

## **COMMITTEE OF THE WHOLE – SEPTEMBER 13, 2011**

### **PAVEMENT MANAGEMENT PROGRAM UPDATE (2012 AND 2013)**

(Deferred)

Council, at its meeting of June 28, 2011, adopted the following (Item 3, Report No. 35):

That consideration of this matter be deferred to the Committee of the Whole meeting of September 13, 2011.

Committee of the Whole (Working Session) recommendation of June 21, 2011:

That consideration of this matter be deferred to the Committee of the Whole meeting of September 13, 2011.

Report of the Commissioner of Engineering and Public Works, dated June 21, 2011

### **Recommendation**

The Commissioner of Engineering and Public Works recommends:

1. That the Update to the Pavement Management Program for 2012 and 2013 be approved, in principle; and;
2. That the proposed projects be brought forward for submission as part of the 2012 and 2013 Budgets.

### **Contribution to Sustainability**

Council at its meeting of April 2, 2007 (Item 1, Report No. 14, of the Committee of the Whole (Working Session), which can be found in Attachment 3) adopted without amendment a report outlining the City's proposed 5 Year Pavement Management Program for the years 2007 to 2011, which identified a number of activities to maintain, preserve, rehabilitate and replace the City's road infrastructure. The works identified will ensure that an acceptable level of service by the City's infrastructure is maintained for the health and well being of its citizens.

Analysis of current funding levels for the Pavement Management Program illustrate that the existing road network is projected to approach the minimum level of service threshold, Pavement Composite Index (PCI) of 70 out of 100 (possible points), by 2030. This does not account for any new roads that are assumed by the City that may impact service level projections.

### **Economic Impact**

The 2 Year Update to the Pavement Management Program (PMP) will require an investment of \$18,320,615 (excluding interest). This funding level is consistent with previous funding levels for the PMP of approximately \$9M per year. Capital Funding is provided through the issuance of debentures while maintenance related costs are funded through the Operating Budget. The issuance of the long term debt will have an estimated interest cost of \$5,496,185 when the projects are complete.

The requirement per annum is broken down as follows:

Year	Long Term Debenture (LTD) Amount	LTD Annual Principal & Interest On Issue	Annual Impact of Tax Rate (1%=1,410,074)	Cumulative Operating Budget Impact
2012	\$9,075,390	\$1,164,320	0.83 %	0.83%
2013	\$9,245,225	\$1,186,110	0.84 %	1.67%
<b>Total</b>	<b>\$18,320,615</b>	<b>\$2,350,430</b>		

The cumulative annual impact after year 2 of the update to the PMP, to the operating budget, as a result of issuing debentures in the amount of \$18,320,615, is \$2,350,430 or 1.67% on the tax rate. The payments will continue over the term of the debentures which typically has been 10 years.

The Long Term optimization of resources can be achieved through City initiatives such as the asset management strategies incorporated into the Pavement Management System. Modeling these figures within the Long Range Financial Planning Model so that future funding implications are known and can be planned for at the earliest possible time will allow for budgetary and/or program changes to be considered accordingly.

### **Communications Plan**

Implementation of individual projects would be subject to the Engineering Services Department standard communication protocol. All affected residents will be notified during the pre-engineering, detailed design and construction phases of all projects.

### **Purpose**

The purpose of this report is to obtain Council approval, in principle, for the update to the Pavement Management Program for the years 2012 and 2013.

### **Background - Analysis and Options**

On April 2, 2007, Council approved the Pavement Management Program for the years 2007 to 2011. The philosophy behind this new pavement management strategy was a departure from the traditional roads program methodology implemented previously. Prior to 2007, these programs (Road Resurfacing, Road Reconstruction and Rural Road Upgrading) were prepared on a 'worst first' basis and road sections were evaluated utilizing factors such as traffic volumes and condition rating of the road facility. Consideration was also given to other factors such as roads in the same vicinity that are also deficient and that were constructed in the same era.

The PMP established a level of service for the entire road network, that would be measured using a Pavement Composite Index. An overall average PCI of 70 out of 100 possible points would be maintained. A prioritized listing of roads was developed for preventative maintenance, pavement preservation, road rehabilitation and reconstruction to meet this objective. The first 4 years of this program has been successfully delivered and the final year will be completed before the end of the 2011 construction season.

The Pavement Management Program is a planned system of treating pavements at the optimum time to maximize their useful life, resulting in enhanced pavement longevity at a minimized cost. Typically, a pavement will perform well until a certain point in their life span, at which time it deteriorates rapidly to failure. Treating a pavement prior to this point (early in its life cycle) eliminates or delays spending 10 to 20 times the cost on future, more extensive rehabilitation or reconstruction. The PMP is subdivided into four main categories; Preventative Maintenance, Preservation, Rehabilitation and Replacement.

### Preventative Maintenance

Preventive maintenance is a culmination of activities undertaken to provide and maintain serviceable roads which may include some minor rehabilitation projects. It excludes pavements requiring major rehabilitation or reconstruction. The American Association of State Highway and Transportation Officials (AASHTO) has defined preventive maintenance as, "a planned strategy of cost effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without substantially increasing structural capacity)." The treatment methods currently utilized for pavement preservation are crack sealing and drainage treatments. The Preventative Maintenance activities are delivered by the Public Works Department.

### Preservation

Pavement Preservation utilizes timely and appropriate treatments that will have the cumulative effect of postponing costly rehabilitation, preventing the need for reconstruction, and improving overall pavement conditions. Timely preservation results in improved safety and mobility, and smoother, longer lasting pavements.

Experience shows that spending \$1 on pavement preservation eliminates or delays spending \$6 to \$10 dollars on future rehabilitation or reconstruction costs. Pavement preservation can result in a pavement receiving a treatment even when there is nothing apparently wrong with it. Micro surfacing is the preferred method utilized for pavement preservation.

Micro surfacing projects were carried out in 2009, and the product met the required performance expectations. However, as a result of aesthetic concerns identified, staff was directed to carry out a full review of the micro surfacing process. In 2010, the mix design was modified to improve the aesthetic characteristics of the treatment. The modifications resulted in improved aesthetic characteristics, however, the product did not meet other performance expectations.

### Rehabilitation

Road rehabilitation is the partial or full removal of existing asphalt and the installation of new hot mix asphalt. It is important to note that the existing granular base remains untouched in rehabilitation projects. Experience shows that spending \$1 on rehabilitation at the ideal time in a pavement's life cycle will delay spending \$4 to \$5 dollars on future reconstruction costs. As a result, the majority of the proposed PMP (on a cost basis) utilizes this treatment method.

During the preliminary engineering stage of these projects, any surface and sub-base drainage deficiencies are identified, reviewed corrected. In addition, the structural integrity of the existing curb is assessed using the curb removal policy, and the quantity of curb removal is calculated. The treatments utilized for rehabilitation are mill and overlay, or removal and replacement of the existing asphalt.

### Replacement

Road replacement is the removal of existing asphalt, granular base and concrete curb/curb and gutter and the construction of a new road (including new granular base, concrete curb and gutter and asphalt). This is the most expensive treatment method and is reserved for roads, at a point in their life cycle, that are structurally failing, and where the application of preventative maintenance, pavement preservation and/or rehabilitation would be ineffective. These roads have significant surface and sub-base drainage deficiencies and the structural integrity of concrete curbs and asphalt are considerably compromised. The treatment utilized for replacement is full road reconstruction.

## Changes to the Pavement Management Program

Based on the experience gained from delivering the PMP from 2007 to 2011, the input criteria was reviewed by Engineering Services staff as part of the development of the update to the Pavement Management Program. New parameters were established and inputted to ensure a more efficient program. The following criterion was analyzed and evaluated:

### **1. Project Groupings**

The road network analysis was completed on reviewing a grouping of roads within a subdivision as opposed to individual roads. Typically, roads within the same subdivision have similar characteristics such as pavement age, structural integrity and overall quality. In addition, there are a number of advantages that can be realized by developing a program that groups projects within the same geographic region. These advantages include economies of scale resulting in cost reductions, construction efficiencies and reduction in overall construction timelines, as well as improved customer service by reducing construction impact to residents.

### **2. Micro Surfacing**

In 2009 and 2010 micro surfacing was piloted and introduced as part of pavement preservation activities. Based on the feedback received, micro surfacing will not be used on local and feeder roads within residential communities. However, this treatment will be considered on residential collector roads (4 lanes), industrial roads, and locations where skid resistance issues may exist.

### **3. Crack Sealing**

All proposed mill and overlay and micro surfacing projects will undergo a crack sealing treatment within 4 years after completion. This will create an opportunity to seal any cracks that may migrate from the base asphalt to the surface. This would also assist in ensuring that the pavement will realize the greatest projected life cycle benefits.

### **4. Curb/Curb and Gutter Replacement**

In order to meet residents' expectations, the following guidelines have been revised to reflect changes in the criteria regarding curb replacement for all rehabilitation and replacement projects.

A) All driveway curb lines, showing any extent of structural deficiencies, will be replaced for the entire width of the existing driveway curb depression. Principle structural deficiencies considered in determining replacement of curb/curb and gutter include, but are not necessarily limited to, the following:

- major stress cracks - greater than 2 per driveway entrance or longer than 500mm each
- any ponding area – standing water along the curb line/gutter
- curb misalignment – offset curb lines
- differential settlement - greater than 25mm high/low
- type of curb – not to City Standard
- any missing curb line sections
- other major defects affecting structural integrity or public safety

B) Driveways disturbed as a result of curb/curb and gutter replacements will be restored in kind to a maximum distance of 0.5m behind the curb in order to allow for any grade adjustments or “matching” to the existing driveway. Driveway aprons (the portion of driveways between the curb and sidewalk, within the City's right-of-way) will be completed replaced as part of the curb/curb and gutter replacements on

Rehabilitation projects. Any additional driveway replacement requested beyond these limits will be the responsibility of the property owner.

- C) Engineering Services will endeavour to replace all barrier curb with curb and gutter. During the preliminary engineering stages of rehabilitation and/or reconstruction projects, a feasibility study will be undertaken to determine the benefit of replacing existing barrier curb with curb and gutter.

**5. Sidewalk Replacement**

To date, the sidewalk replacement undertaken as part of the rehabilitation program was mainly identified on an “as needed” basis. Any sidewalk that has been identified as comprimized structurally or presents a hazard to pedestrians (such as trip, slip and fall, etc.) was removed and replaced to alleviate these issues. In future, to meet the requirements of the Accessibility for Ontarians with Disabilities Act (AODA) and as identified within the Engineering Services 2010 Accessibility Plan, all existing pedestrian ramps (sidewalks that lead to an intersection) will be retrofitted to include directional lines as part of any rehabilitation or replacement project.

Asset Management Methodology

On February 16, 2006, Council endorsed through resolution, InfraGuide and the best practices with respect to Asset Management. Through InfraGuide, a comprehensive business strategy involves three pillars: People, Information and Technology.

The Essential Elements of an Asset Management Plan are:

1. *What do you have and where is it?*
2. *What is it worth?*
3. *What is its condition and its expected service life?*
4. *What is the level of service expectation, what needs to be done?*
5. *When do you need to do it?*
6. *How much will it cost and what is the acceptable level of risk?*
7. *How do you ensure long term affordability?*

People, Information and Technology in practice with the Essential Elements is the key to a successful implementation of an Asset Management Plan.

It is within this framework that the Pavement Management Program Update is being reported.

**1. What do you have and where is it?**

The inventory of City owned active roads are summarized in the following table by Ward, Surface Material Type.

Table No.1

<b>Summary of Road Network - By Ward and Surface Material</b>			
<b>Ward</b>	<b>Surface Material</b>	<b>Total Centreline kms</b>	<b>Total Lane kms</b>
1	Gravel / Stone	23.57	47.14
	Asphalt	176.18	379.04
	Surface Treated	24.88	49.77
2	Gravel / Stone	7.14	14.29

Summary of Road Network - By Ward and Surface Material			
Ward	Surface Material	Total Centreline kms	Total Lane kms
	Asphalt	151.07	344.36
	Surface Treated	5.67	11.34
3	Asphalt	144.21	347.43
4	Asphalt	154.96	392.26
5	Asphalt	74.16	176.74
	Surface Treated	3.27	6.53
<b>Total</b>		<b>765.11</b>	<b>1768.9</b>

## 2. What is it worth?

The 2010 City of Vaughan road network asset is valued at \$780M. Based on the reconstruction unit rate used within the Pavement Management System, staff have estimated the replacement value of the City's entire road network, to be approximately \$2.1B. This figure does not include the value for underground servicing such as water and wastewater systems nor boulevard amenities such as sidewalk or street lighting.

## 3. What is its condition and its expected service life?

The condition of a road is determined through a combination of field inspection and review of various analytical factors. Individual ratings and indices are combined into an overall index called a Pavement Composite Index (PCI) with an ascending range of 0 (worst) to 100 (best). This index is comprised of 3 major subsections being:

<b>Health</b>	The condition of a road which includes surface ride comfort, structural distresses and its ability to properly drain water away from the road's structural components;
<b>Capacity</b>	The current, measured traffic volume (Annual Average Daily Traffic) as compared to the theoretical capacity of a road;
<b>Physical Environment</b>	The remaining considerations surrounding the behavior of a road including skid resistance, safety and geometry.

A complete definition and description of the Pavement Composite Index is included in Attachment No. 1.

According to the Pavement Management System, the projected average overall network condition (at the end of 2011) for all City roads is a PCI of 88 out of 100 possible points. The current average network condition distribution for all City roads is summarized in the following table:

Table No.2

Pavement Management System Grouping	Value Range	Network Distribution
Excellent	80 to 100	92.3%
Good	60 to 80	5.7%
Fair	35 to 60	1.4%
Poor	20 to 35	0%
Very poor	0 to 20	0%

**4. What is the level of service expectation, what needs to be done?, and**

**5. When do you need to do it?**

Setting a Level of Service (LOS) or a target, is an important and critical step in a proper Asset Management Plan. From Item 1, Report No. 28 of the Committee of the Whole (Working Session) on May 23, 2006, Council set a Level Of Service to maintain an overall average road network rating being a Pavement Composite Index (PCI) of 70 out of 100 (possible points).

Applicable treatments that fall within Capital and Operations and Maintenance Budget categories are as follows:

<b>Budget Type</b>	<b>Treatment Name</b>
Operating	Crack Seal
Operating	Drainage Treatment
Capital	Complete Reconstruction
Capital	LCB Surface Treatment
Capital	LCB Upgrade To HCB
Capital	Micro Surface
Capital	Mill And Overlay
Capital	Pulverize And Overlay
Capital	Remove And Replace

Attachment No. 2 includes a detailed Project Level Program This list is sorted by the following criteria:

- Year
- Treatment Name
- Street Name
- Street From
- Street To

Please note that the Pavement Management Program reflects a shift to more preventative and rehabilitative methods of intervening strategies in the lifecycle of a road such as Crack Sealing, Micro Surfacing and Mill and Overlay. This philosophy will provide the City with its greatest return on every dollar invested to maximize the life of our road asset.

**6. How much will it cost and what is the acceptable level of risk?**

Based on the target Level of Service, investment required over the next 2 years are as follows:

<b>Year</b>	<b>Capital Budget</b>
2012	\$9,075,390
2013	\$9,245,225

Ongoing discussions take place with staff of our Public Works Department regarding the conditions of existing underground services such as storm and sanitary sewers and watermains. If there is also a potential need to perform substantial repairs or replacement of underground services in the near future, then the road need in those locations will be aligned to remedy both deficiencies at the same time.

**7. How do you ensure long term affordability?**

As the City's road infrastructure, information, systems and technology matures, multi-faceted integration across all asset classes such as roads, structures, pipes and amenities will be

realized. This is a natural path not only from an engineering technical analysis but should also be embraced from a financial perspective.

We must acknowledge that activities such as Crack Sealing and Drainage Treatment directly affect the lifecycle of a road. Future funding requirements will shift year to year between preventative and rehabilitative types of intervention such as Crack Sealing and Mill and Overlay.

Ensuring that the funding requirements are captured in the long range financial planning model, and that any increases to proposed funding requirements are supported, will ensure that the road network is maintained at our target Level of Service.

Meeting the target level of service is critical to maximize the benefit for every dollar invested in road rehabilitation which will directly reduce costly future road reconstruction. Should current and future funding levels not be supported, the risk of further deterioration of roads, a reduced level of serviceability and an increase in long term maintenance costs for our road system, without the opportunity to achieve sustainability.

### **Relationship to Vaughan Vision 2020/Strategic Plan**

In consideration of the strategic priorities related to Vaughan Vision 2020, the recommendations of this report will assist in:

- Maintaining corporate assets and infrastructure;
- Enhance environmental sustainability and a healthier environment through the use of alternative construction methodologies; and,
- In compliance with Green Directions Vaughan – Community Sustainability and Environmental Master Plan – the need to support the continuing repair and renewal of our road network is facilitated.

This report is consistent with the priorities previously set by Council.

### **Regional Implications**

There are no Regional implications.

### **Conclusion**

The purpose of this report is to obtain Council approval, in principle, for the update to the Pavement Management Program for the years 2012 and 2013.

### **Attachments**

1. Summary of Terms
2. 2012 and 2013 Update to the Pavement Management Program
3. Extract from Council Meeting Minutes – April 2, 2007 – 5 Year Pavement Management Program

### **Report prepared by:**

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# ATTACHMENT NO. 1

## Summary of Terms

The Pavement Composite Index (PCI) definition

PAVEMENT COMPOSITE INDEX (PCI) RATING					
Category	Category Weight	Variable	Variable Point	Variable Weight	Methodology
Health	80%	Surface Condition	0 - 10	40%	MDC
		Structural Adequacy	0 - 20	40%	MDC
		Drainage	0 - 15	20%	R
Capacity	10%	Capacity	0 - 100	100%	MDC
Physical Environment	10%	Skid		0%	-
		Safety	0 - 100	50%	AC
		Geometry	0 - 100	50%	AC

### Methodology Terminology

Model Deterioration Curve (MDC)	Subject has a separate life cycle model applied to it to predict future performance.
Rating (R)	Subject has a rating and forms part of a greater computation.
Analyze and Compute (AC)	Subject is studied for various conditions and a rating is computed based on the analysis.

### General Terminology

Network Level	Reviewing a particular piece of information or state with respect to all City roads as a whole.
Project Level	Reviewing a particular piece of information or state with respect to an individual roads section as defined by a road, from an intersection, to an intersection.

### Health Terminology

Surface Condition	Maximum 10 Point Rating related to driving ease, comfort and safety. Inadequacies for paved surfaces include excessive or uneven crowns, washboarding, raveling and bumpiness because of cracking, sealing and rough patching. Inadequacies on loose top surfaces do not include situations that can be readily corrected by maintenance blading.
Structural Adequacy	Maximum 20 Point Rating related to the capability of the surface and base courses to support a load and to resist deformation or rupture. Distress signs include cracking, rutting, heaving, pot-holing, roughness, alligatoring, dishing, breakup, distortion, frost boils, soft spots, etc.

Drainage Maximum 15 Point Rating related the various elements to maintain a well drained surface on a stable subgrade: the height of the grade line; the cross slopes of the crown, shoulders and ditches; the slopes of gutters and frequency of outlets or catchbasins and the adequacy of the storm sewer system; the capacity of the cross-drains (culverts) and parallel and off-take ditches.

Capacity Terminology

Capacity The Capacity index is a function of the annual traffic volume and the capacity of the road.

Physical Environment Terminology

Skid A measure of skid resistance for future implementation  
Safety The safety index is a calculation which is a function of the AADT and the rate and severity of crashes on a road section.

Where Geometry is comprised of the following:

Horizontal Alignment Maximum 10 Point Rating related to the number of Substandard Horizontal Curves and Substandard Horizontal Stopping Sight Distances per length of road section.

Vertical Alignment Maximum 10 Point Rating related to the number of Substandard Grades and Substandard Vertical Stopping Sight Distances per length of road section.

Other

HCB High Class Bituminous (Asphalt Pavement)

LCB Low Class Bituminous (Surface Treatment)

# ATTACHMENT NO. 2

## 2012 and 2013 Update to the Pavement Management Program

2012 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2012	Aberdeen Avenue	Queenston Crescent	Highway 7	Crack Seal	\$12,344.83
2012	Aberdeen Avenue	Belview Avenue	Queenston Crescent	Mill And Overlay	\$260,830.57
2012	Adam Ernst Court	Seshi Drive	Cul-De-Sac	Crack Seal	\$267.94
2012	Airdrie Drive	Aberdeen Avenue	Aberdeen Avenue	Crack Seal	\$5,745.64
2012	Albion Vaughan Road	Kirby Road	King Vaughan Road	Drainage Major	\$7,083.21
2012	Alderson Avenue	Pine Valley Drive	Aberdeen Avenue	Crack Seal	\$2,190.12
2012	Alex Avenue	Strada Drive	Rowntree Dairy Road	Mill And Overlay	\$75,723.77
2012	Alliston Road	Aberdeen Avenue	Airdrie Drive	Crack Seal	\$1,299.32
2012	America Avenue	Jane Street	Dead End	Crack Seal	\$5,999.73
2012	Amy Court	Belview Avenue	Belview Avenue	Crack Seal	\$1,856.35
2012	Amy Wood Road	Kingsview Drive	Maria Antonia Road	Crack Seal	\$2,197.57
2012	Andrea Lane	Aberdeen Avenue	Ashcroft Court	Crack Seal	\$2,403.43
2012	Andy Crescent	Dolores Crescent	Andy Crescent	Crack Seal	\$4,486.37
2012	Anstley Grove Road	Embassy Drive	Highway 7	Mill And Overlay	\$253,387.26
2012	Antonella Crescent	Chancellor Drive	Chancellor Drive	Crack Seal	\$2,453.88
2012	Antonia Court	Dolores Crescent	Cul-De-Sac	Crack Seal	\$903.08
2012	Ashbridge Circle	Highway 27	Dead End	Crack Seal	\$2,595.08
2012	Ashburn Crescent	Airdrie Drive	Airdrie Drive	Crack Seal	\$1,762.55
2012	Ashcroft Court	Aberdeen Avenue	Cul-De-Sac	Crack Seal	\$965.94
2012	Attorney's Lane	Forest Drive	Cul-De-Sac	Mill And Overlay	\$30,526.92
2012	Audia Court	North Rivermede Road	Cul-De-Sac	Mill And Overlay	\$52,320.67
2012	Autumn Hill Boulevard	Thornhill Woods Drive	Daphnia Drive	Crack Seal	\$3,391.25
2012	Avon Crescent	Airdrie Drive	Alliston Road	Crack Seal	\$1,066.46
2012	Avro Road	Kale Crescent	Jane Street	Crack Seal	\$2,437.92
2012	Bachman Drive	Via Lanciano Crescent	Emmitt Road	Crack Seal	\$436.69
2012	Bachman Drive	Wilcox Road	Norwood Avenue	Crack Seal	\$450.89
2012	Baldwin Avenue	Southview Drive	Highway 7	Crack Seal	\$2,020.57
2012	Basie Gate	Pleasant Ridge Avenue	Chagall Drive	Crack Seal	\$897.75
2012	Beatrice Way	Fiori Drive	Vera Street	Crack Seal	\$3,875.02
2012	Bella Vista Court	Belview Avenue	Cul-De-Sac	Crack Seal	\$647.08
2012	Belview Avenue	Chancellor Drive	Coalbrooke Court	Crack Seal	\$2,056.11
2012	Blaine Court	Trevor Street	Cul-De-Sac	Crack Seal	\$1,854.04
2012	Blue Willow Drive	Weston Road	Pottery Place	Mill And Overlay	\$76,630.22
2012	Blue Willow Drive	Michelle Drive	Embassy Drive	Mill And Overlay	\$167,592.39
2012	Bluestone Street	Medallion Boulevard	Sungold Court	Mill And Overlay	\$65,094.83
2012	Bordeaux Drive	Alderson Avenue	Brougham Drive	Crack Seal	\$1,804.17
2012	Bordeaux Drive	Western Skies Court	Chancellor Drive	Crack Seal	\$491.36
2012	Bordeaux Drive	Brougham Drive	Western Skies Court	Mill And Overlay	\$45,356.56
2012	Bradwick Drive	Highway 7	Cul-De-Sac	Crack Seal	\$9,760.32

2012 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2012	Brandy Crescent	Alderson Avenue	Alderson Avenue	Crack Seal	\$1,820.12
2012	Brougham Drive	Aberdeen Avenue	Bordeaux Drive	Crack Seal	\$1,392.28
2012	Brussels Court	Alderson Avenue	Cul-De-Sac	Crack Seal	\$235.96
2012	Buckhorn Road	Yellowwood Circle	Yellowwood Circle	Crack Seal	\$793.04
2012	Burgosa Court	Russet Way	Cul-De-Sac	Remove And Replace	\$270,483.13
2012	Cabalotta Crescent	Medallion Boulevard	Coronation Street	Mill And Overlay	\$70,908.60
2012	Cabinet Crescent	Morning Star Drive	Morning Star Drive	Mill And Overlay	\$123,531.93
2012	Calabria Court	Castelpoint Drive	Cul-De-Sac	Crack Seal	\$298.81
2012	Cape Verde Way	Naples Avenue	Madeira Avenue	Crack Seal	\$719.28
2012	Cantright Boulevard	Malden Street	Velmar Drive	Crack Seal	\$511.20
2012	Casa Nova Drive	Davos Road	Kingsview Drive	Crack Seal	\$2,235.12
2012	Casmir Court	Spinnaker Way	Cul-De-Sac	Crack Seal	\$943.39
2012	Caster Avenue	Whitmore Road	Trowers Road	Mill And Overlay	\$157,590.65
2012	Castlepoint Drive	Dolores Crescent	Stollia Street	Crack Seal	\$3,550.03
2012	Cedar Glen Court	Forest Heights Boulevard	Cul-De-Sac	Crack Seal	\$824.50
2012	Cedarvalley Crescent	Stevenson Road	Cul-De-Sac	Crack Seal	\$1,454.12
2012	Cezanne Trail	Coltrane Drive	Auburndale Drive	Crack Seal	\$1,337.04
2012	Chagall Drive	Coltrane Drive	Autumn Hill Boulevard	Crack Seal	\$1,554.24
2012	Chancellor Drive	Weston Road	Anslay Grove Road	Crack Seal	\$7,509.71
2012	Charles Cooper Court	Nashville Road	Cul-De-Sac	Crack Seal	\$1,554.01
2012	Charmaine Road	Dorengate Drive	Kiloran Avenue	Crack Seal	\$3,218.92
2012	Chart Avenue	Naples Avenue	Madeira Avenue	Crack Seal	\$783.73
2012	Chateau Drive	Davos Road	Casa Nova Drive	Crack Seal	\$1,740.08
2012	Citation Drive	Stafferin Drive	Cul-De-Sac	Crack Seal	\$797.02
2012	Citron Court	Spinnaker Way	Cul-De-Sac	Crack Seal	\$619.31
2012	Coalbrook Court	Cul-De-Sac	Cul-De-Sac	Crack Seal	\$1,736.34
2012	Coldspring Road	Nashville Road	Cul-De-Sac	Crack Seal	\$1,586.11
2012	Coltrane Drive	Thornhill Woods Drive	Pleasant Ridge Avenue	Crack Seal	\$2,648.89
2012	Confederation Parkway	Dufferin Street	Westway Crescent	Crack Seal	\$8,462.96
2012	Connie Crescent	Langstaff Road	North Rivermede Road	Crack Seal	\$4,611.47
2012	Convoy Crescent	John Deisman Boulevard	John Deisman Boulevard	Crack Seal	\$2,638.11
2012	Coronation Street	Gates Road	Morning Star Drive	Mill And Overlay	\$164,263.77
2012	Couture Gardens	Pleasant Ridge Avenue	Treecrest Drive	Crack Seal	\$2,248.73
2012	Degas Drive	Gauguin Avenue	Pleasant Ridge Avenue	Crack Seal	\$1,465.68
2012	Diamond Street	Morning Star Drive	Cabinet Crescent	Mill And Overlay	\$31,628.50
2012	Discovery Trail	America Avenue	Tierra Avenue	Crack Seal	\$2,910.03
2012	Dolores Crescent	Martin Grove Road	Martin Grove Road	Crack Seal	\$2,836.29
2012	Dorengate Drive	Figlen Ridge	Cul-De-Sac	Crack Seal	\$1,375.21
2012	Dorwood Court	Figlen Ridge	Cul-De-Sac	Crack Seal	\$1,094.16
2012	Emily Anna Street	Sheshi Drive	Maria Antonia Road	Crack Seal	\$567.36
2012	Emmitt Road	Bachman Drive	Avro Road	Crack Seal	\$367.12
2012	English Daisy Court	Whisper Lane	English Daisy Court	Crack Seal	\$1,439.94

2012 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2012	Equator Crescent	Discovery Trail	Genoa Road	Crack Seal	\$3,731.80
2012	Ferdinand Avenue	Discovery Trail	John Deisman Boulevard	Crack Seal	\$2,150.77
2012	Fieldstone Drive	Weston Road	Blue Willow Drive	Crack Seal	\$3,930.20
2012	Florentia Court	Dolores Crescent	Cul-De-Sac	Crack Seal	\$229.33
2012	Firenza Road	Fossil Hill Road	Kingsview Drive	Crack Seal	\$915.02
2012	Floral Parkway	Confederation Parkway	Cul-De-Sac	Crack Seal	\$1,362.64
2012	Fonti Drive	Villa Royale Avenue	Hollywood Hill Circle	Crack Seal	\$307.55
2012	Forest Drive	Attorneys Lane	Jade Crescent	Mill And Overlay	\$53,295.38
2012	Forest Heights Boulevard	Highway 27	Cul-De-Sac	Crack Seal	\$2,385.93
2012	Fossil Hill Road	Davos Road	Firenza Road	Crack Seal	\$1,791.43
2012	Fossil Hill Road	Hollywood Hill Circle	Marla Antonia Road	Crack Seal	\$1,251.96
2012	Foxchase Avenue	Blue Willow Drive	Fieldstone Drive	Crack Seal	\$2,363.80
2012	Gaelano Court	Dolores Crescent	Cul-De-Sac	Crack Seal	\$680.73
2012	Gauguin Avenue	Summeridge Drive	Pleasant Ridge Avenue	Crack Seal	\$2,662.90
2012	Gemma Court	Rockview Gardens	Cul-De-Sac	Crack Seal	\$539.96
2012	Genoa Road	America Avenue	Naples Avenue	Crack Seal	\$1,394.25
2012	George Gale Road	Sheshi Drive	Marla Antonia Road	Crack Seal	\$565.02
2012	Getz Park	Pleasant Ridge Avenue	Collrane Drive	Crack Seal	\$808.54
2012	Glenvilla Road	Chancellor Drive	Cul-De-Sac	Crack Seal	\$960.95
2012	Gould Lane	Pleasant Ridge Avenue	Chagall Drive	Crack Seal	\$851.07
2012	Governor Crescent	Aberdeen Avenue	Aberdeen Avenue	Remove And Replace	\$379,782.10
2012	Grant Crest Gate	Coalbrooke Court	Pottery Place	Crack Seal	\$428.32
2012	Gully Lane	America Avenue	Stern Gate	Crack Seal	\$621.61
2012	Haist Avenue	Marycroft Avenue	Rowntree Dairy Road	Mill And Overlay	\$120,578.64
2012	Hartley Court	Rockview Gardens	Cul-De-Sac	Crack Seal	\$473.39
2012	Hedgerow Court	Hedgerow Lane	Cul-De-Sac	Crack Seal	\$950.53
2012	Hedgerow Lane	Highway 27	Cul-De-Sac	Crack Seal	\$2,810.94
2012	Hendel Drive	Pleasant Ridge Avenue	Couture Gardens	Crack Seal	\$1,403.19
2012	Hillside Drive	Baldwin Avenue	Highway 7	Crack Seal	\$3,274.73
2012	Hollyburn Court	Morning Star Drive	Cul-De-Sac	Mill And Overlay	\$9,518.52
2012	Hollywood Hill Circle	Fossil Hill Road	Fossil Hill Road	Crack Seal	\$3,922.14
2012	Humber Bridge Trail	Dead End	Highway 27	Drainage Major	\$929.92
2012	Huntington Road	King Vaughan Road	Ranch Trail Road	Crack Seal	\$623.47
2012	Imperial Court	Misty Meadow Drive	Cul-De-Sac	Crack Seal	\$387.69
2012	Iona Crescent	Andy Crescent	Andy Crescent	Crack Seal	\$1,255.29
2012	Inish Moss Court	Misty Meadow Drive	Cul-De-Sac	Crack Seal	\$736.90
2012	Isa Court	Dolores Crescent	Cul-De-Sac	Crack Seal	\$867.29
2012	Ivy Place	Queen Post Drive	Queen Post Drive	Crack Seal	\$297.33
2012	Jacobi Court	Pleasant Ridge Avenue	Cul-De-Sac	Crack Seal	\$775.97
2012	Jade Crescent	Coronation Street	Coronation Street	Mill And Overlay	\$104,781.30
2012	Jardin Drive	Keele Street	Cul-De-Sac	Crack Seal	\$4,363.82
2012	Jeanne Drive	Villa Park Drive	Willis Road	Crack Seal	\$2,899.07

2012 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2012	John Deisman Boulevard	Tierra Avenue	John Deisman Boulevard	Tierra Avenue	\$1,547.35
2012	Journal Avenue	America Avenue	Ferdinand Avenue	Crack Seal	\$1,038.52
2012	Jules Avenue	Jeanne Drive	Jeanne Drive	Crack Seal	\$2,467.30
2012	Kale Crescent	Avro Road	Avro Road	Crack Seal	\$3,010.90
2012	Karla Court	Michelle Drive	Cul-De-Sac	Crack Seal	\$287.76
2012	Keeleview Court	Hillside Drive	Cul-De-Sac	Crack Seal	\$1,087.13
2012	Kendall Drive	Wycliffe Avenue	Korright Place	Crack Seal	\$494.94
2012	King Vaughan Road	Kipling Avenue	Highway 27	Crack Seal	\$8,249.65
2012	King Vaughan Road	Huntington Road	Huntington Road	Crack Seal	\$215.04
2012	King Vaughan Road	Highway 27	Huntington Road	Pulverize And Overlay	\$368,078.75
2012	Kingsview Drive	Davos Road	Maria Antonia Road	Crack Seal	\$2,768.49
2012	Kipling Avenue	Toston Road	King Vaughan Road	Crack Seal	\$12,849.31
2012	Kipling Avenue	Abell Avenue	Woodbridge Avenue	Reconstruction	\$429,847.28
2012	Kirby Road	Kipling Avenue	Highway 27	Crack Seal	\$8,200.30
2012	Kleins Crescent	Nashville Road	Nashville Road	Mill And Overlay	\$48,031.76
2012	Klein's Ridge	Nashville Road	Cul-De-Sac	Crack Seal	\$1,577.41
2012	Lamp Crescent	Morning Star Drive	Morning Star Drive	Mill And Overlay	\$92,422.49
2012	Laneway 18281 20430	Foxchase Avenue	Laneway	Crack Seal	\$241.65
2012	Laneway 18282 18281	Cul-De-Sac	Laneway	Crack Seal	\$157.24
2012	Laneway 18282 18281	Laneway	Cul-De-Sac	Crack Seal	\$121.30
2012	Langstaff Road	Vaughan Mills Road	Highway 27	Crack Seal	\$7,145.85
2012	Lanterna Crescent	Castlepoint Drive	Castlepoint Drive	Crack Seal	\$1,564.29
2012	Lavender Place	Mathew Drive	Mathew Drive	Crack Seal	\$1,291.26
2012	Lento Court	Wilfrid Road	Cul-De-Sac	Crack Seal	\$1,125.98
2012	Leyton Road	Belview Avenue	Lime Drive	Crack Seal	\$487.25
2012	Lorengate Place	Figlen Ridge	Cul-De-Sac	Crack Seal	\$415.63
2012	Lucky Court	Flori Drive	Cul-De-Sac	Crack Seal	\$735.38
2012	Macbride Crescent	Kale Crescent	Kale Crescent	Crack Seal	\$1,371.18
2012	Madeira Avenue	Genoa Road	Equator Crescent	Crack Seal	\$1,033.22
2012	Marco Crescent	Aldrie Drive	Aldrie Drive	Crack Seal	\$1,507.46
2012	Margaret Mary Road	Figlen Ridge	Dead End	Crack Seal	\$285.67
2012	Maria Antonia Road	Weston Road	Amy Wood Road	Crack Seal	\$6,907.51
2012	Marrone Street	Amy Wood Road	Maria Antonia Road	Crack Seal	\$669.73
2012	Martin Grove Road	Stiglia Street	Highway 27	Crack Seal	\$6,989.63
2012	Martin Grove Road	Highway 7	Woodbridge Avenue	Mill And Overlay	\$245,031.24
2012	Martin Grove Road	Morning Star Drive	Langstaff Road	Mill And Overlay	\$48,974.49
2012	Marycroft Avenue	Rowntree Dairy Road	Highway 7	Mill And Overlay	\$259,841.22
2012	Matthew Drive	Wilfrid Road	Mathew Drive	Crack Seal	\$4,280.66
2012	Maximilian Street	Sheshi Drive	Maria Antonia Road	Crack Seal	\$569.26
2012	Mazzone Drive	Amy Wood Road	Maria Antonia Road	Crack Seal	\$575.84
2012	Monaughton Road	Cransion Park Avenue	Major Mackenzie Drive West	Crack Seal	\$3,631.42
2012	Medallion Boulevard	Gates Road	Cabaletta Crescent	Mill And Overlay	\$17,303.23

2012 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2012	Melville Avenue	Avro Road	Major Mackenzie Drive West	Crack Seal	\$3,769.21
2012	Mindel Crescent	Pleasant Ridge Avenue	Pleasant Ridge Avenue	Crack Seal	\$1,425.29
2012	Michelle Drive	Blue Willow Drive	Blue Willow Drive	Crack Seal	\$2,788.39
2012	Minton Drive	Blue Willow Drive	Foxchase Avenue	Crack Seal	\$647.85
2012	Misty Meadow Drive	Ansley Grove Road	Queenston Crescent	Crack Seal	\$4,076.08
2012	Monica Court	Antonella Crescent	Cul-De-Sac	Crack Seal	\$277.66
2012	Morisset Avenue	Pleasant Ridge Avenue	Courture Gardens	Crack Seal	\$1,524.33
2012	Morning Star Drive	Maples Avenue	Martin Grove Road	Mill And Overlay	\$261,179.53
2012	Naples Avenue	Discovery Trail	Equator Crescent	Crack Seal	\$1,277.53
2012	Native Trail	Treasure Road	Ferdinand Avenue	Crack Seal	\$890.78
2012	Nestor Crescent	Embassy Drive	Embassy Drive	Remove And Replace	\$461,286.37
2012	Nickle Gate	Highway 27	Morning Star Drive	Mill And Overlay	\$59,038.62
2012	Nicola Court	Antonella Crescent	Cul-De-Sac	Crack Seal	\$326.97
2012	North Rivermede Road	Langstaff Road	Connie Crescent	Crack Seal	\$1,924.14
2012	North Rivermede Road	Rivermede Road	Highway 7	Crack Seal	\$4,720.81
2012	North Rivermede Road	Connie Crescent	Rivermede Road	Mill And Overlay	\$235,890.37
2012	Ocean Avenue	America Avenue	Santa Maria Trail	Crack Seal	\$800.34
2012	Old Humber Crescent	Forest Heights Boulevard	Forest Heights Boulevard	Crack Seal	\$3,738.46
2012	Opera Place	Lento Court	Cul-De-Sac	Crack Seal	\$435.38
2012	Otona Court	Rivermede Road	Cul-De-Sac	Crack Seal	\$2,143.92
2012	Panorama Crescent	Royalpark Way	Royalpark Way	Crack Seal	\$2,249.41
2012	Pennycross Court	Kiloran Avenue	Cul-De-Sac	Crack Seal	\$934.56
2012	Pine Valley Drive	Langstaff Road	Clubhouse Road	Crack Seal	\$4,786.12
2012	Pleasant Ridge Avenue	Summeridge Drive	Autumn Hill Boulevard	Crack Seal	\$4,987.77
2012	Positview Court	Torran Road	Cul-De-Sac	Crack Seal	\$353.58
2012	Pottery Place	Blue Willow Drive	Windflower Gate	Crack Seal	\$1,850.06
2012	Presidential Street	Governor Crescent	Governor Crescent	Remove And Replace	\$156,842.63
2012	Putting Green Crescent	Coldspring Road	Coldspring Road	Crack Seal	\$1,446.39
2012	Queen Post Drive	Villa Park Drive	Cul-De-Sac	Crack Seal	\$797.44
2012	Queenston Crescent	Aberdeen Avenue	Aberdeen Avenue	Crack Seal	\$1,513.84
2012	Ranch Trail Road	Huntington Road	Cul-De-Sac	Crack Seal	\$3,308.06
2012	Ravine Court	Sylvan Brook Avenue	Cul-De-Sac	Crack Seal	\$988.69
2012	Renoir Drive	Coltrane Drive	Autumn Hill Boulevard	Crack Seal	\$902.31
2012	Ritun Lane	Spinnaker Way	Cul-De-Sac	Crack Seal	\$1,094.73
2012	Rockview Gardens	Baldwin Avenue	Keele Street	Crack Seal	\$3,774.20
2012	Rockview Gardens	Hartley Court	Baldwin Avenue	Crack Seal	\$583.48
2012	Roe Road	Huntington Road	Nashville Road	Crack Seal	\$1,270.20
2012	Romano Crescent	Chancellor Drive	Chancellor Drive	Crack Seal	\$1,906.28
2012	Rowntree Dairy Road	Weston Road	Marycroft Avenue	Mill And Overlay	\$932,452.00
2012	Royal Garden Boulevard	Pine Valley Drive	Ravine Court	Crack Seal	\$1,585.18
2012	Royalpark Way	Highway 27	Vaughan Mills Road	Crack Seal	\$12,594.50
2012	Russet Way	Ansley Grove Road	Chancellor Drive	Remove And Replace	\$660,676.28

2012 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2012	Sail Crescent	Discovery Trail	Discovery Trail	Crack Seal	\$2,698.65
2012	San Marko Place	Chancellor Drive	Cul-De-Sac	Crack Seal	\$683.56
2012	Santa Maria Trail	Discovery Trail	Ferdinand Avenue	Crack Seal	\$2,447.32
2012	Sassafras Circle	Sassafras Circle	Cul-De-Sac	Crack Seal	\$3,539.63
2012	Scholar Road	Confederation Parkway	Spinnaker Way	Crack Seal	\$1,564.60
2012	Seurat Place	Coltrane Drive	Autumn Hill Boulevard	Crack Seal	\$1,111.75
2012	Sharer Road	Whitmore Road	Towers Road	Mill And Overlay	\$157,451.62
2012	Sheshi Drive	Fossil Hill Road	Maria Antonia Road	Crack Seal	\$2,116.63
2012	Sicilia Street	Martin Grove Road	Castlepoint Drive	Crack Seal	\$739.87
2012	Simmons Street	Rutherford Road	Cul-De-Sac	Crack Seal	\$2,626.36
2012	Snider Green	Ansley Grove Road	Mathew Drive	Crack Seal	\$291.26
2012	Southview Drive	Baldwin Avenue	Jardin Drive	Crack Seal	\$3,855.34
2012	Spinnaker Way	Casmir Court	Cul-De-Sac	Crack Seal	\$4,973.28
2012	Stafferin Drive	Citation Drive	Confederation Parkway	Crack Seal	\$3,228.27
2012	Stern Gate	Discovery Trail	Ocean Avenue	Crack Seal	\$717.80
2012	Stevenson Road	Nashville Road	Valleyview Court	Crack Seal	\$1,945.21
2012	Strada Drive	Pine Valley Drive	Towers Road	Crack Seal	\$261,265.64
2012	Sugarforest Drive	Maple Sugar Lane	Sassafras Circle	Crack Seal	\$463.93
2012	Sundance Court	Royalpark Way	Cul-De-Sac	Crack Seal	\$309.08
2012	Sungold Court	Medallion Boulevard	Cul-De-Sac	Mill And Overlay	\$66,536.08
2012	Sylvadene Court	Sylvadene Parkway	Cul-De-Sac	Crack Seal	\$641.78
2012	Sylvadene Parkway	Francis Street	Cul-De-Sac	Crack Seal	\$3,269.38
2012	Sylvan Brook Avenue	Sylvadene Parkway	Cul-De-Sac	Crack Seal	\$806.99
2012	Teahouse Road	Windflower Gate	Lento Court	Crack Seal	\$815.35
2012	Timberview Drive	Langstaff Road	Yellowwood Circle	Crack Seal	\$1,231.50
2012	Todd Court	Dorengate Drive	Cul-De-Sac	Crack Seal	\$467.76
2012	Treasure Road	America Avenue	Tierra Avenue	Crack Seal	\$2,041.96
2012	Towers Road	Rowntree Dairy Road	Whitmore Road	Mill And Overlay	\$302,606.26
2012	Tumbleweed Court	Teahouse Road	Cul-De-Sac	Crack Seal	\$1,275.30
2012	Tweed Court	Cabinet Crescent	Cul-De-Sac	Mill And Overlay	\$10,700.65
2012	Twiberry Crescent	Misty Meadow Drive	Misty Meadow Drive	Crack Seal	\$1,525.26
2012	Ursini Court	Chamaine Road	Cul-De-Sac	Crack Seal	\$523.23
2012	Valleyview Court	Stevenson Road	Cul-De-Sac	Crack Seal	\$1,066.56
2012	Vaughan Mills Road	Langstaff Road	Humberview Drive	Crack Seal	\$6,120.13
2012	Vellore Avenue	Amy Wood Road	Maria Antonia Road	Crack Seal	\$833.67
2012	Velvet Crescent	Venetian Crescent	Venetian Crescent	Crack Seal	\$34,466.57
2012	Venetian Crescent	Chancellor Drive	Chancellor Drive	Mill And Overlay	\$102,799.33
2012	Vera Street	Beatrice Way	Flori Drive	Crack Seal	\$1,556.46
2012	Via Nova Drive	Chancellor Drive	Belview Avenue	Crack Seal	\$1,223.32
2012	Villa Park Drive	Pine Valley Drive	Cul-De-Sac	Crack Seal	\$2,719.72
2012	Villarboit Crescent	Spinnaker Way	Riftin Lane	Crack Seal	\$3,760.06
2012	Vita Road	Coronation Street	Jade Crescent	Mill And Overlay	\$50,123.70

2012 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2012	Waterfall Road	Embassy Drive	Embassy Drive	Remove And Replace	\$240,611.26
2012	Western Skies Court	Bordeaux Drive	Cul-De-Sac	Crack Seal	\$230.32
2012	Whiffletree Court	Villa Park Drive	Cul-De-Sac	Crack Seal	\$313.73
2012	Whisper Lane	Nashville Road	Cul-De-Sac	Crack Seal	\$1,313.45
2012	Whitmore Road	Rowntree Dairy Road	Highway 7	Mill And Overlay	\$244,133.08
2012	Wildfire Road	Turnbleweed Court	Matthew Drive	Crack Seal	\$827.98
2012	Williamsburg Lane	Russet Way	Burgosa Court	Remove And Replace	\$77,266.67
2012	Windflower Gate	Ansley Grove Road	Teahouse Road	Crack Seal	\$400.40
2012	Windy Way	America Avenue	Santa Maria Trail	Crack Seal	\$399.74
2012	Wings Road	Whitmore Road	Rowntree Dairy Road	Mill And Overlay	\$177,668.22
2012	Woodgreen Drive	Kiloran Avenue	Cul-De-Sac	Crack Seal	\$1,728.56
2012	Yellow Pine Crescent	Jeanne Drive	Cul-De-Sac	Crack Seal	\$1,428.73
2012	Yellowwood Circle	Yellowwood Circle	Cul-De-Sac	Crack Seal	\$4,857.75
2012	Zinnia Place	Martin Grove Road	Zinnia Place	Crack Seal	\$108,359.53
2012	Zola Gate	Coltrane Drive	Autumn Hill Boulevard	Crack Seal	\$719.13
2012	Zuchet Court	Chancellor Drive	Cul-De-Sac	Crack Seal	\$1,020.04

2013 Pavement Management Program						
Year	Street	From	To	Treatment Name	Cost	
2013	Adirondack Drive	Laurentian Boulevard	Foot Hills Road	Crack Seal	\$2,557.06	
2013	Admiral Court	Vaughan Mills Road	Cul-De-Sac	Crack Seal	\$944.41	
2013	Adrianno Crescent	Flori Drive	Flori Drive	Remove And Replace	\$376,309.24	
2013	Afton Crescent	Barrhill Road	Sherbourne Drive	Crack Seal	\$2,045.93	
2013	Andes Crescent	Emily Anna Street	Emily Anna Street	Crack Seal	\$2,010.02	
2013	Angellina Avenue	Coles Avenue	Nadia Avenue	Cul-De-Sac	\$65,381.72	
2013	Anne Court	McClintock Crescent	Cul-De-Sac	Crack Seal	\$150.19	
2013	Ansley Grove Road	Langstaff Road	Belview Avenue	Mill And Overlay	\$75,493.74	
2013	Applewood Crescent	Jane Street	Edgely Boulevard	Crack Seal	\$4,859.29	
2013	Arbourview Drive	Camden Drive	Westway Crescent	Crack Seal	\$1,086.27	
2013	Arnold Avenue	Yonge Street	Charles Street	Crack Seal	\$3,930.00	
2013	Arnold Avenue	Atkinson Avenue	Cul-De-Sac	Crack Seal	\$2,275.46	
2013	Atona Road	Flori Drive	Olive Green Road	Mill And Overlay	\$29,792.88	
2013	Arrowhead Drive	Wigwoss Drive	Wigwoss Drive	Crack Seal	\$2,386.07	
2013	Barrhill Road	Keele Street	Foxhill Drive	Crack Seal	\$7,349.93	
2013	Bayhampton Crescent	Judith Avenue	Judith Avenue	Crack Seal	\$2,009.34	
2013	Beechnut Road	Kipling Avenue	Claremont Lane	Crack Seal	\$324.28	
2013	Beechnut Road	Claremont Lane	Cul-De-Sac	Mill And Overlay	\$83,983.62	
2013	Belair Way	Trevor Street	Maneta Street	Mill And Overlay	\$119,614.59	
2013	Belview Avenue	Ansley Grove Road	Chancellor Drive	Mill And Overlay	\$635,361.68	
2013	Benjamin Drive	Wigwoss Drive	Wigwoss Drive	Crack Seal	\$2,009.09	
2013	Bevshire Circle	Spring Gate Boulevard	Spring Gate Boulevard	Crack Seal	\$1,590.57	
2013	Birch Hill Road	Pine Ridge Avenue	Riverside Drive	Crack Seal	\$723.43	
2013	Borrows Street	Conley Street	Conley Street	Crack Seal	\$3,079.30	
2013	Brack Place	Swinton Crescent	Cul-De-Sac	Crack Seal	\$545.35	
2013	Briarcliffe Crescent	Judith Avenue	Bayhampton Crescent	Crack Seal	\$1,210.02	
2013	Brownridge Drive	Carl Tennen Street	Clark Avenue West	Mill And Overlay	\$358,222.02	
2013	Brownstone Circle	Springfield Way	Brownstone Circle	Mill And Overlay	\$114,971.11	
2013	Brydon Court	Cherhill Drive	Cul-De-Sac	Crack Seal	\$504.22	
2013	Butterfield Crescent	Barrhill Road	Barrhill Road	Crack Seal	\$4,448.18	
2013	Camden Drive	Confederation Parkway	Westway Crescent	Crack Seal	\$1,869.82	
2013	Campbell Avenue	Spring Gate Boulevard	Atkinson Avenue	Crack Seal	\$4,191.93	
2013	Capit Court	Roselawn Drive	Cul-De-Sac	Crack Seal	\$216.14	
2013	Carl Tennen Street	Chelwood Drive	Centre Street	Crack Seal	\$3,047.35	
2013	Carmen Crescent	Flori Drive	Belview Avenue	Mill And Overlay	\$90,702.72	
2013	Centre Street	Atkinson Avenue	Bathurst Street	Crack Seal	\$4,892.81	
2013	Chavender Place	Kipling Avenue	Cul-De-Sac	Mill And Overlay	\$46,913.45	
2013	Checker Court	Wade Gate	Cul-De-Sac	Crack Seal	\$319.10	
2013	Chelwood Drive	Judith Avenue	Carl Tennen Street	Crack Seal	\$1,663.31	
2013	Chelwood Drive	Brownridge Drive	Judith Avenue	Mill And Overlay	\$47,261.96	
2013	Cherhill Drive	Barrhill Road	Cul-De-Sac	Crack Seal	\$2,189.69	

2013 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2013	Cidermill Avenue	Jane Street	Edgeley Boulevard	Crack Seal	\$4,728.03
2013	Claremont Lane	Beechnut Road	Tandian Court	Crack Seal	\$1,322.03
2013	Clubhouse Road	Pine Valley Drive	Dead End	Mill And Overlay	\$83,151.99
2013	Coles Avenue	Kipling Avenue	Cul-De-Sac	Mill And Overlay	\$63,389.19
2013	Confederation Parkway	Westway Crescent	Ten Oaks Boulevard	Crack Seal	\$2,059.29
2013	Conley Street	Steeles Avenue West	New Westminster Drive	Crack Seal	\$3,954.11
2013	Courtland Avenue	Edgeley Boulevard	Cul-De-Sac	Mill And Overlay	\$55,279.99
2013	Credlistone Road	Macintosh Boulevard	Pippin Road	Crack Seal	\$6,266.04
2013	Credlistone Road	Pippin Road	Langstaff Road	Mill And Overlay	\$135,787.56
2013	Crestwood Road	Hilda Avenue	Bathurst Street	Mill And Overlay	\$263,215.08
2013	Cristina Crescent	Dante Court	Dante Court	Mill And Overlay	\$46,166.29
2013	Croteau Crescent	Pinewood Drive	Pinewood Drive	Mill And Overlay	\$92,995.73
2013	Dante Court	Belview Avenue	Cul-De-Sac	Mill And Overlay	\$168,935.97
2013	Davidson Drive	Islington Avenue	Cul-De-Sac	Crack Seal	\$2,946.09
2013	Dean Place	Stephanie Boulevard	Cul-De-Sac	Crack Seal	\$1,170.80
2013	Deerchase Circle	Cul-De-Sac	Cul-De-Sac	Crack Seal	\$3,635.40
2013	Derrywood Drive	Forest Run Boulevard	Ten Oaks Boulevard	Crack Seal	\$3,196.43
2013	Dew Drop Court	Quail Run Boulevard	Cul-De-Sac	Crack Seal	\$1,184.99
2013	Donna May Crescent	Centre Street	Cul-De-Sac	Crack Seal	\$1,130.75
2013	Draper Boulevard	Dufferin Street	Brownridge Drive	Mill And Overlay	\$66,499.06
2013	Dunforest Gate	Jolana Court	Deerchase Circle	Crack Seal	\$507.28
2013	Edgeley Boulevard	Cidermill Avenue	Langstaff Road	Crack Seal	\$6,545.99
2013	Edgeley Boulevard	Langstaff Road	Corstate Avenue	Mill And Overlay	\$285,833.58
2013	Emerson Court	Huron Place	Cul-De-Sac	Crack Seal	\$221.29
2013	Emily Anna Street	Maria Antonia Road	Dead End	Crack Seal	\$1,029.83
2013	Father Ermanno Crescent	Fiori Drive	Fiori Drive	Mill And Overlay	\$109,451.30
2013	Faye Court	Spring Gate Boulevard	Cul-De-Sac	Crack Seal	\$575.21
2013	Fenrose Crescent	Golf Avenue	Fenrose Crescent	Mill And Overlay	\$153,402.83
2013	Fiddler's Circle	Quail Run Boulevard	Cul-De-Sac	Crack Seal	\$492.70
2013	Fieldcroft Court	Butterfield Crescent	Cul-De-Sac	Crack Seal	\$913.87
2013	Fifield Drive	Fieldcroft Court	Butterfield Crescent	Crack Seal	\$2,648.98
2013	Fiori Drive	Olive Green Road	Belview Avenue	Crack Seal	\$3,338.39
2013	Fiori Drive	Chancellor Drive	Olive Green Road	Mill And Overlay	\$36,146.22
2013	Firefly Crescent	Belview Avenue	Firefly Crescent	Belview Avenue	\$2,064.40
2013	Firefly Crescent	Hayhoe Lane	Hayhoe Lane	Remove And Replace	\$687,546.41
2013	Foot Hills Road	Kirby Road	Laurentian Boulevard	Crack Seal	\$953.11
2013	Forecastle Road	Ten Oaks Boulevard	Derrywood Drive	Crack Seal	\$1,154.47
2013	Forest Run Boulevard	Ten Oaks Boulevard	Derrywood Drive	Crack Seal	\$1,413.77
2013	Fossil Hill Road	Maria Antonia Road	Muscadel Road	Crack Seal	\$1,924.92
2013	Foxfield Crescent	Forest Run Boulevard	Forest Run Boulevard	Crack Seal	\$3,339.25
2013	Francine Court	Benjamin Drive	Cul-De-Sac	Crack Seal	\$180.67
2013	Francis Street	Sylvadene Parkway	Riverview Avenue	Crack Seal	\$1,556.77

2013 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2013	Fredrick Street	Wigwoss Drive	Emerson Court	Crack Seal	\$1,749.16
2013	Freemont Street	Ten Oaks Boulevard	Derrywood Drive	Crack Seal	\$1,264.43
2013	Gamble Street	Islington Avenue	Cul-De-Sac	Crack Seal	\$1,944.89
2013	Garview Court	Pine Valley Drive	Cul-De-Sac	Mill And Overlay	\$36,643.77
2013	Gate House Court	Kipling Avenue	Cul-De-Sac	Crack Seal	\$919.25
2013	Glacier Court	Laurentian Boulevard	Cul-De-Sac	Crack Seal	\$1,144.10
2013	Glenmanor Way	Spring Gate Boulevard	Clarkhaven Street	Mill And Overlay	\$146,942.94
2013	Glitter Road	Firefly Crescent	Belview Avenue	Crack Seal	\$811.87
2013	Green Avenue	Clubhouse Road	Pine Valley Crescent	Crack Seal	\$4,769.16
2013	Greenway Walk	Pine Valley Crescent	Dead End	Mill And Overlay	\$9,984.69
2013	Gregory Gate	Golf Avenue	Cul-De-Sac	Crack Seal	\$336.99
2013	Hailey Court	Weston Road	Belview Avenue	Mill And Overlay	\$63,473.29
2013	Hartman Avenue	Jaimie Road	Cul-De-Sac	Crack Seal	\$326.60
2013	Havenbrook Court	Islington Avenue	Dead End	Crack Seal	\$509.92
2013	Hayhoe Street	Brownridge Drive	Cul-De-Sac	Mill And Overlay	\$25,168.72
2013	Honey Locust Court	Pine Grove Road	Pine Valley Drive	Crack Seal	\$2,281.92
2013	Humbenview Drive	Rebecca Court	Cul-De-Sac	Crack Seal	\$981.38
2013	Huntingfield Street	Vaughan Mills Road	Cul-De-Sac	Crack Seal	\$1,743.32
2013	Huronina Place	Ten Oaks Boulevard	Forecastle Road	Crack Seal	\$1,132.75
2013	Ida Court	Emerson Court	Cul-De-Sac	Crack Seal	\$686.82
2013	Ivano Mews	Riverview Avenue	Cul-De-Sac	Crack Seal	\$179.53
2013	Jaimie Road	Blaine Court	Belview Avenue	Mill And Overlay	\$27,481.02
2013	Jaimie Road	Teagarden Court	Brownridge Drive	Crack Seal	\$861.63
2013	Jolana Court	Brownridge Drive	Teagarden Court	Mill And Overlay	\$99,334.10
2013	Jordan Hofer Way	Vaughan Mills Road	Cul-De-Sac	Crack Seal	\$1,396.83
2013	Judith Avenue	Fossil Hill Road	Emily Anna Street	Crack Seal	\$1,211.88
2013	Kanata Court	Clark Avenue West	Carl Tannen Street	Crack Seal	\$4,380.26
2013	Karl Court	Wigwoss Drive	Cul-De-Sac	Crack Seal	\$466.52
2013	Katerina Avenue	Oakhurst Drive	Oakhurst Drive	Crack Seal	\$624.82
2013	Keefér Court	New Westminster Drive	Macarthur Drive	Mill And Overlay	\$102,380.21
2013	Kingsview Drive	Wade Gate	Cul-De-Sac	Mill And Overlay	\$43,944.59
2013	Kipling Avenue	Maria Antonia Road	Mediterra Drive	Crack Seal	\$933.63
2013	Kipling Avenue	Meeting House Road	Chavender Place	Crack Seal	\$1,270.88
2013	Kipling Avenue	Dead End	Veneto Drive	Loc Upgrade	\$123,866.30
2013	Kirby Road	Veneto Drive	Highway 7	Mill And Overlay	\$143,029.70
2013	Kokanee Court	Dufferin Street	Ravineview Drive	Crack Seal	\$5,737.25
2013	Langstaff Road	Laurentian Boulevard	Cul-De-Sac	Crack Seal	\$1,273.08
2013	Langstaff Road	Dead End	Creditstone Road	Crack Seal	\$1,297.63
2013	Laurentian Boulevard	Creditstone Road	Jane Street	Mill And Overlay	\$82,202.49
2013	Lime Drive	Kirby Road	Cul-De-Sac	Crack Seal	\$5,595.25
2013	Lina Mairra Drive	Fiori Drive	Cul-De-Sac	Remove And Replace	\$335,351.11
2013		Foxfield Crescent	Foxfield Crescent	Crack Seal	\$1,001.61

2013 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2013	Liskeard Circle	Carmen Crescent	Carmen Crescent	Mill And Overlay	\$49,950.42
2013	Lloyd Street	Davidson Drive	Dead End	Crack Seal	\$900.08
2013	Looking Glass Court	Belview Avenue	Lime Drive	Mill And Overlay	\$73,665.38
2013	Macamo Court	Woodland Acres Crescent	Cul-De-Sac	Crack Seal	\$1,424.39
2013	Macarthur Drive	Katerina Avenue	Cul-De-Sac	Crack Seal	\$471.69
2013	Macarthur Drive	Beverley Glen Boulevard	Katerina Avenue	Mill And Overlay	\$69,977.73
2013	Maika Gate	Katerina Avenue	Oakhurst Drive	Mill And Overlay	\$21,840.30
2013	Marcus Court	Woodland Acres Crescent	Cul-De-Sac	Crack Seal	\$813.37
2013	Marieta Street	Belair Way	Belair Way	Mill And Overlay	\$52,272.15
2013	Marieta Street	Belview Avenue	Belair Way	Remove And Replace	\$66,720.68
2013	Martina Crescent	Mediterra Drive	Mediterra Drive	Crack Seal	\$1,423.59
2013	Matterhorn Road	Laurentian Boulevard	Nevada Crescent	Crack Seal	\$1,192.29
2013	Mccabe Crescent	Conley Street	Mccabe Crescent	Crack Seal	\$1,925.58
2013	Mcdintock Crescent	Conley Street	Conley Street	Crack Seal	\$1,823.17
2013	Mccrackin Court	Borrowes Street	Cul-De-Sac	Crack Seal	\$158.73
2013	Mckenzie Street	Highway 7	Dead End	Lcb Upgrade	\$54,143.08
2013	Meadowland Court	Golf Avenue	Cul-De-Sac	Crack Seal	\$822.14
2013	Mediterra Drive	Fossil Hill Road	Vallere Avenue	Crack Seal	\$2,001.88
2013	Meeting House Road	Clarence Street	Kipling Avenue	Remove And Replace	\$354,976.73
2013	Melissa Court	Woodland Acres Crescent	Cul-De-Sac	Crack Seal	\$383.07
2013	Millrun Crescent	Shamrock Crescent	Shamrock Crescent	Crack Seal	\$1,610.02
2013	Millway Avenue	Pennsylvania Avenue	Langstaff Road	Crack Seal	\$6,714.30
2013	Millwood Court	Millwood Parkway	Cul-De-Sac	Crack Seal	\$550.18
2013	Millwood Parkway	Major Mackenzie Dr West	Cul-De-Sac	Crack Seal	\$4,997.01
2013	Miriam Garden Way	Katerina Avenue	Oakhurst Drive	Crack Seal	\$552.79
2013	Moccasin Trail	Wigwoss Drive	Cul-De-Sac	Crack Seal	\$953.41
2013	Mountbatten Road	Tova Place	Westmount Boulevard	Crack Seal	\$2,583.39
2013	Mountfield Crescent	Brownridge Drive	Brownridge Drive	Mill And Overlay	\$63,666.50
2013	Nada Crescent	Trevor Street	Trevor Street	Crack Seal	\$1,826.85
2013	Nadia Avenue	Kipling Avenue	Angelina Avenue	Mill And Overlay	\$56,231.21
2013	Nattress Street	Riverside Drive	Pine Ridge Avenue	Mill And Overlay	\$33,683.80
2013	Nevada Crescent	Laurentian Boulevard	Laurentian Boulevard	Crack Seal	\$3,520.89
2013	New Westminster Drive	Steeles Avenue West	Joseph Aaron Boulevard	Mill And Overlay	\$240,064.93
2013	Nikitas Court	Dead End	Rebecca Court	Crack Seal	\$429.21
2013	Nimacor Avenue	Courtland Avenue	Romina Drive	Mill And Overlay	\$56,862.67
2013	Norglen Road	Belview Avenue	Romina Drive	Mill And Overlay	\$31,166.79
2013	Norton Place	Meeting House Road	Cul-De-Sac	Remove And Replace	\$34,918.37
2013	Oakhurst Drive	Beverley Glen Boulevard	Edenbridge Drive	Crack Seal	\$420.98
2013	Oakhurst Drive	Edenbridge Drive	Karl Court	Mill And Overlay	\$99,521.28
2013	Olive Green Road	Chancellor Drive	Fort Drive	Mill And Overlay	\$66,871.94
2013	Pamela Court	Woodland Acres Crescent	Cul-De-Sac	Crack Seal	\$722.64
2013	Parsons Place	Valentine Place	Cul-De-Sac	Crack Seal	\$665.15

2013 Pavement Management Program					
Year	Street	From	To	Treatment Name	Cost
2013	Patrice Crescent	Campbell Avenue	Campbell Avenue	Crack Seal	\$1,723.33
2013	Pentland Crescent	Empress Road	Greenock Drive	Crack Seal	\$2,370.17
2013	Petermar Drive	Millwood Parkway	Millwood Parkway	Crack Seal	\$3,014.12
2013	Pikington Crescent	Chelwood Drive	Judith Avenue	Mill And Overlay	\$43,026.09
2013	Pine Grove Road	Pine Valley Drive	Islington Avenue	Crack Seal	\$4,002.31
2013	Pine Ridge Avenue	Nattress Street	Woodview Road	Crack Seal	\$1,036.14
2013	Pine Valley Crescent	Clubhouse Road	Cul-De-Sac	Mill And Overlay	\$161,523.41
2013	Pinewood Drive	Hilda Avenue	Cul-De-Sac	Mill And Overlay	\$130,600.39
2013	Pippin Road	Jane Street	Credistone Road	Crack Seal	\$4,930.32
2013	Quail Run Boulevard	Teston Road	Cul-De-Sac	Crack Seal	\$6,337.91
2013	Queensbridge Drive	Confederation Parkway	Westway Crescent	Crack Seal	\$1,749.69
2013	Rachelle Court	Stephanie Boulevard	Cul-De-Sac	Crack Seal	\$1,370.80
2013	Rebecca Court	Woodland Acres Crescent	Honey Locust Court	Crack Seal	\$3,213.62
2013	Rejane Crescent	Campbell Avenue	Campbell Avenue	Crack Seal	\$1,756.03
2013	Richbell Street	Wade Gate	Brownridge Drive	Mill And Overlay	\$87,341.91
2013	Riverside Drive	Nattress Street	Woodview Road	Crack Seal	\$1,286.19
2013	Riverside Drive	Willis Road	Nattress Street	Mill And Overlay	\$39,374.87
2013	Riverview Avenue	Emerson Court	Jules Avenue	Crack Seal	\$3,273.09
2013	Rodeo Drive	Atkinson Avenue	Cul-De-Sac	Crack Seal	\$2,519.27
2013	Romina Drive	Edgley Boulevard	Corstate Avenue	Mill And Overlay	\$225,587.32
2013	Rondeen Road	Derrywood Drive	Ten Oaks Boulevard	Crack Seal	\$944.98
2013	Rosebury Lane	Clarence Street	Meeting House Road	Remove And Replace	\$331,020.10
2013	Rosewood Court	Rosebury Lane	Cul-De-Sac	Remove And Replace	\$42,184.34
2013	Samuel Oster Avenue	Chelwood Drive	Judith Avenue	Mill And Overlay	\$59,742.80
2013	Sara Street	Tasha Court	Angelina Avenue	Mill And Overlay	\$31,981.96
2013	Shallmar Place	Pentland Crescent	Cul-De-Sac	Crack Seal	\$552.35
2013	Shamrock Crescent	Roselawn Drive	Roselawn Drive	Crack Seal	\$2,377.01
2013	Silver Fox Place	Woodland Acres Crescent	Cul-De-Sac	Crack Seal	\$1,155.35
2013	Snidercroft Road	Keele Street	Cul-De-Sac	Crack Seal	\$4,632.71
2013	Snow Boulevard	Talman Court	Pippin Road	Crack Seal	\$4,763.79
2013	Southlawn Drive	Capri Court	Vaughan Mills Road	Crack Seal	\$1,939.32
2013	Spring Garden Gate	Vaughan Mills Road	Deerchase Circle	Crack Seal	\$518.40
2013	Spring Gate Boulevard	Atkinson Avenue	Thornbury Circle	Crack Seal	\$2,325.34
2013	Spring Gate Boulevard	Cul-De-Sac	Charles Street	Mill And Overlay	\$119,815.84
2013	Stan Gate	Langstaff Road	Belview Avenue	Mill And Overlay	\$61,133.56
2013	Steeves Court	Mcclellan Crescent	Cul-De-Sac	Crack Seal	\$117.81
2013	Stephanie Boulevard	Kirby Road	Kirby Road	Crack Seal	\$6,622.24
2013	Sugarbush Court	Greenway Walk	Cul-De-Sac	Crack Seal	\$622.90
2013	Sundown Court	Swinton Crescent	Cul-De-Sac	Crack Seal	\$303.80
2013	Sunnyview Street	Westway Crescent	Westway Crescent	Crack Seal	\$1,243.96
2013	Swinton Crescent	Borrow Street	Borrow Street	Crack Seal	\$2,019.70
2013	Sylvadene Parkway	Fredrick Street	Francis Street	Crack Seal	\$497.50

2013 Pavement Management Program						
Year	Street	From	To	Treatment Name	Cost	
2013	Tandian Court	Langstaff Road	Cul-De-Sac	Crack Seal	\$767.32	
2013	Tangreen Circle	Spring Gate Boulevard	Spring Gate Boulevard	Crack Seal	\$1,641.22	
2013	Tanjo Court	Springfield Way	Cul-De-Sac	Mill And Overlay	\$36,723.32	
2013	Tasha Court	Nadia Avenue	Cul-De-Sac	Mill And Overlay	\$37,173.66	
2013	Teagarden Court	Jaimie Road	Cul-De-Sac	Mill And Overlay	\$12,914.30	
2013	Thomson Creek Boulevard	Roselawn Drive	Vaughan Mills Road	Crack Seal	\$1,718.88	
2013	Thornbury Circle	Spring Gate Boulevard	Spring Gate Boulevard	Crack Seal	\$1,451.00	
2013	Tinti Place	Campbell Avenue	Cul-De-Sac	Crack Seal	\$405.79	
2013	Trevor Street	Belview Avenue	Belair Way	Crack Seal	\$1,361.06	
2013	Valentine Place	Carl Tennen Street	Cul-De-Sac	Crack Seal	\$275.70	
2013	Vas Road	Vellore Avenue	Medterra Drive	Crack Seal	\$911.80	
2013	Vaughan Mills Road	Humberview Drive	Thomson Creek Boulevard	Crack Seal	\$5,562.63	
2013	Vellore Avenue	Maria Antonia Road	Dead End	Crack Seal	\$1,927.37	
2013	Vroom Court	Riverview Avenue	Cul-De-Sac	Crack Seal	\$515.91	
2013	Wade Gate	Centre Street	Brownridge Drive	Mill And Overlay	\$138,714.93	
2013	Wakelin Court	Islington Avenue	Cul-De-Sac	Crack Seal	\$1,379.99	
2013	Wallace Street	Highway 7	Cul-De-Sac	Lot Upgrade	\$32,925.03	
2013	Waymar Heights Boulevard	Davidson Drive	Gamble Street	Crack Seal	\$2,368.85	
2013	Westcroft Avenue	Brownridge Drive	Judith Avenue	Crack Seal	\$414.88	
2013	Westway Crescent	Camden Drive	Confederation Parkway	Crack Seal	\$4,944.42	
2013	White Boulevard	Draper Boulevard	Draper Boulevard	Mill And Overlay	\$104,257.36	
2013	Wigwoss Court	Wigwoss Drive	Cul-De-Sac	Crack Seal	\$248.96	
2013	Wigwoss Drive	Highway 7	Arrowhead Drive	Crack Seal	\$5,364.29	
2013	Willis Road	Pine Valley Drive	Islington Avenue	Mill And Overlay	\$183,775.74	
2013	Wood Dale Road	Camden Drive	Westway Crescent	Crack Seal	\$903.62	
2013	Woodland Place	Major Mackenzie Drive West	None	Crack Seal	\$1,037.46	
2013	Woodland Acres Crescent	Bathurst Street	Bathurst Street	Crack Seal	\$13,700.50	
2013	Woodview Road	Riverside Drive	Riverside Drive	Crack Seal	\$786.67	

# ATTACHMENT NO. 3

## CITY OF VAUGHAN

### EXTRACT FROM COUNCIL MEETING MINUTES OF APRIL 2, 2007

Item 1, Report No. 14, of the Committee of the Whole (Working Session), which was adopted without amendment by the Council of the City of Vaughan on April 2, 2007.

#### 1 5 YEAR PAVEMENT MANAGEMENT PROGRAM

The Committee of the Whole (Working Session) recommends:

- 1) That the recommendation contained in the following report of the Commissioner of Engineering and Public Works, dated March 20, 2007, be approved; and
- 2) That the presentation by the Supervisor, Infrastructure Management, and presentation material submitted entitled, "5-Year Pavement Management Program", be received.

#### Recommendation

The Commissioner of Engineering and Public Works in consultation with the Commissioner of Finance and Corporate Services recommends:

1. That the proposed 5 Year Pavement Management Program be approved; and
2. That the Commissioner of Engineering and Public Works be authorized to engage external professional services for the preliminary engineering and design of the projects proposed in the 5 Year Pavement Management Program upon approval of the 2007 Capital Budget Item EN-1655-07 Pre-Engineering Pavement Management Program.

#### Economic Impact

The 5 Year Pavement Management Program will require an investment of \$46,732,600 (excluding interest). The capital component of \$45,752,600 compares to the \$45,000,000 (excluding interest) which would be required over the next 5 years under the previous Roads Program. Capital Funding is provided through the issuance of debentures while maintenance related costs are funded through the Operating Budget. The issuance of the long term debt will have an estimated interest cost of \$13,500,000 when the projects are complete.

The requirement per annum is broken down as follows:

Year	Long Term Debenture (LTD) Amount	Annual Principal & Interest On Issue	Annual Maintenance	Total Operating Budget Impact	Annual Impact of Tax Rate (r=1,014,037)	Cumulative Operating Budget Impact
07	\$10,815,000	\$1,400,592	\$200,000	\$1,600,592	1.58%	1.58%
08	\$6,592,000	\$853,694	\$240,000	\$1,093,694	1.08%	2.66%
09	\$9,064,000	\$1,173,830	\$240,000	\$1,413,830	1.39%	4.05%
10	\$9,084,600	\$1,176,497	\$160,000	\$1,336,497	1.32%	5.37%
11	\$10,197,000	\$1,320,558	\$140,000	\$1,460,558	1.44%	6.81%
Total	<b>\$45,752,600</b>	<b>\$5,925,171</b>	<b>\$980,000</b>	<b>\$6,905,171</b>		

The cumulative annual impact after year 5 of the 5 Year Payment Management Program to the operating budget as a result of issuing debentures in the amount of \$45,752,600 and funding the \$980,000 5 year maintenance program is \$6,905,171 or 6.81% on the tax rate. The payments will continue over the term of the debentures which has been typically 10 years.

The Long Term optimization of resources can be achieved through City initiatives such as the Pavement Management System. Modeling these figures within the Long Range Financial

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**EXTRACT FROM COUNCIL MEETING MINUTES OF APRIL 2, 2007**

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Planning Model so that future funding implications are known and can be planned for at the earliest possible point in time will allow for budgetary and/or program changes to be considered accordingly.

It should be noted that 2007 to 2008 is a transition year in implementing the 5 Year Pavement Management Program. The 2007 program reflects the older Road Reconstruction, Road Resurfacing and Rural Road Upgrade combined programs based on a 'worst first', Road Needs methodology. The 2008 and beyond program reflects a life cycle triggered and greatest-return-on-dollar invested methodology. The increased dollar figures for the 2007 year reflect updated project benchmark estimates using unit rates developed in the Pavement Management System.

**Communications Plan**

There has not been public consultation to this point. Implementation of individual projects would be subject of the Engineering Services Department standard communication with affected residents prior to and during construction.

**Purpose**

The purpose of this report is to obtain Council approval of the 5 Year Pavement Management Program, Project Level Program requirements based on the Level Of Service to maintain an overall average road network rating being a Pavement Composite Index (PCI) of 70 out of 100 (possible points) and communicate the associated funding requirements.

**Background - Analysis and Options**

**Pavement Management System Project Initiation**

On December 6, 2004, Council approved the contract award for the Pavement Management System project. The purpose of a Pavement Management System (PMS) is to assist City staff in the coordination, planning and implementation of its roadway maintenance, rehabilitation and construction programs.

**Traditional Roads Program Methodology**

On June 27, 2005, Council endorsed in principle, Road Resurfacing, Road Reconstruction and Rural Roads Upgrading Programs for 2006.

Annually, staff brings forward a report to seek Council endorsement of the proposed 5 Year Roads Program and authorization to employ external professional engineering services for the preliminary engineering and detailed design of these proposed construction projects.

The adoption of this program was to deal with the increasing backlog of deteriorating roads and to provide Council with a comprehensive plan for road upgrading across the City. These programs (Road Resurfacing, Road Reconstruction and Rural Road Upgrading) were prepared on a 'worst first' basis and road sections are evaluated utilizing factors such as traffic volumes and condition rating of the road facility. Consideration was also given to other factors such as roads in the same vicinity that are also deficient and that were constructed in the same era as well as needs identified regarding the condition of existing underground services such as sewers and watermains.

This last report advised Council that a new program would be coming forward with the implementation of a Pavement Management System.

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New Asset Management Methodology

On February 16, 2006, Council endorsed through resolution, InfraGuide and the best practices with respect to Asset Management. Through InfraGuide, a comprehensive business strategy involves three pillars: People, Information and Technology.

The Essential Elements of an Asset Management Plan are:

1. *What do you have and where is it?*
2. *What is it worth?*
3. *What is its condition and its expected service life?*
4. *What is the level of service expectation, what needs to be done?*
5. *When do you need to do it?*
6. *How much will it cost and what is the acceptable level of risk?*
7. *How do you ensure long term affordability?*

People, Information and Technology in practice with the Essential Elements is the key to a successful implementation of an Asset Management Plan.

It is within this framework that the 5 Year Pavement Management Program is being reported.

Pre-Engineering

The Engineering Services Department completes design and tender documents for Capital construction projects annually at the earliest possible time. Having early tenders produces savings to the City through lower unit rates from bidders and earlier project start and finish dates, resulting in reduced impact to citizens and the environment.

Engineering Services has traditionally worked on Pre-Engineering for various projects one year in advance of their proposed construction year. This methodology becomes restrictive when the annual budget approval process goes beyond February of the current calendar year.

Staff seek Council's approval of Pre-Engineering beyond the traditional 1 year window to a multi-year window. This will allow the City to have completed design and tender documents "on the shelf" for multiple projects, in multiple years ready for bidding. With projects in this state, the City can go out to tender at the earliest possible time and take advantage of lower rates and favourable construction timing.

5 Year Pavement Management Program

The Infrastructure Management Division of the Engineering Services Department is responsible for infrastructure records, engineering related data and data management and strategic analysis related to the City's civil infrastructure. The Division maintains road related data and undertakes the condition assessment of the City's roads annually in partnership with the Design Services Division and the Public Works Department.

The base data required for the Pavement Management System is generated as a regular function of the Infrastructure Management Division and is fully integrated with the Enterprise G.I.S. Database.

1. What do you have and where is it?

The inventory of City owned active roads are summarized in the following table by Ward, Surface Material Type.

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**EXTRACT FROM COUNCIL MEETING MINUTES OF APRIL 2, 2007**

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Table No. 1

Summary of Road Network - By Ward and Surface Material			
Ward	Surface Material	Total C/L (km)	Total Lane (km)
1	Gravel / Stone	24.23	48.46
	Asphalt	235.48	503.46
	Surface Treated	28.61	57.21
2	Gravel / Stone	8.50	17.00
	Asphalt	153.27	347.89
	Surface Treated	6.25	12.50
3	Asphalt	101.25	258.83
4	Asphalt	178.12	449.81
5	Asphalt	74.63	174.99
	Surface Treated	3.27	6.53
<b>Total</b>		<b>813.61</b>	<b>1876.68</b>

2. What is it worth?

Based on the Reconstruction unit rate used in the Pavement Management System, staff have estimated the replacement value of the City's entire road network to be approximately **\$1.8 BILLION DOLLARS**. This figure does not include the value for underground servicing such as water and wastewater systems nor boulevard amenities such as sidewalk or street lighting.

3. What is its condition and its expected service life?

The condition of a road is determined through a combination of field inspection and review of various analytical factors. Individual ratings and indices are combined into an overall index called a **Pavement Composite Index (PCI)** with an ascending range of 0 (worst) to 100 (best). This index is comprised of 3 major subsections being:

Health	The condition of a road which includes surface ride comfort, structural distresses and its ability to properly drain water away from the road's structural components;
Capacity	The current, measured traffic volume (Annual Average Daily Traffic) as compared to the theoretical capacity of a road;
Physical Environment	The remaining considerations surrounding the behavior of a road including skid resistance, safety and geometry.

A complete definition and description of the Pavement Composite Index is included in Attachment No. 1.

According to the Pavement Management System, our current average network condition for all City roads has a PCI of 86.7 out of 100 possible points. This differs from an average of 86.2 out of 100 previously reported which reflects an update to road condition to the network based on work done in 2006.

Our current average network condition distribution for all City roads is summarized in the following table:

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Table No. 2

Pavement Management System Grouping	Value Range	Network Distribution
Excellent	80 to 100	81.6%
Good	60 to 80	15.8%
Fair	35 to 60	2.6%
Poor	20 to 35	0%
Very poor	0 to 20	0%

4. What is the level of service expectation, what needs to be done?, and
5. When do you need to do it?

Setting a **Level of Service (LOS)** or a target, is an important and critical step in a proper Asset Management Plan. From Item 1, Report No. 28 of the Committee of the Whole (Working Session) on May 23, 2006, Council set a Level Of Service to maintain an overall average road network rating being a **Pavement Composite Index (PCI) of 70 out of 100** (possible points).

Applicable treatments that fall within Capital and Operations and Maintenance Budget categories are as follows:

Budget Type	Treatment Name
Operating	Crack Seal
Operating	Drainage Treatment
Capital	Complete Reconstruction
Capital	Gravel To HCB
Capital	Gravel To LCB
Capital	LCB Surface Treatment
Capital	LCB Upgrade To HCB
Capital	Micro Surface
Capital	Mill And Overlay
Capital	Pulverize And Overlay
Capital	Remove And Replace

Attachment No. 2 includes a detailed Project Level Program This list is sorted by the following criteria:

- Year
- Treatment Name
- Street Name
- Street From
- Street To

Please note that the Pavement Management Program reflects a shift to more preventative and rehabilitative methods of intervening strategies in the lifecycle of a road such as Crack Sealing, Micro Surfacing and Mill and Overlay. This philosophy will provide the City with its greatest return on every dollar invested to maximize the life of our road asset.

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6. How much will it cost and what is the acceptable level of risk?

Based on the target Level of Service, investment required over the next 5 years are as follows:

Year	Capital Budget	Operating Budget
2007	\$10,815,000.00	\$200,000.00
2008	\$6,592,000.00	\$240,000.00
2009	\$9,064,000.00	\$240,000.00
2010	\$9,084,600.00	\$160,000.00
2011	\$10,197,000.00	\$140,000.00

Ongoing discussions take place with staff of our Public Works Department regarding the conditions of existing underground services such as storm and sanitary sewers and watermains. If there is also a potential need to perform substantial repairs or replacement of underground services in the near future, then the road need in those locations will be aligned to remedy both deficiencies at the same time.

7. How do you ensure long term affordability?

As the City's road infrastructure, information, systems and technology matures, multi-faceted integration across all asset classes such as roads, structures, pipes and amenities will be realized. This is a natural path not only from an engineering technical analysis but should also be embraced from a financial perspective.

We must acknowledge that activities such as Crack Sealing and Drainage Treatment directly affect the lifecycle of a road. Future funding requirements will shift year to year between preventative and rehabilitative types of intervention such as Crack Sealing and Mill and Overlay.

Ensuring that the funding requirements are captured in the long range financial planning model and that any increases to proposed funding requirements are supported, will ensure that the road network is maintained at our target Level of Service.

Meeting the target level of service is critical to maximize the benefit for every dollar we invest in road rehabilitation which will directly reduce costly future road reconstruction. Should current and future funding levels not be supported, we risk further deterioration of roads, a reduced level of serviceability and increase long term maintenance costs for our road system, without the opportunity to achieve sustainability.

**Regional Implications**

There are no Regional implications.

**Relationship to Vaughan Vision 2007**

This report is consistent with the priorities previously set by Council.

*Service Delivery Excellence*

We are able to develop and establish service level standards that are sustainable and provide effective and efficient delivery of service.

*Manage our Resources*

The City has a significant investment in infrastructure that requires a process and a plan to ensure that its repair and eventual replacement is properly managed.

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*Communications and Public Relations*

Through endorsement of the InfraGuide Best Practices, we strengthen Corporate Image and identity.

*Technology and Innovation*

The system conforms with the policies, standards and procedures as defined through the Corporate G.I.S. Initiative. The 5 Year Pavement Management Program achieves the Corporate Strategic Plan to develop and implement an Infrastructure Management System to enhance safety through proactive repair and replacement and improve financial efficiency and return on investment through life cycle costing.

**Conclusion**

The purpose of this report is to obtain Council approval of the 5 Year Pavement Management Program, Project Level Program requirements which meets the Level Of Service to maintain an overall average road network rating being a Pavement Composite Index (PCI) of 70 out of 100 (possible points) and to communicate the associated funding requirements.

**Attachments**

1. Attachment No. 1 - Summary of Terms
2. Attachment No. 2 – 2007 to 2011 Pavement Management Program

**Report prepared by:**

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(A copy of the attachments referred to in the foregoing have been forwarded to each Member of Council and a copy thereof is also on file in the office of the City Clerk.)