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TECH MEMO

DATE: April 15, 2026

FROM: Kelly Sandow P.E.
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RE: City of Winston Pavement Conditions Update

BACKGROUND

This memorandum updates the City of Winston Pavement Conditions Memo prepared September 2017 . The update reflects changes in pavement conditions due to ongoing deterioration of the roadway network, as well as improvements completed by the City since the original evaluation. Additionally, the cost estimates for recommended maintenance and rehabilitation treatments have been revised to reflect current construction pricing. This information is intended to provide the City with an updated understanding of system conditions and associated improvement costs for planning and budgeting purposes.

COST UPDATE SUMMARY

The updated cost analysis reflects current unit pricing for pavement maintenance and rehabilitation treatments based on recent bid data and observed construction costs in the region. Unit costs have been revised across all treatment types to account for changes in material pricing, contractor availability, and overall market conditions. The updated costs have been applied to the recommended treatment strategies identified in the Pavement Management Plan.

Based on the updated analysis, the total estimated cost to complete the recommended pavement maintenance and rehabilitation program for the City of Winston is approximately **$7.28 million**. This includes approximately **$756,000** in slurry seals, **$22,000** in chip seals, **$2,119,000** in inlays, **$1,160,000** in overlays, **$2,483,000** in total replacements, and **$740,000** in new paving. In addition, the estimated cost to upgrade deficient ADA ramps throughout the City is approximately **$2,385,000**.

These values are presented in current dollars at the time of this update and are intended for planning-level purposes. Actual construction costs may vary depending on project size, location, phasing requirements, and site-specific conditions.

PAVEMENT EVALUATION DETAILS

The pavement conditions survey spreadsheet has been updated to reflect current conditions and estimated costs. As per the original evaluation, the spreadsheet is includes an estimated

age of the asphalt, overall road condition rating, detailed road conditions, repair recommendations, and a cost estimate for the suggested repair method.

The estimated age of the asphalt was established using a visual evaluation of the physical conditions of the asphalt. A newer asphalt, 0-7 years old, will have a fresh black color to the asphalt and will generally display few signs of aging in the form of pavement fatigue. As an asphalt ages, oxidation on the surface will lighten the color of the surface to a pale gray color and general fatigue in the form of cracking, layer separation, rutting, and aggregate exposure will become more evident.

The overall road condition rating is shown on a spectrum ranging from very poor to very good as shown in the attachments of ODOT's Pavement Conditions Rating Manual tables.

The asphalt road condition is broken down into several individual columns. These columns are rated from A to F for each road if pavement distress is evident. These grades are used to evaluate the overall road condition rating. These columns for pavement distress are: fatigue cracking, alligator cracking, potholing, delamination, aggregate exposure, seam cracking, trench patch deterioration, rutting and pavement unevenness, narrowness of the street, settlement, and drainage problems. These columns are discussed below.

Fatigue Cracking: A series of cracks in close proximity caused by fatigue failure of the asphalt surface due to age, traffic loading, and/or unstable road base layers. On City streets, the pavement thickness is generally less than 3" and cracks begin at the bottom of the asphalt and work up to the surface as the pavement flexes under vehicle loading.

Transverse/Block Cracking: A series of interconnected cracks that can separate the pavement into rectangular parts, often evenly spaced. This generally occurs within larger sections and is not isolated in nature. This type of pavement cracking can be caused by aged, brittle asphalt. A pavement that was placed with low oil content, a 'dry' mix, can also cause this deterioration.
These cracks create a conduit for water to enter the base layers below the pavement and expedite the deterioration of the section.

Potholing: Failure of the asphalt layer that causes the asphalt to break out of an isolated area and expose the base layers. This is a product of prolonged failure of both fatigue cracking and alligator cracking. The pavement breaks out when the cracks become so close together that the asphalt become unstable and breaks out in small pieces. Water is able to easily enter the base layers and causes further deterioration of the surrounding area.

Delamination: A failure method of asphalt that exhibits sections of asphalt separating from a lower layer of asphalt. When multiple layers of asphalt are placed on a road they are bonded together with a layer of asphalt oil that effectively 'glues' the layers

together. This bond can break down over time and the top layer begins to break out of the road section.

Aggregate Exposure: Several factors can cause the asphalt oil to separate from the aggregate in a pavement mixture. When the aggregate gets exposed to environmental factors, it becomes susceptible to accelerated aging and deterioration. As this happens, the aggregate loses its bond to the pavement and dislodges, called raveling. Over time the surfaces becomes pitted and rough.

Seam Cracking: This pavement failure is seen in the form of cracking exhibited along the construction joints of the pavement. These joints are weak points in the asphalt and cracks can form along the joints due to several factors. When these cracks form they allow water to access the base layers and cause further damage to the pavement.

Trench Patch Deterioration: Trench patches are introduced in a pavement when the installation or maintenance of utilities require sections of the asphalt to be removed and repaved. The trench patches usually experience settlement from the backfilling of the trenches and poor compaction of the asphalt due to the nature of the work. These patches can settle or exhibit accelerated cracking and delamination from the surrounding pavement.

Rutting and Pavement Unevenness: Rutting and unevenness can be caused by either or both of two factors. One is the failure of the base layers and is usually caused by settlement due to poor compaction or the introduction of water to the base. The other factor is poor performance of the asphalt or mix design of the asphalt. Improper compaction of the asphalt can cause rutting or the wrong mix can cause the asphalt to lose its resistance to rutting. Excessive rutting can be hazardous for vehicles to navigate.

Narrowness of the Street: Several streets are too narrow by today's standards and increased width would help motorists navigate the streets.

Settlement: Pavements exhibiting settlement have locations that are visibly no longer at their original elevations. This is usually evident in areas with curb and gutter and creates improper drainage. This is caused by settling base layers under the asphalt.

Drainage Problems: All of the pavement conditions listed above can cause improper drainage. This is evident when surface water is held within the roadway instead of draining away or into the stormwater system. Retained water infiltrates the base layers of the asphalt and expedites the pavement deterioration. It can also cause hazards for a motorist.

The repair recommendations sare based on the following standard asphalt repair options Microsurfacing, Slurry Seal, Asphalt Concrete Pavement Replacement, Crack Seal, Chip Seal, Cape Seal, Inlay, Overlay, Base Course Depth Check and Refurbish, Full Replacement, No Repairs, and New Asphalt. There is an estimate for the cost associated with each treatment option. This estimate is for the construction cost only and does not include costs for engineering, contingencies, contract administration, or escalation of bid prices.
These columns are discussed below.

Micro Surfacing: This is the application of a mixture of water, asphalt emulsion, cement, fine (stronger than a slurry seal) aggregate, and chemical additives to an existing roadway surface. The chemical additives are generally used to get the mixture to break/set without heat and sunlight. This treatment is used to seal the surface and provide a new driving surface. These are generally used on exiting pavements with low traffic volumes and a fair or good rating with minimal cracking. This treatment is estimated to be $7.00 per square yard.

Slurry Seal: This is the application of a mixture of water, asphalt emulsion, fine aggregate, and chemical additives to an existing roadway surface. The chemical involved is generally a polymer that helps the mix properties. Unlike a microsurfacing application, slurry seals generally need a warm ambient temperature and sunlight to get it to break/set. This treatment is used to seal the surface and provide a new driving surface. These are generally used on exiting pavements with low traffic volumes and a fair or good rating with minimal cracking. This treatment is estimated to be $5.00 per square yard.

Asphalt Concrete Pavement Replacement: When a small and localized section of a road deteriorates to a point that less intrusive rehabilitation techniques can't be used, asphalt concrete pavement replacement can be used. With this method the failed pavement section is removed along with the base/subbase layers if needed. New base layers and asphalt are then replaced. This treatment is estimated to be $130.00 per square yard.

Crack Seal: The application of an asphalt-based sealant to cleaned cracks in the roadway. This sealant helps inhibit water from compromising the base layers below the asphalt surface. This treatment is estimated to be $0.25 per square yard, or $3.00 per foot for a linear measurement.

Chip Seal: Chip sealing is done with a heavy application of emulsified asphalt to which clean, washed aggregate is placed and rolled into place. The excess rock is then removed from the surface. Chip seals are shown to effectively seal fair to poor roads and add some structural integrity to the road. The finished product has a high friction coefficient and is slightly rough to a motorist. This treatment is estimated to cost $5.25 per square yard.

Cape Seal: This is an application of a chip seal followed by a slurry seal. This application is used on a road that is in fair to poor condition and provides a higher degree of sealing and some structural integrity due to the use of a chip seal. The application of the slurry seal over the chip seal serves to smooth the road surface and eliminates the loose rock associated with a chip seal. This treatment is estimated to cost $8.50 per square yard.

Inlay: This treatment involves the use of a pavement mill that removes a prescribed depth of asphalt and then it is repaved. This method has several benefits, among those is the removal of aged pavement and surface damage. In addition, some structural integrity can be added to the pavement and the ride quality increases. This method can be used on poor to fair pavements as is estimated to cost $36.00 per square yard for removal and paving of 2" of asphalt.

Overlay: This treatment can be used if the asphalt is in fair to good condition and involves overlaying a layer of asphalt on top of the existing surface. This increases the structural integrity of the road and is slightly cheaper than an inlay since it eliminates the use of an asphalt grinder. This treatment is estimated to cost $25.00 per square yard for a 2" asphalt overlay.

Base Course Depth Check and Refurbish: This denotes a road that is in poor to fair condition that is showing symptoms of moderate to severe pavement failure due to inadequate base layers. Taking samples of the asphalt and base layers is needed to determine whether an inlay/overlay or full rebuild are the proper solutions. This treatment does not have a cost, it will end up being either a full replacement or and inlay/overlay.

Full Replacement: Road sections with a poor or very poor rating have deteriorated to the point that the above maintenance techniques will not adequately fix the road. In these cases the asphalt and base layers generally need to be removed and replaced with new aggregate and asphalt layers. This treatment is estimated to cost $130.00 per square yard for the removal of material and the placement of 3" of asphalt and 6" of base aggregate.

No Repairs: Several road sections have been recently built or constructed and do not need any maintenance at this time.

New Asphalt: Roads that are currently City owned and are gravel may need to be paved at the discretion of the City. These gravel roads have been shown in the spreadsheet to be paved with new asphalt. Paving a new street is estimated to cost $46.00 per square yard for 3" of asphalt and 6" of base aggregate.

ADA Ramp update: Based on current design criteria for ADA ramps, the cost to replace a deficient ADA ramp is estimated to range from approximately $9,000 to $15,000 per ramp**,** depending on site-specific conditions such as grading, drainage, and utility conflicts.