# City of Winchester

# Street Maintenance Master Plan

**Adopted by City Council: September 10, 2013**

## Introduction

In the most recent survey of City residents completed in December 2011, the maintenance of City streets was selected by residents as the single City service that should receive the most emphasis within the next two years. City Council has responded to this strong desire for improved street maintenance by appropriating significant funding the past few years for street paving. In addition, the Strategic Plan recently adopted by City Council contains the following goal:

### Strategic Plan Goal #4: Create a More Livable City for All

### Policy Agenda #5: Develop a Street Maintenance Master Plan that includes Policy Direction, Project Priority, and a Funding Mechanism.

This document has been prepared to address this goal and policy agenda contained in the Strategic Plan.

## Existing Street Network

The City is responsible for maintaining all the public streets within the City and currently maintains approximately 221.5 lane miles of streets which are shown in Figure 1. Each street is classified by the Virginia Department of Transportation (VDOT) based the type of street it is, its location, and its usage. The three classifications are: arterial, collector, and local. The definition for each type of street is as follows:

**Arterial Street:**

- Serves the major centers of activity within the City
- Highest traffic volume corridors
- Serve the longest trip desires
- Carry a significant amount of intra-area travel
- Examples: Pleasant Valley Road, Jubal Early Drive, etc.

**Collector Street:**

- Provides land access and traffic circulation within residential neighborhoods, commercial, and industrial areas
- Collects traffic from local streets and channels it to the arterial system
- Examples: Tevis Street, Shawnee Drive, etc.

**Local Street:**

- Serves primarily as access to abutting land
- Through traffic movements are discouraged
- Examples: Streets in residential neighborhoods

The breakdown of length of each type of street within the City is shown in the table below.

| Classification | Length (lane miles) |
|---|---|
| Arterial | 48.3 |
| Collector | 24.9 |
| Local | 148.3 |
| **Total** | **221.5** |

The street classifications within the City have not been updated in numerous years by VDOT and should be updated to reflect current conditions.

## Street Maintenance Techniques

Asphalt roadways deteriorate over time primarily due to vehicle usage and weather. Freeze and thaw cycles are especially destructive to asphalt pavement, particularly when the asphalt is nearing the end of its useful life. Arterial streets with high traffic volumes and a significant amount of truck traffic will deteriorate much more quickly than residential streets that have only a few cars each day.

There are several maintenance techniques that can be used for maintaining asphalt streets. These include:

- Crack Sealing
- Patching
- Slurry Sealing
- Chip Sealing
- Asphalt Overlay
- Reconstruction

The two street maintenance methods used most within the City are patching and asphalt overlays. City crews complete the vast majority of patching on City streets in-house on an as needed basis. All asphalt overlays are completed by an outside contractor.

Asphalt overlays are the primary focus of this report as it is the primary tool used by the City for long term street maintenance. Slurry seals and chip seals, while used frequently in some parts of the country, have not been used often in northern Virginia in recent years and have not been cost effective for use in the City. It is recommended, however, that the City implement a crack sealing program in the future where feasible since this is a cost effective maintenance method that will help extend the life of the pavement.

## Estimating Future Street Repaving Needs

Due to the higher volume of traffic and the relative importance of arterial streets in comparison to the other street types, the cycle length for repaving arterial streets is generally much shorter than the cycle length for repaving local streets.

For purposes of this report, the following cycle lengths for repaving were used to estimate the approximate number of lane miles that the City should repave each

year to keep the City streets in good physical condition and at a service level desired by the residents:

| Street Classification | Cycle Length for Repaving (years) | Lane Miles of Repaving Needed Each Year |
|---|---|---|
| Arterial | 15 | 3.22 |
| Collector | 20 | 1.25 |
| Local | 25 | 5.93 |
| **Total** | **221.5** | **10.4** |

If the repaving frequency in the table above was achieved, each street in the City would be repaved approximately every 22.3 years on average. It should be noted that the actual frequency for repaving each street may vary on numerous factors including: truck traffic volumes, drainage issues, and the quality of the street when originally constructed.

## History of Street Repaving

The table below summarizes the street repaving that has been completed within the City during the period 2005 thru 2012. Figure 2 is a map which shows the actual streets that have been repaved during this same period. A detailed listing of these streets is found in Appendix 1.

| Street Classification | Total Lane Miles Repaved 2005 - 2012 | Avg. Number of Lane Miles Repaved per Year (2005 – 2012) |
|---|---|---|
| Arterial | 37.42 | 4.68 |
| Collector | 7.87 | 0.98 |
| Local | 17.07 | 2.13 |
| **Total** | **62.3** | **7.8** |

It is easy to ascertain from the numbers above that the focus of the City's repaving program during the past eight years has been on the arterial streets. As mentioned previously, arterial streets are the major and most important streets within the City that carry the highest volume of traffic and need to be repaved more frequently than local or residential streets.

While the City did accomplish a significant amount of repaving during the past eight years, 62.3 total lane miles or an average of 7.8 lane miles per year, this amount is below the average number of lane miles that need to be repaved each year (10.4 lane miles) so that all the streets within the City are maintained in good physical condition. This repaving deficit of approximately 2.6 lane miles per year over an extended period of time will mean that the average physical condition of the City's streets will continue to get worse and the streets within the City will not be maintained at a level desired or expected by the City's residents.

## Priorities for Selecting Street for Repaving

Determining the priority for selecting the streets that are repaved each year is based on the following criteria:

1. Street Classification (arterial, collector, local)

   Arterial streets are the major streets within the City and have the highest overall priority for repaving. Collector streets have the next highest priority, followed by local streets.

2. Traffic Volumes

   In general, the more traffic that utilizes a street, the higher the priority will be repaving.

3. Physical Condition of the Street

   The actual physical condition of each street is taken into consideration when determining the priorities for repaving.

It should be noted that in some instances a local street may be in worse physical condition than an arterial street, but the arterial street will have an overall higher priority for repaving due to its street classification and higher traffic volumes.

## Costs for Street Repaving

The cost to repave a lane mile of a street can vary based on multiple factors, including:

- Width of street
- Current physical condition of street
- Asphalt milling required
- Volume of truck traffic
- Striping needs
- Manhole adjustments

Liquid asphalt prices can fluctuate significantly, even within the same year, which can make it difficult to estimate the long term costs for repaving. For purposes of this report, an average cost of $90,000 per lane mile has been estimated.

Based on this unit cost, the total cost to repave all of the streets in the City (at current prices) would be approximately $20 million. Utilizing an average repaving frequency of 22.3 years as determined above, the City should be spending approximately $900,000 per year on average for street repaving.

## Funding Sources for Street Repaving

The following are the primary funding sources that are available to the City to fund sidewalk replacements and a brief discussion of each:

1. Highway Maintenance Fund

The City receives annual funding each year from the state for street maintenance. For the current fiscal year, the amount of funding will be:

- Arterial Streets: $18,684 per lane mile
- Collector/Local Streets: $10,970 per lane mile

Based on these rates, the total amount of state funding will be $2,802,000.

In addition to street repaving, these funds are also used for:

- Asphalt patching
- Curb & gutter and drainage system maintenance
- Sidewalk maintenance
- Street lighting
- Traffic signal maintenance
- Street signs and pavement markings
- Street sweeping
- Snow/ice removal
- Street median mowing/maintenance
- Street trees

Due to all of these maintenance activities, the $2.8 million per year received from the state is simply not adequate to meet the approximate $900,000 annual need

for street repaving. Therefore, supplemental funding sources will be necessary in the future.

2. City's General Fund

The City's General Fund is one potential supplemental funding source for street repaving. In the current FY2014 budget, the General Fund is providing $500,000 in funding for street repaving.

3. City's Utility Fund

Over the past six years, the City has completed numerous underground utility replacement projects. At the conclusion of the utility replacements, each street is repaved as a part of the overall project. As there are still many existing water and sewer mains that are very old and need to be replaced, utility replacement projects are expected to continue to play a key role in the City's overall repaving program.

4. VDOT Revenue Sharing Funds

Revenue sharing funds administered by VDOT is another funding source for street repaving. In the current fiscal year (FY2014), the City will receive approximately $130,000 in state Revenue Sharing funds for repaving.

## Proposed 3-year Street Repaving Plan

Based on the priorities developed herein for street repaving, a proposed 3-year plan for street repaving has been developed and is presented in Figure 3. A detailed listing of the specific streets to be repaved each year is found in Appendix 2.

A summary of the proposed 3-year program is shown in the following table:

| Fiscal Year | Lane Miles of Streets to Repave | Estimated Cost for Repaving |
|---|---|---|
| | | |
| 2014 | 11.7 | $ 900,000 |
| 2015 | 14.3 | $ 950,000 |
| 2016 | 12.3 | $ 1,100,000 |
| Average Per Year | 12.7 | $983,000 |

The following are the primary guiding factors of the proposed 3-year plan:

1. The plan will complete and average of 12.7 lane miles of street repaving per year over the next three years. This amount is significantly more repaving than what has been completed on average over the past several years and is more than the 10.4 lane miles of repaving that is needed each year on average to maintain all City streets in a good condition. The plan recognizes that the City has a significant backlog of streets in poor condition and is necessary to help the City "catch up" in its street repaving program.
2. As the focus of the City's repaving efforts the past several years have focused on arterial streets, a significant number of residential streets are included in the 3-year plan.

The proposed 3-year plan (and plan in subsequent years) will require significant funding to implement. The following are the proposed primary funding sources to complete the street repaving in the 3-year plan:

- Highway Maintenance Fund
- General Fund

- State Revenue Sharing Funds (VDOT)

A summary of the estimated funding sources for the proposed 3-year street repaving plan is presented in the table below.

| Fiscal Year | General Fund | Highway Maintenance Fund | State Revenue Sharing Funds (VDOT) | Total Funding |
|---|---|---|---|---|
| | | | | |
| 2014 | $ 670,000 | $ 100,000 | $130,000 | $ 900,000 |
| 2015 | $ 720,000 | $100,000 | $130,000 | $950,000 |
| 2016 | $ 870,000 | $100,000 | $130,000 | $1,100,000 |

## Summary and Recommendations

1. The City currently maintains approximately 221.5 lane miles of public streets within the City. This figure does not include alleys.

2. In order to keep all of the roadways within the City in good physical condition and at a service level desired and expected by the residents, the City should repave approximately 10.4 lane miles of streets each year.

3. During the period between 2005 and 2012, the City repaved an average of 7.8 lane miles of streets per year. As this amount is below the recommended amount of 10.4 lane miles of street repaving per year, the average physical condition of all the streets within the City has declined. The majority of repaving the past seven years has been on the City's arterial streets.

4. A proposed 3-year street paving plan has been developed which is based on a prioritized system where a combination of the street classification

(arterial, collector, or local), traffic volumes, and current physical condition of the street is used to select the streets for repaving. The plan will complete and average of 12.7 lane miles of street repaving over the next three years and recognizes that the City has a significant backlog of streets in poor condition and it is necessary to help the City "catch up" in its street repaving program.

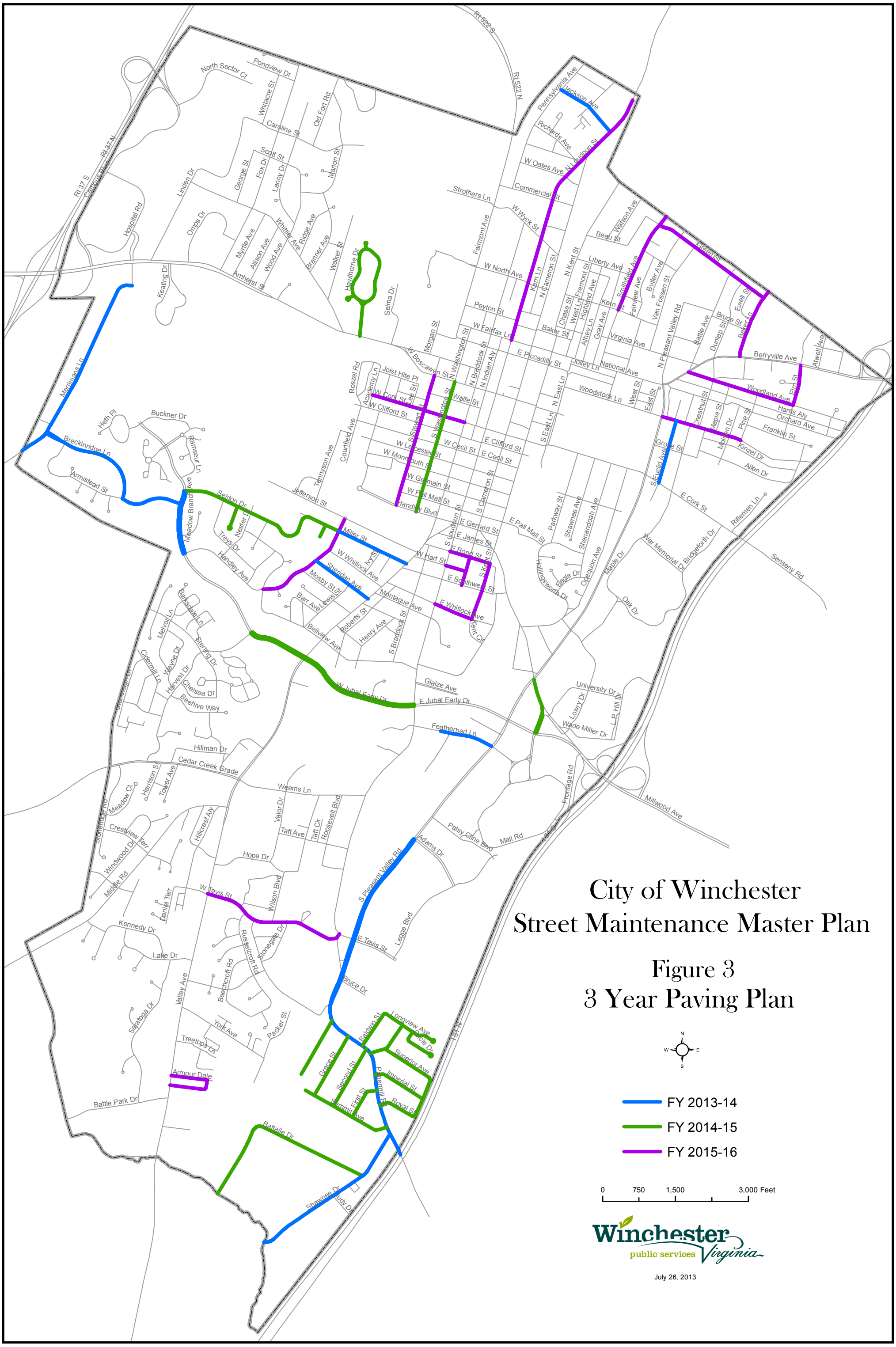
5. A significant amount of funding will be required to implement the proposed 3-year repaving program – approximately $1 million per year. The primary funding sources are projected to be the Highway Maintenance Fund, the City's General Fund, and Revenue Sharing Funds from VDOT. The primary funding source is projected to be the General Fund due to funding limitations from the state. The estimated funding from the General Fund in FY2015 and FY2016 is projected to be $720,000 and $870,000, respectively.

6. It is very important that all streets within the City be inspected every year and that the 3-year street repaving program is updated on an annual basis. The physical condition of some streets can change fairly quickly and so can economic conditions, especially the cost of liquid asphalt and the overall costs for paving. Street repaving will need to remain a priority in the future to ensure that the physical condition of all streets remains at a level expected by City residents.

7. It is recommended that the City pursue and implement a crack sealing program in the future where feasible to help extend the life of the asphalt pavements within the City.

City of Winchester
Street Maintenance Master Plan
Figure 1
Existing Street Network
ARTERIAL
COLLECTOR
(As per VDOT classifications)
0
750
1,500
3,000 Feet
Winchester
public services
Virginia
July 26, 2013

City of Winchester
Street Maintenance Master Plan
Figure 2
Streets Paved
2005-2012
0
750
1,500
3,000 Feet
Winchester
public services
Virginia
July 26, 2013


City of Winchester
Street Maintenance Master Plan
Figure 3
3 Year Paving Plan
FY 2013-14
FY 2014-15
FY 2015-16
0
750
1,500
3,000 Feet
Winchester
public services
Virginia
July 26, 2013

# City of Winchester
# Street Repaving History Since 2005
# Appendix 1

| Year | Street Repaved | From | To | Length (ft) | Travel Lanes | Lane Miles Paved |
|---|---|---|---|---|---|---|
| | | | | | | |
| 2005 | Millwood | Pleasant Valley | Kent | 2,790 | 2 | 1.06 |
| 2005 | Fairmont | Piccadilly | City Limit | 4,575 | 2 | 1.73 |
| | | | | | | **2.79** |
| 2006 | Amherst | Medical Circle | Boscawen | 2,880 | 2 | 1.09 |
| 2006 | Boscawen | Amherst | Kent | 3,080 | 2 | 1.17 |
| 2006 | Woodland | Elm | End (east) | 1,190 | 2 | 0.45 |
| | | | | | | **2.71** |
| 2007 | Valley | Jubal Early | South City Limit | 10,810 | 4 | 8.19 |
| 2007 | Valley | Jubal Early | Braddock | 3,555 | 2 | 1.35 |
| 2007 | Mosby | Valley | Lewis | 420 | 2 | 0.16 |
| 2007 | S. Loudoun | Jubal Early | Cork | 5,900 | 2 | 2.23 |
| 2007 | Peyton | Fairmont | Braddock | 675 | 2 | 0.26 |
| 2007 | North | Fairmont | Braddock | 675 | 2 | 0.26 |
| 2007 | Kern | Kent | Smithfield | 1,160 | 2 | 0.44 |
| 2007 | Beau | Kent | Watson | 620 | 2 | 0.23 |
| 2007 | Ohio | Watson | End | 555 | 2 | 0.21 |
| 2007 | Woodstock Lane | Pine | City Limit | 1,655 | 2 | 0.63 |
| 2007 | Allen | Franklin | Woodstock Lane | 360 | 2 | 0.14 |
| 2007 | Elm | Orchard | Franklin | 305 | 2 | 0.12 |
| 2007 | Pine | Woodstock Lane | Orchard | 640 | 2 | 0.24 |
| 2007 | Orchard | Pine | Elm | 790 | 2 | 0.30 |
| 2007 | Franklin | Elm | End | 630 | 2 | 0.24 |
| | | | | | | **14.98** |
| 2008 | Pleasant Valley | Parkview | Adams | 4,800 | 4 | 3.64 |
| 2008 | Patsy Cline | Pleasant Valley | Entrance | 710 | 2 | 0.27 |
| 2008 | Jubal Early | Pleasant Valley | I-81 | 1,820 | 4 | 1.38 |
| 2008 | Kent | Cork | Piccadilly | 1,600 | 2 | 0.61 |
| 2008 | S. Loudoun | Featherbed | Weems Ln | 1,770 | 4 | 1.34 |
| 2008 | Roosevelt | Weems | Papermill | 1,960 | 2 | 0.74 |
| 2008 | Taft | Wilson | Papermill | 900 | 2 | 0.34 |
| | | | | | | **8.31** |
| 2009 | Braddock | Wyck | Gerrard | 6,350 | 2 | 2.41 |
| 2009 | Cameron | N. Loudoun | Gerrard | 8,030 | 2 | 3.04 |
| 2009 | Cork | Braddock | East Lane | 1,760 | 2 | 0.67 |
| 2009 | East Lane | Cork | Piccadilly | 1,570 | 2 | 0.59 |
| 2009 | Woodstock Lane | East Lane | Pleasant Valley | 2,100 | 2 | 0.80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2009 | Papermill Road | Weems | RR Tracks | 1,750 | 4 | 1.33 |
| 2009 | Cedar Creek Grade | Valley | City Limit | 2,720 | 4 | 2.06 |
| | | | | | | **10.89** |
| 2010 | Gerrard | Braddock | Kent | 1,340 | 2 | 0.51 |
| 2010 | James | Valley | Kent | 1,200 | 2 | 0.45 |
| 2010 | Cameron | Gerrard | James | 300 | 2 | 0.11 |
| 2010 | Valley | Braddock | Gerrard | 645 | 2 | 0.24 |
| 2010 | Millwood | Cameron | Kent | 530 | 2 | 0.20 |
| 2010 | Piccadilly | Washington | East Lane | 2,160 | 2 | 0.82 |
| 2010 | S. Loudoun | Jubal Early | Featherbed | 430 | 4 | 0.33 |
| 2010 | Featherbed | S. Loudoun | RR Tracks | 515 | 2 | 0.20 |
| 2010 | East Street | Woodstock | End | 590 | 2 | 0.22 |
| 2010 | Berryville | Pleasant Valley | I-81 | 4,750 | 4 | 3.60 |
| 2010 | Ross | Berryville | Conway | 470 | 2 | 0.18 |
| 2010 | Pleasant Valley | Berryville | Woodstock Lane | 685 | 4 | 0.52 |
| | | | | | | **7.38** |
| 2011 | Kent | Piccadilly | Baker | 835 | 2 | 0.32 |
| 2011 | Weems | Valley | Roosevelt | 2,255 | 2 | 0.85 |
| | | | | | | **1.17** |
| 2012 | Amherst | City Limit | Wood | 4,500 | 4 | 3.41 |
| 2012 | Amherst | Wood | Entrance to MSV | 1,100 | 2 | 0.42 |
| 2012 | Kent | Baker | City Limit | 3,470 | 2 | 1.31 |
| 2012 | Liberty | Kent | Smithfield | 1,200 | 2 | 0.45 |
| 2012 | Fremont | Liberty | Kern | 750 | 2 | 0.28 |
| 2012 | Highland | Liberty | National | 1,980 | 1 | 0.38 |
| 2012 | Gray | Liberty | Kern | 950 | 2 | 0.36 |
| 2012 | Kern | Fremont | Smithfield | 820 | 2 | 0.31 |
| 2012 | Smithfield | Kern | National | 1,200 | 2 | 0.45 |
| 2012 | Virginia | Smithfield | Pleasant Valley | 1,290 | 2 | 0.49 |
| 2012 | National | Smithfield | Piccadilly | 825 | 2 | 0.31 |
| 2012 | Pleasant Valley | Virginia | National | 600 | 2 | 0.23 |
| 2012 | Baker Street | Kent | West Lane | 330 | 1 | 0.06 |
| 2012 | West Lane | Kern | Fairfax | 1,215 | 1 | 0.23 |
| 2012 | Fairfax Lane | Cameron | National | 900 | 1 | 0.17 |
| 2012 | Pleasant Valley | Woodstock | Parkview | 5,430 | 4 | 4.11 |
| 2012 | Cork | Purcell | Shawnee | 1,760 | 2 | 0.67 |
| 2012 | Kent | Pall Mall | Millwood | 600 | 2 | 0.23 |
| 2012 | Pall Mall | Cameron | Town Run | 600 | 2 | 0.23 |
| | | | | | | **14.11** |
| | | | | | | |
| | | | | | | |
| | | | Total | | | **62.34** |

# City of Winchester
# 3-year Paving Plan
# Appendix 2

| Street | From | To | Length (ft) | Travel Lanes | Lane Miles |
|---|---|---|---|---|---|
| | | | | | |
| **FY 2014** | | | | | |
| Featherbed | Pleasant Valley | RR Tracks | 1200 | 2 | 0.45 |
| Meadow Branch | Handley | Seldon | 1400 | 2 | 0.53 |
| Sheridan | Valley | Handley | 1300 | 2 | 0.49 |
| Miller | Valley | Handley | 1525 | 2 | 0.58 |
| Jackson | N. Loudoun | Pennsylvania | 1400 | 2 | 0.53 |
| Euclid | Cork | Woodstock | 1300 | 2 | 0.49 |
| Armistead | Meadow Branch | Breckinridge | 1300 | 2 | 0.49 |
| Breckinridge | Armistead | Merrimens | 2400 | 2 | 0.91 |
| Pleasant Valley | Adams | Cedarmeade | 3950 | 4 | 2.99 |
| Merrimans Lane | Meadow Branch | City Limit | 4150 | 2 | 1.57 |
| Papermill Rd | Cedarmeade | City Limit | 3500 | 2 | 1.33 |
| Shawnee Dr | Papermill Rd | City Limit | 3500 | 2 | 1.33 |
| | | | | | 11.70 |
| | | | | | |
| **FY 2015** | | | | | |
| Jubal Early | S. Loudoun | Harvest | 3825 | 4 | 2.90 |
| Millwood | Pleasant Valley | Jubal Early | 1120 | 2 | 0.42 |
| Hawthorne | Amherst | End | 3500 | 2 | 1.33 |
| Washington | Handley | Boscawen | 2770 | 2 | 1.05 |
| Battaile | Shawnee | City Limit | 4025 | 2 | 1.52 |
| Summit | Papermill Rd | End | 1950 | 2 | 0.74 |
| 1st Street | Papermill Rd | Summit | 800 | 2 | 0.30 |
| 2nd Street | Papermill Rd | Summit | 1330 | 2 | 0.50 |
| Grace Street | Papermill Rd | Summit | 1370 | 2 | 0.52 |
| Pleasant Valley Rd | Papermill Rd | End | 1230 | 2 | 0.47 |
| Royal St | Papermill Rd | Imperial | 765 | 2 | 0.29 |
| Imperial St | Papermill Rd | End | 1100 | 2 | 0.42 |
| Superior Ave | Papermill Rd | Imperial | 2270 | 2 | 0.86 |
| Broadview | Papermill Rd | Longview | 580 | 2 | 0.22 |
| Baldwin St | Papermill Rd | Bruce Dr | 790 | 2 | 0.30 |
| Longview Ave | Baldwin | End | 1215 | 2 | 0.46 |
| Circle Dr | Longview | End | 790 | 2 | 0.30 |
| Miller | Handley | Seldon | 860 | 2 | 0.33 |
| Seldon | Miller | Meadow Branch | 2930 | 2 | 1.11 |
| Vanceright Cir | Miller | End | 350 | 2 | 0.13 |
| Dalton Pl | Seldon | End | 475 | 2 | 0.18 |
| | | | | | 14.34 |

| | | | | | |
|---|---|---|---|---|---|
| **FY2016** | | | | | |
| Tevis | Valley Ave | RR Tracks | 2570 | 2 | 0.97 |
| Stewart | Handley | Boscawen | 2770 | 2 | 1.05 |
| Cork | Braddock | Academy | 1950 | 2 | 0.74 |
| Handley Ave | Jefferson | Bellview | 2325 | 2 | 0.88 |
| Cameron | Bond | Southwerk | 570 | 2 | 0.22 |
| Kent | Bond | Whitlock | 1210 | 2 | 0.46 |
| Whitlock | Kent | S Loudoun | 800 | 2 | 0.30 |
| Bond | Kent | S Loudoun | 835 | 2 | 0.32 |
| Hart | Cameron | S Loudoun | 415 | 2 | 0.16 |
| Whitlock | S. Loudoun | Kent | 810 | 2 | 0.31 |
| Green | Smithfield | Baker | 2600 | 2 | 0.98 |
| Baker Lane | Berryville | City Limit | 1465 | 2 | 0.55 |
| Woodstock Lane | Pleasant Valley | Pine | 1685 | 2 | 0.64 |
| Woodland | Berryville | Elm | 2240 | 2 | 0.85 |
| N Loudoun | Fairfax Ln | City Limit | 5820 | 2 | 2.20 |
| Armour Dale | Valley Ave | End | 840 | 2 | 0.32 |
| Elm | Berryville | Woodland | 1240 | 2 | 0.47 |
| Smithfield | Kern | City Limit | 2190 | 2 | 0.83 |
| | | | | | 12.25 |