Main Street Unionville Streetscape Master Plan

Council Meeting
March 8, 2022

Agenda

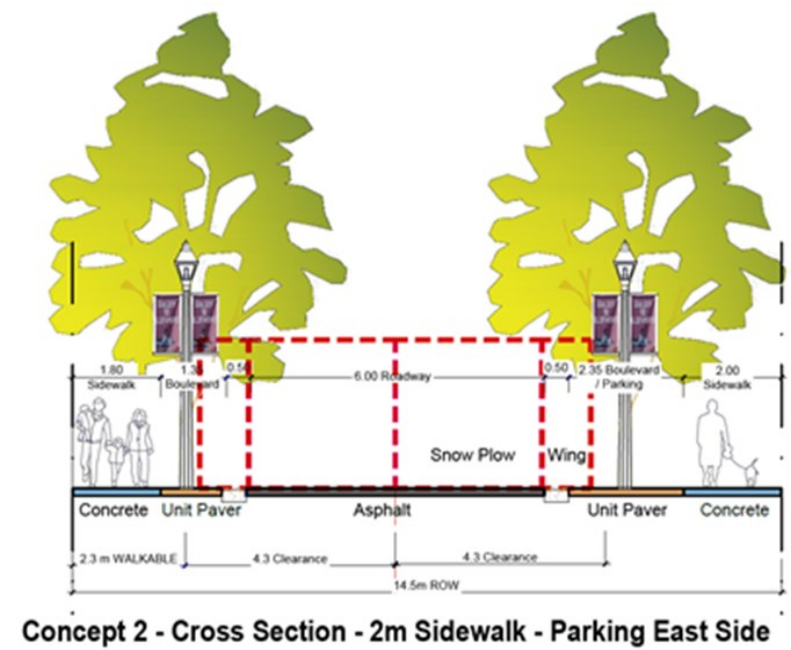
- Streetscape Enhancement Option 3A
- Brick Pavers Maintenance and Repairs
- Long Term Life Cycle Costs
- Paver Design
- Similar Type of Projects
- Queens Quay and Main Street Markham Issues

Background

- At the February 22, 2022 Development Services Committee meeting, staff presented to the report titled: "Main Street Unionville Commercial Core Streetscape Master Plan Study (2021)",
- The Development Services Committee recommended that Council endorse the streetscape enhancement Option 3A for the Main Street Unionville Reconstruction Project; and,
- That staff report back at the March 8, 2022, Council meeting with more technical information on;
  - Option 3A;
  - Why the Queen Quay and Main Street Markham installations of brick pavers failed;
  - The maintenance of pavers versus asphalt and how it effects the lifecycle;
  - On the implications of having the pavers cut in a circular pattern; and
  - The rationale for having a concrete pad underneath the pavers

Streetscape Enhancement Option 3A

Brick Pavers on Road, Sidewalks and Boulevards



Concept 2 - Cross Section - 2m Sidewalk - Parking East Side

Brick Pavers Maintenance and Repairs

Winter Maintenance

- Specialized snow clearing equipment with shoes or high-density plastic blades will reduce scraping of brick finish.

- Winter salting practices;
  - The use of common rock salt (sodium chloride) as a de-icer is a widespread practice on paver installations. However excessive use of de-icing salts over a long period could cause damage to the pavers;
  - The effectiveness of the salt on melting snow is more effective on asphalt, as the darker asphalt will have greater heat absorption from the sun, increasing snow melt. (-12^{o}C vs -7^{o}C)

- Specialized Sweeper Brooms for street and sidewalk sweepers to remove excess salt and brine.

Brick Pavers Maintenance & Repairs

Utility Repairs

- The ability to repair underground utilities without causing irreparable damage to the pavement surface is a major advantage of brick pavers.
- Utility cut repairs must be restored properly with the reinstatement of the paver concrete base otherwise differential settlement will occur.

Pavers cut in a circular pattern:

- The integrity of most concrete pavers is not compromised when cut. Typically the concern around placing concrete pavers around structures in the ground is the adequacy of the compaction effort around the structure. Added effort and smaller equipment is required to ensure that these areas close to obstructions

Durability and Pavement Strength

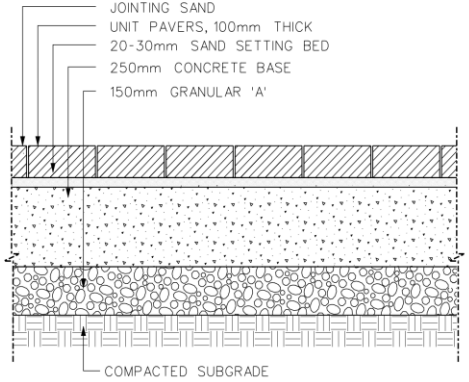
- Pavers are more durable material than asphalt.
- Surface asphalt is typically replaced in 15-20 years through a "shave and pave" which gives the asphalt added life before complete replacement in a 40-50 years cycle.

Maintenance & Repair Costs

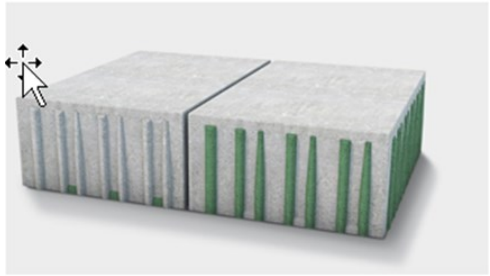
Operations and Maintenance Activities	Capital Cost	Estimated Annual Cost
Rehabilitation and Repair (includes the replacement of damaged and degraded unit pavers as well as any settlements)		$120,000
Special Snow Plow Blade with High-Density Cutting Edges	$7,500 over 1yr Lifecycle	$7,500
Increased Winter Snow Clearing Operations (includes specialized equipment for dedicated route)	$315,600 over 10yr Lifecycle	$31,560
Increased Winter Sidewalk Operation (includes specialized equipment for dedicated route)	$172,400 over 7yr Lifecycle	
Equipment Operator for dedicated route		$14,000
Specialized Street & Sidewalk Sweeper Brooms	$26,000 over 5yr Lifecycle	$5,200
Total		**$202,890**

Paver Design

- **Concrete base:** allowing for the loads imparted to be spread over a greater area of the supporting granular material reducing the likelihood of deformation/settlement of area being loaded;
- **Proper drainage:** improper/poor drainage May cause the ejection of the joint and base material through the joints under passing loads resulting in settlements;
- **Specific Joint Sand material:** to minimize movement in freeze thaw conditions as well as maintenance activities;
- **Paver Type:** new 2021 heavy duty brick pavers, with integrated protection against shifting. The jointing technology developed especially for surfaces with heavy traffic volumes and high loads
- **Pattern layout of pavers**: Herring bone



New For 2021 Load Lock



Similar Type of Projects

City of London, ON (Dundas St.)

- $16 Million dollar project to complete London's first "Flex Street" (opened at the end of 2019)
- Features: pavers in roadway encourage lower speeds, extra-wide sidewalks, no curbs. Textured pavers guide people with visual impairments.
- Objective: "A flex street is seamless space that allows for more pedestrian priority and for the area to be closed off for events."
- The design utilized a concrete base across the entire right-of-way width. The warranty period has recently lapsed with no issues to date in regard to the maintenance of the pavers.

Similar Type of Projects

City of North Bay (Main Street)

- A case study prepared by Interlocking Concrete Pavement Institute was completed 20 years after the original installation noted:
  - Little or no deformations or rutting in wheel paths.
  - Little to know degradation of the concrete pavers (less than 1%)
  - 4% of the pavement surveyed had depressions concentrated in an area that had been reinstated after utility repairs.
- City of North Bay is in the process of replacing their interlocking brick that was placed in the 80's on a granular base.
- Even though the City's Main Street has been a successful installation we have been advised of sidewalk concrete paver installation across the City that have prematurely failed due to salt corrosion.

Similar Type of Projects

City of Toronto (Yorkville Avenue)

- Streetscape and road rehabilitation project to the revitalization of the streetscape environment from Bay St to Avenue Road (constructed in 2015)
- Features: pavers in roadway encouraging lower speeds and modified concrete curbs.
- The design utilized a concrete base across the entire right-of-way width.

Queens Quay- City of Toronto

Queens Quay- Blvd Failures

- Streetscape and road rehabilitation project to the revitalization Queens Quay was completed by Waterfront Toronto in 201.)
- The design utilized a concrete base within the blvd of the public right-of-way width.
- Waterfront Toronto recommended the installation of a concrete base on private property, however, some locations may not have agreed to installation of a concrete base resulting in differential settlement.

Main Street Markham - City of Markham

Main St Markham – Road Failures

The major contributor to the failure was the type of bedding layer used between the concrete brick paver and the concrete base. It was determined that:

- the bedding layer used was a soft aggregate and was not suitable for this type of application;
- the thickness of the concrete brick paver (7cm vs 8cm);
- laying pattern;
- lack of edge restraint to hold the concrete brick pavers in place; and
- joint width (spacing) of pavers

Questions ?