

## TECHNICAL MEMORANDUM

**Date:** May 1, 2009

**To:** City of Black Diamond  
Planning and Community Development  
24301 Roberts Drive  
Black Diamond, WA 98010

**From:** David Sherrard, AICP Senior Planner

**Subject:** Street Maintenance: Master Plan Development Impacts  
Yarrow Bay Group, Lawson Hills and Villages MPD

**Project Number:** 217-3043-003

**Project Name:** City of Black Diamond, Yarrow Bay Master Plan Developments EIS

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### INTRODUCTION AND SUMMARY

This technical report assesses potential methods for assessing the impacts of two Master Plan Development (MPD) proposals by the Yarrow Bay Group in the City of Black Diamond on street maintenance.

The following issues are addressed:

- Is this an appropriate issue for fiscal analysis, or can it be excluded as a “stand alone” enterprise fund entirely funded by state gas tax distributions and other revenue
- If it should be analyzed, what methodology should be used to assess potential revenue and expenditures

The general conclusion are

- In the development period to approximately 2025, or to the 2030 period analyzed by ECS it is unlikely that street maintenance will exceed gas tax revenues simply because street infrastructure will be new and will not require rehabilitation or reconstruction, which is the major maintenance cost for asphalt streets.
- In the longer term, street maintenance costs are likely to exceed gas tax revenues, based on the experience of other communities, if the maintenance goal of the city is to avoid deterioration of road serviceability

### THE STAND ALONE QUESTION

The City of Black Diamond, like many cities in Washington State has a Street Fund separate from the General Fund. The revenue source for this fund is gas tax distributions from the state. The revenues in 2008 were estimated at \$104,318 (24.32 per capita) with miscellaneous revenue of \$15,000 for a total of 127,818. The street fund separates maintenance from administration; however the former does not appear to include wages and salary expenses, such that the total expenditure in the fund is assumed to all

represent street maintenance. Based on the current population, the maintenance cost per person would be \$31.02. This compares to the International City Manager’s Association (ICMA) 2006 survey per capita cost of \$28.88 for cities under 100,000 populations. (ICMA 2006)

The ICMA 2006 survey of cities identified an average maintenance cost per mile of \$3,592 for cities smaller than 100,000. (ICMA 2006) Analogous figures for Black Diamond have not been calculated because city road miles are not known.

The problem with both figures is that is simply provides an index of what is spent by various jurisdictions, not what is needed to maintain roads such that they do not deteriorate over time. It is fairly clear that these maintenance funding levels do not include the cost of periodic pavement overlays for asphalt roads every 20 years, which would total an annualized cost per mile of about \$5,000 to \$7,500 at costs per mile between \$100,000 and \$150,000. (AI 2008, Means 2008, FHWA 2007)

In general, studies of funds available for infrastructure in Washington State conclude that current levels of funding have led to a substantial deterioration in public streets and that existing revenue sources are not adequate to reverse the trend. In surveys of Washington Cities, 69 percent rated their street conditions as fair to poor and 49 percent identified deferred maintenance as the primary factor contributing to the need for street maintenance (AWC 2008).

The conclusion is that the existing funding level for streets in Black Diamond supports routine maintenance but not costs of maintaining serviceable roads through their life cycle.

Therefore it would be appropriate for fiscal analysis to include street maintenance, with would require bringing street fund costs and revenues into the budget analysis.

## **METHODOLOGY**

Recommended analysis methodology is either a per mile or per capita multiplier. The per mile methodology is probably more accurate, but the per capita methodology is more suited to the fiscal analysis methodology used by both ECS and DPF.

## **Proposals**

Two Master Plan Developments are under review.

The Lawson Hills MPD which is generally in the southeast corner of the city

- 930 single family detached dwelling units
- 320 multi-family dwelling units
- 190,000 square feet (SF) of retail space and 200,000 SF of office space in the “North Triangle”
- A 6-acre school site with adjacent 9-acre school play area

The Villages MPD is in the southwest corner of the city and includes:

- 3,600 single family detached dwelling units
- 1,200 multi-family dwelling units
- 325,000 SF of retail space and 450,000 SF of office space
- Two school sites: one 10-acre site and one 20-acre site

The key parameters typically used in street maintenance analysis are:

- Population
- Road miles

## **Population**

Standard King County multipliers were used:

- Single family dwellings were assumed to have an average family size of 2.7 persons per unit
- Multi family dwellings were assumed to have an average family size of 1.9 persons per unit

These assumptions result in the following population projections

- Lawson Hills: 3,212 residents
- Villages: 12,360 residents

An additional factor, the equivalent in Full Time Equivalent persons represented by employees was not derived since the nationwide survey data reviewed does not utilize this parameter.

## **Road Miles**

The detail of the conceptual plans for MPD applications does not include detailed road layout, therefore the following general methodology was used.

- Single family dwellings were assumed to have an average of 60 feet of road frontage on both sides of a double loaded residential street, or a net of 30 linear feet per dwelling unit
- Multi family dwellings were assumed to be on larger sites with an average size of 5 acres and a road frontage of 500 feet, with an average of 10 units per acre, or 10 linear feet per unit
- Office and retail development street frontage was based on an assume 5 acre parcel size
- An addition of arterials without lot frontage calculated from the conceptual MPD layout

This resulted in the following estimate for road miles

- Lawson Hill, 9.4 miles (15.4 feet per person)
- Villages, 31.7 miles (13.6 feet per person)

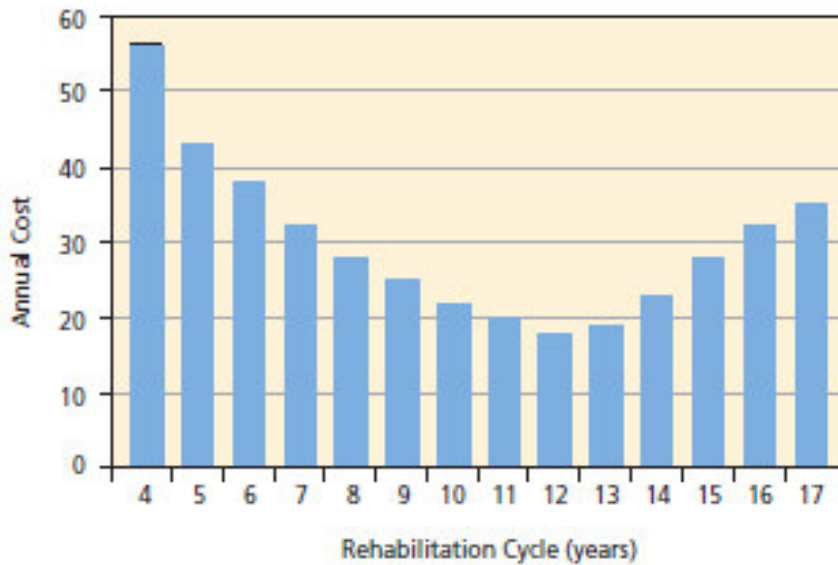
The number of linear feet per person is much less than the average in the sample used in the International City Manager’s Association (ICMA) road maintenance cost. (ICMA 2006) For their sample, the average was 50 linear feet per resident. This raises some methodological question in using data compiled from other cities where road systems may be different than in new development such as the MPD applications.

## **Analysis Methodology**

For the purpose of this analysis, maintenance is assumed to include all activities needed to maintain streets at a level of service that does not result in permanent degradation.

Analysis also assumes a “pavement management system” in which investments in maintenance are made regularly with specific measures taken on a regular basis with major rehabilitation a the end of the life-cycle.

A graphic description of the investment cycle is shown below. (WSDOT 2005)



Elements would include:

- Periodic sweeping
- Snow removal
- Periodic stormwater system maintenance related to the street surface
- Short term repair of the road surface such as pothole repair, as well as sidewalk repair
- Periodic surface treatment or seals

For these elements, the existing city expenditures of \$31.02 per capita is considered representative and can be factored for future increases in population.

- Longer term resurfacing prior to the end of the pavement life to maintain a durable and effective surface, which may include removal of a top course of the asphalt in conjunction with an overlay, but does not include reconstruction of the sub-base.

For this element, the estimated cost per capita is \$20 (Based on a per mile overlay cost of \$125,000 per mile at a 20 year interval and using the miles and population of the two MPD proposals).

In addition to the expenditure information above, the additional gas tax revenue would need to be included in the fiscal analysis. At this point, it appears that the total annual expense would be about \$794,300 and gas tax revenue (based on current per capita) would be \$394,300. It would be relevant, however, only in a long term static analysis after buildout – about 2040 – when the initial streets built in the first phases have deteriorated to the point that they need overlays. At that point, the expense of overlays would add about \$282,580 in annual expenses.

References

AI (Asphalt Institute) 2009 Publication IS-174 Calculating Pavement Costs ISBN: 9781934154380  
[http://www.asphaltinstitute.org/store\\_category\\_browse.asp?ic\\_id=14](http://www.asphaltinstitute.org/store_category_browse.asp?ic_id=14)

AWC (Association of Washington Cities) 2008 Washington's Invisible Backbone, Infrastructure Systems in Washington's Cities and Towns, Association of Washington Cities  
<http://www.awcnet.org/stateofthecities/soc08/docs/2008SOCFullReport.pdf>

Bellevue, City of 2006 Comparative Cities Performance Report  
[http://www.ci.bellevue.wa.us/pdf/Finance/Entire\\_Document\\_for\\_website.pdf](http://www.ci.bellevue.wa.us/pdf/Finance/Entire_Document_for_website.pdf)

Black Diamond, City of 2009 Budget  
<http://www.ci.blackdiamond.wa.us/Depts/Finance/Budgets/2008%20Budget%20Document.pdf>

FHWA (Federal Highway Administration) 2007 Growth in Highway Construction and Maintenance Costs, Report Number: CR-2007-079, Issued: September 26, 2007  
[http://www.oig.dot.gov/StreamFile?file=/data/pdfdocs/Growth\\_in\\_Highway\\_Construction\\_and\\_Maintenance\\_Costs\\_Final.pdf](http://www.oig.dot.gov/StreamFile?file=/data/pdfdocs/Growth_in_Highway_Construction_and_Maintenance_Costs_Final.pdf)

ICMA (International City Manager's Association) 2006 Comparative Performance Measurement: FY 12006 Data Report, Center for Performance Measures <http://icma.org/performance/>

WSDOT (Washington State Department of Transportation) 2005 Pavement Management Systems, The Washington State Experience, FHWA IF-08-010 Federal Highway Administration Office of Asset Management [http://www.fhwa.dot.gov/pavement/pub\\_details.cfm?id=626](http://www.fhwa.dot.gov/pavement/pub_details.cfm?id=626)

WSDOT (Washington State Department of Transportation ) 2008 Recent Trends in Highway Construction Costs, <http://www.wsdot.wa.gov/biz/Construction/pdf/WASHTO2006.pdf>