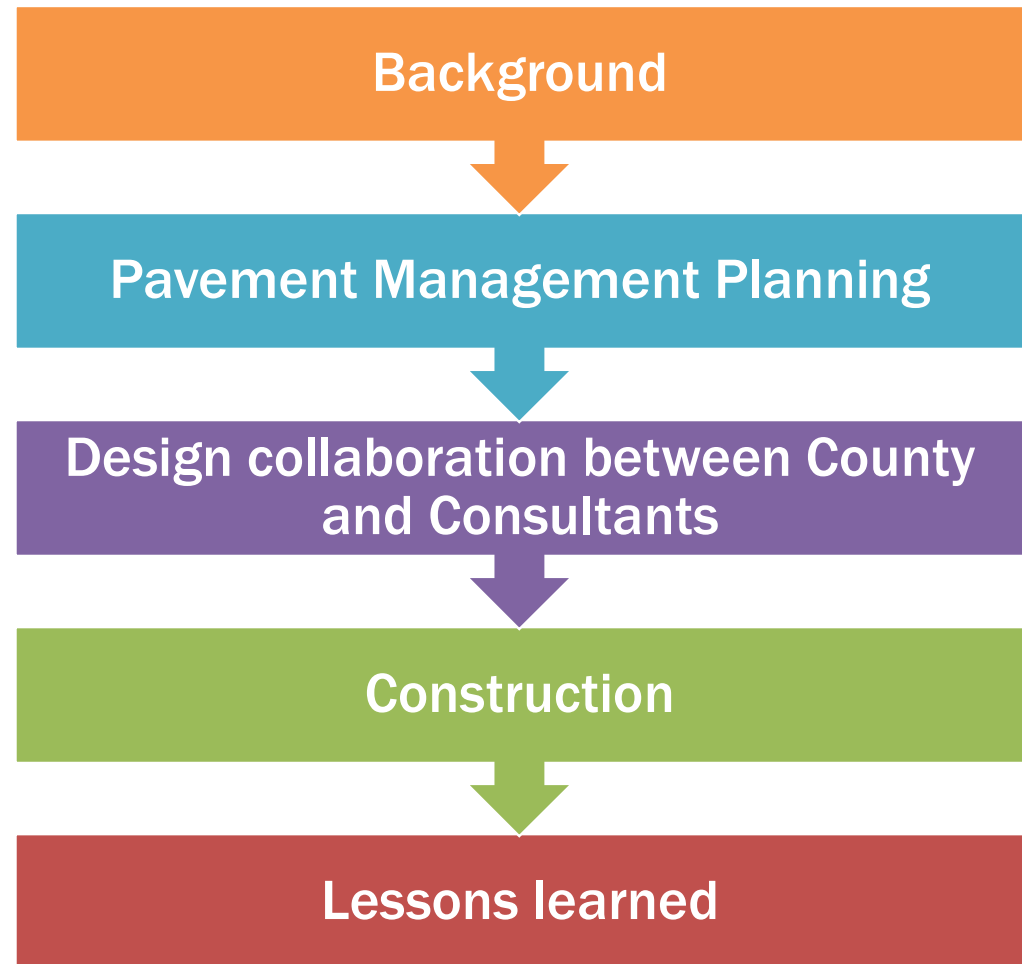


Andrew Giesy, PE | Senior Engineer



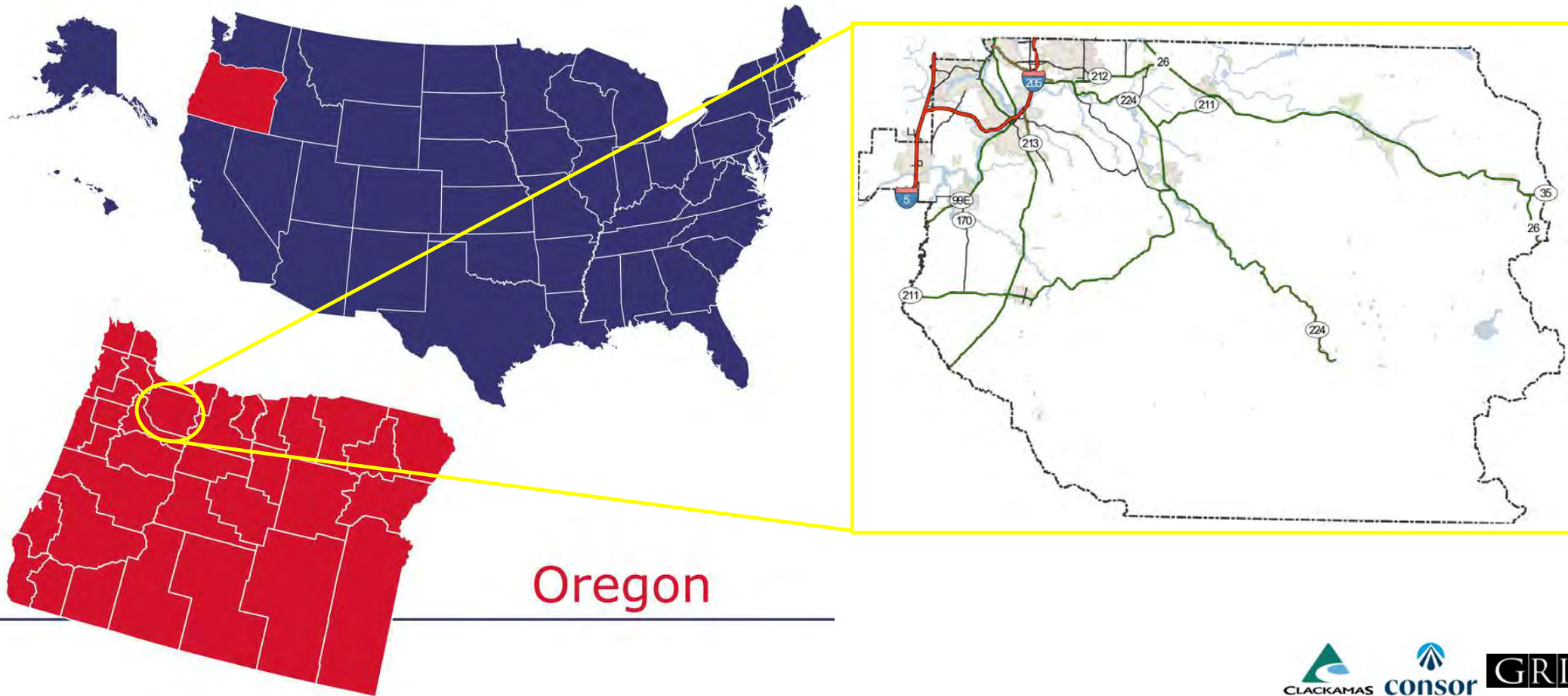
Lindsi Hammond, PE | Principal

AGENDA



BACKGROUND

CLACKAMAS COUNTY, OREGON

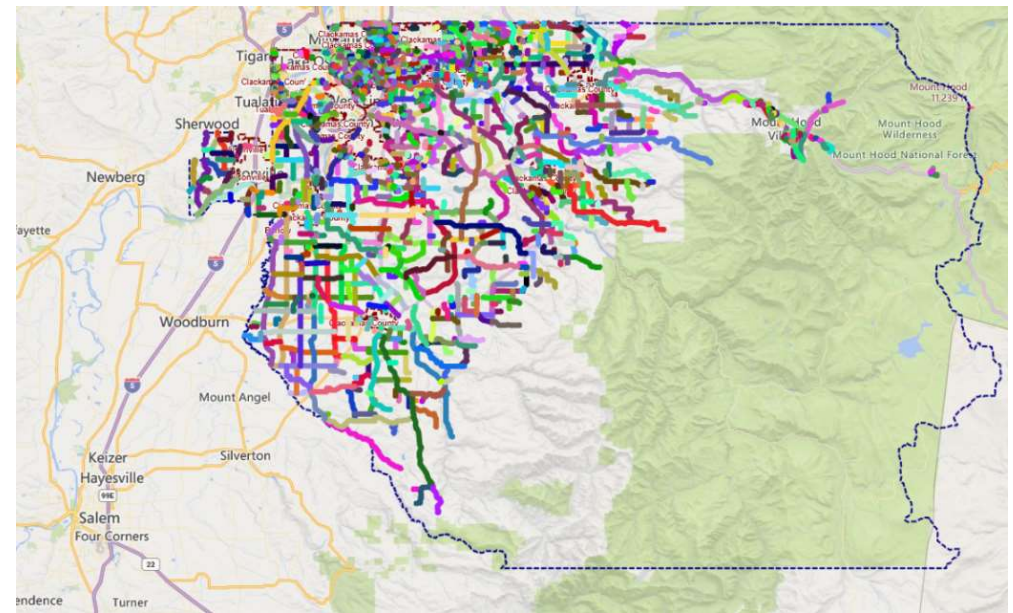
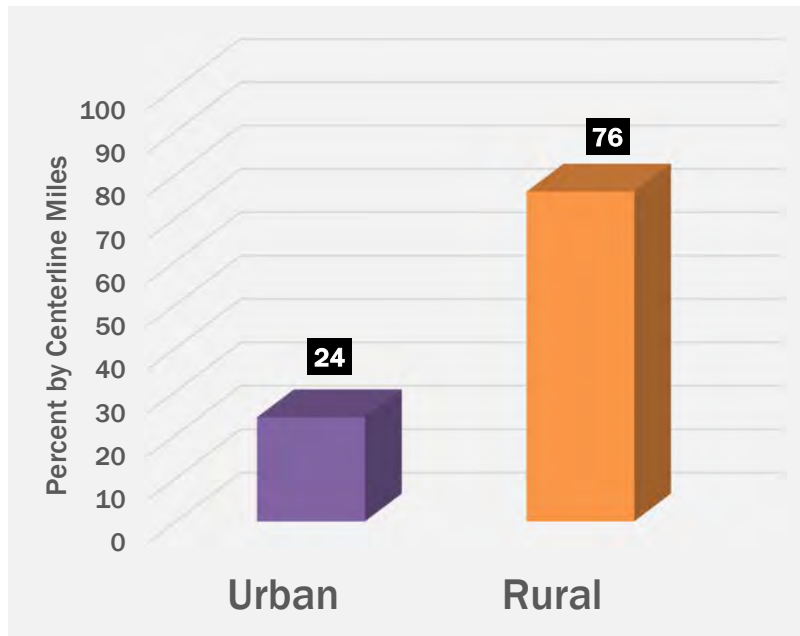


Oregon

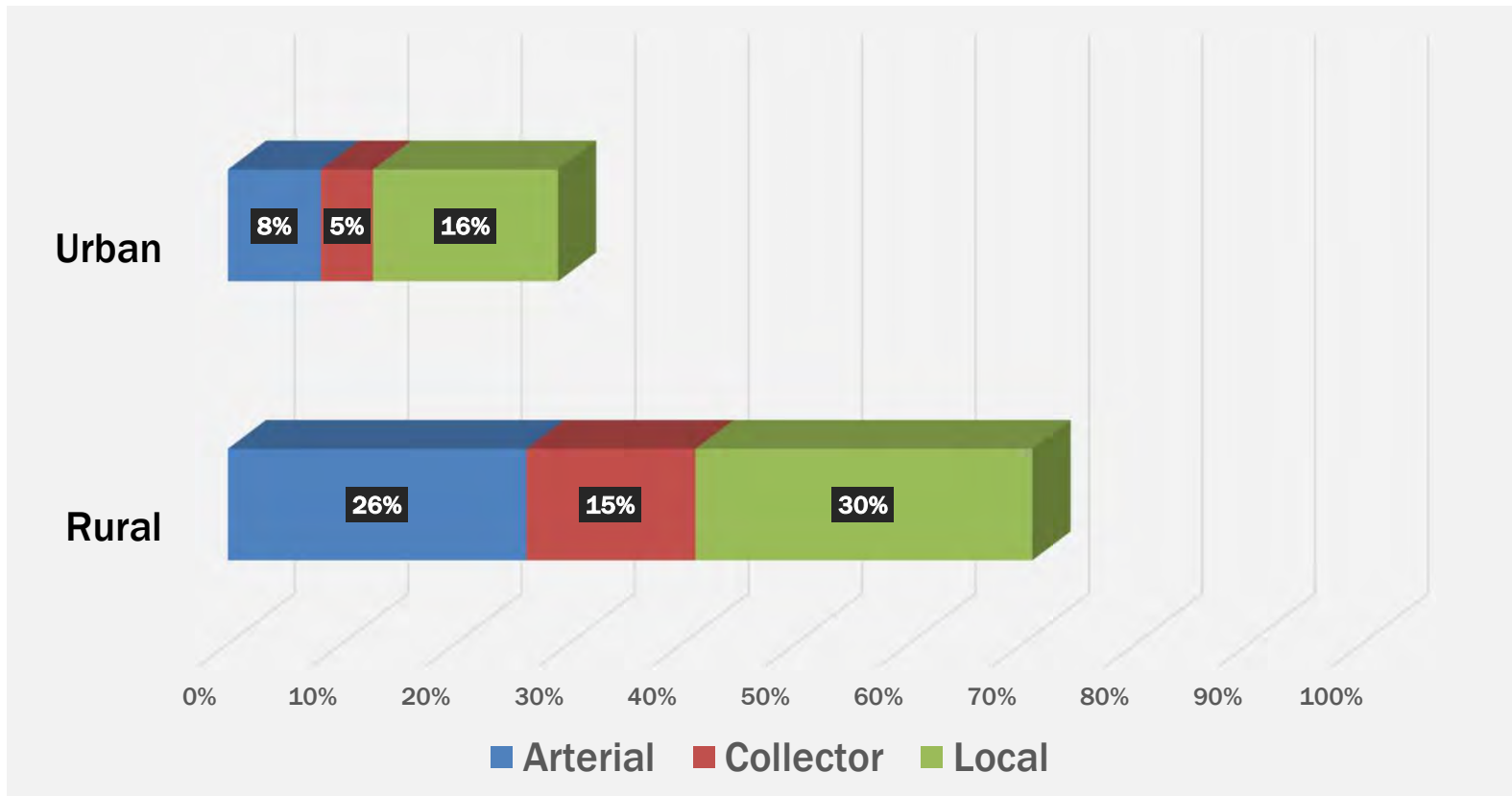
CLACKAMAS COUNTY - BACKGROUND

1,400+ centerline miles

Over 6 square miles of pavement

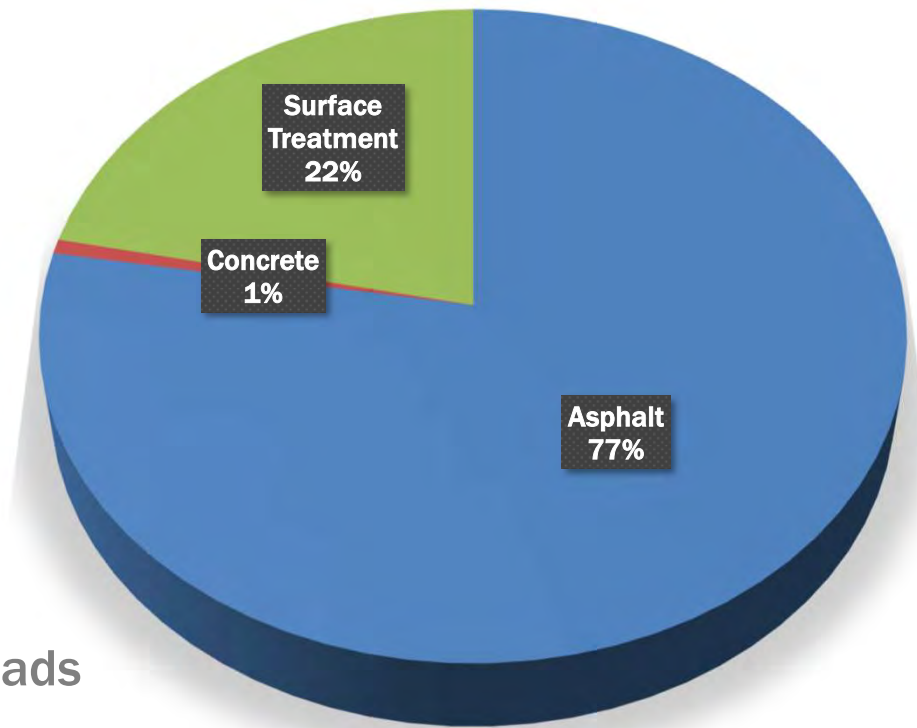


CLACKAMAS COUNTY - BACKGROUND



CLACKAMAS COUNTY - BACKGROUND

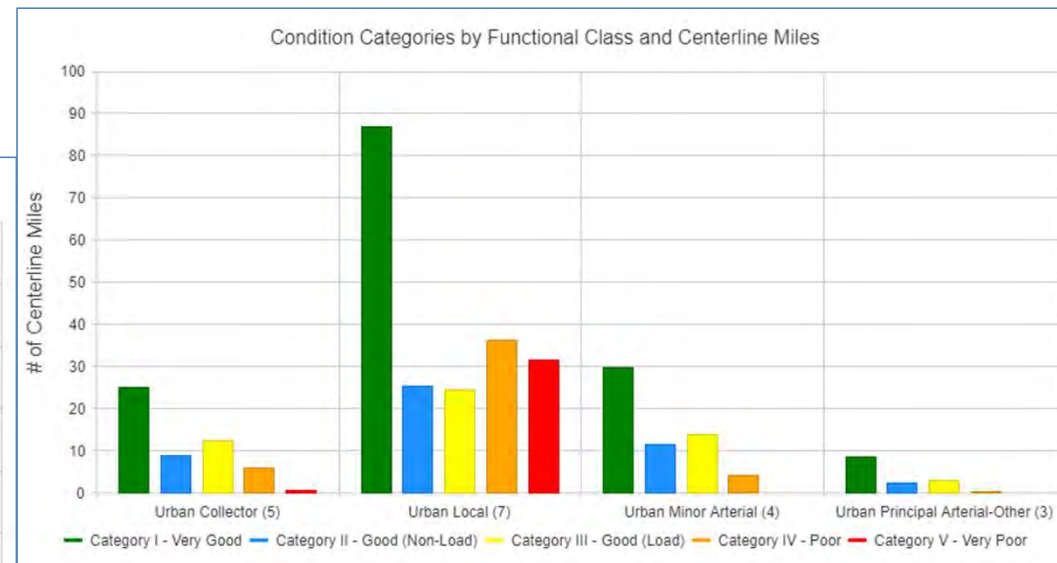
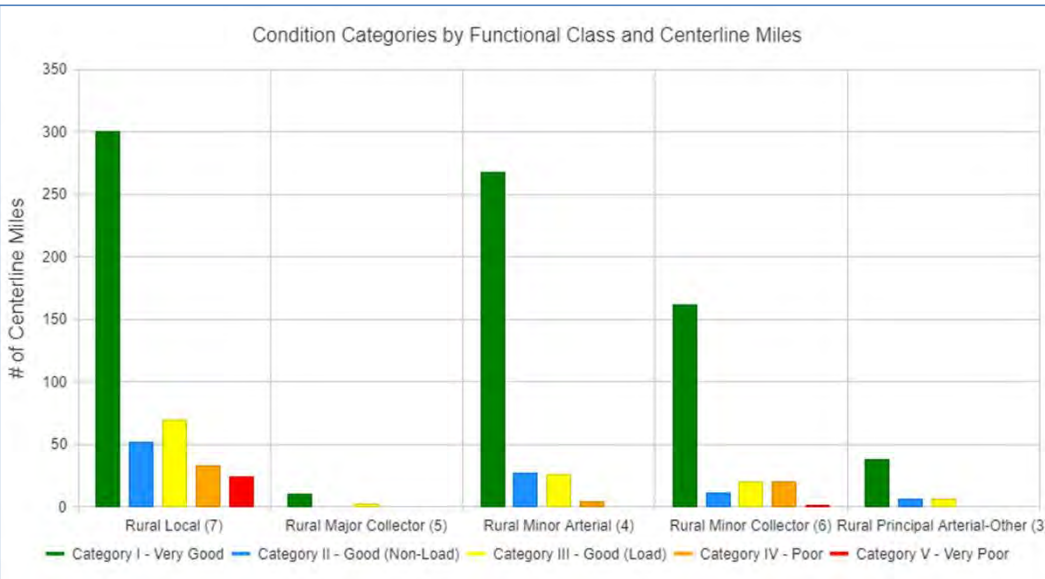
Surface Type by Area




+ 6 miles of gravel roads

CLACKAMAS COUNTY - BACKGROUND

Overall PCI – 67
 Rural PCI – 70
 Urban PCI – 60



CLACKAMAS COUNTY - BACKGROUND

- 2007 - 2012: RoadMatrix software
- 2016: Pavement Management System Implementation  StreetSaver®
Keeping good roads good!
- Asphalt Paving
 - In-house for small repair jobs
- Chip Seal/Slurry Seal
 - 2016: County stopped chip sealing in-house & contracting slurry seals

COUNTY ROAD FUNDING

- **Historic funding sources**
 - Oregon Transportation Investment Act (OTIA)

- **Current funding sources**
 - County Road Fund
 - Surface Transportation Program (STP)
 - HB2017
 - Community Road Fund

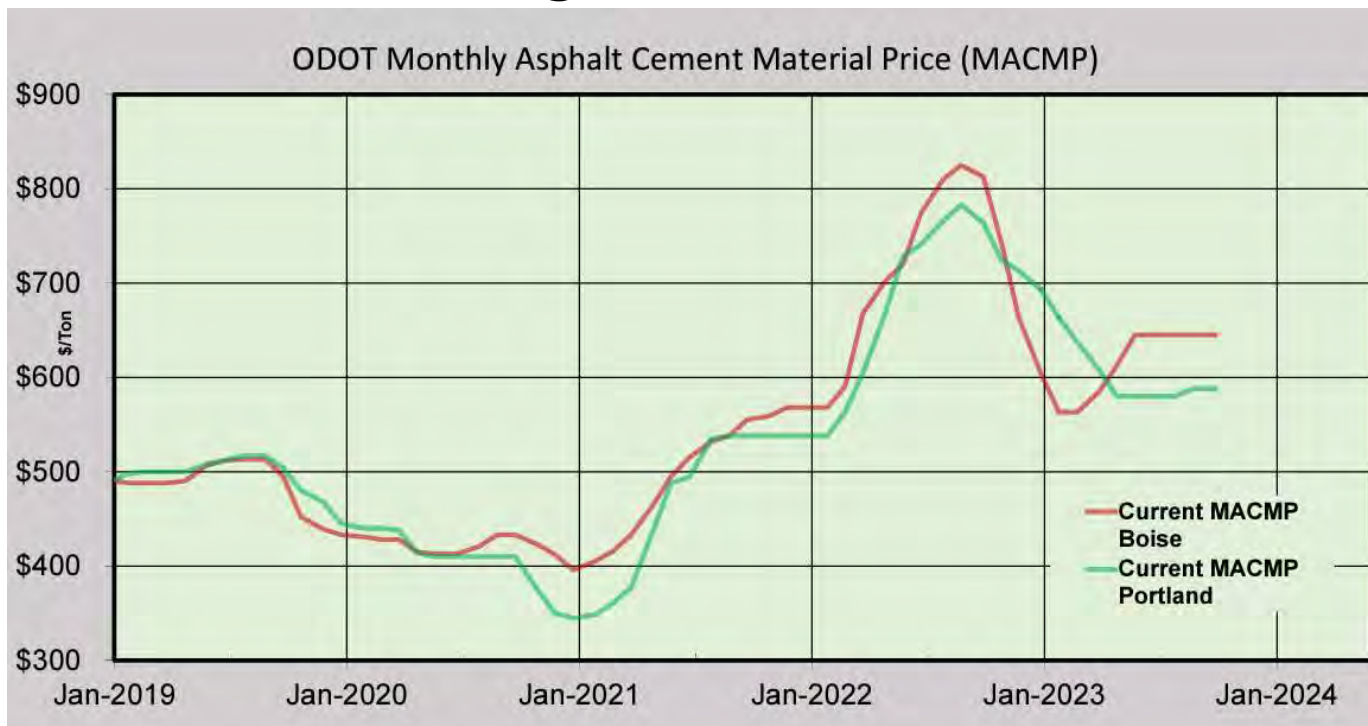
COUNTY ROAD FUNDING

Community Road Fund = Vehicle Registration Fee

	Multnomah County	Washington County	Clackamas County
Local Gas Tax	\$6.8 million	\$2.1 million	\$0
Local Vehicle Registration Fee	\$34.3 million	\$7.8 million	\$5.5 million
Local Property Tax	\$0	\$35 million	\$0
Road District	\$0	\$3.7 million	\$0
Total Annual Revenue	\$41.1 million	\$48.6 million	\$5.5 million

COUNTY ROAD FUNDING

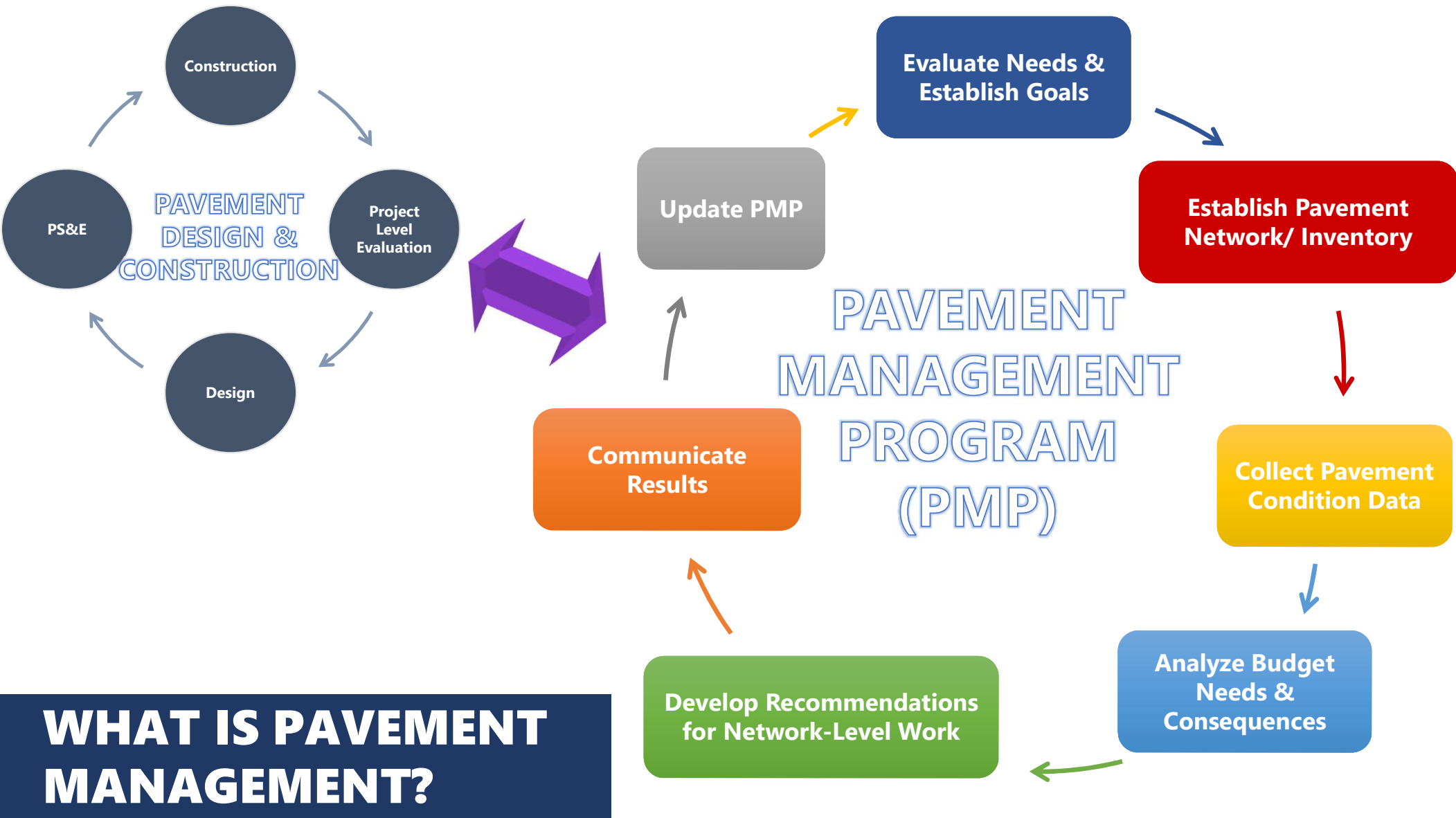
Funding has not kept up with the continued pavement deterioration and rising construction costs!



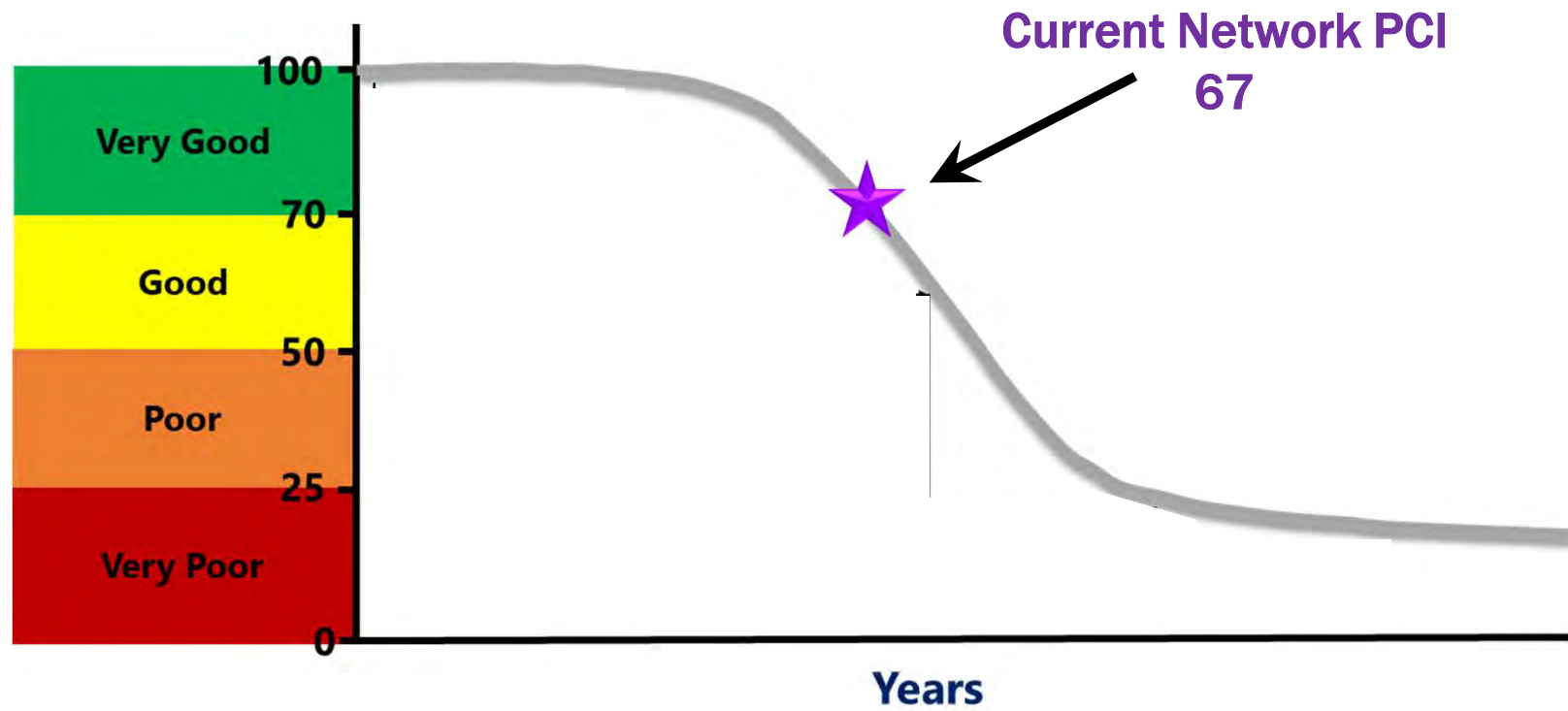
PAVEMENT MANAGEMENT PLANNING

PAVEMENT MANAGEMENT PLANNING

- **Pavement Management Program**
 - **Managed by the Transportation and Development (DTD) group**
- **2020: GRI contracted to support DTD**
 - **Review StreetSaver Setup**
 - **Revise Decision Tree and Unit Costs**
 - **Develop 5-Year Plan for maintenance, preservation, and rehab**



PAVEMENT MANAGEMENT PLANNING



PAVEMENT MANAGEMENT PLANNING

Ideal PMP Approach:



Reality Using the Ideal PMP Approach:



Revised PMP Approach:



PAVEMENT MANAGEMENT PLANNING

StreetSaver Setup – Decision Tree

- **Challenge #1: Rural vs. Urban**
- **Challenge #2: ADA**
- **Challenge #3: Developing realistic treatments**
- **Challenge #4: How to project cost over an extended period**

PAVEMENT MANAGEMENT PLANNING

StreetSaver Setup – Decision Tree

PCI Condition Categories	URBAN	RURAL
Very Good	Slurry Seal (residential)	Chip Seal
Good – Non-Load	Overlay/ Slurry Seal (residential)	Chip Seal
Good – Load	Overlay + Patching/ Slurry Seal + Patching (residential)	Overlay + Patching/ Chip Seal + Patching (residential)
Poor	Thick Overlay + Patching	Thick Overlay + Patching
Very Poor	Reconstruction	Reconstruction

Challenge: urban and rural treatments require separate decisions trees = analysis occurs twice

PAVEMENT MANAGEMENT PLANNING

StreetSaver Setup – Decision Tree

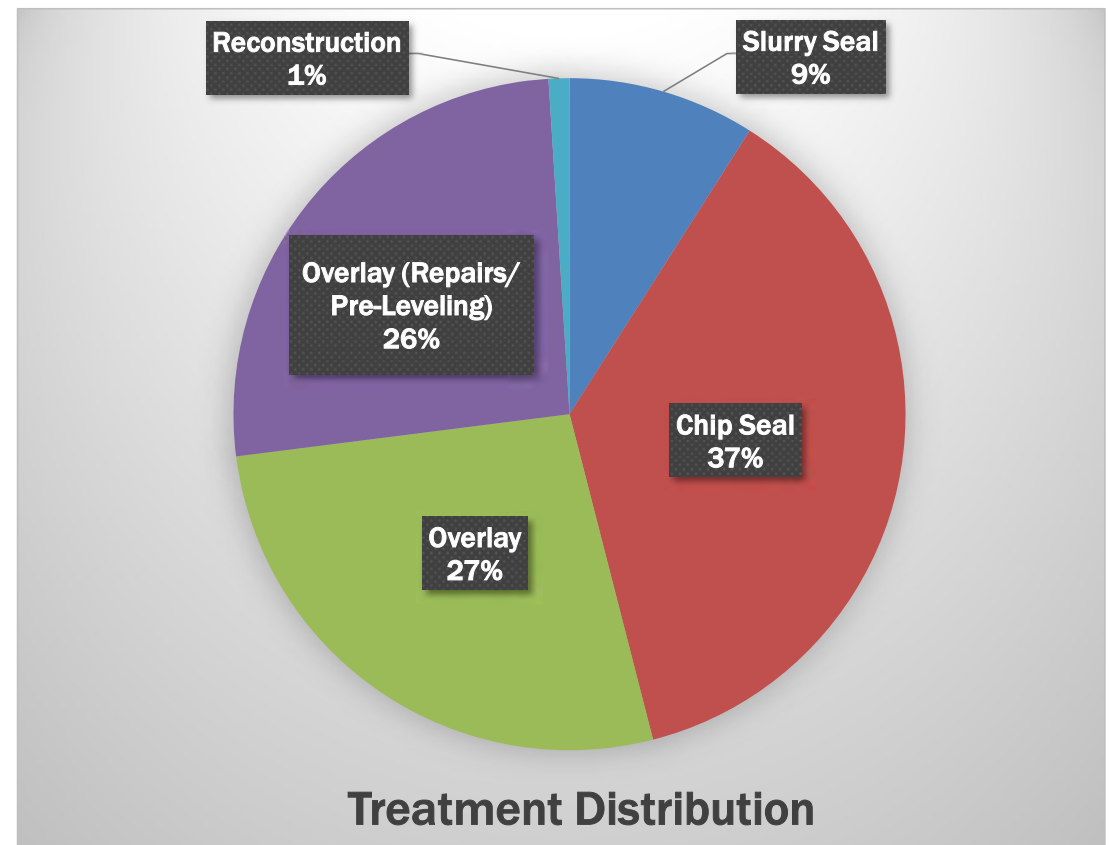
- *Cost...how do we more closely model Project-Level costs?*

Fully Loaded Factors	Percentage in 2021
Mobilization	7%
Drainage	5%
Traffic Control	6%
Engineering/Construction	23%
Striping/Markings	2%
ADA ←	25% (25 - 100% varies)
Contingency	10%

PAVEMENT MANAGEMENT PLANNING

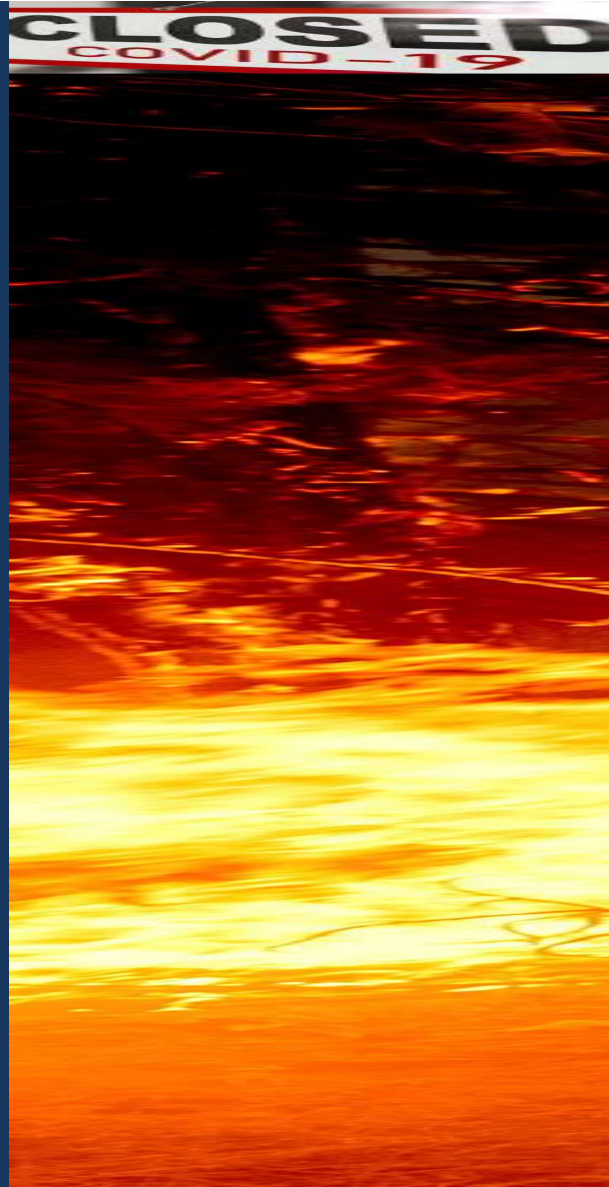
5-Year Plan

- Fixed Budget
 - Annual split between **urban** and **rural** ranged from
 - 50:50
 - 54:46
- Inflation Rate/Cost Escalation



PAVEMENT MANAGEMENT PLANNING

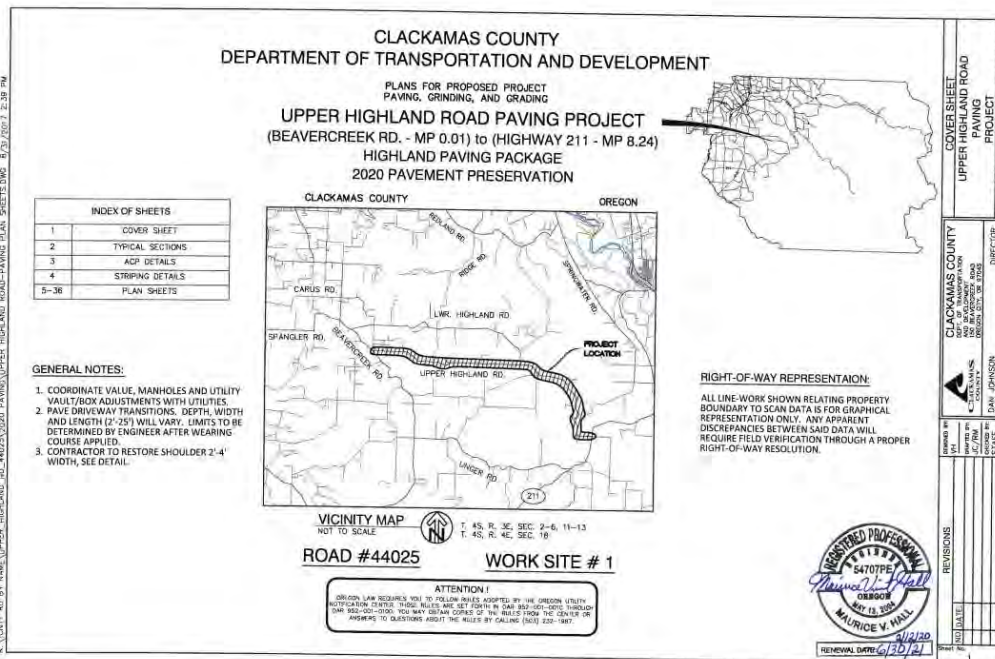
Challenges/
Lessons learned



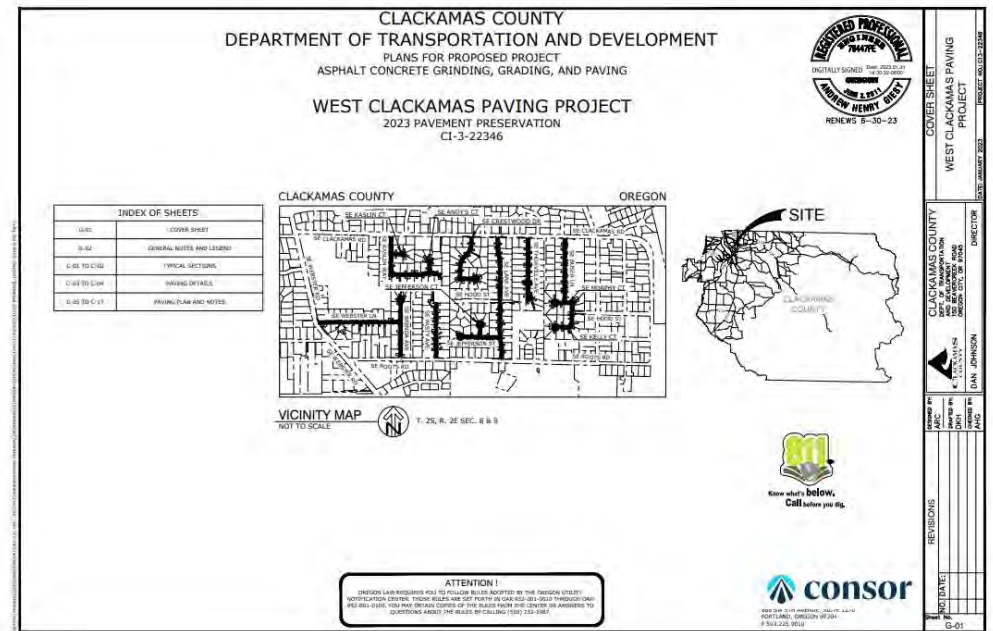
DESIGN

Rehabilitation

DESIGN – REHABILITATION



2020 Pavement Rehab Project (County)



2023 Pavement Rehab Project (Conсор/GRI)

DESIGN – REHABILITATION

Typical Clackamas County Scope of Work for Pavement Rehabilitation for Design

Task 1: Project Management

Task 2: Basemapping

Task 3: Pavement Investigations

Task 4: 50% Design

Task 5 and Task 6: 90% and Final Design

Task 7: Utility Coordination

Task 8: Right of Entry Requests

Task 9: Public Involvement

Task 10: Bid Phase Services

DESIGN – REHABILITATION

Basemapping



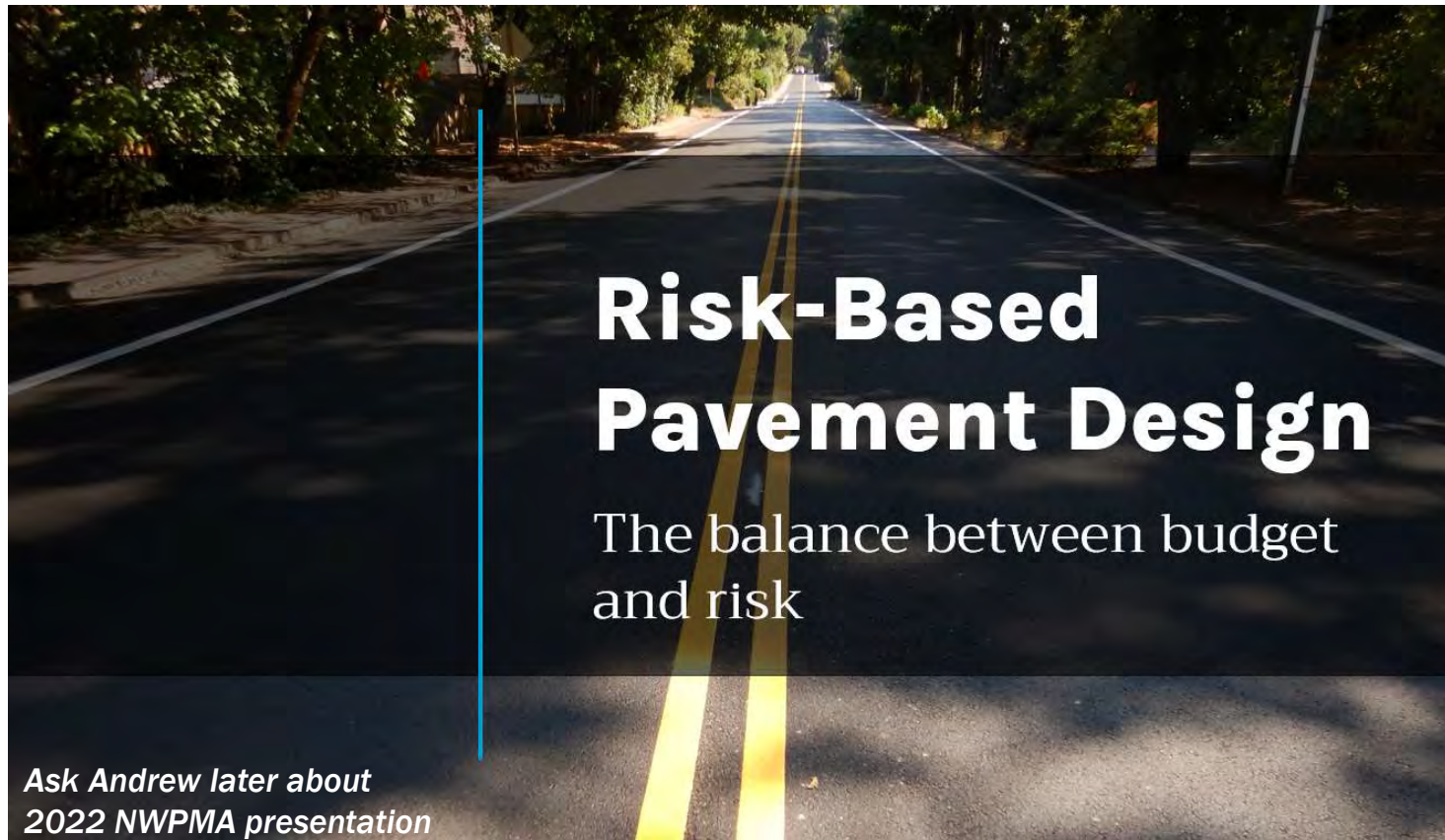
Mobile Lidar (Courtesy of Erlandson)



High-resolution NearMap aerial photography at SE Webster Rd and SE Webster Ln

DESIGN – REHABILITATION

Pavement Investigations – Risk Based Pavement Design



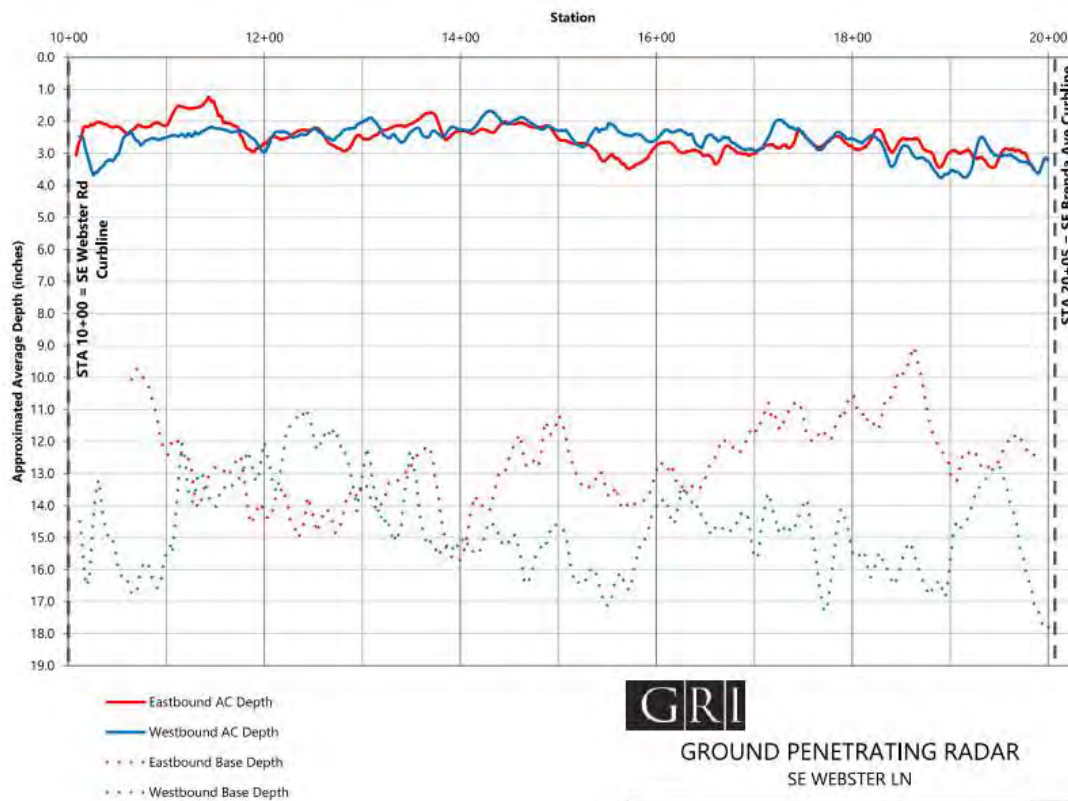
Risk-Based Pavement Design

The balance between budget
and risk

*Ask Andrew later about
2022 NWPMA presentation*

DESIGN – REHABILITATION

Pavement Investigations – GPR



GROUND PENETRATING RADAR
SE WEBSTER LN

DEC. 2022

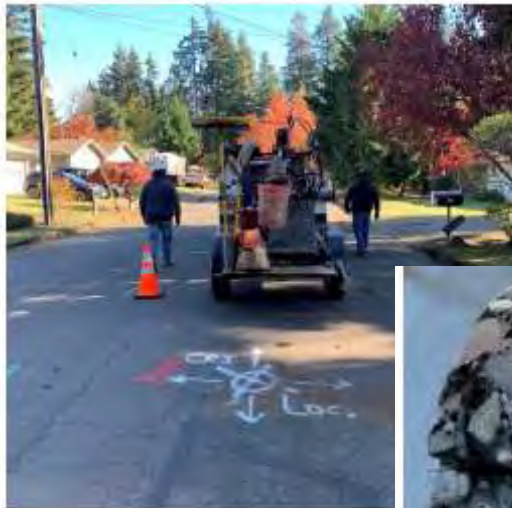
JOB NO. 6738-A

FIG. 11B



DESIGN – REHABILITATION

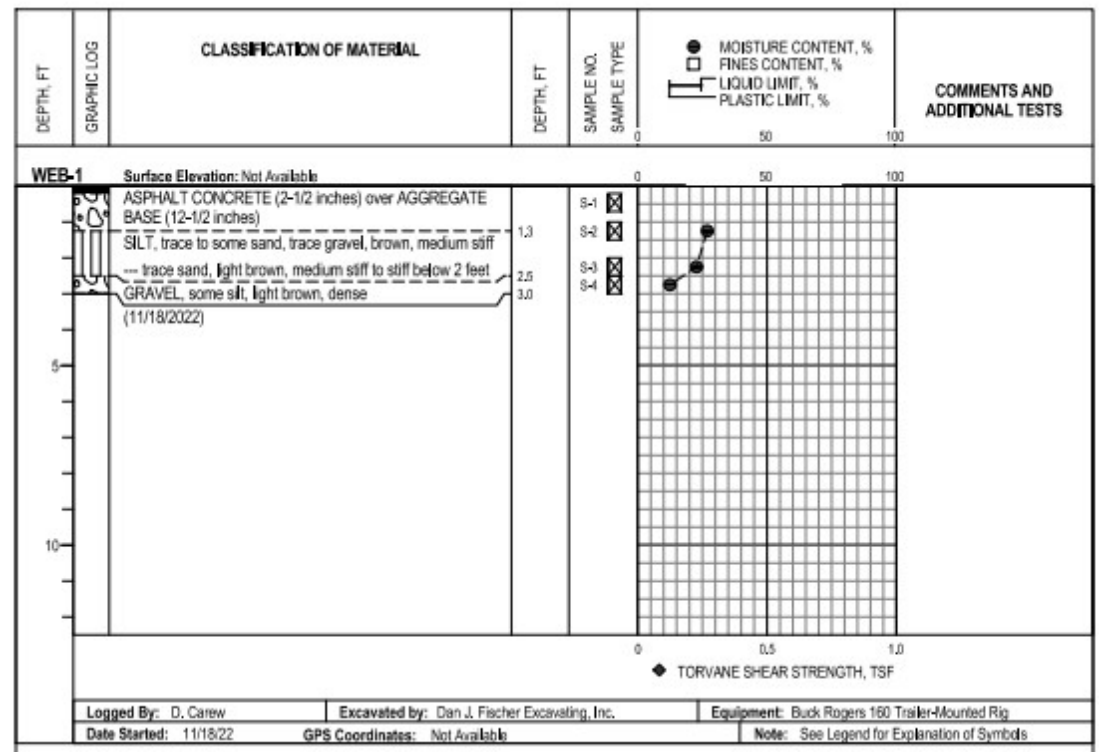
Pavement Investigations – Cores/Shallow Borings



WEB-2 Location



WEB-2 Core Sample



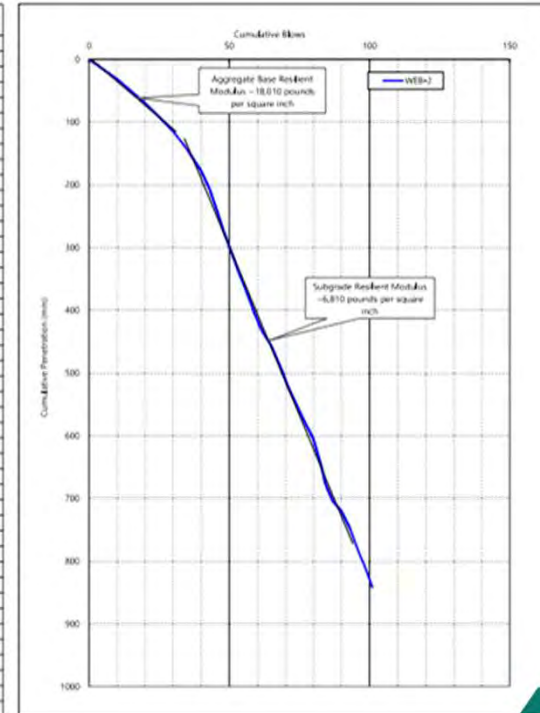
DESIGN – REHABILITATION

Pavement Investigations - DCP



KESSLER DYNAMIC CONE PENETROMETER LOG			
JOB NO. 6738-A	DRAWN BY MAH	TESTING DATE	11/18/2022
Test Number	WEB-2	Surface Type	All over Subgrade
Location	Clackamas, OR	Hammer	17.5 pounds

Depth, inches	Depth, millimeters	Cumulative Blows
0.0	0	0
1.3	32	10
2.8	70	20
3.6	92	25
4.5	115	30
5.7	144	35
7.0	178	40
8.1	207	43
9.7	246	46
10.2	260	47
10.8	274	48
11.3	288	49
11.7	298	50
12.2	310	51
12.7	327	52
13.2	335	53
13.6	348	54
14.1	357	55
14.5	368	56
15.0	381	57
15.4	392	58
15.8	405	59
16.3	415	60
16.8	426	61
17.1	435	62
18.0	457	65
19.2	488	68
20.6	527	71
21.7	551	74
22.8	579	77
23.8	605	80
25.6	651	83
26.5	673	84
27.0	685	85
27.4	695	86
27.8	705	87
28.3	720	90
29.4	747	93
30.9	784	96
31.3	795	97
31.7	805	98
32.2	817	99
32.6	829	100
33.1	842	101



DESIGN – REHABILITATION

Pavement Investigations – Preliminary Recommendations

Street Name	Rehabilitation ¹	Partial-Depth Reconstruction ^{2,3}				Full-Depth Reconstruction ^{4,5}	
	2-Inch Overlay	3-Inch Mill-and-Inlay		4-Inch Mill-and-Inlay		50,000 ESAL Design Life	
	Approximate ESAL Capacity	Approximate ESAL Capacity	Remaining AB Thickness, inches	Approximate ESAL Capacity	Remaining AB Thickness, inches	AC Thickness, inches	AB Thickness, inches
SE Brenda Ave	170,000	67,000	8½	295,000	7½	4	9
SE Buser Lane	29,000	18,000	5½	45,000	4½	4	10
SE Crestwood Dr	19,000	21,000	6½	51,000	5½	4	11
SE Jefferson Street	73,000	57,000	6	139,000	5	4	9
SE Kaslin Ct	71,000	35,000	7	83,000	6	4	10
SE Kaslin Way	57,000	36,000	6½	87,000	5½	4	10
SE Kelly Ct	54,000	60,000	9½	246,000	8½	4	9
SE Lark Ave	75,000	66,000	7½	154,000	6½	4	9
SE Murphy Ct	80,000	56,000	7½	132,000	6½	4	9
SE Patsy Ave	79,000	48,000	6½	118,000	5½	4	9
SE Thonville Ave	72,000	56,000	7	133,000	6	4	9
SE Webster Lane	186,000	56,000	10½	248,000	9½	4	9

Abbreviations: ESAL = Equivalent Single-Axle Load; AC = Asphalt Concrete; AB = Aggregate Base

DESIGN – REHABILITATION

Pavement Investigations – Preliminary Cost Estimates

		RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	
2" Overlay														
Unit	Item	Webster	Brenda	Patsy	Lark	Jefferson St	Buser Ln	Murphy Ct	Kelly Ct	Kaslin Way	Kaslin Ct	Crestwood	Thorville	SUB TOTAL
LS	Mob (10%)	\$ 9,000.00	\$ 7,000.00	\$ 6,000.00	\$ 13,000.00	\$ 5,000.00	\$ 7,000.00	\$ 5,000.00	\$ 4,000.00	\$ 10,000.00	\$ 2,000.00	\$ 8,000.00	\$ 8,000.00	\$ 84,000.00
LS	TCP (1.5%)	\$ 5,000.00	\$ 4,000.00	\$ 3,000.00	\$ 6,000.00	\$ 3,000.00	\$ 3,000.00	\$ 2,000.00	\$ 2,000.00	\$ 5,000.00	\$ 1,000.00	\$ 4,000.00	\$ 4,000.00	\$ 42,000.00
LS	ESCP (0.5%)	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 12,000.00
LS	0-2 Inch Grind	\$ 12,000.00	\$ 9,000.00	\$ 9,000.00	\$ 18,000.00	\$ 10,000.00	\$ 10,000.00	\$ 5,000.00	\$ 5,000.00	\$ 13,000.00	\$ 2,000.00	\$ 10,000.00	\$ 10,000.00	\$ 113,000.00
TON	Lvl 2 ACP (2")	\$ 72,000.00	\$ 52,000.00	\$ 49,000.00	\$ 102,000.00	\$ 38,000.00	\$ 50,000.00	\$ 36,000.00	\$ 29,000.00	\$ 77,000.00	\$ 13,000.00	\$ 58,000.00	\$ 59,000.00	\$ 635,000.00
LS	Contingency (25%)	\$ 25,000.00	\$ 18,000.00	\$ 17,000.00	\$ 35,000.00	\$ 14,000.00	\$ 17,000.00	\$ 12,000.00	\$ 10,000.00	\$ 27,000.00	\$ 5,000.00	\$ 20,000.00	\$ 20,000.00	\$ 220,000.00
Sub Totals for Each Street		\$ 124,000.00	\$ 91,000.00	\$ 85,000.00	\$ 175,000.00	\$ 71,000.00	\$ 88,000.00	\$ 61,000.00	\$ 51,000.00	\$ 133,000.00	\$ 24,000.00	\$ 101,000.00	\$ 102,000.00	\$ 1,106,000.00
														Total 2" Overlay Project Cost
														36,713 Total SY
														\$ 30.13 \$/SY
3" Grind & Inlay														
Unit	Item	Webster	Brenda	Patsy	Lark	Jefferson St	Buser Ln	Murphy Ct	Kelly Ct	Kaslin Way	Kaslin Ct	Crestwood	Thorville	TOTAL
LS	Mob	\$ 9,000.00	\$ 7,000.00	\$ 6,000.00	\$ 13,000.00	\$ 5,000.00	\$ 7,000.00	\$ 5,000.00	\$ 4,000.00	\$ 10,000.00	\$ 2,000.00	\$ 8,000.00	\$ 8,000.00	\$ 84,000.00
LS	TCP	\$ 5,000.00	\$ 4,000.00	\$ 3,000.00	\$ 6,000.00	\$ 3,000.00	\$ 3,000.00	\$ 2,000.00	\$ 2,000.00	\$ 5,000.00	\$ 1,000.00	\$ 4,000.00	\$ 4,000.00	\$ 42,000.00
LS	ESCP	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 12,000.00
SQYD	3 Inch Grind	\$ 34,000.00	\$ 25,000.00	\$ 23,000.00	\$ 48,000.00	\$ 18,000.00	\$ 23,000.00	\$ 17,000.00	\$ 14,000.00	\$ 37,000.00	\$ 6,000.00	\$ 28,000.00	\$ 28,000.00	\$ 301,000.00
TON	Lvl 2 ACP (3")	\$ 100,000.00	\$ 73,000.00	\$ 69,000.00	\$ 142,000.00	\$ 53,000.00	\$ 69,000.00	\$ 50,000.00	\$ 40,000.00	\$ 108,000.00	\$ 18,000.00	\$ 81,000.00	\$ 82,000.00	\$ 885,000.00
TON	Lvl 2 ACP (3")	\$ 134,000.00	\$ 97,000.00	\$ 91,000.00	\$ 189,000.00	\$ 70,000.00	\$ 92,000.00	\$ 66,000.00	\$ 53,000.00	\$ 144,000.00	\$ 23,000.00	\$ 108,000.00	\$ 109,000.00	\$ 1,176,000.00
LS	Contingency	\$ 25,000.00	\$ 18,000.00	\$ 17,000.00	\$ 35,000.00	\$ 14,000.00	\$ 17,000.00	\$ 12,000.00	\$ 10,000.00	\$ 27,000.00	\$ 5,000.00	\$ 20,000.00	\$ 20,000.00	\$ 220,000.00
Sub Totals for Each Street		\$ 165,000.00	\$ 121,000.00	\$ 113,000.00	\$ 232,000.00	\$ 89,000.00	\$ 113,000.00	\$ 82,000.00	\$ 67,000.00	\$ 178,000.00	\$ 31,000.00	\$ 134,000.00	\$ 135,000.00	\$ 1,544,000.00
														Total 3" Grind & Inlay Project Cost
														\$ 793,000.00
														36,713 Total SY
														\$ 42.06 \$/SY
4" Grind & Inlay														
Unit	Item	Webster	Brenda	Patsy	Lark	Jefferson St	Buser Ln	Murphy Ct	Kelly Ct	Kaslin Way	Kaslin Ct	Crestwood	Thorville	TOTAL
LS	Mob	\$ 9,000.00	\$ 7,000.00	\$ 6,000.00	\$ 13,000.00	\$ 5,000.00	\$ 7,000.00	\$ 5,000.00	\$ 4,000.00	\$ 10,000.00	\$ 2,000.00	\$ 8,000.00	\$ 8,000.00	\$ 84,000.00
LS	TCP	\$ 5,000.00	\$ 4,000.00	\$ 3,000.00	\$ 6,000.00	\$ 3,000.00	\$ 3,000.00	\$ 2,000.00	\$ 2,000.00	\$ 5,000.00	\$ 1,000.00	\$ 4,000.00	\$ 4,000.00	\$ 42,000.00
LS	ESCP	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 12,000.00
SQYD	4 Inch Grind	\$ 42,000.00	\$ 31,000.00	\$ 29,000.00	\$ 60,000.00	\$ 22,000.00	\$ 29,000.00	\$ 21,000.00	\$ 17,000.00	\$ 46,000.00	\$ 8,000.00	\$ 34,000.00	\$ 35,000.00	\$ 374,000.00
TON	Lvl 2 ACP (4")	\$ 134,000.00	\$ 97,000.00	\$ 91,000.00	\$ 189,000.00	\$ 70,000.00	\$ 92,000.00	\$ 66,000.00	\$ 53,000.00	\$ 144,000.00	\$ 23,000.00	\$ 108,000.00	\$ 109,000.00	\$ 1,176,000.00
LS	Contingency	\$ 25,000.00	\$ 18,000.00	\$ 17,000.00	\$ 35,000.00	\$ 14,000.00	\$ 17,000.00	\$ 12,000.00	\$ 10,000.00	\$ 27,000.00	\$ 5,000.00	\$ 20,000.00	\$ 20,000.00	\$ 220,000.00
Sub Totals for Each Street		\$ 207,000.00	\$ 151,000.00	\$ 141,000.00	\$ 291,000.00	\$ 110,000.00	\$ 142,000.00	\$ 102,000.00	\$ 83,000.00	\$ 223,000.00	\$ 38,000.00	\$ 167,000.00	\$ 169,000.00	\$ 1,908,000.00
														Total 4" Grind & Inlay Project Cost
														36,713 Total SY
														\$ 51.97 \$/SY
Reconstruct														
Unit	Item	Webster	Brenda	Patsy	Lark	Jefferson St	Buser Ln	Murphy Ct	Kelly Ct	Kaslin Way	Kaslin Ct	Crestwood	Thorville	TOTAL
LS	Mob (10%)	\$ 30,000.00	\$ 22,000.00	\$ 21,000.00	\$ 42,000.00	\$ 16,000.00	\$ 21,000.00	\$ 15,000.00	\$ 12,000.00	\$ 32,000.00	\$ 6,000.00	\$ 24,000.00	\$ 25,000.00	\$ 266,000.00
LS	TCP (1.5%)	\$ 5,000.00	\$ 4,000.00	\$ 3,000.00	\$ 6,000.00	\$ 3,000.00	\$ 3,000.00	\$ 2,000.00	\$ 2,000.00	\$ 5,000.00	\$ 1,000.00	\$ 4,000.00	\$ 4,000.00	\$ 42,000.00
LS	ESCP (0.5%)	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 12,000.00
SQYD	EXCAVATION	\$ 74,000.00	\$ 53,000.00	\$ 50,000.00	\$ 104,000.00	\$ 39,000.00	\$ 51,000.00	\$ 37,000.00	\$ 29,000.00	\$ 79,000.00	\$ 13,000.00	\$ 60,000.00	\$ 60,000.00	\$ 649,000.00
TON	ACP (4")	\$ 134,000.00	\$ 97,000.00	\$ 91,000.00	\$ 189,000.00	\$ 70,000.00	\$ 92,000.00	\$ 66,000.00	\$ 53,000.00	\$ 144,000.00	\$ 23,000.00	\$ 108,000.00	\$ 109,000.00	\$ 1,176,000.00
TON	Agg base (Varies)	\$ 85,000.00	\$ 62,000.00	\$ 58,000.00	\$ 120,000.00	\$ 45,000.00	\$ 59,000.00	\$ 42,000.00	\$ 34,000.00	\$ 92,000.00	\$ 15,000.00	\$ 69,000.00	\$ 70,000.00	\$ 751,000.00
LS	Contingency (25%)	\$ 82,000.00	\$ 59,000.00	\$ 56,000.00	\$ 116,000.00	\$ 43,000.00	\$ 56,000.00	\$ 41,000.00	\$ 32,000.00	\$ 88,000.00	\$ 14,000.00	\$ 66,000.00	\$ 67,000.00	\$ 720,000.00
Sub Totals for Each Street		\$ 376,000.00	\$ 272,000.00	\$ 256,000.00	\$ 530,000.00	\$ 198,000.00	\$ 259,000.00	\$ 187,000.00	\$ 149,000.00	\$ 404,000.00	\$ 66,000.00	\$ 304,000.00	\$ 307,000.00	\$ 3,350,000.00
														Total Reconstruction Project Cost
														36,713 Total SY
														\$ 91.25 \$/SY

DESIGN – REHABILITATION



Pavement Investigations – Field walkthrough

- Geotech, Civil, and Agency
- Plans, preliminary data and cost estimates in hand
- Apply Field Checklist Again
- Looking for practical issues/factors affecting paving treatment selection

- ❑ Client-specific needs as determined at the kickoff meeting
- ❑ Surface utility locations (manholes, valves, inlets, etc.)
- ❑ Appropriate paving limits
- ❑ Cracks/rutting (for spot repairs)
- ❑ Off-kilter manholes
- ❑ Low curb exposure
- ❑ Low spots/drainage issues
- ❑ Asphalt drainage berms
- ❑ Existing cross-slope for wedge grinds
- ❑ Speed humps
- ❑ Driveway geometry and grades
- ❑ Parking areas that may or may not be paved
- ❑ Roof drain outlet locations
- ❑ Striping measurements and street widths
- ❑ Curb type/locations
- ❑ Tree/shrub clearing needs
- ❑ Detector loop locations and conditions
- ❑ Areas potentially not needing work
- ❑ Other odd-ball features that may affect construction
- ❑ Take lots of pictures!

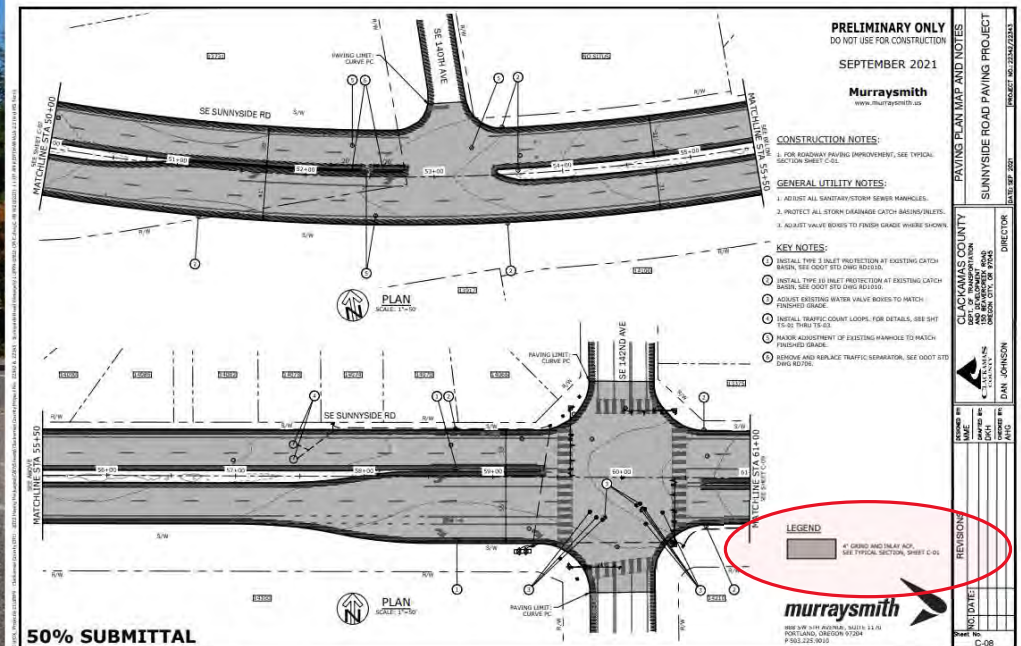
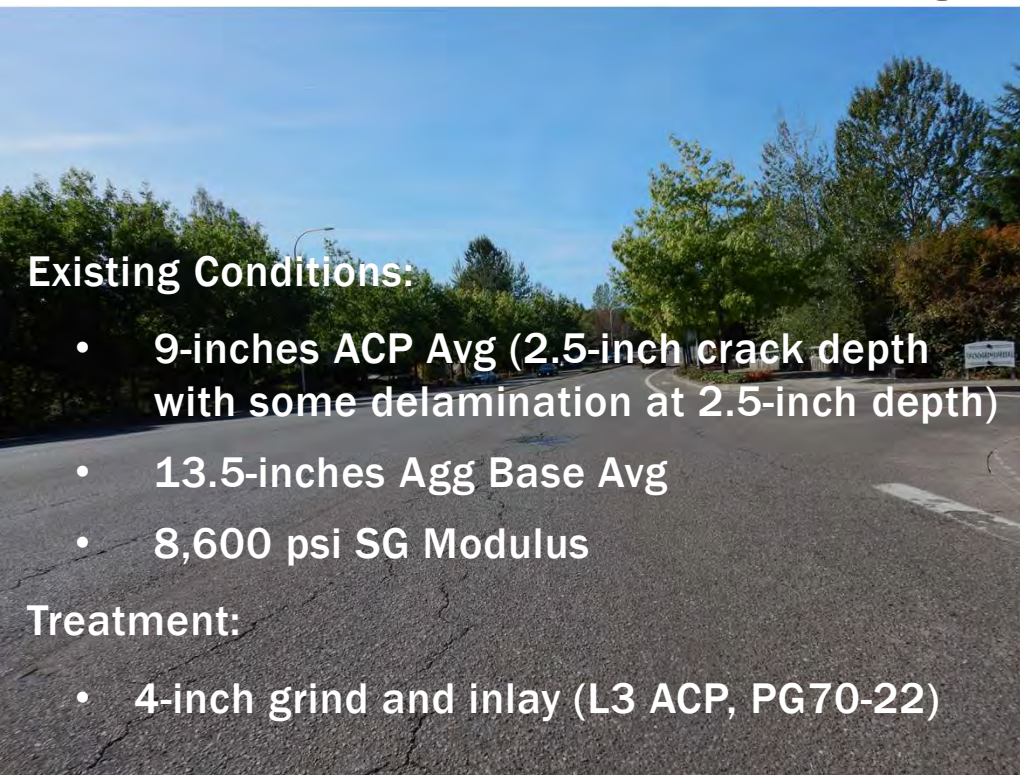
DESIGN – REHABILITATION

Pavement Investigations – Field walkthrough

- Scrutinize designs and data
- Apply lessons learned from past construction
- Confirm data matches eyes
- Discuss street maintenance history
- Consider alternative treatment options and variation along street
- Consider subgrade modulus for support during construction
- Consider traffic control needs
- Review stability of street and value of deferment

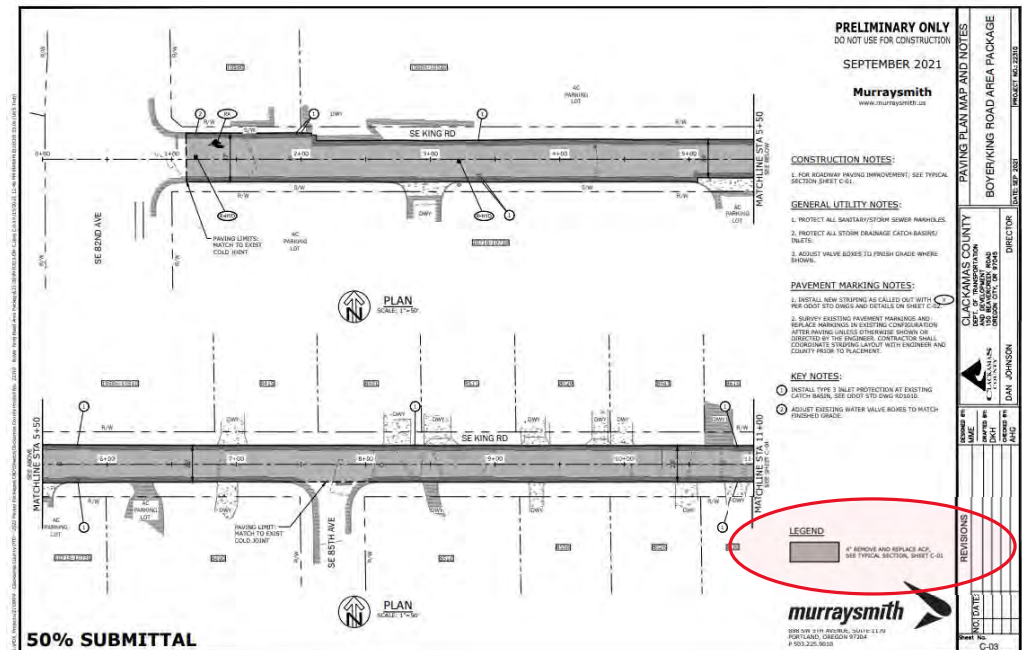
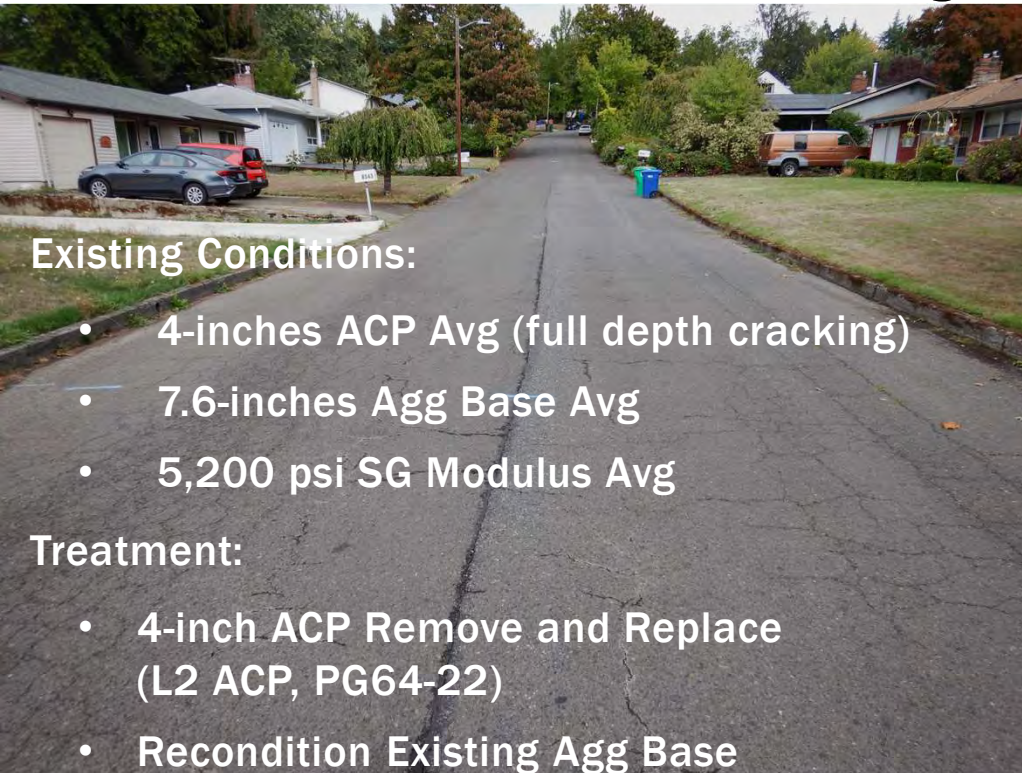
DESIGN – REHABILITATION

50% Pavement Rehabilitation Design: Sunnyside Rd.



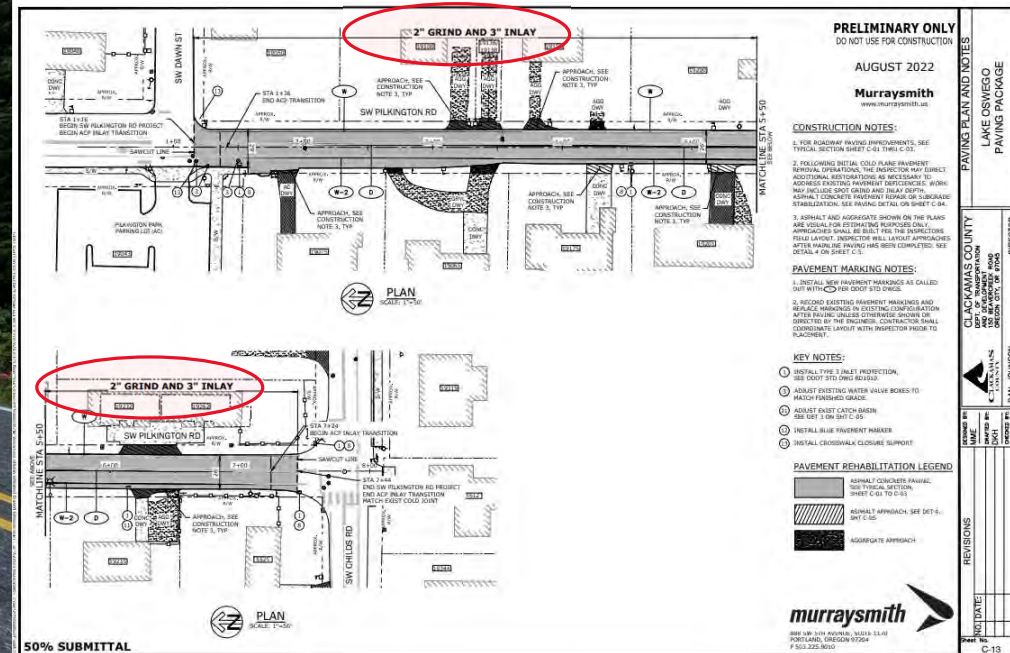
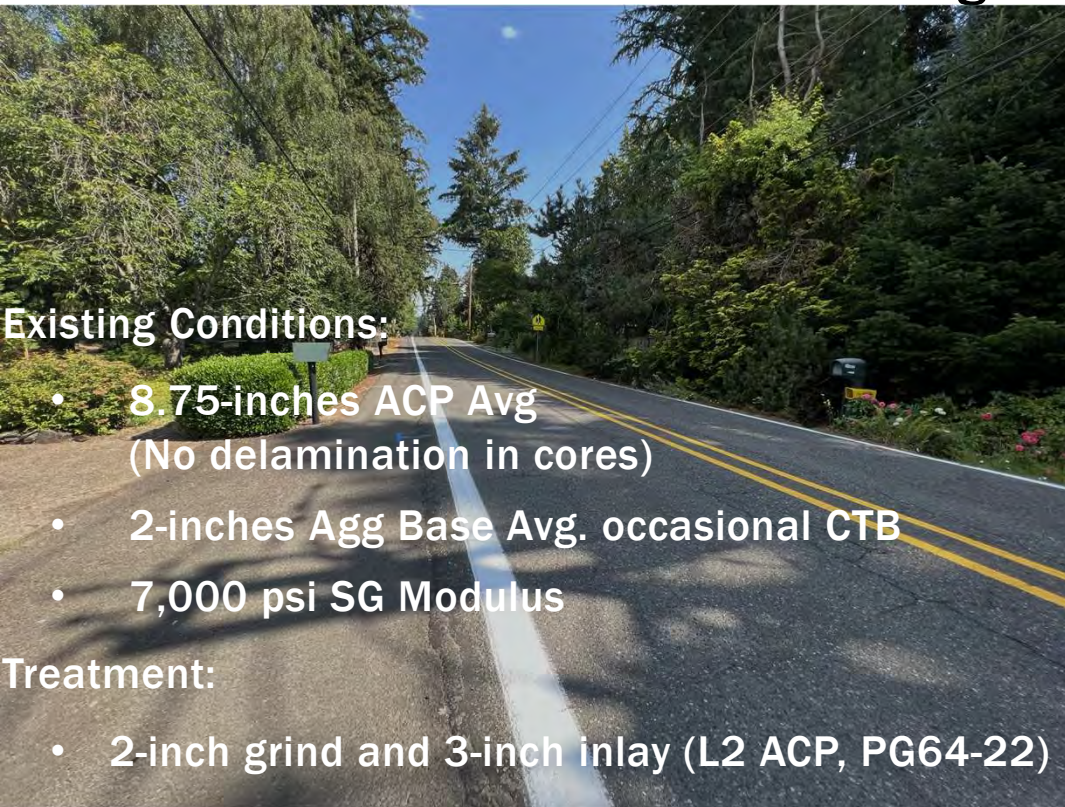
DESIGN – REHABILITATION

50% Pavement Rehabilitation Design: King Rd



DESIGN – REHABILITATION

50% Pavement Rehabilitation Design: Pilkington Rd



DESIGN – REHABILITATION

50% Pavement Rehabilitation Design: Webster Ln

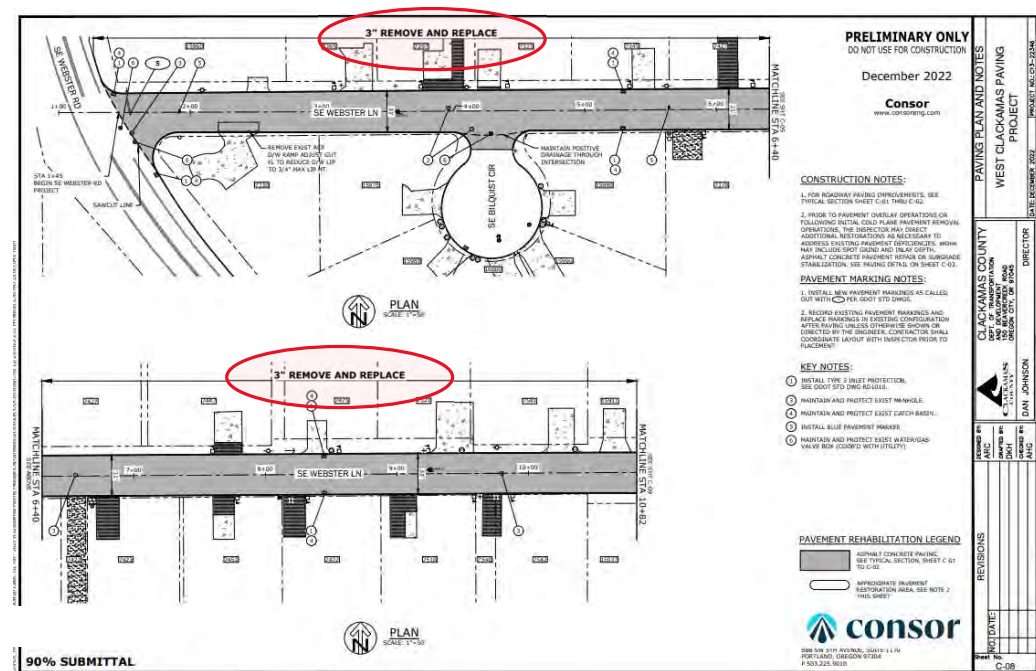
Existing Conditions:

- 2.5-inches ACP Avg (full depth cracking)
- 11-inches Agg Base Avg
- 7,000 psi SG Modulus Avg

Treatment:

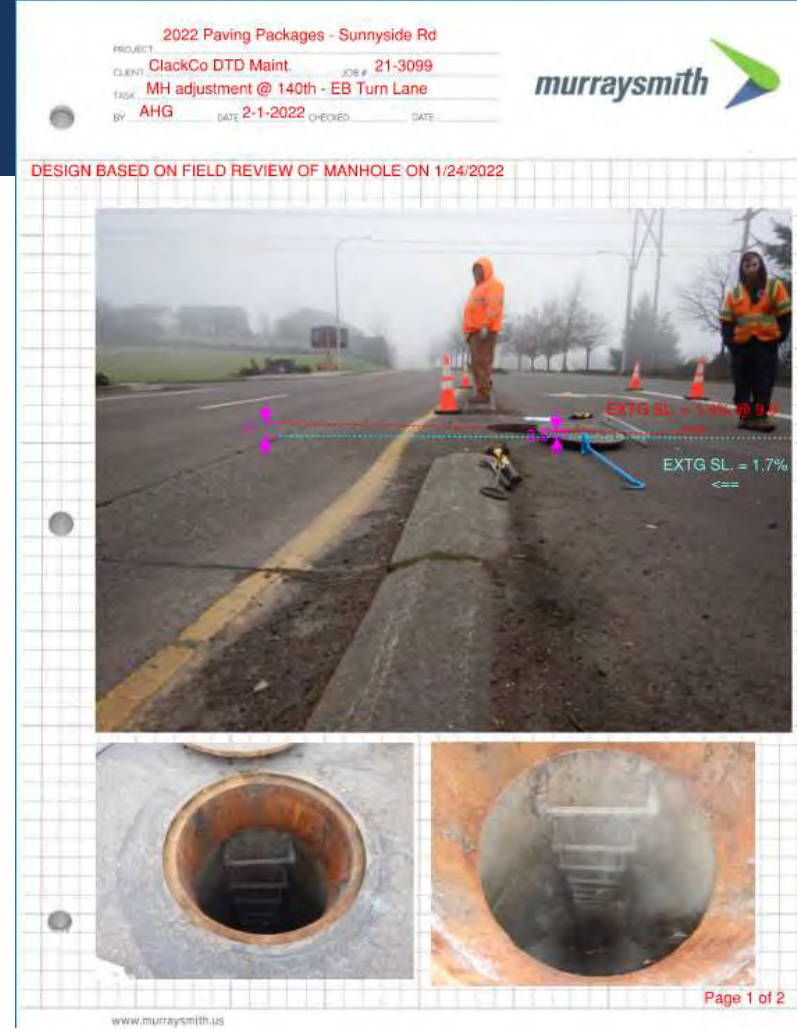
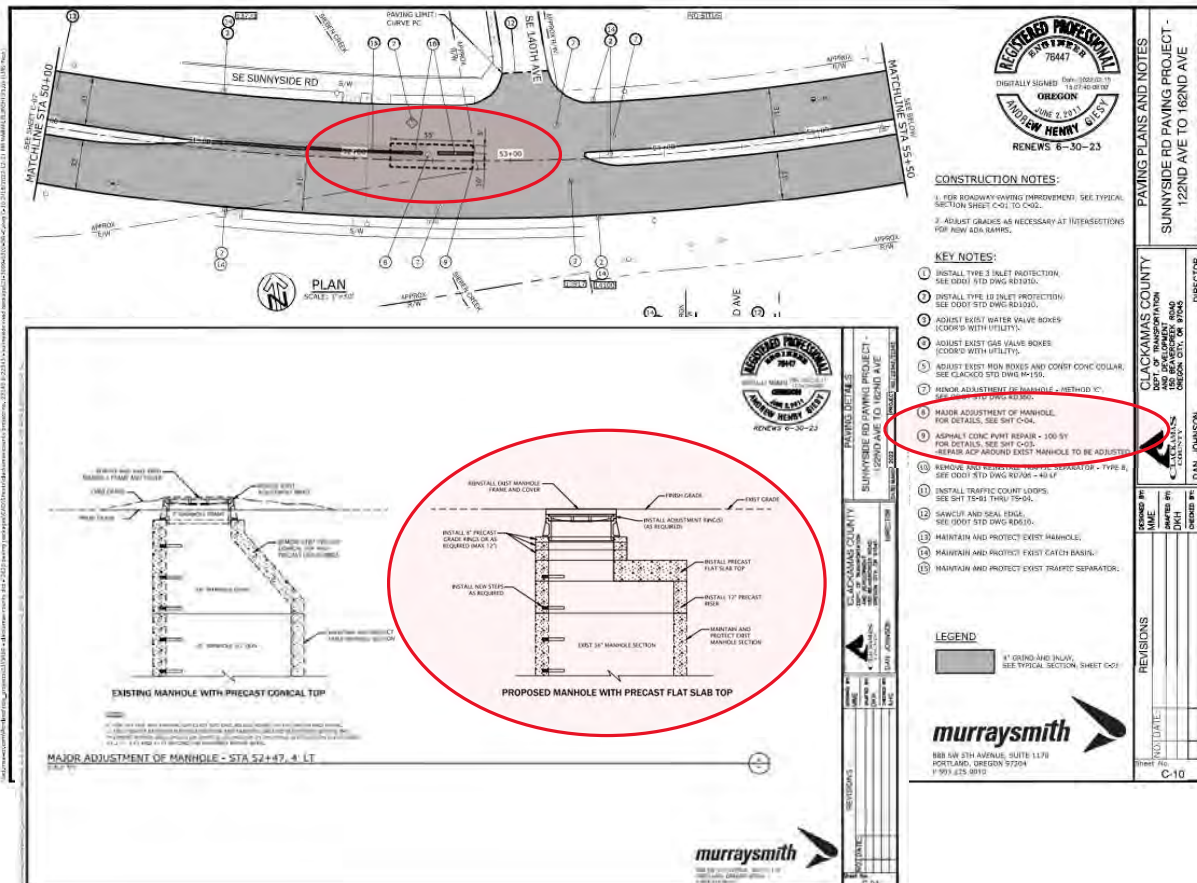
- 3-inch ACP Remove and Replace (L2 ACP, PG64-22)
- Recondition Existing Agg Base

Nov 21, 2022 9:06:21 AM
 7323 Southeast Webster Lane
 Milwaukie
 Clackamas County
 Oregon



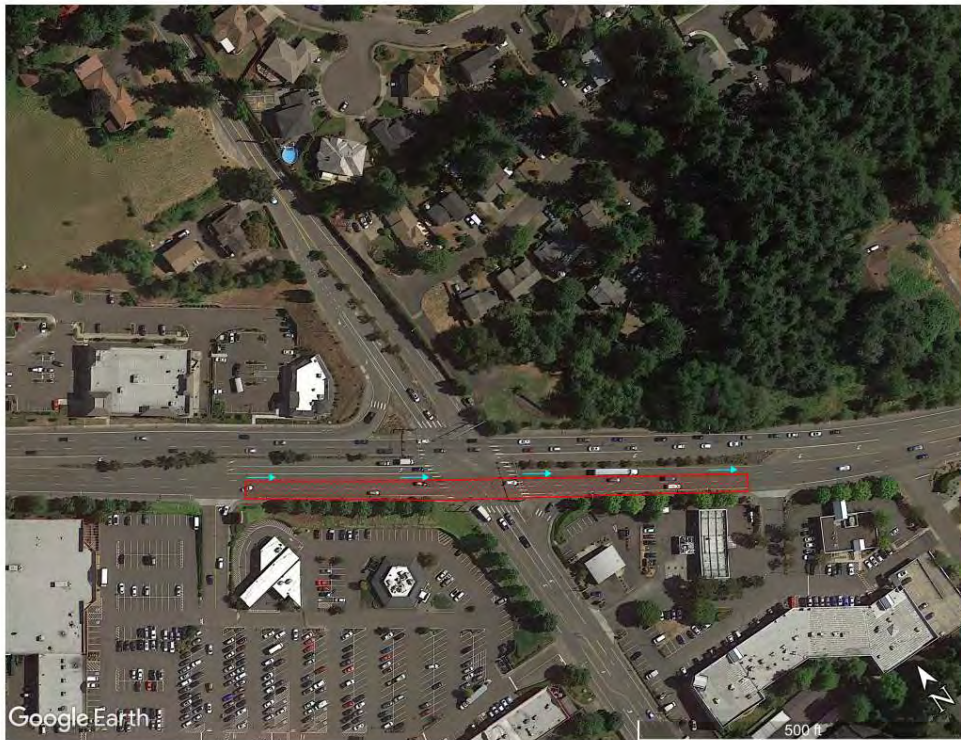
DESIGN - REHABILITATION

90% and Final Pavement Rehabilitation Design



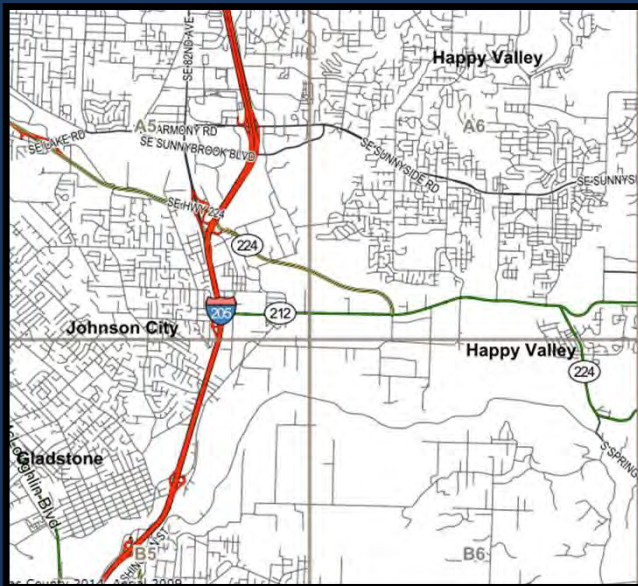
DESIGN – REHABILITATION

90% and Final Pavement Rehabilitation Design: Traffic Control Concepts



DESIGN - REHABILITATION

Lessons Learned



DESIGN

Preservation

DESIGN – PRESERVATION

Typical Clackamas County Scope of Work for Pavement Preservation for Design

Task 1: Project Management and Coordination

Task 2: Field Review Preservation Candidates & Quantity Development

Task 3: Design (60%/ 100%/ Final)

Task 4: Bid Phase Services

Goal: develop a design approach the County can complete in-house

DESIGN – PRESERVATION

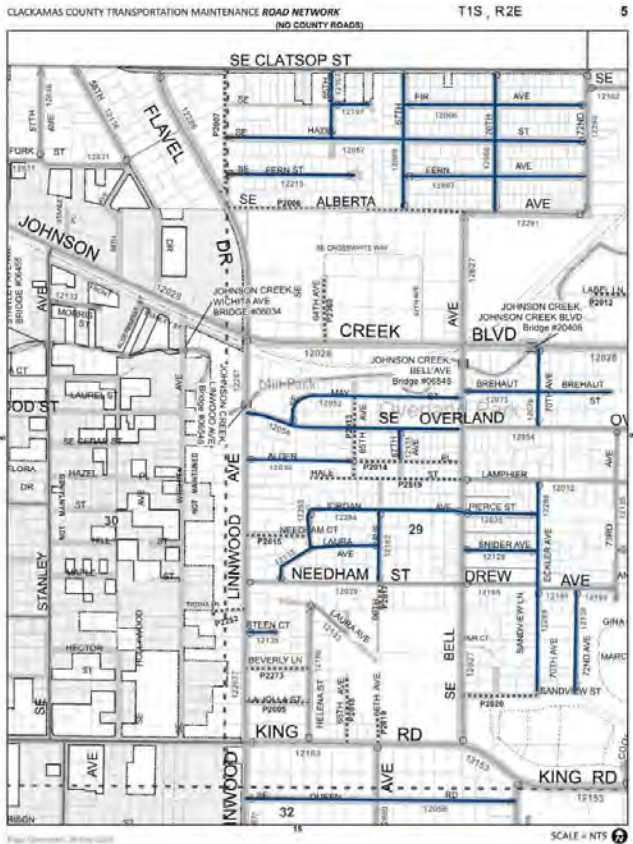
Field Review

Road Name	Street ID	From	To	Functional Classification	Length, feet				Surface Treat	Tree Trimming	Patching Needed	Striping/ Stop Bars	Cracking Quantity, feet	Comments	
CHIPSEAL PROJECTS						Width	Area_Sf	Area_Sf	Y/N?	Y/N?	Y/N?	Y/N?			
ESTACADA/EAGLE CREEK CHIP SEAL PROJECT						ESTACADA									
COUPLAND	34063	TRACY RD	DIVERS RD	RMIA	1,056	22	23,232	2,581	Y	N	N	Y	510	High severity fatigue at the intersection of Tracy Rd	
COUPLAND RD	34020	CURRIN RD	TRACY RD	RMIA	5,755	22	126,610	14,068	Y	N	N	Y	3,650		
COUPLAND RD	34076	CURRIN	CEMETERY RD	RMIA	7,286	24	174,864	19,429	Y	N	N	Y	5,700		
CURRIN RD	34075	SNUFFIN RD	COUPLAND RD	RMIA	7,286	24	174,864	19,429	Y	N	N	Y	2,150		
DAVIS RD SE	34031	TRACY RD	DEAD END MP 1.01	RL	5,333	20	106,660	11,851	Y	N	Y	N	5,000	High severity fatigue on approx. 75% of road north of Snuffin Rd	
DIVERS RD	34064	COUPLAND RD	FALLCREEK RD	RMIA	12,302	22	270,644	30,072	Y	Y	Y	Y	9,100	Recommended tree root removal	
DOWTY RD	24060	OSH 224	FOLSOM RD	RMIC	15,312	22	336,864	37,429	Y	Y	Y	Y	2,000	Previous patch repairs deteriorated; Localized high severity fatigue	
DAVIS RD SE	34000	EAGLE CREEK RD	CURRIN RD	RMIA	11,832	22	272,021	30,225	Y	N	Y	Y	5,200	Localized medium fatigue cracking; Slippage near the middle of the road segment	
							630,914	70,102	Y	N	Y	Y	21,000	Recommended mill and inlay on bridge deck; Patching at the intersection of Wildcat Mountain Dr	
							24,398	2,771	N	N	N	Y	0	Potential candidate for exclusion	
							12,140	1,349	Y	Y	N	N	100		
							121,968	13,552	Y	Y	Y	Y	2,100	Continuous high severity fatigue in centerline on approx. 50% of road segment; Rutting observed	
							11,616	1,291	Y	N	Y	Y	1,000	Recommend patching at the intersection of OSH 211	
							137,487	15,276	Y	N	Y	Y	4,000	Localized high severity fatigue	
							23,240	2,582	Y	Y	N	Y	200		
							67,580	7,509	Y	N	Y	Y	2,200	High severity fatigue	
							45,144	5,016	Y	Y	N	Y	1,100		
							92,928	10,325	N	N	Y	Y	0	Recommend tree root removal; Good condition	
							58,080	6,453	Y	N	Y	Y	1,000	High severity fatigue	
							121,440	13,493	Y	N	Y	Y	7,600	High severity fatigue; Potential slippage near western end of the road segment	
							160,520	17,836	Y	N	Y	Y	6,000	Localized high severity fatigue	
							326,392	36,266	Y	Y	Y	Y	9,500	Recommended tree root removal on southern end of the road segment; Potential slippage North of Kemp Rd; Observed rutting	
							21,850	2,428	Y	N	N	Y	200		
							3,341,456	371,273							

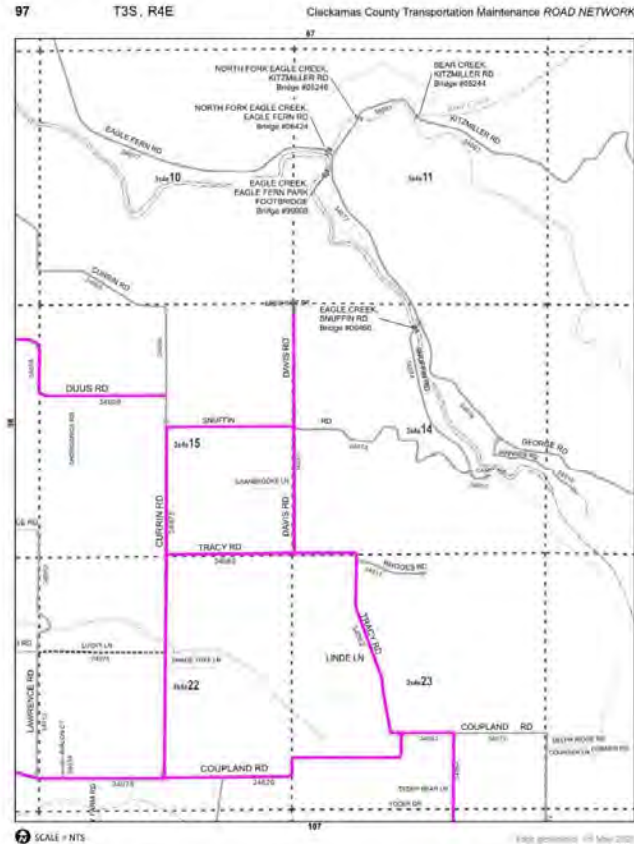


DESIGN – PRESERVATION

2023 Slurry Seal Project



2023 Chip Seal Project



Plans

- Used County Map Book for easy mapping

REVISIONS		 CLACKAMAS COUNTY CLACKAMAS COUNTY 10000 NE MULTNOMAH ST PORTLAND, OR 97218 (503) 325-1000	CLACKAMAS COUNTY PLAN OVERLAND PARK SLURRY SEAL PROJECT DATE: 08-31-2023 PROJECT NO.: 20-3-23241
NO.	DATE		
1	08-31-2023	LAH	
2	09-13-2023	DWE	
3	09-13-2023	LAH	

REVISIONS		 CLACKAMAS COUNTY CLACKAMAS COUNTY 10000 NE MULTNOMAH ST PORTLAND, OR 97218 (503) 325-1000	CLACKAMAS COUNTY PLAN ESTACADA/EAGLE CREEK CHIP SEAL PROJECT DATE: 08-31-2023 PROJECT NO.: 20-3-23248
NO.	DATE		
1	08-31-2023	LAH	
2	09-13-2023	DWE	
3	09-13-2023	LAH	



DESIGN – PRESERVATION

Slurry Seal

- **Specifications**
 - Customized ODOT Section 00706
 - Type II aggregate
 - LMCQS-1h emulsion

Chip Seal

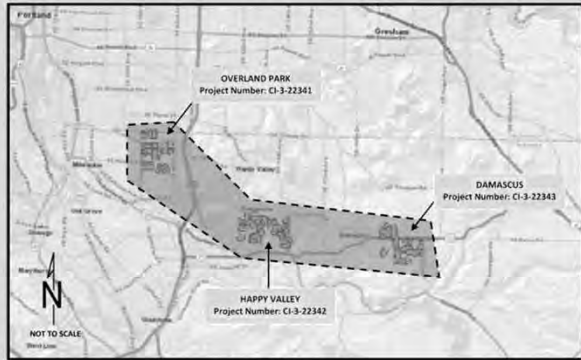
- **Specifications**
 - Customized ODOT Section 00710
 - PMCRS-2H or CRS-3P emulsion
- **County provided chip rock**
 - ODOT Graded Medium chip aggregate (3/8” – No. 4)

DESIGN – PRESERVATION

2023 Slurry Seal Project



CLACKAMAS COUNTY, OREGON TYPE II SLURRY SEAL PROJECT



LOCATION MAP

PROJECT CONTACTS

OWNER: _____
CLACKAMAS COUNTY

INDEX OF SHEETS

NO.	DESCRIPTION
01	COVER
02	PLAN SHEET: HAPPY VALLEY
03	PLAN SHEET: HAPPY VALLEY
04	PLAN SHEET: HAPPY VALLEY
05	PLAN SHEET: HAPPY VALLEY
06	PLAN SHEET: HAPPY VALLEY
07	PLAN SHEET: DAMASCUS
08	PLAN SHEET: DAMASCUS
09	PLAN SHEET: OVERLAND PARK
10	PLAN SHEET: OVERLAND PARK
11	PLAN SHEET: OVERLAND PARK
12	PLAN SHEET: OVERLAND PARK
13	QUANTITIES: HAPPY VALLEY
14	QUANTITIES: DAMASCUS
15	QUANTITIES: OVERLAND PARK

GENERAL NOTES

1. THE 2021 EDITION OF THE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION BY THE OREGON DEPARTMENT OF TRANSPORTATION AND THE AMERICAN PUBLIC WORKS ASSOCIATION OREGON CHAPTER WILL BE CONSIDERED THE STANDARD SPECIFICATION.
2. PROJECT LIMIT LOCATIONS SHOWN ON ENGINEERING DRAWINGS ARE APPROXIMATE. THE EXACT LOCATION OF PROJECT LIMITS WILL BE PAINTED OUT.
3. CONTRACTOR SHALL COVER/PROTECT ALL VALVES, MONUMENT BOXES, CATCH BASINS, RAISED PAVEMENT MARKERS, MANHOLES OR OTHER IN-STREET APPURTENANCE PRIOR TO SLURRY SEAL APPLICATION.
4. CONTRACTOR SHALL REMOVE ALL COVER/PROTECTIONS APPLIED AFTER THE CHIP SEAL HAS CURED.
5. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR WORKING IN PUBLIC RIGHT-OF-WAY (I.E., ODOT CITY, COUNTY).
6. CONTRACTOR RESPONSIBLE FOR SECURING A STOCKPILE LOCATION.

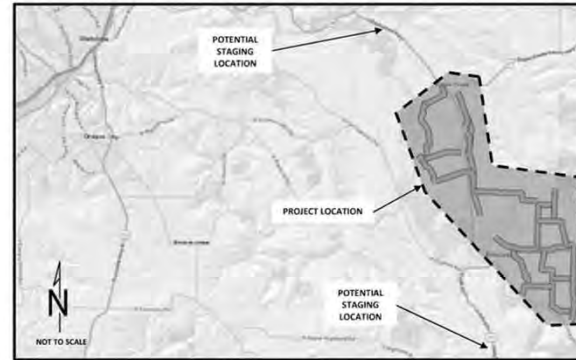
REVISIONS		DATE	BY	DESCRIPTION

LAH	DAN JOHNSON	DIRECTOR
-----	-------------	----------

CLACKAMAS COUNTY	COVER SHEET
2023 SLURRY SEAL PROJECT	
DATE: 03-21-2023	PROJECT NO: 03-23-10000



CLACKAMAS COUNTY, OREGON ESTACADA – EAGLE CREEK CHIP SEAL PROJECT



LOCATION MAP

PROJECT CONTACTS

OWNER: _____
CLACKAMAS COUNTY

INDEX OF SHEETS

NO.	DESCRIPTION
01	COVER
02	PLAN SHEET
03	PLAN SHEET
04	PLAN SHEET
05	PLAN SHEET
06	PLAN SHEET
07	PLAN SHEET
08	PLAN SHEET
09	QUANTITIES

GENERAL NOTES

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4. CONTRACTOR SHALL REMOVE ALL COVER/PROTECTIONS APPLIED AFTER THE CHIP SEAL HAS CURED.
5. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR WORKING IN PUBLIC RIGHT-OF-WAY (I.E., ODOT CITY, COUNTY).
6. CONTRACTOR RESPONSIBLE FOR SECURING A STAGING LOCATION.

REVISIONS		DATE	BY	DESCRIPTION

LAH	DAN JOHNSON	DIRECTOR
-----	-------------	----------

CLACKAMAS COUNTY	COVER SHEET
ESTACADA-EAGLE CREEK CHIP SEAL PROJECT	
DATE: 04-07-2023	PROJECT NO: 03-23-10000



DESIGN – PRESERVATION

Slurry Seal

Overland Park Area Slurry Seal Package 2023 page 2 of 2

Item #	Spec #	Item Description	Unit	Quantity	Unit Price	Amount
TEMPORARY FEATURES AND APPURTENANCES						
1	00197	EXTRA WORK DONE ON FORCE ACCOUNT BASIS	FA	1	\$5,000.00	\$5,000.00
2	00210	MOBILIZATION	LS	1	\$19,000.00	\$19,000.00
3	00290	POLLUTION CONTROL PLAN	LS	1	\$1,000.00	\$1,000.00
TEMPORARY FEATURES AND APPURTENANCES-SUBTOTAL						
ROADWORK						
4	00310	REMOVAL OF PAVEMENT MARKINGS	LS	1	\$5,500.00	\$5,500.00
ROADWORK-SUBTOTAL						
WEARING SURFACES						
5	00706	TYPE II SLURRY SEAL	SY	85,851	\$2.50	\$214,628.33
WEARING SURFACES - SUBTOTAL						
WORKSITE #3 - OVERLAND PARK PROJECT TOTAL (PLAN SHEETS 9-12)						\$245,128.33

Type II Slurry Seal Package

WORKSITE TOTALS	
WORKSITE #1 - HAPPY VALLEY PROJECT TOTAL (PLAN SHEETS 2-6)	\$190,583.33
WORKSITE #2 - DAMASCUS PROJECT TOTAL (PLAN SHEETS 7-8)	\$246,432.78
WORKSITE #3 - OVERLAND PARK PROJECT TOTAL (PLAN SHEETS 9-12)	\$245,128.33
TYPE II SLURRY SEAL PACKAGE TOTAL	\$682,144.44

Total Price _____ Dollars and Cents

Name of Firm _____

Name (Print) _____

Signature _____

Date

Chip Seal

Estacada - Eagle Creek Chip Seal Package 2023 page 1 of 1

Item #	Spec #	Item Description	Unit	Quantity	Unit Price	Amount
TEMPORARY FEATURES AND APPURTENANCES						
1	00197	EXTRA WORK DONE ON FORCE ACCOUNT BASIS	FA	1	\$15,000.00	\$15,000.00
2	00210	MOBILIZATION	LS	1	\$150,000.00	\$150,000.00
3	00290	POLLUTION CONTROL PLAN	LS	1	\$1,000.00	\$1,000.00
TEMPORARY FEATURES AND APPURTENANCES-SUBTOTAL						
ROADWORK						
4	00310	REMOVAL OF PAVEMENT MARKINGS	LS	1	\$30,000.00	\$30,000.00
ROADWORK-SUBTOTAL						
WEARING SURFACES						
5	00705	EMULSIFIED ASPHALT FOG COAT	TON	179	\$490.00	\$87,710.00
6	00710	APPLICATION OF EMULSIFIED ASPHALT CHIP SEAL	SY	354,164	\$2.40	\$849,992.53
7	00710	ASPHALT IN EMULSIFIED ASPHALT CHIP SEAL	TON	812	\$690.00	\$560,280.00
WEARING SURFACES - SUBTOTAL						
ESTACADA - EAGLE CREEK PROJECT TOTAL (PLAN SHEETS 2-8)						\$1,693,982.53

Estacada - Eagle Creek Chip Seal Package

2023 ESTACADA-EAGLE CREEK CHIP SEAL PACKAGE TOTAL						\$1,693,982.53
--	--	--	--	--	--	-----------------------

Total Price _____ Dollars and Cents

Name of Firm _____

Name (Print) _____

Signature _____

Date

DESIGN - PRESERVATION

Challenges/
Lessons learned



CONSTRUCTION

Rehabilitation

CONSTRUCTION



CONSTRUCTION

Rehabilitation – ACP Spot Grind and Inlay



CONSTRUCTION

Rehabilitation – 4-inch Remove and Replace



CONSTRUCTION

Rehabilitation – ACP Repair and Subgrade Stabilization



CONSTRUCTION

Rehabilitation – Asphalt Reinforcement Fibers



CONSTRUCTION

Boyer Road Waterline Break Mid-Construction



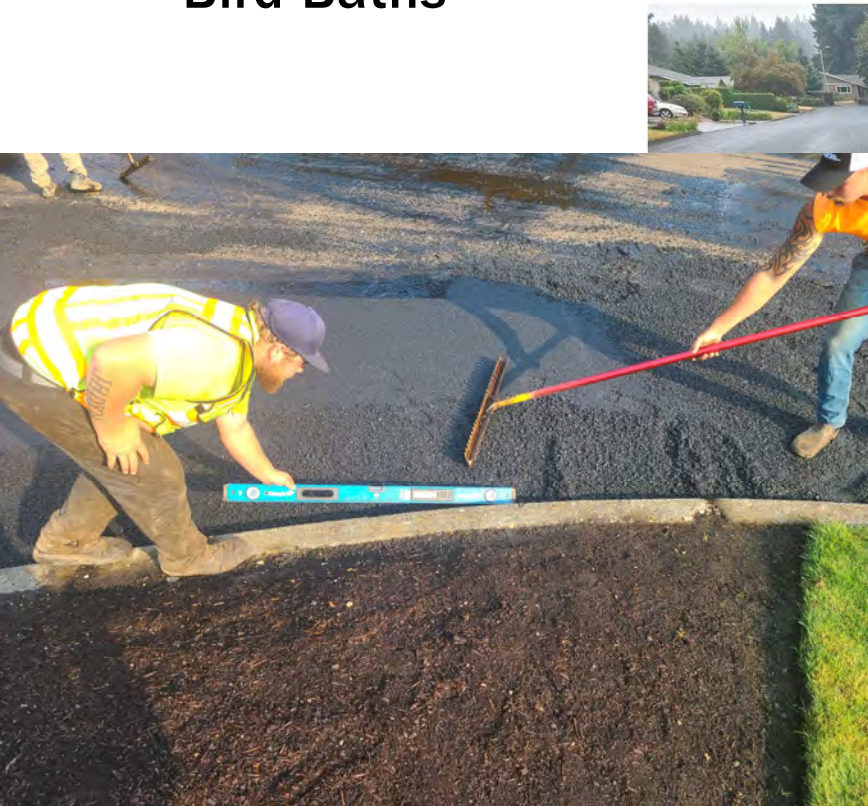
CONSTRUCTION

What you can find during milling...



CONSTRUCTION

Bird Baths



CONSTRUCTION

Crestview Drive – Drainage Issue



CONSTRUCTION



Smoothness

CONSTRUCTION

Mulino Road



CONSTRUCTION

Striping/Markings



CONSTRUCTION

Rehabilitation – Post Construction



Boyer/King Rd



Boyer/King Rd



McLoughlin

CONSTRUCTION

Preservation

CONSTRUCTION – CHIP AND SLURRY

Preparation



CONSTRUCTION – CHIP AND SLURRY

Preparation



CONSTRUCTION – SLURRY SEAL



CONSTRUCTION – SLURRY SEAL



CONSTRUCTION – SLURRY SEAL

video

CONSTRUCTION – CHIP SEAL



CONSTRUCTION – CHIP SEAL



CONSTRUCTION – CHIP SEAL



CONSTRUCTION – CHIP SEAL



CONSTRUCTION – CHIP SEAL



CONSTRUCTION – CHIP SEAL



CONCLUSIONS/ LESSONS LEARNED

2023 Construction Season

- 10 Contracted Projects
- All bid estimates were below engineer's estimates
- Only 1 project went over budget due to unforeseen field conditions
- Future preservations jobs
 - Physically measure lengths and widths
 - Area estimates were 5-8% low
 - Area based on County Maintenance Software/StreetSaver

Communication Challenges...how to inform the community?

- Mailers, social media, door hangers, website

CONCLUSIONS/ LESSONS LEARNED

CONCLUSIONS/ LESSONS LEARNED

Time Will Tell...

- We are at the beginning of the revised process
 - Will the modifications and assumptions hold true?
 - Will this approach allow us to reach the ultimate PCI goal?
 - Will the funding level keep pace with the cost increases and pavement deterioration?
-
- Moving between network-level and project-level work is HARD





QUESTIONS

THANK YOU



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503-694-4522

clackamas.us/transportation/



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gri.com