TOWN BOARD WORK SESSION MEETING
July 11, 2016 – 5:30 P.M.
301 Walnut Street, First Floor Conference Room
Windsor, CO 80550

The Town of Windsor will make reasonable accommodations for access to Town services, programs, and activities and will make special communication arrangements for persons with disabilities. Please call (970) 674-2400 by noon on the Thursday prior to the meeting to make arrangements.

GOAL of this Work Session is to have the Town Board receive information on topics of Town business from the Town Manager, Town Attorney and Town staff in order to exchange ideas and opinions regarding these topics.

Members of the Public in attendance are asked to be recognized by the Mayor before participating in any discussions of the Town Board.

AGENDA

1. Town Board Benefits discussion – no packet materials
2. Pavement Management discussion
3. Future meetings agenda

PAVEMENT MANAGEMENT PLAN UPDATE
2016

TOWN OF WINDSOR

July 2016

Introduction

The purpose of this report is to update the Pavement Management Plan dated June 2012. This report contains information regarding the amount of pavement the Town maintains, the current condition of this pavement, and future pavement conditions based on varying budget amounts to be put toward maintenance.

The Town, with the help from Borstad Consulting Services, LLC, implemented the PAVER program in 2007. In 2009, the Town Engineering staff began performing the field inspections, inputting the data in to the PAVER program, analyzing the data, and determining the construction needs throughout the Town.

Pavement Inventory

In 2012, the Town had 124.4 miles of paved streets, over the last four years the Town has added 4.3 miles of paved streets due to annexations, subdivision development, private to public street conversions, and improved centerline length information. Table 1 compares the 2012 inventory information to the 2016 inventory information.

Table 1
Inventory Information

	2012 Inventory		2016 Inventory		Change	
Street Classification	**Length (Miles)**	**Area (sqft)**	**Length (Miles)**	**Area (sqft)**	**Length (Miles)**	**Area (sqft)**
Arterial	22.3	5,676,504	24.5	6,330,061	2.2	653,557
Collector	28.8	6,406,488	31.7	6,936,265	2.9	529,777
Local	73.3	15,199,829	78.3	16,458,476	5.0	1,258,647
Total	**124.4**	**27,282,821**	**134.5**	**29,724,802**	**4.3**	**2,441,981**

Viewing the Town's roadway as an asset with a value of $3 per square foot, the value of the Town's pavement is just over $89.2 million, up $7.3 million since 2012.

Today's Pavement Condition

The Pavement Condition Index (PCI) is the default condition index for the PAVER program. The PCI is a numerical index, ranging from 0 for a failed pavement to 100 for a pavement in perfect condition. Calculation of the PCI is based on the results of a visual condition survey in which distress type, severity, and quantity are identified. It was developed to provide an index of the pavement's structural integrity and surface operational condition.

The overall weighted PCI average for the Town's streets is currently 78.8, which is approximately 0.6 points below the PCI overall weighted average from 2012. The current PCI weighted averages for each of the street classifications are shown in Chart 1.

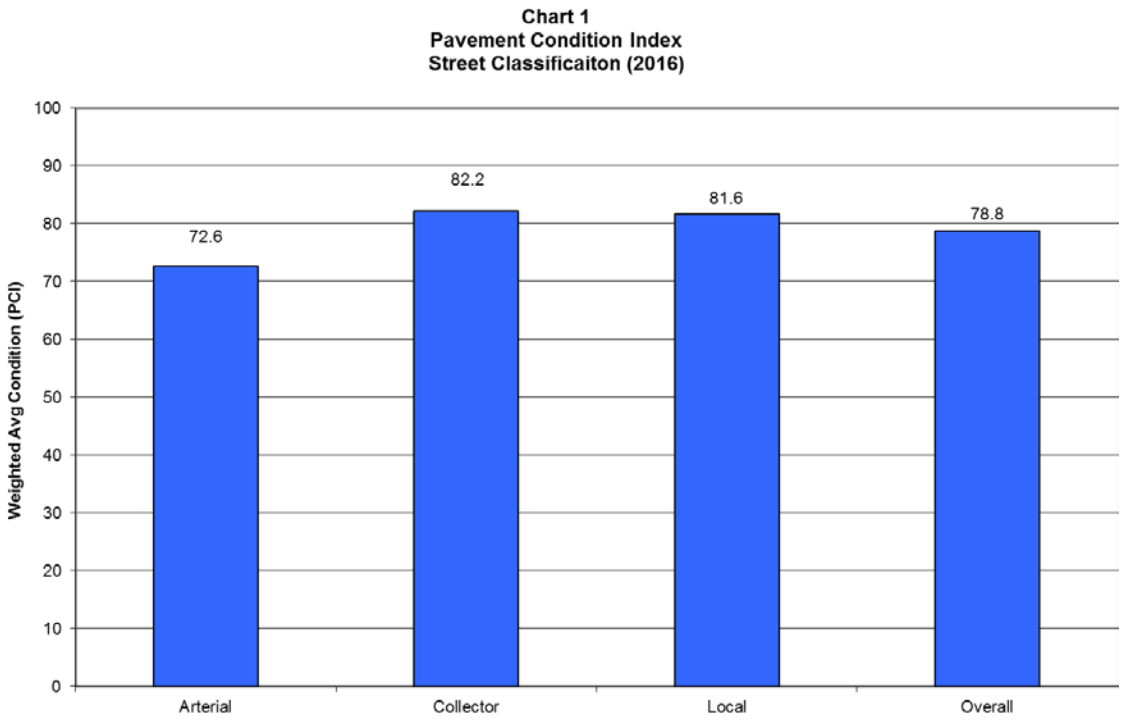
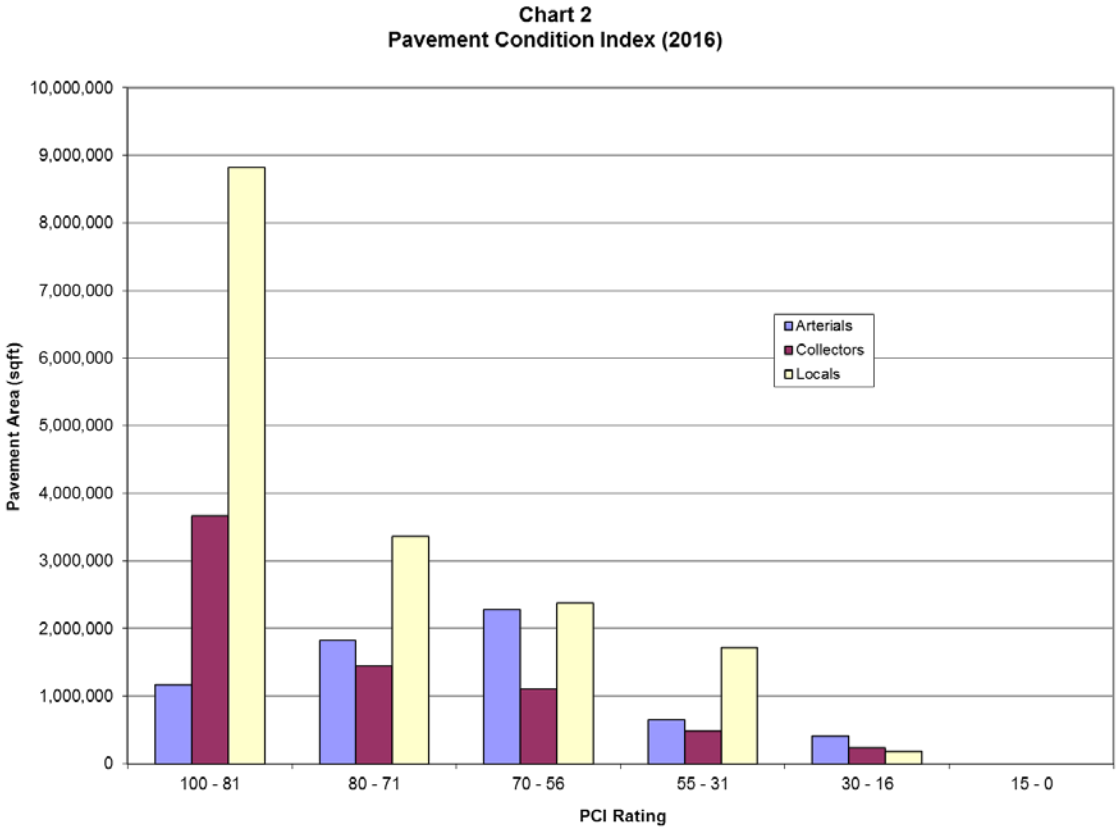
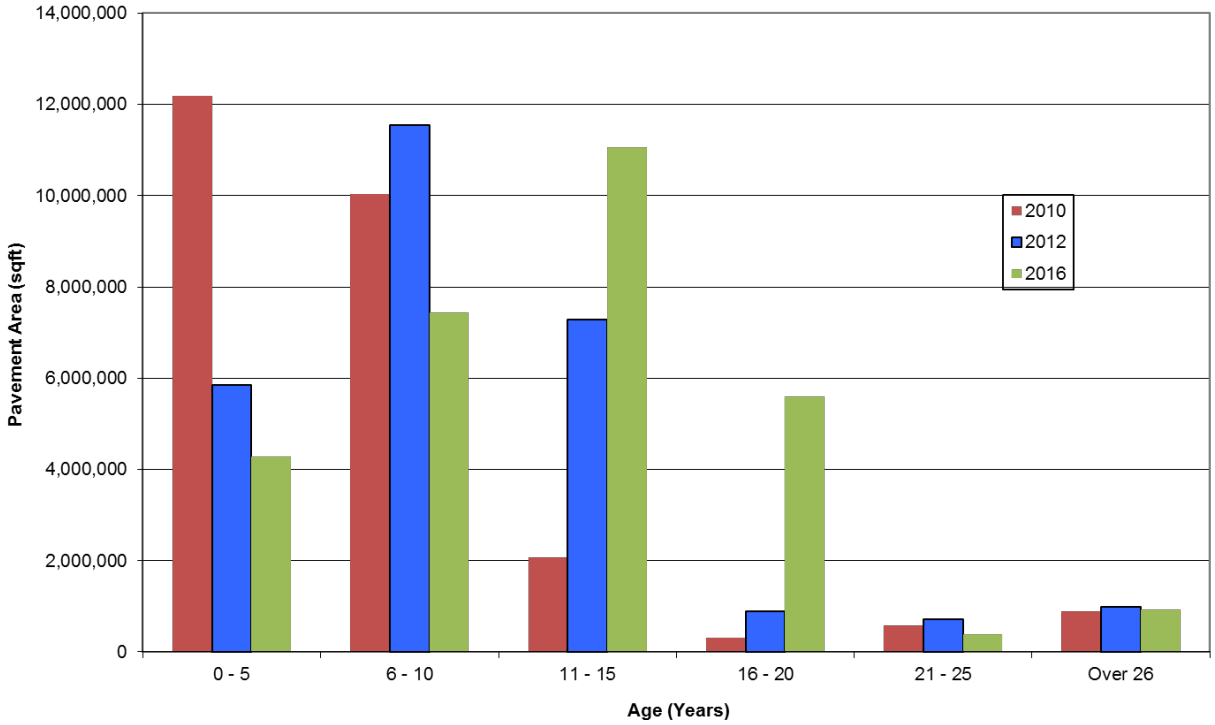


Chart 2 breaks down the amount of roadway in each PCI level based on the roadway classification. The Town currently has very few streets, approximately 12.4%, that are currently below the Critical PCI (PCI ≤ 55); this is up from 10.3% in 2012.



The primary reason for having a relatively high PCI rating is the age of the streets. Approximately 40% of the Town's streets have been constructed, reconstructed, or overlaid in the past 10 years; this percentage is down from 64% in 2012. Chart 3 shows the amount of pavement in each age category for the Town's roadway system. Comparing the 2010 & 2012 ages to the 2016 ages, a significant shift in the age of the Town's pavement has begun.

Chart 3
Roadway Age

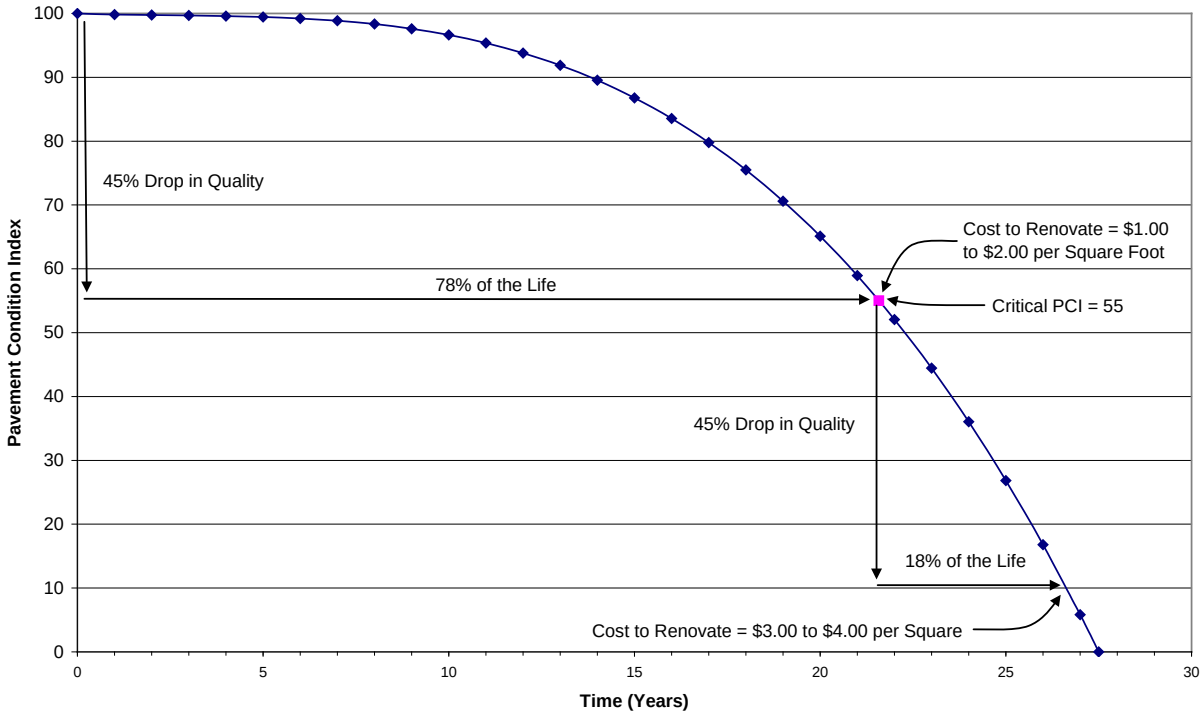


Pavement Life Cycle

The PAVER program was developed by the US Army Corps of Engineers to provide an objective method of evaluating pavement condition. As the data from the field inspections is inputted in to the PAVER program, the program evaluates this data and assigns a PCI value to each roadway section(s). This PCI value is plotted verses the age of the pavement to develop a curve for that roadway section; this curve is known as a Deterioration Curve. Chart 4 is an example of a typical Deterioration Curve for asphalt pavement. Generally, pavement will deteriorate 45% over the first 78% of its life cycle (19.5 – 23.4 years, assuming the full life cycle for pavement is 25 – 30 years), this point is called the Critical PCI value or point, because the next 45% of pavement deterioration will occur in 18% of its life cycle (4.5 – 5.4 years), over four times faster then the first 45%.

Also, the cost to renovate the pavement below the Critical PCI will cost approximately 2 to 2.5 times more than the cost to renovate the pavement above the Critical PCI. The PAVER program can utilize varying budget levels (determined by the program operator) to maintain the pavement PCI above the Critical PCI. Once the PCI of a roadway section drops below this Critical PCI the program will no longer perform work to that roadway section, unless the budget amount is significant, so that section would eventually reach a failed PCI value (0 PCI).

Chart 4
Pavement Life Cycle
Deterioration Curve



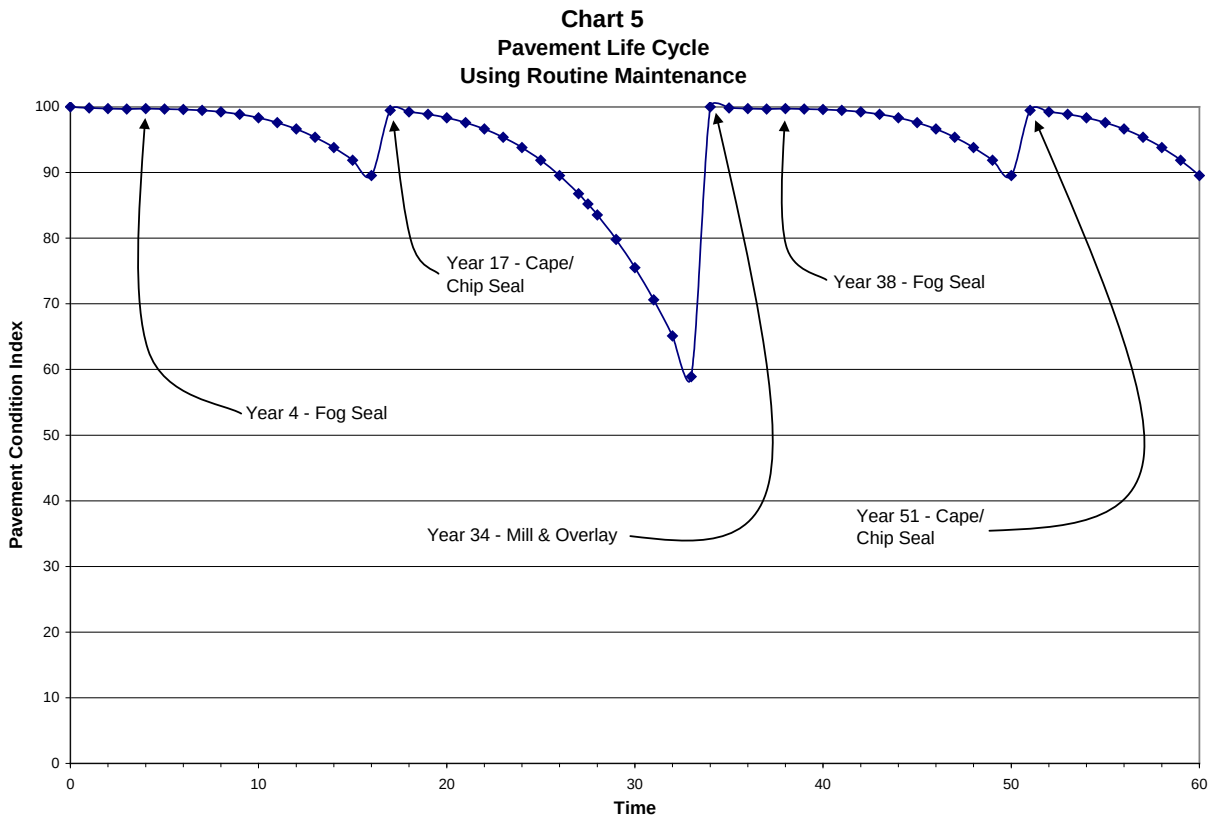
As you can see in Chart 4, it is crucial from a financial standpoint to maintain the Town's roadway system above the Critical PCI. In addition, with a relatively young roadway system, the Town will begin to see more roadways approaching the Critical PCI over the next 5 to 10 years; in fact, the Town has seen an increase of streets below the critical PCI from 94 in 2010 to 119 in 2012 to 146 in 2016. There are a number of maintenance procedures that can be utilized to extend the pavement life and maintain a healthy PCI value. Table 2 shows some maintenance procedures the Town has utilized or will be utilizing in the future for streets that have PCI values above the Critical PCI.

Table 2
Pavement Management Maintenance Procedures
(PCI Value > Critical PCI)

Maintenance Procedure	Roadway Classification	Typical Cost ($/ft^2)	Amount of Increase Life (Years)
Crack Repair/Crack Sealing	All	$0.025	Not Defined
Fog Seal	Locals	$0.10	2 to 5
Slurry Seal	Locals	$0.35	4 to 6
Chip Seal	Arterials & Collectors	$0.51	8 to 10
2" Mill & Overlay	All	$1.60	12 to 15

Notes:
1. Crack Repair/Crack Sealing – Is the process of using hot rubberized asphalt to fill cracks in the asphalt
2. Fog Seal - A fog seal is an application of asphalt emulsion sprayed onto a pavement surface with or without a sand cover. The emulsion is diluted to the proper consistency in order to get complete coverage on the roadway but not be too thick to cause a slippery surface.
3. Slurry Seal - A slurry seal is a mixture of quick setting asphalt emulsion, fine aggregate, mineral filler, additive, and water. The ingredients are carefully measured and combined on the project site and spread with a squeegee device.
4. Chip Seal - A chip seal is an application of asphalt followed by an aggregate cover. The asphalt is usually applied as hot asphalt cement or emulsified asphalt. After the aggregate is swept an application of fog seal is applied.
5. 2" Mill & Overlay – Is the process of milling the top 2" layer of the pavement surface and overlaying a new asphalt surface

Once a maintenance procedure is completed on a roadway section, the procedure type is inputted in to the PAVER program for that roadway section. The PAVER program calculates a new PCI for that roadway section and updates the pavement life cycle. Chart 5 is an ideal example of a pavement life cycle of a street that is maintained utilizing some of the above maintenance procedures.



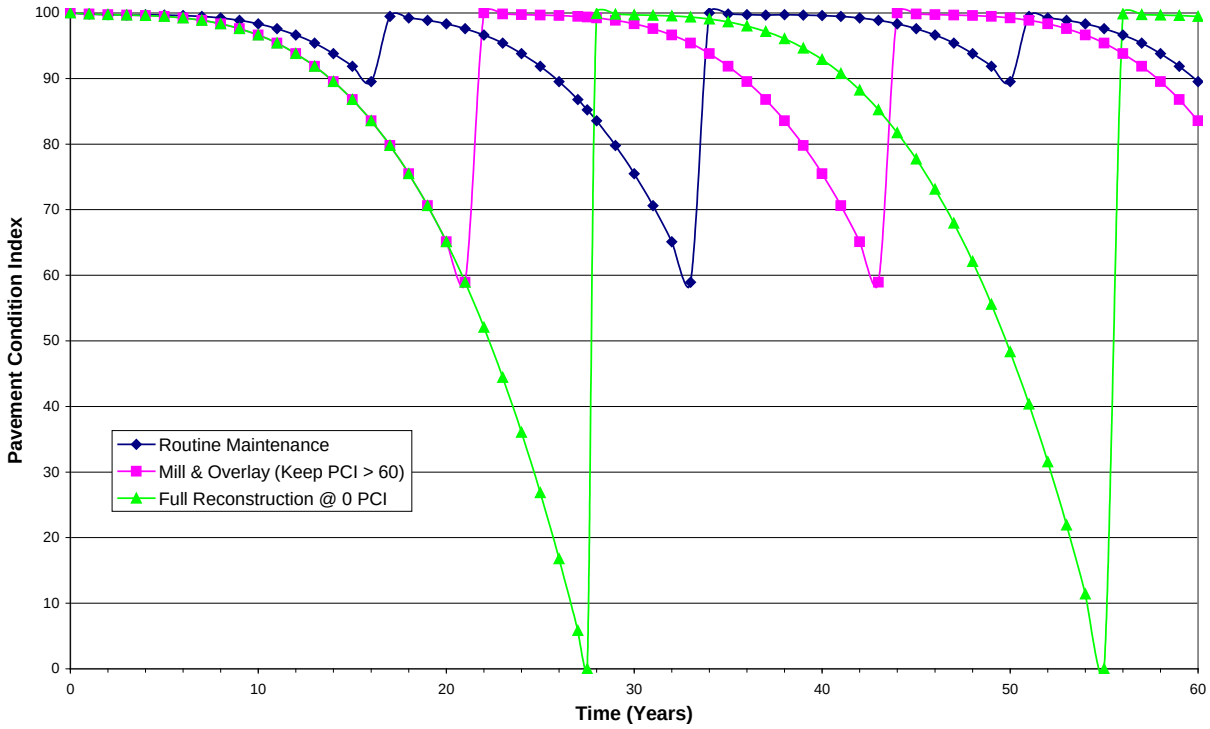
There are a number of different approaches to maintaining the Town's roadway system, all ranging in expense and results. Table 3 examines three typical approaches to maintaining a roadway section over a period of time, in this case that period was defined as 60 years (approximately two life cycles); these examples use the same Deterioration Curve equation and assume an increase in life based on the type of work completed as defined in Table 2. Whenever the street is overlaid and/or reconstructed the PCI value resets to 100. The cost in this table is based on a local street cross-section by one mile in length (177,760 sqft) and assumes an annual inflation rate of 3%.

Table 3
Maintenance Approaches – 60 Year Period

Maintenance Approach	Number of Years Above the Critical PCI (55)	Average PCI	Cost for a 60 Year Period
Routine Maintenance	60	94.01	$ 1,027,453
Mill & Overlay (Keep PCI > 60)	60	91.32	$ 1,131,976
Full Reconstruct @ 0 PCI	49	80.76	$ 2,892,511

In Chart 6, these three maintenance approach's Deterioration Curves are shown. Note the amount of time each of the approaches are the higher ranked street (Routine Maintenance = 33 years, Mill & Overlay = 14 years, & Full Reconstruct = 11 years; the first 3 years the streets are all ranked the same).

Chart 6
Pavement Life Cycle
Three Maintenance Approaches



2016 Street Repair/Pavement Management Plan

In 2010, the Town began to encompass some of the above pavement maintenance approaches in to the Street Repair/Pavement Management portion of the budget. For the 2016 budget the Town will continue to diversify the Street Repair/Pavement Management portion of the budget by increasing the budgeted amounts for chip seal and crack seal, while reducing the overlay amounts. Table 4 has the break down of the Street Repair/Pavement Management portion of the 2016 budget.

Table 4
2016 Street Repair/Pavement Management Budget

Budget	Maintenance Approach	Street	From	To	Bid Cost
$ 2,100,000	**Overlay**	Grand Avenue	15th Street	Prospector Street	$ 511,548
		Birch Street	13th Street	15th Street	$ 104,125
		Locust Street	7th Street	10th Street	$ 127,023
		Cornerstone Drive	Garden Drive	Kenosha Court	$ 56,357
		Kenosha Court	Garden Drive	CDS	$ 77,597
		Meander Road	River West Drive	River West Drive	$ 147,308
		Hunter Drive/Court	Highland Meadows Pkwy	CDS	$ 87,584
		Promontory Circle/Drive	Highland Meadows Pkwy	Highland Meadows Pkwy	$ 192,594
				Subtotal	**$ 1,304,136**
	Slurry Seal	7th Street	Eastman Park Drive	Main Street	$ 143,333
		10th Street	11th Street	Main Street	$ 56,614
		Aspen Lane & Sycamore Drive			$ 6,682
		Mountain View Subdivision	Oak Street, Parkview Mtn. Drive & CDS's		$ 64,623
		Windsor Village Sub.	Ponderosa, Lilac, Lodgepole Drives		$ 28,997
		Water Valley Subdivision	CDS west of Pelican Lakes Pt.		$ 69,921
		North Shores Subdivision			$ 52,436
				Subtotal	**$ 422,606**
	Crack Seal	Locations Vary		**Subtotal**	**$ 141,877**
	Misc. Concrete	Locations Vary		**Subtotal**	**$ 143,762**
				Total	**$ 2,012,381**

Notes:
1. CDS = Cul-de-sac

Future Pavement Conditions

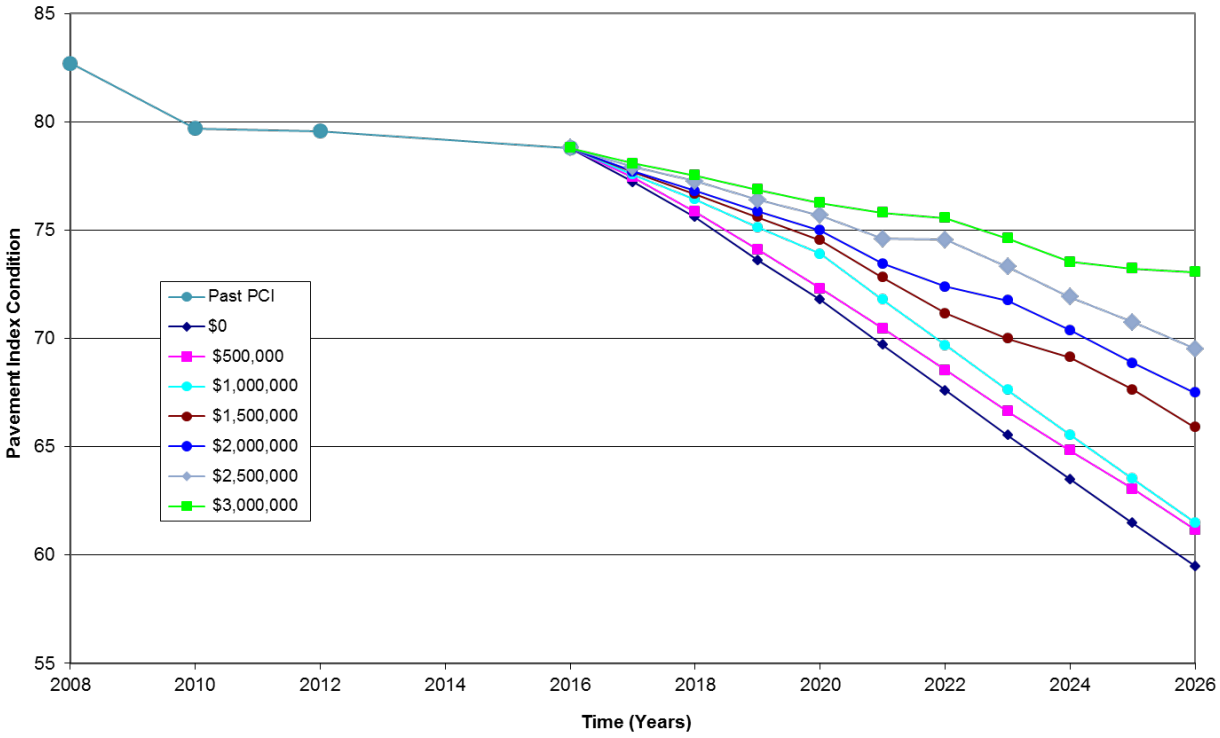
Another valuable feature of the PAVER program is the Maintenance & Repair Planner or M & R Plan. This feature is where the Deterioration Curves and the current and future budgets come together to develop a maintenance plan. This feature takes an inputted budget (controlled by the operator), evaluates the current PCI of the streets, and outputs a maintenance plan to utilize the budget in the most efficient matter possible. The one drawback of this program is the outputted maintenance plan tends to bounce around from one block of a street to another block on a different street in a different part of Town. From a constriction mobilization cost point of view, this is not very cost efficient and having a checker board of blocks completed would not be very pleasing to the eye. With this understanding the Town evaluates this plan and decides to work on the street(s) that will have the highest benefit from the work with the most efficient cost.

This feature will also take a budgeted amount and project it over time to evaluate the future condition of the Town's streets. Utilizing this feature, the 2016 budget amount of $2,100,000 ($100,000 is budgeted for concrete repairs, $140,000 is budgeted for crack repair, $360,000 is budgeted for slurry seal, & $1,500,000 is budgeted for overlay) was projected over the next 10 years. The resulting overall weighted PCI average showed a steady decline over this period to a value of 67.5.

A couple other items to note are the number of street sections that have a PCI rating below 55 (Critical PCI) increases from 140 to 273 and the number of street sections with a 0 PCI rating increases from 0 to 27 over this ten year period.

In addition to projecting the 2016 budget amount over the next 10 years, annual expenditures of $0, $0.5 million, $1.0 million, $1.5 million, $2.0 million, $2.5 million, and $3.0 million were projected over the same period. An additional $100,000 would be budgeted for concrete repair. As expected the 2026 overall weighted average increases as the budget amounts are increased. Chart 7 shows the past weighted average and the overall weighted average curves for each of the budget amounts.

Chart 7
Pavement Condition Index Curves - Weighted Average
Varying Budgets



Conclusion

The Town's roadway system is a relative young valuable asset that is aging, which will require further monitoring and continued maintenance. It is crucial for the Town to continue to maintain the streets above the Critical PCI which, in many cases, will double the life of that street. For those streets below the Critical PCI, the Town needs to look for opportunities to improve these streets without sacrificing other routine maintenance projects. As the Town moves forward in to the future it is essential to decide what PCI level the Town wants and spend the time and money to achieve that level of service.

FUTURE TOWN BOARD MEETINGS

Work Sessions & Regular Meetings will be held in the Board Chambers unless otherwise noted.

July 18, 2016 6:00 p.m. 1st floor conference room	Town Board Work Session Update from Xcel Regional Tourism Act update
July 25, 2016 5:30 p.m.	Town Board Work Session Greeley Loveland Irrigation Company Water Conversion & City of Greeley-Windsor IGA
July 25, 2016 7:00 p.m.	Town Board Meeting
August 1, 2016 6:00 p.m.	Town Board Work Session Ballot Question Presentation - People for a Healthier Larimer County Municipal Judge appointment process Review of Sections 8-2-20 through 8-2-40 regarding parking prohibitions Liquor authority - administrative approval of applications
August 8, 2016 5:30 p.m./1st floor conference room	Board/Manager/Attorney Monthly Meeting
August 8, 2016 7:00 p.m.	Town Board Meeting
August 15, 2016 6:00 p.m.	Town Board Work Session 2017 Revenue and CIP discussion Public Works project update
August 22, 2016 6:00 p.m.	Town Board Work Session PVREA update
August 22, 2016 7:00 p.m.	Town Board Meeting
August 29, 2016	Fifth Monday
September 5, 2016 6:00 p.m.	Labor Day holiday
September 12, 2016 5:30 p.m./1st floor conference room	Board/Manager/Attorney Monthly Meeting
September 12, 2016 7:00 p.m.	Town Board Meeting Kern Board Meeting
September 19, 2016 5:00 p.m.	Town Board Work Session NISP work session and tour

September 26, 2016 6:00 p.m.	Town Board Work Session
September 26, 2016 7:00 p.m.	Town Board Meeting

Additional Events

July 12, 2016; 7:30 am Senor Jalapenos	Joint meeting with Weld County Commissioners; attending - Melendez, Baker, Morgan, Bennett, Boudreau, Rennemeyer
July 18, 2016; 7:30 am The Egg & I	Joint meeting with Larimer County Commissioners; attending – Baker, Morgan, Boudreau, Rennemeyer

Future Work Session Topics

Continuation of Water Discussion
Water Rights Dedication Policy
Broadband discussion
CIP Parks Master plan
Economic Development Incentive Program review
Review of current Internal Governmental Agreements
Road Impact Fee review/update