



Road Operations

**Pierce County Public Works & Utilities
Road Operations Division**



Road Maintenance Asset Management

About Us

- **1,790 square miles**
 - Including Mt. Rainier National Park
- **County Population**
 - 813,600 total; 382,115 unincorporated
- **3,150 lane miles** (unincorporated)
- **164 full time employees**
 - 15 seasonal-hires (normally)
- **170+ pieces of equipment**
- **Three Road Ops facilities**



Road Asset Management

Is a holistic approach to managing road assets under total life-cycle strategy. Asset management strategies are not task oriented, but instead are driven by pre-established priorities and level of service goals for each asset category and sub-category. Consequently, performance measures are determined by assessments of outcomes in terms of asset condition; asset function; safety; and costs to achieve levels of service over time. Statistical information is compiled and evaluated relating to types of assets, usage, condition level, threshold of intervention, quantifiable risks, future construction, MOP costs, and long term outcomes.



Why Asset Management?



Public Expectations

Do your job, and do it better.

Do more with fewer resources.

Cut costs

Reduce spending

Government assumed inefficient until
proven otherwise?

I don't remember drinking any Kool-Aid when I was hired...



**Pierce County Road Operations Division
Mission Statement:**

**To maintain, operate and preserve
Pierce County's roads at full
function, 24/7, as safely and
efficiently as possible.**



8 Elements of PWU Road Ops AM System

1. Inventory
2. Level of Service (LOS)
3. Condition Assessment
4. Usage Data
5. Cost Data
6. Replacement Model
7. Risk Assessment
8. Performance Measures



Inventory

An accurate inventory for each asset type and category is compiled and maintained. The level of attribute detail captured for each asset is driven by several factors:

- 1.Provides the ability to define and assess relevant asset condition information.**
- 2.Provides the ability to evaluate and establish optimal LOS goals for the asset.**
- 3.Provides the ability to determine the appropriate M&O activity when condition thresholds are exceeded.**
- 4.Provides the ability to track performance of the asset relevant to its expected lifecycle.**
- 5.Provides the ability to identify the value of each asset and the sum of assets within each category.**
- 6.Provides the ability to capture and correlate MOP costs specific to each asset.**





Level of Service (LOS)

Establishes the desired asset condition thresholds (severity and extent of defects that will be tolerated before corrective action is taken), and/or scope service that will be delivered (bare and wet pavements during snow events, potholes patched within 24hrs of notice, etc.). The LOS goal serves as an agreement with citizens and policymakers on the services to be provided including a comprehensive understanding of the costs to deliver that service.



Condition Assessment

A systematic assessment of the condition of an asset relative to its function and to the factors germane to its MOP needs. Asset condition is captured and weighted by defect type, defect severity, and the extent of the defect as it affects each asset. The condition assessment provides managers the ability to determine whether or not LOS goals are being met, the optimal remedy if action is warranted, and overall performance of the asset within its lifecycle model.



Condition Assessment

No Work Necessary	0	- As-built Condition	Good Condition
	1	- Minor Defect; Isolated	
	2	- Minor Defect; Several	Fair Condition
	3	- Minor Defect; Predominant	
Work Should Be Scheduled Within 6 Months	4	- Significant Defect; Isolated	Poor Condition
	5	- Significant Defect; Several	
	6	- Significant Defect; Predominant	
Work Should Be Scheduled Within 2 Months	7	- Same as 4 with secondary damage	Very Poor Condition
	8	- Same as 5 with secondary damage	
	9	- Same as 6 with secondary damage	

Usage Data

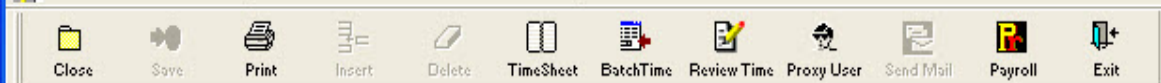
Asset usage data is important to the development of MOP program performance modeling. The level of asset usage often correlates directly to the rate at which an asset deteriorates over time. Usage information is also utilized when prioritizing competing needs, particularly when managing resource constraints, e.g. – resources can be invested to benefit the largest number of citizens.



Resource Requirements and Cost Data

Cost data includes all costs associated with the MOP activities required for each asset category. Cost data is evaluated at a level of detail that provides managers the ability to quantify both budget requirements and the corresponding labor, equipment and material resources needed to meet objectives.





Select the Timekeeper Location:

Road Shop #2 Elk Plain

Month (1-12): Year (YYYY):

7

2010

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Figure 8
Monthly Work Plans
By Road District

Information from function/task detail; labor, equipment, & materials data; and, the cycle distribution table are calculated to produce monthly work plans & budgets by road district

CYCLE PRODUCTION PLANNING 2010

Printed 12/20/2009

Road Shop #2 Elk Plain

CYCLE 7 7/1/2010 THRU 7/31/2010

21 WORK DAYS

9 WEEK END DAYS

1 HOLIDAYS

FUNCTION	PLANNED PRODUCTION	TOTAL COST	LABOR COST	EQUIPMENT COST	MATERIAL COST
20A BUILDING MAINTENANCE/TOOL ROOM	MANHOUR 58.31	3,021.17	2,417.16	604.00	0.00
20B GROUNDS MAINTENANCE	MANHOUR 74.97	4,224.88	3,134.51	1,070.25	20.12
20X OTHER GROUNDS/FACILITIES	MANHOUR 30.82	2,110.22	1,433.48	667.52	9.22
31A TEMPORARY PAVEMENT PATCHING	Hours 10.00	642.39	403.18	130.62	108.60
31B PERMANENT PAVEMENT PATCHING	TON 21.66	7,522.52	4,322.97	1,788.15	1,411.40
31BD BASE DIG OUT	Hour 20.82	1,747.74	934.69	642.43	170.62
31F CHIP SEALING	LANE MILE 0.00	0.00	0.00	0.00	0.00
31FR RUBBERIZED CHIPSEAL	LANE MILE 16.00	264,304.67	38,188.45	21,889.65	204,226.56
31FS FOG SEAL	MILE 2,150.79	6,363.68	1,214.79	3,965.96	1,182.93
31G SKIN PATCHING	SQ. YARD 1,350.00	5,796.58	2,136.85	1,547.65	2,112.09



Select the Timekeeper Location:

Road Shop #2 Elk Plain

Month (1-12): Year (YYYY):

7

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Figure 8.1 Monthly Work Plans By Road District

Each monthly work plan include calculations of resource requirements; labor below.

90D	TRAINING	MANHOUR	145.77	6,865.50	6,541.32	324.18	0.00
90G	SHOP STEWARD ACTIVITIES	MANHOUR	3.33	192.90	169.84	23.06	0.00
90S	SAFETY MEETINGS	Labor Hour	33.32	1,461.34	1,393.68	67.66	0.00
90T	CREW MEETING	MANHOUR	41.65	1,840.56	1,757.52	83.04	0.00
90W	DRUG & ALCOHOL TESTING	MANHOUR	2.50	149.28	114.70	34.58	0.00
90X	OTHER	MANHOUR	24.99	1,169.68	1,063.76	105.92	0.00

RESOURCE TYPE LABOR

RESOURCE CODE		PLANNED UNITS		MONTH'S COST
4063	Maintenance Office Manager	3.32	HOURS	\$111.37
9009	Road Ops Field Supervisor	397.36	HOURS	\$21,362.30
9151	Maintenance Worker	1,025.70	HOURS	\$40,463.79
9154	Maintenance Technician	2,447.40	HOURS	\$106,070.35
9158	Heavy Equipment Operator	701.40	HOURS	\$33,386.74
9164	Heavy Equipment Op Lead	25.36	HOURS	\$1,279.47



Select the Timekeeper Location:

Road Shop #2 Elk Plain

Month (1-12): Year (YYYY):

7

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Figure 8.2
Monthly Work Plans
By Road District
 Each monthly work plan include calculations of resource requirements; materials below.

CYCLE PRODUCTION PLANNING 2010

Printed 12/20/2009

Road Shop #2 Elk Plain

CYCLE 7 7/1/2010 THRU 7/31/2010

21 WORK DAYS

9 WEEK END DAYS

1 HOLIDAYS

RESOURCE TYPE MATERIAL

RESOURCE CODE		PLANNED UNITS		MONTH'S COST
5765	Asphalt - Class B Mix	4.56	Ton	\$206.30
5790	Asphalt - Class G Mix	1.61	Ton	\$72.69
5793	Asphalt - Bagged Temporary Patch Mix	5.59	Bag	\$37.17
5794	Asphalt - UPM Cold Patch / EZ Street	0.95	Ton	\$70.29
5797	Propane	17.81	Gallon	\$61.28
5R09	Randles - 3/4 Shoulder Rock	107.89	Ton	\$1,650.79
5R10	Randles - 1 1/4 Shoulder Rock	12.27	Ton	\$187.81
5R12	Randles - 2-7 Quarry Spall	21.42	Ton	\$327.72
5R13	Randles - Washed drain rock	3.40	Ton	\$31.58
5R14	Randles - 1/2 Chipseal Rock	24.30	Ton	\$292.09
5R16	Randles - 3/8 Chipseal Rock	10.80	Ton	\$129.82
5R18	Randles - Ice Sand	6.00	Ton	\$91.84



Resource Usage Report (RMS200)

Select Beginning and Ending Dates:

Select a TKL

Function:

Category:

01/01/2009

12/24/2009

Road Shop #2 Elk Plain

Function

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Summary Only:

Detail Only:

Display Graph:

Save To Excel

PIERCE COUNTY

PUBLIC WORKS DEPARTMENT

RESOURCE USAGE: 1/1/2009 THRU 12/24/2009 09:52:58

Road Shop #2 Elk Plain TKL 820

FUNCTION 31FR RUBBERIZED CHIPSEAL

PROJECT CSM6200 GENERAL ROADWAY MAINTENANCE

PRODUCTION 59.69 LANE MILE % \$823,075.13 Funct total \$13,789.16 Per ProductionUnit

	CODE	UNITS	%	AMOUNT	DESCRIPTION
RESOURCE TYPE LABOR	9009	152.00	2.546	7,882.72	Road Ops Field Supervisor (9009)
	9151	396.00	6.634	15,333.12	Maintenance Worker (9151)
	9154	986.10	16.520	41,692.30	Maintenance Technician (9154)
	9158	425.60	7.130	19,858.50	Heavy Equipment Operator (9158)
	9169	83.00	1.391	3,685.20	Maint Technician Lead (9169)
RESOURCE TYPE EQUIPMENT	005C	18.00	0.302	183.96	1/2 Ton Pick-Up
	005G	112.00	1.876	1,230.88	3/4 Ton Pick Up
	005H	166.50	2.789	1,625.04	Crew Cab Pick Up, PW
	005L	82.50	1.382	1,085.70	Flatbed 4x4
	006C	106.00	1.776	2,127.42	Flat Bed 1 Ton
	006E	6.50	0.109	141.31	5 Yard Diesel Dump Truck
	006F	532.80	8.926	13,463.20	10 Yard Dump Truck, PW
	008I	56.50	0.947	2,056.60	Tanker - Flush Truck
	010B	135.00	2.262	1,161.00	9-20 Ton Trailers
	011B	15.00	0.251	1,010.70	Grader 22000lb-28000lb Yellow
	013A	9.00	0.151	249.84	Skid-Steer Loader
	013E	103.30	1.731	3,920.24	Front End Loader

Figure 10
Resource Usage Report
By Road District

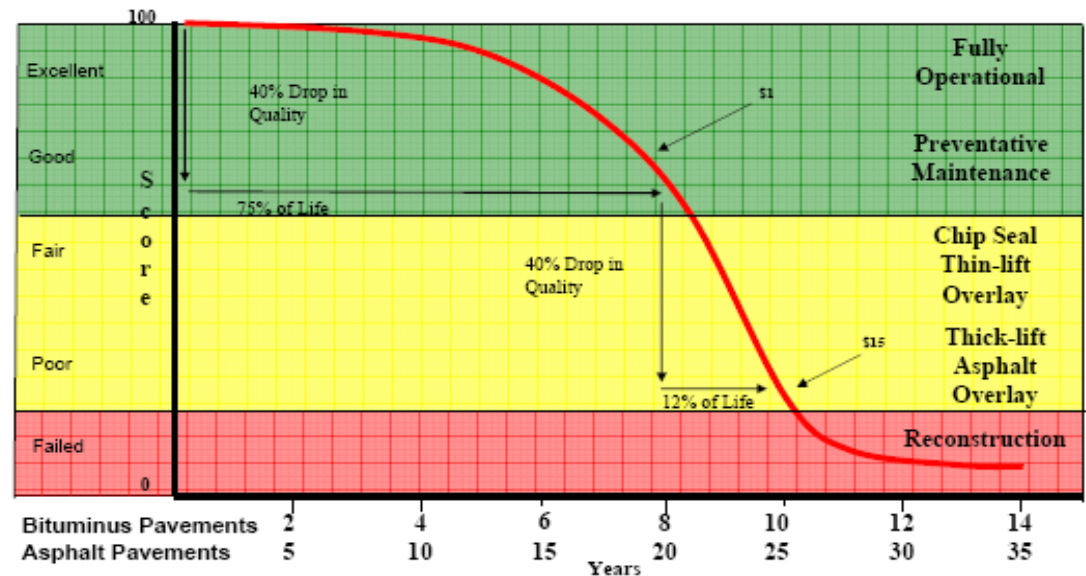
Detail of actual expenditures, unit cost and resource consumption by function/task.

Replacement Model

A replacement model is used to determine the optimal time, scope of action and method to replace an asset consistent with its lowest lifecycle model. Typically displayed over a deterioration curve, the replacement model considers the optimal balance of repair and maintenance typically required over time until replacement or reconstruction of the asset is required to avoid reaching a point of diminished return on investment. This model also serves to evaluate various MOP strategies and the associated costs of each.



Typical Pavement Life Curve



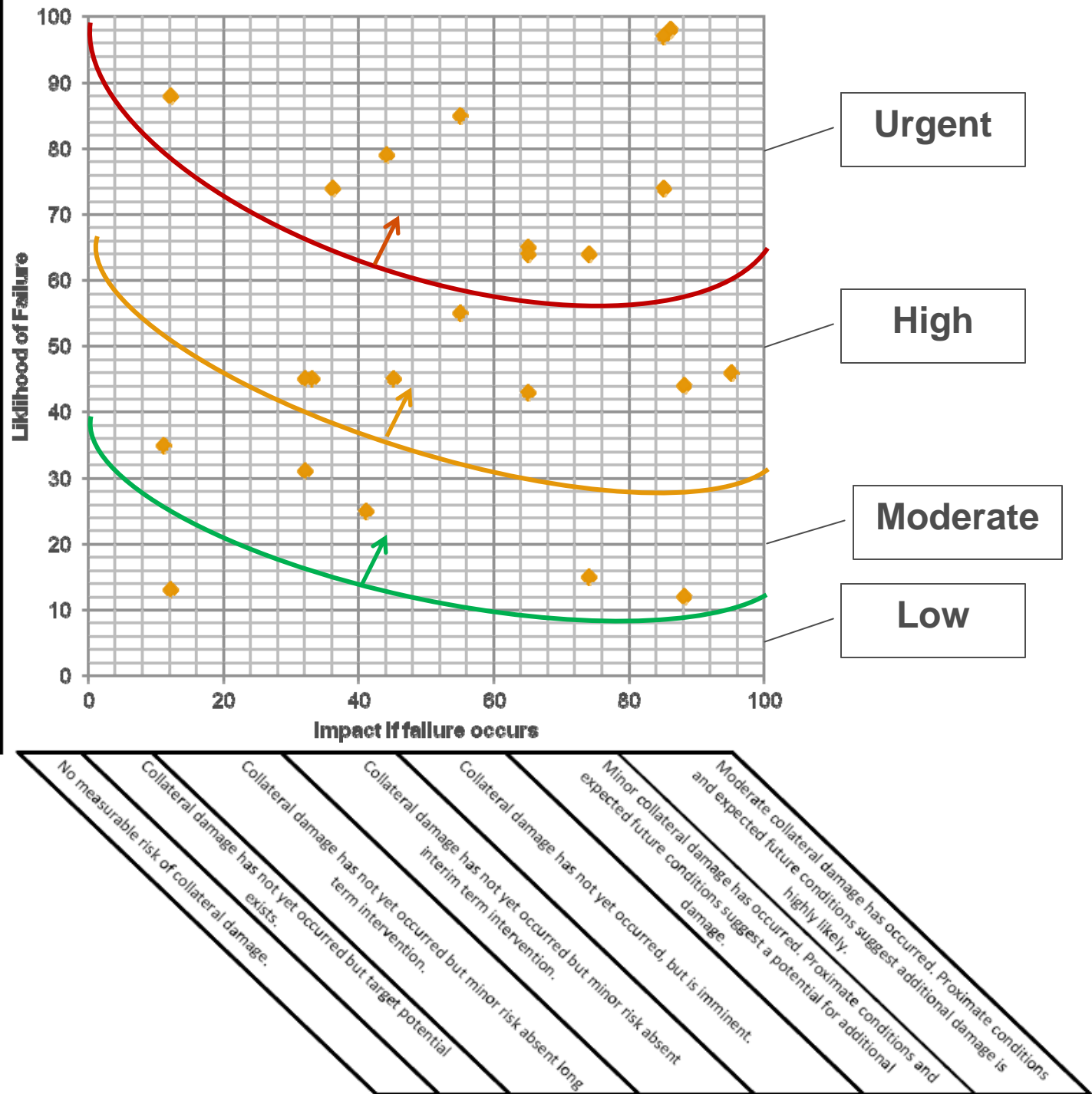
Risk Assessment

The Risk Assessment process is an estimate of two important categories of risk factors. The likelihood an asset will fail and/or may reach a condition that creates an undesirable outcome; and, the scope of impact should such a failure occur. The weighting factors for each include relevant asset attributes, environmental factors, potential impacts to public safety, exposure to liability and/or the potential that collateral damage may occur. This information is used in conjunction with condition assessment and LOS information to triage competing needs and to prioritize, plan and schedule work.

Hazard/Threat	Probability			Impact		
	Low	Med	High	Low	Med	High
Snow & Ice			X			X
Flooding & Mudslide			X			X
Windstorm		X				X
HazMat Release		X				X
Emergency Traffic Disruption		X				X
Earthquake	X					X
Volcano	X					X
Terrorism, CBRNE	X					X

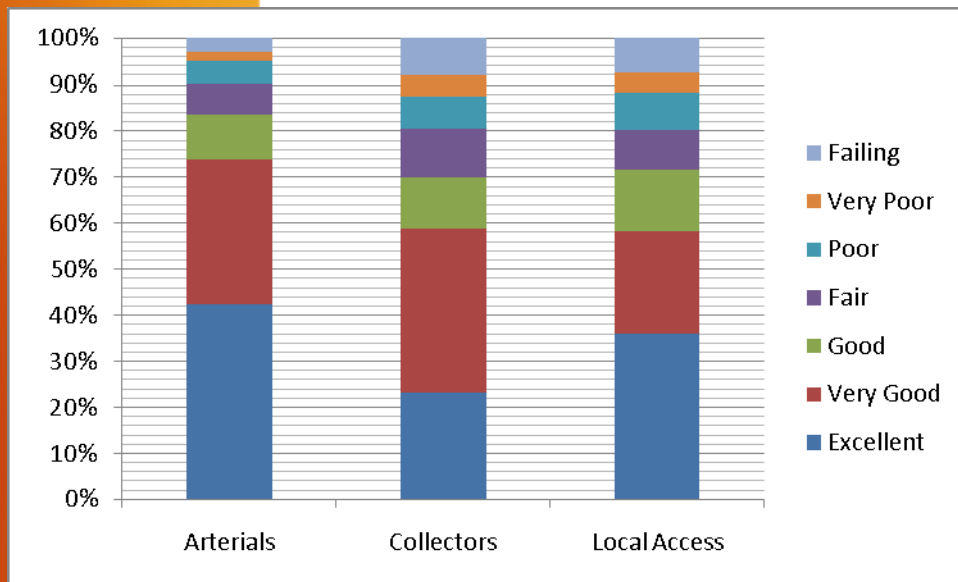


Current asset condition is failed. Delivers 0% of intended LOS function.
Current asset condition is very poor. LOS function is minimal and significantly exceeds tolerances. Proximate conditions and/or usage history suggests failure is imminent.
Current asset condition is poor to very poor. LOS function is reduced and significantly exceeds tolerances. Proximate conditions and/or usage history suggests failure potential within 90 days.
Current asset condition is poor. LOS function is reduced and slightly exceeds tolerances. Proximate conditions and/or usage history suggests failure potential within 180 days.
Current asset condition is fair. LOS function is reduced but within tolerances. Proximate conditions and/or usage history suggests a failure potential within 360 days.
Current asset condition is good to fair. LOS function meets tolerance goals. Proximate conditions and/or usage history suggests a failure is not likely within 360 days.
Current asset condition is very good to good. LOS function meets or exceeds goals. Proximate conditions and/or usage history suggests a failure is not likely within two years.
Current asset condition is very good to excellent. LOS function meets or exceeds goals. Proximate conditions and/or usage history suggests asset is in early stage of performance lifecycle.
Current asset conditions is excellent to as-built. LOS function meets or exceeds goals. Proximate conditions and/or usage history suggests asset was recently constructed.



Performance Measures

A series of key performance indicators expressed in qualitative, quantitative, or other tangible terms that indicate whether current performance of an asset, and the corresponding MOP program(s), are meeting objectives and are cost effective.



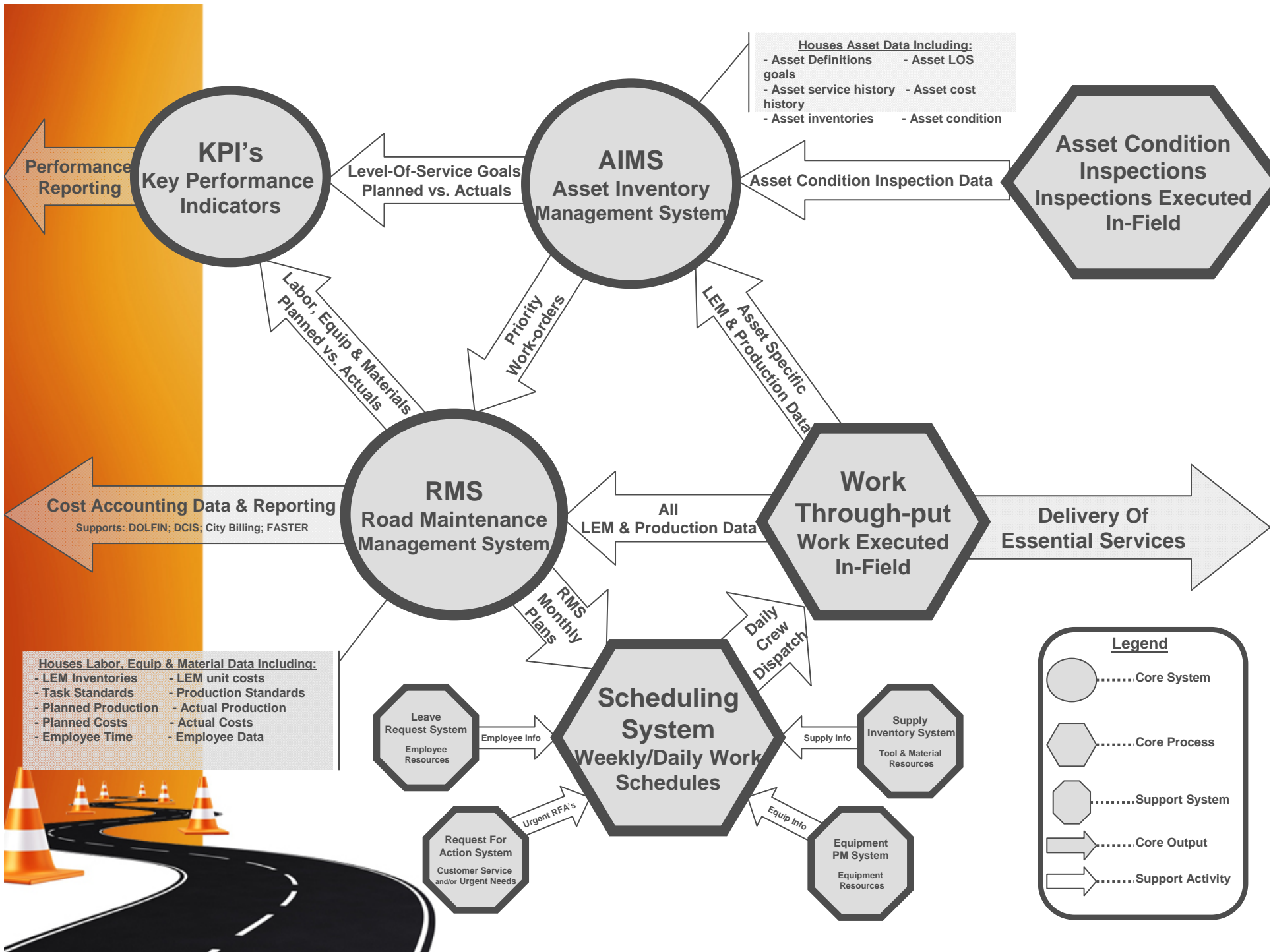
PCI	Arterials	Collectors	Local Access	
100-86	315.79	168.81	601.38	Excellent
85-71	235.06	258.96	370.33	Very Good
70-56	72.19	80.3	219.18	Good
55-41	51.02	77.16	143.58	Fair
40-26	35.74	50.15	137.87	Poor
25-11	13.03	33.54	68.13	Very Poor
<10	23.4	58.22	124.88	Failing



E-tools and Systems

- What do you already have?
- What do you need?





Public Works Transportation & Utilities Scheduling System

Schedule Calendar

Daily Schedule - 10-19-2011

Explorer

Groups

- 10-19-2011
- RO District 1
- RO District 10
- RO District 2
- RO District 3
- RO District 4

Field Supervisors

- Paul Burg
- John Hoppe
- Richard Kelly
- Jeff Skoda

Support Personnel

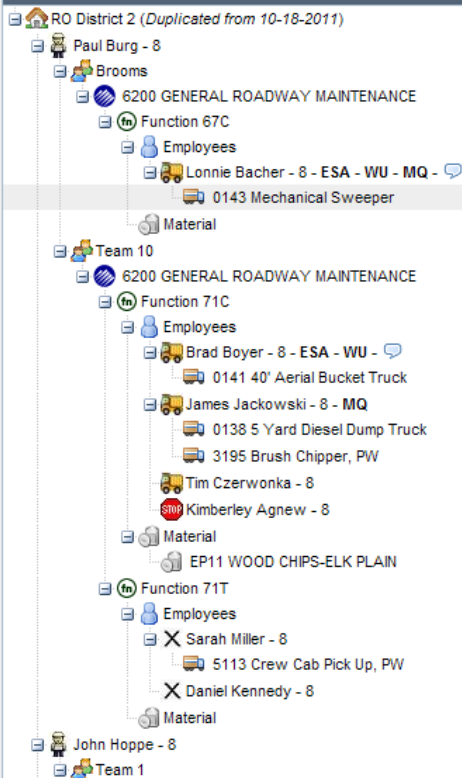
Mech 1:

Mech 2:

RO District 2

Daily Schedule - RO District 2

Comments Dispatch Print



Save Changes

Messages

Duplicate

- Warning: Eugene Swanson is scheduled for leave on that day.
- Warning: Matthew Watson is scheduled for leave on that day.
- Warning: Timothy Todhunter has already been assigned on that day.
- Warning: Harold Cole is scheduled for leave on that day.
- Warning: Gary Salatino has already been assigned on that day.
- Warning: Arthur Anderson has already been assigned on that day.
- Warning: Equipment ID:2135 - ACTIVE/WORK IN PROGRESS.
- Warning: Equipment ID:2180 - FINISHED.
- Warning: Equipment ID:4131 - FINISHED.
- Warning: Equipment ID:8106 - AWAITING PARTS ON ORDER.
- Warning: Equipment ID:7137 - Used by Lionel Ghislandi.
- Warning: Equipment ID:0135 - FINISHED.

Resources

- Projects
- Functions
- Employees

Name	Hrs
Alice Studos	0
Andre Thelander	0
Andy Barichio	0
Arthur Anderson	0
Barry Stokke	0
Ben Craig	0
Bennie Simon	0
Bill Flanders	0
Bob Alires	0
Bob Riley	0
Brad Boyer	0
Maintenance Technician	
RO District 2:6200.71C:8.00	
Brandon Jones	0
Brian Wade	0
Casey Allen	0
Chris Brown	2
Christopher Woods	0
Chuck Carlson	0
Daniel Kennedy	0
Dave Brown	3
David Sahlin	0
David Schmitt	0

RO District 2

Wednesday Oct 19, 2011

Dist. Manager: Linda Goheen #200 253-798-4948 cell 253-377-5934
 PWU Maint. Supervisor: Jeff Skoda #209 253-798-4981 cell 253-405-0980
 Mech(s):

On Leave: Holt #319 Lundeen #208 Swanson #254 (4.0) Kennard #212 (2.0) Gratz #268 (2.0) Millie #245 (2.0) Laduke #244 (2.0) Swanson #254 (4.0)

Field Supervisor: Burg #310 cell 253-377-5935 Report to for Dispatch

Team: Brooms

Location: GENERAL ROADWAY MAINTENANCE

Bacher #327 (EWM)	87C	0143	Dist 3
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Team: Team 10

Location: GENERAL ROADWAY MAINTENANCE

Boyer #187 (EW)	71C	0141	128th and Golden Given SW Corner / Works Orders on Brookdale & 25 Ave
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Jackowski #218 (M)	71C	0138 / 3195	
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Czenwonka #389	71C		
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Agnew #134	71C		
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Miller #	71T	5113	
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Kennedy #	71T		
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EP11 WOOD CHIPS-ELK PLAIN

Field Supervisor: Hoppe #210 cell 253-377-7473 Report to for Dispatch

Team: Team 1

Location: GENERAL ROADWAY MAINTENANCE

Reisdorph #221 (EWM)	75G	7147	RFA's
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DC07 ROADSIDE LITTER-DISPOSAL CO, EP12 WOOD DEBRIS-ELK PLAIN

Team: Team 2

Location: GENERAL ROADWAY MAINTENANCE

Wade #252 (EWM)	40A	3172	Ditching list / 304 St E & South Creek Rd / 320 St E & 84 Ave E
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Riley #237 (M)	40A	4150 / 8104	
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Pingul #328	40A	4135	
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Patterson #243	40A	8121	
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Cole #	40T		
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Field Supervisor: Kelly #211 cell 253-405-0953 Report to for Dispatch

Team: Team 1

Location: GENERAL ROADWAY MAINTENANCE

Jackowski #339 (EWM)	31E	2180	178th ave e off West Tapps / 1 rental transfer
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Kennard #212	31E		Ride in with Millie, because you have a Focus group meeting in Elk Plain Room from 10-12:00
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Jensen #126	31E	1197	
-------------	-----	------	--

Strub #216	31E	1196 / 7137	Ride with Art
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Strom #269	31E	2135 / 4153	Mix from Sumner Miles Miles
------------	-----	-------------	-----------------------------

Alires #231	31E	0137	FC 4
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Woods #227	31E	4131	
------------	-----	------	--

Baker #219	31E	0139 / 2150	
------------	-----	-------------	--

Zurfluh #240	31E	3193 / 7136	
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Akins #230	31E	0140 / 2151	make sure we have signs
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Millie #245	31E	8106	Bring Kennard in because you have a Focus Group meeting in Elk Plain Room from 10-12:00
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Watson #	31E		
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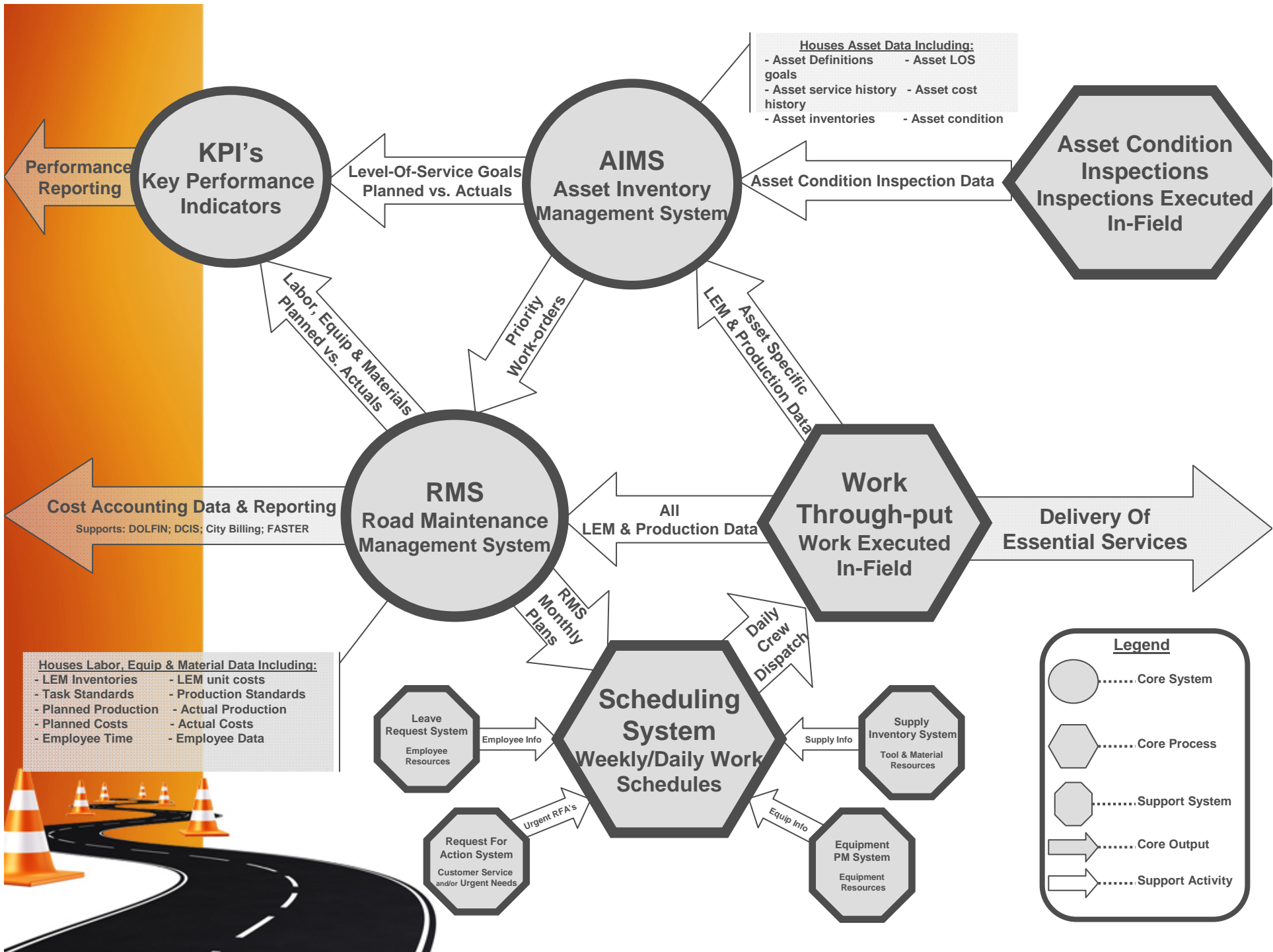
Fleming #236	31T	7149	
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Wilson #	31T		
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5320 Asphalt - Liquid AR4000 Tar, 5291 Asphalt - Liquid CSS-1 (Asphalt Plant), 5290 Asphalt - Liquid CSS-1 (Refinery), C109 Elk Plain Pit - 3/4 Shoulder Rock, R110 Rhodes Lake Pit - 1/4 Shoulder Rock, R112 Rhodes Lake Pit - 2 - 7 Quarry Spall, R109 Rhodes Lake Pit - 3/4 Shoulder Rock, S775 Tucoi - Asphalt - Class E Mix, 8720 Tucoi - Liquid AR4000 Tar, 7030 WATER, SW65 Woodworth - Asphalt - Class B Mix, SW91 Woodworth - Asphalt - Liquid CSS - 1, SW20 Woodworth - Liquid AR4000 Tar

Name	Hrs
Alice Stubbins	0
Andre Thelander	0
Andy Barichio	0
Arthur Anderson	0
Barry Stokke	0
Ben Craig	0
Bennie Simon	0
Bill Flanders	0
Bob Alires	0
Bob Riley	0
Brad Boyer	0
Maintenance Technician RO District 2:6200.71C:8.00	
Brandon Jones	0
Brian Wade	0
Casey Allen	0
Chris Brown	2
Christopher Woods	0
Chuck Carlson	0
Daniel Kennedy	0
Dave Brown	3
David Sahlin	0
David Schmitt	0







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Road Maintenance

12

2

250

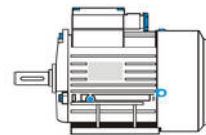
60

2



Brush-cutting

1 mile per day
\$1,200 per LM
Vegetation cut to
8"



Ditch Cleaning

400ft per day
\$8 per ditch-foot
Shaped and
graded to invert
elevation of
culverts



**Shoulder
Grading**

1 mile per day
\$1,200 per LM
Graded and
compacted to 2%



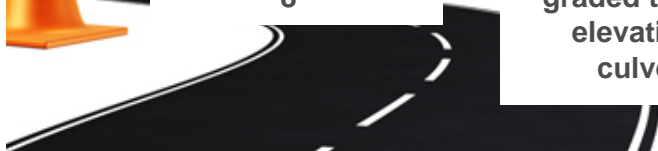
**Pavement
Grinding
Repair**

1 mile per day
\$1,200 per LM
vegetation cut to
8"



Chipsealing

1 mile per day
\$1,200 per LM
vegetation cut to
8"



Questions?

Thanks For Your Time and Attention!

