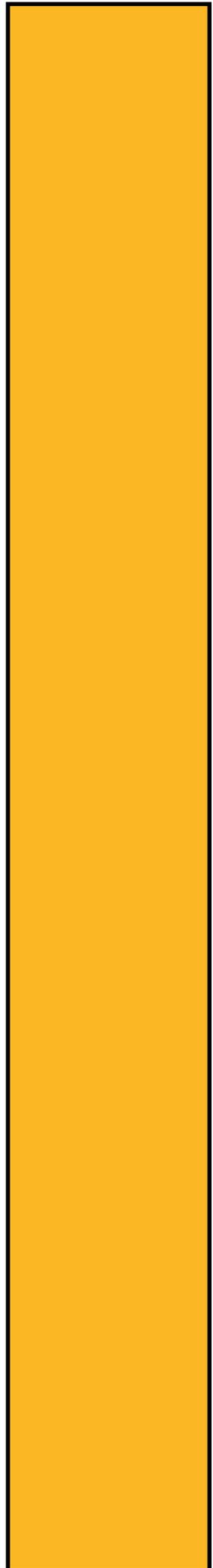
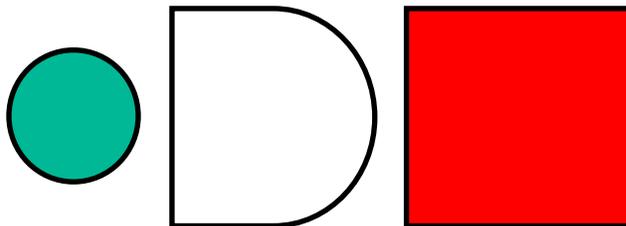


**2022**

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**Pavement Management Plan**  
**City of Baker City**





**Public Works Department**

1655 1st Street

P.O. Box 650

Baker City, OR 97814

Phone: (541) 524-2047

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# Washington Ave. Overlay Project



Justin Plumbtree



Blain LeaMaster



Kris Younger (L), Karl Ritch, Nate Miller & Jake Fuzi



Nate Miller (L) & Karl Ritch



Brian Johnson

# Introduction

Date: February 24, 2022  
To: Public Works Advisory Committee  
Subject: 2022 Pavement Management Program

I hope that 2022 finds you well. I'll start this year's memo with a brief look back on what we accomplished last year. The Washington Street overlay project was a huge undertaking and turned out great. It was a long spring and summer with the challenges of a construction project in a residential neighborhood on a designated collector street. The chip seal also went well. There are always more streets to work on than there is time and money available.

With that said, we have a modest pavement improvement plan for the upcoming season. This year there will be significantly more crack filling and patching throughout the spring, summer and fall. In addition, the Pavement Plan includes a modest chip seal program and a fog seal for the recently overlaid Washington section and Auburn between Resort and Birch. Auburn will receive a chip seal and then a fog to better seal the rock to the street. We are trying this technique on Auburn as it is a designated collector street and gets a significant amount of traffic. Other chip sealed residential streets will not receive a fog seal.

The other unique project included in this year's plan has been somewhat controversial. We have included paving a short section of Indiana Avenue. The City Council voted to pave this gravel street at the request of some adjacent residents. The typical process for street construction requires a Local Improvement District (LID) to be formed and then a street constructed to standards with benefitting property owners paying their fair share. This special circumstance will only include doing modest base work and applying a 20' wide asphalt surface from Reservoir Road to the city limit line near Scenic Vista Lane. The Council agreed to a \$50,000 expenditure for this one project.

As I said last year, I know we need to be aggressive in our street treatments because the network is failing, but I also know there isn't enough funding to do what's really needed. It's been a decades long struggle without a clear path to a resolution. This year's plan provides some information on other communities' funding strategies. It's good information to consider.

Thank you for taking the time to review the 2022 Pavement Management Plan. I look forward to our discussion about the upcoming construction season and appreciate your willingness to serve as a volunteer.

Michelle Owen  
Public Works Director

# Washington Ave. Overlay Project ...continued



Brady Tennent (L) & Brian Johnson



Tom Fisk



Dennis Bachman (L) & Craig Dolby

# Program Background

In the fall of each year an engineering technician drives each paved city street to conduct a street inspection.

The following characteristics are analyzed and rated:

- The ride quality
- Surface cracking
- Trench settlement
- Drainage issues
- Miscellaneous items affecting the street's structural integrity

The illustration to the right is an example of the rating form used by staff when conducting the inspection. It is through this inspection that each paved street is rated. This rating system assists staff in determining what maintenance techniques, if any, will be recommended.

Each street is placed into a category by rating the defects found in each section of pavement. A street starts with a rating value of 100. The number of defects found, based on the inspection, are subtracted from 100 to arrive at the rating value for that street section.

After the street is rated, it is placed into the appropriate condition category based upon the rating value. There are five street condition categories: *Very Good, Good, Fair, Poor, and Very Poor.*

ASPHALT PAVEMENT RATING FORM				DATE
Fifth - Valley to Court				10/12
STREET		ZONE	ROUTE	LENGTH
Fifth - Valley to Court		SE	233	313
Defects - Cracks				
TYPE	RATING INSTRUCTIONS	RATING	COMMENTS	
5 Transverse	Rate 0 - 10 (10= Major Crack at 25' Intervals)	4		
Longitudinal	Rate 0 - 5 (5= Joint Cracks Full Length of Block)	1		
Alligator	Rate 0 - 60 (60= 100% of Road Surface)	3		
Shrinkage	Rate 0 - 60 (60= 100% of Road Surface)	3		
Subtotal crack defects ratings (cannot exceed 60)				11
Other Defects				
TYPE	RATING INSTRUCTIONS	RATING	COMMENTS	
Trench Settlement or Bad Patching	Rate 0 - 10	-		
Pot Holes	Rate 0 - 5 (5 = Five per Block)	-		
Deficient Drainage	Rate 0 - 5	3	curb failure	
Base Failure	Rate 0 - 5	-		
Other Defects	Rate 0 - 10 Corrugations <input type="checkbox"/> Raveling <input checked="" type="checkbox"/> Rutting <input checked="" type="checkbox"/>	3	6	
Subtotal other defects ratings (cannot exceed 40)				
Overall Ride Quality				
TYPE	INSTRUCTIONS	QUANTITY	RATING	COMMENTS
Transverse Crack	1 Noticeable/50'=15	5	3	
Patch or Settlement	1 Noticeable/100'=10			
Subtotal Ride Quality Ratings (Maximum 20)				
Overall ride quality converted rating (use subtotal above)				18
Total defects ratings (cracks-other-overall r.q.)				
Suggested Maintenance				
Overlay	DCH	Crackfill 1st Priority	Crackfill 2nd Priority	Asphalt Crackfill
				Grind and Overlay
				Fog Seal
				Patching
Condition Rating				2020 Rating
Possible Points	-	Defects	=	Rating
100		18		82
Categories				
Very Good	Good	Fair	Poor	Very Poor
100 - 98	97 - 89	88 - 70	69 - 45	44 - 0
Other Comments:				Ride Quality Conversion Chart
				Ride Quality
				Defect Rating
				1 - 6
				7 - 12
				13 - 17
				18 - 20
				1
				2
				3
				4
Last Maintenance: 2003-gsb 88				
Last Year's Comments:				
pot holes close, deficient drainage-curb failure, raveling, rutting				

# Street Condition: “Very Good”

Rating Range: 98-100 Paved Streets Within This Category: 9.85%



**21st Street (Baker St. to Campbell St.)**

Constructed: 1982

Last Maintenance: Chip Seal 2021

Suggested Maintenance for 2022: None

Ratings: 2017=94 2018=92 2019=91 2020=89 2021=99

The most western residential street in town, 21st St. is generally utilized by the adjacent residents. Prior to the chip seal in 2021, 21st St. received the lowest rating within the “Good” category. A thin overlay was performed on this street section in 1999.



**Washington Avenue (W side of Clark St. to W side of Balm St.)**

Constructed: 1955

Last Maintenance: Overlay 2021

Suggested Maintenance for 2022: Fog Seal

Ratings: 2017=66 2018=57 2019=62 2020=63 2021=99

This year’s overlay project was the second phase of the Washington Ave. improvement project. The first phase, west side of the river to the west side of Clark St., was completed in 2019. This section of Washington Ave. was also overlaid in 1983.

## CHARACTERISTICS

With no more than the occasional crack, streets within this category have stable, excellent ride qualities. The “Very Good” category generally only includes streets that have been recently overlaid or constructed.

## RECOMMENDED TREATMENTS

- Possible minor crack filling
- 1/4”-10# chip seal to prevent oxidation
- Fog seal

# Street Condition: “Good”

Rating Range: 89-97 Paved Streets Within This Category: **29.74%**

## CHARACTERISTICS

A “Good” street rating generally includes stable ride qualities. Distress characteristics may include: gray or light-colored appearance (due to oxidation), some transverse and longitudinal cracking, and possible trench settlement.

## RECOMMENDED TREATMENTS

- Crack filling
- Chip seal to prevent oxidation
- Fog seal
- Possible thin overlay



2022 Pavement Management Plan

**D Street (W side of Grove St. to E side of Elm St.)**

Constructed: 1982

Last Maintenance: Chip Seal 2010, Thin Overlay 2009

Suggested Maintenance for 2022: Crack Fill

Ratings: 2017=97 2018=97 2019=94 2020=91 2021=92

D Street was constructed to provide better connection to adjacent residential streets as well as alleviate vehicle traffic from Campbell Street. Providing connection from 10th St. to Birch St., it receives a steady flow of vehicle traffic from adjacent residents as well as those avoiding Campbell St. to go to the store!



**J Street (196' W of Plum St. to Birch St.)**

Constructed: 1995

Last Maintenance: Fog Seal 2000

Suggested Maintenance for 2022: Crack Fill & Patch

Ratings: 2017=93 2018=97 2019=94 2020=94 2021=92

J Street is a local residential street tucked in between other residential areas on the far east side of town. There are 12 homes that are accessed off of J Street as well as five homes and two group homes that can utilize J Street for access.

# Street Condition: “Fair”

Rating Range: 70-88 Paved Streets Within This Category: 49.35%



## 15th Street (Baker St. to Campbell St.)

Constructed: 1978

Last Maintenance: Chip Seal 2009

Suggested Maintenance for 2022: Crack Fill & Patch or Overlay

Ratings: 2017=75 2018=88 2019=87 2020=87 2021=86

Located on the west side of town, 15th Street is a local residential street.

Directly after its construction this section of 15th St. was fog sealed in 1979.

It received a chip seal treatment in 1988, then fog sealed in 1993 and 2006, and received an additional chip seal layer in 2009.



## Grace Street (4th St. to 3rd St.)

Constructed: 1977

Last Maintenance: Chip Seal 2010

Suggested Maintenance for 2022: Crack Fill & Patch

Ratings: 2017=92 2018=91 2019=85 2020=82 2021=81

Directly adjacent to South Baker Elementary, this block of Grace Street receives a steady flow of vehicle traffic during the school months. After the chip seal application in 2010 it received a rating of “95.” This section of Grace St. was also chip sealed in 1985 and 1990 and fog sealed in 1995 and 2005.

### CHARACTERISTICS

The “Fair” street category includes streets which are considered to be generally stable, although minor areas of structural weakness may be evident. Ride qualities are good to fair. Distress characteristics may include: transverse, longitudinal and some alligator cracking, trench settlement or drainage deficiencies.

### RECOMMENDED TREATMENTS

- Extensive patching
- Chip seal
- Thin overlay

# Street Condition: “Poor”

Rating Range: 45-69 Paved Streets Within This Category: **10.78%**

## CHARACTERISTICS

A street receiving the rating of “Poor” is a street which has areas of instability with evidence of structural deficiency. Ride qualities range from fair to poor. Distress characteristics may include transverse, longitudinal, alligator, and shrinkage cracking. Trench settlement and drainage deficiencies will also be evident. To alleviate settlement and drainage issues, extensive crack filling and patching would need to be accomplished. If the street base is in such condition that rehabilitation is possible, an overlay is recommended; otherwise street reconstruction is necessary.

## RECOMMENDED TREATMENTS

- Overlay
- Reconstruction



**Plum Street (S side of Madison St. to Campbell St.)**

Constructed: 1980

Last Maintenance: Chip Seal 2007

Suggested Maintenance for 2022: Crack Fill, Patching or Overlay

Ratings: 2017=61 2018=58 2019=55 2020=48 2021=57

This section of Plum Street provides connection to adjacent properties within a wide array of land use zones - commercial, industrial and residential. For years it has absorbed the weight and frequent use of semi-trucks using it to access the truck wash located off of it.



**Resort Street (Indiana Ave. to Estes St.)**

Constructed: 1973

Last Maintenance: Fog Seal 2004

Suggested Maintenance for 2022: Patch or Overlay

Ratings: 2017=74 2018=64 2019=71 2020=69 2021=69

Since its construction nearly 48 years ago, this section of Resort Street has been chip sealed three times - 1980, 1985 and 1990 and fog sealed twice - 1995 and 2004. It is nestled within a high-density residential area.

# Street Condition: “Very Poor”

Rating Range: 0-44 Paved Streets Within This Category: .29%



## Clifford Street (Washington St. South)

Constructed: 1975

Last Maintenance: Asphalt Patching 2017

Suggested Maintenance for 2022: Patch or Overlay

Ratings: 2017=53 2018=40 2019=44 2020=36 2021=33

Clifford Street is a dead-end street that serves approximately 12 homes.

This is the seventh year Clifford Street has been within the “Very Poor” street rating category. Extensive street patching was accomplished in 2014 and 2017 which only temporarily elevated its annual street rating.



## Mitchell Street (Highway 7 to 4th St.)

Constructed: 1982

Last Maintenance: Fog Seal 2005

**Suggested Maintenance** for 2022: Grind & Overlay

**Actual Maintenance** for 2022: Crack Fill, Patch & Chip Seal

Ratings: 2017=58 2018=54 2019=53 2020=45 2021=44

This is the first year Mitchell Street has been in the “Very Poor” street rating category. The current condition of Mitchell St. justifies a substantial street improvement project; however, the reality is our street maintenance budget cannot afford such a project at this time. We are therefore proposing significant crack fill & patching efforts followed by a chip seal application.

### CHARACTERISTICS

Streets within the “Very Poor” category have many areas of instability with obvious structural deficiencies. Ride qualities are poor. Distress characteristics generally include alligator and shrinkage cracking with potholes, extensive trench settlement, and drainage deficiencies. The cost of maintaining the pavement in an acceptable condition would exceed the maintenance funds available.

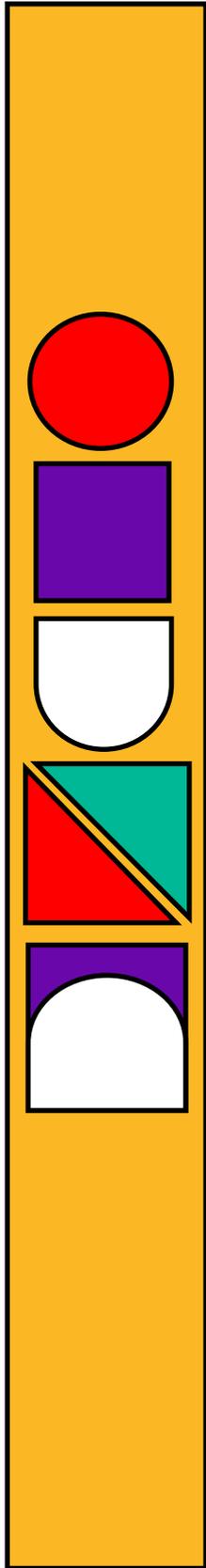
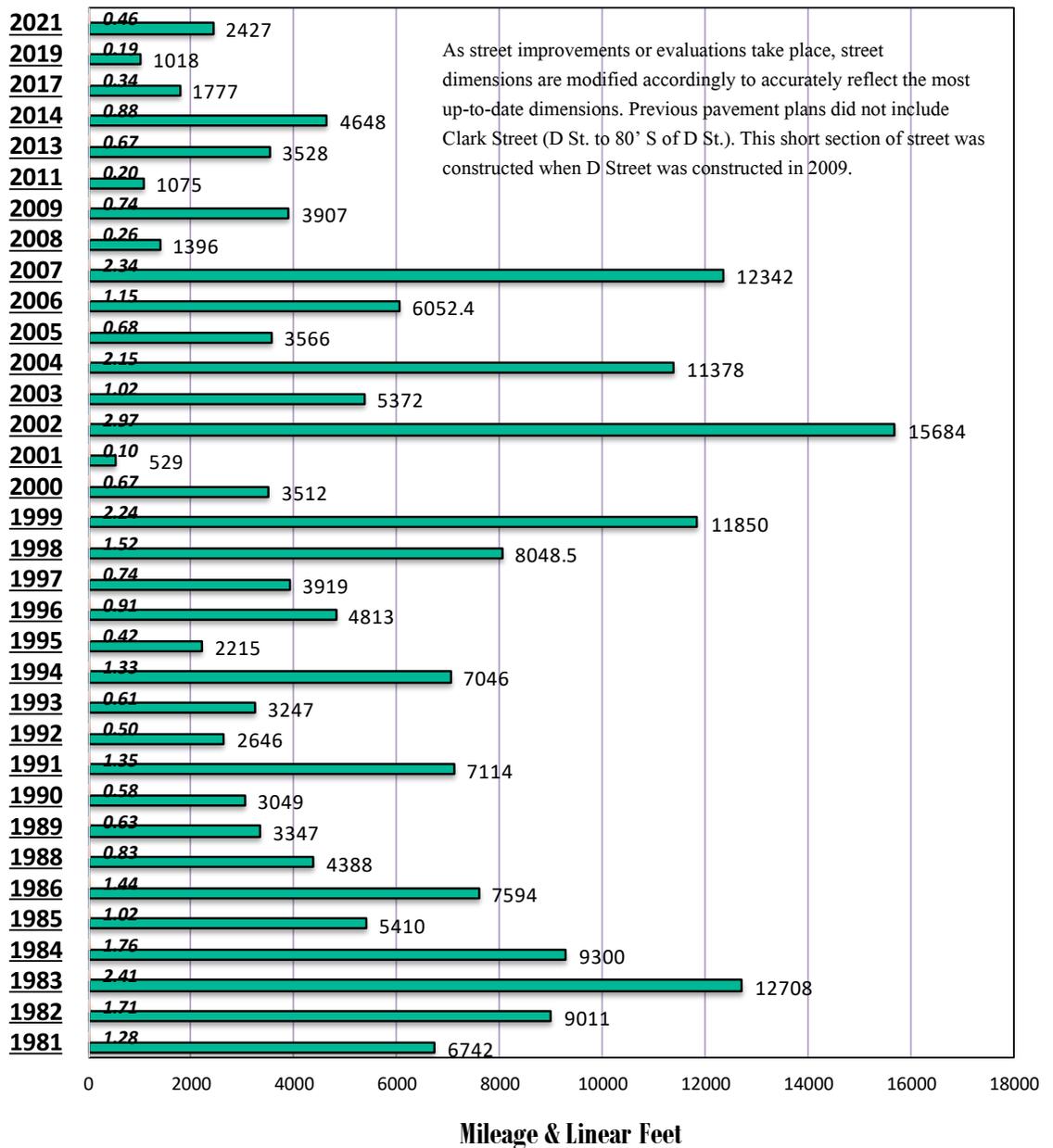
### RECOMMENDED TREATMENTS

- Emergency maintenance only
- Schedule reconstruction as soon as possible; however, with current funding constraints we now have to look at other factors such as traffic volume, balancing needs vs. utilizing funds to perform preventative maintenance work on arterial or collector streets.

# Asphalt Applied 1981-2021

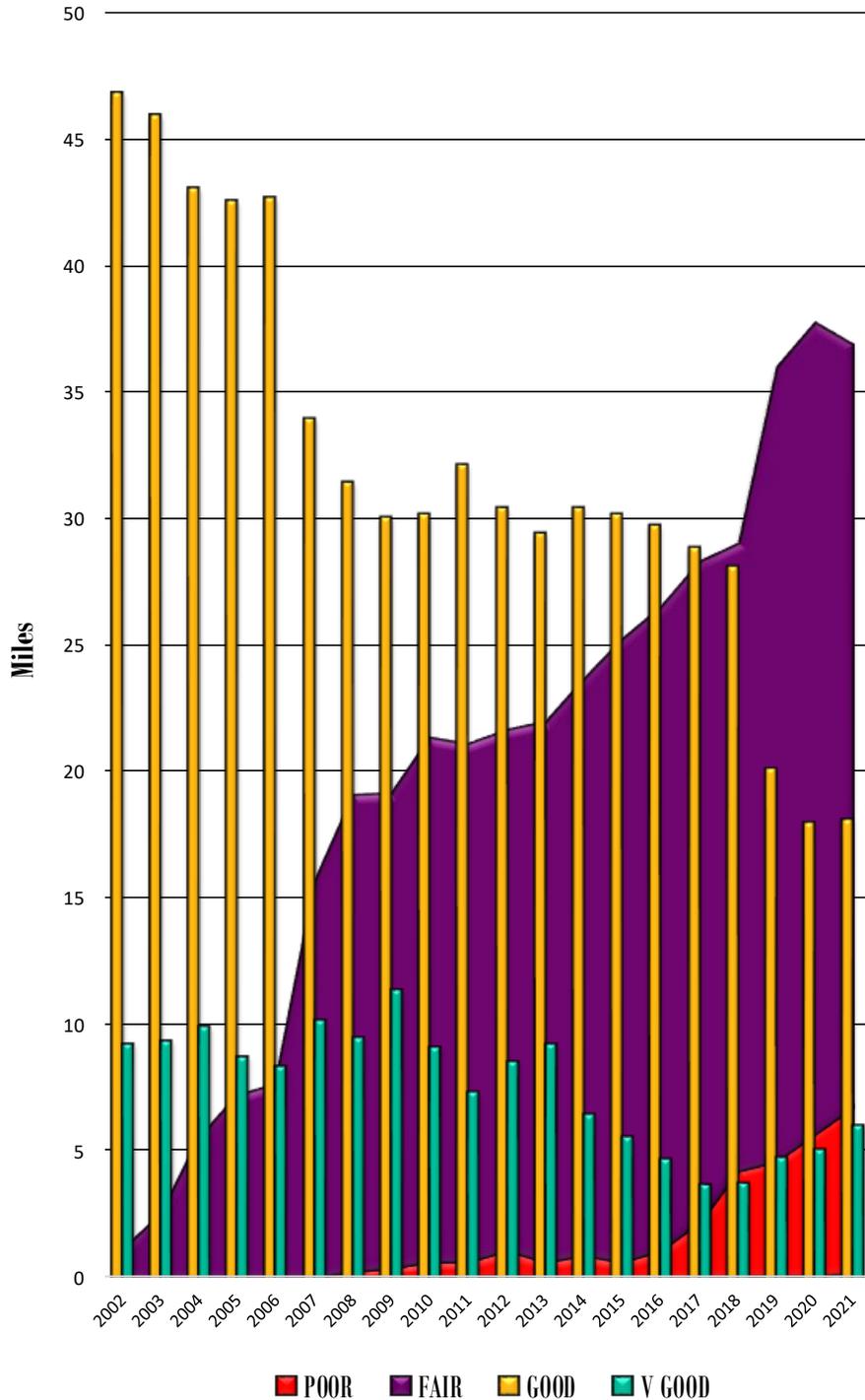
This chart illustrates how many feet of new asphalt (streets that were newly constructed or a thin overlay was completed) were applied in each calendar year for the last 40 years. Chip seal and/or fog seal treatments are not considered to be substantial asphalt surface treatments. The absence of a year indicates that no new asphalt was applied that year.

An average of 11.12 miles of new asphalt has been applied each decade since 1981. This last decade, however, that average has significantly decreased to total approximately 25



# Asphalt Condition Ratings

ASPHALT STREET CONDITION RATINGS 2002-2021



This graph gives you an overall view of the gradual decline of our paved streets’ ride quality and structural integrity.

Two decades ago the majority of our paved streets were within the “Good” rating category. That rating category is dwindling while the “Fair” rating category continues to escalate. The “Poor” rating category is following that escalation trend.

The “Very Good” category’s fluctuation is less noticeable as those ratings are generally influenced by streets recently chip sealed. A chip sealed surface only temporarily conceals the deterioration of a street’s surface.

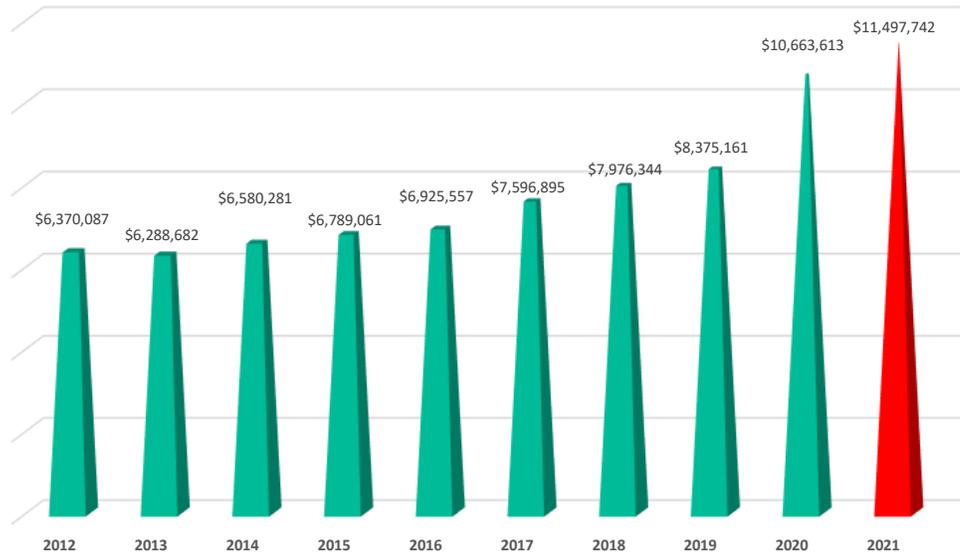
# Deferred Maintenance

As we continue to see the trend of paved streets within the “Fair” category escalate and the number of paved streets within the “Good” category decrease, we soon may have to re-evaluate the management of our street infrastructure.

With that in mind, the reality is that our street improvement projects will also continue to dwindle in size because costs continue to increase. When streets are overlaid, re-constructed or constructed such projects involve relocating utilities, making curb and gutter improvements, and improving pedestrian access in

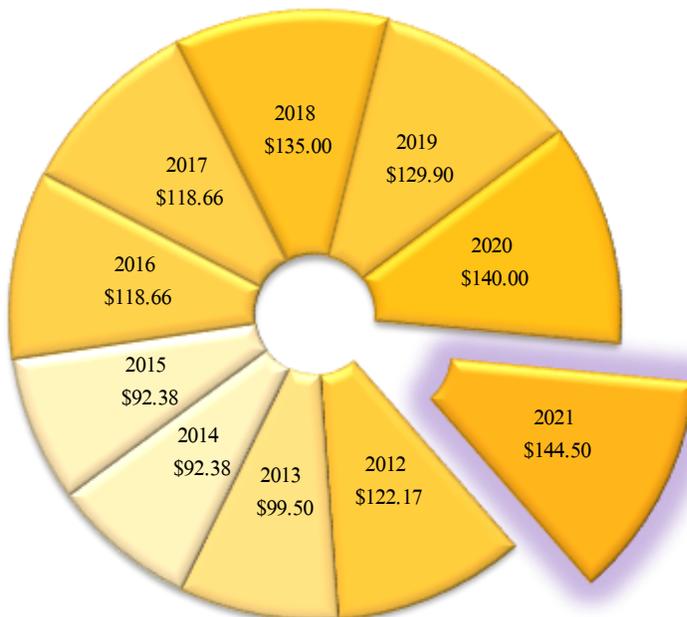
compliance with the current ADA standards. As you may guess, the longer street improvements are delayed, the more costly they become. The \$8M-\$10M project can easily turn into a \$16M-\$24M project.

Cost Escalation



2022 Pavement Management Plan

Contract Cost of Asphalt Applied



An example of the fluctuating cost of asphalt is illustrated to the left. Streets were not overlaid in 2012, 2015 & 2018. The asphalt costs for these years were derived by using the average costs from surrounding years as well as information received from asphalt companies. In 2014 the Best Frontage Road and Pocahontas Road overlays were done simultaneously which allowed us to purchase asphalt at a lower per-ton rate. An overlay was not done in 2020, so the cost reflected for that year was based on a bid awarded for a wastewater improvement project that year.

# Street Condition Ratings/Miles

## 2002-2021

2022 Pavement Management Plan

The table below reflects the total mileage of Baker City’s street system and the specific mileage within each corresponding category. Paved streets are the only streets evaluated each year.

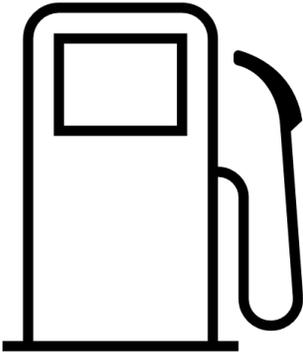
In the “Good” street rating category from 2002 to 2012 there was approximately a 35% decrease of mileage within this category. And then from 2012 to 2021 there was a 40.47% decrease. In the last five years the number of paved streets within the “Fair” category has increased approximately 18%. Five years ago in the “Poor” category there were 1.05 miles of paved streets. This year there are 6.57 miles - a substantial increase.

Year	Very Good	Good	Fair	Poor	Very Poor	Total Miles Asphalt Streets	Gravel Double Chip	Gravel Collector	Gravel Local	Total Miles Gravel Streets	Total Miles Unopened Streets	Total Miles All Streets
2021	6.00	18.12	30.07	6.57	0.17	60.94 <sup>5</sup>	1.27	1.01	7.36	9.64	11.17	81.75
2020	5.11	18.04	32.08	5.58	0.08	60.88	1.27	1.01	7.36	9.64	11.17	81.69
2019	4.79	20.14	31.34	4.53	0.08	60.88 <sup>4</sup>	1.27	1.01	7.36	9.64	11.17	81.69
2018	3.76	28.14	24.78	4.13	0.08	60.89	0.82	1.01	7.81	9.64	11.47	82.00
2017	3.70	28.87	26.13	2.19	0.00	60.89 <sup>3</sup>	0.82	1.01	7.81	9.64	11.47	82.00
2016	4.74	29.73	25.42	1.05	0.00	60.94	0.82	1.01	7.81	9.64	11.47	82.05
2015	5.57	30.16	24.6	0.61	0.00	60.94 <sup>2</sup>	0.82	1.01	7.81	9.64	11.47	82.05
2014	6.48	30.39	22.83	0.88	0.00	60.58	0.82	1.01	7.81	9.64	11.47	81.69
2013	9.22	29.43	21.33	0.54	0.08	60.58 <sup>1</sup>	0.82	1.01	7.81	9.64	11.47	81.69
2012	8.52	30.44	20.57	1.00	0.08	60.61	0.82	1.01	7.81	9.64	11.47	81.72
2011	7.38	32.13	20.44	0.58	0.08	60.61	0.82	1.01	7.81	9.64	11.47	81.72
2010	9.09	30.18	20.71	0.63	0.00	60.61	0.82	1.01	7.81	9.64	11.47	81.72
2009	11.39	30.05	18.81	0.36	0.00	60.61	0.82	1.14	8.06	10.02	11.70	82.33
2008	9.46	31.46	18.80	0.28	0.00	60.00	0.82	1.14	8.06	10.02	11.70	81.72
2007	10.16	33.93	15.69	0.00	0.00	59.78	0.82	1.14	7.95	9.91	11.80	81.49
2006	8.33	42.69	7.67	0.00	0.00	58.69	0.82	1.14	7.95	9.91	11.98	80.58
2005	8.72	42.54	7.25	0.00	0.00	58.51	0.82	1.14	7.95	9.91	11.98	80.40
2004	9.93	43.06	5.52	0.00	0.00	58.51	0.82	1.14	7.95	9.91	11.98	80.40
2003	9.35	45.96	2.54	0.00	0.00	57.85	0.82	1.27	7.95	10.04	11.98	79.87
2002	9.21	46.84	1.13	0.00	0.00	57.18	0.82	1.27	7.95	10.04	11.98	79.20

Table Notes:

- <sup>1</sup> The variation in total asphalt street mileage from 2012 to 2013 was due to a correction made in ‘M’ Street’s dimensions as well as the modified dimensions of Resort Street when it was reconstructed.
- <sup>2</sup> The total asphalt street mileage reflected for 2015 includes the construction of Best Frontage Road as well as the addition of dimensions of ‘E’ Street (N 2nd St.-Grandview Ave.). This section of ‘E’ Street was not previously included in our street rating data.
- <sup>3</sup> The variation in total asphalt street mileage from 2016 to 2017 is due to a correction made in North Second Street’s dimensions as well as removing Court Street (Main to Resort) from the street inventory.
- <sup>4</sup> The variation in total asphalt street mileage from 2018 to 2019 is due to a correction made in Washington Avenue’s (W. side of river to Balm St) dimensions. Additionally, 14th St. (Auburn N) dimensions were modified to reflect vacated right-of-way. Thirteenth St. (Auburn to Broadway) was also removed from the street inventory as it has been vacated (Ordinance 2915).
- <sup>5</sup> The variation in total asphalt mileage from 2020 to 2021 is due to the addition of Clark St. - D St. to 325’ S of D St.

# Gas Tax and LIDs



**Federal Gas Tax \$.0184/gallon**

**State Gas Tax \$.38/gallon**

**Baker City Gas Tax \$.00**

**Federal Diesel Tax \$.244/gallon**

**State Diesel Tax \$.38/gallon**

**Baker City Diesel Tax \$.00**

## **Baker City's Potential Revenue:**

Gallons of Gasoline Sold in Baker City in 2021: **9,804,593**

**Potential Revenue w/\$.03 Gas Tax: \$294,138**

Gallons of Diesel Sold in Baker City in 2021: **4,055,151**

**Potential Revenue w/\$.03 Diesel Tax: \$121,655**

(Oregon Department of Transportation Fuels Tax Group)

Oregon passed the nation's first per-gallon tax on gasoline in 1919. The first gasoline tax was one cent per gallon. This revenue was used for early road and building projects, including the Pacific Highway and the Columbia River Highway. Oregon's fuel taxes are used for the creation, preservation and maintenance of Oregon's transportation infrastructure. *(Oregon Department of Transportation 2022)*

Thirty Oregon cities and two counties collect a local gas tax. Twenty-eight of those 30 cities also collect a local diesel tax. The cities of Coburg and The Dalles have a gas tax but do not have a local diesel tax. The cities of Reedsport and Newport have a varying gas/diesel tax rate. Reedsport does not impose a gas/diesel tax in the months of November through April, and then in May through October they have a \$.03 tax. Newport's gas/diesel tax is \$.01 November through May and \$.03 June through October.

In Oregon local gas tax ordinances levy a business license tax on fuel dealers. The amount of tax levied is set as a certain number of cents per gallon of motor vehicle fuel sold by the dealer. **HB 2001** (Section 27), enacted by the 2009 Legislature, requires that a city, county or local government submit the proposed new or increased gas tax to the electors for their approval, prior to enacting or amending any charter, provision, ordinance, resolution or other provision taxing fuel for motor vehicles. *(League of Oregon Cities 5/1/2020)*

Maintenance of our public street infrastructure is paid through the State of Oregon gas tax as well as a portion of Baker City's property tax revenue. As you might guess, the current revenue collected is not able to sustain the current maintenance needs of our transportation system. The condition of our existing infrastructure will continue to decline while the maintenance needs and costs for it will continue to escalate. Nearly 50% of our paved streets are currently within the "Fair" street rating category. Five years ago approximately 42% of paved streets were within that same category. Ten years prior, nearly 34% of our paved streets were within the "Fair" category.

**Other funding options?** A **Local Improvement District (LID)** is a public improvement area created under State of Oregon statutes. These statutes allow for public financing of public improvement projects that benefit private property. An LID is typically used for street and/or sidewalk improvements; however, it can also be used to install wastewater, water, and storm lines. To be included within an LID, the property must receive some benefit from the project. For example, a street improvement project would benefit properties abutting the street. In order to form an LID, a specified minimum percentage (33.34%) of the property owners fronting on, or benefiting from, the proposed improvement must be in favor of the improvement petition.

# 2022 Maintenance Objectives

## Pavement Management Objectives

1. Keep most of Baker City’s paved streets in the “Very Good” or “Good” categories.
2. Do not allow any street to remain in the “Poor” category for more than two years.
3. Do not allow any paved street to deteriorate below the “Poor” category.
4. Increase the percentage of paved streets in the “Very Good” category.
5. Monitor deterioration patterns. Recognize future needs and plan to minimize their impact.

<sup>6</sup> A detailed explanation of the pavement rating system can be found on pages 2-7.

1. **The program is not meeting objective number one.** This year 39.59% of Baker City’s paved streets are in the “Very Good” and “Good” categories. Although this is an increase of 4.1% from last year, this objective is still not being met. Our ongoing analysis continues to demonstrate that Band-aid treatments, like a single chip seal treatment, only temporarily elevates/maintains a street’s rating.

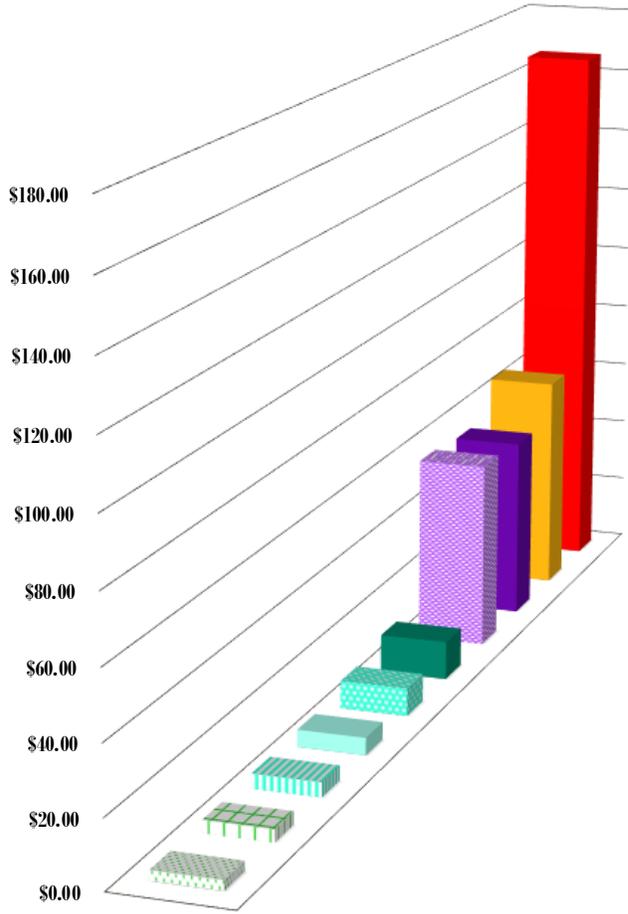
2. **The program is not meeting objective number two.** There are 43 street sections - 6.57 miles - within the “Poor” street rating category this year. Thirteen of those 43 street sections were not within the “Poor” category last year. Eighteen of the 43 street sections within the “Poor” category this year have been within this category for three or more years.

3. **The program is not meeting objective number three.** Pavement conditions continue to decline and the overall deterioration of the infrastructure overwhelms the available resources needed to address it. We now have two street sections within the “Very Poor” street rating category - Clifford Street and Mitchell Ave. (Hwy. 7 to 4th St.). This is the first year Mitchell Ave. (Hwy 7 to 4th St.) has received a low enough rating to be found within the this category. This section of Mitchell Ave. is steadily utilized by vehicles as it’s one of only two access points east of Highway 7 to gain access to adjacent residential properties. This section of Mitchell Ave. and 26 other street sections were constructed in 1982. This section of Mitchell St. appears to be the only one of the 27 street sections constructed in 1982 that has never received a chip seal application.

4. **The program is meeting objective number four.** Maintaining this objective is largely influenced by community growth and streets being constructed through new development or with the assistance of grant program funding. Without new construction, additions to the “Very Good” category are the result of overlay projects or chip sealing of high-rated “Good” streets. Raising the percentage by adding new streets is more indicative of current community growth than the success of the Pavement Management Plan. New streets incorporated into the system add increased pavement maintenance responsibilities. This year 9.85% of paved streets are within the “Very Good” category. Last year there were 8.4% of streets within this category. Eighteen of the 45 street sections within this category were constructed within the last two decades.

5. **The program is meeting objective number five.** We continue to monitor and analyze deterioration patterns in our pavement system. Current and future needs have been identified in past reports. We continue to systematically set priorities and utilize available resources to provide the best use of the taxpayer dollar.

# Maintenance Tasks & Costs



- VERY GOOD
- VERY GOOD/GOOD
- GOOD
- GOOD/FAIR
- GOOD/FAIR
- FAIR
- GOOD/FAIR/POOR - Thin Overlay
- GOOD/FAIR/POOR - Reclamation
- POOR
- VERY POOR

This graph represents the very foundation upon which the Pavement Management Plan was developed: Maintaining streets in the “Fair,” “Good,” and “Very Good” categories and therefore providing the citizens of Baker City with the most cost-effective and reliable transportation system.

Focusing on Program Objectives 1-4 outlined on the previous page, street maintenance this year will involve chip sealing approximately 3.17 miles of paved city streets. Streets traditionally recommended for chip seal are those with a rating within the lower range of the “Good” category as well as streets within the mid “Fair” category. The significant number of street sections within the “Poor” category this year requires that we consider if chip sealing will be of any benefit. Prior selection criteria has included collector streets with a rating less than “94” that have not been chip sealed since 2011, and local streets with higher anticipated traffic demands (downtown corridor or streets within the vicinity of schools or government buildings) has proven to be a successful methodology.

STREET CATEGORY	COST PER SQUARE YARD	TYPE OF MAINTENANCE
VERY GOOD	\$2.95	FOG SEAL (NO PREP)
VERY GOOD/GOOD	\$3.75	1/4"-10 SINGLE CHIP (NO PREP)
GOOD	\$4.44	FOG SEAL (INCLUDING PATCHING)
GOOD/FAIR	\$5.25	3/8"-1/4" SINGLE CHIP SEAL (SOME PREP)
GOOD/FAIR	\$8.37	DOUBLE CHIP SEAL (SOME PATCHING)
FAIR	\$11.58	DOUBLE CHIP SEAL (CONSIDERABLE PATCHING)
GOOD/FAIR/POOR - Thin Overlay	\$56.84	THIN OVERLAY (MINOR PATCHING)
GOOD/FAIR/POOR - Reclamation	\$55.07	FULL DEPTH RECLAMATION & ASPHALT PAVING
POOR	\$66.15	THIN OVERLAY (CONSIDERABLE PATCHING)
VERY POOR	\$166.41	REBUILD

If funding allows, we will also be paving a gravel section of Indiana Ave. (Reservoir Rd. to Scenic Vista). Paving of this short section of Indiana Ave. was determined to be a street improvement priority by a majority vote of the city council in July of 2021.

# Maintenance Procedures

## **Full-Depth Reclamation with Cement (FDR-C)**

Full-Depth Reclamation is a rehabilitation strategy that involves in-place recycling of the existing roadway materials. The existing street surface and a portion of the granular base layer is pulverized and then stabilized by introducing Portland cement and water into the recycled mixture. The pulverized layer that has been stabilized with cement becomes the base for the new pavement structure. Two to three inches of new asphalt are then placed on the prepared base to create the finished driving surface. Cold milling of two to three inches of existing asphalt can precede the FDR-C work so that the completed street section matches the original grade, reducing the amount of curbs, driveways, and sidewalks that need to be replaced.



Because FDR-C replaces the asphalt surface and re-stabilizes the base, this treatment is appropriate for use on “Very Poor” to “Good” category streets.

## **Thin Overlay**

Placing a thin asphalt mat, generally 2” - 2 1/2” thick, on an existing asphalt street. An asphalt pre-level mat may be applied prior to the top mat with a motor grader or paving machine. Geosynthetic fabric is often used beneath the overlay to prevent cracks from projecting into the new overlay.



Various combinations of patching, crack filling, grinding, and other rehab work is completed prior to the application. A fog seal or 1/4”-#10 chip seal is applied within two years of the overlay to seal the new asphalt. The degree of surface preparation for an overlay is dependent on the condition and type of the existing pavement. Generally, the existing pavement should be structurally sound, level, clean and capable of bonding to the overlay.

Milling (also called grinding) can be used to smooth pavement prior to overlays. Rather than filling in low spots, milling removes the high points in existing pavement to produce a relatively smooth surface. Milling can help eliminate varying compaction problems. After milling, new asphalt is inlaid at the original asphalt grade, eliminating the need to raise adjacent curbs, sidewalks, and driveways.

# Maintenance Procedures



## **Crack Fill**

Filling existing narrow cracks with hot liquid asphalt compound or emulsified asphalt sealer. This seals the crack and keeps moisture from penetrating the asphalt and street base. Wide cracks are filled with a 1/4" mix of hot asphalt compacted into and overlapping the cracks. Sealant is then applied to the surface to effectively fill the crack.



## **1/4"-#10 Single Chip Seal**

An application of emulsified asphalt and a single layer of graded aggregate. The aggregate is usually 1/4"-#10 in size. Patching and crack filling are generally not necessary prior to the chip seal application.

Streets in the "Very Good" and "Good" categories are targeted for this treatment.



## **3/8"-1/4" Single Chip Seal**

An application of emulsified asphalt and a single layer of graded aggregate. The aggregate is usually 3/8"-1/4" in size. Patching and crack filling are completed in preparation of the application.

Streets in the "Good" and "Fair" categories traditionally receive this treatment.



## **Double Chip Seal**

Similar to a single chip seal application, emulsified asphalt is applied, a 3/8"-1/4" chip aggregate is applied, loose rock is swept up, then another coat of emulsified asphalt and 1/4"-#10 chip aggregate is applied over the 3/8"-1/4" layer. Extensive patching is completed prior to the chip seal application.

Streets in the "Good" and "Fair" categories are generally selected to receive this treatment.



## **Fog Seal**

An emulsified asphalt coating is applied to existing asphalt surfaces. The coating seals and rejuvenates the existing asphalt. It is used as preventative maintenance to extend the operational life of a street.

"Good" and "Very Good" rated streets and newly-constructed or overlaid streets are fog sealed. Products used in the past: HFE-901-S, CRF with a sand blotter as well as GSB-88.

# 2021 Street Maintenance



Wabash Ave.



Spencer Shirtcliff (L) & Hayden Owen



Blain LeaMaster



8th & Baker St.



Matt McBride



Kris Younger (F), Jake Fuzi, Karl Ritch & Blain LeaMaster (R)

# '22 Estimated Improvement Costs

Revenue for pavement maintenance work comes from the Surface Transportation Program (STP) and Serial Maintenance Levy (now a portion of the property tax base). The crack filling and asphalt patching necessary to prep streets for treatment are funded in the Street Maintenance Department of the State Tax Street Fund and not the Preventative Maintenance Department.

**Priority A:** This year's proposed street maintenance budget also includes the necessary maintenance preparation of, and application of chip seal to, approximately 3.17 miles of paved city streets.

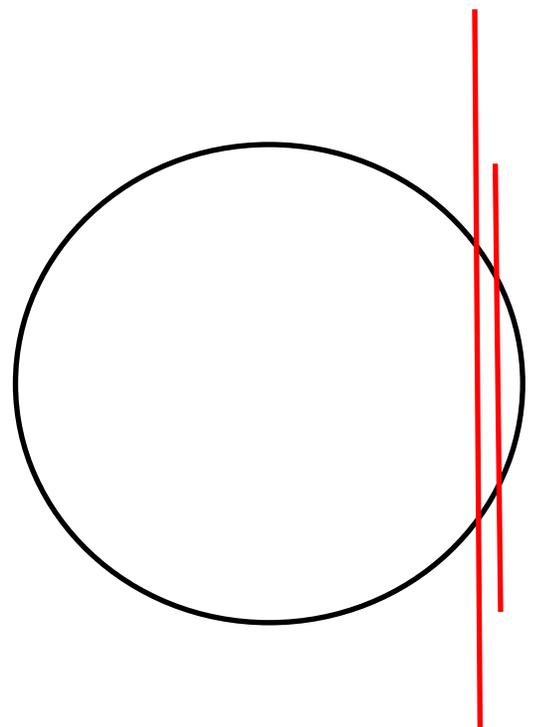
**Priority B:** The Baker County Road Department has offered their assistance in fog sealing approximately 1.09 miles of paved city streets. We are proposing to apply a fog seal application to newly overlaid Washington Ave. (Clark St. to Birch St.) as well as Auburn Ave. (Resort St. to Birch St.) after it receives a chip seal application in 2022.

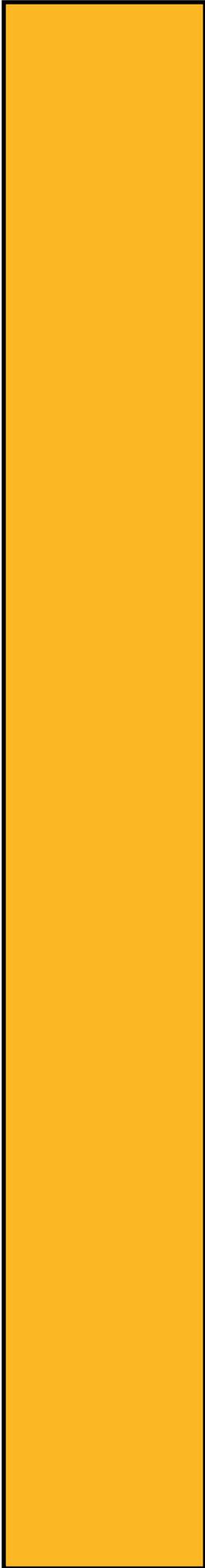
**Priority C:** On May 25, 2021 the City Council reviewed a request from property owners of Boulder Drive, a private drive adjacent to Indiana Ave. The group requested that the City pave Indiana Ave. west of Reservoir Road. Council deferred the matter to the Public Works Advisory Committee for their review. On June 10th the PWAC reviewed the request. At the conclusion of that meeting, a majority of the PWAC members recommended that the street be fully constructed through a Local Improvement District. PWAC members further recommended that if an LID could not be formed, that the street section remain as it currently is - a gravel street - with annual dust abatement performed. The matter was then brought again before the City Council in June of 2021. The council did not vote on the matter at that time and instead requested staff to poll the impacted property owners regarding the formation of an LID. On July 27, 2021 the matter once again went before the council. At this meeting the majority of the council voted in favor of moving forward with the City solely funding up to \$50,000 towards the Indiana Ave. road improvements. That project is included within this year's improvement costs.

A breakdown of the costs associated with the proposed improvement projects outlined above can be found on the following page.

# '22 Estimated Improvement Costs

2022 Pavement Management Plan	<b>Priority A: Chip Seal</b>		
	Application to Selected City Streets	63,366.6 yd <sup>2</sup> @\$4.99	\$ 316,199.33
	Preparing Streets Prior to Application	63,366.6 yd <sup>2</sup> @\$1.27	\$ 80,475.58
	Subtotal of Chip Seal Application and Prep:		\$ 396,674.92
	Subtotal for Chip Seal Application:		\$ 396,674.92
	Engineering (10%)		\$ 39,667.49
	Administration (7.3%)		\$ 31,853.00
	Contingency (10%)		\$ 46,819.54
	<b>2022 Total of Chip Seal Estimated Cost:</b>		<b>\$ 515,014.94</b>
	<b>Priority B: Fog Seal</b>		
	Application to Auburn Ave. (Resort St. to Birch St.)	15,844.2 yd <sup>2</sup> @\$2.95	\$ 46,740.39
	Application to Washington Ave. (Clark St. to Birch St.)	9,881.3 yd <sup>2</sup> @\$2.95	\$ 29,149.94
	Subtotal of Fog Seal Application:		\$ 75,890.33
	<b>2022 Total of Fog Seal Application:</b>		<b>\$ 75,890.33</b>
<b>Priority C: Construction of Indiana Ave. (Reservoir Rd. to Scenic Vista)</b>			
Preparation of Road Surface & Application of Material		<i>Not to Exceed \$50,000</i>	
Subtotal of Construction Project:		<i>Not to Exceed \$50,000</i>	
<b>2022 Total Estimated Cost of Construction of Section of Indiana Ave. :</b>		<b>\$ 50,000.00</b>	





# 2022

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## Pavement Management Plan

City of Baker City

