

**DATE:** February 21, 2022

**TO:** Chair Ramos and Transportation and Mobility Commission members

**CC:** Rebecca Kennedy, Deputy Director, Community Development; Ryan Lopossa, Public Works Streets and Transportation Division Manager

**FROM:** Ryan Miles, PE, Street Operations Program Manager

**RE:** **Pavement Management Program Overview**

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The purpose of this memo is to provide information about the Pavement Management (PM) Program in advance of the Transportation and Mobility Commission meeting on March 1, 2022.

### **Background**

The City of Vancouver has over 1,900 lane miles of paved street. About 30% of the streets are classified as arterials. The other 70% are residential streets. Streets are generally classified as either arterial streets or residential streets. Arterials have higher traffic volumes and speeds, whereas residential streets have lower traffic volume and speeds and generally provide local access. Under the City's current classification system, which is being revisited through the Transportation System Plan (TSP) update process, the primary purpose of arterials is to provide a high degree of vehicular mobility through effective street design and by limiting property access, given that vehicles on arterials are often through traffic. Under the current system, generally the higher the classification of a street (Principal Arterial being the highest), the greater the volumes, through movements, length of trips and fewer access points. Arterials in the City of Vancouver are further divided into the three classes and are described as follows:

- Principal Arterials have higher levels of local land access controls, with limited driveway access, and regional significance as major vehicular travel routes that connect between cities within a metropolitan area. Examples: Andresen Road and Mill Plain Blvd.
- Minor Arterials are generally designed to provide a high degree of intra-community connections and are less significant from a perspective of a regional mobility. Examples: Macarthur Blvd. and McGillivray Blvd.
- Collector Arterials assemble traffic from the interior of an area/community and deliver it to the closest Minor or Principal Arterials. Collector Arterials provide for both mobility and access to

property and are designed to fulfill both functions. Examples: NW Lincoln Avenue (between NW 39<sup>th</sup> Street and NW Bernie Drive) and Cascade Park Drive.

All streets other than arterials are generally designated as non-arterial (residential) streets, which provide local access. As noted above the City will be updating its street classification system through the TSP process, to focus on greater mobility for all users on all types of streets, and an emphasis on person throughput and access rather than vehicular access, which our current classification system prioritizes.

The primary goal of the City of Vancouver Pavement Management (PM) Program based on current funding is to extend the life of the existing pavement over the entire network for as long as possible, and to maintain the overall network condition with a gradual improvement each year. This is based on the City's Street Funding Strategy (SFS) guiding principles and outcomes related to the PM Program and the City's Capital Planning and Asset Management (CPAM) Policies #33-37:

- “Take care of what we have” – SFS Guiding Principle
- Over a 20-year period, improve pavement conditions overall from Fair to Good – SFS Outcomes
- In pursuit of an asset management strategy that prioritizes safety, equity and climate action, the City will (CPAM Policy #33):
  - Consider the climate impacts of asset investments and pursue asset management strategies that reduce its contribution to climate change over time.
  - Consider equity impacts of capital projects and asset management strategies and prioritize investments that improve equity within the City.
  - Consider the potential improvements to community safety associated with capital investments and prioritize investments that improve community safety, particularly in the transportation system.
- The City's Complete Street ordinance requires roadway investments to provide a safe, accessible street system that serves all users, ages and abilities, regardless of mode of travel.

Since 2016 and the addition of Street Funding Strategy investments, the overall Pavement Condition Index (PCI) for the city has increased from 70 to 73. The percentage of streets that are in good condition or better has increased by about 4%.

### **Overview of the City's Pavement Management (PM) Program**

The PM Program consists of five engineering technicians and inspectors as well as a licensed civil engineer. The department is supported by engineering consultants and many other city staff. Other city staff include public outreach, transportation planners, street operations and maintenance, construction engineers, and construction inspectors.

The primary tasks performed by PM Include:

- Monitoring pavement condition.
- Selecting streets for street preservation and paving projects.
- Coordinating projects with Transportation Planning to design and implement complete streets.
- Inventorying curb ramps that need to be upgraded for ADA Compliance.
- Preparing plans and specifications for streetwork and curb ramp projects.

- Coordinating pavement restoration with City utilities, private utilities, and development projects.

### *Pavement Condition Monitoring*

We monitor the condition of the streets by performing a pavement condition assessment of half the city streets each year. The condition of all the streets is assessed every two years. This assessment is performed by visually inspecting every street for defects such as cracks, patches, weathering, rutting, and potholes. The assessment provides a pavement condition index (PCI) that ranges from 0 to 100 with 0 being a completely failed street, and 100 being a brand-new street without defects.

### *Preservation Treatment Types*

The purpose of pavement preservation treatments is to slow down pavement degradation. Some of the primary causes of degradation include water intrusion through cracks and traffic loads. Sun exposure and oxidation also make the pavement brittle, which results in more cracking and water intrusion. Preservation treatments are thin and are applied to the surface of the pavement to help seal the surface. They are very effective at preserving pavement that is still in fair to good condition. However, since they are thin, they are not effective on a pavement that has too much degradation and cracking. Streets that are in poor condition generally must be resurfaced or rehabilitated with conventional hot mix asphalt to improve their condition.

The primary preservation treatments we use include crack sealing, slurry sealing, microsurfacing, asphalt rubber chip sealing, and cape sealing. Each of these treatments is described below:

Crack sealing is one of the most cost-effective method for preserving streets by sealing cracks. Crack sealant consists of polymer modified asphalt and is applied in a molten state to penetrate cracks, and then hardens after it cools down. Each street that gets one of the preservation treatments will be crack sealed before the preservation treatment is applied.

Slurry Seals consist of a mixture of asphalt emulsion and sand and are approximately a quarter inch thick. We typically use this treatment on residential streets that are still in good condition, and apply it on streets in the PCI range of 70 to 80. If there are nearby streets outside that range, we'll add those streets as well so that we can complete entire neighborhoods, which efficiently utilizes limited funding by reducing construction costs and allowing for efficient public outreach processes. This product goes down wet during construction and takes several hours to set up before cars can drive on it.

Micro-surfacing- consists of a mixture of polymer modified asphalt emulsion with additives and sand. The polymers make the treatment more durable than slurry and the additives can help the treatment set up much faster than slurry, so that streets can be opened to traffic sooner after application. This treatment can either be applied with one fourth or three eighths inch aggregate. The three eighths inch aggregate makes a more durable treatment than the one fourth inch aggregate, so it is used on streets with higher traffic volumes. As with the slurry seal, we typically use it on arterials that are still in good condition, with a PCI in the range of 70 to 80. If there are nearby streets outside that range, we typically add these to complete full neighborhoods, which efficiently utilizes limited funding by reducing construction costs and allowing for efficient public outreach processes.

Asphalt Rubberized (AR) Chip Seals consist of melted tire rubber/asphalt and three eighths inch rock chips. Note that the other preservation treatments use emulsified asphalt for the

binder whereas this treatment uses melted tire rubber and asphalt for the binder, which is heated to over 400 degrees Fahrenheit. The construction process consists of first spreading the melted tire rubber/asphalt over the street with a distributor truck. This is followed by chip spreaders that spread the chips over the molten rubber/asphalt. This is then followed by rollers that roll the chips into the molten rubber/asphalt. The chips are locked into place after the molten tire rubber/asphalt cools down. The street is then swept with street sweepers to remove loose chips. After sweeping, a fog seal is applied, which further helps lock in the chip. Fog seal is emulsified asphalt that has been diluted with water. AR chip sealing is very different than a traditional chip seal process, which uses emulsified asphalt. Because of the process and the way chips are locked into the asphalt, there is far less chip loss than with traditional chip sealing. We typically use this method on arterials that have a PCI in the range of 55 to 80.

Cape Seals are a combination of an AR Chip Seal with a slurry seal or a micro-surfacing treatment placed over it to help smooth out the surface, and is approximately a half inch thick. We typically use it on residential and collector arterial streets with PCI ranging from 50 to 70.

### *Program Budget*

The pavement management budget is approved at an amount designed to maintain the entire network condition over time based on modeling projections run through our pavement management system as well as following best pavement practices. Reductions to the modeled amounts to maintain the system will result in a decrease in pavement condition over time and an increase in deferred maintenance and added costs for treating streets that have a worsened condition.

There are two main components of pavement management funding comprised of City General Fund dollars and Street Funding Strategy (SFS) investments. The General Fund component is outlined in City Financial & Asset Management Policy #35, which sets a base amount of pavement investment and allows for adjustments due to system increases and inflation. The SFS amounts were added starting in 2016 with the annual amount developed and set to an amount that would make up the difference between the General Fund component and the amount needed to maintain the network condition over time.

For 2022, the combined amounts of both sources of funding for the pavement management program is approximately \$12.3M with approximately \$10M allocated for construction contracts and the rest going to construction inspection, design, consultant help, street operations and traffic signal crews doing prep work for contracts, and other aspects of managing and running the program.

### *Program Street Selection*

We use a best-first approach for selecting streets for treatments, which is in accordance with pavement best practices. This approach maximizes the available funding to extend the service life of the entire system. When selecting streets for annual pavement projects, the PM program looks at several criteria:

- Pavement Condition Index (PCI) and type of defects on each street
- Balance Preservation with Resurfacing
- Keep streets in good condition
- Keep streets from needing a more expensive pavement treatment in the future
- Priority on arterial streets but don't neglect residential streets

- Length of time since last street work completed
- Group streets together with similar treatments
- Spread work throughout the entire City
- Needed ADA curb ramp upgrades
- Consider equity impacts when having to decide between similar streets

Once the preliminary street selection is done, the PM program coordinates with Transportation Planning, other city departments, other agencies, and private utilities for input related to conflicts and partnering opportunities. Revisions are then made to the preliminary street lists to get a final project list for the year based on this input and any needed adjustments to meet the annual budget.

When we do streetwork, it is an opportunity to make changes and improvements to roadway striping as well as adding traffic calming elements or other changes that help improve safety and mobility as well as implement our Complete Streets ordinance, which requires roadway investments to be safe for all users regardless of age, ability, or mode of travel, and NTSA projects. On many projects, we change striping to achieve enhanced traffic flow, and add new or improve existing bike lanes, including adding protected facilities. The program has also reconstructed and replaced many worn out traffic calming devices, like speed bumps, and have installed new speed cushions and traffic tables.

In this biennium (2021-2022), the Council has identified four street segments that will be evaluated for updated striping, traffic calming and other treatments that will enhance their safety for all users and create Complete Streets. These planning projects are being done in advance of future paving work, which allows us to leverage resources to improve pavement condition and mobility and safety, as noted above. These projects were reviewed by the Commission at several previous meetings meeting and will be part of its ongoing work program over the next 12 months, and include the following:

- Fourth Plain Blvd. between Main Street and Andresen Rd.
- Fort Vancouver Way between Mill Plain Blvd. and Fourth Plain Blvd.
- SE 34<sup>th</sup> Street between 164<sup>th</sup> and 192<sup>nd</sup>
- NE 112<sup>th</sup> Avenue between Mill Plain and Fourth Plain/City limits

In addition, through subsequent Council endorsement of a chartering process for these Complete Streets planning projects, another project was added that will start planning work in this biennium, and will continue into the next one:

- SE McGillivray Blvd: Chkalov Dr. to SE 164<sup>th</sup> Ave.

## **2022 Pavement Management Program**

The 2022 pavement program is set and well underway with all projects either being in construction, out to bid, or finalizing design. There are 9 separate contracts (3 curb ramp projects, 3 resurfacing projects, and 3 preservation projects), that are being managed by the program to complete work on all of the programmed streets.

The 2022 program consists of the following:

- 9 contracts totaling approximately \$11.0M

- 215 new or upgraded ADA curb ramps
- 89 lane miles of preservation
- 19.4 lane miles of resurfacing
- 80 lane miles of street Crack sealing and mastic repairs
- 23 city neighborhoods will receive some work through the above activities

The 2022 program will also implement the Countryside Woods Neighborhood Traffic Calming Program project along NE 155<sup>th</sup> Avenue as well as speed tables along SE Evergreen Highway to complete the section out to SE 164<sup>th</sup> Ave. Originally, the Council supported SE 34<sup>th</sup> Street Complete Street project was going to be implemented with the 2022 program. However, this was delayed to 2023 to allow more time to get through the planning process and subsequent design. In addition, several streets/corridors are being evaluated for minor striping changes to improve safety and mobility. These include SE 176<sup>th</sup> Avenue, SE 15<sup>th</sup> Street, SE 20<sup>th</sup> Street, NE 162<sup>nd</sup> Avenue, and SE 192<sup>nd</sup> Avenue.

### **2023 & 2024 Preliminary Pavement Management Program**

The 2023 and 2024 preliminary street lists have been developed. Coordination with Planning and other departments has already begun, and design on the 2023 project will begin, starting with the curb ramp projects, once all of this year's projects are out to construction. The streets will likely change slightly based on timing of coordinated efforts and projects, feedback from the Transportation and Mobility Commission, future construction costs, and aligning the projects with the approved 2023-2024 biennial budget, which will happen later this year.

#### 2023 Preliminary Pavement Management Program

There are several Complete Streets corridors that Council endorsed as part of the 2021-2022 budget process that will be implemented in 2023 with the pavement program. Planning is already underway for these streets, which include:

- 4<sup>th</sup> Plain Blvd: Main St. to Ft. Vancouver Way
- Ft. Vancouver Way: Mill Plain Blvd. to 4<sup>th</sup> Plain Blvd.
- McLoughlin Blvd: F St. to Brandt Rd.
- SE 34<sup>th</sup> Street: SE 164<sup>th</sup> Ave. to SE 192<sup>nd</sup> Ave.

Streets where there will be an opportunity to consider making minor adjustments to existing striping to improve the safety and mobility for all users include:

- Main Street: W 39<sup>th</sup> St. to Highway 99, in alignment with planning work that C-TRAN will undertake for their forthcoming Highway 99 Bus Rapid Transit project
- Kauffman: 4<sup>th</sup> Plain Blvd. to W 39<sup>th</sup> St.
- E 29<sup>th</sup> Street: I-5 to St. Johns Blvd.
- Ross/NE 54<sup>th</sup> Street: Hwy 99 to St. James Blvd.
- NE 49<sup>th</sup> Street: NE 15<sup>th</sup> Ave. to St. James Blvd. (Identified through the City's Neighborhood Traffic Calming Program)
- NE 104<sup>th</sup> Avenue: Mill Plain to NE 14<sup>th</sup> Street

#### 2024 Preliminary Pavement Management Program

There are several Complete Streets corridors that Council endorsed as part of the 2021-2022 budget process and the subsequent Complete Streets chartering process that will be implemented in 2023 with the pavement program. Planning is already underway for these streets, which include:

- 4<sup>th</sup> Plain Blvd: Ft. Vancouver Way to Andresen Road
- NE 112<sup>th</sup> Avenue: Mill Plain Blvd. to 4<sup>th</sup> Plain Blvd.
- SE McGillvray Blvd: Chkalov Dr. to SE 164<sup>th</sup> Ave.

Streets where there will be an opportunity to consider making minor adjustments to existing striping to improve the safety and mobility of all users will include, but not limited to:

- NE 9<sup>th</sup> Street: NE 112<sup>th</sup> Ave. to NE 125<sup>th</sup> Ave.
- NE 136<sup>th</sup> Avenue: SE 4<sup>th</sup> St. to NE 18<sup>th</sup> St.

### **Pavement Programs in Future Years**

As the program moves into future years beyond the current 3-year implementation and planning cycle, there will be continued coordination with the Transportation Mobility Commission (TMC) annually. This will allow the opportunity for the TMC to provide input and feedback on proposed street lists before they get to the design phase, which will allow time to consider minor adjustments to existing streets for safety and mobility improvements as part of the pavement program. The pavement program will also be able to integrate recommendations from the updated Transportation System Plan once it is complete. In addition, the TMC will have the opportunity to discuss future Complete Streets projects that are endorsed by Council as part of future budget cycles and can be implemented with the pavement program.

### **Conclusion**

The Pavement Management Program was established several years ago to keep the City's entire network of streets in the best condition that the available funds will allow. Every year we preserve streets that are ready for a preservation treatment and rehabilitate/repave as many streets as possible with the remaining funds. We can't pave all the streets that need paving in a single year, but by following this strategy we are maintaining and incrementally improving the condition and safety for the City's overall street network over time. The Pavement Management Program is also the primary program within the City that constructs and upgrades curb ramps to current ADA standards, and supports implementation of Complete Streets projects and Neighborhood Traffic Calming Projects, and supports broad improvements to safety and mobility for users of all ages and abilities, regardless of how they choose to travel.