

City of West Jordan

# Pavement Management Report

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## Department of Public Works

Director – Wendell Rigby

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January 2013

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# Introduction

## Pavement Management

A good pavement management program applies scientific principles to the street maintenance decision making process. The goal of any pavement management program is to apply the right treatment to the right surface at the right time. As the chart below illustrates, spending money on maintaining good roads eliminates or delays costly repairs. City staff works hard each year to:

- Regularly collect existing street condition data,
- Enter collected data into a database program,
- Analyze the data to determine appropriate treatment options and to suggest a proposed pavement maintenance program.

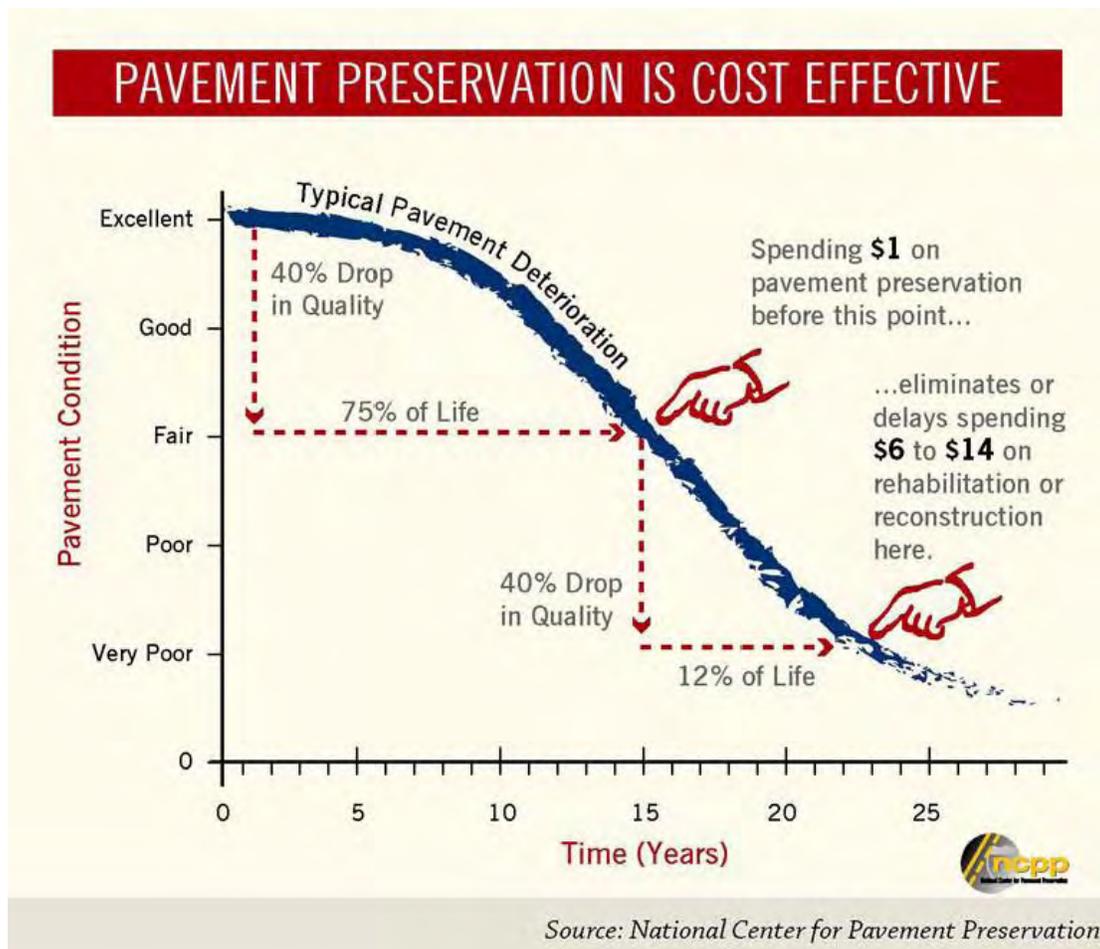


Figure 1 – Standard Deterioration Curve for Asphalt Pavements

## Current Pavement Conditions

### Inspections

In December 2012 the City of West Jordan completed its annual survey of City Streets. These surveys are used by the Cartegraph database to calculate a **Pavement Condition Index**, or **PCI** for each street segment. The PCI might range from 100, a perfect street, to below 10, a failed street. Streets in excellent and very good condition show little signs of aging and minor cracking. Streets in good and fair condition show moderate cracking and some need for patching. Streets in poor and very poor condition require full depth patching and overlay treatments. The results of this survey are shown in the table below.

**Table 1 – Results of PCI Inspections**

Pavement Conditions - 2012									
Road Classification	PCI	Lane Miles	%	Pavement Categories					
				Very Poor, Failed	Poor	Fair	Good	Very Good	Excellent
				%	%	%	%	%	%
<b>Arterial</b>	76	40	5%	0%	5%	8%	18%	14%	55%
<b>Collector</b>	76	287	34%	2%	5%	4%	14%	33%	42%
<b>Local</b>	70	518	61%	6%	5%	10%	17%	23%	39%
<b>Total</b>	72	845	100%						

A complete map of existing street conditions as determined by the Cartegraph database is available in appendix A. Council district specific maps are also provided.

### Existing Conditions

West Jordan arterial streets are the most heavily travelled. Fortunately, as can be seen in table 1, they are mostly in good condition. 9000 South, 7000 South and 7800 South have all improved thanks to increased maintenance spending. 5600 West and 7800 South west of 4800 West still need improvement. Some of this work is already in the strategic plan.

West Jordan collector streets include 2700 West, and 3200 West. These roads saw good improvement in 2012 as capital projects and regularly scheduled maintenance projects improved the condition of both streets. West Jordan collector streets also included 4000 West, which saw critical construction work begin but not completed. This improvement should remove the last remaining very poor road in the collector system.

A large majority of city streets are local roads that connect residents to their neighbors and local businesses. These local roads also have the highest percentage of poor, very poor, and failed roads. These roads will be the most expensive roads to maintain in the future and will require pothole repairs and patches. Eventually, these roads will require some form of road rehabilitation or reconstruction.

**Historical Progress**

The overall pavement condition index of the street system rose 1 point. This was an improvement from the previous year as shown in the table below.

**Table 2 – Historic Progress Chart**

City of West Jordan Street Network				
Street System Category	2009	2010	2011	2012
Road Lane Miles	813	816	820	845
Replacement Value of Roadway System	\$272,583,373	\$272,583,373	\$274,755,994	\$283,132,701
PCI Condition	67	69	71	72
** Design Life of Average West Jordan Roadway is 20 years unless maintenance activities are completed				

The table also indicates that road lane miles and the value of the roadway system increase in 2012. When the road lane miles increase the costs associated with maintenance increase. The amount of increase in lane miles was approximately 3 percent. The change can be attributed to an increase in local roads through the subdivision process.

## 2012 Maintenance Projects

The following Table summarizes the work completed in the 2012 calendar year to maintain the street system. Calendar year efforts better illustrate the work since it is accomplished mostly in summer months which are split by the budget year. Funds spent in the calendar year are allocated by the previous budget year. (The work done in 2012 calendar year is set aside by City Council in the 11/12 budget year.)

**Table 3 – Road Maintenance Projects**

2012 Road Maintenance Projects (Calendar Year)				
Activity	Budget	Actual Cost	Completed	Cost / Unit
Crack Seal	\$120,000.00	154,542.00		
Slurry Seal	\$600,000.00	\$576,910.00	4,457,961 SF	\$0.13 / SF
Chip Seal	\$380,000.00	\$327,982.00	921,825 SF	\$0.36 / SF
Overlay	\$1,600,000.00	\$1,800,000.00	1,281,575 SF	\$1.40 / SF
High Density Mineral Bond		\$37,454.41	222,408 SF	\$0.17 / SF
POMOSA Asphalt Overlay				
<b>Totals</b>	<b>\$2,700,000.00</b>	<b>\$2,896,888.41</b>		

### Crack Seal Projects

Crack sealing benefits city streets by filling cracks that would normally allow water to penetrate the surface and weaken the base. The city purchased a new crack seal machine that pre-heats the crack seal material and offered an additional wand for crews to utilize in 2012. This new machine helped the West Jordan Public Works department applied over 100 tons of crack seal to city streets in 2012. City staff spent more money on crack sealing by using funds saved from previous budget years.

Public Works hopes to apply even more crack seal in 2013. To accomplish this goal the Public Works department has hired seasonal workers to assist in the placing of the crack seal material. Public Works is keeping two crews busy during the winter months hoping to finish the work prior to the summer slurry seal project. In the future City staff will continue to spend as much as it can in this area.

## **Slurry Seal Projects**

In 2012 West Jordan hired American Paving Preservation to slurry seal roads in fair or better condition from the Jordan River to 3200 West and from 7800 South to the City's northern boundary with Taylorsville. A map of the streets slurry sealed is included in appendix B. The mix included more asphalt and appeared to be a better product. City staff will continue to adjust its construction specifications to get the best possible product for residents.

Home owners still complained of loose aggregate in the streets but the number of complaints for this problem decreased. Public notice was a problem for the Contractor. Some homeowners came home from vacation to find their street had been slurry sealed except for the area around the car parked in the street. The Contractor happily corrected the problem but City staff believes an article in the West Jordan Journal in the spring of next year to alert effected homeowners would be helpful. City staff has also created an educational video about slurry seal to help residents understand the project better.

## **Chip Seal Projects**

In 2012 Salt Lake County Public Works department chip sealed multiple roads for the City. The County began chip sealing Old Bingham Highway from SR-111 west to New Bingham Highway and on SR-111 from Old Bingham Highway north to New Bingham Highway in June. It returned in August to chip seal Grizzly Way from 7000 South to 7400 South, 3200 West from 7800 South to 9400 South, and Campus View Drive from Jordan Landing Boulevard to 7800 South. This work was done professionally and without many complaints. Chip sealing in Jordan Landing proved to be more difficult than the County anticipated due to the volume of traffic in the area.

## **Overlay Projects**

In 2012 the West Jordan Public Works department partnered with Salt Lake County Public Works department, Leon Poulsen Construction and Lyndon Jones Construction to complete more thin overlays in West Jordan neighborhoods than in any other year. Lyndon Jones Construction reconstructed pedestrian ramps, Salt Lake County Public Works department performed milling operations, West Jordan Streets department overlaid the streets with asphalt, and Leon Poulsen Construction raised the manhole, monument, and water valve lids. This method of construction required a lot of cooperation from respective organizations but the work progress would not have been as successful without the team effort. A map of the work can be found in Appendix B.

City staff spent more money on street overlays by using funds saved from previous budget years. The extra money spent allowed City crews to mill and overlay 6400 West from 8400 South to 8200 South, 4000 West from 9200 South to 9400 South and additional neighborhood streets.

## **Test Projects**

City staff is always looking to find the best products for use on City Streets. This year City staff tested a couple of new products to determine if they should be used on a larger scale. The new products and the locations of the test areas are indicated below.

**High Density Mineral Bond.** The capital project team has received complaints from residents regarding the loose stone produced by the slurry seal product. In trying to address those complaints the City tested a high density mineral bond on City streets this summer. This product is similar to a seal coat and is limited in use to roads that are in very good and excellent condition. It produces no loose stone after placement, is higher in asphalt content, and is spread thinner than a slurry seal. The test locations included Copperfield and the Bateman Pond subdivisions. A map of the test areas may be seen in appendix C. The initial response has been positive. If you are in the area please stop by and provide some feedback to City staff.

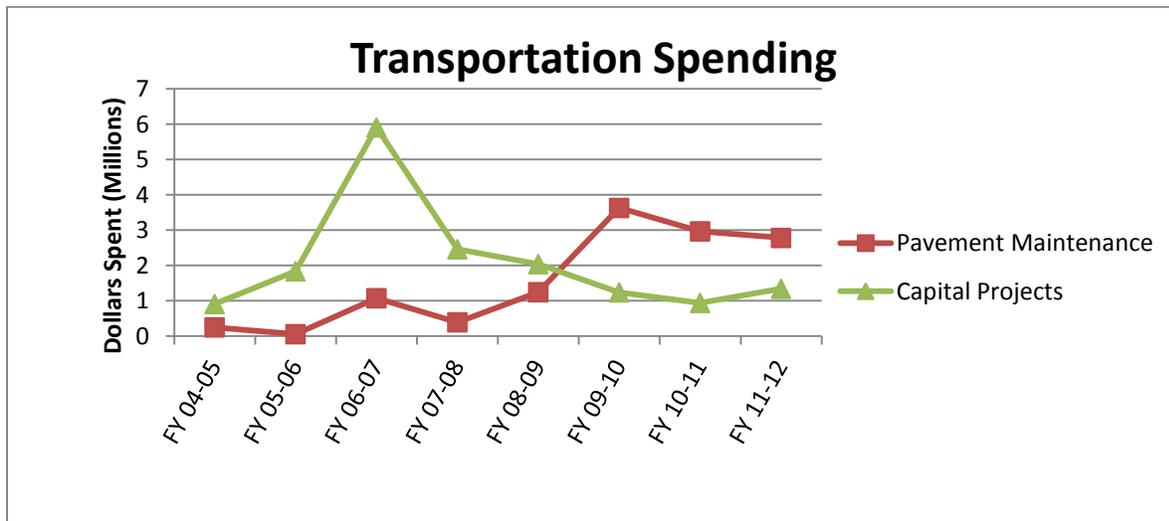
**POMOSA Asphalt.** The City was approached by a natural asphalt oil supplier to test a new product on city streets. It is manufactured from Utah oil sands and claims to have a better resistance to cracking than crude oil asphalt. The product was prepared by Asphalt Materials and placed by City crews on Hawley Park Road from Old Bingham highway to Axel Park Road. A project report was prepared and is included in this report in appendix C.

**Future Tests.** The City has heard interesting feedback from Riverton and South Jordan regarding the use of warm mix asphalt. City crews will likely try this product in the summer of 2013 to see if the claims of increased life and greater durability are true.

**Historical Transportation Spending**

The money spent on pavement maintenance decreased for the second straight year in 2012. It is anticipated that the City will slightly increase the amount spent on maintenance in 2013 as City staff begins to work on more poor and very poor roads.

**Maintenance Spending – Multiple Year Look**



## 2013 Proposed Pavement Management Projects

City staff rotates pavement management work around the city each year to avoid the confusion that results when slurry seal, chip seal, and overlay contractors work in the same neighborhood. The budget adopted in 2012-2013 has allocated approximately \$150,000 for crack sealing, \$400,000, for chip sealing, \$600,000 dollars for slurry sealing, and \$2,000,000 for asphalt overlays.

The following chart will help to identify how City staff decides what treatments are required to properly maintain City streets in the areas designated for treatment.

**Table 4 - 2013 Decision Matrix**

Pavement Condition	Typical treatment	Typical Cost
Excellent PCI = 100-86	Crack Seal – Asphalt rubber placed into cracks to reduce moisture penetration. (Adds 1-2 years to any treatment)	\$0.20 per square yard
Very Good PCI = 85-71	Slurry Seal – A thin mixture of asphalt / aggregate mixture over the pavement to reduce oxidation and moisture penetration. (Adds 3-5 years)	\$2.00 per square yard
Good PCI = 70-56	Chip Seal – A thin mixture of asphalt / aggregate mixture over the pavement to reduce oxidation and moisture penetration. (adds 5-7 years)	\$2.20 per square yard
Fair PCI = 55-41	Thin Overlay –1-1/2” thick layer of asphalt applied to the existing pavement. No structural support to the roadway. (Adds 10 years)	\$17 per square yard
Poor PCI = 40 - 26	Thick Overlay –3” thick layer of asphalt applied to the existing pavement. Adds some structural support to the road surface. (Adds 10 years)	\$23 per square yard
Very Poor, Failed PCI = 25 - 0	Reconstruction - Removal of Existing pavement and base. Installation of entire new street section. (adds 20 years)	\$48 per square yard

### Crack Seal Projects:

City staff has designated the area from 7800 South to 9400 South and 3200 West to the Jordan River as the best areas to crack seal in the Winter / Spring of 2013. Public Works crews will continue to use temporary workers to help staff crack seal crews so that the preparation for a summer slurry seal is complete. City staff will direct crews to begin crack sealing the area from 4000 West to 3200 West in the winter of 2013.

### Slurry Seal Projects:

City staff has designated the area from 7800 South to 9400 South and from 3200 West to the Jordan River for an application of type II slurry seal. This project should advertise for bid in March and be awarded to a Contractor in April. Work should begin in the summer months and continue for

approximately 45 days. City staff will work with the public to give them more advanced notice. A map of the proposed work is shown in appendix D.

**Chip Seal Projects**

City staff has identified likely candidates for chip seal in 2013. Salt Lake County asks that candidates be at least collector roadways in fair condition of better. In 2013 the City will ask Salt Lake County to chip seal Jordan Landing Boulevard from 7000 South to 7800 South; 5600 West from 8200 South to 8600 South; 6700 West from 7800 South to 8200 South; OBH from 4000 West to Terra Linda Elementary; and 1300 West – from 7000 South to 7500 South.

**Overlay / Reconstruction Projects:**

City Staff has identified likely candidates for mill and overlay in 2013. The area under investigation lies between 3200 West and 4000 West from the city’s northern boundary to the southern boundary. Unfortunately the list was longer than anticipated. The first list proposed by Cartegraph Pavement View Plus was driven by City staff and refined to improve its accuracy. A map of the proposed work is shown in appendix D.

**2013 / 2014 Proposed Budget**

City staff has proposed 3 separate budgets for fiscal year 2013/2014. This should provide enough information for the council to make a good fiscal decision for the City. Each budget is meant to spark interest and debate. The results of the budget discussion are included in appendix E and can be seen below.

**Table 5 – 2013/2014 Budget Request**

<b>2013/2014 Proposed Budget Request</b>						
Budget	Crack Seal	Slurry Seal	Chip Seal	Overlay	Total	PCI
2013 Budget A	\$150,000	\$1,000,000	\$450,000	\$1,100,000	\$2,700,000	72.76
2013 Budget B	\$150,000	\$1,000,000	\$450,000	\$1,600,000	\$3,200,000	72.91
2013 Budget C	\$150,000	\$1,000,000	\$450,000	\$2,100,000	\$3,700,000	73.12
No Funds	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	70.18
** Budget in appendix E does not include chip seal request.						

The first budget proposal, 2013 Budget A, indicates the funding required to maintain the current pavement condition index. This budget includes no work on arterial streets and limited chip seal activities on collector streets. Funds for work completed on these roads would need to be included in a separate funding mechanism.

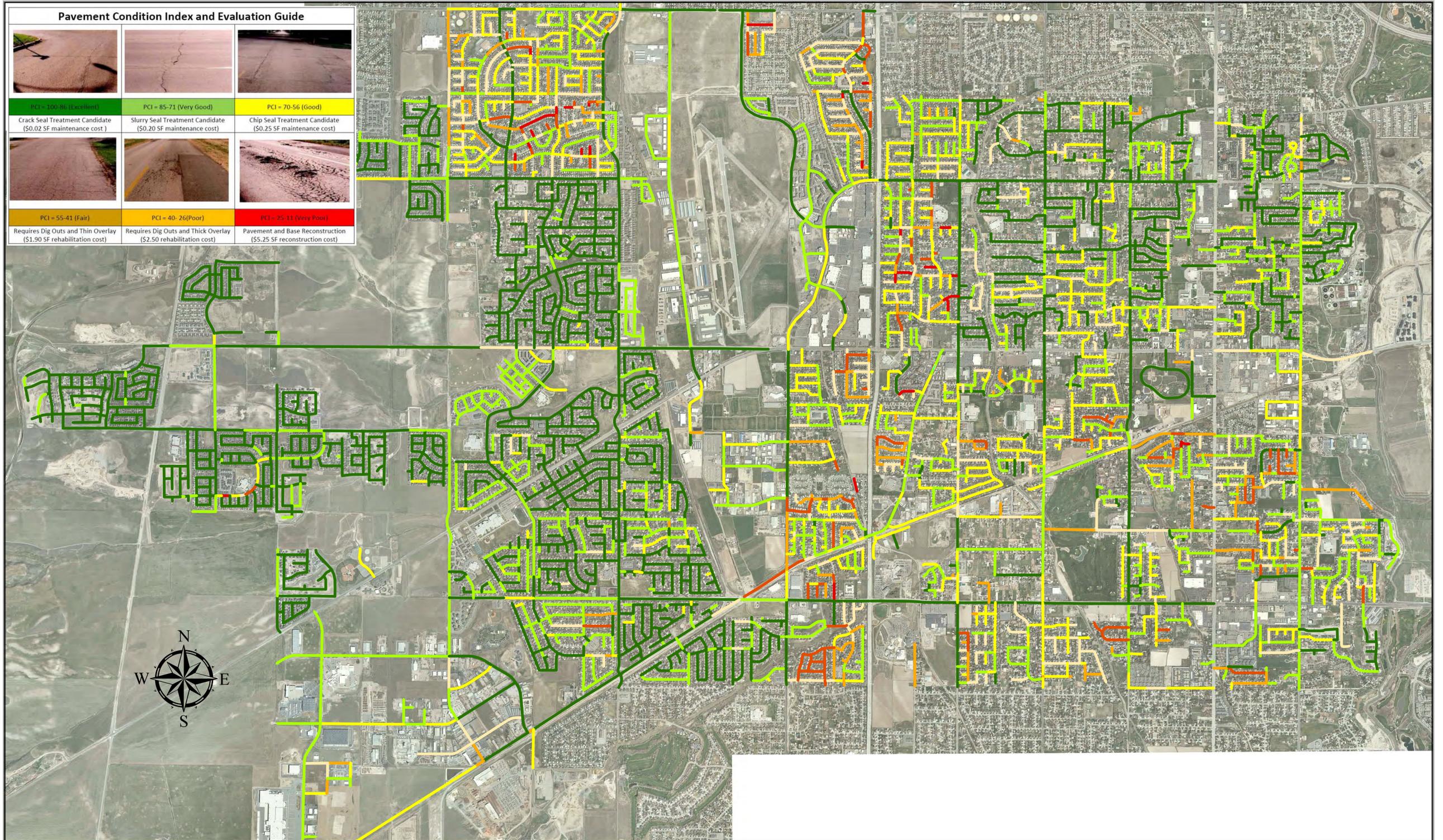
The second budget proposal, 2013 Budget B, indicates the funding required to improve the current pavement condition index. This budget includes no work on arterial streets and limited chip seal activities on collector streets. Funds for work completed on these roads would need to be included in a separate funding mechanism. This budget repairs a greater number of poor local streets than 2013 Budget A. Some residents have complained that the poorly maintained roads decrease the pride of home ownership in the City.

The third budget proposal, 2013 Budget C, indicates the funding required to improve the current pavement condition index. This budget includes funds for work on arterial streets or collector streets. This budget proposal continues to repair and replace a greater number of the poorest local city streets than 2013 Budget A.

**Exhibit A**  
**(Current PCI Maps)**

**Pavement Condition Index and Evaluation Guide**

		
PCI = 90-95 (Excellent)	PCI = 85-71 (Very Good)	PCI = 70-56 (Good)
Crack Seal Treatment Candidate (\$0.02 SF maintenance cost)	Slurry Seal Treatment Candidate (\$0.20 SF maintenance cost)	Chip Seal Treatment Candidate (\$0.25 SF maintenance cost)
		
PCI = 55-41 (Fair)	PCI = 40-26 (Poor)	PCI = 25-11 (Very Poor)
Requires Dig Outs and Thin Overlay (\$1.90 SF rehabilitation cost)	Requires Dig Outs and Thick Overlay (\$2.50 SF rehabilitation cost)	Pavement and Base Reconstruction (\$5.25 SF reconstruction cost)

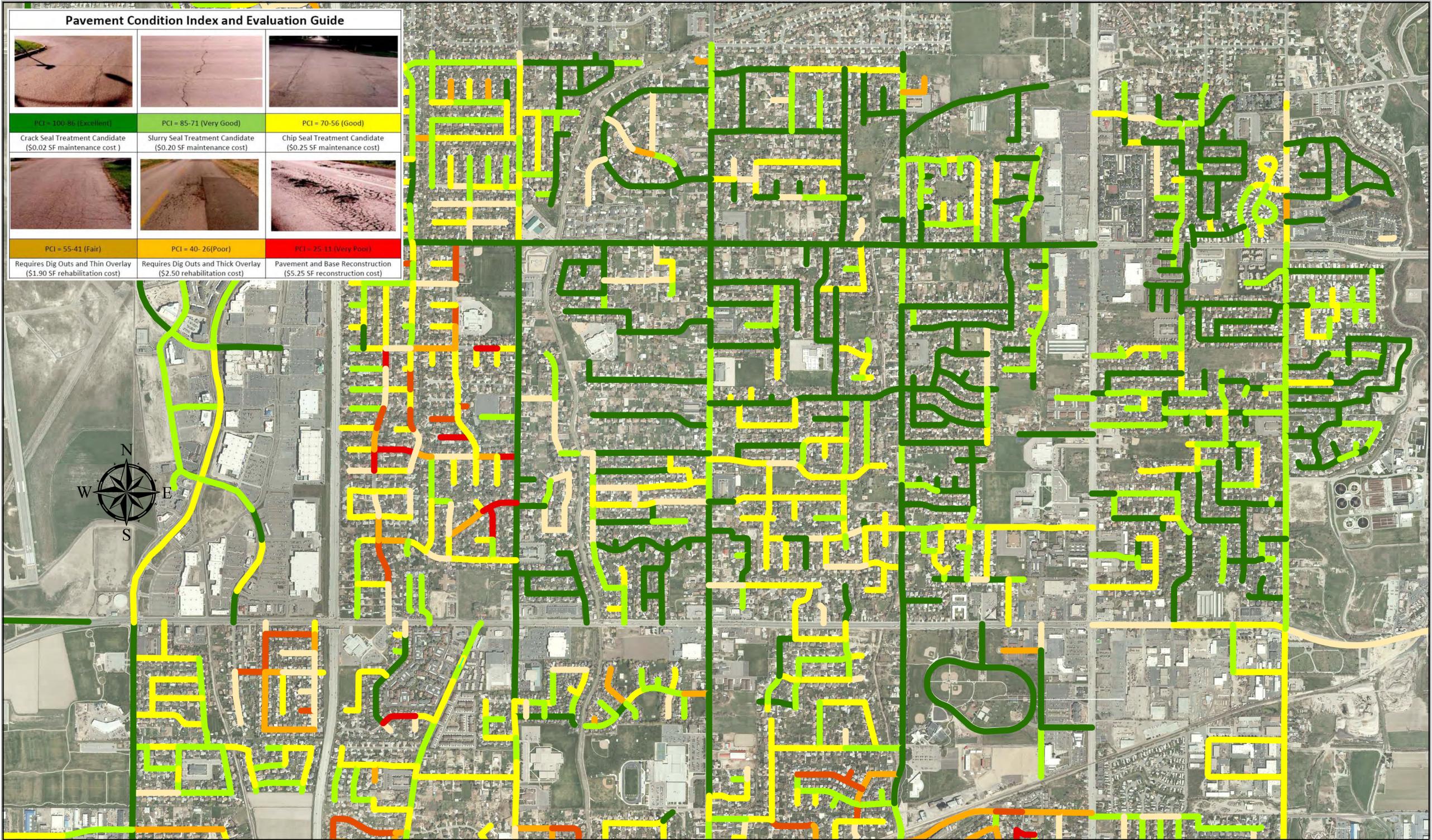


# Pavement Condition Map 2012

**Legend**

-  Failed
-  Very Poor
-  Poor
-  Fair
-  Good
-  Very Good
-  Excellent





**Pavement Condition Index and Evaluation Guide**

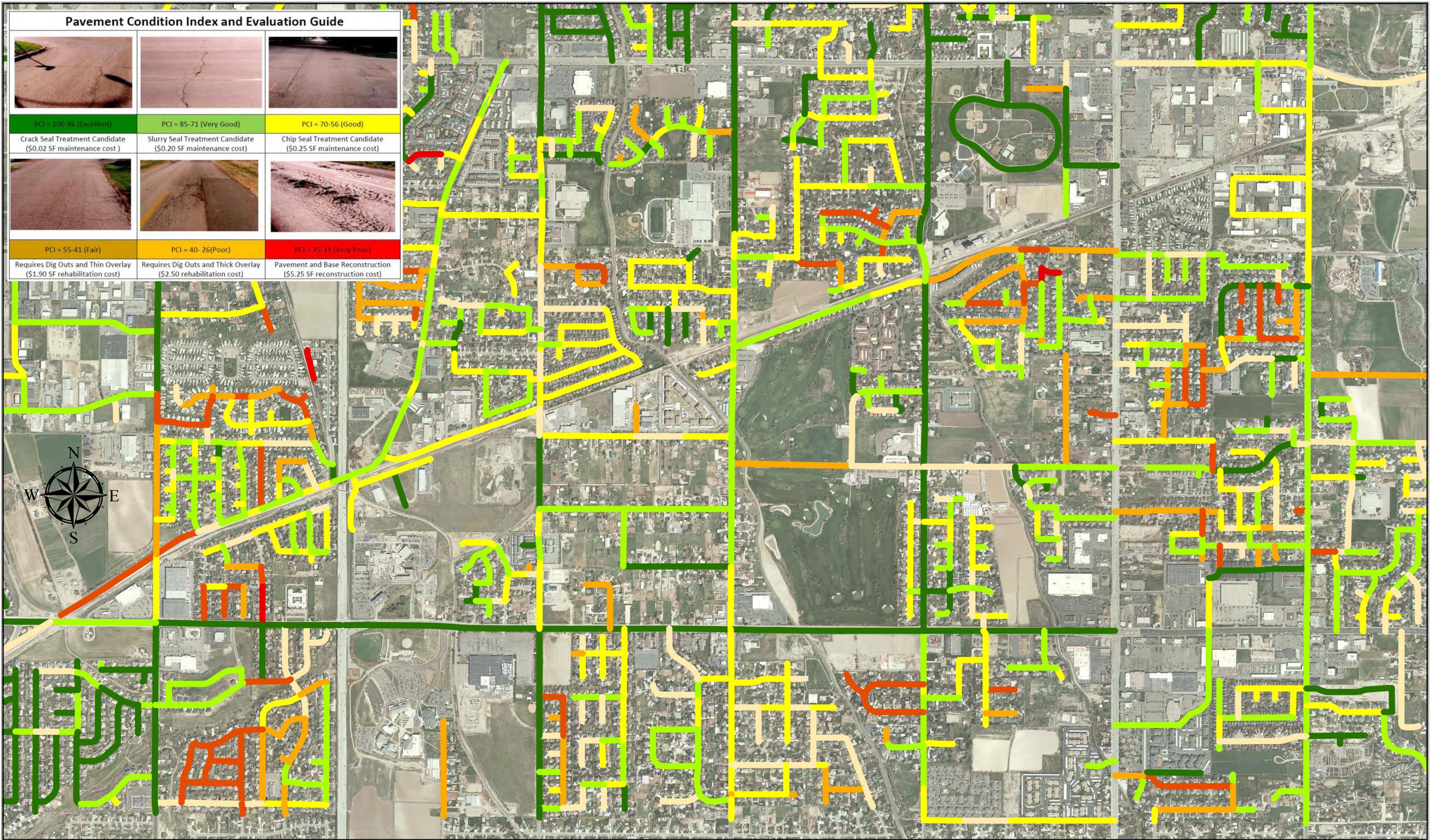
PCI = 100-86 (Excellent)	PCI = 85-71 (Very Good)	PCI = 70-56 (Good)
Crack Seal Treatment Candidate (\$0.02 SF maintenance cost)	Slurry Seal Treatment Candidate (\$0.20 SF maintenance cost)	Chip Seal Treatment Candidate (\$0.25 SF maintenance cost)
PCI = 55-41 (Fair)	PCI = 40-26 (Poor)	PCI = 25-11 (Very Poor)
Requires Dig Outs and Thin Overlay (\$1.90 SF rehabilitation cost)	Requires Dig Outs and Thick Overlay (\$2.50 rehabilitation cost)	Pavement and Base Reconstruction (\$5.25 SF reconstruction cost)

# Pavement Condition Map 2012

## Council District 1

- Legend**
- Private
  - Failed
  - Very Poor
  - Poor
  - Fair
  - Good
  - Very Good
  - Excellent

0 312.5 625 1,250 1,875 2,500 3,125 Feet



**Pavement Condition Index and Evaluation Guide**

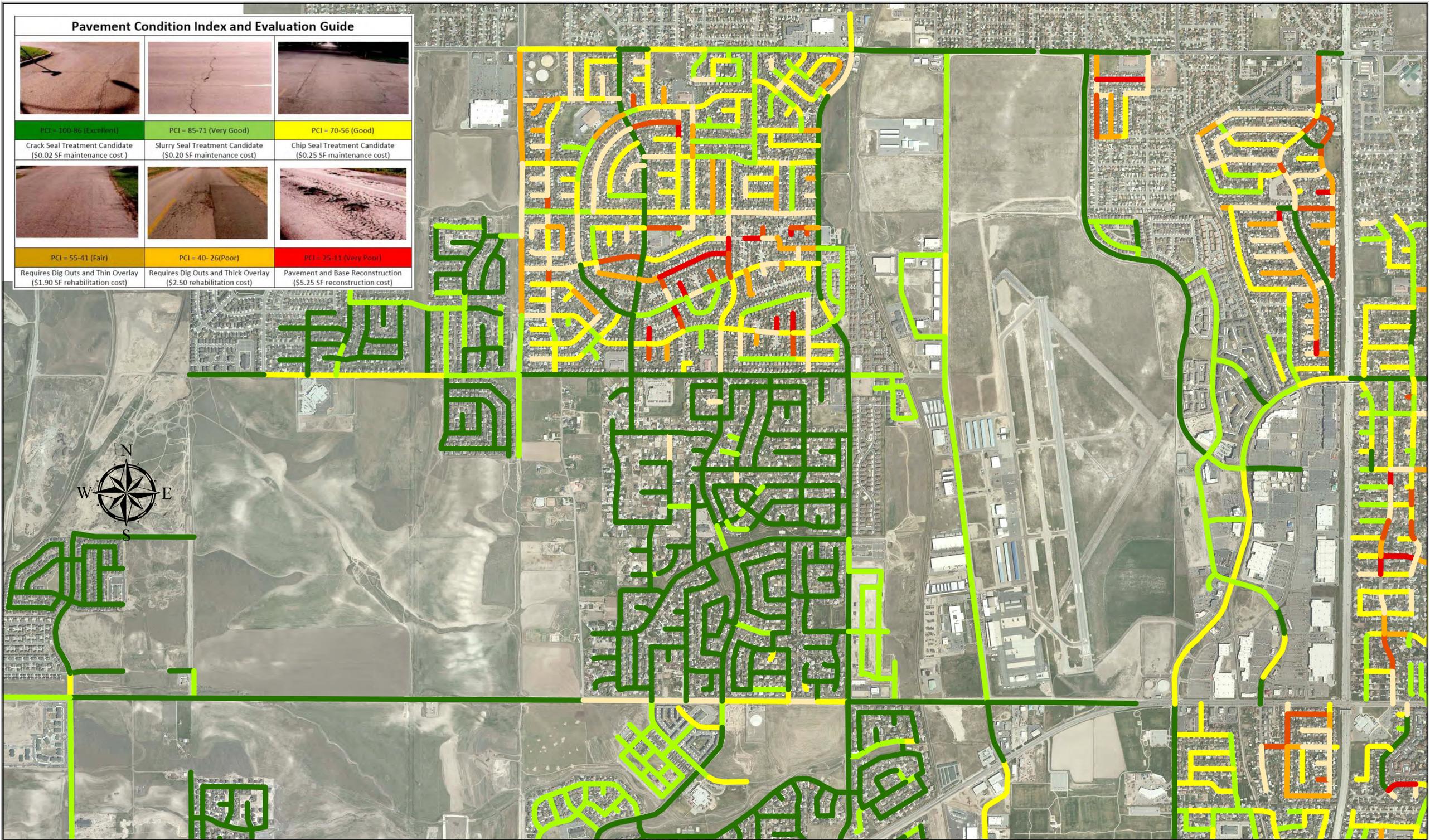
PCI = 100-86 (Excellent)	PCI = 85-71 (Very Good)	PCI = 70-56 (Good)
Crack Seal Treatment Candidate (\$0.02 SF maintenance cost)	Slurry Seal Treatment Candidate (\$0.20 SF maintenance cost)	Chip Seal Treatment Candidate (\$0.25 SF maintenance cost)
PCI = 55-41 (Fair)	PCI = 40-26 (Poor)	PCI = 25-11 (Very Poor)
Requires Dig Outs and Thin Overlay (\$1.90 SF rehabilitation cost)	Requires Dig Outs and Thick Overlay (\$2.50 rehabilitation cost)	Pavement and Base Reconstruction (\$5.25 SF reconstruction cost)



# Pavement Condition Map 2012

## Council District 2

- Legend**
- Private
  - Failed
  - Very Poor
  - Poor
  - Fair
  - Good
  - Very Good
  - Excellent



**Pavement Condition Index and Evaluation Guide**

		
PCI = 100-86 (Excellent)	PCI = 85-71 (Very Good)	PCI = 70-56 (Good)
Crack Seal Treatment Candidate (\$0.02 SF maintenance cost)	Slurry Seal Treatment Candidate (\$0.20 SF maintenance cost)	Chip Seal Treatment Candidate (\$0.25 SF maintenance cost)
		
PCI = 55-41 (Fair)	PCI = 40-26 (Poor)	PCI = 25-11 (Very Poor)
Requires Dig Outs and Thin Overlay (\$1.90 SF rehabilitation cost)	Requires Dig Outs and Thick Overlay (\$2.50 rehabilitation cost)	Pavement and Base Reconstruction (\$5.25 SF reconstruction cost)

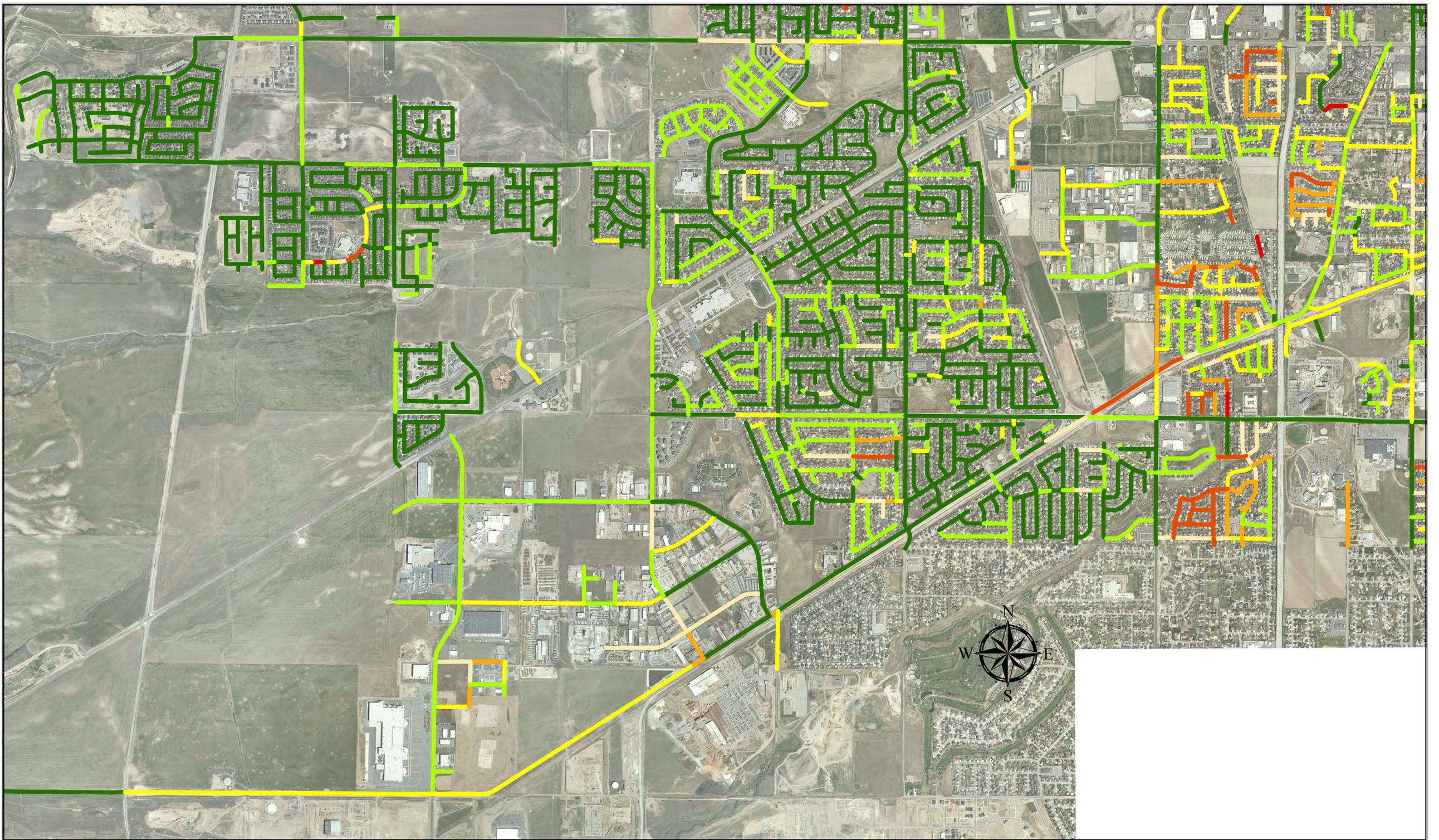
# Pavement Condition Map 2012

## Council District 3



**Legend**

Private	Fair
Failed	Good
Very Poor	Very Good
Poor	Excellent



0 470 940 1,880 2,820 3,760 4,700 Feet

# Pavement Condition Map 2012

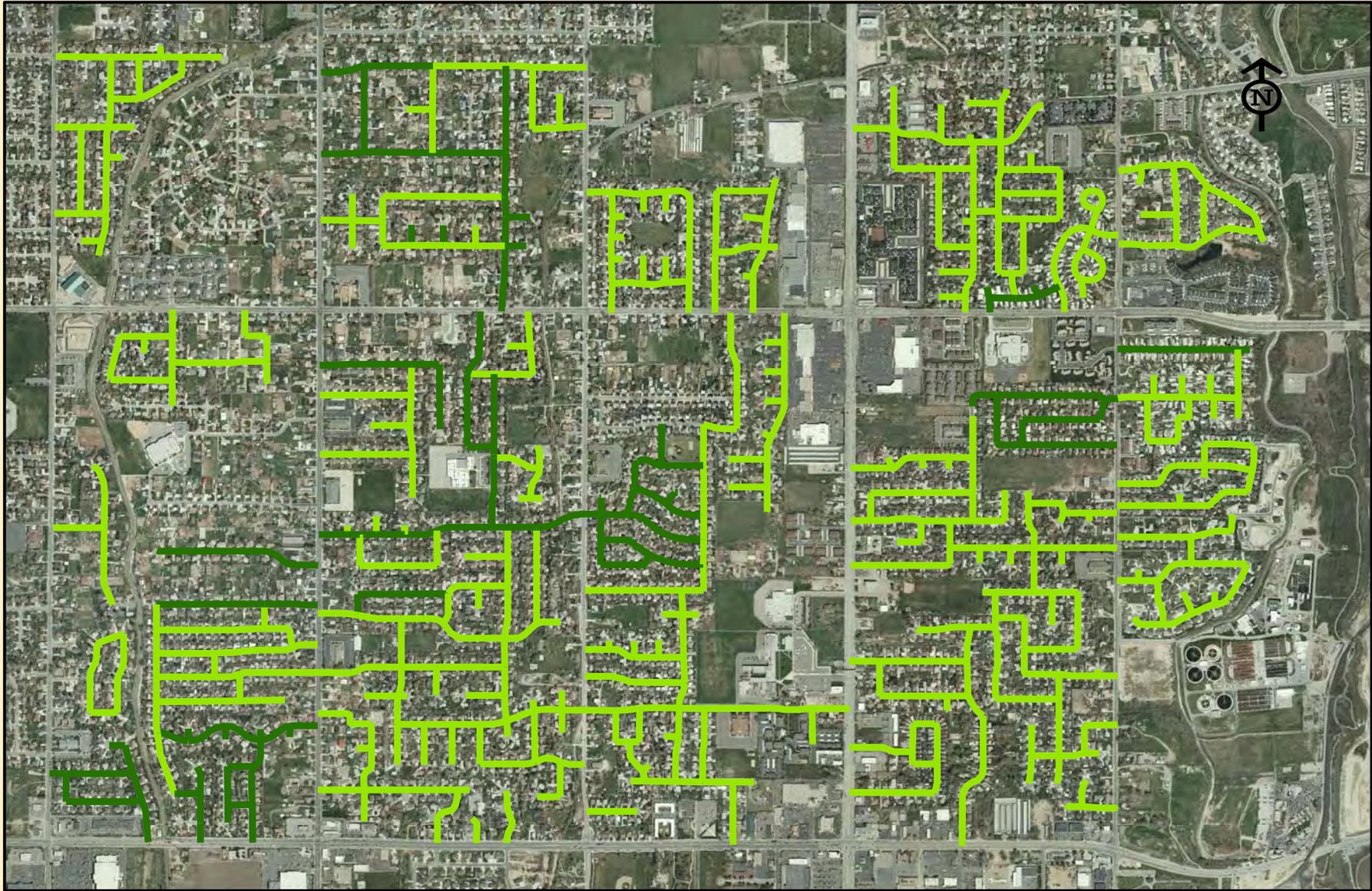
## Council District 4

### Legend

- |           |           |
|-----------|-----------|
| Private   | Fair      |
| Failed    | Good      |
| Very Poor | Very Good |
| Poor      | Excellent |

**Exhibit B**

**(2012 Road Maintenance Projects)**



**Legend**

- 2012 Overlay
- 2012 Slurry Seal

# 2012 Pavement Management Projects



**Exhibit C**  
**(2012 Test Project Reports)**

**"Holbrook's preservation treatments last longer"**

-Darcy Stewart, SunRiver, Manages 3.5 Million Sq Ft of Streets

**HOLBROOK  
ASPHALT CO.**



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# HA5™

**HA5 is a High Density Mineral Bond surface treatment  
that extends asphalt serviceability**

**Benefits to you:**

- Significantly extends pavement life
- Lower cost of pavement ownership/management
- No loose aggregate or grainy residue on the surface post installation
- Millions of square feet installed by municipalities
- Performance backed by seven year study
- Installations guaranteed up to 5 years
- High public approval

**EXTENDING ASPHALT SERVICE LIFE**

HA5 was developed to meet the demand for effective asphalt preservation on residential roadways without the negative side effects of chip seals or slurry seals. HA5 was specifically engineered to preserve the native asphalt binder. Effectively preserving the asphalt binder before oxidative damage takes place is recognized as the most cost-effective strategy for managing asphalt pavement.

Due to the asset preservation qualities and durability of the installations, HA5 is also a surface treatment specified by owners and managers responsible for asphalt parking surfaces. School districts, religious organizations, medical providers, and various business types utilize HA5 for asset preservation due to the measurable return investment. HA5 installations are backed with up to a 5 year guarantee.

**WHAT IS HA5?**

HA5 is a High Density Mineral Bond uniquely emulsified with a near neutral charge that is able to hold a proprietary blend of fine aggregates.

Limiting oxidative damage from moisture is fundamental to HA5's preservation qualities. But just as critical to the prevention of oxidative damage from moisture is preventing oxidative damage from UV rays. UV rays are strong throughout the western U.S., especially in higher elevations as well as desert regions.

HA5 combats oxidation from UV rays by including limited amounts of specific polymers to reflect damaging UV rays.

**TESTED, PROVEN PERFORMANCE**

**Independently Tested**

HA5 has been independently evaluated by Nolte Engineering and was recommend as a superior option to slurry seals on residential (lower load/volume) roadways and parking surfaces.

**400% Less Cracking**

In 2009, an evaluation was conducted that compared the oxidative damage of an asphalt street having HA5 installed to an adjoining street not having HA5 installed. The pavements evaluated were both 11 years old, with one having had HA5 installed at year six. The pavement with HA5 installed had 400% less cracking.

**INSTALLATION:**

For HA5 to be properly installed, specialized equipment is required that can uniformly disperse a thixotropic material housing the required density of fine aggregate.

**GUARANTEE:**

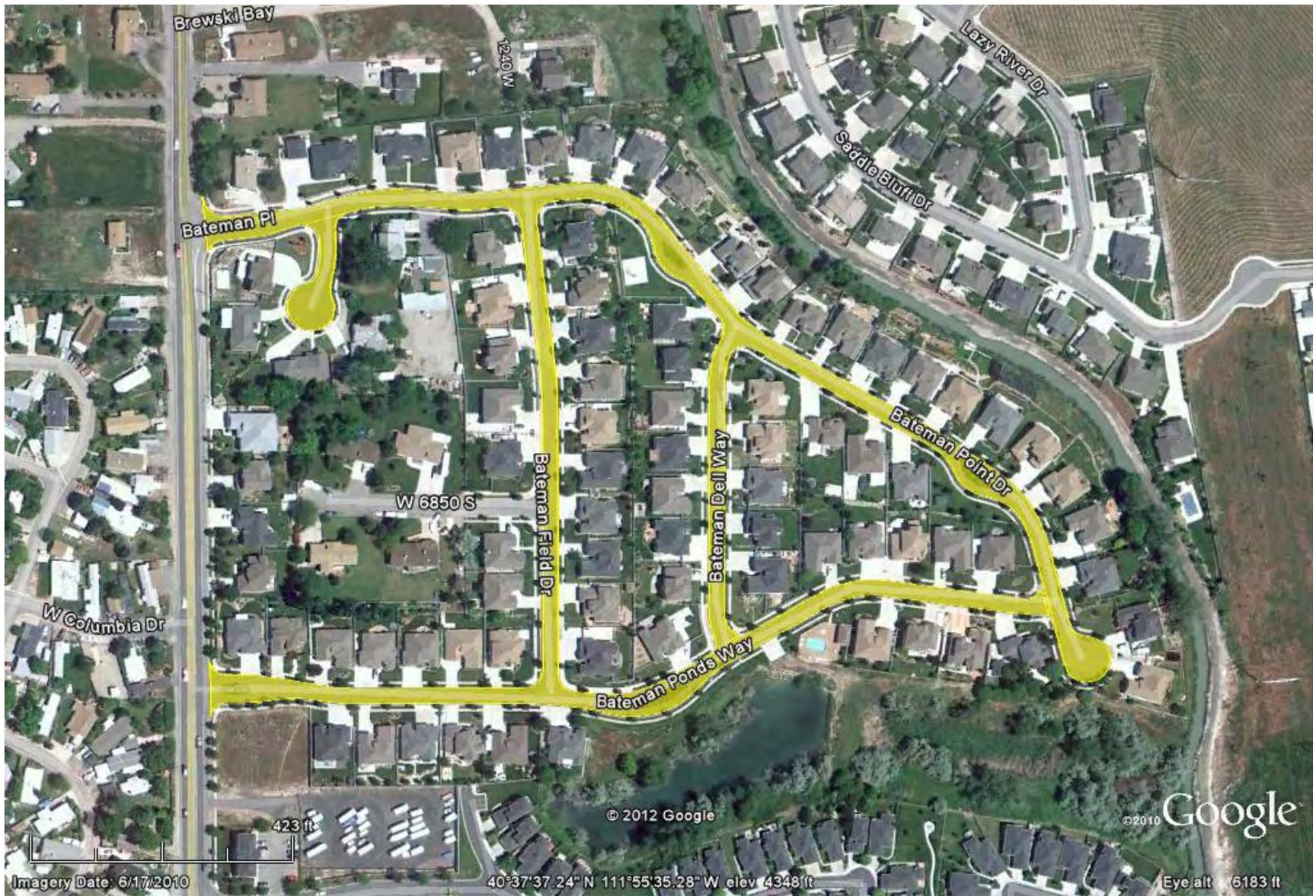
HA5 installations are backed by a five year warranty. Contact a Holbrook Asphalt representative for complete warranty details.

**Links:**

- [Receive a copy of a free HA5 performance evaluation study](#)
- [Request a quote](#)



Bateman Pond Subdivision Map



Copperfield Subdivision Map



# DRY FROTH MIX PLACEMENT PROJECTS

Use of the Dry Froth binder from Crown Asphalt Ridge is continuing to move forward with the implementation of several field projects arranged by Natural Asphalt Solutions.

Two of these projects include a 100 ton placement of a 2" lift at the Asphalt Materials, Inc. plant at 7900 South 1300 East on October 18, 2012 and a 275 ton placement of a 3" lift on Hawley Park Road (5430 West) north of Old Bingham Hwy in West Jordan placed on November 6, 2012. The mix for both projects was supplied by Asphalt Materials, Inc. The mix at the AMI facility was placed as an overly of an existing pavement that was exhibiting block and fatigue cracking. The mix on Hawley Park Road was placed as an overlay over a milled HMA surface that appeared in fair to good condition.

## Mix Specifics

- Dry Froth Binder supplied by Natural Asphalt Solutions/Crown Asphalt Ridge.
- The mix was a ¾" 50-Blow Marshall mix produced by Asphalt Materials, Inc.
- The mix was produced at 320 °F for the AMI placement and 280 °F for the Hawley Park Road placement.
- The mix was placed by Preferred Paving, of Salt Lake City, and the West Jordan City Roads Department.

## Mix Quality Control

Quality control testing was performed by CMT Engineering Laboratories. Results are based on a single sample.

Mix Parameter	Target	Field
¾"	100	100
½"	90	94
⅜"	75	83
#4	57	59
#8	41	44
#16	26	27
#50	14	16
#200	9	7
AC Content, %	5.7	5.3 (uncorrected)

Mix Parameter	Target	Field
RAP Portion, %	15	15
Air Voids, %	4.0	4.15
Marshall Value	-	142.8
Rice Value	-	149.0

## Summary

Overall, the placement was no different than a mix placed with a conventional AC or PG binder. Mix design characteristics with the Dry Froth are nearly identical to the mix characteristics with the PG 64-22 typically used by AMI for this type of placement. Review of both mix placements one week later indicated a pavement performing similar to other conventional mixes produced by AMI.

**Figure 1. AMI Facility: Placement of Dry Froth 3/4" Mix**



**Figure 2. AMI Facility: Surface of Dry Froth 3/4" Mix after placement**



**Figure 3. AMI Facility: Surface of Dry Froth 3/4" Mix after one week**



**Figure 4. AMI Facility: Tight Surface Texture of Dry Froth 3/4" Mix**

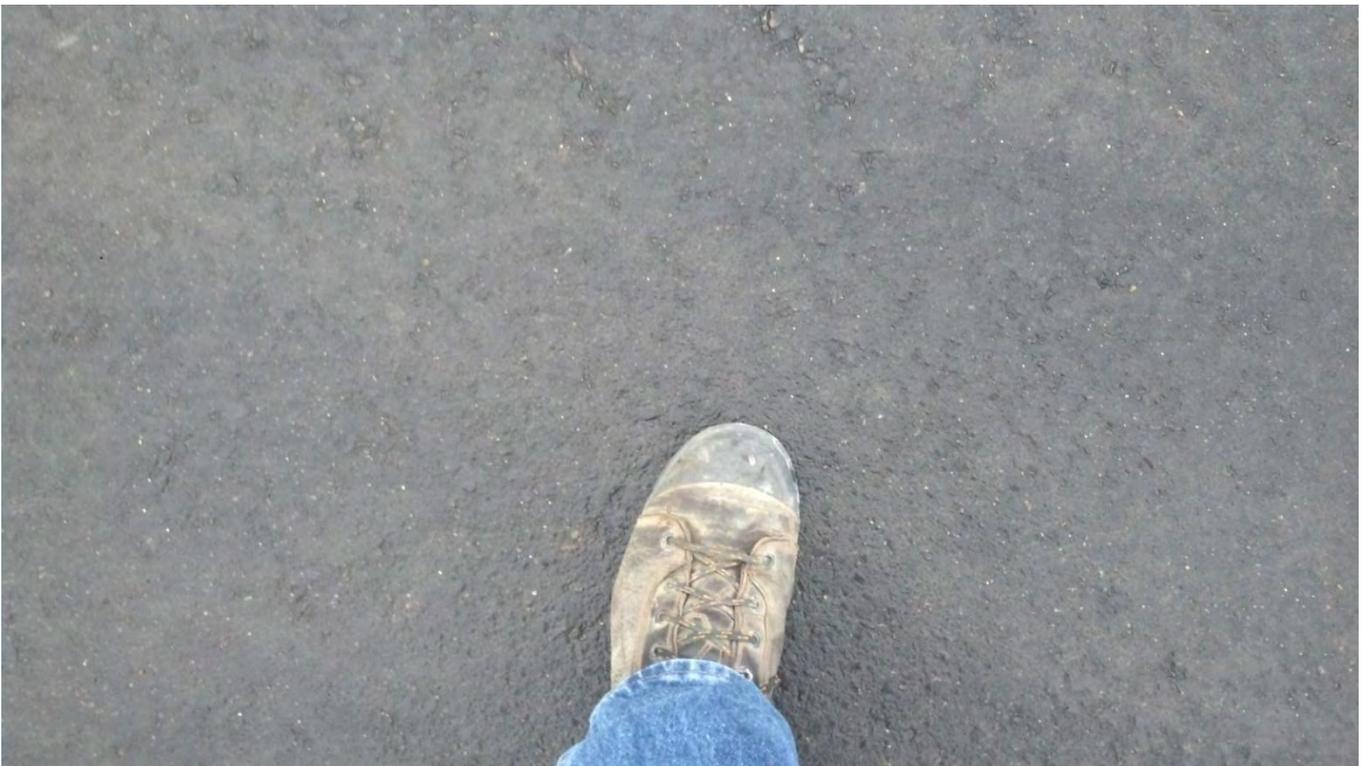


Figure 5. Hawley Park Road: Placement of Dry Froth 3/4" Mix



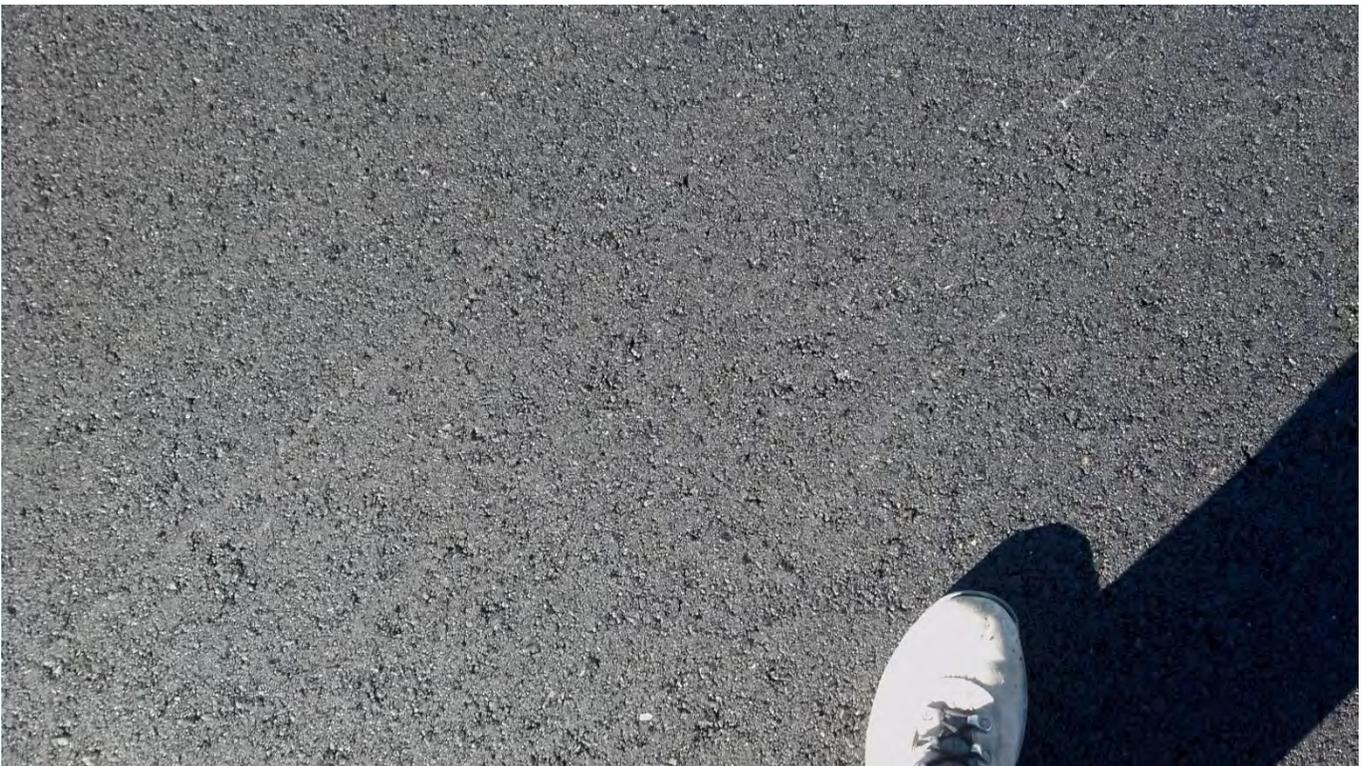
Figure 6. Hawley Park Road: Surface of Dry Froth 3/4" Mix after placement



**Figure 7. Hawley Park Road: Surface of Dry Froth 3/4" Mix after one week**



**Figure 8. Hawley Park Road: Tight Surface Texture of Dry Froth 3/4" Mix**

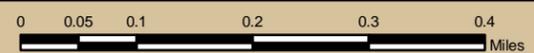


**Exhibit D**

**(2013 Proposed Road Maintenance Projects)**

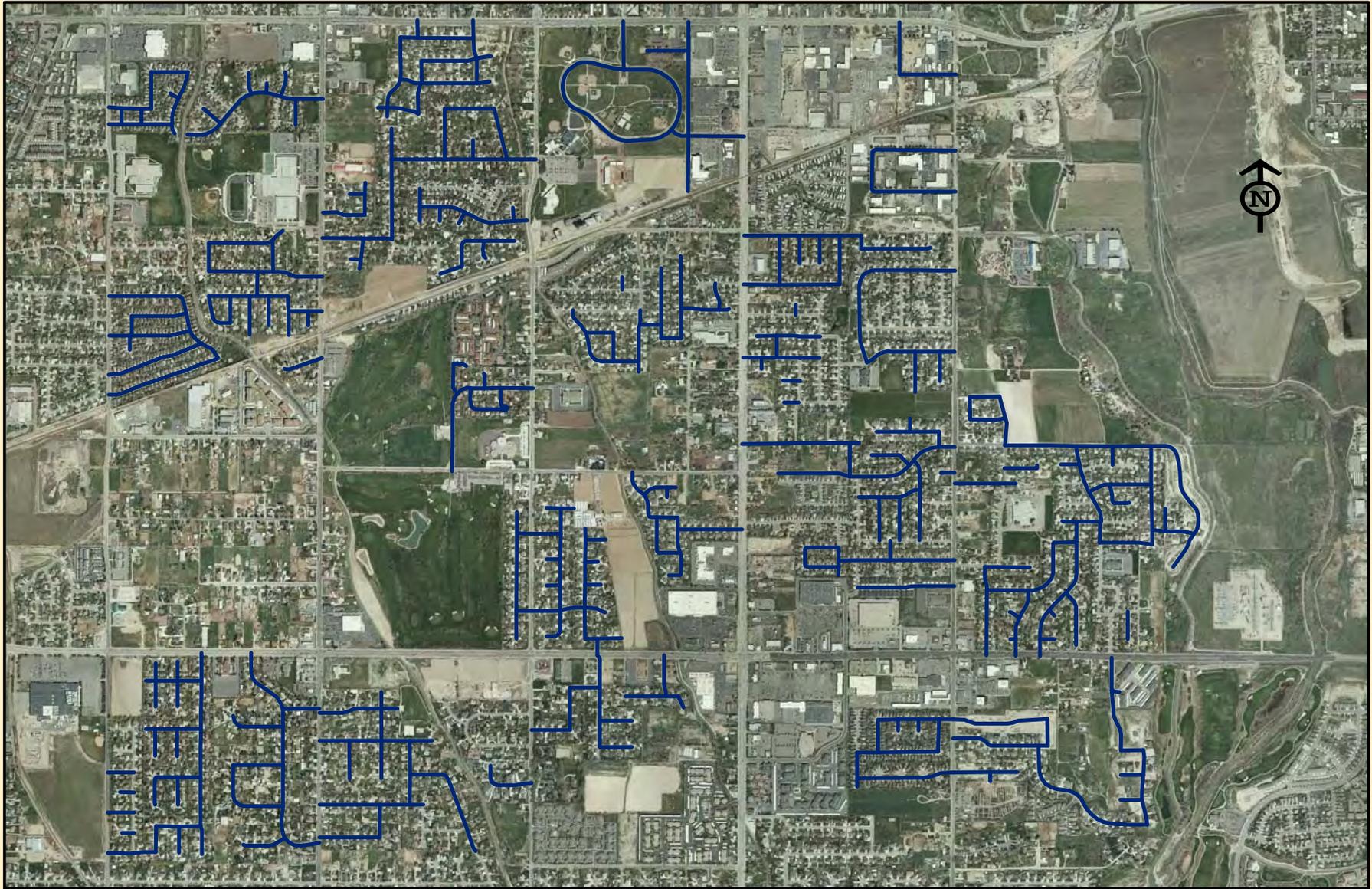


# 2013 Overlay Candidates



**Legend**

— Possible Overlay Candidates



# 2013 Proposed Slurry Seal Map A

## Legend

— Proposed 2013 Slurry Seal



**Exhibit E**  
**(2013/2014 Budget Requests)**

# City of West Jordan Pavement Management Report

## Budget Summary 2013

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<b>Scenario</b> 2013 Budget A	<b>Time Frame</b> 3
<b>Protocol</b> Cartegraph 2013 Three Year Look A	<b>Budget</b> 2013 Three Year Budget A
<b>Is OCI Driven</b> No	<b>Inflation</b> 2.90
<b>Do Best First</b> Yes	<b>Interest Rate</b> 4.50
<b>Description</b> 2013 Budget A	

**Plan Year 1**

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Target Network OCI 100.00  
Unimproved Network OCI = 71.25  
Improved Network OCI = 72.73  
Cost of Improvement = \$2,172,240.96

**Plan Year 2**

---

Target Network OCI 100.00  
Unimproved Network OCI = 70.18  
Improved Network OCI = 72.76  
Cost of Improvement = \$2,330,390.00

**Plan Year 3**

---

Target Network OCI 100.00  
Unimproved Network OCI = 70.17  
Improved Network OCI = 72.83  
Cost of Improvement = \$2,248,661.71

---

**Total Plan Cost = \$6,751,292.67**

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<b>Scenario</b> 2013 Budget B	<b>Time Frame</b> 3
<b>Protocol</b> Cartegraph 2013 Three Year Look A	<b>Budget</b> 2013 Three Year Budget B
<b>Is OCI Driven</b> No	<b>Inflation</b> 2.90
<b>Do Best First</b> No	<b>Interest Rate</b> 4.50
<b>Description</b> 2013 Budget B	

**Plan Year 1**

---

Target Network OCI 100.00  
Unimproved Network OCI = 71.25  
Improved Network OCI = 72.80  
Cost of Improvement = \$2,674,130.23

**Plan Year 2**

---

Target Network OCI 100.00  
Unimproved Network OCI = 70.26  
Improved Network OCI = 72.91  
Cost of Improvement = \$2,827,258.38

**Plan Year 3**

---

Target Network OCI 100.00  
Unimproved Network OCI = 70.34  
Improved Network OCI = 73.07  
Cost of Improvement = \$2,747,990.58

---

**Total Plan Cost = \$8,249,379.19**

## Budget Summary 2013

<b>Scenario</b> 2013 Budget C	<b>Time Frame</b> 3
<b>Protocol</b> Cartegraph 2013 Three Year Look A	<b>Budget</b> 2013 Three Year Budget C
<b>Is OCI Driven</b> No	<b>Inflation</b> 2.90
<b>Do Best First</b> Yes	<b>Interest Rate</b> 4.50
<b>Description</b> 2013 BUdget C	

**Plan Year**      **1**

**Target Network OCI** 100.00  
**Unimproved Network OCI** = 71.25  
**Improved Network OCI** = 72.89  
**Cost of Improvement** = \$3,172,754.44

**Plan Year**      **2**

**Target Network OCI** 100.00  
**Unimproved Network OCI** = 70.37  
**Improved Network OCI** = 73.12  
**Cost of Improvement** = \$3,329,228.60

**Plan Year**      **3**

**Target Network OCI** 100.00  
**Unimproved Network OCI** = 70.58  
**Improved Network OCI** = 73.36  
**Cost of Improvement** = \$3,025,555.31

**Total Plan Cost** = **\$9,527,538.35**

<b>Scenario</b> Do Nothing	<b>Time Frame</b> 3
<b>Protocol</b> Cartegraph 2013 Three Year Look A	<b>Budget</b> No Funds
<b>Is OCI Driven</b> No	<b>Inflation</b> 2.90
<b>Do Best First</b> Yes	<b>Interest Rate</b> 4.50
<b>Description</b> Do Nothing	

**Plan Year**      **1**

**Target Network OCI** 100.00  
**Unimproved Network OCI** = 71.25  
**Improved Network OCI** = 71.25  
**Cost of Improvement** = \$0.00

**Plan Year**      **2**

**Target Network OCI** 100.00  
**Unimproved Network OCI** = 68.79  
**Improved Network OCI** = 68.79  
**Cost of Improvement** = \$0.00

**Plan Year**      **3**

**Target Network OCI** 100.00  
**Unimproved Network OCI** = 66.44  
**Improved Network OCI** = 66.44  
**Cost of Improvement** = \$0.00

**Total Plan Cost** = **\$0.00**

**Total Scenarios**    **4**