OHIO
HUDSON
ENGINEERING ● 1140 Terex Road ● Hudson, Ohio 44236 ● (330) 342-1770

2022 ROAD TOUR
MAY 14, 2022

A light breakfast and coffee will be available at 8:00 a.m.
The bus will depart City Hall, 1140 Terex Road at 8:30 a.m.

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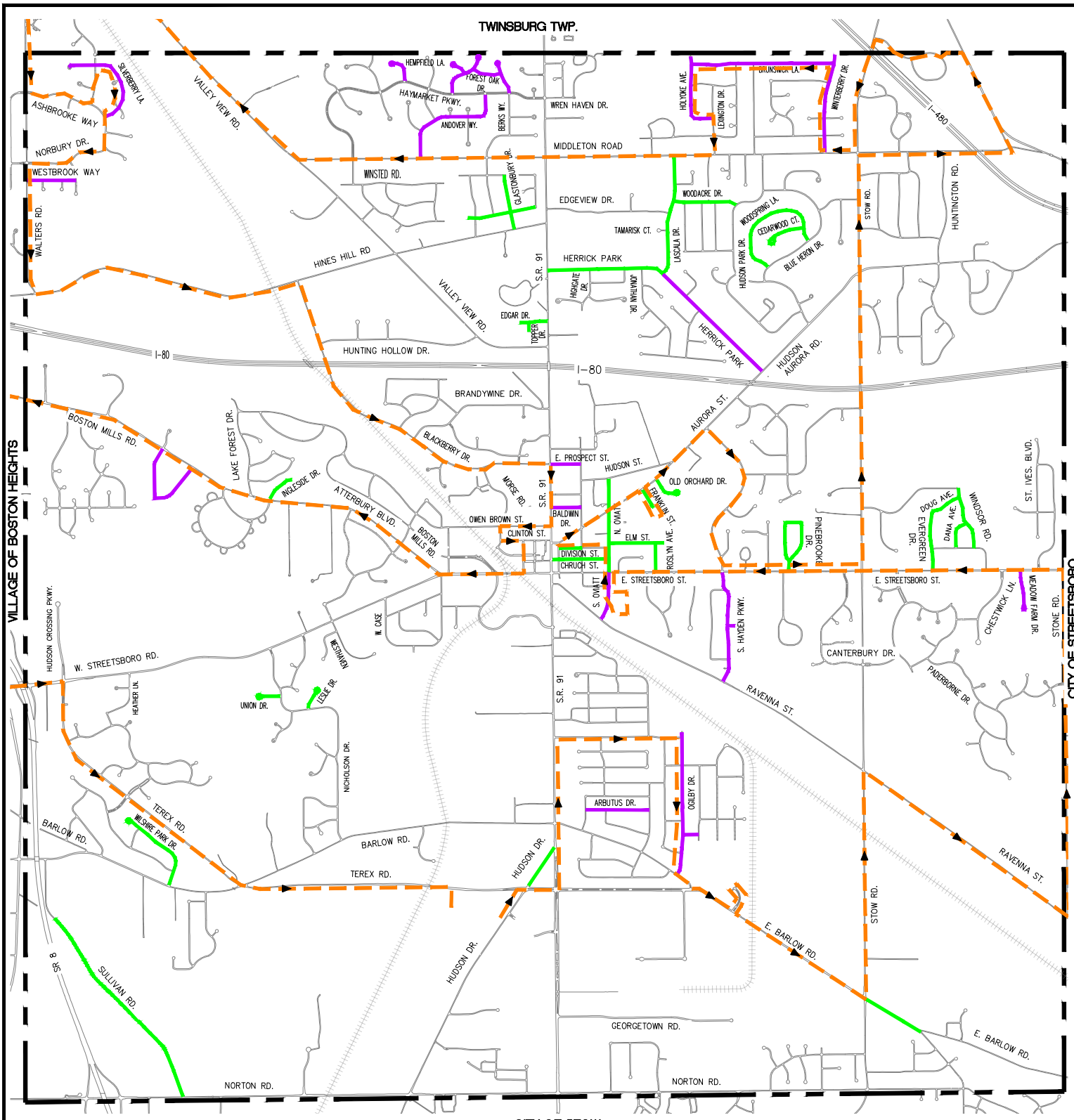

LEGEND:

- 2022 ASPHALT PROGRAM STREETS
- 2022 ASPHALT ALTERNATE STREETS
- STREETS
- ROAD TOUR

0 1750 3500

SCALE IN FEET

SCALE: 1" = 3500'

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OHIO HUDSON

1140 Terex Road
Hudson, Ohio 44236
(330) 342-1770

CITY OF HUDSON
2022 ROAD TOUR

City of Hudson Road Tour

Summary of Street Selection, PCI Rating and Pavement Distresses

May, 2022

The City of Hudson selects streets for resurfacing using four major categories:
(1) Condition Rating or PCI, (3) proximity to other streets selected for resurfacing and
(2) Average Daily Traffic (ADT), (4) interaction with other capital improvement projects.

The primary factor selecting local streets (non-state routes) to be paved is a street's Pavement Condition Index (PCI). The PCI is an ASTM standardized method used to establish a numerical "rating" of the street. The ratings range from 0 to 100 with 100 being the best and 0 being the worst condition. Most streets in Hudson are considered Fair or better (see Figure 1 below). The average PCI rating for the overall street network is a 78.

Condition Category	PCI Range	% of Streets
Excellent	92-100	29%
Very Good	82-91	19%
Good	68-81	20%
Fair	50-67	23%
Poor	35-49	9%
Very Poor	20-34	0%
Failed	0-19	0%
		100.0%

Fig. 1 - PCI Ratings & Distribution in Hudson

Load Related Distress	Climate Related Distresses	Other Types of Distresses
Alligator Cracking	Block Cracking	Bleeding
Edge Cracking	Joint Reflection	Bumps and Sags
Pothole	L&T Cracking	Corrugation
Rutting	Raveling	Depression
Shoving	Weathering	Lane/Shoulder Drop
Slippage Cracking		Patch/Utility Cut
		Polished Aggregate
		Railroad Crossing
		Swell

Fig. 2 – Types of Pavement Distresses

Figure 2 above notes the types of factors used to determine a streets PCI rating. In order to determine the street's PCI, a field inspection takes place and the types of pavement distress including area and severity for the street are identified. The most common types of pavement distresses found in Hudson are: (1) Alligator Cracking, (2) Block Cracking, (3) Longitudinal/Transverse Cracking, (4) Potholes and (5) Weathering. A description of each of these types of pavement distresses can be found below.

Alligator Cracking

Alligator or fatigue cracking is a series of interconnecting cracks caused by fatigue failure of the asphalt concrete surface under repeated traffic loading. Cracking begins at the bottom of the asphalt surface (or stabilized base) where tensile stress and strain are highest under a wheel load. The cracks propagate to the surface initially as a series of parallel longitudinal cracks. After repeated traffic loading, the cracks connect, forming many sided, sharp-angled pieces that develop a pattern resembling chicken wire or the skin of an alligator. Alligator cracking occurs in areas subjected to repeated traffic loading, such as wheel paths.

Block Cracking

Block cracks are interconnected cracks that divide the pavement into approximately rectangular pieces. The blocks may range in size from approximately 1 x 1 foot to 10 by 10 feet. Block cracking is caused mainly by shrinkage of the asphalt concrete and daily temperature cycling (which results in daily stress/ strain cycling). It is not load-associated.

Block cracking usually indicates that the asphalt has hardened significantly. Block cracking normally occurs over a large portion of the pavement area, but sometimes will occur only in non-traffic areas. This type of distress differs from alligator cracking in that alligator cracks form smaller, many-sided pieces with sharp angles.

Longitudinal and Transverse Cracking

Longitudinal cracks are parallel to the pavement's centerline. Transverse cracks extend across the pavement at approximately right angles to the pavement centerline. They may be caused by:

1. A poorly constructed paving lane joint.

2. Shrinkage of the AC surface due to low temperatures or hardening of the asphalt and/ or daily temperature cycling.

3. A reflective crack caused by cracking beneath the surface course, including cracks in PCC slabs (but not PCC joints).

Potholes

Potholes are caused by the expansion and contraction of water after it has entered into the ground under the pavement. When water freezes, it expands the base material under the pavement surface, causing bending, cracking and weakening of the surface. When ice melts, the pavement contracts and leaves gaps/voids under the surface, where more water can get in and be trapped. When the water freezes and thaws over and over, the pavement weakens continues to degrade and is then displaced by the weight of vehicles causing a pothole.

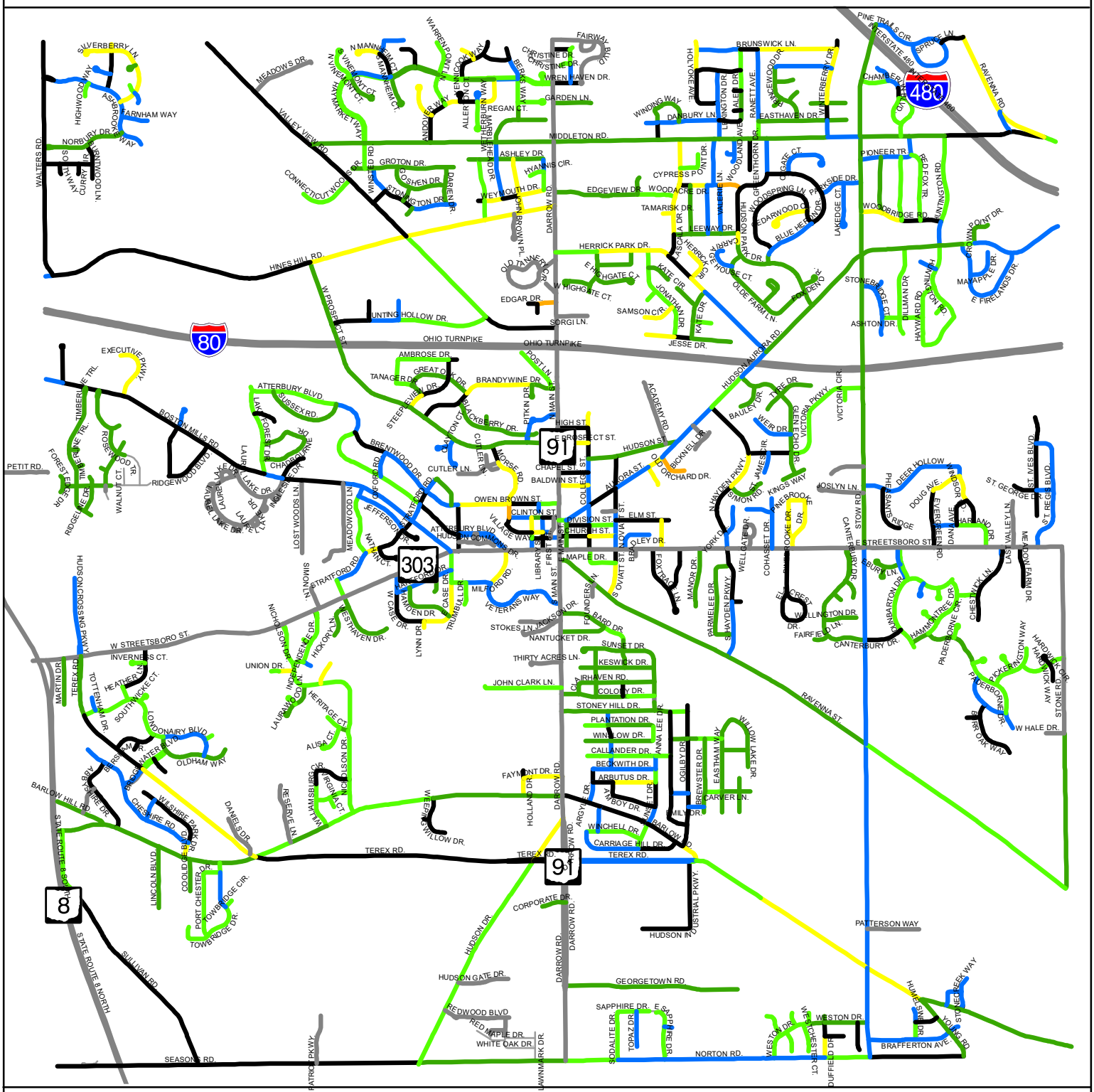
What happens when salt is brought into the picture? Water will freeze at 32 degrees Fahrenheit. When salt is used, it lowers the temperature that water will freeze. This creates an artificial freeze-thaw cycle that

permits more occurrences of the damaging cycle to occur. This happens more often in the spring because of the melting that takes place and because the temperatures fluctuating above and below the freezing point very frequently.

Weathering

Weathering is caused by the wearing away of the asphalt binder and fine aggregate mixture. Weathering is normally caused by oxidation, inadequate compaction, insufficient asphalt content, excessive natural sand, surface water erosion, and traffic. Weathering occurs faster in areas with high solar radiation.

PCI Condition



PCI

- NA
- 0-19 - Failed
- 20-34 - Very Poor
- 35-49 - Poor
- 50-67 - Fair
- 68-81 - Good
- 82-91 - Very Good
- 92-100 - Excellent
- Other Streets

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OHIO HUDSON

0 0.5 1 Miles

DISCLAIMER:

All data on this map were created for the City of Hudson to assist City Departments in management and planning activities. The suitability of this map for any other use is not guaranteed and the user assumes all risk for such uses. The City of Hudson, Ohio, assumes no legal responsibility for the information on this map. Users noting errors or omissions are encouraged to contact the City of Hudson Geographic Information Services at 330-342-9541.

Map Compiled: December 2021

2022 Asphalt Resurfacing and Patching Program

ID	STREET	FROM	TO	TYPE OF WORK	LENGTH FEET*	AVG WIDTH FEET*
2201	Doug Avenue	Evergreen Drive	Windsor Road	1.5" off 1.5" on Resurfacing	760	20
2202	Dana Avenue	Harland Drive	Windsor Road	1.5" off 1.5" on Resurfacing	770	20
2203	Evergreen Drive	E. Streetsboro Street	Doug Avenue	1.5" off 1.5" on Resurfacing	1,508	20
2204	Windsor Road	Harland Drive	Deer Hollow Road	1.5" off 1.5" on Resurfacing	1,436	20
2205	Cedarwood Court	Woodspring Lane	Loop	1.5" off 1.5" on Resurfacing	1,280	23
2206	Woodspring Lane	Blue Heron Drive	Blue Heron Drive	1.5" off 1.5" on Resurfacing	3,368	24
2207	Wilshire Park Drive	Barlow Road	Cul-de-Sac	1.5" off 1.5" on Resurfacing	2,354	27
2208	Leslie Drive	Nicholson Drive	Cul-de-Sac	1.5" off 1.5" on Resurfacing	592	24
2209	Union Drive	Nicholson Drive	Cul-de-Sac	1.5" off 1.5" on Resurfacing	632	24
2210	Edgar Drive	Darrow Road	Dead End	1.5" off 1.5" on Resurfacing	675	18
2211	Topper Drive	Edgar Drive	Dead End	1.5" off 1.5" on Resurfacing	233	18
2212	Hudson Drive	Darrow Road	Terex Road	1.5" off 1.5" on Resurfacing	1,223	26
2213	Herrick Park Drive	East of SR 91	Highgate Drive	1.5" off 1.5" on Resurfacing	921	25
2214	Herrick Park Drive	Highgate Drive	Jonathan Drive	1.5" off 1.5" on Resurfacing	1,448	26
2215	Herrick Park Drive	Jonathan Drive	LaScala Drive	1.5" off 1.5" on Resurfacing	502	26
2216	LaScala Drive	Herrick Park Drive	Middleton Road	1.5" off 1.5" on Resurfacing	3,095	24
2217	Tamarisk Drive	LaScala Drive	Cul-de-Sac	1.5" off 1.5" on Resurfacing	262	24
2218	Woodacre Drive	LaScala Drive	Hudson Park Drive	1.5" off 1.5" on Resurfacing	1,631	22
2219	Church Street	N. Main Street	N. Oviatt Street	1.5" off 1.5" on Resurfacing	1,387	20
2220	Old Orchard Drive	Aurora Street	Cul-de-Sac	1.5" off 1.5" on Resurfacing	760	25
2221	Division Street	E. Main Street	College Street	1.5" off 1.5" on Resurfacing	572	24
2222	N. Oviatt Street	W. Streetsboro Street	Aurora Street	1.5" off 1.5" on Resurfacing	1,576	25
2223	N. Oviatt Street	Aurora Street	Hudson Street	1.5" off 1.5" on Resurfacing	810	25
2224	Elm Street	N. Oviatt Street	Dead End	1.5" off 1.5" on Resurfacing	1,385	24
2225	Glastonbury Drive	Hines Hill Road	Ashley Drive	1.5" off 1.5" on Resurfacing	1,403	24
2226	Weymouth Drive	Wellfleet Drive	Dead End	1.5" off 1.5" on Resurfacing	1,689	24
2227	Ingleside Drive	Bridge	Dead End	1.5" off 1.5" on Resurfacing	553	18
2228	Sullivan Road	Seasons Road	Pavement Change	1.5" off 1.5" on Resurfacing	5,704	22
2229	Pinebrooke Drive	east leg of E. Streetsboro Street	HN 6839	1.5" off 1.5" on Resurfacing	1,428	23
2230	W. Pinebrooke Drive	(west leg) HN 6839	Pinebrooke Drive	1.5" off 1.5" on Resurfacing	1,072	23

2022 Asphalt Resurfacing and Patching Program

ID	STREET	FROM	TO	TYPE OF WORK	LENGTH FEET*	AVG WIDTH FEET*
2231	Barlow Road	Stow Road	Young Road	2" off 2" on Resurfacing	1,500	24
2232	Patching	Various Areas				
2233	Wessington Road	HN 6282	HN 6296	Repair	60	24
2234	Colony Park Trails	Parking Lot	Sunset Drive, RR Bridge, Mayflower Dr.	Mill and Resurface	2,936	10
2235	Colony Park Parking Area					

2022 Asphalt Resurfacing and Patching Program - Alternates

ID	STREET	FROM	TO	TYPE OF WORK	LENGTH FEET*	AVG WIDTH FEET*
ALT 2221	Westpoint Drive	Boston Mills Road	Ridgewood Blvd.	1.5" off 1.5" on Resurfacing	1,303	26
ALT 2222	Ridgewood Blvd.	Boston Mills Road	Westpoint Drive	1.5" off 1.5" on Resurfacing	1,328	26
ALT 2223	Arbutus Drive	Argyle Drive	Sunset Drive	1.5" off 1.5" on Resurfacing	1,638	22
ALT 2224	Baldwin Street	N. Main Street	College Street	1.5" off 1.5" on Resurfacing	769	21
ALT 2225	E. Prospect Street	N. Main Street	College Street	1.5" off 1.5" on Resurfacing	531	22
ALT 2226	Silverberry Lane	Ashbrooke Way	Loop	1.5" off 1.5" on Resurfacing	3,093	26
ALT 2227	Westbrook Way	Walters Road	Burntwood Lane	1.5" off 1.5" on Resurfacing	1,244	27
ALT 2228	Meadow Farm Drive	E. Streetsboro Street	Cul-de-Sac	1.5" off 1.5" on Resurfacing	1,028	21
ALT 2229	Holyoke Avenue	Lexington Drive	Dead End	1.5" off 1.5" on Resurfacing	2,115	22
ALT 2230	Winterberry Drive	Middleton Road	Dead End	1.5" off 1.5" on Resurfacing	2,570	25
ALT 2231	Brunswick Lane	Holyoke Avenue	Winterberry Drive	1.5" off 1.5" on Resurfacing	3,679	22
ALT 2232	Andover Way	Middleton Road	Haymarket Way	1.5" off 1.5" on Resurfacing	3,003	26
ALT 2233	Emily Drive	Ogilby Drive	Brewster Drive	1.5" off 1.5" on Resurfacing	388	23
ALT 2234	Berks Way	Haymarket Way, North	Cul-de-Sac	1.5" off 1.5" on Resurfacing	1,098	27
ALT 2235	Forest Oak Drive	Yennicook Way	Berks Way	1.5" off 1.5" on Resurfacing	720	27
ALT 2236	Hempfield Lane	Haymarket Way	Cul-de-Sac	1.5" off 1.5" on Resurfacing	727	26
ALT 2237	Kilbourne Drive	S. Hayden Parkway	Dead End	1.5" off 1.5" on Resurfacing	220	26
ALT 2238	Royal Oaks Circle	Yennicook Way	Cul-de-Sac	1.5" off 1.5" on Resurfacing	409	26
ALT 2239	Yennicook Way	Haymarket Way	Cul-de-Sac	1.5" off 1.5" on Resurfacing	1,317	27
ALT 2240	Herrick Park Drive	Lascala Drive	Kate Drive	1.5" off 1.5" on Resurfacing	1,412	24
ALT 2241	Herrick Park Drive	Kate Drive	Hudson-Aurora Road	1.5" off 1.5" on Resurfacing	2,225	24
ALT 2242	Ogilby Drive	Barlow Road	Colony Park	1.5" off 1.5" on Resurfacing	1,612	25
ALT 2243	S. Hayden Parkway	E. Streetsboro Street	Ravenna Street	1.5" off 1.5" on Resurfacing	6,139	26
ALT 2244	S. Oviatt Street	E. Streetsboro Street	Ravenna Street	1.5" off 1.5" on Resurfacing	1,237	24
ALT 2245	Barlow Community Center			Trail Repair		

2022 Crack Seal

	Street	From	To	Length (12' Lane miles)
1	Alisa Ct.	Heritage Ct.	Circle	0.36
2	Ambrose Dr.	Tanager Dr.	Dead End	0.80
3	Arborwood Dr.	Old Farm Ln.	Loop	0.48
4	Ashton Dr.	Dilman Dr.	Stonebridge Ct.	0.16
5	Aurora St.	Franklin St.	Herrick Park Dr.	1.66
6	Bauley Dr.	Glen Echo Dr.	Cul-De-Sac	0.30
7	Blaikley Dr.	Huntington Rd.	Cul-De-Sac	0.22
8	Bridgewater Blvd	Terex Rd.	Oldham Way	0.58
9	Cambridge Dr.	Holyoke Dr.	Salem Dr.	0.44
10	Carriagehouse Ct.	Old Farm Ln.	Cul-De-Sac	0.32
11	Chippendale Dr.	Huntington Rd.	Cul-De-Sac	0.18
12	Danbury Ln.	Salem Dr.	Dead End	0.96
13	Deerpath Trail	Woodbridge Rd.	Pioneer Trail	0.56
14	Division St.	N.Oviatt St.	College St.	0.26
15	Fox Den Dr.	Hudson Park Dr.	Circle	0.22
16	Foxbush Cir.	Salem Dr.	Cul-De-Sac	0.12
17	Glen Echo Dr.	Hudson-Aurora Rd.	Kings Way	1.28
18	Great Oak Dr.	Brandywine Dr.	Tanager Dr.	0.66
19	Haymarket Way	N. Manheim Ct.	Middleton Rd.	1.89
20	Hayward Rd.	Huntington Rd.	Huntington Rd.	0.64
21	Heather Ln.	Lauren Dr.	W. Streetsboro St.	0.52
22	Heritage Ct.	Nicholson Dr.	Cul-De-Sac	0.28
23	Hudson Park Dr.	Hudson-Aurora Rd.	Old Farm Ln.	1.10
24	Huntington Rd.	Middleton Rd.	Hudson-Aurora Rd.	1.10
25	Huntington Rd.	Hudson-Aurora Rd.	Hayward Dr.	1.24
26	Inverness Ct.	Heather Ln.	Circle	0.20
27	Kings Way	Cul-De-Sac	Cul-De-Sac	0.12
28	Laurawood Ct.	Laurawood Ln.	Circle	0.14
29	Laurawood Ln.	Nicholson Dr.	Circle	0.44
30	Lauren Dr.	Londonairy Blvd.	End	0.14
31	Leeway Dr.	Hudson Park Dr.	LaScala Dr.	0.64
32	Lexington Dr.	Middleton Rd.	Cambridge Dr.	0.68
33	Londonairy Blvd.	Terex Rd.	Oldham Way	1.68
34	Londonairy Cir.	Londonairy Blvd.	Circle	0.14
35	Middleton Rd.	Darrow Rd.	Ravenna Rd.	4.88
36	Middleton Rd. Ext.	Middleton Rd.	Ravenna Rd.	0.20
37	Nicholson Dr.	Barlow Rd.	W. Streetsboro St.	2.42
38	Old Farm Ln.	Hudson Park Dr.	Hudson Park Dr.	1.16
39	Oldham Way	Londonairy Blvd.	Cul-De-Sac	0.82
40	Ranett Ave.	Middleton Rd.	Brunswick Ln.	0.88
41	Ravenna St.	S. Main St.	Stone Rd.	6.06
42	Salem Cir.	Salem Dr.	Cul-De-Sac	0.12
43	Salem Dr.	Danbury Dr.	Brunswick Ln.	0.72
44	Stonebridge Cir.	Stonebridge Ct.	Cul-De-Sac	0.14
45	Stonebridge Ct.	Stow Rd.	Cul-De-Sac	0.62
46	Sugarbush Trail	Woodbridge Rd.	Pioneer Trail	0.62
47	Tanager Dr.	Steepleview Dr.	Ambrose Dr.	0.32

2022 Crack Seal

	Street	From	To	Length (12' Lane miles)
48	Trye Dr. (East & West)	Cul-De-Sac	Cul-De-Sac	0.60
49	Virginia Ct.	Virginia Cir.	Cul-De-Sac	0.12
50	Virginia Dr.	Nicholson Dr.	Williamsburg Cir	0.34
51	Williamsburg Cir.	Nicholson Dr.	Barlow Rd.	0.92
			Total	**41.45**

Alternates				
53	Alexandra Dr.	Middleton Rd.	Chamberlin Blvd.	0.60
54	Blackberry Ln.	Blackberry Dr.	Cul-De-Sac	0.14
55	Brandywine Dr.	Darrow Rd.	Pavement Change	0.58
56	Chamberlin Blvd	Alexandra Dr.	Alexandra Dr.	0.32
57	Connecticut Woodss	Valley View Rd.	Cul-De-Sac	0.60
58	Garden Ln.	Darrow Rd.	Cul-De-Sac	0.40
59	Harland Dr.	E. Streetsboro Rd.	Evergreen Dr.	0.70
60	Pitkin Dr.	Brandywine Dr.	Cul-De-Sac	0.16
61	W. Prospect St.	Darrow Rd.	Hines Hill Rd.	3.50
62	Winding Way	Danbury Ln.	Danbury Ln.	0.54
			Total	**7.54**

Asphalt Rejuvenating Streets				
63	Church St.	N. Main St.	N. Oviatt St.	3,450
64	Elm St.	N. Oviatt St.	Dead End	3,719
65	N. Oviatt St.	Aurora St.	Hudson St.	2,317
66	Division St.	E. Main St.	College St.	1,561
			Total	**11,047**

2022- RESURFACE STREETS - DRAFT				
Street Name	**From**	**To**	**Type**	**PCI**
Clinton St.	Morse Rd.	Pavement Change	Mill & Resurface	26.5
Doug Ave.	Evergreen Dr.	Windsor Rd.	Mill & Resurface	42.5
Dana Ave.	Harland Dr.	Windsor Rd.	Mill & Resurface	49.5
Evergreen Dr.	E. Streetsboro St.	Doug Ave.	Mill & Resurface	52.5
Windsor Dr.	Harland Dr.	Doug Ave.	Mill & Resurface	40
Leslie Dr.	Nicholson Dr.	Cul-De-Sac	Mill & Resurface	38.5
E. Case Dr.	Milford Dr.	Lynn Dr.	Mill & Resurface	38.5
W. Case St.	Hartford Dr.	Lynn Dr.	Mill & Resurface	64
Milford Rd.	Veterns Way	W. Streetsboro St.	Mill & Resurface	37.5
Lynn Dr.	W. Case Dr.	Dead End	Mill & Resurface	39.5
E. Prospect St.	Darrow Rd.	College St.	Mill & Resurface	40.5
E. Main St.	Aurora St.	E. Streetsboro st.	Mill & Resurface	39.5
Franklin St.	Aurora St.	Dead End	Mill & Resurface	36.5
N. Oviatt St.	E. Streetsboro St.	Aurora St.	Mill & Resurface	54.5
N. Oviatt St.	Aurora St.	Hudson St.	Mill & Resurface	41.5
Weston Dr.	Stow Rd.	Alsace Ct.	Mill & Resurface	35.5
Young Rd.	Barlow Rd.	Norton Rd.	Mill & Resurface	39.16
Duffield Dr.	Weston Dr.	Cul-De-Sac	Mill & Resurface	46.5
Ashley Dr.	Wellfleet Dr.	Dead End	Mill & Resurface	48
Ebury Cir.	Ebury Ln.	Cul-De-Sac	Mill & Resurface	58.5
Ebury Ln.	Hollis Blvd.	Loop	Mill & Resurface	43
Morse Rd.	Dead End (south)	W. Prospect St.	Mill & Resurface	45
Wessington Dr.	Paderborne Dr.	Paderborne Dr.	Mill & Resurface	61
Westbrook Way	Walters Rd.	Burntwood Way	Mill & Resurface	64

2022 MAIN ASPHALT ROADS PROGRAM - DRAFT				
Street Name	**From**	**To**	**Type**	**PCI**
Barlow Rd.	Willshire Park Dr.	WCL	Mill & Resurface	49.5
Barlow Rd.	Stow Rd.	RR Tracks	Mill & Resurface	44.5
Barlow Rd.	Stow Rd.	Young Rd.	Mill & Resurface	43.5

2022 ALTERNATES - DRAFT				
Street Name	**From**	**To**	**Type**	**PCI**
Cedarwood Ct.	Woodspring Ln.	Cul-de-Sac	Mill & Resurface	61.5
Woodspring Ln.	Blue Heron Dr.	Blue heron Dr.	Mill & Resurface	55.5
Winterberry Dr.	Middleton Rd.	Dead End	Mill & Resurface	44
Holyoke Ave.	Lexington Dr.	Dead End	Mill & Resurface	43.16
Brunswick Ln.	Winterberry Dr.	Holyoke Ave.	Mill & Resurface	48

2023- Resurface Streets -Draft			
Street Name	**From**	**To**	**PCI**
E. Case Dr.	Hartford Dr.	Lynn Dr.	37
W. Case St.	Hartford Dr.	Lynn Dr.	54
Milford Rd.	Veterns Way	W. Streetsboro St.	40
Clinton St.	Morse Rd.	West of N. Main St.	
Library St.	Village Way	Clinton St.	37
Essex Cir.	Lake Forest Dr.	Cul-de-Sac	51
Greenthorne Dr.	Middleton Rd.	Cul-de-Sac	53
Morse Rd.	Dead End (south)	W. Prospect St.	32
Westpoint Dr.	Boston Mills Rd.	Ridgewood Blvd.	50
Ridgewood Blvd.	Boston Mills Rd.	Westpoint Dr.	53
Silverberry Ln.	Ashbrooke Way	Loop	35
Westbrook Way	Walters Rd.	Burntwood Way	54
Meadow Farm Dr.	E. Streetsboro St.	Cul-De-Sac	55
Holyoke Ave.	Lexington Dr.	Dead End	46
Winterberry Dr.	Middleton Rd.	Dead End	57
Brunswick Ln.	Winterberry Dr.	Holyoke Ave.	57
Andover Way	Middleton Rd.	Haymarket Way	38
Berks Way	Haymarket Way	North to Cul-de-Sac	58
Forest Oak Dr.	Berks Way	Yennicook Way	55
Hempfield Ln.	Haymarket Way	Cul-de-Sac	55
Royal Oaks Cir	Yennicook Way	Cul-de-Sac	47
Yennicook Way	Haymarket Way	Cul-de-Sac	53
Kilbourne Dr.	S. Hayden Pkwy	dead end	56
S. Hayden Pkwy	Ravenna St.	E. Streetsboro St.	55
E. Prospect St.	Darrow Rd.	College St.	42
Baldwin St.	N. Main St.	College St.	41
S. Oviatt St.	E. Streetsboro St.	Ravenna St.	49
Olgilby Dr.	Stoney Hill Dr.	Barlow Rd.	51
Bradford Way	Stoney Hill Dr.	Olgilby Dr.	56
Emily Dr.	Olgilby Dr.	Brewster Dr.	75
Amboy Dr.	Arbutus Dr.	Sunset Dr.	47
Arbutus Dr.	Argyle Dr.	Sunset Dr.	46

2023 MAIN ASPHALT ROADS PROGRAM - DRAFT			
Street Name	**From**	**To**	**PCI**
Terex Rd.	Londonairy Blvd.	Darrow Rd.	47
Hines Hill Rd	Darrow Rd.	W. Prospect St.	39
Barlow Rd.	Stow Rd.	RR Tracks	46

What Elected and Appointed Local Officials Need to Know *About*

Funding & Maintaining Pavement Maintenance

John G. Calvert
Director – Tennessee Public Works Institute

What Elected and Appointed Local Officials
Need To Know About Pavement Maintenance

Elected and appointed officials in today's government face many trials and tribulations in the process of performing the responsibilities that accompany their positions. The struggle to balance wants and needs with available funding seems to be never ending.

Each year the process of planning, preparing and approving operating budgets grows more cumbersome. Officials are often stuck between a rock and hard spot as they try to accommodate taxpayers desires for low tax rates in a manner that prevents reductions in services for the community. This becomes very difficult considering that the costs of goods, materials and services used by most governments continue to rise annually.

This task can be less stressful in communities that are fortunate to be in a growing mode. However, it can be very difficult and trying in communities that are experiencing very little or no growth. The pressure from citizens to hold property tax and utility rates steady each year is and will always bear heavily on officials responsible for delivering the goods and services their publics desire and often demand.

During times of tight budgets and reductions in funding officials sometimes make reductions in budgets submitted to them for maintenance of the public-owned infrastructures that surround them. This infrastructure includes a community's utilities such as electric, natural gas, water, wastewater and storm water systems. It includes public-owned buildings and facilities. It also includes roads, streets and highways and their related pavements.

In years past, elected and appointed officials of many communities in efforts to prevent rate increases chose to not provide the funding requested by department managers and directors for maintenance of water and wastewater systems. It is also possible that many of the utility managers chose not to ask for increases in funding believing their efforts would be in vain. Whatever the reason, it likely appeared at the time that those officials were helping reduce or minimize costs for their citizens and customers. However, the dollar saved in those past years is often costing the community three or four dollars today as many communities have had to drastically increase maintenance funding in order to comply with state or federal mandates related to the Clean Water Act. Some communities are now having to annually budget millions of dollars for utility infrastructure rehabilitation on systems that in years past failed to have the funding for adequate and proper maintenance.

One other vital public-owned infrastructure has been critically under funded for many years as well by many communities. Funding for maintenance of roads and streets has too often been an area often cut or reduced by elected officials as they toiled with reducing or minimizing tax increases in their community. This practice has ultimately resulted with many communities having streets whose pavements are in very poor and failing condition. Some streets are in such poor condition they are having to be completely reconstructed at costs that are four to five times that which would have been paid if they could have been simply resurfaced on a timely schedule and frequency.

The historical lack of adequate funding in many communities may be attributed to a number of reasons. As noted earlier it could be due to elected officials and their attempts to reduce budgets or minimize increases in funding and tax rates.
It could also be due to reluctance by city managers, public works and street directors or others who are hesitant to request the funding increases sufficient to allow for adequate maintenance believing their attempts would be in vain.

One other possible reason might be that the actual department director or other person responsible for street resurfacing and maintenance is somewhat fearful of asking for funding increases due to fear of how the request might be received by his or her

superior(s). Many city managers and administrators are advising all department heads to submit reduced budgets. As such, department leaders may believe it to be potentially detrimental to them if they made such a request.

And one more possible and very real reason for officials to not provide adequate funding for pavement maintenance could be attributed to a total lack of knowledge and/or understanding of pavements and how they age and deteriorate with time.

This is to be expected considering that most elected officials and city managers typically have no formal experience, education or training in pavement maintenance. They should have confidence in and expect their public works leaders and highway maintenance managers to provide them with background information in this area. However, it is quite common to find public works directors and engineers that actually have no real knowledge in the area of pavement maintenance as well. Many engineers I have known openly admit that they have no experience in this area and acknowledge that their college engineering courses did not address pavement maintenance in depth, but rather focused more on roadway and pavement design and construction.

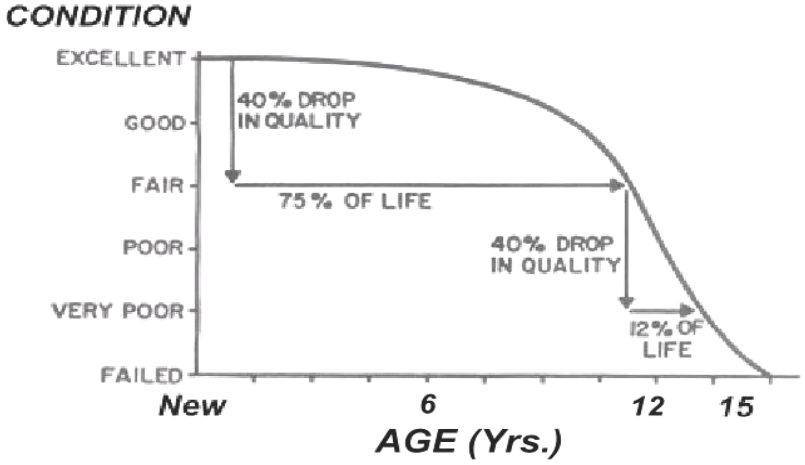
As such, there are ten basic but critical things that elected and appointed officials need to know about pavement maintenance and the consequences for failing to provide adequate annual funding for it.

1. Pavements begin aging and deteriorating the day they are constructed or applied.

2. On the average, most asphalt pavements have a cost-effective useful life of 15 years. Some will have a cost-effective life of only 10 to 15 years while others may have 15 to 20 years depending on design, structure, traffic volumes and weights and climate. This does not mean that pavements will completely fail after 12 to 15 years, although some do. It means that after that age the cost of performing routine maintenance on the pavement will greatly, but unnecessarily increase as the pavements develop more extensive cracking, pot holes, and other defects. Typically pavements remain in excellent to fair condition for the first five or six years of their life. Then after approximately 6 years they begin to exhibit cracking and loss of fine aggregates from the surface. Their condition slowly changes from excellent to fair over the first 11 or so years, then the condition dramatically deteriorates over the next 5 to 7 years as noted on the graph at the top of the following page.

3. In order to keep up with the average rate of deterioration, most independent agencies such a s be resurfa

Typical Asphalt Pavement Deterioration Curve



4. Cities and communities need to resurface 6.6% of their streets annually in order to keep up with the average rate of deterioration and have their pavements on a 15 year cycle.

5. The current (2009) average cost for resurfacing one mile of 25' wide roadway in Tennessee is approximately $80,000. It should be noted that the actual cost for cities and/or counties can vary depending on overlay thickness, volume of work, availability of multiple bidders to provide competitive pricing, and proximity from the lowest bidders to the work location.

6. A formula to use for calculating and determining how much approximate funding should be in a typical city or county's annual resurfacing budget is :

   Total Miles of Street (Centerline miles) X 6.6% X $80,000

   Example: City "A" has 100 centerline miles of street. It should have a resurfacing/contracts budget of $363,000 annually. Using the above formula…… **100 X 6.6% X $80,000 = $528,000.**

7. One dollar spent using proper preventive maintenance during a pavement's first five years of life can save three to four dollars over the pavement's next 10 to 15 years of life.

8. There are many time proven and cost effective preventive maintenance activities, such as penetrating asphalt rejuvenators that can be used during a pavement's first 1 to 5 years of life to extend its useful life from 15 to 20-25 years.

9. Cities can resurface more miles of pavement annually by using thinner hot-mix overlays such as 0.75" and 1.0" in depth rather than the historical and common 1.5" overlay. (One ton of asphalt mix placed at 0.75" thickness will cover twice the amount of pavement as one ton placed 1.5" thick.) Approximately 75% of most cities streets are in residential areas and do not need the thicker 1.5" overlay assuming the street has a sound structure.

10. Longer lasting pavements reduce an agency's pavement's life cycle cost per year. A pavement managed and maintained in a manner that provides for a 20 year life will have an annual life cycle cost that is approximately 25% lower than that of a 15 year pavement.

    Example:

    A. The annual life cycle cost for a 15 Year pavement one mile in length and applied at a cost of $80,000 per mile equals $80,000÷15 or $5,333 per year.

    B. The annual life cycle cost for the same pavement but with a 20 year life equals $80,000 ÷ 20 equals $4,000 per year, a savings of $1,333 per yr.

A survey conducted by the City of Oak Ridge in 2002 indicated that the average per cent of total miles resurfaced annually by the cities surveyed was approximately 4.5%. This amount equates to a 22 year resurfacing cycle, which means those cities are not keeping up with the rate at which pavements deteriorate. A 22 years cycle would result with the overall average condition of the pavements getting worst each year meaning more costly resurfacing and repair techniques would be required.

One of the cities surveyed averaged resurfacing only 1.6% of its streets annually. This means that the city was on a 62 year resurfacing cycle. That city has approximately 400 centerline miles of streets and therefore should have had approximately $1.4 Million in annual resurfacing funds and should have been resurfacing 26 or so miles each year. Instead that city only had an average of $500,000 in its annual resurfacing budget was falling behind on and essentially neglecting nearly 20 miles per year. Since the survey, the city has apparently seen the light of its errors and indicated it plans to spend $3.2 million over the next two years on resurfacing. To avoid future borrowings, the city will need to commit to budgeting of $1.6 Million per year every year afterwards or it will find itself in the same predicament within the next 5 to 10 years. It is good that this city's leaders have stepped up to the plate as their past practice might have otherwise been seriously frowned upon by upcoming GASB 34 guidelines and auditors.

The problems with proper pavement maintenance are not limited to the state of Tennessee. In fact, the Federal Highway Administration and the Federal Pavement Preservation task force has launched a new initiative referred to as Right Treatment for the Right Pavement at the Right Time. In essence they have acknowledged the problems with pavement maintenance by many city, county and state highway agencies across the nation and the fact that historically inadequate funding has been a major force behind the problem. Both agencies are trying to educate and emphasize to cities and counties the availability of cost effective preventive maintenance strategies that can greatly aid in addressing the problems of aging and deteriorating pavements.

So, in summary what can cities do to protect and maintain their costly road and street infrastructure?

First of all, its elected and appointed officials should use the noted formula to determine if the city has adequate funding for street resurfacing and preventive maintenance activities. If they don't meet the formula's calculation, they have no choice but to increase their budgets in a manner that meets that requirement, preferably the sooner the better, like within 1 to 3 years.

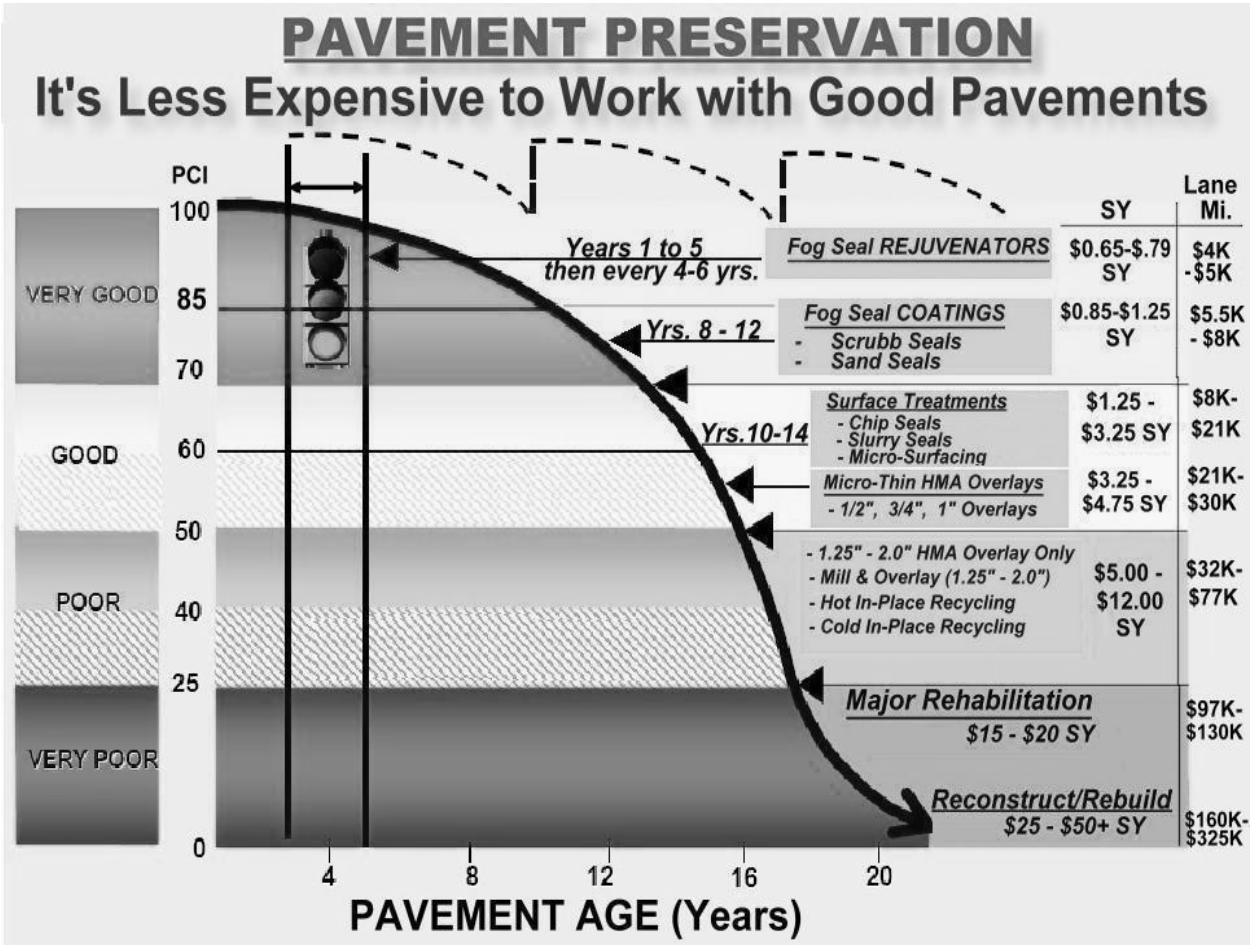
The cities should implement the use of an Enhanced Pavement Maintenance Program (EPMP) that uses a wide variety of both **preventive and corrective** maintenance activities rather than just a conventional 1.5" overlay.

The EPMP should include such activities as:

- **Preventive maintenance** activities including the use of:
    - Penetrating asphalt rejuvenators in years 1 to 5 of a pavement's life.
    - Restorative seals, slurry and micro-thin (1/2-inch) resurfacing for pavements 8 to 10 years old.
    - Crack filling and/or sealing on pavements 8 to 10 years old or older

- **<u>Corrective maintenance</u>** activities should include :
    - A variety of pavement milling techniques and depths including both Wedge and Whole Width milling techniques
    - A finer grade asphalt mix design for use with 0.75” , 1.0” and 1.25” thick overlays
    - Conventional asphalt mix designs for 1.5” thick overlays.

The graph below shows the various maintenance options and approximated costs that should typically be expected and/or used on pavements of various ages.



Elected and appointed city officials and city department heads and leaders should remember they are all on the SAME TEAM. It is all of their professional responsibilities to protect and adequately maintain their taxpayers public-owned roads and streets and other infrastructure. It is also their responsibility to provide sufficient funding and planning to ensure proper maintenance is provided, even when doing so might cause moderate to severe increases in funding levels and tax rates.

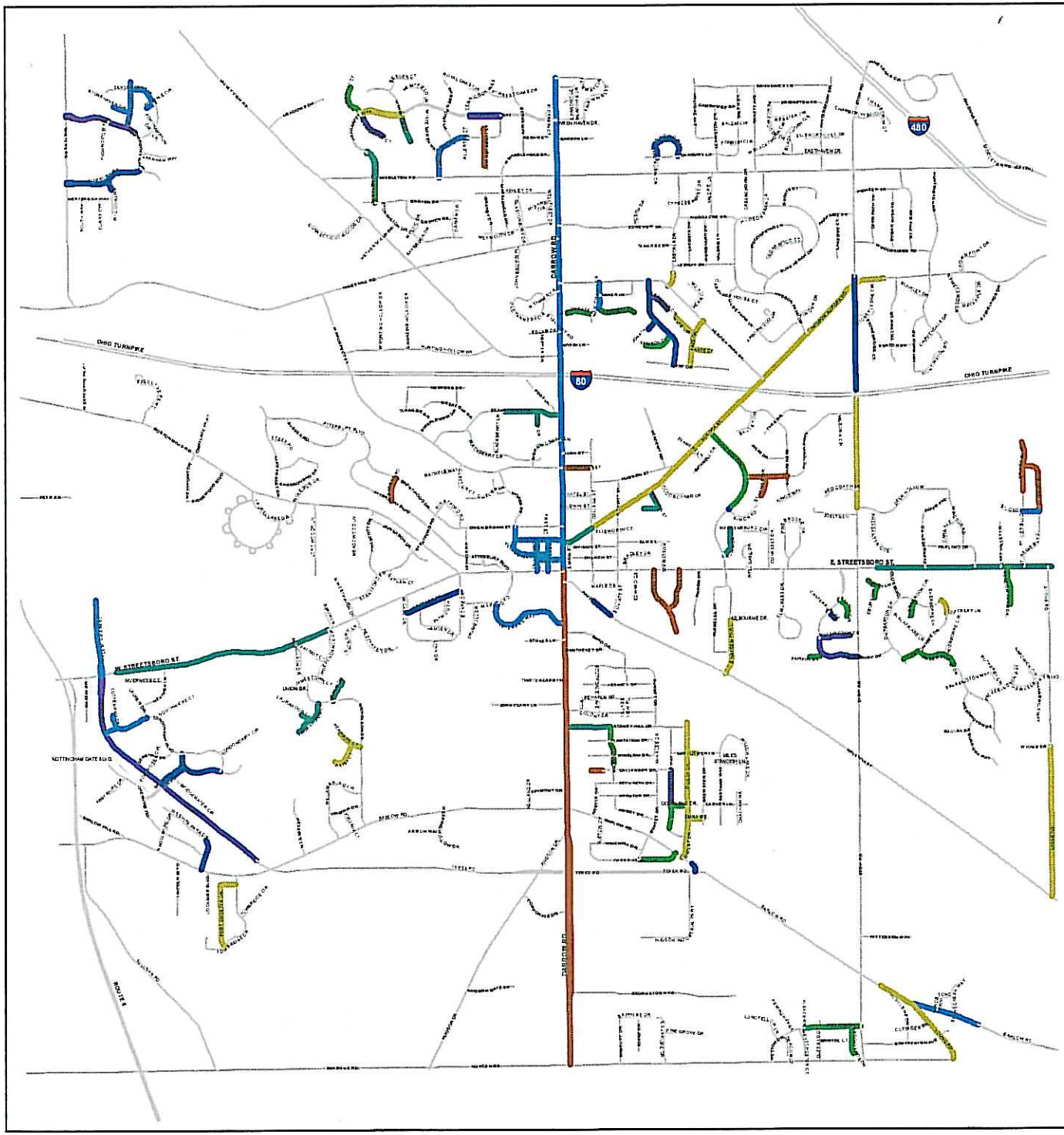
Their knowledge and understanding of the pavement deterioration process and maintenance strategies will allow them to properly educate or advise citizens of the reasons behind their decision making process.

The elected officials have the ultimate and last decision when it comes to providing adequate funding for pavement maintenance. They can choose to ignore the situation in order to prevent tax increases (possibly in an attempt to insure reelection) or they can step up to the plate and do what is necessary. They need to remember during budget preparation that the pavement maintenance dollar they cut or save today will cost their taxpayers of tomorrow three to four dollars, if not more.

The old saying of "*pay me now or pay me later*" is right on when it relates to pavement maintenance, however, a truer version now might be "Pay me a $1 today or Pay me $5 later".

About The Author

John Calvert has over 30 years experience in municipal government and public works. He is a graduate of Middle Tennessee State University and retired from the City of Oak Ridge as Public Works Division Manager in 2003 after 28 years of service. He joined the staff of Pavement Technology, Inc. in July 2003 as technical consultant for the company where he meets and works with local and state public works and highway officials across the nation. He also serves as Director of the Tennessee Public Works Institute and Administrator of the Tennessee Chapter of the American Public Works Association.
He has been a speaker and presenter on pavement maintenance at APWA national and state conferences and served as APWA's Speaker on Pavement Preservation for its 2007 nationwide live webcast on Pavement Maintenance. He has also taught pavement maintenance classes for the UTAH LTAP and UTAH League of Cities "Road School", the University of Tennessee TTAP (LTAP) Office and the National Center for Pavement Preservation funded by the FHWA. He has written various articles for Tennessee Public Works Magazine, the APWA Reporter national magazine and other associations.



Asphalt Replacement Streets 1999-2005

Lane Miles North of 303 = 219.74
Lane Miles South of 303 = 162.58

Legend

- 2005
- 2004
- 2003
- 2002
- 2001
- 2000
- 1999
- No Data

0 0.5 1
Miles

N

CITY OF HUDSON

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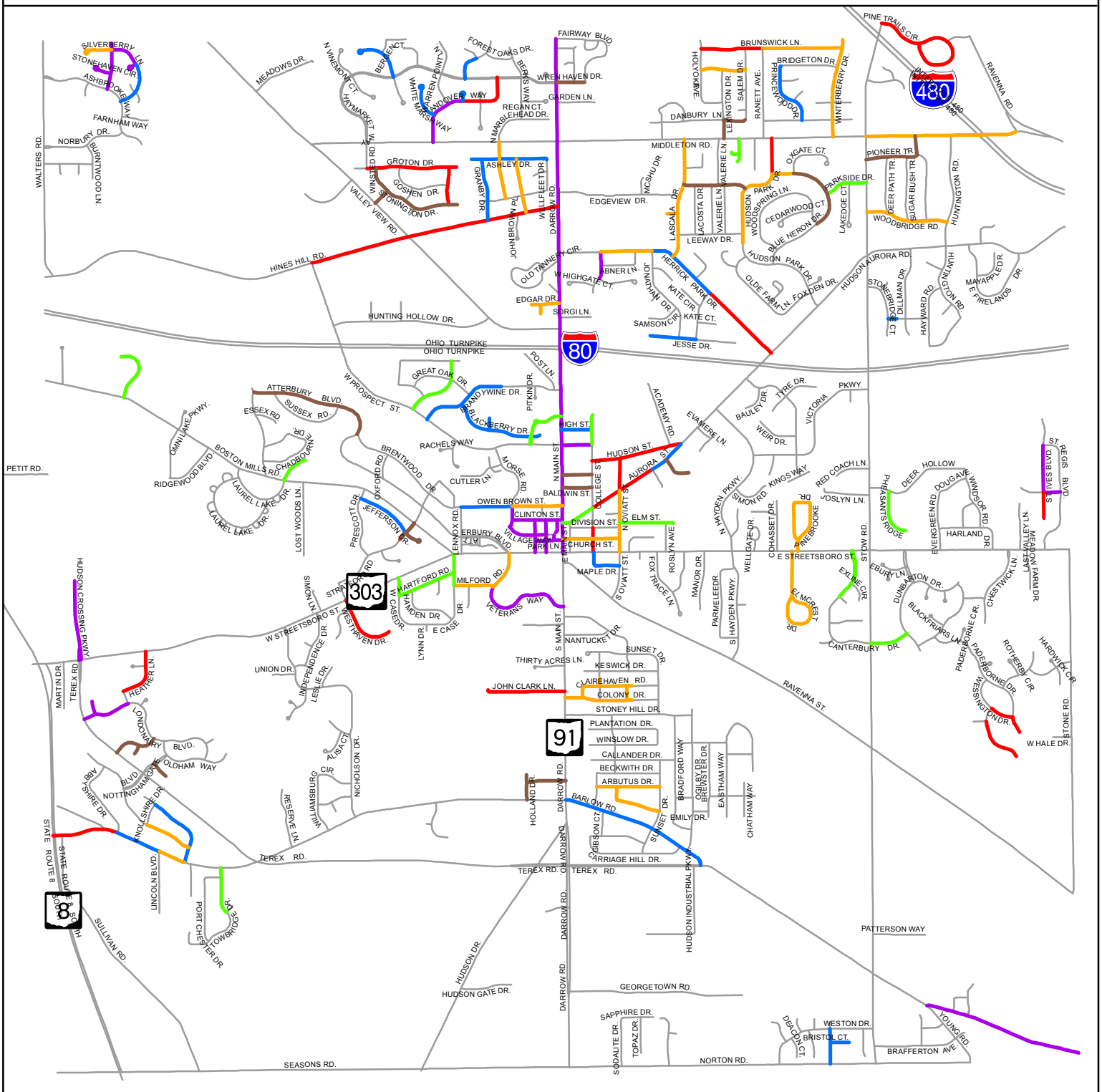
Asphalt Program 2005-2010



Year - Lane Miles

- 2010- 7.9
- 2009 - 7.1
- 2008 - 17.5
- 2007 - 12.7
- 2006 - 13.3
- 2005 - 14.7
- Other Streets

N

0 0.5 1
Miles

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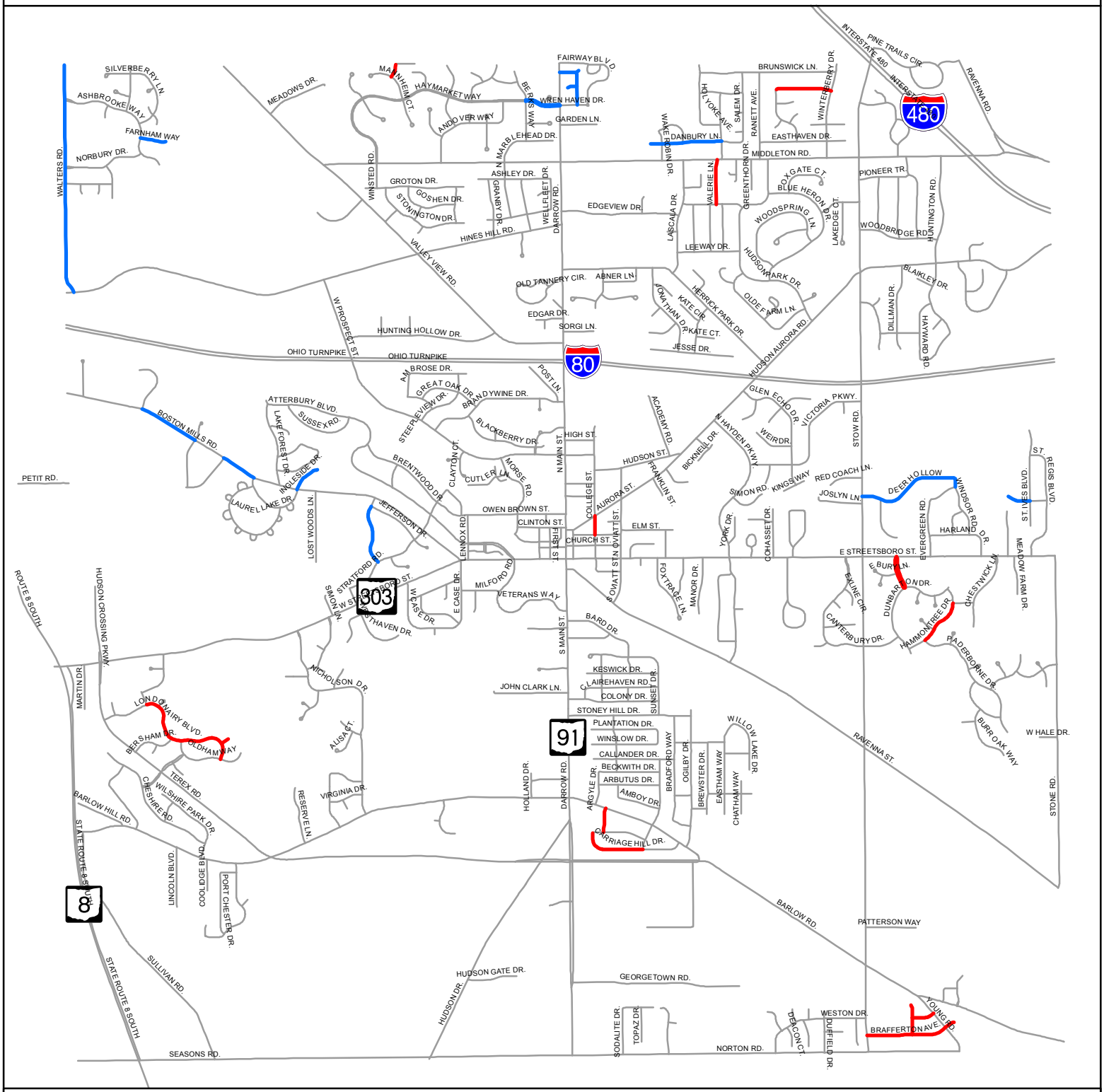
Map Compiled: January 2011

Asphalt Program 2011-2012



Year - Lane Miles

- 2012 - 5.9
- 2011 - 7.5
- Other Streets

N

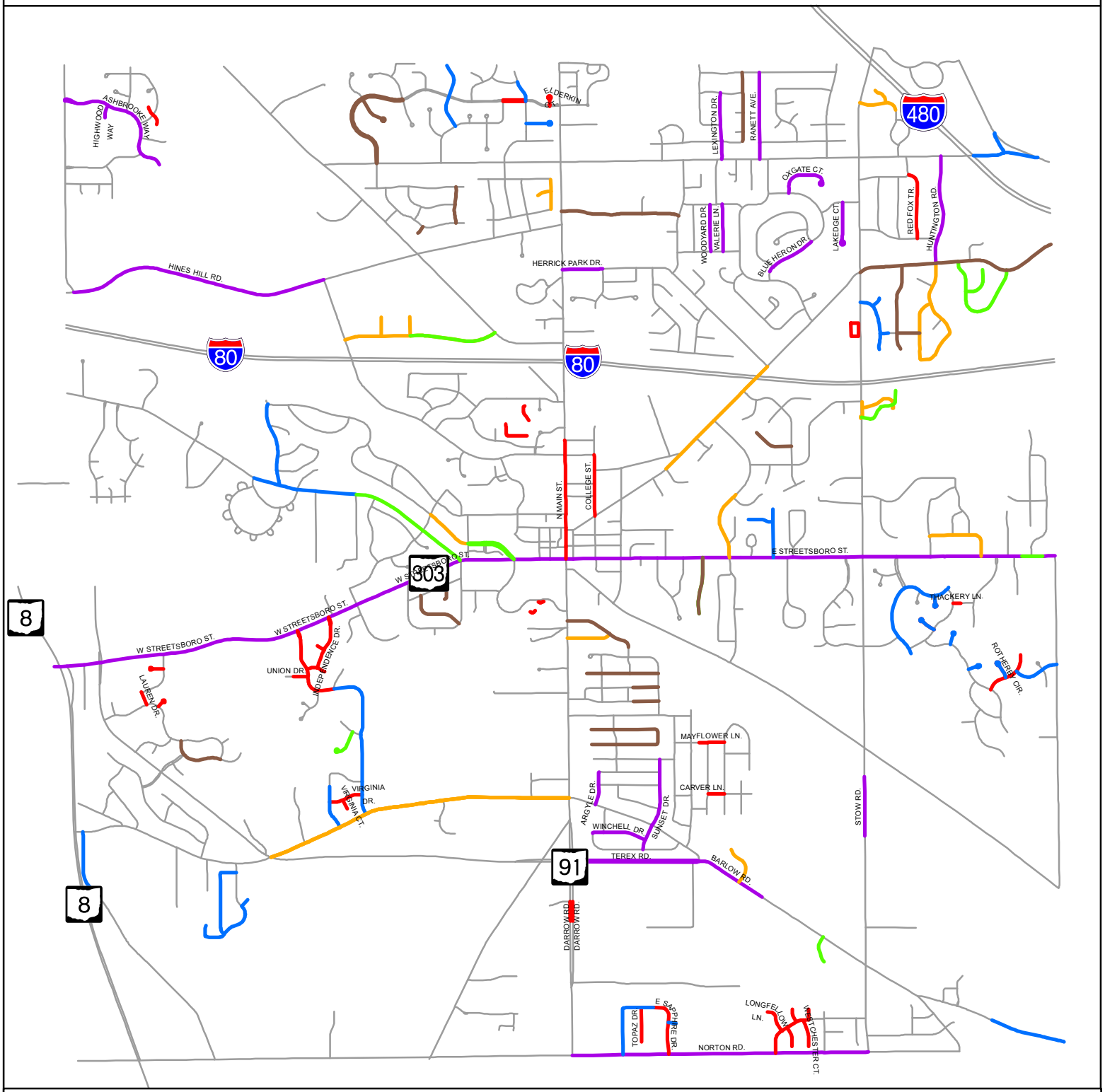
0 0.5 1

Miles

CITY OF HUDSON

Map Compiled: October 2012

Asphalt Program 2013-2018



2018
2014
2017
2013
2016
Other Streets
2015

N

0 0.5 1
Miles

OHIO HUDSON

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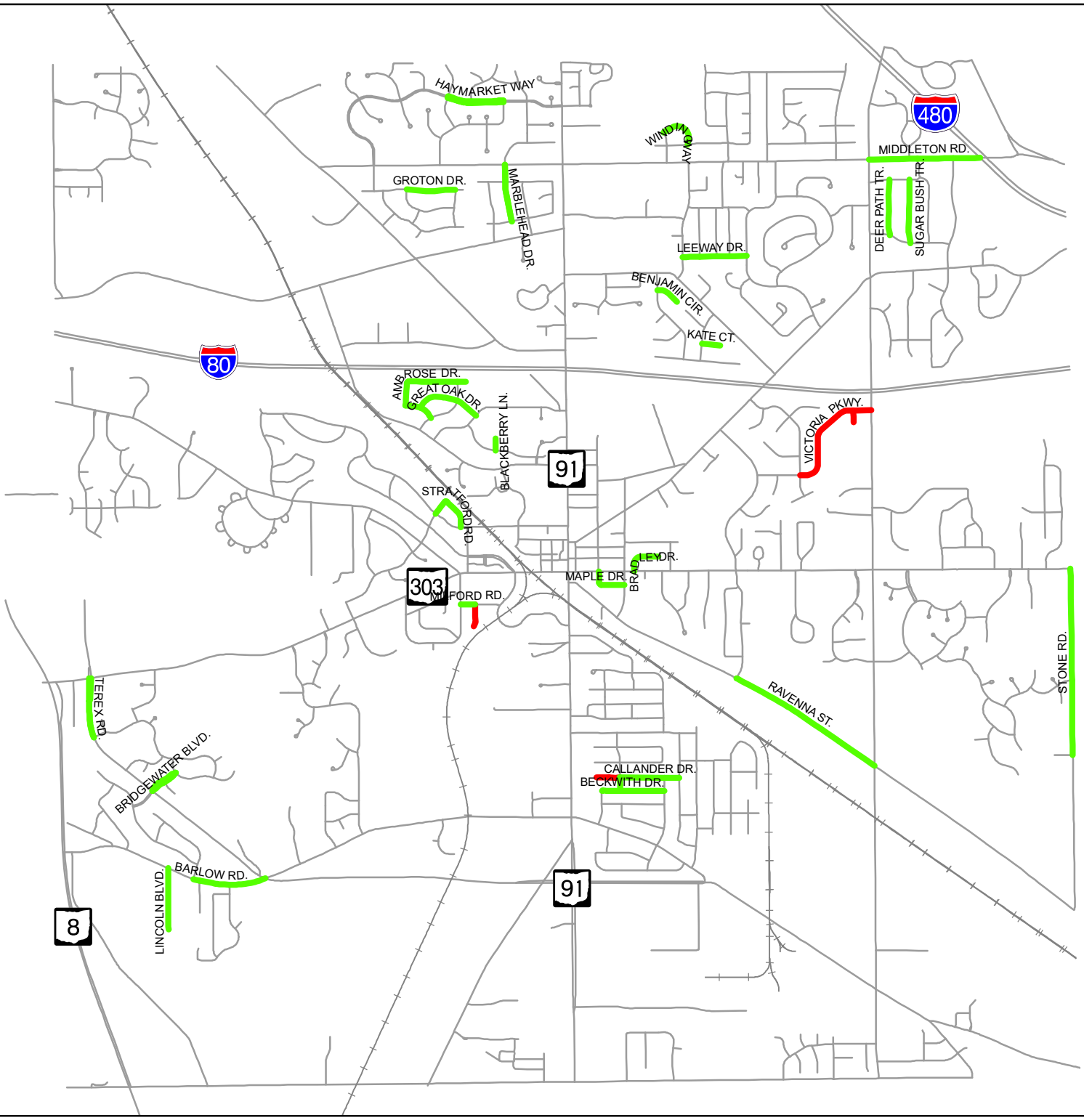
Map Compiled: March 2018

Asphalt Program 2019



Asphalt Program - Resurfacing - 2019

Asphalt Program - Overlay - 2019

Railroads

Streets

N

0 0.5 1

Miles

OHIO HUDSON

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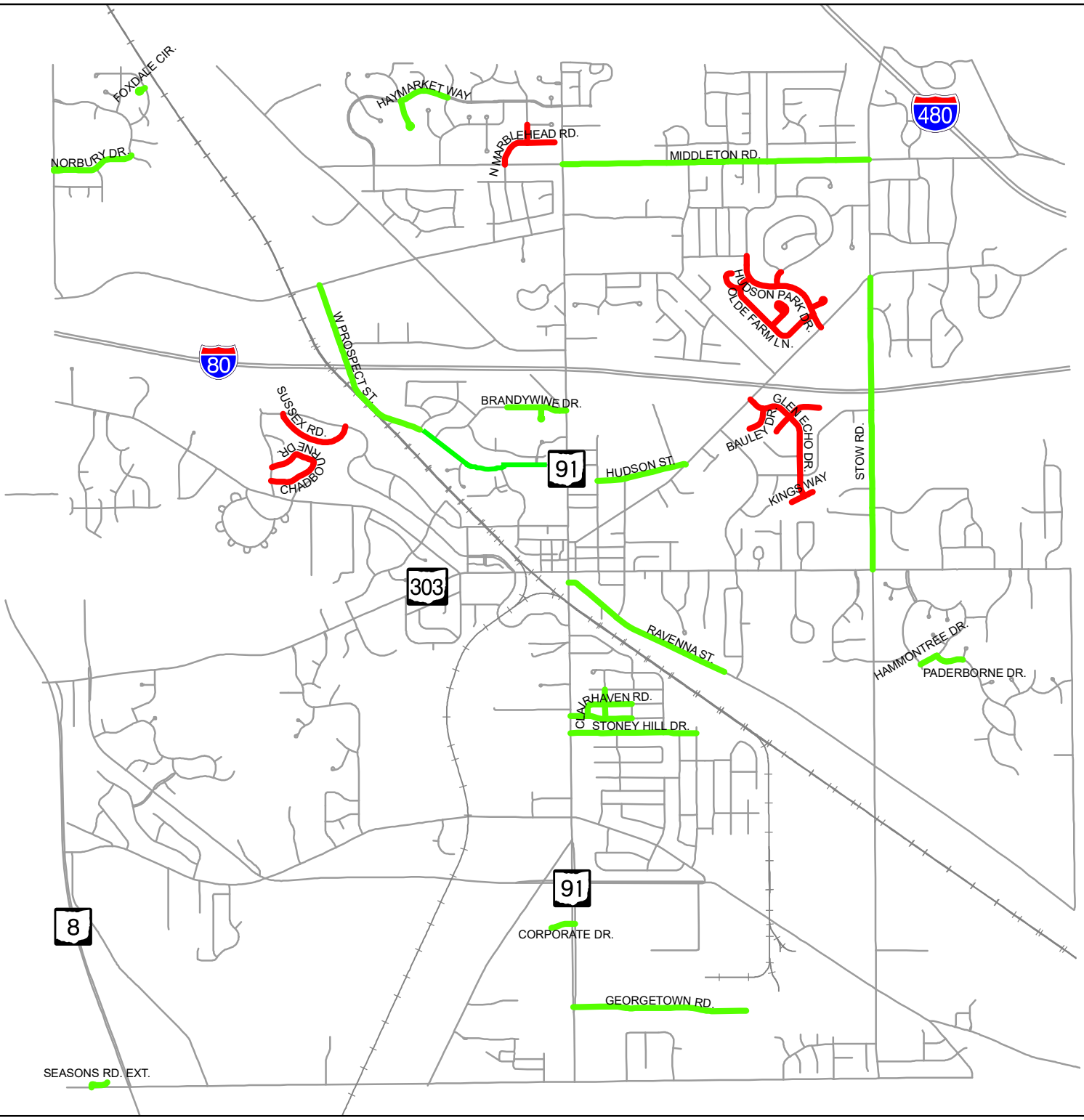
Map Compiled: June 2020

Asphalt Program 2020



- Asphalt Program - Overlay - 2020
- Asphalt Program - Resurfacing - 2020
- Railroads
- Streets

N

0 0.5 1
Miles

OHIO HUDSON

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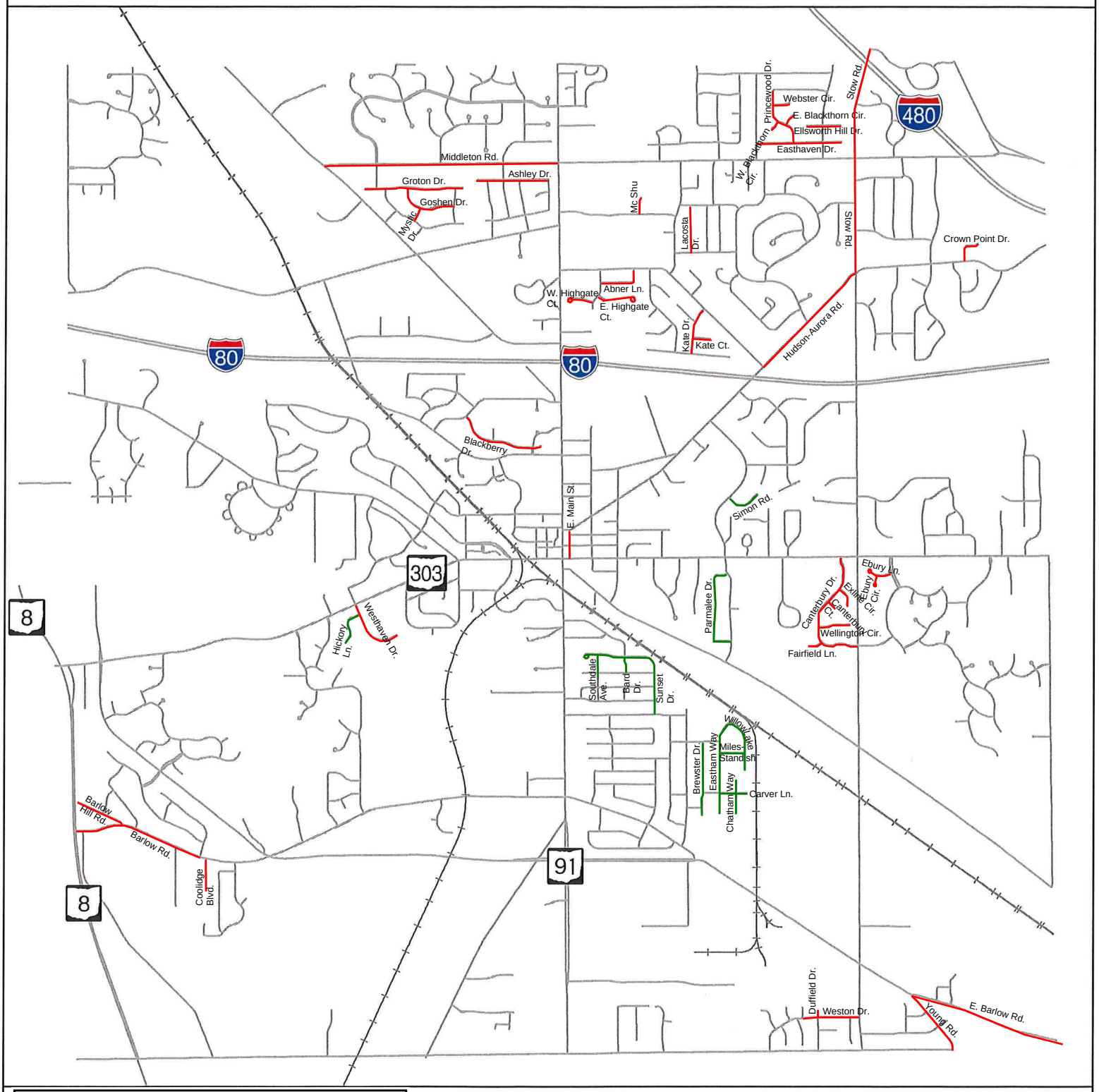
Map Compiled: June 2020

Asphalt Program 2021



Asphalt Program - Overlay - 2021

Asphalt Program - Resurfacing - 2021

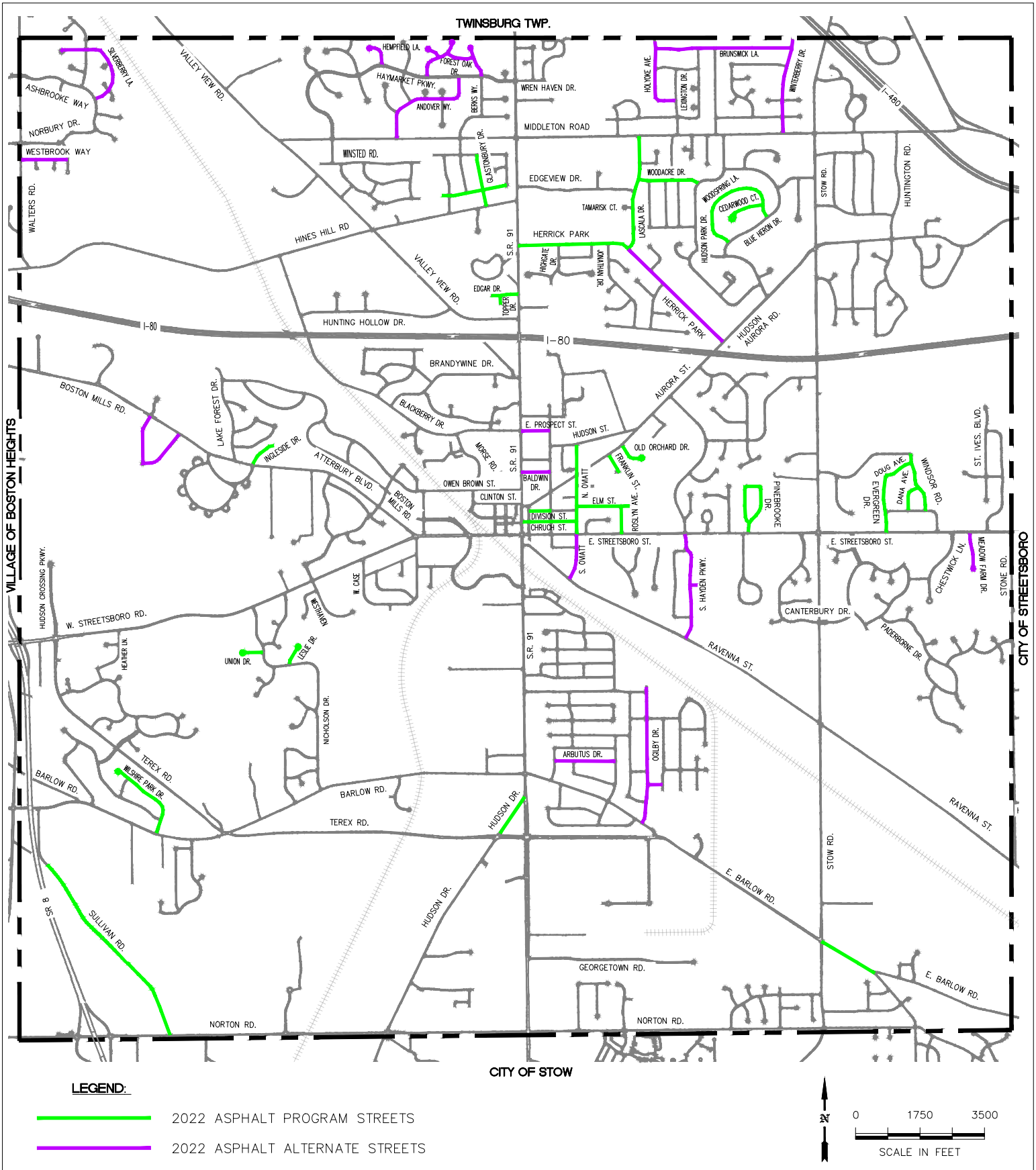
Asphalt Program - Alternates -

Railroads

Streets

N

OHIO HUDSON



OHIO HUDSON

1140 Terex Road
Hudson, Ohio 44236
(330) 342-1770

ANNUAL ASPHALT PROGRAM

2022 STREET MAP

Drawn:	Checked:	Date:
JVG	XXX	12/16/2021
Scale: 1" = 3500'	Drawing No: Figure 1	

CITY OF HUDSON, OHIO
FIVE YEAR PLAN - CAPITAL IMPROVEMENT SUMMARY

Note: D = Design and C = Construction on the Connectivity Program below.

		2022	2023	2024	2025	2026	Unfunded	Total
	Street Construction Annual Program							
1	Annual Reconstruction/Resurfacing Program	$1,950,000	$1,935,000	$1,925,000	$1,915,000	$1,910,000		$9,635,000
2	Annual Asphalt Patching Program	$100,000	$100,000	$100,000	$100,000	$100,000		$500,000
3	Annual Concrete Program	$179,000	$170,000	$170,000	$170,000	$170,000		$859,000
4	Annual Striping Program	$195,000	$200,000	$205,000	$210,000	$215,000		$1,025,000
5	Annual Crack Sealing	$120,000	$125,000	$130,000	$135,000	$135,000		$645,000
	Total Street Construction Annual Program	**$2,544,000**	**$2,530,000**	**$2,530,000**	**$2,530,000**	**$2,530,000**	**$0**	**$12,664,000**
	Connectivity Program							
1	Middleton Road From 91 to Highpoint Park. Construction	$2,830,200						$2,830,200
2	Stow Road From Pine Trails to exist. sidewalk. Construction	$500,000						$500,000
3	Franklin St from Aurora to School, Construction (2) (3)	$65,000						$65,000
4	Stow Road From Hudson Springs Park to 303. Construction		$916,300					$916,300
5	SR 303 From N Hayden Parkway to Stow Road. Construction		$444,400					$444,400
6	Middleton Road From Valley View Drive to 91. Construction		$1,996,628					$1,996,628
7	SR 303 From Stow Road to St. Regis Blvd. Construction	$1,092,300						$1,092,300
8	Hines Hill Road From Valley View to Glastonbury Dr. 2023 D, 2024 C		$362,120	$1,201,000				$1,563,120
9	Valley View Road From Hines Hill Rd. to Hunting Hollow Dr. 2023 D, 2024 C		$181,720	$908,600				$1,090,320
10	SR 303 from exist. sidewalk to Hudson Crossing Pkwy. 2023 D, 2024 C		$124,740	$646,380				$771,120
11	Vet. Trail Ph 1 - Hines Hill & Prospect From Hunting Hollow to Co. Metro Park. 2023 D, 2025 C			$315,700	$1,635,900			$1,951,600
12	Stow Road from 303 to Ravenna Street. 2024 D, 2025 C			$257,200	$1,414,600			$1,671,800
13	Ravenna Street from South Hayden Pkwy. to Stow Rd. 2024 D, 2025 C			$290,840	$1,454,200			$1,745,040
14	Lake Forest Dr from Boston Mills to Essex Rd (2025 D, 2026 C) (3)				$37,500	$250,000		$287,500
15	Boston Mills Road from Stratford to Lake Forest Dr 2026 D, 2027 C (3)					$140,000	$1,000,000	$1,140,000
16	Owen Brown St. Sidewalk from Morse to Lennox Rd.			$375,000				$375,000
17	SR303 Sidewalk from Nicholson Dr. to West Case Dr.			$725,000				$725,000
	Total Connectivity Program	**$4,487,500**	**$4,025,908**	**$4,719,720**	**$4,542,200**	**$390,000**	**$1,000,000**	**$19,165,328**

CITY OF HUDSON, OHIO
FIVE YEAR PLAN - CAPITAL IMPROVEMENT SUMMARY

Note: D = Design and C = Construction on the Connectivity Program below.

		2022	2023	2024	2025	2026	Unfunded	Total
	Street Improvement Projects - Pay as you go							
1	S. Main St. (Barlow to Stoney Hill Dr.) Project Construction and Construction Mgmt.) (1)	$700,000						$700,000
2	Opticom Traffic Signal Upgrades for Safety Services	$105,000						$105,000
3	Stow Road / Middleton Road Traffic Signal Construction	$250,000						$250,000
4	Terex Road / SR 91 Intersection Improvement (D 2024, C 2025)	$30,000	$250,000					$280,000
5	Ravenna Road Resurfacing with Summit Co Engineer (D 2024, C 2025)	$57,500	$82,500					$140,000
6	Owen Brown St. (Rt. 91 to Morse Rd.) Partial Recon. (Curb & Storm Imp - See 504)		$500,000					$500,000
7	Citywide Guardrail Replacement Program		$60,000					$60,000
8	S. Main Street Sidewalk Project at the ODOT Bridge		$175,000					$175,000
9	Terex Road Resurfacing (ODOT Project, Londonairy to Barlow - Construction)		$200,000					$200,000
10	Terex Rd, Hudson Industrial Pkwy, Barlow Rd Imp. (D 2022, C 2023) - Placeholder			$150,000	$1,000,000			$1,150,000
11	Barlow Road/Young Road Intersection (Design)				$60,000			$60,000
12	Dillman Drive Bridge Replacement (D 2026, C 2027)					$100,000	$1,000,000	$1,100,000
13	Heinen's Parking Exit Relocation		$150,000					$150,000
14	Adaptive Signals for Remaining System (Design)						$650,000	$650,000
15	Adaptive Signals for Remaining (Const and Const Mgmt.)						$3,000,000	$3,000,000
16	Barlow Road/Young Road Intersection (Construction)						$850,000	$850,000
17	Hines Hill Road RxR Grade Separation Project (Design)						$2,000,000	$2,000,000
	Total Street Improvement Projects - Pay as you go	**$1,142,500**	**$1,417,500**	**$150,000**	**$1,060,000**	**$100,000**	**$7,500,000**	**$11,370,000**
	TOTAL STREET & SIDEWALK PROJECTS	**$8,174,000**	**$7,973,408**	**$7,399,720**	**$8,132,200**	**$3,020,000**	**$8,500,000**	**$43,199,328**
	Other Sources of Funding							
1	State Highway Improvement Fund (202)	$65,000	$65,000	$65,000	$65,000	$65,000		$325,000
2	Permissive Auto Capital (401)	$245,000	$245,000	$245,000	$245,000	$245,000		$1,225,000
	Total Other Sources of Funding	**$310,000**	**$310,000**	**$310,000**	**$310,000**	**$310,000**	**$0**	**$1,550,000**
	TOTAL STREET & SIDEWALK FUND CHARGE	**$7,864,000**	**$7,663,408**	**$7,089,720**	**$7,822,200**	**$2,710,000**	**$8,500,000**	**$41,649,328**

(1) Project split with Safety Funds ($1.5 mil @ 90/10) + CMAQ Funds ($2.5 mil @ 80/20) + Local funding
(2) Design In-House with Construction being Split 50/50 with Schools (budget shown as 50% of total construction cost).
(3) Project was not part of 2020 Sidewalk Master Plan.

Note: The City issued $5,000,000 in 10 year bonds in 2013 to accelerate the replacement of poorly constructed neighborhood roads. The repayment of these bonds ends in 2023 and the annual payment is $563,809.