



## CITY OF KIRKLAND

### Department of Public Works

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#### MEMORANDUM

**To:** David Ramsay, City Manager

**From:** Ray Steiger, P.E., Interim Public Works Director  
Andrea Mast, P.E., Project Engineer

**Date:** February 10, 2010

**Subject:** STREET PRESERVATION STRATEGIES

#### RECOMMENDATION:

It is recommended that the City Council review and discuss the proposed street preservation strategies.

#### BACKGROUND AND DISCUSSION:

This memo summarizes the work of the Transportation Commission, the Council Finance Committee, and Public Works Staff over the last year to develop a proposal to stabilize and/or increase the overall pavement quality in the City of Kirkland. Staff has included a number of options for consideration and is seeking additional comment, feedback, and direction from the Council.

#### *Pavement Condition Index and Deferred Maintenance*

In 2002, 2005, and 2009, Staff presented Council with reports that summarized the City's Pavement Management System (PMS), the roadway network pavement condition, and made recommendations for funding of the City's Annual Street Preservation Program based on a ten year projection of the street system condition. Using information presented in the reports, and after discussions with Staff, Council established budgets for the Annual Street Preservation Program in the Capital Improvement Program. Additionally, based on the 2005 report, Council approved the purchase of a commercial grade asphalt paving machine for use by City maintenance personnel to supplement the Annual Preservation Program.

In the 2009 report to Council, Staff indicated that the overall Pavement Condition Index (PCI) for the City's street network had declined to 65 and was trending downward; this compared to an overall PCI of 70 and 67 in the 2005 and 2002 reports respectively. As a point of reference, a newly paved roadway has a PCI of 100, and over time, the PCI decreases depending on environmental exposure, traffic volumes, and other factors (Figure A). The PCI of the overall City street network is a combination of *all* individual roadways (150 miles of City streets) and their respective PCI's; it is this overall PCI that is used to summarize the "health" of the network. This measure is utilized for objective comparisons over time, with other agencies, and in grant funding applications. Other factors also need to be considered when assessing the complete picture of street network health such as the type of road vs. the PCI (for example, maintaining higher PCI's on the arterials helps commerce and transit in addition to cars; neighborhood street speeds are lower and PCI for driver comfort is not as crucial), however the PCI is a good benchmark to use for comparisons.

Besides sufficient funding, optimizing the investment level for a street network over its lifetime requires two considerations: 1) determining the best treatment measure for given conditions (the PCI rating among those conditions), and 2) determining the correct time to apply the measure. To start with, Kirkland has identified a

number of acceptable treatment measures for pavement repair ranging in cost and applicability; they include: slurry seal, patching, overlay, and total reconstruction. An *unacceptable* treatment measure, tried in the mid 1990's, is called "chip seal", and this measure is not used in Kirkland; the materials used in chip seal were incompatible with the urban nature of Kirkland and community feedback took that measure off the list of options. Slurry seal on the other hand (also a low cost preventative maintenance measure) is used on certain roads with good PCI's (typically above 80), and it allows for the roadway's life to be extended a number of years at a low cost (Figure B). Slurry seal cannot be applied indefinitely, since over time the structure of the underlying asphalt will break down, but it can be applied on repeating cycles (say every 5 – 8 years) thereby saving the cost of the more expensive overlay treatment. As graphically shown in Figure B, a number of low costs slurry seals can be applied to keep the pavement in the "good" range rather than immediately overlaying at the early signs of degradation. On the other end of the cost spectrum is total reconstruction.

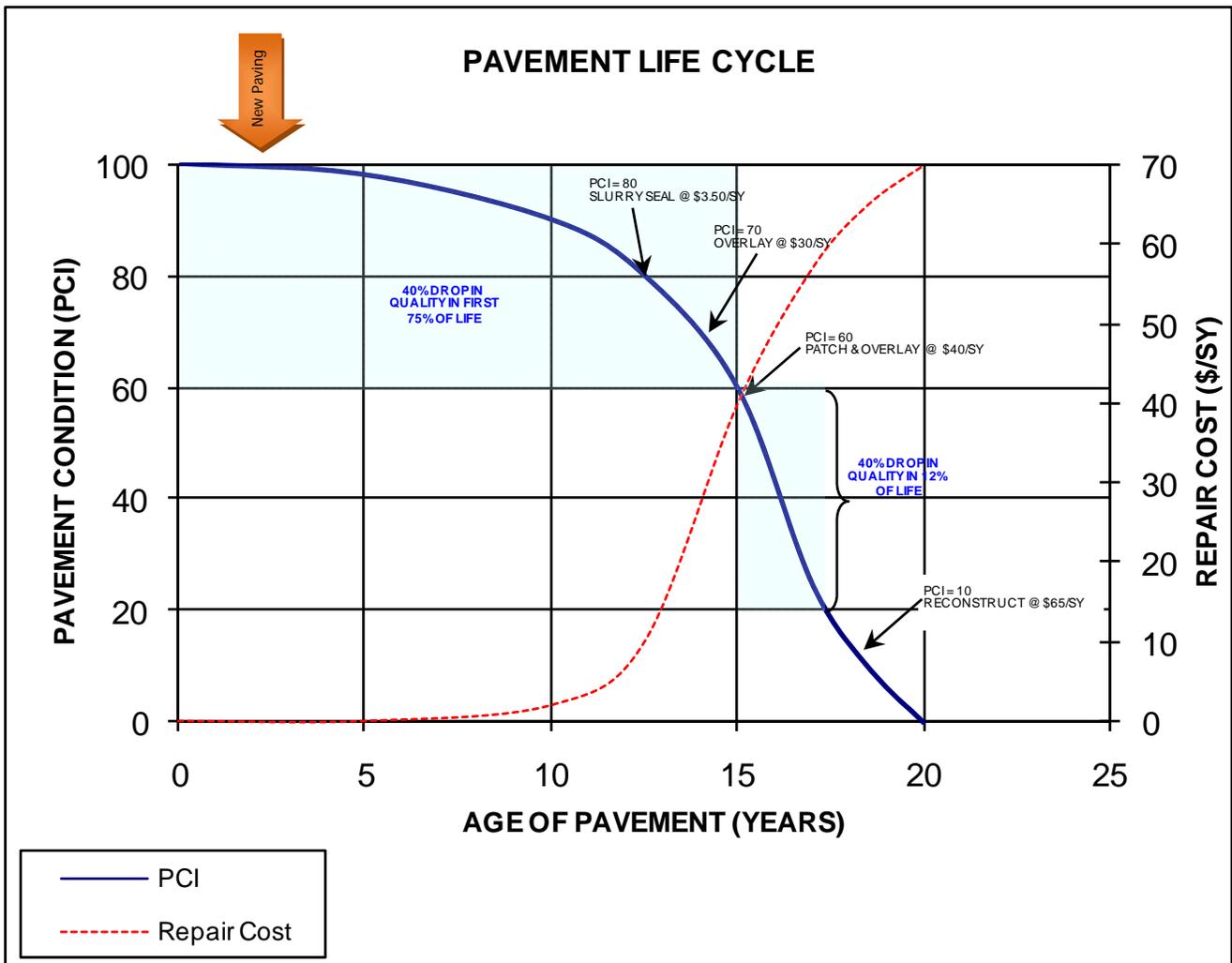
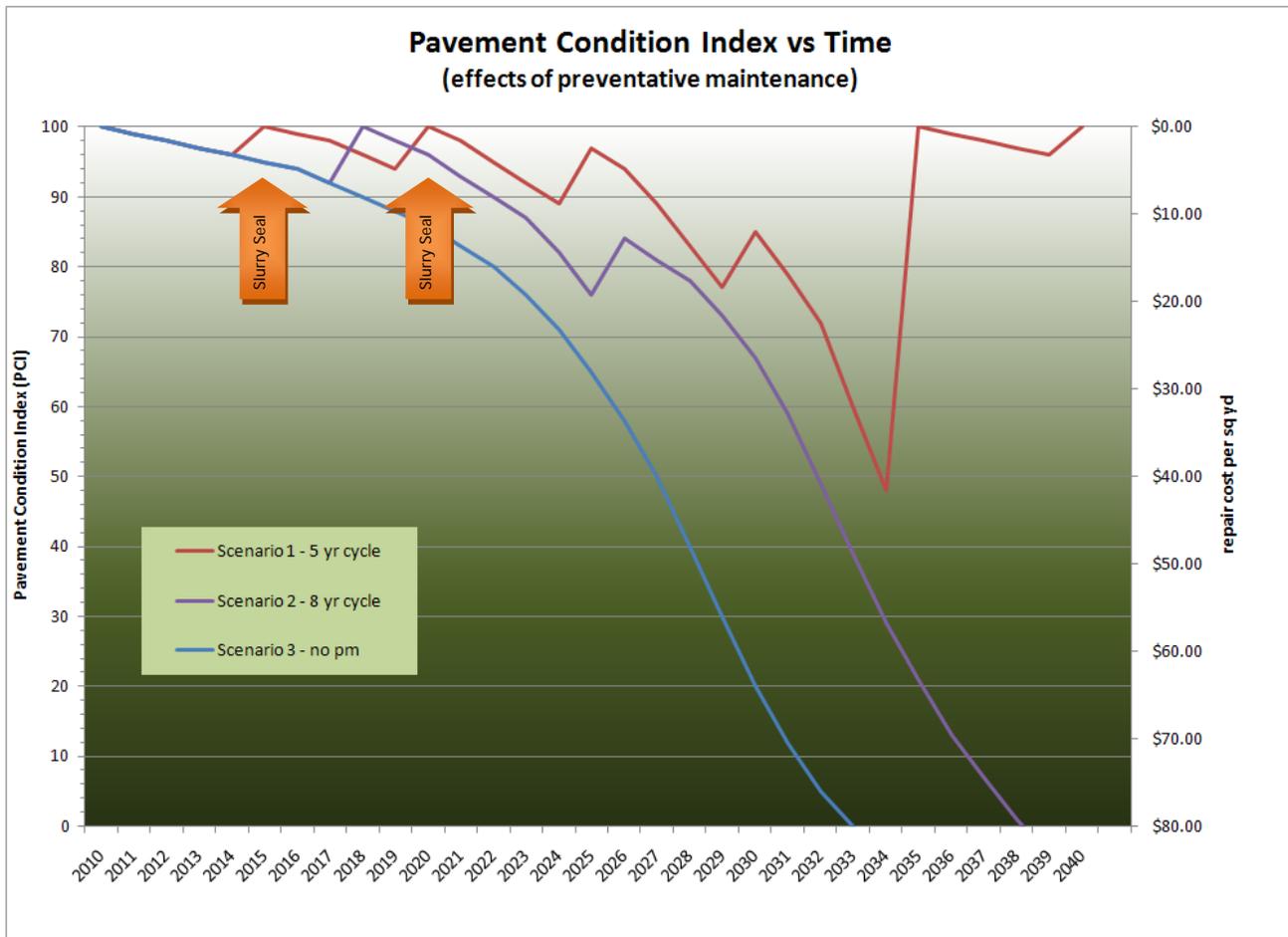


Figure A – Typical asphalt degradation curve over time



**Figure B – lifecycle cost comparison of asphalt treatment measures**

Reconstruction involves complete removal of the roadway section down to the native soil, and then the road is reconstructed with excellent materials using appropriate construction methods under good weather conditions; this is the most expensive measure and represents the largest impact to residents, commuters, and other users during the construction activities. This measure is typically used once a roadway has degraded below the 20 PCI range. The direct cost of reconstruction does not increase significantly as the road degrades further than this PCI range, but the indirect cost, tire damage, complaints, and general community dissatisfaction, will continue to go up. Most of the roadways under Kirkland’s current funding level and overall PCI fall within the more moderately priced overlay treatment measure.

Along with the PCI, a second attribute that can be looked at globally with the PMS is the deferred maintenance of the network – the estimated repair cost in current dollars to bring the whole system to a PCI of 85. A PCI of 85 for the entire network represents the optimum investment in the system. At this level, repair costs are minimized since the low cost treatment measures are applicable at that level. An overall PCI of 100 as a target would not consider the useful life of the pavement and is virtually impossible to attain for a large roadway system. A typical roadway will function completely well between the PCI 85 and 100 level without any maintenance. On the other hand, a PCI that slips into the “steeper” portion of the degradation curve, not only costs more to repair but degrades at an accelerated rate. Thus, industry wide a PCI at 85 is recognized to optimize investment over the life of a system; this sweet spot on the degradation curve balances expenditures and amount of useful life of the pavement. For comparison, Figure C shows a number of comparable agencies.

Questions	Mill Creek	Marysville	Kent	Olympia	Bellevue	Redmond	Bothell
Network PCI	NA	76	81	78	83 (OCI)	85 (estimated)	68 (OCI)

						OCI)	
<b>Year of Survey</b>	2008	2008	2009	2007	2007	2008	
<b>Annual Investment</b>	\$400K in 2010 \$500K in 2013	\$800K in CIP + \$80K in-house annually \$0 spent 2009 & 2010 due to budget	\$5.4M annually \$0 spent 2008 & 2009 due to budget	\$2,225,000 annually	\$5.5M annually	\$1M annually	\$630K annually
<b>Centerline Miles</b>	50	196		206	390	135	118
<b>Lane Miles</b>	104	411		500	942	332	264

**Figure C – Puget Sound comparable agency Street System report**

In 2005, the deferred maintenance of the City's street network was approximately \$9,000,000; in the 2009 report, replacement of the network would cost an estimated \$15,500,000 (2008 \$). The cost per ton of asphalt increased from approximately \$42 in 2005 to \$80 in 2008. If no repairs had been conducted on the system and if there were no degradation (i.e. a static system), a doubling of the cost of repair would have doubled the deferred maintenance – this however was not the case. Repairs were done and the system did degrade further. However, since the system deferred maintenance did not double, using this as one more measuring attribute suggests that the backlog was being somewhat mitigated with spending during that timeframe. However, significantly more remains to be done.

The annual street preservation program is one category of the City's transportation program. Other categories are building the capacity network to comply with concurrence under GMA, other maintenance programs, and building the non-capacity (or non-motorized) network. Approximately \$7.4 million of funding is annually available for the transportation system from a number of sources and for the 2009-2014 CIP were targeted as shown in Figure D.

<b>Average Annual Transportation funding 2009 through 2014:</b>	
Current revenue:	
Gas Tax	\$ 544,000
Sales Tax	\$ 270,000
REET 1	\$ 567,000
REET 2	\$ 1,701,000
Impact fees	\$ 2,104,000
Surface Water	\$ 950,000
Subtotal	\$ 6,136,000
REET 2 (grant match reserve)	\$ 480,000
Grants (avg '93-'03)	\$ 792,500
<b>Total annual funding</b>	<b>\$ 7,408,500</b>

Target allocation per Category	Concurrence (94% of "req'd")	\$ 3,860,000
	Sidewalk Maintenance	\$ 200,000
	Street Maintenance	\$ 2,000,000
	Striping Program	\$ 250,000
	Non-capacity (target)	\$ 1,098,500

**Figure D – transportation funding components and allocation (per 2009 report)**

In light of the 10-year projections of the street network under the 2009-2014 CIP budgeted amounts (a PCI=54 and a deferred maintenance of \$142 million) and after presentation of the 2009 report, the Council asked staff to review any and all possible innovations and funding sources to increase Kirkland's PCI. The alternatives were to examine both the revenue and expenditure side of the issue. In addition, we were asked to work with the Finance Committee and the Transportation Commission and return with a plan to enhance our overall street maintenance program.

*Since the 2009 report*

Staff has worked on this issue for the last several months. In addition, we presented draft proposals at three Transportation Commission meetings during 2009, and each time were provided with useful feedback and direction. In July, 2009 Staff updated the Finance Committee with information on the components and requirements of a Transportation Benefit District (TBD). At that time, the Finance Committee asked that Staff present the TBD option in context of the full array of funding options. Staff was asked to continue to work with the Transportation Commission on developing options.

The recommendations in this memo are a result of feedback from the Transportation Commission. There were several recommendations the Transportation Commission noted which are incorporated in this summary. It should be noted the Transportation Commission also reviewed our recommendations in light of the recently developed 'Transportation Conversation' document and with consideration of the recent Council Goal on "Dependable Infrastructure." In addition, Staff has attended pavement management workshops, researched practices in other cities, and evaluated our internal procedures and processes in order to develop this set of recommendations.

A detailed presentation of our recommendations is included as Figure E, and staff is prepared to review in detail each of the proposals. Below are two summaries of the information on the spreadsheet, and are most easily understood read alongside the information on Figure E.

*Summary of the Current Situation and Proposed Strategy*

1. The annual revenue required to attain and sustain a PCI of 70, Council's adopted LOS, is highly dependent upon the prevailing inflation rate. In general terms, staff estimates approximately \$5-7 M/year, depending on the rate of inflation. Given the long-term nature of investment in the street network, the inflation rates dramatically change the annual cost requirements.
2. Currently the city has \$2.7 M available in annual preservation funds. This includes \$2.0 M for the Annual Preservation program, \$400 K for the Street Maintenance Division's pavement program, and an estimated \$300 from other various roadway restoration projects (i.e. grant projects).
3. The gap, therefore, is between \$2.3 M and \$4.3 M/yr.
4. We are assuming there will be no single source of revenue in the near future to close that gap.
5. Therefore, we have developed a four-tiered strategy for increasing funding levels. The details of each tier are included in the attached spreadsheet. The Tiers are:
  - a. Efficiencies
  - b. Regulatory and Policy Changes
  - c. Partnerships
  - d. New Revenue Sources
6. In addition, we have reviewed each of the strategies and placed them in four somewhat additive alternatives based on their relative ease of implementation. These are color-coded on the attached spreadsheet. The alternatives are:
  - a. Base Program (existing 2009-2014 CIP)
  - b. Administrative Changes made with Council knowledge (recommended in the 2011-2016 CIP)
  - c. Changes requiring Council decisions and/or financial impacts to third parties
  - d. Changes requiring State Legislative Action or third party agreements
7. Staff is recommending we proceed with the administrative changes (Alternative B) and are currently developing a community outreach/involvement program for pursuing Alternative C (upon input from the Council Finance Committee). Primary among the strategies requiring Council action is community feedback regarding the Transportation Benefit District (explanation later in this memo). Input gained from the community feedback would also be applicable in the event legislation is passed for the Street Utility also.

**Street Maintenance Strategy**

Element	Annual Investment Alternatives			Annual cost or notes	
	Base	1	2		3
	2009-2014 CIP	Administrative changes (implement in 2011-2016 CIP)	Council decisions or potential impacts to other parties	State legislature or 3rd Party agreements required	
<b>Current Budget</b>					
Overlay	\$ 1,800,000	✓	✓	na	CIP - Phase I
Preventative Maintenance (i.e. slurry seal)	\$ 200,000	✓	✓	na	CIP - Phase II
Operating Fund for Street Maint crews	\$ 400,000	✓	✓	na	TIF
<b>1. Efficiencies</b>					
a. More aggressive crack sealing	\$ (10,000)	✓	✓	✓	deprec., materials
b. Increased utilization of Paver	\$ (11,500)	✓	✓	✓	deprec., materials
c. Acquisition of Milling machine			\$ (31,667)	✓	deprec., materials
<b>2. Regulatory and Policy Changes</b>					
a. Past Improvements to paving standards	\$ 57,600	✓	✓	✓	
b. Utilize more CDF in backfill			\$ 20,000	✓	
c. Expand standard street patch width			\$ 20,000	✓	
d. Implement Street Cut Fee (researched other cities)			\$ 38,000	\$ 195,000	
e. Water, Sewer, Storm contribution for pavement impacts	\$ 190,000	✓	✓	✓	
f. Modify PCI from 70 to 70 for arterials and 65 for neighborhood streets	\$ 50,000	✓	✓	na	
<b>3. Be an active partner</b>					
a. Prior grants and 3rd party contributions	\$ 350,000	✓	✓	✓	
b. Additional third party contributions beyond 3.a	\$ 20,000	✓	✓	✓	
c. Eliminate studded tires				\$ 100,000	\$5000 for lobby
d. Regional partnerships - efficiencies in joint contracts with other cities			\$ 50,000	\$ 50,000	
e. Gas Tax Increase - statewide					
<b>4. Pursue new revenues</b>					
a. Additional \$500K in 2011					Milling machine?
b. Reallocate funds from Capacity to Street Maintenance and Overlay			\$ 50,000	na	
c. Solid Waste haulers fee - new contract discussion				\$ 300,000	(Bothell's #)
d. Transportation Benefit District, 2011			\$ 750,000	na	\$20/vshicle/yr
e. Proposed Street Utility Legislation				\$ 4,700,000	\$5/month/SF
<b>Total Annual Funding Level</b>	<b>\$ 2,827,600</b>	<b>\$ 3,067,600</b>	<b>\$ 4,055,600</b>	<b>\$ 6,400,600</b>	

		2008 \$'s				
by end of 2020 @ 4% inflation	PCI	Arterials	55 -	70 +	70 +	70 +
		Non-arterial	70 +	50 -	58 -	62
	Optimum one time investment \$ million		15.5	54.8 -	48.9	43.8 -
		2008 \$'s				
by end of 2020 @ 6% inflation	PCI	Arterials	55 -	68 +	70 +	70 +
		Non-arterial	70 +	47 -	54 -	60
	Optimum one time investment \$ million		15.5	69.1 +	62.1 +	57.1 +

**Notes:**  
 ✓ Indicates that element is included in the Alternative  
 na Indicates that element is not included in the Alternative  
 - value is decreasing  
 + value is increasing

**Figure E – Street Maintenance Strategies and projected outcomes**

*Summary Discussion of Figure E*

1. The current total annual investment for pavement maintenance and preservation, shown in **beige**, is \$2.8 Million. This alternative includes existing City funding and also considers existing third party funding such as TIB grants, WSDOT paving of City streets, and franchise paving.
2. By including the additional elements, identified as Administrative in the **green** column, the annual investment increases to \$3.0 Million. This requires City utilities (water, sewer, storm) to pay into the

- street preservation fund if roads are impacted by utility projects; past practice has allowed utilities to patch sufficiently well if roads were in good condition and paving contribution was "waived" if the road was in poor condition. This cost will be reflected in utility estimates in the CIP.
3. The third column includes areas requiring Council direction. This column, shown in **yellow**, includes the Transportation Benefit District (TBD) and purchase of a commercial grade asphalt milling machine. Staff is recommending Council consider implementing a TBD in 2011. Essentially, cities can create a Transportation Benefit District for all or part of their jurisdiction. The process is
    - a. Governing Body determines need, creates boundary, and establishes revenue source
    - b. Projects must be in state or regional plan, street maintenance projects are allowable
    - c. Four funding mechanisms are available; only one, a vehicle license fee of \$20 per vehicle or less, are available without public vote. This would generate between \$750-850 K annually in pre-annexation Kirkland. If post-annexation Kirkland is included, it would generate approximately \$1.3 M annually.
    - d. Six cities in Washington have implemented TBD's with a \$20 vehicle license fee
    - e. The Transportation Commission supported a TBD after careful debate, and included the following comments.
      - i. It is important to consider this in light of annexation, specifically, whether to include the annexation area or not.
      - ii. If the PCI in the annexation area is higher than existing Kirkland's, consider use of TBD for other projects like sidewalks, active transportation projects, or other efforts; and continue to use TBD in existing Kirkland for annual overlay
      - iii. If the Street Utility ever becomes a viable option, consider the TBD as a temporary measure for street maintenance purposes. If a Street Utility was approved and utilized, the City could sunset the TBD, or utilize it for specific beneficial transportation projects.
    - f. If Council provides direction to proceed, staff could return with a report on the schedule, issues, and process for a Kirkland Transportation Benefit District
  4. The fourth column in **red** includes items beyond the City to implement. Primary among these is the proposed Street Utility currently under discussion in the state legislature. Specifically, the proposed legislation eliminates the past legal barriers and replaces a flat per parcel fee with a fee directly tied to land use and estimated travel patterns and system usage. These are very preliminary numbers, but some estimates are that, for single-family homes, the monthly fees would range from \$2 to \$8. Small retail would be \$11.17, and large retail \$83.20. In addition, the way a Street Utility would operate; the cost of maintaining the entire street system (pavement, signals, markings) would be paid by the users. Therefore, if we estimated our annual need at \$7 M, the rates would be set to generate that amount. Consequently, the maintenance needs of the city would be fully funded. There is still much debate to come on this bill, but it does have the potential to resolve urban street maintenance needs. As the Transportation Commission suggested, the TBD, if implemented, could be redirected or eliminated with use of the Street Utility. This option is the only that fully funds our needs.
  5. Other recommendations of the Transportation Commission.
    - a. The Commission also suggested that sometime in the future, Kirkland staff develop a quantitative measure for the active transportation network. They believed that sidewalks, paths and trails and bike lanes could benefit from a measure similar to the PCI for pavement. They recognized this was potentially a difficult and time-consuming effort, but urged staff to consider a low-cost way to measure that network, particularly the sidewalk network.
    - b. The Commission reviewed the information for the Deferred Maintenance figures as presented in the staff recommendation. They urged us to find a more straightforward and understandable way to present that information. Specifically, they suggested we look at whether deferred maintenance is simply increasing or decreasing; rather than focus on the total dollar amount of the backlog or of deferred maintenance.

### *Summary Policy Issues*

1. Does Council support staff implementation of the Administrative Changes in the Green column?
2. Does Council support implementation of the recommendations in the Yellow Column regarding third parties (excluding TBD)

3. Does Council support a TBD in Kirkland in 2011, and if so, what are the boundaries?
4. Council supports the Street Utility in the 2010 Legislative Agenda, consistent with Association of Washington Cities priorities