Challenges in Utility Coordination and Implementation of Pavement Degradation Fees

7th Annual Western Canada Pavement Workshop – Edmonton, Alberta
February 9th, 2016

Mohammad Karim, M.A.Sc., P. Eng.
Senior Engineer, Materials & Research, Construction, Roads, City of Calgary
Acknowledgments

• Co-Authors from CTAA and TAC 2014
• Co-Authors from TAC 2015
Outline

- Background
- Key Drivers
- Engineering Study
- Fee Structure
- Implementation
- Concluding Remarks
Background

• 16,000 lane-km of paved roadways in The City

• Pavements when built new act as one uniform structure

• A number of factors contribute to the rate of deterioration
  • Inconsistency in the pavement
  • Pavement Structure
  • Lack of integrity
  • Construction issues
Background

- Substantial effort & investment to maintain the roads
  - Annual pavement rehab budget $25 M

- Right of way utilities and diverse ownership
  - Water and Sewer (internal stakeholder)
  - ENMAX, ATCO (deep utilities), Telus and Shaw (shallow)

- Utility cuts impact
  - The backlog
  - Road users
Corporate push for densification – re-zoning, infills and reconstruction

User complaints (311 Service Requests)
- Traffic delays, safety, claims

Uncertainty in predictive maintenance planning
- Increased maintenance & rehab expenses

Need for a fair cost recovery from the utility “road cuts”
- Utilities recover their investment from users but cuts affect long-term performance
Impacted Infrastructure

- In 2015, $7 M spent on pavement rehabilitation in a single community
- 1/3rd of budget utilized to improve Pavement Quality Index (PQI) from 5.0 to 7.5
- Rezoned and featured a high density of utility cuts

Road with utility cuts

Same age road without utility cuts

About three cuts/infill
Comprehensive Engineering Study
Engineering Study

Study analyzed the impact of utility cuts

- Ride Quality
- Structural Integrity
- Surface condition
- Age of pavements & roadway classification

Study Findings

- Utility cuts impact the quality of the pavement
- About **22% reduction** in pavement life
- Degree of impact is usually identical and largely indifferent of the age and road classification
- Pavement ride quality and/or structural reliability is affected
Study proposed fees

- Meant to recover the cost of long term damage to the pavement
- Applies to all cuts

\[
Area = (\text{Length} + 2m) \times (\text{Width} + 2m)
\]

Total Cost = PDF ($/m^2) \times Area

<table>
<thead>
<tr>
<th>Road Classification</th>
<th>Road Age at Time of Utility Cut (Years)</th>
<th>Pavement Degradation Fee ($/m^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial</td>
<td>0-5</td>
<td>$57</td>
</tr>
<tr>
<td></td>
<td>5-10</td>
<td>$52</td>
</tr>
<tr>
<td></td>
<td>10-20</td>
<td>$47</td>
</tr>
<tr>
<td></td>
<td>20-30</td>
<td>$38</td>
</tr>
<tr>
<td></td>
<td>30-70</td>
<td>$29</td>
</tr>
<tr>
<td>Collector</td>
<td>0-5</td>
<td>$51</td>
</tr>
<tr>
<td></td>
<td>5-10</td>
<td>$47</td>
</tr>
<tr>
<td></td>
<td>10-20</td>
<td>$42</td>
</tr>
<tr>
<td></td>
<td>20-30</td>
<td>$34</td>
</tr>
<tr>
<td></td>
<td>30-70</td>
<td>$26</td>
</tr>
<tr>
<td>Local</td>
<td>0-5</td>
<td>$46</td>
</tr>
<tr>
<td></td>
<td>5-10</td>
<td>$42</td>
</tr>
<tr>
<td></td>
<td>10-20</td>
<td>$38</td>
</tr>
<tr>
<td></td>
<td>20-30</td>
<td>$30</td>
</tr>
<tr>
<td></td>
<td>30-70</td>
<td>$23</td>
</tr>
</tbody>
</table>
City’s Decision

- Introduce **pavement degradation fee** as per Streets Bylaw 20M88
  - Applies to all stakeholders & all roads

- Enforce **surface restoration fee**, historically existed in Specifications
  - Applies to all stakeholders
  - Roads with Visual Condition Index (VCI) ≥ 7.0

- Restricted permits on **roads less than 2 years old** (emergency work)

- Streamline the permit process and recover the cost of repairing the long term damage caused by utility cuts

- Enhance coordination with internal and external stakeholders
Implementation

Stakeholder engagement plan

Planning
Internal utilities and Permit office

Consultation with utility partners

Coordination with Capital Works Coordination Committee (Major Projects – Enmax, Atco, Water/Sewer, Internal units)

Developers and Indemnified Contractors

Fee structure, permit process, enforcement

Permit office is equipped for implementation

Publish online & notify all stakeholders of agreed fees and process
Stakeholder Engagement

- Deliberations through the Capital Works Coordination Committee (CWC)

<table>
<thead>
<tr>
<th>Exchange</th>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Project Schedules</td>
<td>Annually in January</td>
<td>Project information and timelines are entered in a template by all stakeholders (internal and external). Conflicts are coordinated with Project Managers, plans realigned, if necessary.</td>
</tr>
<tr>
<td>GIS Information</td>
<td>Updated Quarterly</td>
<td>PDF map published on Calgary.ca</td>
</tr>
<tr>
<td>Monthly Project Status Meetings</td>
<td>Monthly</td>
<td>Status updates. Potential conflicts are discussed</td>
</tr>
<tr>
<td>Multi Year Program List</td>
<td>Annually in January</td>
<td>Paving program, water, sanitary, gas line replacement programs and other similar programs that have 3 - 5 year program lists are shared to assist in project scheduling</td>
</tr>
<tr>
<td>Internal Stakeholders</td>
<td>Paving, Water, Sanitary, Local Improvements, Development &amp; Planning, Traffic, Water, Sewer, Transportation Infrastructure, Transportation Planning, Bike Planning, Permits, Liveable Streets</td>
<td></td>
</tr>
<tr>
<td>External Stakeholders</td>
<td>Electricity, Gas, Telecommunications</td>
<td></td>
</tr>
</tbody>
</table>
Indemnified contractors and developers – agreed with findings and intent to recover the cost

They preferred flat rate fees for ease of estimating

City analyzed – proposed a flat rate fees for Pavement Degradation and Surface Restoration for cuts less than <100 m²

<table>
<thead>
<tr>
<th>Fee Type</th>
<th>Roadway Classification</th>
<th>Utility Cut &lt; 100 m²</th>
<th>Utility Cut &gt; 100 m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement Degradation</td>
<td>Arterial</td>
<td>$1,900</td>
<td>$49/m²</td>
</tr>
<tr>
<td></td>
<td>Collector</td>
<td>$1,900</td>
<td>$44/m²</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>$1,900</td>
<td>$40/m²</td>
</tr>
<tr>
<td>Surface Restoration (Roads with VCI ≥7)</td>
<td>Arterial</td>
<td>$5,800</td>
<td>$49/m²</td>
</tr>
<tr>
<td></td>
<td>Collector</td>
<td>$4,800</td>
<td>$49/m²</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>$3,800</td>
<td></td>
</tr>
</tbody>
</table>
Applicable Fees

- Both PDF and SRF implemented on Jan 1, 2015
- Expected to generate $2 M revenue in 2015 from pavement degradation fees

- Excavation Permit Fees (Online, In-person)
  - PLUS

- All Excavations (I) Degradation Fees
- Visual Condition of Pavement
  - VCI ≥ 7
  - (I) + Restoration Fees (II)
- Pavements < 2 Years Old
  - Director’s approval required.
  - If approved, (I) & (II) are applicable
Pavement Degradation Fee

- Drawings showing the impact should accompany permit application
- Flat rate degradation and restoration fee for excavation <100 m²
- Excavations >100 m² is based on proposed excavation plans
- 1 m zone of influence (z) on all sides of cut
Surface Restoration

Collector/Arterial Road - Area >100 m²

Example

Centerline

Sidewalk

Mill 50 mm & Paver laid Asphalt

Sidewalk

1 m

1 m
Surface Restoration

Collector/Arterial Road – Area >100 m²

Example

Sidewalk

Mill 50 mm & Paver laid asphalt

Centerline

Sidewalk
Concluding Remarks

- The proceeds are earmarked for road repairs (and not funneled into general revenues)
  - Pavement Degradation Fees become part of pavement rehab budget
  - Surface Restoration Funds are mobilized to repair specific locations after one freeze thaw cycle
- Once work is completed, Permit office will verify the area and adjust the fees as required
- Balance developments and maintain existing infrastructure at acceptable levels
- Encourage better coordination between stakeholders and use alternative methods (trenchless) to realize cost savings
Moving Forward

- Enhancements to the e-Permits process – online permits, drawings using e-Maps
- Sharing multi-year program information
- Live updates on projects through e-Maps (Project start and end dates, PM’s name etc.)
- Business process review to streamline the process
- Periodic review of fee structure and monitor the effectiveness of implementation
- Measurements, evaluations and continuous learning – need for additional permit coordinators and inspectors
Moving Forward
Thank You