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City of Black Diamond

December 2009
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H Visual
I (Intentionally Omitted)
J Fiscal
K Schools
L Street Maintenance
M Water
N Plants and Animals
O Wetlands
P Fisheries
Q GHG, Air Quality
R CMART Document
## Acronyms and Key Terms

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<td>United States Army Corps of Engineers</td>
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<td>best management practices</td>
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<td>community commercial</td>
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<td>million gallon</td>
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<tr>
<td>MPD</td>
<td>Master Planned Development</td>
</tr>
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<td>metric tons of carbon dioxide</td>
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Acronyms

N
NAAQS National Ambient Air Quality Standards
NC neighborhood commercial
NMFS National Marine Fisheries Services
NOAA National Oceanic and Atmospheric Administration
NPDES National Pollutant Discharge Elimination System
NRCS Natural Resources Conservation Service
NRHP National Register of Historic Places

P
PAA potential annexation area
Phase II Permit Washington NPDES Phase II Permit
PHS Priority Habitats and Species
PSCAA Puget Sound Clean Air Agency
Pw Open Water

R
R Residential Areas
R4 single family residential
RCW Revised Code of Washington

S
SAO Sensitive Areas Ordinance
SCWSD Soos Creek Water & Sewer District
SDWA Safe Drinking Water Act
SEPA State Environmental Policy Act
sf square feet
SMA Shoreline Management Act

T
town center commercial
TDR Transfer of Development Rights
TWSC Two-Way Stop Control

U
UGA Urban Growth Area
USDA United States Department of Agriculture’s
USFWS United States Fish and Wildlife Service
USGS United States Geologic Service

W
WAC Washington Administrative Code
WDFW Washington State Department of Fish and Wildlife
WHR Washington Historic Register
WRA Water Resources Act
WRIA Water Resource Inventory Area
WSDOT Washington State Department of Transportation
WSFFA Water Supply and Facilities Funding Agreement
Fact Sheet

Title
Lawson Hills Master Planned Development – Final
Environmental Impact Statement

Description of Proposed Action

BD Lawson Partners has proposed development of the 371-acre Lawson Hills area of the City of Black Diamond, Washington. The City has received an application from the BD Lawson Hills Partners for development of Lawson Hills under the City’s Master Planned Development Ordinance.

Purpose of this EIS

The objective of this Environmental Impact Statement (EIS) is to identify potential alternatives and associated impacts of the development of Lawson Hills under the City’s Master Planned Development Ordinance. This EIS will review significant adverse impacts and associated mitigation of the proposed project, as well as three alternative development scenarios.

Alternatives

Four alternatives were analyzed in the EIS:

1) Alternative 1 – (No Action) assumes development will occur incrementally over time, and will include only single-family dwelling units.

2) Alternative 2 – (MPD Proposal) represents the applicant’s proposal under the City’s MPD Ordinance. This alternative includes 930 single-family and 320 multi-family units, for a total of 1,250 dwelling units and 3,103 new residents.

3) Alternative 3 – (Mitigated MPD Proposal) would also follow a master planned approach and would be subject to the MPD ordinance requirements. In order to lessen or “mitigate” impacts, Alternative 3 includes a greater amount of land set aside for open space particularly surrounding sensitive areas, provides all school facilities on site, and includes less residential and commercial development.
4) Alternative 4 – (Fiscally Balanced MPD) has the same land use acreages as Alternative 2, but with a lower number of total residential units (1,075 units) and resulting population (2,674). This reflects the provision in the City’s MPD Ordinance that MPD proposals have a positive fiscal impact on the City at each stage of development.

Location

The Lawson Hills area generally consists of two subareas, the Main Property and the North Triangle. The “Main Property” is located between the SR 169/Roberts Road intersection to the west and extends into King County to the east. The “North Triangle” is located on the west side of SR 169, approximately one mile north of the SR 169/Roberts Road intersection.

Proponent/Applicant

BD Lawson Partners, LP
10220 NE Points Drive
Suite 120
Kirkland, WA 98033

Proposed Date for Implementation

The Applicant intends to begin construction in 2010 with buildout by 2025.

Lead Agency

City of Black Diamond
P.O. Box 599
24301 Roberts Drive
Black Diamond, WA 98010

Responsible Official

Steve Pilcher
Community Development Department, SEPA Official
P.O. Box 599
24301 Roberts Drive
Black Diamond, WA 98010
spilcher@ci.blackdiamond.wa.us
Permits and Approvals

Master Planned Development Permit
Development Agreement
Planned Action Ordinance

EIS Authors and Principal Contributors

Parametrix, Inc.
1231 Fryar Avenue
Sumner, WA 98390-1516

Date of Final EIS Issuance

December 11, 2009

Draft EIS Public Meeting

September 29, 2009, 7:00 p.m.
Black Diamond City Council Chambers
25510 Lawson Street
Black Diamond WA 98010

Date Final Action is Planned

First Quarter 2010

Type and Timing of Subsequent Environmental Review

Following MPD approval, the City may adopt a Planned Action Ordinance allowing implementing projects within the MPD to be processed as “planned actions,” pursuant to WAC 197-11-172. Alternatively, the City might raise its SEPA thresholds for categorically exempt actions for the MPD project area.

Location of Draft EIS and Technical Appendices

Black Diamond branch, King County Library System
24707 Roberts Drive
Black Diamond, 98010

Black Diamond Community Development Department
24301 Roberts Drive
Black Diamond, WA 98010
Availability of Final EIS

The FEIS has been distributed to the Department of Ecology, all agencies with jurisdiction, any agency who commented on the Draft EIS, and (though a fee may be charged) to any person requesting a copy. The Final EIS (or a notice that it is available) must also be sent to anyone who had commented or received the Draft EIS [WAC 197-11-460]. Agencies may take action on the proposal seven days after the Final EIS has been issued.

An electronic version of the FEIS has been made available on the City of Black Diamond’s website. Hard copies are available for purchase at the City of Black Diamond, at a reproduction cost of $40.00 per volume. This document will also be available on CD for $10.00.
Foreword

1 What historic land use actions led up to this proposal?

The City of Black Diamond, including the historic downtown, Morganville and various additional properties, was incorporated in 1959; the majority of the Lawson Hills site was part of the City at that time. The City completed its first Comprehensive Plan in 1980. That plan proposed future annexation of lands to the northwest, east, and southwest to the City. Subsequent annexations in 1985 and 1994 added lands to the northwest and southwest to the City.

The City of Black Diamond completed its first Growth Management Act (GMA) Comprehensive Plan in 1996. That same year, the City negotiated a “potential annexation area” (PAA) agreement with King County and nearby property owners that was formalized as the “Black Diamond Urban Growth Area Agreement (BDUGAA). Following execution of the BDUGAA, the City annexed an area around Lake Sawyer and the West Annexation Area to the City in 1998 and 2005, respectively. The South Annexation Area (in the southeast portion of The Villages site), the East Annexation Area (in the east portion of the Lawson Hills site), an area near Kentlake High School, and the Lake 12 Annexation Areas are the remaining PAAs. The South and East Annexations are currently filed with the King County Boundary Review Board. The South Annexation will be included as part of The Villages, while the East Annexation is part of Lawson Hills.
In 2005, the City adopted Master Planned Development (MPD) Ordinances (Ordinance No. 05-779 and Ordinance No. 05-796). These Ordinances establish the MPD zoning district, and its standards and MPD permit requirements for parcels/groups of parcels that are greater than 80 acres in size.

In 2009, the City took several actions to update planning and environmental policies and procedures, including the Comprehensive Plan, MPD Ordinance, and the Sensitive Areas Ordinance (SAO).

Regulations guiding development of an MPD are incorporated into the Black Diamond Municipal Code (BDMC) Chapter 18.98. In 2009, the City also adopted MPD Framework Design Standards and Guidelines, which are intended to:

...provide guiding principles for the overall design of MPD applications within the City. These guidelines are to be followed in consideration of an MPD at both the initial and subsequent phases of approval. It is anticipated they will be supplemented by additional guidelines and standards that are developed when more specific plans for phased development are proposed.

Those guidelines may be initially drafted by the MPD developer for consideration by the City prior to eventual adoption as part of a development agreement. As such, these guidelines are not intended to address all potential aspects of future development, but to provide an overall framework upon which additional guidelines may be added to in the future.

The statements contained herein are intended to be standards and guidelines, rather than prescriptive rules, and thereby provide an amount of flexibility. Any decision regarding strict application of any guideline contained herein will be made by the City Council as part of its consideration of granting overall MPD approval.

The Lawson Hills MPD is intended to be developed consistent with the MPD Ordinances, Design Guidelines, the Sensitive Areas Ordinance, and other adopted plans and policies.

Relevant plans and policies are included in Appendix A of this EIS, as well as through the City’s website.
2 What is the purpose of this EIS?

This Environmental Impact Statement was prepared in accordance to the State Environmental Policy Act (SEPA) and Washington Administrative Code (WAC) 197-11. SEPA requires an EIS be completed when a proposal is likely to result in significant, adverse environmental impacts. The EIS is used to analyze the proposal, reasonable alternatives, and other methods that may be used to reduce or eliminate the adverse environmental impacts associated with the proposal.

3 How were the alternatives established?

Chapter 197-11-440(5) of the WAC requires that an EIS discuss the proposal and reasonable alternatives, including a “No Action” alternative. “Reasonable alternatives” include actions that could feasibly attain or approximate a proposal’s objectives, but at a lower environmental cost or with decreased levels of environmental degradation.

In this EIS there are four alternatives: Alternative 1, No Action; Alternative 2, the MPD Proposal; Alternative 3, Mitigated MPD Proposal; and Alternative 4, Fiscally-Balanced MPD. A greater level of detail is applied to Alternative 2, since it represents an MPD application that was filed with the City in May 2009. The other alternatives provide a range of development scenarios for discussion and comparison purposes, but none of the other action alternatives represent a specific proposal. Alternative 3 was developed to also comply with the MPD Ordinance, but includes more open space, all on-site school facilities, and clustered development, away from sensitive areas. Alternative 4 was developed as a case study to achieve a positive fiscal performance, as required by the City’s MPD Ordinance.

4 How is this EIS written?

This document has been prepared in a “reader-friendly” format which summarizes a great deal of technical analysis that has been completed for the proposal. It is written in a question-and-answer format, and intended to be read and
understood by anyone, including those without a technical background. For this purpose, much of the technical and scientific data is summarized in the body of the EIS.

5 Where are the technical documents?

The technical reports used to develop the EIS can be found in the Technical Appendices. The Appendices are included on the same CD as the EIS or attached to the back of this document, if you have the hard copy version.

A comprehensive list of Technical Appendices is included in the Table of Contents, and specific appendix call-outs are also included in side bars (like the one to the right) throughout the document.

6 How does this EIS relate to the Master Planned Development applications?

BD Lawson Partners has submitted an MPD application for Lawson Hills. This application is prepared in accordance with BDMC Chapter 18.98. The City’s Master Planned Development Ordinance is a land use regulation establishing the public review, permit process, and standards applying to proposed Master Planned Developments. The City is currently reviewing the applications and will hold public hearings to obtain input prior to making any final decisions on the MPDs.

While the purposes and objectives of MPDs in the ordinance speak to preservation of environmentally critical areas, environmental impacts, and appropriate mitigation; the process through which impacts to – and mitigation for those impacts – the built and natural environment are evaluated is the SEPA process. Therefore, some comments are more appropriately addressed in the MPD process while others – those relating to significant adverse impacts – are more appropriately addressed in this EIS.

EIS Appendices
The technical reports used to develop the summaries in the EIS can be found in the document’s appendices. CDs with the appendices are attached to the back of the hard copy EIS.
7 What are the benefits and disadvantages of deferring implementation of the MPD?

The advantages of deferring all actions on the Lawson Hills proposal include:

- Slower conversion of these undeveloped lands to urban uses; and
- The environmental impacts associated with the proposed urban-type development, including increased traffic, stormwater runoff, light and glare, noise, and demand for public facilities and services would occur at a slower rate.

The disadvantages of deferring all actions on the Lawson Hills MPD include:

- The opportunity to created a mixed-use development with a range of site amenities, including public parks, trails, and an open space system;
- The identification and provision of an elementary school site; and
- A coordinated approach to providing infrastructure, including roads, stormwater management, and sewer/water service.

8 How were public comments from the Draft EIS addressed?

The Draft EIS was published September 1, 2009, and the public comment period was open through September 30, 2009. Following the public hearing on September 29, 2009, however, the comment period was extended to October 9, 2009, to allow for additional time to receive written comments.

Comments related to a number of different issues. Some are reviewable within the context of SEPA (such as traffic impacts and water supply, for example). Other issues (such as dislike for the proposal or any new development) are outside the purview of SEPA and should be submitted during the MPD approval process.
A total of 139 letters were received, from individuals, agencies, community organizations, tribes, and the proponent. Within these letters, 457 total comments were identified. The comments, and the corresponding responses, are included in the CMART Project Document, which is attached to this EIS as Appendix R. One CMART document which covers both Lawson Hills and The Villages was prepared, because many comments related to both EIS documents.

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of Letters</th>
<th>Number of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>93</td>
<td>241</td>
</tr>
<tr>
<td>Community Organization</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>Agency</td>
<td>9</td>
<td>90</td>
</tr>
<tr>
<td>Tribe</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td>Proponent</td>
<td>26</td>
<td>43</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>141</strong></td>
<td><strong>455</strong></td>
</tr>
</tbody>
</table>

The responses to comments are consistent with the means outlined in WAC 197-11-560.
Chapter 1 Project Summary

1 What is the purpose of this EIS, and why is it being proposed?

The objective of this Environmental Impact Statement (EIS) is to identify potential alternatives and associated impacts of the development of the 371-acre Lawson Hills area of the City of Black Diamond (see Exhibits 1-1 and 1-2).

The Lawson Hills area generally consists of two subareas, the Main Property and the North Triangle. The “Main Property” is located between the SR 169/Roberts Road intersection to the west and extends into King County to the east. The “North Triangle” is located on the west side of SR 169, approximately one mile north of the SR 169/Roberts Road intersection.

The City has received an application from the BD Lawson Partners (the Applicant) for development of Lawson Hills under the City’s Master Planned Development Ordinance. This EIS will review impacts and mitigation of the proposed project, which is considered herein as Alternative 2, as well as three alternative development scenarios.

The intent of the EIS is to provide an impartial discussion of significant environmental impacts and to inform decision makers and the public of reasonable alternatives, including mitigation measures that would avoid or minimize adverse impacts or enhance the environmental quality of the Lawson Hills MPD area. The EIS may mention non-significant impacts or mitigation measures to satisfy other environmental review laws or requirements.
Exhibit 1-1
Vicinity of the Lawson Hills Master Planned Development

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
The City may find that the EIS (and the MPD Application representing Alternative 2) include sufficient information and analysis to adopt a Planned Action Ordinance or to consider raising SEPA thresholds for the MPD area.

This would allow for flexibility for an applicant to submit supplemental documentation and/or addendums as specific development plans are submitted and project-related impacts are identified.

2 What is the planning horizon?

For the alternatives under consideration, the planning horizon is assumed to be 2025. However, some impacts will not be fully realized until after 2025, and in those instances, longer planning horizons have been identified.

3 What alternatives are being considered?

There are four alternatives under consideration for the Lawson Hills area:

- Alternative 1 – No Action
- Alternative 2 – Master Planned Development (MPD) Proposal
- Alternative 3 – Mitigated MPD
- Alternative 4 – Fiscally Balanced MPD

Each of these alternatives is briefly summarized in this chapter. More detail on all four alternatives can be found in Chapter 2.

Alternative 1 – No Action

Alternative 1 (No Action) assumes that the Lawson Hills area will develop consistent with its current low- and medium-density residential zoning. Residential development is expected to occur slowly and incrementally as individual landowners develop their property. Alternative 1 assumes that development will not occur by master plan and will not follow the City’s Master Planned Development (MPD) process. There are no multi-family units, schools, commercial, or office developments in Alternative 1. Sensitive areas, such as wetlands, wildlife, and surface water, would be protected as required by the City’s Sensitive Areas Ordinance (SAO).
This alternative includes 1,330 single-family dwelling units. The number of dwelling units was determined by subtracting sensitive lands and their buffers from the total Lawson Hills area acreage and assuming minimum 7,200-square foot lot sizes.

**Alternative 2 – MPD Proposal**

Alternative 2 (MPD Proposal) represents the Applicant’s proposal as submitted, with the intent to follow the requirements and stipulations of the City’s MPD Ordinance (Chapter 18.98 of the City Municipal Code). The ordinance allows for a master planned approach that would accommodate a mix of low-, medium-, and high-density residential, commercial, retail, and office uses. This alternative includes the required amount of open space to provide both sensitive areas buffers and recreational opportunities. In addition, this alternative provides for inclusion of one 10-acre elementary school site, located in the northern section of the Main Property. The application states that additional school sites would be provided off-site.

Alternative 2 includes 930 single-family and 320 multi-family units, for a total of 1,250 dwelling units on 156 acres, and 390,000 square feet of commercial and office space on the North Triangle.

**Alternative 3 – Mitigated MPD Proposal**

Alternative 3 (Mitigated MPD Proposal) would also follow a master planned approach and would be subject to the MPD Ordinance requirements. Alternative 3 would include a greater amount of land set aside for open space, more on-site school facilities, and would cluster a fewer number of residential units in a more dense development pattern, away from sensitive areas. Alternative 3 would have less commercial/office square footage in the North Triangle than Alternative 2, reflecting a reduced demand due to fewer residential units.
The mitigated approach to Alternative 3 includes the following components:

- **Land Use** – Cluster more intense development on less buildable acreage, further from sensitive areas. There are less residential units overall, generating a lower total population and fewer infrastructure impacts.
- **Open Space** – Provide more open space (50 percent of total land area), particularly as it relates to sensitive areas, thereby increasing the protection of those areas.
- **Public Services** – Provide for all needed school facilities, at Enumclaw School District’s preferred school site size, on-site.
- **Economy** – Provide commercial and retail square footage commensurate with reduced residential units.
- **Water Resources (surface water, stormwater, groundwater)** – Employ low impact development techniques as described in EIS mitigating strategies.

**Alternative 4 – Fiscally Balanced MPD**

Alternative 4 was developed as a case study to achieve a positive fiscal performance, as required by the City’s MPD Ordinance. As such, it includes the same land acreages as Alternative 2, but with fewer residential units. The primary purpose of this alternative was to explore the residential unit and commercial/retail mix necessary to result in a fiscally balanced economic condition. It is not analyzed in depth for built and environmental impacts in this EIS, as it is intended solely to address the fiscal benefit element of the City’s MPD Ordinance.

4 **How do the alternatives compare?**

The purpose of this EIS is to compare development alternatives and their impacts for the Lawson Hills area. Exhibit 1-3 provides a summary comparison of land uses of the four alternatives.
Exhibit 1-3

Land Use by Alternative at Year 2025

<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>Alternative 1 (No Action)</th>
<th>Alternative 2 (MPD)</th>
<th>Alternative 3 (Mitigated MPD)</th>
<th>Alternative 4 (Fiscally Balanced MPD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwelling Units (du)</td>
<td>1,330 single-family units on 259 acres</td>
<td>1,250 du on 165 acres: 938 du on 151 acres:</td>
<td>938 du on 151 acres:</td>
<td>1,075 du on 198 acres:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 930 single-family</td>
<td>• 698 single-family</td>
<td>• 806 single-family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 320 multi-family</td>
<td>• 240 multi-family</td>
<td>• 269 multi-family</td>
</tr>
<tr>
<td>Commercial/Office</td>
<td>None</td>
<td>35 acres</td>
<td>20 acres</td>
<td>35 acres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 190,000 sf retail space</td>
<td>• 150,000 sf retail space</td>
<td>• 190,000 sf retail space</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 200,000 sf office space</td>
<td>• 75,000 sf office space</td>
<td>• 200,000 sf office space</td>
</tr>
<tr>
<td>Open Space</td>
<td>112 acres</td>
<td>138 acres</td>
<td>185 acres</td>
<td>138 acres</td>
</tr>
<tr>
<td>Schools</td>
<td>Not provided on-site</td>
<td>10 acres</td>
<td>15 acres</td>
<td>Not provided on-site</td>
</tr>
<tr>
<td>New Roads</td>
<td>Included in residential and commercial lands</td>
<td>23 acres</td>
<td>Included in residential and commercial lands</td>
<td>Included in residential and commercial lands</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Acres:</td>
<td>371</td>
<td>371</td>
<td>371</td>
<td>371</td>
</tr>
<tr>
<td>Total Population:</td>
<td>3,591</td>
<td>3,103</td>
<td>2,328</td>
<td>2,674</td>
</tr>
</tbody>
</table>

Alternative 1 – No Action

Alternative 1 assumes that individual properties would develop separately and incrementally over time, without an overall master plan to guide the development. This alternative includes more residential units than any of the other alternatives, with residential units assumed to be single-family. It does not include any commercial or office use, nor does it have specific provisions for on-site schools. Rather than having a master planned road network, Alternative 1 assumes that roads will be built incrementally to serve residential and commercial development as it occurs. This alternative protects 112 acres of sensitive areas and their buffers, the lowest acreage of open space of any alternative.

Alternative 2 – MPD Proposal

Alternative 2 represents the Applicant’s proposal for developing the Lawson Hills area as a comprehensive, mixed-use Master Planned Development, subject to the requirements of the City’s MPD Ordinance (Ch 18.98 of the City Municipal Code). This alternative has a substantial amount of commercial and office square footage, provides for 138 acres of open space, an on-site elementary school facility, and a planned roadway network that
reflects the City’s Comprehensive Plan 2025 transportation system. The analysis indicates a need for school facilities off-site. This will be resolved during the MPD approval process.

**Alternative 3 – Mitigated MPD**

Alternative 3 assumes an MPD process and requirements, but mitigates impacts by lowering residential and commercial units. This alternative provides a full 50 percent (185 acres) of open space, more than any other alternative. It also includes a 15-acre on-site elementary school facility, and a planned roadway network that reflects the City’s Comprehensive Plan 2025 transportation system.

**Alternative 4 – Fiscally Balanced MPD**

Alternative 4 includes a balance of uses that achieves the “fiscally balanced” goal of the City’s MPD Ordinance. This alternative includes a substantially smaller amount of residential units, but the same amount of retail and office square footage and open space as Alternative 2. This alternative does not include any on-site schools, but would locate proposed school facilities within The Villages proposed MPD (see Chapter 5, Indirect Affects and Cumulative Impacts). This assumption was made because Lawson alone does not generate the student population to require an elementary school site; however, when added to the Villages student population, two elementary schools would be needed. Since the demand comes later with Villages, it made sense to locate the school sites there.

5 How would the proposed action affect the Built Environment (people and community resources)?

The Built Environment includes the social, economic, and cultural elements of the environment. Exhibit 1-4 summarizes the elements and expected impacts the alternatives would have on the Built Environment. Detailed information about each element is included in Chapter 3, Built Environment.
### Exhibit 1-4

#### Summary of Impacts – Built Environment

<table>
<thead>
<tr>
<th>Element</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 1,330 single-family</td>
<td>1,250 dwelling units</td>
<td>938 dwelling units</td>
<td>1,187 dwelling units</td>
<td></td>
</tr>
<tr>
<td>units</td>
<td>3,591 residents</td>
<td>Most multi-family units</td>
<td>2,674 residents</td>
<td></td>
</tr>
<tr>
<td>Incremental Development</td>
<td>Mixed Use (live/work)</td>
<td>Less commercial than Alternative 2</td>
<td>Same commercial as Alternative 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Master Planned</td>
<td>2,328 residents</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed Use (live/work)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Master Planned</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Transportation**       |               |               |               |               |
| - 8 study intersections  | 12 study intersections | 28% fewer trips are generated compared to Alternative 2; improvements may not be required at all 12 intersection locations |
| require improvements     | require improvements | Assumes completion of new alignments, connections, and other improvements as planned in the 2025 Transportation Element |
| - No planned network     | Assumes completion of new alignments, connections, and other improvements as planned in the 2025 Transportation Element |

| **Noise**                | Greatest impacts due to highest traffic volumes | Lesser impacts than Alternative 1 | Least Impacts | Similar to Alternative 2; not specifically analyzed |
|                         |               |                            |               |               |
| Public Utilities         | Greatest impacts due to highest population and resulting impacts on infrastructure | Lesser impacts than Alternative 1 | Least impacts due to lowest population generation |
| (water, wastewater,     | - Impact occurs incrementally | Assumes construction of all planned water, sewer, and stormwater projects as planned in the respective utility comprehensive plans |
| stormwater)             |               | Assumes construction of all planned water, sewer, and stormwater projects as planned in the respective utility comprehensive plans |

| Visual                   | Impacts are incremental in nature, less likely to be comprehensively mitigated | Master Plan allows for preservation of views where possible, use of open space as buffers |
|                         | Master Plan allows for preservation of views where possible, use of open space as buffers |

<table>
<thead>
<tr>
<th>Historic and Cultural Resources</th>
<th>No impacts</th>
<th>No impacts</th>
<th>No impacts</th>
<th>No impacts</th>
</tr>
</thead>
</table>
## Exhibit 1-4
### Summary of Impacts – Built Environment

<table>
<thead>
<tr>
<th>Element</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Services</strong></td>
<td>Greatest impacts due to highest population and resulting demand on parks, schools, police, and fire</td>
<td>Lesser impacts than Alternative 1</td>
<td>Least impacts due to lowest population generation</td>
<td>Similar to Alternative 2; not specifically analyzed</td>
</tr>
<tr>
<td>(parks, schools, public safety)</td>
<td>Impacts occur incrementally</td>
<td>Population will generate need for 4.34 on-duty firefighters</td>
<td>Population will generate need for 3.1 on-duty firefighters</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Population will generate need for no additional police staff</td>
<td>Population will generate need for no additional police staff</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Population generates need for 1 new community park site, 2 neighborhood park sites, and 2 pocket park sites</td>
<td>Population generates need for 1 new community park site, 2 neighborhood park sites, and 2 pocket park sites</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Population generates need for 1 elementary school, and partial need for 1 middle school and 1 high school</td>
<td>Population generates need for 1 elementary school and partial need for 1 middle school and 1 high school</td>
<td></td>
</tr>
</tbody>
</table>

| Fiscal Analysis            | Not fiscally balanced             | May be fiscally balanced          | Not fiscally balanced             | Fiscally balanced                                                                                       |

### 6 How would the proposed action affect the Natural Environment (ecosystems and natural resources)?

The Natural Environment includes the geology, water resources, habitat, air quality, and climate change elements of the environment. Exhibit 1-5 summarizes the elements and expected impacts the alternatives would have on the Natural Environment. Detailed information about each element is included in Chapter 4, Natural Environment.
## Summary of Impacts – Natural Environment

<table>
<thead>
<tr>
<th>Element</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth (geology, topography, and soils)</td>
<td>Assumes that severe mine hazard areas would be preserved in open space</td>
<td>Majority of areas mapped as potential severe hazard areas are designated as open space</td>
<td>Assumes that severe mine hazard areas would be preserved in open space</td>
<td>Similar to Alternatives 2 and 3; not specifically analyzed</td>
</tr>
<tr>
<td></td>
<td>Low and moderate mine hazard areas would be developed with residential uses</td>
<td>Major roads and utility corridors cross the potential severe mine hazard area</td>
<td>Low (and to some extent) moderate mine hazard areas would be developed with residential uses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major roads and utility corridors may cross the mine hazard area</td>
<td></td>
<td>Major roads and utility corridors may cross the mine hazard area</td>
<td></td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>None of the Alternatives is likely at risk of significant impacts from hazardous waste sites</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water (surface water and groundwater resources)</td>
<td>140 acres impervious surface creation</td>
<td>131 acres impervious surface creation</td>
<td>90 acres impervious surface creation</td>
<td>Similar to Alternatives 2 and 3; not specifically analyzed</td>
</tr>
<tr>
<td></td>
<td>Development of multiple small detention/treatment facilities may result in less displacement of water flows</td>
<td>Greatest potential impact is on Ravensdale Creek from the North Triangle, where the majority of the site would be developed in commercial use with a high proportion of impervious surface</td>
<td>Development is concentrated away from sensitive areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stream scouring and erosion from greater duration of flows and water quality impacts likely, would be similar to Alternative 2</td>
<td>Medium and high density development on slopes draining to Jones Lake Creek is likely to have substantially greater impact on water resources than low density residential development</td>
<td>Potential impacts to Ravensdale Creek would be less in Alternative 3 given that there will be 15 less acres of commercial/office use</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Greater impacts to Mud Lake Creek than Alternative 1</td>
<td>Proposed low impact development for stormwater management, including numerous small ponds and reduction of impervious surface area</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proposes the use of large stormwater ponds, which may cause temperature elevation due to solar heating that could impact Mud Lake Creek</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exhibit 1-5
Summary of Impacts – Natural Environment

<table>
<thead>
<tr>
<th>Element</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants and Animals</td>
<td>• Wetlands and their standard (SAO-assigned) buffers will be preserved</td>
<td>• Permanent filling of approximately 1 acre of wetland; filling is proposed</td>
<td>• No direct impacts to wetlands or their buffers</td>
<td>Similar to Alternatives 2 and 3; not specifically analyzed</td>
</tr>
<tr>
<td>(wetlands, habitat, fish</td>
<td>• No direct impacts to wetlands or their buffers</td>
<td>for roads, home sites, and stormwater detention facilities</td>
<td>• Proximity impacts are less likely to occur (or at lesser magnitude)</td>
<td></td>
</tr>
<tr>
<td>and wildlife)</td>
<td>• Incremental development could lead to fragmented open space corridors</td>
<td>• Wetland impacts are restricted to the Main Property</td>
<td>because development will be clustered further away from sensitive areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Landowners could seek permits to individually impact wetlands and buffers,</td>
<td>• No direct wetland impacts proposed on the North Triangle</td>
<td>• Incremental future loss of wetlands and buffers is not expected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the likelihood or results of which cannot be estimated at this time</td>
<td>• Approximately 4 acres of regulated wetland buffer will be permanently</td>
<td>• One stream crossing due to proposed roadways and crossings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No direct impacts to fish or riparian habitat</td>
<td>impacted</td>
<td>• Direct impacts to streams due to stormwater outfalls</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• More open space provides less fragmented corridors, but corridor may not</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>be appropriately located to provide meaningful habitat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incremental future loss of wetlands and buffers is not expected</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Direct impacts to streams due to proposed roadways and crossings</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Direct impacts to streams due to stormwater outfalls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate Change</td>
<td>2,194,858 metric tons of carbon dioxide (MTCO₂e)</td>
<td>2,491,728 MTCO₂e</td>
<td>1,806,189 MTCO₂e</td>
<td>Similar to Alternatives 2 and 3; not specifically analyzed</td>
</tr>
<tr>
<td>(air quality, greenhouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gas emissions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7 How have the public, agencies, and tribes been involved in development of the proposed action?

The City has engaged the public and potentially impacted stakeholders through a variety of outreach forums, in addition to following the specific procedures required by Washington Administrative Code (WAC) 197-11-960 and outlined in Chapter 43.21C of the Revised Code of Washington (RCW):

- A scoping announcement and public meeting (May 28, 2008);
- An agency scoping meeting (May 29, 2008);
• Transportation-specific scoping meetings (June 11, 2008; October 3, 2008; and April 2, 2009);
• A public open house (November 11, 2008);
• Several individual agency meetings;
• Pre-DEIS release open house (August 4, 2009);
• Preliminary Draft EIS stakeholder meetings (August 12, 2009, and August 19, 2009);
• Draft EIS Public Hearing (September 29, 2009); and
• Public Comment Period (September 1, 2009, through October 9, 2009).

In addition, the City has posted all relevant EIS materials, announcements, and a quarterly project update on their website (http://www.ci.blackdiamond.wa.us/).

All public comments received at the pre-release hearing, the public hearing (testimony was recorded and a transcript is included in Appendix R), and in response to the Draft EIS were added to the public record and responded to in accordance with SEPA regulations.

8 What is the decision-making process for the proposal?

The Final EIS was prepared using comments from the Draft EIS. Per WAC 197-11-460, the lead agency “shall not act on a proposal for which an EIS has been required prior to seven days after issuance of the FEIS.”

The City of Black Diamond MPD Ordinance requires the City’s Hearing Examiner to conduct a public hearing on the MPD applications and then issue a recommendation to the City Council. At this time, a date has not been established for the hearing before the Hearing Examiner, but it is anticipated to occur in the first quarter of 2010.

Following issuance of a recommendation from the Examiner, the City Council will conduct a closed record hearing. The Council has the final decision-making authority on the MPD applications.
Chapter 2 Alternatives

1 What alternatives are being considered?

Four alternatives have been developed in order to provide a meaningful range of options for consideration by the public, neighboring agencies, and other interested parties. The alternatives are summarized briefly, followed by additional detailed discussion on each.

Alternative 1
Alternative 1 (No Action) assumes development will occur incrementally over time. A total of 1,330 single-family dwelling units are assumed for this alternative, which would generate 3,591 new residents. There are no multi-family units, commercial or office development or schools assumed in Alternative 1. The Main Property in Alternative 1 is based on current residential zoning. However, the North Triangle is shown as Mixed Use in the City’s Comprehensive Plan and would require rezone/reclassification. Sensitive areas, such as wetlands, wildlife, and surface water, would be protected as required by the City’s SAO.

Alternative 2
Alternative 2 (MPD Proposal) represents the Applicant’s proposal under the City’s MPD Ordinance. This alternative includes 930 single-family and 320 multi-family units, for a total of 1,250 dwelling units and 3,103 new residents. This scenario includes 390,000 total square feet of commercial and office space on the North Triangle property as well as a new 10-acre elementary school site. Because it is an MPD, this

What is addressed in this chapter?
This chapter includes a discussion of each of the four EIS Alternatives:
- Alternative 1 – No Action
- Alternative 2 – MPD Proposal
- Alternative 3 – Mitigated MPD
- Alternative 4 – Fiscally Balanced MPD

Appendix A
Information regarding the City’s MPD ordinance and population generation calculations can be found in Appendix A.
Alternative also includes a substantial amount of open space, as required by City ordinance. A more complete description of the MPD proposal can be found in the MPD application, submitted to the City of Black Diamond on May 11, 2009.

**Alternative 3**

Alternative 3 (Mitigated MPD Proposal) would also follow a master planned approach and would be subject to the MPD ordinance requirements. In order to lessen or “mitigate” impacts, Alternative 3 includes a greater amount of land set aside for open space particularly surrounding sensitive areas, provides all school facilities on-site, and includes less residential and commercial development. This alternative has 25 percent fewer residential units (938) and a population at build out of 2,328. Alternative 3 has proportionately less commercial/office square footage (225,000) than Alternative 2, reflecting a lower demand based on fewer households.

**Alternative 4**

Alternative 4 (Fiscally Balanced MPD) has the same land use acreages as Alternative 2, but with a lower number of total residential units (1,075 units) and resulting population (2,674). This reflects the provision in the City’s MPD Ordinance that MPD proposals have a positive fiscal impact on the City at each stage of development. The reduced number of residential units allows the revenues generated by the commercial development to be balanced by the costs associated with servicing the larger population. In order to create this alternative, the total office and commercial square footage from Alternative 2 was held constant.

This alternative is provided strictly as a “bookend” to illustrate the number of housing units that result in a fiscally balanced (neutral) economic status for the City. As a result, this alternative is not further explored or analyzed in detail within the EIS.

---

**How were population assumptions arrived at for the alternatives?**

In order to determine the total population generated by each alternative, the number of dwelling units was multiplied by the average number of persons per household (pph). The average is 2.7 pph for single family and 1.85 for multi-family.

**What is Fiscal Balance?**

The City’s MPD Ordinance requires that all MPDs must generate positive fiscal benefit at each stage of development. This means that revenues generated by the development must be in balance with the costs of providing services to the increased population. Additional discussion on the economic analysis completed for this EIS can be found in Chapter 3 and Appendix J.
2 What elements are included in Alternative 1 – No Action

As shown in Exhibit 2-1, the majority of Lawson Hills that is within the city limits is zoned for low density residential, which would allow for development of 4 to 6 units per acre. For purposes of this Final EIS, a minimum lot size of 7,200 square feet (sf) was assumed, which results in approximately 5 units per acre. In developing the parameters for the number of dwelling units in Alternative 1, the following assumptions were made:

- Sensitive areas and buffers associated with streams and wetlands were not considered developable land. Landslide hazard areas and severe coal mine hazard areas were excluded as well. No exclusion was made for terrestrial species or erosion hazard areas.
- Development was based on an average of 4.94 units per acre, with standard subdivision layout, with no provision for varying lot size or clustering dwelling units.
- No adjustments were made based on the location and shape of lots, sensitive areas, or for the practicality of providing a rational street system that might affect the total number of lots. The total available acres were simply divided by the lot size plus a street adjustment.

In order to develop the total number of residential units, the first step is to convert the total (gross) acres into net acres, by removing the acreage determined to be “sensitive areas” as defined by the City’s SAO:

\[
371 \text{ gross acres} - 102 \text{ sensitive areas} = 269 \text{ net acres}
\]

Net acres were then converted to dwelling units by multiplying the number of net acres by the number of units per acre:

\[
269 \text{ acres} \times 4.94 \text{ units/acre} = 1,330 \text{ units}
\]

All units in Alternative 1 are assumed to be single family units, which generate 2.7 persons per household on average. This results in a total population of 3,591 residents.
Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
3 What elements are included in Alternative 2 – MPD Proposal

As shown in Exhibit 2-2, Alternative 2 assumes development of the 371-acre Lawson Hills area as an MPD, and as such includes a mix of residential, retail/commercial, office, educational, recreational, and open space uses. It assumes development will occur following the policies set forth in the City’s MPD Ordinance, including setting aside a substantial amount of passive and active open space as well as a “fiscally balanced” mix of uses.

The Applicant’s Objectives for Alternative 2 are:

- Utilize the Master Planned Development (MPD) ordinance and code to design and plan a master planned community that fulfills the Public Benefit Objectives by: providing employment uses; improving the City’s long-term fiscal performance; preserving special characteristics of the site within future site planning; protecting surface and groundwater quality; conserving water and other resources; providing a variety of housing options; preserving and enhancing open spaces and views of Mt. Rainier; and providing a coordinated system of pedestrian and bike facilities.

- Provide an appropriate ratio of commercial, retail, and office opportunities that are well integrated into the MPD to satisfy the demand for jobs and commerce created by the new households and the surrounding community.

- Propose a mix of uses that complements the range of existing and planned uses within the City of Black Diamond and the surrounding rural area; respects the character of adjacent neighborhoods and rural unincorporated areas; and utilizes existing availability and planned capacity of urban services, access opportunities, and infrastructure systems located in proximity to the site.
Exhibit 2-2
Alternative 2 - Proposed Master Planned Development

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
• Implement the Black Diamond Urban Growth Area Agreement (BDUGAA) by preserving the City’s 50-acre In-City Forest land and annexing the 50-acre East Annexation Area, thus applying 100 Transfer of Development Rights (TDR) credits to the East Annexation Areas.

• Create a community that seeks to protect the naturally constrained areas of the site and surrounding area, including streams, wetlands, and surface and groundwater resources, through master planning concepts and, to the extent feasible, through low impact development technologies.

• Plan for and develop a proposal that is consistent with the applicable City policies, objectives codes, and ordinances.

• Create an economically-viable community that provides office, retail, other commercial uses, preserves open spaces, integrates open space corridors, recreational opportunities, essential public facilities, and a wide range of residential opportunities which are fiscally sound and able to aid in implementing necessary upfront infrastructure upgrades and generate an adequate financial return to justify the risk and cost of local and regional improvements to transportation, sewer, and stormwater facilities.

• Provide a range of residential and lifestyle opportunities at urban densities within the City’s Urban Growth Area (UGA) that adequately responds to dynamic market factors over time, is affordable to a range of income levels, and contributes to the City’s targets for accommodating growth under the Growth Management Act (GMA).
The land uses proposed in Alternative 2 are summarized in Exhibit 2-3 and are discussed in greater detail in the following pages.

### Exhibit 2-3
**Alternative 2 – Proposed Land Use**

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Description</th>
<th>Estimated Acreage</th>
</tr>
</thead>
</table>
| Residential           | • 1,250 Dwelling Units (du):  
                        |   • 930 single-family  
                        |   • 320 multi-family  
                        |   • 7.58 dwelling units per acre  
                        |   • 3,103 residents  | 165 acres |
| Commercial/Office     | • 190,000 sf retail space  
                        |   • 200,000 sf office space | 35 acres |
| Open Space            | • Community parks, forested areas, and trails  
                        |   • Environmentally sensitive areas and buffers | 138 acres |
| School                | Elementary school site and play area | 10 acres |
| New Roads             | Internal road systems | 23 acres |
| **TOTAL**             |                                                                             | **371 acres** |

### Commercial/Office
The commercial and office uses are proposed to occur on the North Triangle parcel. The North Triangle would also include mixed-use development, which would allow for commercial or retail spaces with residential housing on upper floors.

### Residential
The residential use includes both single-family detached homes and multi-family units, ranging from low density (4 to 8 units per acre) to high density (potentially up to 30 units per acre, as allowed by MPD code). The multi-family units could include townhomes, duplexes, condominiums, and apartments.

### Open Space
Preservation of open space is a key component of the MPD. The purpose of the open space is to protect sensitive areas and to provide the community with parks, trails, wildlife corridors, and recreational opportunities. The MPD ordinance provides incentives for setting aside 50 percent of the total area as open
space, except as modified by prior agreements (in this case, the East and West Annexation Agreements and the Black Diamond Urban Growth Area Agreement). The open space required for this MPD is met with dedicated open space and portions of the school sites dedicated to outdoor recreation, as stated in the City’s Ordinance No. 09-897, BDMC 18.98. Specific open space areas will need to be verified prior to future implementing approvals for development within the MPD.

**Schools**
Alternative 2 includes provision of a 10-acre elementary school site. Additional schools needed to support the population of this Alternative would be provided off-site (see Schools analysis in Chapter 3 for additional details).

**Roadways**
The road network assumed at build out of Alternative 2 is consistent with the City’s 2025 Transportation Element of the Comprehensive Plan.

4 **What elements are included in Alternative 3 – Mitigated MPD?**

Alternative 3 (Mitigated MPD Proposal) would also follow a master planned approach and would be subject to the MPD Ordinance requirements. As shown in Exhibit 2-4, Alternative 3 would include a greater amount of land set aside for open space, provide on-site school facilities, and have 25 percent fewer residential units than Alternative 2. Commensurate with a lowered residential population, commercial and retail square footages are also proportionately lower in Alternative 3.

---

**What is the Planning Horizon for Alternative 3?**
Alternative 3 anticipates full development of the Lawson Hills area by 2025.
Alternative 3 is considered the “mitigated” alternative because it takes into account the impacts generated by the Applicant’s proposal (as depicted in Alternative 2), and diminishes or reduces the impacts in a variety of areas. These include:

- **Land Use** – Cluster more intense development on less residential and commercial acreage, and locate that development farther from sensitive areas. Fewer units also mean a lower population, which results in less demand on the transportation, water, and wastewater infrastructure.

- **Transportation** – Reduced residential and commercial uses result in fewer trips on the local and regional transportation network, and fewer intersection improvements would likely be needed.

- **Open Space** – Provide more open space, particularly around sensitive areas, meeting the MPD Ordinance incentive to provide 50 percent of the total MPD area in preserved open space.
Exhibit 2-5
Alternative 3 - Mitigated MPD Proposal

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
- **Public Services** – Assume the need for additional school sites are all provided for on the MPD site, and that individual school sites are at the maximum end of the range required by the Enumclaw School District.

- **Water Resources** (surface water, stormwater, groundwater) – Employ low impact development techniques to reduce impacts on surface waters and to treat and store stormwater.

**Residential**
Alternative 3 assumes 25 percent fewer residential units as Alternative 2, while maintaining the same single-family/multi-family split (75 percent single and 25 percent multi). The resulting residential population of this alternative is 2,328.

**Commercial/Office**
The commercial and office uses are proposed to occur primarily on the North Triangle parcel, and would also include mixed-use development. The office and retail uses are lower in this alternative, reflecting less demand due to a lower potential residential population.

**Open Space**
Alternative 3 assumes that, regardless of prior agreements, a total of 50 percent open space is preserved, to protect sensitive areas and their buffers, and to provide additional open space for passive and recreational uses.

**Schools**
Alternative 3 includes a 15-acre elementary school site.
5 What elements are included in Alternative 4 – Fiscally Balanced MPD?

Alternative 4 was developed as a case study to achieve the “fiscally balanced” status as required by the City’s MPD Ordinance, specifically that:

_The proposed project will have no adverse financial impact upon the city at each phase of development, as well as at full build-out. The fiscal analysis shall also include the operation and maintenance costs to the city for operating, maintaining and replacing public facilities required to be constructed as a condition of MPD approval or any implementing approvals related thereto._

As such, this Alternative includes the same land acreages as Alternative 2, but with a fewer number of residential units. The number of units has been decreased so that in each operational year, the City’s budget is balanced between revenues and expenditures.

The land uses and estimated acreage for each are summarized in Exhibit 2-6.

---

**Exhibit 2-6**

**Alternative 4 – Proposed Land Use**

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Description</th>
<th>Estimated Acreage</th>
</tr>
</thead>
</table>
| Residential                | • 1,075 du  
  ➢ 806 single-family  
  ➢ 269 multi-family  
  • 5.43 du/ac  
  • 2,674 residents | 198 acres |
| Commercial/Office          | • 190,000 sf retail  
  • 200,000 sf office | 35 acres |
| Open Space                 | 138 acres                                             | 138 acres |
| School                     | Not provided on-site                                                | 0 |
| New Roads                  | Included as part of developed area                                              | 0 |
| **TOTAL**                  |                                                                   | **371 acres** |
(This page intentionally left blank.)
Chapter 3 The Built Environment – Effects on People and Community Resources

What is addressed in this chapter?

This chapter describes the community’s existing built environment and how the alternatives may impact that built environment. This chapter specifically addresses the following elements:

- Land Use
- Transportation
- Noise
- Public Utilities (water supply, wastewater, stormwater)
- Visual
- Historic and Cultural Resources
- Public Services (parks, schools, public safety)
- Fiscal Analysis
Land Use

1 What land uses are found in the area?

The City of Black Diamond is comprised of approximately 4,300 acres of land that includes a variety of uses, with the primary uses being residential, commercial, parks, schools, and open space.

Existing residences are loosely grouped in three general areas of the City: the original Black Diamond town site along SR 169, the Morganville settlements along Roberts Drive, and the Lake Sawyer neighborhood. Additional development is located along other major roadways throughout the City.

The City’s 2009 Zoning Map (see Exhibit 3-1) shows that the majority of the City is zoned for either single family residential (R4 and R6) or Master Planned Development (MPD). Land zoned for community commercial (CC), light industrial (Bus Pk/Light Ind), and Industrial (IND) uses exist primarily to the west of SR 169 and north of SE Auburn Black Diamond Road. These non-residential uses are generally not found within the residentially developed areas. Lands designated for neighborhood commercial (NC) and town center commercial (TC) uses are found in residential areas, though the amount of land with these designations is relatively small compared with the total amount of CC zoned land within the city limits.

The Lawson Hills area is designated for low- and medium-density residential housing in the Main Property, and mixed use development in the North Triangle.
Exhibit 3-1
City of Black Diamond Zoning

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
2 How are land uses expected to change in the future?

The City’s Comprehensive Plan states the City’s future land use goal is to “Establish a pattern of development that maintains and enhances quality of life within the community.” The City’s Zoning Map supports that goal by maintaining a majority of the City for either single family residential (R4) or Master Planned Development (MPD) use.

Two important provisions of the City’s development codes can affect land uses and development patterns – Transfer of Development Rights (TDR) and Master Planned Development (MPD) Approval.

The City’s TDR program (BDMC Section 19.24) allows the transfer of development rights from lands that have important natural characteristics to lands with less important natural characteristics. Important natural characteristics include wetlands, stream and wildlife corridors, historic landmarks, park and open space lands, and trails. There are both primary and secondary TDR sending areas designated within the Lawson Hills site. TDR receiving areas are designated in portions of Lawson Hills, including the North Triangle.

MPD is another key concept the City is using to implement its vision and provide flexibility in attaining City goals. The purposes of the MPD regulations include establishing a comprehensive development review process, preserving open space and wildlife corridors, and allowing alternative and innovative forms of development. The MPD process also encourages imaginative site layout and building design, with the intent of retaining significant features of the natural environment while allowing flexibility in development standards and permitted uses.
Certain components of the TDR program are designed to work with the requirements of the MPD process. TDR sending and receiving areas are a part of the MPD requirements so that the maximum allowable MPD residential densities can be achieved through participation in the City’s TDR program as a receiving site (BMC 18.98.160). The Lawson Hills site includes areas designated as sending areas and areas designated as receiving areas.

The Lawson Hills development does not require any TDRs beyond what are needed for the East Annexation Area (50 acres). The rest of the project achieves density through “clustering” the development. The minimum density required for the East Annexation Area is four dwelling units per acre, with a base density of two dwelling units per acre. The remaining two dwelling units per acre required will come from the In-City Forest through TDRs.

3 What are the population characteristics of Black Diamond?

The City of Black Diamond had an estimated population of 4,180 in 2009, which was a 5.2 percent growth from 2000. The population is comprised of approximately equal numbers of men and women, a median age of 35.7 years, and an average household size of 2.7 people.

4 What are the population characteristics of the surrounding community?

King County, which the City and the entire study area lies within, had a population of 1,909,300 in 2009, representing a 9.9 percent increase from 2000. Exhibit 3-2 summarizes the population characteristics in Washington State, King County, and neighboring cities.

<table>
<thead>
<tr>
<th>Region</th>
<th>Population (2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington</td>
<td>6,668,200</td>
</tr>
<tr>
<td>King County</td>
<td>1,909,300</td>
</tr>
<tr>
<td>Auburn</td>
<td>67,485</td>
</tr>
<tr>
<td>Black Diamond</td>
<td>4,180</td>
</tr>
<tr>
<td>Covington</td>
<td>17,530</td>
</tr>
<tr>
<td>Enumclaw</td>
<td>11,460</td>
</tr>
<tr>
<td>Kent</td>
<td>88,380</td>
</tr>
<tr>
<td>Maple Valley</td>
<td>20,840</td>
</tr>
</tbody>
</table>
5 How do the alternatives impact land use?

Alternatives 2, 3, and 4 represent development scenarios that could occur under existing zoning within the Lawson Hills area. As the North Triangle is zoned MPD and designated for mixed use development in the Comprehensive Plan, Alternative 1, as an all-residential use development pattern, would require changes to the Zoning Code and Comprehensive Plan to be implemented. All of the alternatives are assumed to be fully built out by 2025.

The existing uses on the Lawson Hills site are forestry and single-family homes. The commercial forestry use is incompatible with the property’s location inside an Urban Growth Area (UGA). The development of the MPD will displace the commercial forestry use, and result in a conversion of land uses from rural commercial forestry to residential and commercial uses more appropriate for the UGA.

**Alternative 1**
Development of the Main Property in Alternative 1 is based on the City’s low-density residential zoning. This scenario considers the North Triangle is also developed only in single-family residential uses, which would require a zoning change, as the area is currently designated MPD. Alternative 1 includes 1,330 new single-family dwelling units on 269 acres. This equates to just under 5 units per acre. This alternative does not propose any multi-family, commercial, or industrial uses. Open space is provided through protection of sensitive areas, which comprise approximately 102 of the 371 acre Lawson Hills site. This alternative would not require the use of the City’s TDR program discussed earlier in the chapter.

At the existing average household size of 2.7 people per single-family household, this alternative would increase population in the City by 3,591 persons.

**Alternative 2**
Alternative 2 includes a variety of land uses including residential, commercial/office, educational, recreational, and open space areas that are consistent with MPD zoning. The majority of the projected residential use is concentrated in the central and southern portions of the Main Property and includes a total 1,250 new residential dwelling units, including both single- and multi-family. A new 10-acre elementary
school with ball fields and play areas is also located in the northern section of the Main Property. The North Triangle property contains primarily commercial and office uses, with some mixed-use buildings that could incorporate residential units. This alternative would use the TDR program to achieve the overall density proposed.

The Lawson Hills MPD has very few multi-family or commercial areas abutting existing development in the City. There are commercial areas planned for the North Triangle, which abut rural lands in King County along the western border. Those King County lands are designated for open space and recreational use. Overall site design can assure quality integration of the commercial area with the neighboring open space. For example, it may be possible to include parking on the MPD commercial lands available for the visitors to the open space, so that King County need not build an independent parking lot on the open space. Similarly, landscaping and lighting on the MPD commercial lands can be designed to buffer the open space use. In fact, lighting on the North Triangle and throughout the development will be designed to meet City policies to protect the night sky and, therefore, is not expected to spill over into the King County open space area.

The southern border of the North Triangle abuts City lands zoned for similar “Business Park/Light Industrial” uses and the North Property of the Villages MPD, which is planned for similar commercial and high density uses. As a result, uses along this border will be compatible with uses on adjoining lands. Along the eastern border of the North Triangle, the MPD development is designed to comply with buffering requirements of the Gateway Overlay District and includes open space and two curving road connections to Highway 169, so as to assure compatibility with adjoining uses.

The majority of the Lawson Hills Main Property abuts City lands zoned R-4 for low-density single-family development. The MPD is designed with low-density residential and open space uses abutting almost all of these areas, thereby assuring land use compatibility. In addition, the MPD is designed to comply with the MPD Design Guidelines.
At the existing average household size of 2.7 people in single-family housing, and 1.85 in multi-family housing, this alternative would increase population in the City by 3,103 persons.

The City has a wide range of requirements for MPDs that address specific design criteria as well as public benefit objectives not typically available through conventional development. Those benefits include preservation and enhancement of environmental functions; provision of employment uses to help meet the City’s economic development objectives; and timely provision of all necessary facilities, infrastructure, and public services. Compliance with these standards is addressed through a separate review process of the Lawson Hills MPD Application, which was submitted to the City on May 11, 2009.

**Alternative 3**
Alternative 3 (Mitigated MPD Proposal) also follows a master planned approach, would be subject to the MPD Ordinance requirements, and would address many of the compatibility issues described in Alternative 2. Alternative 3 includes a 50 percent total acreage set aside for open space, enhancement of open space as it particularly relates to additional protection of sensitive areas, provides a 15-acre elementary school facility on-site, and includes 150,000 square feet of retail space and 75,000 square feet of office space. This alternative, similar to Alternative 2 would utilize the City’s TDR program to achieve the density discussed.

This alternative would increase population in the City by 2,328 persons.

**Alternative 4**
Alternative 4 was developed as a case study to reflect the provision in the City’s MPD Ordinance that all MPDs have a positive fiscal impact on the City at each stage of development. As a result, Alternative 4 assumes the same amount of office and retail use, but with a reduced number of residential units. This reflects a balance in the revenues (for example, the sales
tax) generated by new development and the costs associated with serving that additional population (increased police, fire, and other City services). This alternative would not require the use of the City’s TDR program discussed earlier in the chapter.

This alternative would increase population in the City by 2,674 persons.

6 What is the local business community like?

Black Diamond started as a coal mining company town in the 1800s and remained as such for nearly 50 years. Once the coal businesses left the area, King County maintained the town and incorporated it as a city in January 1959.

Currently the businesses of Black Diamond are dispersed into three areas within the City. Each of the three areas is partially developed and includes a variety of commercial uses:

- The historic Black Diamond Town has several businesses, including a bakery, shops, museum, post office, convenience store, and automotive repair businesses.
- A commercial strip along northern SR 169 has a variety of commercial properties, including an attorney’s office, dental office, grocery store, meat market, church, sporting goods shop, and bakery.
- A very small commercial area near the Covington-Sawyer Road/216th Avenue SE intersection also contains a small convenience store, restaurant, retail store, and automotive repair business.

The four largest employers operating within the City are Anesthesiology Supply Company, City of Black Diamond, Enumclaw School District, and Palmer-Coking Coal Company.
7 Do the alternatives provide additional commercial and retail opportunities?

**Alternative 1**
Alternative 1 does not designate any industrial or commercial areas. The existing local businesses will be providing the necessary items to meet the needs of new residents for the immediate future. It is anticipated that additional businesses would enter into the market over time, but because housing is anticipated to occur slowly and incrementally, businesses are not planned to occur in conjunction with this alternative.

**Alternative 2**
Alternative 2 provides 35 acres of commercial/office land, including approximately 190,000 square feet of retail space and 200,000 square feet of office space. New businesses would provide additional services along with businesses currently in operation. It is likely that the existing population of the City would support this additional retail and employment if additional retail uses were to “capture” a larger proportion of the purchases currently made in surrounding communities. The new residents anticipated with this alternative will likely support additional retail sales and provide a demand for new employment.

**Alternative 3**
Alternative 3 provides 20 acres of commercial/office land, including approximately 150,000 square feet of retail space and 75,000 square feet of office space. The commercial and office uses associated with this alternative are proportionately lower than Alternative 3, to reflect a reduced residential population and the demand generated by such.

**Alternative 4**
Alternative 4 assumes the same amount of commercial/office land as Alternative 2, with 190,000 square feet of retail space and 200,000 square feet of office space.
8 What measures could reduce the alternative’s effects on land use?

Alternative 1 would require changes to the City’s Zoning Code and Comprehensive Plan. No specific mitigation is identified for land use impacts in Alternatives 2, 3, or 4, since the City’s current Comprehensive Plan allows for any of these alternatives to be developed.

All of the alternatives will also need to be in compliance with several other codes and ordinances. Compliance with the policies and standards set forth in these ordinances should minimize the impacts on the surrounding areas and on the character of Black Diamond. These include:

- City of Black Diamond Comprehensive Plan
- Master Planned Development Ordinance – BDMC 18.98
- Sensitive Area Ordinance – BDMC – 19.10
- Black Diamond Engineering Design Standards
- MPD Design Standards and Guidelines
- Tree Preservation Ordinance – BDMC 19.30
- Gateway Overlay District Ordinance
- Black Diamond Urban Growth Area Agreement

As potentially allowed by the Black Diamond Municipal Code 18.98.130, the current MPD application seeks modification to some of the codes referenced above and adoption of functionally equivalent standards.
Transportation

1 What roadways currently serve the area?

The roadway transportation system is composed of a variety of different roadway types, each with a different intended use and characteristic. For example, some roads have several lanes, relatively high speed limits, longer distances between intersections, and are generally used for long-distance trips.

The different categories of roads, based on their intended uses and characteristics, are called “functional classifications.” The functional classifications in the study area can be generally defined as:

- **Principal Arterials** – Roadways that typically connect two or more communities, primarily serve through traffic, have the highest speed limits, and have limited direct access to abutting properties.

- **Minor Arterials** – Roadways that typically connect areas within a community and slightly favor through traffic, have relatively high speed limits, and have infrequent and controlled access to abutting properties.

- **Collectors** – Roadways that connect residential neighborhoods with other areas within a community, are intended to serve through and cross street traffic equally, have lower speed limits, and prioritize property access over through traffic.

- **Local Access Streets** – Roadways that are within neighborhoods that primarily serve traffic to and from driveways, have the lowest speed limits, and frequent direct access to individual residential or commercial properties.
There are two important state routes that serve the City of Black Diamond:

- **SR 169** (also known as Maple Valley Black Diamond Road SE and 3rd Avenue, within City Limits) is an urban principal arterial that serves as a primary north-south route for commuters traveling between Renton, Maple Valley, Covington, Black Diamond, and Enumclaw. The majority of trips along SR 169 are long-distance “regional” trips. The WSDOT classifies SR 169 as a Highway of Statewide Significance.

- **SR 516** (also known as SE Kent Kangley Road) is an urban minor arterial in the study area, though it is outside Black Diamond’s city limits. This important east-west route connects SR 18 and SR 169 and is an important route for the communities of Maple Valley, Covington, Black Diamond, and Ravensdale.

The remaining roadways within the study area consist of minor arterials, collector arterials, and local access streets. These roadway types generally accommodate moderate- to short-distance trips and connect the regional roadways, such as SR 169, to businesses and residences.

2 What is level of service and what are “acceptable” levels of service?

Level of service (LOS) is an estimate of the quality and performance of the transportation system operations. Traffic conditions are assessed with respect to the average intersection delay, which is measured in seconds per vehicle. The letter “A” is used to describe the least amount of congestion and best (quickest) operations and the letter “F” indicates the most congestion and worst (slowest) operations. Exhibit 3-3 provides a description of the amount of delay corresponding to each LOS grade.

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**What is delay?**

Delay is the average amount of time experienced by a driver in congestion, compared to the time the same trip would take under uncongested traffic conditions. For this study, the delay is measured as the average time a driver waits at a traffic signal or stop sign. The amount of delay, as a weighted average, determines the LOS grade.
What does the traffic analysis tell us?

The traffic analysis provides us with a good representation of how traffic conditions would be in the future without or with a project. However, the emphasis should be placed on the relative differences between alternatives, rather than focus on any single alternative.

Different jurisdictions set different LOS standards for the intersections they are responsible for. Based on the jurisdictions adopted policies, the acceptable LOS standards for intersections in the study area include:

- City of Black Diamond – LOS C (except for SR 169, which is LOS D)
- City of Maple Valley – LOS D
- City of Covington – LOS D
- King County – LOS E
- WSDOT – LOS D

3 What is traffic currently like in the study area?

SR 169 is the only regional north-south roadway that connects areas with high levels of employment and services. As a result, a majority of commuters utilize SR 169 during some point of their trip. Peak hour traffic along SR 169 is highly “directional” because there is little employment in the Black Diamond area. During the morning peak hour, approximately 72 percent of travel is northbound, compared to only 30 percent during the evening peak. SR 169 becomes moderately congested, due to the lack of alternative north-south routes and the highly directional distribution of traffic during the peak hours.
SR 516, SE Kent Kangley Road, Roberts Drive, and Lawson Street provide the primary east-west connections to SR 169. Despite having low roadway capacities and being affected by SR 169 operations, the relatively low volumes along these roadways results in low to moderate levels of congestion.

A total of 46 intersections were selected to be studied for this project, covering a large geographic area ranging across Maple Valley, Covington, Black Diamond, and other areas within King County.

During the evening peak hour, three of the study intersections currently operate worse than their LOS standards:

- SE 288th Street/216th Avenue SE – LOS D (LOS C is the City of Black Diamond standard)
- SR 169/Black Diamond Ravensdale Road – LOS F (LOS D is the City of Black Diamond standard along SR 169)
- SR 169/SR 516 – LOS E (LOS D is the City of Maple Valley standard)

The existing evening (PM) peak hour traffic operations are shown in Exhibit 3-4.

4 What future scenarios were analyzed?

A build-out year of 2025 was analyzed as the “future year” condition. The analysis assumes that all roadway improvements as listed in the City’s Transportation Element of the Comprehensive Plan, including new alignments, are constructed. No “interim” year analysis was conducted; therefore all impacts are based upon the assumption that at build out, all planned improvements are in place.

(Note: The land use quantities discussed under different disciplines may have nominal deviations as a result of the timing of when each analysis was completed. However, these small differences would not result in substantial changes that would affect the decision-making process. A sensitivity analysis was completed for Alternative 1 based on the construction of 1,330 single-family residences. The result was a maximum difference in intersection delays of 0.8 seconds/vehicle. The increase in dwelling units did not change any of the LOS grades, recommendations for mitigation, or conclusions.)
Exhibit 3-5
2007 Existing PM Peak Hour Traffic Conditions

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
5 How would the alternatives impact traffic operations in the future?

All of the alternatives are expected to increase travel delay as a result of increased traffic generated by the proposed land uses. However, the extent of the impacts is directly related to the total number of residential units and office/retail square feet proposed in each alternative. The higher the unit count, the more traffic is generated, and the more potential delay that could occur.

It should not be overlooked that the City’s Transportation Element includes a substantially revised network from today’s existing conditions. Many of the new roadways are developer-driven projects, which would be required as a result of development. No environmental analysis has been conducted on any of the potential new alignments – upon receipt of specific applications for development, the City will need to determine if additional impacts could occur, and what appropriate mitigation may be necessary.

Specific traffic operational analysis was only conducted on Alternatives 1 (No MPD Action) and 2 (MPD Proposal). Alternatives 3 (Mitigated MPD) and 4 (Fiscally Balanced MPD) were not analyzed in detail because they represent scenarios that are less densely developed, with fewer residential units and commercial/office square feet.

At some locations, the increases in delay would result in a level of service that is considered unacceptable. The number of intersections expected to operate below their respective standards in 2025 are:

- Alternative 1 – 10 of 46 would fail.
- Alternative 2 – 12 of 46 would fail.
Alternative 3 has 25 percent less residential units and reduced office and retail square footage. With 28 percent fewer trips on the network, it can be assumed that there would likely be fewer intersections that will degrade below their accepted LOS.

Alternative 4 has roughly the same number of units and office/retail square footage as Alternative 2, and impacts to intersections would generally be comparable. Although 10 intersections would fail under Alternative 1, only eight of these intersections would need improvements. This is because two intersections (SR 169/Witte Road and SR 169/Wax Road) would continue to operate below their respective LOS standards, but the amount of delay under Alternative 1 would be less than Baseline conditions.

The intersections that are expected to degrade worse than their respective LOS standards are shown on Exhibits 3-5 and 3-6.
Exhibit 3-5
2025 Alternative 1
PM Peak Hour Traffic Conditions

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Exhibit 3-7
2025 Alternative 2
PM Peak Hour Traffic Conditions

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
6 What measures could mitigate impacts on future traffic conditions?

The identified intersection mitigation measures are similar amongst all of the alternatives, however, the number of locations and magnitude of improvements is different. Mitigation measures generally consist of channelization improvements, such as left- and right-turn pockets, acceleration lanes, signal phasing and timing, and adding through-lanes.

In all cases, the 2025 planned network is assumed as a condition of the alternatives. Since the planned network includes many new alignments that would be needed as a result of development, Exhibit 3-7 should not be assumed to be a comprehensive list of all transportation mitigation needed to support the alternatives – it only addresses additional mitigation needs, beyond the planned improvements depicted in the City’s Transportation Element.

Exhibit 3-7
Mitigation Measures

<table>
<thead>
<tr>
<th>Study Intersection</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 288th St/216th Avenue SE</td>
<td>Signalize.</td>
<td>Signalize.</td>
</tr>
<tr>
<td>SR 169/Roberts Drive</td>
<td>Add SBL turn pocket.</td>
<td>Add SBL turn pocket.</td>
</tr>
<tr>
<td>SR 169/SE Black Diamond Ravensdale Road (Pipeline Road)</td>
<td>NA</td>
<td>Add SBL turn pocket.</td>
</tr>
<tr>
<td>SR 169/SE 240th Street</td>
<td>NA</td>
<td>Add third SB lane from Wax Road to Witte Road ending it as a right only lane</td>
</tr>
<tr>
<td>SR 169/Witte Road</td>
<td>NA</td>
<td>at Witte Road.</td>
</tr>
<tr>
<td>SR 169/SE Wax Road</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>SR 169/SE 231st Street</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>SE 272nd Street/160th Avenue SE</td>
<td>Provide a 100-foot refuge on WB approach for SBL turning vehicles.</td>
<td>Add SBR turn pocket. Provide a 100-foot refuge on WB approach for SBL turning</td>
</tr>
<tr>
<td>SE Kent Kangley Road/Landsburg Road SE</td>
<td>Add a SBL turn pocket.</td>
<td>vehicles.</td>
</tr>
<tr>
<td>SR 169/SE Green Valley Road</td>
<td>Provide a refuge on SB approach for EBL turning vehicles.</td>
<td>Provide a refuge on SB approach for EBL turning vehicles.</td>
</tr>
<tr>
<td>SE Auburn-Black Diamond Road/SE Green Valley Road</td>
<td>Provide a refuge on EB approach for NBL turning vehicles.</td>
<td>Provide a refuge on EB approach for NBL turning vehicles.</td>
</tr>
<tr>
<td>SR 169/North Connector</td>
<td>Convert to a TWSC with NB and SB free movements. Provide a refuge on SB</td>
<td>Signalize. Add SBR and NBL turn pockets.</td>
</tr>
<tr>
<td></td>
<td>approach for EBL turning vehicles.</td>
<td></td>
</tr>
</tbody>
</table>
Exhibit 3-7 summarizes the mitigation measures for Alternatives 1 and 2. Although Alternative 3 was not analyzed in detail, it assumes approximately 28 percent less trips than Alternative 2, and would likely require similar mitigation. Alternative 4 was created solely as a fiscally balanced alternative only, and was therefore not analyzed for transportation impacts.

It is important to note that in the case of intersection improvements where control beyond a four-way stop is needed, the City will strongly encourage the consideration of roundabouts. The mitigation table in this chapter does not consider if a roundabout or signal would be the preferred control device at a specific intersection. However, in cases where the mitigation indicates that a signal be installed, every effort should be made to first determine if a roundabout is appropriate.

7 What transit routes currently serve the area?

Public transit within the study area is provided by King County Metro in the form of bus service. King County Metro provides transit service along the major roads in the study area and connects to several major activity areas, such as Renton, Seattle, Enumclaw, Kent, Timberlane, and Lake Meridian. Exhibit 3-8 summarizes the existing transit service.

<table>
<thead>
<tr>
<th>Route</th>
<th>Weekday Headway (Min)</th>
<th>Service Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>KC 143</td>
<td>20-30 (northbound only) 20-30 (southbound only)</td>
<td>Downtown Seattle, Maple Valley, Renton, Black Diamond</td>
</tr>
<tr>
<td>KC 149</td>
<td>20-30 (southbound only) 120 20-30 (northbound only)</td>
<td>Black Diamond, Maple Valley, Renton, Downtown Seattle</td>
</tr>
<tr>
<td>KC 912</td>
<td>No service 120 (4 trips) No service</td>
<td>Covington, Black Diamond, Enumclaw</td>
</tr>
<tr>
<td>KC 168</td>
<td>60 60 60</td>
<td>Kent, Covington, Timberlane</td>
</tr>
<tr>
<td>KC 159</td>
<td>20-30 No service 20-30</td>
<td>Downtown Seattle, Kent, Lake Meridian, Timberlane, Covington</td>
</tr>
</tbody>
</table>

Notes: KC = King County Metro route number
KC Route 168 is the only route in the area that provides weekend service with 60 minute headways throughout the day.
To complement the transit service described in Exhibit 3-8, the following park and ride facilities are provided in the study area:

- **Black Diamond Masonic Lodge** – Served by King County Metro Routes 143, 149, and 912.
- **Cornerstone United Methodist Church** – Served by King County Metro Route 912.
- **Maple Valley Park and Ride** – Served by King County Metro Routes 143 and 149.

8 **How would the alternatives affect future transit service?**

The demand for public transit can be expected to increase as population and congestion increase, and King County Metro may alter their operations to compensate for longer travel times and maintain the same quality of transit service. None of the alternatives are expected to adversely affect transit service or facilities in the study area.

9 **What pedestrian, bicycle, and other off-road facilities are currently available in the area?**

Non-motorized travel, such as walking and biking, are important elements of the transportation system and the provision, extent, and quality of non-motorized facilities affect mode choice.

The SR 169 and SR 516 corridors in the study area generally accommodate non-motorized travel with gravel or paved shoulders. Sidewalks are located along the majority of both corridors on at least one side of the road, except for the area between SR 516 and downtown Black Diamond along SR 169. Striped crosswalks with pedestrian call buttons are located at most of the signalized intersections. There are no formally designated (striped) on-street bicycle lanes within the study area. However, both routes have wide curb lanes or paved shoulders that can serve as informal bicycle routes.

This area has a fairly heavy recreational bicycling use, and Auburn-Black Diamond Road is a favorite route.
10 **How would the alternatives affect future pedestrian, bicycle, and other off-road facilities in the area?**

The future alternatives would not affect the non-motorized system external to the specific project sites. On site, the master planned alternatives (2, 3, and 4) would all incorporate trails and sidewalks as part of their developments. This is the benefit of building as an MPD, rather than incremental development as described in Alternative 1, which would not necessarily provide for additional non-motorized travel opportunities.
Noise

1 What sources and intensity of noise are currently present in the area?

The major sources of noise in the Black Diamond area are from roadways, particularly from SR 169 and the Auburn-Black Diamond Road/Roberts Drive. Existing noise levels from SR 169 have been measured between 54 and 66 decibels (dBA), depending largely on the speed of vehicles. Noise levels have been measured at 62 dBA on Roberts Drive/Auburn-Black Diamond Road at the City offices. Noise levels in residential areas at a distance from major roads drop to between 46 and 53 dBA, with noise levels in more rural and undeveloped areas as low as 31 dBA.

Sound level measurements taken in the area are indicated in Exhibit 3-9. The measurements are reported in a variety of metrics, each having a specific meaning. The $L_{eq}$ is an average sound level for a given period of time that gives more weight to the highest and longest lasting sound levels. The $L_{eq}$ is a good indicator of how individuals within a community experience noise. $L_{max}$ is the maximum sound level recorded during the measurement period. The $L_{max}$ is a useful metric for identifying the existence of short-term, high sound level noises. $L_{25}$ is the sound level exceeded 25 percent of a period of time.

Where can I find additional technical analysis?

The original and updated noise analysis reported in this chapter is available in Appendix C of this document.

What is a decibel?

A decibel (dB) is a measurement unit that describes the relative loudness of a sound. The scale used is logarithmic, which means that an increase of one decibel is equal to a ten-fold increase in sound pressure, and an increase of 10dB is an increase of 100 times in sound pressure. This scale roughly approximates how humans perceive sound. In general, a 3-dB difference is the threshold at which most people perceive a difference in sound levels.

Exhibit 3-9

Project Vicinity Noise Measurements

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Daytime Range L$_{eq}$ (dBA)</th>
<th>Nighttime Range L$_{eq}$ (dBA)</th>
<th>$L_{eq}$ (dBA)</th>
<th>$L_{max}$ (dBA)</th>
<th>$L_{25}$ (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SR 169 south of Summit Drive</td>
<td>66</td>
<td>79</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>West of 25000 Franklin Drive</td>
<td>42–57</td>
<td>31–48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>SR 169/3rd Avenue north of James Street</td>
<td>54</td>
<td>71</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>32828 277th Place SE</td>
<td>41–50</td>
<td>32–45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Roberts Drive west of 236th Avenue SE</td>
<td>66</td>
<td>85</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>32222 Bruckners Way</td>
<td>41–51</td>
<td>30–45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Roberts Drive east of Morgan Drive</td>
<td>62</td>
<td>75</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Lake Sawyer Road at Sawyer Woods Elementary School</td>
<td>60</td>
<td>78</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Lawson Street east of SR 169</td>
<td>57</td>
<td>74</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>32514 McKay Lane</td>
<td>39–51</td>
<td>27–45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Green Valley Road west of SR 169</td>
<td>60</td>
<td>78</td>
<td>53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Noise levels in the Black Diamond area can generally be characterized as typical of quiet rural and residential areas, which is consistent with the predominant existing land use.

2 What noise limits apply in the area?

There are no universally accepted noise limits. An acceptable noise level for a community or neighborhood is a decision to be made by the community based on their values. For example, residents in a rural or suburban single-family neighborhood may place a higher value on lower noise levels and a sense of tranquility. An urban neighborhood with high-density multi-family housing and street level commercial uses may place a higher value on the vibrant character of the neighborhood and be tolerant of higher noise levels.

Appropriate noise levels vary for other uses. Most commercial uses are generally less sensitive to higher noise levels. Park and open spaces may have a range of toleration for noise levels. An open space area that is oriented primarily to the values of peaceful retreat may seek very low noise levels, while sports fields may have high levels of noise from player and crowd activities.

State and Local Noise Limits

Maximum environmental noise levels are regulated from different classifications of land use called an “environmental designation for noise abatement” (EDNA), which includes the following:

- Class A EDNA consists of lands where human beings reside and sleep.
- Class B EDNA consists of lands involving uses requiring protection against noise interference with speech.
- Class C EDNA includes lands involving economic activities of such a nature that higher noise levels than experienced in other areas is normally to be anticipated. Persons working in these areas are normally covered by noise control regulations from the Department of Labor and Industries.

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What are typical land uses in a Class A EDNA?

These are areas where human beings reside and sleep. The following are typical examples of land uses in this classification:

- Residential, including single-family and multi family.
- Homes for the aged.
- Hospitals.
- Health and correctional facilities.

What are typical land uses in a Class B EDNA?

These involve uses requiring protection against noise interference with speech. The following are typical examples of land uses in this classification:

- Commercial living accommodations (hotels and motels).
- Commercial dining establishment.
- Retail services.
- Banks and office buildings.
- Community services, property not used for human habitation (educational, religious, governmental, cultural, and recreational facilities).
What is a day-night sound level?
A day-night sound level is a 24-hour sound level average, the calculation of which includes the addition of 10 dBA to actual levels measured during nighttime hours (10 p.m. to 7 a.m.) to account for potential sleep interference noise could cause during these hours.

What are typical land uses in a Class C EDNA?
These involve economic activities of such a nature that higher noise levels than experienced in other areas is normally to be anticipated. Persons working in these areas are normally covered by noise regulations from the Department of Labor and Industries. The following are typical examples of land uses in this classification:
- Storage, warehouse, and distribution facilities.
- Industrial property used for the production and fabrication of durable and nondurable manmade goods.
- Agricultural and silvicultural property used for the production of crops, wood products, or livestock.
- Health and correctional facilities.

Traffic traveling on public roadways is exempt from the State of Washington’s maximum allowable noise levels. Additionally, noise from individual motor vehicles is regulated by performance standards in state regulations (WAC 173-62).

Department of Housing and Urban Development (HUD)

Other criteria are relevant to evaluating the level of noise that may be considered an adverse impact. One such index has been developed by the U.S. Department of Housing and Urban Development (HUD) (24 CFR 51.101[8] [9]):

- **Exterior noise goal:** It is a HUD goal that exterior noise levels do not exceed a day-night average sound level of 55 dBA. This level is recommended by the Environmental Protection Agency as a goal for outdoors in residential areas (Sec24 CFR 51.101).

- **Interior noise goal:** It is a HUD goal that the interior auditory environment shall not exceed a day-night average sound level of 45 dBA. Attenuation measures to meet these interior goals shall be employed where feasible. Emphasis shall be given to noise sensitive interior spaces such as bedrooms.
HUD does not, however, enforce these goals as a standard. Instead, HUD sets a standard of not exceeding a day-night level of 65 dBA as “acceptable.” Levels above 65 dBA, but not exceeding 75 dBA, are defined as “normally unacceptable” and require special approval and attenuation. Noise levels above 75 dBA are defined as unacceptable. HUD criteria do not pertain directly to this proposal, and are used only as reference for indicating potential noise impacts.

**Federal Highway Administration Noise Criteria**

The Federal Highway Administration (FHWA) defines a traffic noise impact to have occurred when the predicted traffic noise levels approach or exceed the noise abatement criteria shown in Exhibit 3-11, or when the predicted traffic noise levels substantially exceed the existing noise levels. FHWA delegates to the State the definitions of “approach” and “substantially exceed.” The Washington State Department of Transportation (WSDOT) defines “approaching” the FHWA limits as sound levels within 1 dBA of the criterion level or 66 dBA for residences. WSDOT defines “substantially exceeding” existing noise levels as an increase of 10 dBA if the projected future noise level is above 50 dBA.

**Exhibit 3-11**

**FHWA Roadway Noise Abatement Criteria**

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Hourly Leq (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Lands which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose</td>
<td>57 (exterior)</td>
</tr>
<tr>
<td>(B) Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals</td>
<td>67 (exterior)</td>
</tr>
<tr>
<td>(C) Developed lands, properties, or activities not included in the above categories</td>
<td>72 (exterior)</td>
</tr>
<tr>
<td>(D) Undeveloped lands</td>
<td>N/A</td>
</tr>
<tr>
<td>(E) Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums</td>
<td>52 (interior)</td>
</tr>
</tbody>
</table>

*Source: Table 1 to Part 772-Noise Abatement Criteria, 23 CFR 772 FHWA.*
3 What are the expected effects of construction noise on nearby uses?

During construction there would be a temporary increase in sound levels in the immediate vicinity, due to infrastructure and building construction. The greatest increase in noise can be expected during site grading due to the use of heavy equipment and the hauling of materials. The increase in noise levels would depend on the type of equipment being used and the amount of time it is in use. Exhibit 3-12 displays ranges of noise produced by typical construction equipment.

**Exhibit 3-12**
Typical Construction Equipment Noise

<table>
<thead>
<tr>
<th>Construction Phase</th>
<th>Estimated Sound Level (dBA)</th>
<th>Types of Equipment</th>
<th>Estimated Sound Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 feet</td>
<td>100 feet</td>
<td>200 feet</td>
</tr>
<tr>
<td>Clearing</td>
<td>80–96</td>
<td>74–90</td>
<td>68–84</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation/Grading</td>
<td>75–88</td>
<td>69–82</td>
<td>63–76</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paving</td>
<td>72–88</td>
<td>66–82</td>
<td>60–76</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundations</td>
<td>75–85</td>
<td>69–79</td>
<td>63–73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Construction</td>
<td>80–87</td>
<td>74–81</td>
<td>68–75</td>
</tr>
<tr>
<td></td>
<td>80–90</td>
<td>74–85</td>
<td>68–78</td>
</tr>
</tbody>
</table>

The parties most likely to be affected by construction noise include residents adjacent to the site and adjacent to off-site infrastructure, such as the road connection proposed between SR 169 and the site.

The character of noise impact during construction is not likely to differ substantially between the alternatives.
4 What are typical construction noise reduction measures?

Construction noise mitigation employs different strategies for different noise sources:

▪ Noise from stationary sources such as pumps, compressors, and welding machines can be reduced by placing equipment far away from sensitive receiving locations and turning equipment off when not in use.

▪ Limiting hours of construction.

▪ Noise from construction equipment can be reduced by choosing equipment that produces less noise, or employing alternative construction practices. For example, hydraulic or electric models for impact tools such as jackhammers, rock drills, and pavement breakers often are quieter than pneumatic powered tools.

5 What long-term noise disturbance will result from the proposal?

Three potential noise impacts may result from development of the Lawson area:

▪ Impacts on sensitive receivers outside the project site from increased traffic noise on roads in the vicinity that experience increased traffic volumes generated by the project.

▪ Impacts to residents of the project area from traffic noise on adjacent streets.

▪ Impacts to residents from non-traffic noise sources.

**Impacts Outside the Project from Increased Traffic Noise**

Impacts of increases in traffic noise were analyzed for the cumulative impacts scenario which includes traffic generation from cumulative development in the area including:

▪ Development of the Lawson Hills MPD.

▪ Development of The Villages MPD.

▪ Other development in the area not part of MPD applications in Black Diamond.
Cumulative impact analysis establishes expected total noise levels in the community over time, compared with existing noise levels, providing a greater understanding of the change in noise levels likely to be experienced in and around the project area under each alternative.

Impacts from traffic noise were estimated using the Federal Highway Administration (FHWA) Traffic Noise Model Lookup Tool. Results for major arterials in the vicinity and local streets in and adjacent to the development are indicated in Exhibit 3-13.

### Exhibit 3-13

**Projected Traffic Noise (dBA) Outside the Proposal Site**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>SR 169 south of Summit Drive</td>
<td>824</td>
<td>65.3</td>
<td>1,116</td>
<td>66.6</td>
<td>3,534</td>
<td>71.6</td>
</tr>
<tr>
<td>C</td>
<td>SR 169/3rd Avenue north of James Street</td>
<td>874</td>
<td>65.2</td>
<td>1,142</td>
<td>66.4</td>
<td>2,641</td>
<td>70.2</td>
</tr>
<tr>
<td>D</td>
<td>Auburn-Black Diamond Road east of 227th Avenue SE</td>
<td>500</td>
<td>61</td>
<td>557</td>
<td>62.2</td>
<td>1,566</td>
<td>66.5</td>
</tr>
<tr>
<td>F</td>
<td>Roberts Drive west of 236th Avenue SE</td>
<td>390</td>
<td>60.4</td>
<td>510</td>
<td>61.6</td>
<td>1,159</td>
<td>64.9</td>
</tr>
<tr>
<td>H</td>
<td>Roberts Drive east of Morgan Drive</td>
<td>426</td>
<td>61.0</td>
<td>557</td>
<td>62.2</td>
<td>1,566</td>
<td>66.5</td>
</tr>
<tr>
<td>J</td>
<td>Lake Sawyer Road at Sawyer Woods Elementary School</td>
<td>333</td>
<td>59.4</td>
<td>435</td>
<td>60.6</td>
<td>1,422</td>
<td>65.7</td>
</tr>
<tr>
<td>K</td>
<td>Lawson Street east of SR 169</td>
<td>172</td>
<td>58.0</td>
<td>225</td>
<td>53.5</td>
<td>461</td>
<td>56.7</td>
</tr>
<tr>
<td>L</td>
<td>McKay Lane south of Connector</td>
<td>39-51</td>
<td></td>
<td></td>
<td></td>
<td>1,945</td>
<td>62.4</td>
</tr>
<tr>
<td>M</td>
<td>SR 169 South of Jones Lake</td>
<td>840</td>
<td>65.9</td>
<td>1,098</td>
<td>67.0</td>
<td>2,488</td>
<td>70.7</td>
</tr>
<tr>
<td>N</td>
<td>Green Valley Road west of SR 169</td>
<td>54</td>
<td>54.4</td>
<td>70</td>
<td>55.2</td>
<td>146</td>
<td>61.5</td>
</tr>
<tr>
<td>O</td>
<td>SR 169 south of SR 516</td>
<td>1,377</td>
<td>68.0</td>
<td>1,801</td>
<td>69.1</td>
<td>3,238</td>
<td>71.7</td>
</tr>
</tbody>
</table>
Defining noise impacts depends on the extent to which a community values lower noise levels in terms of the overall environment and the extent to which noise constitutes an intrusion into the desired character of the environment. Noise impacts are typically experienced differently in areas with different land uses and intensities, be they high intensity urban environments, lower intensity residential areas, rural areas, and commercial and industrial uses. At most locations modeled, the impacts of additional traffic related to cumulative increases in traffic volumes is generally over 3 dBA, which would be noticeable to the majority of persons. The only case where there would be a severe impact of greater than 10 dBA would be for existing development adjacent to the proposed new connector road between Lawson Road and SR 169.

All of the locations analyzed exceed the HUD daytime exterior noise goal for residential areas of 55 dBA. Modeling did not include nighttime periods, and therefore it is unknown whether the goal of 45 dBA for this time period is met. About three quarters of the locations analyzed exceed the HUD daytime threshold for consideration of mitigation at 65 dBA and about a third meet the FHWA criteria for mitigation of approaching 67 dBA. In most locations adjacent to existing roads, the existing noise levels are above the HUD preferred threshold for residential areas of 55 dBA. However, noise from traffic traveling on public streets is exempt from noise standards.

The character of noise impacts from traffic is not likely to differ substantially between the alternatives. The difference in traffic volumes is not great enough to produce a discernable noise difference. As indicated above, a doubling of traffic produces an increase in noise of about 3 dBA, which is the threshold at which most individuals perceive a difference.

**Impacts Within the Project Site from Increased Traffic Noise**

Traffic volumes and associated noise levels at major roadways within the project site at build-out are projected in Exhibit 3-14 below.
### Exhibit 3-14  
**Noise Levels at Project Build-out**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>Lawson Access south of Lawson Road</td>
<td>724</td>
<td>57.8</td>
</tr>
<tr>
<td>O</td>
<td>Lawson Access south of Lawson Rd WITHOUT Comprehensive Plan connection to SR 169</td>
<td>1,231</td>
<td>60.2</td>
</tr>
<tr>
<td>P</td>
<td>New Lawson Hills Connector east of SR 169</td>
<td>822</td>
<td>60.6</td>
</tr>
<tr>
<td>P</td>
<td>New Lawson Hills Connector east of SR 169 WITHOUT Comprehensive Plan connection to SR 169</td>
<td>1,376</td>
<td>62.9</td>
</tr>
</tbody>
</table>

Noise impacts from traffic within the development will not change the experience of existing residents and therefore is likely to be perceived as the normal background noise level by residents. Noise levels are not likely to differ substantially between the Alternatives, however Alternative 1, which includes all single-family residential uses, would place more residents close to noise generating arterials.

### 6 What are options for reducing long-term noise disturbance?

Long-term noise disturbance from traffic generally is addressed through noise barriers. These can consist of berms or walls. Walls generally are constructed of masonry or heavy wood. The density of the wall, rather than the construction method, is the key factor in reducing noise.

A community’s decision on whether to employ measures to reduce noise impacts depends upon the value the community places on lower noise levels and the balance the community strikes between that value and other values, including cost and aesthetics.

The installation of a noise barrier at the street level generally will result in reduction of noise levels of 4 to 8 dBA at adjacent residential buildings where the site is at or above the grade of the street. Two criteria are generally addressed in determining whether to install a noise wall: feasibility and reasonableness.
To determine feasibility, the following factors are generally considered:

- The topography must be compatible with construction of the noise barrier. In cases where the adjacent land is substantially higher than the source of traffic noise, the wall may not effectively interrupt sound.

- The reduction in sound levels must be of a magnitude sufficient to produce a noticeable reduction in sound. Reduction of less than 3 dBA generally will not be perceived. Most receivers will not perceive a benefit from reduction of less than 5 dBA. A reduction of 10 dBA or more is desirable.

- Gaps in a noise wall to accommodate driveways or local streets generally reduce its effectiveness for receivers in the vicinity of the gap.

The reasonableness of a noise wall relates to how the noise wall will impact the character of the neighborhood, including:

- A noise barrier may block scenic views.

- A noise wall, especially a tall one, can be a visual intrusion into the streetscape that is at variance with the open character of the street. This may depend on the orientation of a neighborhood in relation to the roadway, which is the source of noise mitigated. The impact a noise wall has on the character of a street can be lessened, however, by setting it back from the street or softening it with landscaping.

- A noise wall may be perceived as a barrier that separates a neighborhood from the surrounding community. This may include physical, psychological, and social barriers.

- Noise walls can reduce the ability of residents to have “eyes on the street,” hampering this effective deterrent to crime. This may depend on the orientation of a neighborhood in relation to the roadway which is the source of noise mitigated. If the roadway is a major arterial, it is unlikely that local residences include it in their normal surveillance area.

Generally, installation of noise barriers is considered at the time of major capacity or configuration upgrades to roadways. At that time, the City or the State can determine whether noise barriers are appropriate in a specific situation.
Public Utilities

Water Supply

1 What water sources and facilities are available to serve the study area?

- Lawson Hills is within the City of Black Diamond’s water service area. Five water sources are available to serve the City. Four of these water sources are within the City of Black Diamond Spring Field. These are:
  - Collection Area No. 1 – South Springs
  - Collection Area No. 2 – Middle Springs
  - Collection Area No. 3 – North Springs
  - Collection Area No. 4 – Palmer Spring Area

- Black Diamond currently uses two of these spring sources to meet daily water supply needs. Collection Area No. 2 is currently not in use because it has been designated as under the influence of surface water, which requires it to have more stringent treatment standards before its water can be used for domestic drinking water purposes. Collection Area No. 4 is under consideration as a potential future supply source.

For its fifth source, the City has a wholesale water agreement with the City of Tacoma to provide additional water supply. This source is not currently being used by the City of Black Diamond.

The City’s water distribution system operates in three pressure zones, with pressure heads of 965 feet, 850 feet, and 750 feet. Water from the spring sources is transmitted via a 12-inch main which travels through a section of the Main Property. Water from the spring sources is stored in a 4.3-million gallon (MG) reservoir located to the northwest of the intersection of Lawson Street and Botts Drive. The 4.3-MG reservoir is in the City’s 850 Pressure Zone. Spring water is treated at a facility near the 4.3-MG reservoir and is pumped via an 8-inch main to a 0.5-MG reservoir in the 965 Pressure Zone.

Groundwater

More information on groundwater is provided in Chapter 4.

What are pressure heads and pressure zones?

Adequate water pressure is needed to provide consistent and safe delivery of drinking water to customers. Water pressure is measured in “pressure heads,” which correspond to the amount of pressure generated by storing water a given number of feet above the location of their customers. An area within a water distribution system that has a pressure head of 750 feet would be called a 750 pressure zone or a 750 Zone.
Portions of the Lawson Hills study area are located within various segments of the City’s three pressure zones. The North Triangle property is located within the 750 Zone, while the Lower Lawson site west of 5th Avenue is located in the 850 Zone. The lower third of the project site is within the 965 Zone and the upper two-thirds of the Main Property is located above the 965 Zone. Exhibit 3-15 shows existing water supply and service facilities for the study area.

**Exhibit 3-15**


<table>
<thead>
<tr>
<th>Source of Supply</th>
<th>Maximum Annual Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Diamond Spring Field</td>
<td>179.5 MG</td>
</tr>
<tr>
<td>City of Tacoma Intertie</td>
<td>807.3 MG</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>986.9 MG</strong></td>
</tr>
</tbody>
</table>

2. **Is there adequate water supply to serve the alternatives?**

The City has water rights to a maximum annual water supply of approximately 986.9 MG from the combined Black Diamond spring sources and the City of Tacoma intertie (see Exhibit 3-15). Portions of this supply are owned by the Applicant through a Water Supply and Facilities Funding Agreement (WSFFA) and would be used to serve water needs for the proposal.

In water system planning, the term Equivalent Residential Unit (ERU) is equal to the average amount of water used by a single family residence in gallons over the period of one year. ERUs are useful to project water demand for a community when reasonable assumptions can be made regarding the anticipated land use. For residential single-family land uses it has been assumed that the number of residential dwelling units is equal to the number of ERUs. ERUs were calculated for non-residential land uses consistent with the 2008 City of Black Diamond Final Comprehensive Water System Plan; which assumed a value of 6 ERUs per acre for commercial,
industrial, and retail land uses. Exhibit 3-16 summarizes the projected demands at year 2025 for each of the alternatives. Alternative 4 is not included in this analysis, as its water demand impacts are similar to the ERUs generated by Alternative 2.

### Exhibit 3-16
**Lawson Hills Annual Water Demand**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>New ERUs</th>
<th>Total ERUs&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Annual Demand&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>1,330</td>
<td>2,460</td>
<td>206.5 MG</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>1,528</td>
<td>2,650</td>
<td>222.5 MG</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>1,148</td>
<td>2,278</td>
<td>191.2 MG</td>
</tr>
</tbody>
</table>

<sup>a</sup> Total includes an existing ERU number of 1,130 per the City’s 2008 Water System Comprehensive Plan

<sup>b</sup> Annual demand calculated based on average per capita use of 230 gpd per the 2008 Water System Comprehensive Plan

Given the various ERU estimates above, we can convert the ERUs to a water volume amount, making it possible to estimate future water demands. Currently, the City’s Water System Comprehensive Plan assigns a value of 191 gallons per day (gpd) per each ERU. For future uses, the City and the Applicant have agreed to use the value of 230 gpd which was allowed under the WSFFA. Exhibit 3-16 summarizes the approximate annual demand through the year 2025 associated with each of the alternatives using ERUs converted to millions of gallons.

### 3 What water supply facilities and services are proposed for the study area?

The Main Property is supplied by City-owned water mains located at Botts Drive, McKay Lane, Park Street/4th Avenue, and SR 169. To address the water supply needs of development in Lawson Hills, new water supply lines would be built in or along roadways, utility tracts, and easements and would connect to the City’s existing water system in at least two locations. The number of connections to the existing water system would be based on the need for adequate fire-flow and to minimize residence time to protect water quality. To supply

### Multi-Family Units and Water Demand

The water demand analysis reported in Exhibit 3-17 assumed that residents of multi-family dwelling-units used the same amount of water as residents of single-family dwelling-units. As multi-family residents generally use less water, this analysis provides a conservative estimate.

### East Annexation Area

The east annexation area is located on the easternmost edge of the Lawson Hills site. It is anticipated that this property would be annexed to the City with the MPD application.
portions of the Lawson Hills site that cannot be served by the existing pressure zones, a new reservoir is proposed to be constructed on the eastern edge of the east annexation area. The new reservoir would provide water via gravity flows to the upper portions of the project site. This reservoir would create a new 1175 Pressure Zone.

In addition, the existing capacity of the 965 Reservoir will be evaluated to determine if it meets the added demands from development at the project site. Upgrades to the 965 Reservoir will be made as needed. The City’s 2008 Comprehensive Water Plan identified the need for a new 2.5-MG reservoir adjacent to the 965 Reservoir. The potential addition of the new reservoir at the east annexation area could negate the need for the proposed 2.5-MG reservoir. A pump station is anticipated to be constructed adjacent to the 965 Reservoir to pump water from the 965 Reservoir to the proposed east annexation area reservoir. Exhibit 3-18 shows proposed water supply and service facilities for the study area alternatives, as well as the pressure zones.

4 How will the alternatives affect water supply?

For the purposes of this EIS, it is assumed that the proposed water system plan and pressure zones shown in Exhibit 3-18 will be similar for all alternatives at build-out.

All extensions and upgrades performed on the existing water system will comply with the standards described in Chapter 4 of the City’s 2008 Comprehensive Water System Plan. These standards ensure that development under any of the alternatives will be in compliance with pertinent drinking water regulations and requirements. Under Alternative 2, the Applicant proposes to implement Low Impact Development (LID) practices in the treatment of stormwater, practices which will help protect the groundwater supply.

With regard to the North Triangle Property, the Comprehensive Water Plan shows water service in the area to be a looped main. Additionally, upgrades to the 850 Reservoir and the existing water system line will be performed as necessary to ensure that fire-flow standards are met for the area.
Exhibit 3-17
Existing Water Supply and Service

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Exhibit 3-18
Proposed Water Supply and Service

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Wastewater

1 What wastewater facilities and services are currently provided in the study area?

Future development within the Lawson Hills study area would be served by the City of Black Diamond’s sanitary wastewater system. All of the City’s existing wastewater is directed to the existing King County Wastewater Treatment Division’s Black Diamond Pump Station via gravity flows or by pumping. Wastewater currently flows from The Main Property to the Black Diamond Pump Station via gravity flows (the North Triangle property has no existing wastewater facilities on-site). From the Black Diamond Pump Station, flow is pumped via force main and gravity flows to the Soos Creek Water & Sewer District (SCWSD) Lift Station No. 11. From the SCWSD Lift Station No. 11, sewage is pumped to SCWSD Lift Station 10B and then to King County’s interceptor sewer, and ultimately to King County’s wastewater treatment plant in Renton. These facilities are maintained by both SCWSD and King County, as detailed in each agency’s agreements.

The Main Property is currently served by an 8-inch gravity main located along Botts Drive. The main currently serves eight residences on the project site and four off-site residences along Botts Drive. An eastern spur of the City’s wastewater line also serves five residences adjacent to the eastern boundary of the site. Two parcels located in Lawson Hills utilize on-site septic systems. These septic systems, over time, will be decommissioned and removed as Lawson Hills fully develops.

As mentioned, the North Triangle property has no existing wastewater facilities on-site. The adjacent Diamond Glen development is the closest site with City wastewater. However, the Diamond Glen facilities do not have sufficient capacity to serve the North Triangle property, and off-site wastewater system improvements would be necessary to accommodate development.
The City and King County have been planning for future wastewater capacity needs in the area and several studies have been conducted. In 2005, King County analyzed storage options and concluded that construction of a 0.6-MG storage facility would be needed by 2010 to alleviate peak flows to the wastewater system. The following year, King County entered into an agreement to build and maintain a storage facility in Black Diamond. The storage capacity of the reservoir, when built, is now proposed to be 0.75 MG. This new storage reservoir is currently proposed to be constructed at the King County Jones Lake pump station site. The City is exploring the advantages and viability of locating the storage facility at alternate locations. This will be further assessed during development of the Sewer Comprehensive Plan update.

2 What standards have been established for wastewater?

Title 13 of the City of Black Diamond’s Municipal Code contains regulations with regard to its wastewater system. These regulations outline permitted and prohibited uses of the City’s wastewater system, City inspection and enforcement duties, and design standards. Chapter 13.20.150 of the City’s code requires that all “sewer extensions, side sewers, pump stations and other collection and transport facilities for the sewer system shall comply with the Criteria for Sewage Works Design...” by the Washington State Department of Ecology (Ecology). Per the City’s code, all wastewater extension work is required to be submitted to both the Department of Ecology and the City of Black Diamond for compliance prior to approval and construction.

When are wastewater improvements needed?

For more information on wastewater flow projections, see Appendix G. The flow projections in Appendix G assume that residents of multi-family dwelling-units create the same wastewater demand as residents of single-family dwelling-units. As multi-family units generally create less wastewater, this analysis provides a conservative estimate.

3 What new wastewater facilities are needed to serve the alternatives?

Each of the alternatives would require the modification and expansion of the existing wastewater treatment conveyance and storage facilities in the Black Diamond area. These improvements include building additional storage facilities, repairing and replacing wastewater conveyance structures, and constructing new gravity sewer trunk lines to serve areas that currently lack wastewater facilities.
Exhibit 3-19
Existing Wastewater Facilities and Services

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
The City’s current proposed wastewater facilities and services are shown in Exhibit 3-20. Although there will be differences in the final layout of the wastewater facilities dependent upon the alternative, conceptually, all of the alternatives will utilize a similar system.

**Alternative 1**
Alternative 1 will require the construction of additional peak flow capacity and conveyance structures. Because the parcels will be developed separately over time, it is not possible to accurately forecast what the final layout of the sewer system will look like under this alternative. Regardless, as parcels are developed under Alternative 1, those areas within the City’s urban growth area will be required to be connected to the City’s wastewater system. As with water supply, for wastewater, an assumption has been made that dwelling units and ERUs are equivalent.

**Alternative 2**
Alternative 2 will also require an expansion of the City’s current wastewater system to accommodate increased flows from the Lawson Hills study area. Sewage from the Main Property will be routed initially by gravity wastewater system, which will transition to force main near the western extent of the Main Property. This force main will convey flows to the new storage reservoir. Two new pump stations will be required to be constructed to facilitate wastewater conveyance. The City’s currently proposed wastewater conveyance improvements tie in Lawson Hills to City sewer in the vicinity of the Lake Sawyer Road and Roberts Drive intersection.

The applicant has proposed six alternate routes (A through F) for conveying wastewater from the Main Property to the City sewer. Routes A through E are not consistent with the City’s Comprehensive Plan, and will need to be further assessed to ensure the proposed improvements are functionally equivalent.
Exhibit 3-20
Proposed Wastewater Facilities and Service

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
The City can accept deviations from projects as scoped in the City’s Comprehensive Plan as long as they are evaluated by the City and the developer and are mutually determined to be functionally equivalent. Additional mitigation may be required to meet the long term goals of the City for maintenance and operational efficiency.

Wastewater conveyance routes A, B, and F in the application all tie in to City sewer near the SR 169 and Roberts Road intersection. Routes C, D, and E tie in to City sewer at locations other than the SR 169 and Roberts Road intersection. These three routes are not likely to be viable for wastewater conveyance given that they don’t tie in at the City’s proposed location. The proposed conveyance routes for Alternative 2 are shown in Exhibit 3-22.

With regard to wastewater collection and conveyance from the North Triangle, wastewater will be collected by gravity, which would transition to force main at a new pump station constructed north of Roberts Drive near Rock Creek and subsequently be conveyed to the new storage reservoir. It is expected that the new storage reservoir will ultimately be conveyed to King County for operation and maintenance.

Current wastewater connections for the existing residences at the project site to the 8-inch main along Botts Drive will be abandoned in-place, as the structures are demolished. The Botts Drive main will be upgraded or replaced as necessary and flows redirected to the proposed new or upgraded wastewater main extension. Service to the off-site residences located to the east of the project site boundary will be maintained through the existing mains or via new mains. Existing mains that currently serve off-site residences and cross the project site may have to be rerouted or relocated to maintain service.

**Alternative 3**
Alternative 3 would require a very similar wastewater layout to Alternative 2.

**Alternative 4**
Alternative 4 would be similar in nature to Alternatives 2 and 3 and is not separately analyzed in this section.
Exhibit 3-22
Proposed Wastewater Conveyance Routes for Alternative 2

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Stormwater

1 How is stormwater currently managed in the project site?

The project site is largely undeveloped, with the exception of a few houses located southeast of Lawson Street. Stormwater disposal for the existing houses is handled on-site while no stormwater facilities exist in the undeveloped area. As discussed in Chapter 4 and shown in Exhibit 3-23, the Main Property area is comprised of 5 drainage basins while the North Triangle property exists within a single drainage basin. Due to the underlying soil types in the Main Property area, stormwater flow largely occurs as surface runoff. Having different soil types, stormwater at the North Triangle site ultimately infiltrates to groundwater. Stormwater in the entire Lawson Hills study area ultimately drains to Lake Sawyer.

2 How is stormwater management governed within the study area?

The City of Black Diamond has adopted the 2005 Washington Department of Ecology’s Stormwater Management Manual (Stormwater Management Manual) and therefore regulates development and redevelopment activities that have the potential to create impacts on surface water from stormwater.

All stormwater-related infrastructure and best management practices (BMPs) will be designed, constructed, and enacted in accordance with the Stormwater Management Manual.

Additional Stormwater Information
Detailed information about stormwater, soil types, and site drainage is provided in Chapter 4.

Surface Runoff Versus Infiltration
Infiltration is the process by which stormwater flows through the soil and into the groundwater. Surface runoff occurs when soil types or steep slopes don’t allow for infiltration and water travels over ground towards the lowest point.

What are Stormwater Best Management Practices (BMPs)?
Stormwater BMPs are actions that reduce or prevent pollution from entering stormwater runoff.
Exhibit 3-23
Existing Drainage Basins

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
3 What stormwater facilities are included in the alternatives?

Per the *Stormwater Management Manual*, phosphorous controls need to be implemented in areas that drain to phosphorous sensitive receiving waters. All stormwater in the study area ultimately drains to Lake Sawyer, a phosphorous sensitive lake, through other surface water bodies (primarily creeks and lakes). Stormwater from the study area enters these other surface water bodies either directly as surface runoff or from surface water recharge. In the Main Property, phosphorous control will need to be incorporated into stormwater treatment plans under each alternative.

Phosphorous control facilities described in the *Stormwater Management Manual* include large sand filters, amended sand filters, large wet ponds, media filters, and two-facility treatment trains. In the North Triangle area, where soils allow stormwater to infiltrate, phosphorous treatment is projected to be performed through natural infiltration for all alternatives.

As discussed in Appendix M, Alternative 2 will also seek to utilize Low Impact Development (LID) techniques where possible to maintain natural system hydrology, protect streams from increases in stormwater runoff, and protect wetland areas. In areas with soils amenable to infiltration (the North Triangle), Alternative 2 would maximize infiltration using techniques like biofilter and sand filter treatment in conjunction with discharge infiltration, direct infiltration of roofs and other non-pollution generating surfaces, and utilization of pervious pavement where possible. Additionally, LID practices would be utilized to reduce stormwater runoff by minimizing the area of impervious surfaces, such as streets, and clustering of residential and commercial land uses. Alternative 2 would also seek to retain water on-site that would otherwise be lost due to evaporation associated with impervious surface area increases and loss of vegetation. Some examples of techniques for on-site water retention include: street and urban tree plantings, clustering of buildings, and retention of vegetation and rain garden utilization in landscaped areas.

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**Why is phosphorous harmful?**

Phosphorous is a nutrient found in limited quantities in the natural environment. Human activities – such as fertilizing a lawn – can cause more phosphorous to enter surface water via stormwater. High phosphate levels cause algae growth in surface waters, ultimately decreasing oxygen levels and killing fish.
The *Stormwater Management Manual* also requires that when commercial and/or multi-family residential development contributes 50 percent or more of the total runoff, enhanced stormwater treatment is required prior to discharging to receiving waters. In Alternatives 2 and 3, multi-family residential developments will be located within Basins A through D and commercial development will occur in the North Triangle Basin. As Basins A through C under Alternative 2 would be comprised almost entirely of single-family residential development and would not meet the 50 percent threshold, the proposed treatment facilities for Alternative 2 only include enhanced treatment methods in Basin D and the North Triangle.

Enhanced treatment options include those used for phosphorous treatment plus treatment wetlands, compost-amended filters, bioretention, and ecology embankments.

For Alternative 2, stormwater treatment facilities are proposed for each basin. The location of these facilities is shown in Exhibit 3-24. In Basin A, two similarly-sized ponds are proposed for phosphorous removal and water quality treatment. These ponds are also planned to detain and treat stormwater from a portion of Basin C to prevent potential steep slope disturbance from the southeast side of the Main Property. One of the ponds will discharge to Lawson Creek to maintain flows while the other pond will bypass upper Lawson Creek and be piped to Jones Lake. The bypass to Jones Lake would discharge via a flow splitter equally into both lower Lawson Creek and into Jones Lake Creek, just to the east of Jones Lake.

In Basin B, a treatment pond is proposed to provide phosphorous removal and water quality treatment. The Basin B pond would discharge to Mud Lake. The southwest corner of Basin B might be routed to Basin D for discharge if it is found to be too low in elevation to discharge with the rest of Basin B.

In Basin C, the west and central sub-basins will be routed to stormwater treatment facilities in Basin A for discharge to minimize potential erosion on the steep slopes in those areas. The remainder of Basin C is proposed to be routed to a pond for phosphorous removal and water quality treatment. The pond would discharge water at a rate to match predeveloped conditions to provide flow to Jones Lake Creek and its associated wetlands.
Exhibit 3-24
Locations of Proposed Stormwater Facilities for Alternative 2

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
With regard to Basin D, Alternative 2 is currently proposed to use a combination of detention ponds, detention vault, wetponds, wet vaults, and sand filters. The location of these facilities has not yet been determined. However, it is likely that Basin D treatment facilities will discharge to Ginder Creek.

For the North Triangle, water from non-pollution generating surfaces, such as roof tops, is proposed to be infiltrated directly. Runoff from other surfaces will require phosphorous and enhanced treatment prior to infiltration.

The requirements for treatment in each developed basin are summarized in Exhibit 3-25.

Exhibit 3-25
Drainage Information and Treatment Summary for Basins at Lawson Hills

<table>
<thead>
<tr>
<th>Basin</th>
<th>Size (Acres)</th>
<th>Receiving Water</th>
<th>Stormwater Treatment Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Property</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basin A</td>
<td>152</td>
<td>Lawson Creek</td>
<td>Phosphorous</td>
</tr>
<tr>
<td>Basin B</td>
<td>58.6</td>
<td>Mud Lake</td>
<td>Phosphorous</td>
</tr>
<tr>
<td>Basin C</td>
<td>74</td>
<td>Jones Lake</td>
<td>Phosphorous</td>
</tr>
<tr>
<td>Basin D</td>
<td>32</td>
<td>Ginder Creek</td>
<td>Phosphorous, Enhanced</td>
</tr>
<tr>
<td><strong>North Triangle</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Triangle Basin</td>
<td>54.2</td>
<td>Ravensdale Creek</td>
<td>Phosphorous, Enhanced</td>
</tr>
</tbody>
</table>

Alternative 3, because it is a mitigated version of Alternative 2, will likely require the same or very similar treatment facilities as Alternative 2. However, as presented in the next section, the amount of impervious surface is less than Alternative 2. Therefore, the size of treatment facilities needed may be less. This could especially be true in the case of commercial land use in the North Triangle where the impervious surface in Alternative 3 is less than 60 percent of the area of impervious surface created in Alternative 2. Alternative 3 also includes using low impact development (LID) techniques, such as those discussed above for Alternative 2.

Alternative 4 is not separately analyzed in this section.
4 How might stormwater management affect surface water quantity and quality?

Impacts to surface water quantity and quality could occur during construction of the alternatives. During the construction phase, potential stormwater impacts to surface water would likely be in the form of sediment runoff from the grading and development of properties inside the study area, especially in areas with steep slopes that are prone to erosion and runoff. Because of steep slopes, high runoff rates, and fine soils, construction will not be allowed in the winter months.

With each alternative, the post-construction condition of the study area includes an increase in impervious surface cover from existing conditions. This is summarized in Exhibit 3-26. The impervious acreages were calculated by multiplying the acres of each land use type within each alternative with an estimate of the percent of impervious cover typically found in each land use type.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Additional Impervious Cover (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1</td>
<td>140</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>130.8</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>90.8</td>
</tr>
</tbody>
</table>

Note: Alternative 4 is not included in this analysis.

Impacts from increased amounts of impervious surface cover include less infiltration of stormwater to groundwater, higher rates of runoff resulting in scouring and erosion in receiving water bodies, and an increase in temperature in stormwater runoff resulting in increased receiving water temperatures. Additionally, new development within the study area could increase the amount of contaminants in stormwater as a result of residential and commercial over-application of fertilizer, improper disposal of household chemicals and pet waste, and petroleum contaminants from automobiles.

Potential impacts to surface water from stormwater are covered in greater detail in Chapter 4.
5 What measures could reduce stormwater impacts?

To mitigate for stormwater impacts, development within the study area will be done in accordance with the 2005 Stormwater Management Manual for Western Washington. The recommended stormwater treatment facilities and BMPs will be used to address stormwater impacts during all phases of development. Additionally, LID techniques would be used to reduce impacts. These include using reduced street widths, use of native vegetation, and porous pavements.

Alternative 2 proposes to use several large storm ponds for stormwater detention and treatment. Some potential impacts can be associated with large pond construction. The storm ponds should be sited in areas of relatively shallow slopes. Large pond breaches on steep slopes could cause impacts to human safety, property and excessive erosion, scouring and other damage to the natural environment. This should be evaluated especially in areas like Basin C that have steep slopes. Additionally, some evidence indicates that solar irradiation of ponds may result in effluent discharges that have a higher temperature than receiving waters. This is especially important for discharges to Mud Lake Creek, which has low summer temperatures, and Jones Lake, which is a high productivity lake and serves as a headwater for Rock Creek. Monitoring may be necessary to fully understand the effects of this stormwater discharge.
Visual Quality and Aesthetics

1 How is Visual Quality evaluated?

Visual quality is evaluated and discussed using three attributes: visual character, visual quality, and viewer response.

Visual Character
Visual Character describes the key features of the landscape and how the features relate to one another. Four key factors are used to identify relationships between elements of the visual environment: dominance, scale, diversity, and continuity. The integration of these factors results in a complete description of the character of a view and how elements such as vegetation, land uses, transportation and utility facilities, open space, and water bodies relate to one another.

Visual Quality
Visual Quality describes the value of the visual experience. This assessment asks, “Is this view ordinary, spectacular, or somewhere in between?” Terms used to describe visual quality include vividness, unity, and intactness.

Viewer Response
Viewer response is an individual’s response to the change in the visual character of the area. Viewer response is based primarily on the kinds of activities persons are engaged in. For residential areas near the site, viewer sensitivity is likely to be high because people tend to be concerned about the character of their neighborhoods. For persons engaged in recreational activities, the context is likely to be very important. For persons passing through on local highways and arterials, viewer response is related to how a particular view fits with a series of views in an integrated experience. Sensitivity is likely to be related to how regularly a person travels the route and the extent to which the character of the scenes is of value to the viewer. Residents travelling within the community will experience a series of views that will either support or be at variance with the dominant vision they have of their community. They are likely to be somewhat less sensitive than in the context of their home, but more sensitive than travelers passing through the community.
2 What does the area look like now?

Several of the more prominent landscape features in the study area are discussed below and are shown in Exhibit 3-27. The exhibit also identifies the viewpoints used to assess impacts on visual quality and aesthetics.

Main Property – Lawson Hill

Lawson Hill includes the portion of the Main Property that lies to the east of Lawson Street. The Lawson Hill ridge provides a visual boundary at the northeast edge of the community for many areas from the south and west. The view is not vivid, but provides a unity of features in which native vegetation and natural landforms are the main integrating elements. The cell towers on the ridge encroach only slightly on the view. Because the ridge is at the visual boundary of the community, it contributes to the perception that the natural setting is a predominant element of the Black Diamond community.

The existing view from Viewpoint 10a (shown in Exhibit 3-28) provides a relatively close view of the ridge from Newcastle Drive on the southwest side of Lawson Street. This viewpoint is about a half mile from the top of the ridge. The view shown is similar to views of Lawson Ridge from other points in the community. In general, the ridge is visible except where obscured by trees or structures or in valleys where topography blocks the view.

In some areas, the peaks of the Cascade Mountains are visible behind Lawson Hill, including views of Mount Rainier at some locations. Because of the distance to the mountain peaks, Lawson Hill continues to be a defining visual feature for the local community.
Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Main Property – Corridor
The Corridor includes the area between Lawson Street and SR 169 that is proposed to include a new arterial road and adjacent residential development. This corridor is generally visible from existing homes adjacent to the corridor. It is currently an area of existing open space characterized primarily by relatively sparse native and invasive vegetation. This corridor contributes to the rural character of the area primarily through the unity of vegetation. It is not a vivid element of any views.

North Triangle
The North Triangle property is visible primarily from SR 169 and adjacent properties. The site is at about the same elevation as the road and surrounding development; there are no distant features visible beyond the screen of foreground vegetation. The trees are the single integrating element of the view.
3 What standards have been established for views and aesthetics?

The City’s Comprehensive Plan addresses the visual character of the community through its overall vision, policies, and principles. The City’s vision in regards to views and aesthetics is as follows:

*In the year 2025, Black Diamond will be a beautiful, friendly community based on a rich historic heritage and exceptional natural setting, and with a small-town atmosphere. Forested areas and open space remain, while development maintains a healthy balance of moderate growth and economic viability.*

Comprehensive Plan policies and principles implement this vision and seek to preserve the quality of Black Diamond’s natural setting, its scenery and views, and forested areas and open spaces. Comprehensive Plan policies acknowledge that the community’s visual identity has clear edges and gateways that should be enhanced.

The Black Diamond Municipal Code states that MPDs will provide:

*Preservation and enhancement of open space and views of Mt. Rainier.* (18.98.020.D)

*Natural open space shall be located and designed to form a coordinated open space network resulting in continuous greenbelt areas and buffers to minimize the visual impacts of development within the MPD, and provide connections to existing or planned open space networks, wildlife corridors, and trail corridors on adjacent properties and throughout the MPD.* (18.98.140.B)

Additionally, the code requires an MPD to orient public building sites and parks to preserve and enhance views of Mt. Rainier and other views identified in the comprehensive plan. Major roads shall be designed to take advantage of the bearing lines for those views (18.98.080.A.9) and protect important community-identified viewsheds and scenic areas (18.98.135.F).
The MPD design guidelines include guidelines for clustering single-family residential housing, providing a variety of building sizes and styles, and bulk standards such as floor area ratio and structural setbacks, in order to ensure compatibility with Black Diamond’s small town character.

4 How would the alternatives change views in the study area?

Alternative 1
The single-family residential development anticipated in Alternative 1 is assumed to cover the entire site with no specific requirement for open space, except avoidance of sensitive areas including wetlands, streams, hazardous slopes, and coal mine hazards and associated buffers. In this case, residential development would replace the forested ridgeline and slope of Lawson Hill with structures and would include buildings at the crest, as well as further down the slopes.

The extent to which the replacement of native trees and vegetation by structures affects the character of the view is similar at most locations where the ridge is visible. At these locations, the view will be transformed from one reflecting the natural environment to one in which urban development predominates.

How viewers respond to this change in visual character depends on the extent to which the view of Lawson Hills is currently one of their principal views. For nearby residents, Lawson Hill is the prominent view on the horizon, and therefore, development would have greater impact on the visual quality they experience. For viewpoints further away, Lawson Hills is a narrower segment of the field of view, and is therefore likely to have a lesser impact.

Near views of the property are largely from public roads or nearby residential development. Views along Lawson Street would be of residences and yards. This will change the existing rural character of the area, but would be similar to existing development along the street.
Overall, the transformation of this site to prominent buildings visible from much of the community will contribute to loss of the perception of the community as having a natural setting, and will replace forested views as a major focus with buildings on the top of Lawson Hill.

**Alternative 2**

**Main Property – Lawson Hill**

The development proposed in Alternatives 2 would replace a portion of the forested ridgeline and portions of the slope of Lawson Hill with structures. The proposed development is largely medium- and high-density residential development.

The extent to which the replacement of native trees and vegetation by structures affects the character of the view differs depending on the locations where the ridge is visible. From some locations, the view will be transformed from one reflecting the natural environment to one in which urban development predominates. At other locations, development on Lawson Hill would largely be obscured by the existing off-site vegetation and on-site vegetation proposed to be retained in the foreground.

Views along Lawson Street will largely be of the proposed school site and two very large water detention ponds. This will change the existing rural character of the area. How significant a change in character depends on how the ponds are designed, whether they incorporate berms along the roadway, and the extent to which they incorporate slopes that can accommodate vegetation versus vertical walls. The presence of detention ponds and retention of the existing sparse vegetation pattern would result in residential structures being the dominant middle view as well as distant view component. If native vegetation is planted and maintained in open space areas, it can screen proposed residences on lower slopes from public roads and existing development. The orientation and size of open space provides little opportunity to screen residential development at the crest of the ridge.

Overall, the transformation of this site to include buildings, or portions of buildings, visible from much of the community will contribute to loss of the perception of the community as having a natural setting.
Main Property – Corridor
The development area proposed between SR 169 and Lawson Road will feature a new roadway and residential development. Views from SR 169 would be readily apparent because proposed open stormwater ponds would remove vegetation not displaced by development. Existing lots immediately south of the proposed arterial will observe the new road and adjacent development as the primary element of view.

Alternatives 3 and 4 would have similar impacts, depending on the layout of development. If mitigating measures, including preservation of ridgetop trees, were implemented, impacts would be less.

North Triangle
Alternative 1 would result in the construction of single-family residential uses adjacent to the existing SR 169. The character of development would be similar to other residential development in the Area.
Alternative 2 impacts would include open space set-asides adjacent to SR 169 as required in the Black Diamond Urban Growth Area Agreement. Over time, views of the North Triangle Property from SR 169 will be obscured by new vegetation planted along the roadway’s open space buffer. At the new connector roadway providing access to the site, views are likely to be typical of an urban commercial area.

Alternative 3 would include less commercial use with impacts similar to Alternative 2, but with a larger area devoted to residential use.

Alternative 4 impacts would be the same as Alternative 2, since the amount and character of commercial development would be the same.

5 Would the alternatives generate light or glare that would impact surrounding areas?

Main Property – Lawson Hill
Light and glare generated from new residential buildings would be visible from lower elevation areas to the north, west, and south of the Main Property. Because of the elevation of the Main Property, lighting from the highest points on the site will be visible from considerable distances off-site. As a general rule, light or glare that is produced within any portion of the project that is currently viewable off-site will be visible at night.

Main Property – Corridor
Street lights will be a prominent feature of the new arterial as viewed from residential development. Light from low density residential areas is likely be similar to existing residential areas, with light and glare from high density residential areas largely dependent on the orientation of windows on upper stories and from security lighting.
**North Triangle**
Parking lots, buildings, and signage to serve commercial and office uses would be significant in Alternatives 2, 3, and 4 (Alternative 1 assumes residential development only in the North Triangle). Under any of the alternatives, the open space areas along SR 169 and between the development and adjacent properties will have the potential over the long term to screen lighting from the roadway. Existing residential development is likely to be buffered by trees in buffers around sensitive areas.

6 What measures can reduce the adverse effects of the alternatives on the appearance of the area?

**Main Property – Lawson Hill**
The effects of development on the character of the area can be reduced by preserving mature trees along the ridgeline of Lawson Hill. Preserving those trees involves designing open space areas to be parallel to slopes at or near the top of the hill. Preservation of enough trees that extend above rooftops, and the survival of trees after clearing, would provide a significant enough mass of vegetation to reduce the effects of the proposed urban development at the ridge crest. Preservation of mature trees in open spaces parallel to the slope can reduce the appearance of a solid face of structures on the slopes and contribute to preservation of the rural character of the community.

Planting dense landscaping along Lawson Street and in other open space areas would eventually soften the building profiles somewhat, and screen lighting, but would not be effective until the vegetation reached sufficient size in 10 to 15 years.

**North Triangle**
The visibility of commercial development from SR 169 will be affected primarily by new vegetation that will fill in the gaps left in the existing mature trees left along the highway. Planting with larger specimens will speed that process somewhat.

The visual impacts of the commercial development from the new arterial connector will depend on design details of the development, including bulk, height, setbacks from streets, and the amount and location of landscaping.
The intent to preserve the view corridors is included in the City’s Comprehensive Plan Land Use Goals and Policies:

The City now has a strong visual identity with clear edges and gateways defined by its natural setting. Preservation of this identity, gateways and edges should continue, and be enhanced. New development in the vicinity of a gateway should strengthen, or at least not diminish, these features. This concept has been further implemented along the City’s northern SR 169 gateway through strict view protection requirements on adjacent lands as set forth in the Black Diamond Area Open Space Agreement in 2005.

This is further defined in the City’s Zoning Code Chapter 18.76, as the Gateway Overlay District, which is intended to:

Protect the scenic character of the City’s gateways along 1) the State Route 169 corridor, with its commanding views of Mount Rainier and other attractive natural features and 2) the Auburn-Black Diamond Road, where the transition into the heart of the city from the adjacent rural unincorporated area is now seamless.

Development within any of the Alternatives would need to meet these policies and codes.
Historic and Cultural Resources

A cultural resources assessment was conducted for the Lawson Hills MPD, which revealed seven historical houses and associated outbuildings, none of which appear to be eligible for the National Register of Historic Places (NRHP). The work also recorded five historic-period archaeological sites. Of those five archaeological sites, the Lawson Mining Community site appears eligible for listing in the NRHP because it contains intact archaeological deposits associated with an early mining community.

1 What historic and cultural resources are in the study area?

The cultural resources assessment recommended two houses as eligible for listing in the NRHP, Washington Historic Register, and King County Landmarks List. The 26209 Lawson Street house was recommended as representing the mining history of Black Diamond and the 26122 Lawson Street house was recommended as a rare local example of the Craftsman architectural style. A subsequent technical peer review found that both houses have lost their architectural integrity, and are therefore not eligible for the NRHP.

The cultural assessment and subsequent technical peer review found the Lawson Mining Community site appeared to be eligible for listing in the NRHP. The site contains intact archaeological deposits associated with an early mining community. The locations of the 26209 and 26122 Lawson Street houses and the Lawson Mining Community site are shown in Exhibit 3-30.
Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
2 How will the alternatives affect historic or cultural resources?

Future development of the Lawson Mining Community archaeological site will likely result in unmitigated adverse effects and a lost opportunity for data recovery, preservation of the buildings or information on the buildings, and public interpretation of the properties’ historic values. Even though the 26209 and 26122 Lawson Street houses do not appear to be eligible for NRHP listing, and therefore do not involve federal or SEPA regulations, future development of their sites would have similar adverse effects and lost opportunities.

If the Lawson Mining Community archaeological site proves to be eligible for listing in the NRHP and is not redeveloped, all alternatives could still result in adverse effects on the Lawson Mining Community archaeological site.

If the 26209 and 26122 Lawson Street houses are considered eligible for listing in the NRHP, adverse effects would result from the proximity of a number of new buildings with incompatible designs, which would also have an adverse impact on the integrity of setting and association of the properties. The integrity of the property setting would be compromised if bordered by numerous buildings of modern design.

The areas that would be most sensitive for pre-contact resources would be in the vicinity of where the Indian trail intersects with Lawson Creek, near the western boundary of the South Upper Lawson Hills portion and the North Triangle around the perimeter of the wetland, and near the northern boundary of the West Lower Lawson Hill portion. The locations of these resources are identified in Exhibit 3-30.

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Impacts to archaeological findings
The potential importance of the Lawson Mining Community archaeological site lies in the information that occurs just below the ground surface. Excavation that disturbs on-site soils could destroy or damage information important to local history.
3 What policies and regulations govern historic or cultural resources?

Projects that affect historic or cultural resources need to be in compliance with Washington State and King County laws, regulations, and programs. Historic and cultural preservation must be discussed in the Draft and Final EIS, as required by SEPA. The Revised Code of Washington (RCW) also ensures the protection of Indian graves and regulates archaeological sites and resources. This law prohibits disturbance of an archaeological site without a permit from the Washington State Department of Archaeology and Historic Preservation (DAHP). The agency administers the Washington Historic Register (WHR) that identifies and documents significant historic and prehistoric resources throughout Washington.

The City of Black Diamond has entered into an interlocal agreement with King County, under which the County Landmarks and Heritage Commission acts as the municipal landmarks commission for the City, designating landmarks. King County’s regulations provide for landmark designation and design review of properties within Black Diamond that are 40 years or older and meet the County’s criteria for listing.

The criteria for listing properties in the NRHP require that a historic property be at least 50 years old; possess integrity of location, design, setting, materials, workmanship, feeling, and association; and meet at least one of several criteria. The criteria for listing properties in the WHR require that a building, site, structure, or object must be at least 50 years old or have documented exceptional significance; possess a high to medium level of integrity; and should have documented historical significance at the local, state, or federal level.

What are landmarks?

Landmarks are buildings, structures, sites, districts, or objects that are formally designated because of meeting established criteria.
4 What measures could reduce effects on historic or cultural resources?

The Lawson Mining Community site appears eligible for listing in the NRHP. Consultation with the DAHP about additional research and archaeological testing should be initiated in order to determine the limits and contents of the site with respect to NRHP eligibility. If the site proves eligible, further consultation would establish appropriate mitigation measures. For archaeological sites, mitigation measures typically include research design and data recovery consisting of archaeological excavation, analysis of artifacts and other data, public involvement, interpretive signage, and reporting of the methods and results of the work.

Mitigation measures for the two historical houses include possible relocation, if acceptable to the owner, and documentation to Historic American Building Survey/Historic American Engineering Record standards for both houses. Providing interpretation of historic miners’ housing at the project site might benefit local history, residents, and visitors to the area. If not found to be eligible for the NRHP, these mitigations will not be required.
Public Services

Parks and Recreation

1 What park and recreation facilities and services are currently in the study area?

Currently, the City has very limited park and recreation facilities and services available to the community. Of the City’s 4,300 acres, 214 is parkland acreage, including the undeveloped Lake Sawyer Regional Park which encompasses 168 of those acres. Exhibit 3-31 below describes the existing park and recreation facilities within the City and Exhibit 3-32 identifies their location.

Exhibit 3-31
Black Diamond Existing Park and Recreation Facilities

<table>
<thead>
<tr>
<th>Facility</th>
<th>Type</th>
<th>Acreage</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMX Park</td>
<td>NA</td>
<td>3.1</td>
<td>BMX track, City Maintenance Facility</td>
</tr>
<tr>
<td>Coal Car Triangle</td>
<td>Pocket</td>
<td>0.1</td>
<td>Historic; car reminiscent of City’s history</td>
</tr>
<tr>
<td>Eagle Creek Community Park</td>
<td>Community</td>
<td>0.43</td>
<td>Basketball court and grassy area; park benches</td>
</tr>
<tr>
<td>Ginder Creek Site</td>
<td>Open Space</td>
<td>27.3</td>
<td>Undeveloped</td>
</tr>
<tr>
<td>Jones Lake Site</td>
<td>Open Space</td>
<td>14.0</td>
<td>Undeveloped</td>
</tr>
<tr>
<td>Lake Sawyer Boat Launch</td>
<td>Boat Launch</td>
<td>1.8</td>
<td>Public access boat launch</td>
</tr>
<tr>
<td>Lake Sawyer Regional Park</td>
<td>Regional</td>
<td>168.0</td>
<td>Undeveloped</td>
</tr>
<tr>
<td>Union Stamp</td>
<td>Pocket</td>
<td>0.1</td>
<td>Historic; platform during union/mining era</td>
</tr>
<tr>
<td>School Park</td>
<td>Community</td>
<td>4.75</td>
<td>Baseball diamond, basketball court, tennis court, and skate park</td>
</tr>
</tbody>
</table>

The Black Diamond area has a great deal of off-road trails and pathways. Most trails are on privately-owned land, and are quite popular among the local mountain bikers. A popular public trail in the area often referred to as “Lake Sawyer Trail” or “Black Diamond Coal Mine Trail” is located on King County park land. It takes riders around the south end of Lake Sawyer, Frog Lake, and Ravensdale Creek. A trail up near Maple Valley is the “Lake Wilderness” trail, which is relatively flat and easily accommodates bikes with bike trailers.
Exhibit 3-32
Park and Recreation Services and Facilities

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Per the City’s *Parks, Recreation, and Open Space Plan*, King County retained an easement within the 169-acre piece of land annexed to the City near the south end of Lake Sawyer for a regional trail. The City has included a trail around the perimeter of Jones Lake for future construction.

Other off-road trail information in the Black Diamond area is not readily available, as trails are most commonly found on privately-owned land and are not advertised. Many of the trails are not intended for public use and require trespassing on private land in order to access and ride the trails.

Though Black Diamond does not have any state parks located within city limits, nearby state parks include Hanging Gardens, Kanaskat Palmer, Black Diamond Bridge, and Flaming Geyser.

### 2 Are Level of Service standards for parks and recreation facilities currently being met?

The City’s *Parks, Recreation and Open Space Plan (December 23, 2008)* defines the Level of Service (LOS) standards for city parks and recreation facilities.

Currently, LOS standards for community parks are met for 52 percent of households. School Park provides a community park within a 1.5-mile radius to most households, though it is not considered an official city park since the City does not own the land. Open space is currently at only 1 percent of the total gross area, short of the 10 percent LOS standard. At this time, the City does not have any recreational trails, although there are numerous privately-owned trails that the public enjoys.

The City also has recreational facility LOS standards to ensure community recreational needs are met. The combination of the recreational facility standards and the park LOS standards serve as a comprehensive guide for park and recreational development for the City. Recreational Facility Standards are summarized in Exhibit 3-34.

<table>
<thead>
<tr>
<th>Exhibit 3-33</th>
<th>Black Diamond Park LOS Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Park Types</strong></td>
<td><strong>LOS Standard</strong></td>
</tr>
<tr>
<td>Community</td>
<td>90% of population within 1.5 miles of a community park</td>
</tr>
<tr>
<td>Neighborhood</td>
<td>75% of population within 0.5 miles of a neighborhood park</td>
</tr>
<tr>
<td>Pocket</td>
<td>None</td>
</tr>
<tr>
<td>Trail (nonmotorized)</td>
<td>75% of population within 0.5 miles of a trail</td>
</tr>
<tr>
<td>Open Space</td>
<td>10% of City’s land area</td>
</tr>
</tbody>
</table>
### Exhibit 3-34
**Black Diamond Recreational Facility Standards**

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Minimum Units per Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youth Baseball/Adult Softball Field</td>
<td>1:2,000</td>
</tr>
<tr>
<td>Soccer Field</td>
<td>1:2,000</td>
</tr>
<tr>
<td>Tennis Court</td>
<td>1:2,000</td>
</tr>
<tr>
<td>Basketball Court</td>
<td>1:2,000</td>
</tr>
<tr>
<td>Adult Baseball Diamond</td>
<td>1:5,000</td>
</tr>
<tr>
<td>Gymnasium</td>
<td>1:5,000</td>
</tr>
<tr>
<td>Youth Football Field</td>
<td>1:10,000</td>
</tr>
<tr>
<td>Track</td>
<td>1:10,000</td>
</tr>
<tr>
<td>Community Center</td>
<td>1:10,000</td>
</tr>
<tr>
<td>Swimming Pool</td>
<td>1:20,000</td>
</tr>
</tbody>
</table>

### 3 What park and recreation improvements are planned?

The City’s 2009 to 2014 Capital Facilities Plan anticipates over $6 million in improvements and additions within the City’s Park and Recreation Department’s area of responsibility. Exhibit 3-35 briefly describes those improvements that are directly related to park facilities.

### Exhibit 3-35
**Parks Department Capital Improvement Program 2009–2014**

<table>
<thead>
<tr>
<th>Park Name</th>
<th>Total $ Requested</th>
<th>Year(s)</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skate Park</td>
<td>$25,000</td>
<td>2009</td>
<td>Add swing set, benches, and picnic tables</td>
</tr>
<tr>
<td>School Park</td>
<td>$25,000</td>
<td>2009</td>
<td></td>
</tr>
<tr>
<td>Union Stump Memorial Park</td>
<td>$35,000</td>
<td>2009–2013</td>
<td>Repair fencing; establish formal parking</td>
</tr>
<tr>
<td>Lake Sawyer Boat Launch</td>
<td>$962,000</td>
<td>2008–2011</td>
<td>Move fence; purchase play equipment; add roping for low impact parking area</td>
</tr>
<tr>
<td>Trail System Development</td>
<td>$340,000</td>
<td>2008–2013</td>
<td>Trail improvements throughout City</td>
</tr>
<tr>
<td>BMX Park</td>
<td>$250,000</td>
<td>2009–2012</td>
<td>Circuit course</td>
</tr>
<tr>
<td>Lake Sawyer Regional Park</td>
<td>$4,647,000</td>
<td>2011–2013</td>
<td>Significant development projects</td>
</tr>
</tbody>
</table>
4 How will the alternatives affect provision of park and recreation facilities and services?

The City is currently not meeting the established standards for park and recreation services and facilities. As each alternative adds residential housing units, the City will need additional park and recreation facilities to achieve standards. Without improving the City’s current parks and recreation facilities, growth would increase the deficit in the City’s ability to meet the standards.

Alternative 1
Alternative 1 would add 1,300 single family dwellings, which equates to a population of about 3,600. This population creates a need for additional community parks and facilities. However, because Alternative 1 assumes that development will occur incrementally over time and without an overall plan, it is not likely that such facilities would be provided on-site.

Park and recreation facility maintenance is a substantial cost to the City, one that will increase under any of the alternatives. External studies estimate maintenance costs of about $200 to $500 per acre per year for open space, $2,000 to $3,000 per acre per year for general parkland, $4,000 to $6,000 per year for turf areas, and $8,000 to $10,000 per acre per year of maintaining playing fields.

Alternative 2
Alternative 2 assumes 1,250 dwelling units, with a population of 3,100 residents. Because it is an MPD, Alternative 2 incorporates substantial open space and recreational opportunities, including pocket parks, trails, and passive open space. Based on the City’s parks plan, the MPD should accommodate the following in order to achieve LOS standards:

- Community Parks – One large area in the far northerly portion of the site is designated for a school site that may be of sufficient size to provide the facilities mandated by park standards, including one or more youth/adult baseball/softball fields, soccer fields, tennis courts, or basketball courts. In addition to the facilities mentioned
above, the population increase resulting from Alternative 2 would generate more than half of the need for an adult baseball diamond and a gymnasium and about a third of the need for a youth football field, track, and community center.

- Open Space and Trails – With the Black Diamond Municipal Code’s requirement for MPDs to preserve open space, there will likely be sufficient land available to meet the City’s open space standards and also provide a trail system.

Specific improvements will be identified during subsequent review phases.

**Alternative 3**
Alternative 3 will have 938 additional dwellings and a population of 2,328. The need for additional park, recreation, and open-space facilities and services is indicated in Exhibit 3-36. This alternative would be designed to provide all required park facilities, except community wide facilities such as a gymnasium, community center, or swimming pool on-site.

**Alternative 4**
Alternative 4 would have 1,075 additional dwellings and a population of about 2,674. The need for additional park, recreation, and open-space facilities and services is indicated in Exhibit 3-36. This alternative would be designed to provide all required park facilities, except community wide facilities such as a gymnasium, community center, or swimming pool on-site.
Exhibit 3-36
Park and Recreation Facility Needs by Alternative

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>3,591</td>
<td>3,100</td>
<td>2,480</td>
<td>2,674</td>
</tr>
<tr>
<td>Regional</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Community</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Neighborhood</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pocket</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Trail</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Open Space</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Youth Baseball/Adult Softball</td>
<td>1.8</td>
<td>1.6</td>
<td>1.24</td>
<td>1.34</td>
</tr>
<tr>
<td>Soccer Field</td>
<td>1.8</td>
<td>1.6</td>
<td>1.24</td>
<td>1.34</td>
</tr>
<tr>
<td>Tennis Court</td>
<td>1.8</td>
<td>1.6</td>
<td>1.24</td>
<td>1.34</td>
</tr>
<tr>
<td>Basketball Court</td>
<td>1.8</td>
<td>1.6</td>
<td>1.24</td>
<td>1.34</td>
</tr>
<tr>
<td>Adult Baseball Diamond</td>
<td>.72</td>
<td>.64</td>
<td>.5</td>
<td>.53</td>
</tr>
<tr>
<td>Gymnasium</td>
<td>.72</td>
<td>.64</td>
<td>.5</td>
<td>.53</td>
</tr>
<tr>
<td>Youth Football Field</td>
<td>.36</td>
<td>.32</td>
<td>.25</td>
<td>.27</td>
</tr>
<tr>
<td>Track</td>
<td>.36</td>
<td>.32</td>
<td>.25</td>
<td>.27</td>
</tr>
<tr>
<td>Community Center</td>
<td>.36</td>
<td>.32</td>
<td>.25</td>
<td>.27</td>
</tr>
<tr>
<td>Swimming Pool</td>
<td>.18</td>
<td>.16</td>
<td>.12</td>
<td>.13</td>
</tr>
</tbody>
</table>

5 What measures could reduce or mitigate impacts on park and recreation facilities and services?

The park and recreation facilities needed to meet new demand from the alternatives could be constructed on- or off-site. This could be done as part of the MPD process or in partnership with the City. The cost of such facilities, including a proportionate share of facilities not fully warranted by the alternatives, could be provided by payment of fees.
The siting of parks involves a range of criteria, especially for parks with specialized facilities such as sports fields. Such parks facilities are often provided together at a single location, and are often co-located with schools. The City will need to review in detail whether on-site conditions are appropriate for various types of facilities and determine whether on-site or off-site locations best meet the long term needs of future residents of the study area, and of the City as a whole.

Maintenance and operations costs are generally borne by the City’s general fund, and one of the key factors of effective facilities is the extent to which they can be constructed so as to limit maintenance and operations costs. In some cases, joint maintenance agreements can be reached with homeowners’ associations. It is the Applicant’s desire to maintain a significant portion of landscaping through a joint maintenance agreement with a homeowners’ association. This will be refined during the MPD process, as decisions regarding park and recreation mitigation must be made at the time more specific information about the proposed development is available.
Schools

1 What school facilities and services are currently provided in the study area?

Most of the City of Black Diamond lies within the Enumclaw School District boundaries, with the exception of two areas. One area to the west of Lake Sawyer is served by the Kent School District. A small portion of the City immediately to the east of the lake, including the North Triangle, is served by the Tahoma School District. The Lawson Hills Main Property is served by the Enumclaw School District.

Black Diamond Elementary School is the only school located within the Black Diamond city limits. It has a permanent capacity of 193 students. The District has additional temporary capacity in portable facilities, and is currently housing 325 students. Students in Black Diamond currently attend the schools listed in Exhibit 3-37, depending on their location within the City. All middle school and High School students in the Enumclaw School District are bused to other schools.

Exhibit 3-37
Black Diamond Schools

<table>
<thead>
<tr>
<th>School District</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enumclaw</td>
<td>Black Diamond</td>
<td>Thunder Mountain</td>
<td>Enumclaw</td>
</tr>
<tr>
<td>Kent</td>
<td>Sawyer Woods</td>
<td>Cedar Heights</td>
<td>Kentlake</td>
</tr>
<tr>
<td>Tahoma</td>
<td>Glacier Park</td>
<td>Tahoma</td>
<td>Tahoma</td>
</tr>
</tbody>
</table>

2 What are the Level of Service standards for providing adequate schools in the City?

Level of Service (LOS) standards for school facilities have been adopted by the Enumclaw School District. The following class size standards and school standards are used by Enumclaw School District and described in the District’s Capital Facilities Plan:

- Class size for grades K–4 should not exceed 23 students. School size should be between 400 and 500 students.
- Class size for grade 5 should not exceed 26 students. School size should be between 400 and 500 students.
- Class size for grades 6–8 should not exceed 28 students.
  School size for Middle Schools should be between 500 and 550 students.
- Class size for grades 9–12 should not exceed 28 students.
  School size should not exceed 1,300 students.

The District generally recommends that elementary school sites be 15 acres, middle school sites be 25 acres, and high school sites be 40 acres. The District also has a variety of standards for specific facilities described in more detail in their Capital Facilities Plan.

3 How will the alternatives affect school facilities and services?

Impacts on schools are a function of the number of students generated and affect three aspects of operation:

- Instruction
- Facilities
- Transportation

These are interrelated since instruction depends on adequate facilities and the ability to get to facilities.

Student generation by new development varies by the type of housing and the market orientation. There is wide variation between districts in the state. Much of this is due to whether new housing is oriented to families in the housing formation stage.

The following student generation rates used in this analysis are based on an average of several local school districts:

- Single-Family:
  - 0.403 Elementary students per dwelling
  - 0.136 Middle school students per dwelling
  - 0.167 High school students per dwelling
Multi-Family:
- 0.137 Elementary students per dwelling
- 0.045 Middle school students per dwelling
- 0.056 High school students per dwelling

In addition to calculation of the number of students generated initially, a “cohort progression” model was used to track students in each grade as they move through the system. This methodology is used by the Enumclaw School District in preparing their 6-Year CFP. The State Office of the Superintendent for Public Instruction also uses this methodology, because it accounts for students as they move through the school system, and not just a snap shot in time at build out.

Because the student generation rates for elementary students are higher than for middle and high school students, the demand in the higher grades will not occur until several years after the initial development. For this reason, analysis must extend at least 12 years after the new final home is occupied to track students from kindergarten through high school.

Given the assumption of build out by 2025, this period would end in 2037. For convenience, this is rounded to the year 2040 in this Final EIS. The model accounts for the continued generation of new students as homes are sold; however, this is a relatively small factor.

**Alternative 1**
Development associated with Alternative 1 would generate the following number of students and associated facilities:
- 626 elementary students (increase the existing permanent capacity of the Black Diamond Elementary School and add a second school)
- 435 middle school students
- 532 high school students

Because development occurring in Alternative 1 is not master planned, there is no provision for schools on-site.

---

Because the student generation rates for elementary students are higher than for middle and high school students, the demand in the higher grades will not occur until several years after the initial development. For this reason, analysis must extend at least 12 years after the new final home is occupied to track students from kindergarten through high school.
**Alternative 2**

Development associated with Alternative 2 would generate the following number of students and associated facilities:

- 507 elementary students (increase current capacity of elementary school)
- 371 middle school students (generates partial need for middle school)
- 454 high school students (generates partial need for one high school)

In all cases, the addition of students from other growth in the area, other than MPD applications, could reasonably be considered to utilize a facility of the size that meets the District’s facility size goals.

As submitted by the Applicant, Alternative 2 proposes a site for a new elementary school, with adequate areas for play areas located in the northern section of the Main Property. However, analysis indicates that a middle school and high school are also warranted, and would need to be accommodated through agreement with the Enumclaw School District. Because the City’s MPD ordinance allows for provision of facilities and services through a separate agreement, it is possible that additional school facilities may be located outside of the MPD area. Staff of the District, City, and Applicant have negotiated a mitigation agreement which was undergoing review by the Enumclaw School District at the time this document was prepared. It will also be reviewed by the City Council as part of the MPD review process.
Alternative 3
Development associated with Alternative 3 would warrant the following school facilities:

- 380 elementary school students (increase the existing permanent capacity of the Black Diamond Elementary School)
- 278 middle school students (generates partial need for a middle school)
- 341 high school students (generates partial need for a high school)

Alternative 4
Student generation and school needs would be very similar to Alternative 3.

4 What measures could reduce or mitigate impacts on school facilities and services?

Options for needed facilities for any of the alternatives involve providing additional financial resources to the District beyond the tax revenue generated by the development at existing local tax rates. Options for providing facilities include a range of possible requirements of the development to provide land and to pay some or all of the cost of new facilities.

One common option is the assessment of school impact fees collected at the time dwellings are constructed. The amount of impact fee collected would necessarily be based on a projection of the percent of new school construction borne by the state and by the District as a whole through capital levies. In the worst case, fees could be assessed assuming no state funds and no contribution from the balance of the District. In addition, impact fees are collected as housing is built. Unless bonds are used and impact fees used to pay off bonds, the availability of funding and the provision of facilities will necessarily lag behind occupation of housing.
The City’s MPD regulations (BDMC 18.98.080.A14) state that the requirements of the school provision “may be met by a separate agreement entered into between the Applicant, the City, and the applicable school district.” This allows for some flexibility in how school impacts may be mitigated, and would be further defined at future approval stages.
Police

1 What police facilities and services are currently provided in the study area?

The City of Black Diamond Police Department serves the 4,180 residents of the City of Black Diamond. The Department includes the Chief of Police, a Commander, two Sergeants, and eight patrol officers, for a total of 12 commissioned officers. In addition, the Department includes a records manager and an administrative assistant. The current LOS for police is 3.5 officers per 1,000 residents, with the LOS ratio reduced with each 1,500 to 2,000 increment of population growth, as described in the City’s Capital Facilities Plan and shown in Exhibit 3-38.

<table>
<thead>
<tr>
<th>Exhibit 3-38</th>
<th>Police Level of Service Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Level</td>
<td>4,000–5,000</td>
</tr>
<tr>
<td>Police Officers</td>
<td>8</td>
</tr>
<tr>
<td>Sergeants</td>
<td>2.6</td>
</tr>
<tr>
<td>Administration</td>
<td>1.5</td>
</tr>
<tr>
<td>Total Staff:</td>
<td>12.1</td>
</tr>
</tbody>
</table>

Jail services for the City are provided by the Buckley City Jail for misdemeanor offenders and via the Cities of Enumclaw and Issaquah for other jail facility needs.

A map displaying the location of the fire, medical, police, and school services are shown in Exhibit 3-39.
Exhibit 3-39
Public Services

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
2 How will the alternatives affect police and public safety?

As with any city, population growth may result in a rise in crime, and a perceived need for additional police force to maintain the safety of the City and its residents.

Alternative 1 is anticipated to bring an additional 3,591 residents in the Lawson Hills area, which would bring the total population of the City to around 7,500 residents, and require 12 total police staff to accommodate the total City population. That would require essentially no change in the City’s current staff to meet required LOS standards.

Alternative 2 is anticipated to bring an additional 3,103 residents in the Lawson Hills area, which would also bring the total population of the City to around 7,500 residents. Similar to Alternative 1, this alternative would require essentially no change in the City’s current staff to meet LOS standards, as the City currently has 14 police staff members serving the City.

Alternative 3 is anticipated to have a population of 2,228 in Lawson Hills which would bring the total population of the City to approximately 6,200 residents, and would again require 12 police staff members to serve the City. This alternative would require essentially no change in the City’s current staff to meet LOS standards.

Alternative 4 is anticipated to have a Lawson Hills population of 2,674 which would bring the total population of the City to approximately 6,600 residents. As with the other three alternatives, 12 police staff members would be required and the additional population related to this alternative would require essentially no change in the City’s current staff to meet LOS standards.
Fire and Medical

1 What fire and medical facilities and services are currently provided in the area?

Fire, medical, and emergency services for the City of Black Diamond are provided by Mountain View Fire and Rescue (also known as King County Fire District No. 44). Mountain View Fire and Rescue and Black Diamond Fire are run as one organization, so all Black Diamond firefighters and volunteers are employees and volunteers of Mountain View Fire.

Currently, two fire stations provide service to the residents of the City of Black Diamond. Station 98 is staffed 12 hours per day by career personnel and at night by two volunteer fire fighter/Emergency Medical Technicians (EMTs), though located outside of the city limits. Station 99 is manned solely by volunteers responding from home for those same 12 hours. Outside of Station 98 and 99’s 12 primary service hours, services are provided by nearby Stations 92, 93 (SE Covington Sawyer Road), 97 (Green Valley Road), and 94 (near Krain Corner). The 2007 staffing level within the City of Black Diamond was 0.5 on-duty firefighters per 1,000 people.

Per Policy CF-17, the Level of Service standard for the City of Black Diamond is 1.4 career firefighters on duty per 1,000 residents until the City reaches a population of 10,000. Thereafter, the ratio of on-duty career firefighters per thousand residents will decrease incrementally to no less than 0.89 on-duty firefighters per 1,000 people. The City also takes reasonable action to assure that new development is within 1.5 travel miles of a fire station.

Three hospital/medical care facilities operate near the City of Black Diamond, including Enumclaw Community Hospital in Enumclaw, Valley Medical Center in Renton, and Auburn General Hospital in Auburn. Advanced Life Support services are provided by King County Medic, and funded through a separate county-wide tax assessment.
2 How will the alternatives affect fire services?

Mountain View Fire and Rescue is contracted with the City to provide fire protection, fire prevention, rescue, emergency medical, and other services that protect life and property. It is anticipated that with future growth, the District will need to increase the number of both volunteer and career fire fighters to accommodate the increase in population.

Alternative 1 is anticipated to bring an additional 3,591 residents to the Lawson Hills study area. Based on the City’s LOS standards, the new population would trigger the need for additional staffing of 4.9 on-duty firefighters. This alternative would keep the total population below the 10,000 threshold that allows for decreased staffing levels.

Alternative 2 is anticipated to bring an additional 3,103 residents to the Lawson Hills study area. The new population would require additional staffing of 4.34 on-duty firefighters. Similar to Alternative 1, the total population for the City would remain below 10,000 people.

Alternative 3 is anticipated to add 2,228 people to the City of Black Diamond. The additional population generated by this alternative requires additional staffing of 3.1 on-duty firefighters. This alternative would also keep the City’s population below 10,000.

Alternative 4 is anticipated to bring about 2,674 people to the City of Black Diamond. The additional population would require an additional 3.7 on-duty firefighters. This alternative would also keep the total population well under 10,000 people.
Other Public Services

1 What other facilities and services are currently provided or planned in the area?

A local United States Post Office located within the city limits provides mail carrier service to all residents of Black Diamond. Allied Waste provides critical solid waste collection and disposal as well as recycling collection and processing services to the residents of Black Diamond.

Telecommunication services are provided by Qwest Communications and cable is provided by Comcast.

Energy services are provided in Black Diamond by Puget Sound Energy, based out of Bellevue, Washington, and include electricity and natural gas.

2 How will the alternatives affect other public facilities and services?

Increases in population size due to any new development will create an increase in the service area for those providers. As private, for-profit enterprises provide solid waste disposal, electricity, and gas, it is the responsibility of those providers to make any improvements/additions to serve the population as necessary.

Puget Sound Energy is committed to serving the needs of the community in Black Diamond, though it is unknown at this time to what extent improvements in their facilities and infrastructure will be needed to accommodate the future developments.

3 What measures could reduce or mitigate impacts on other public facilities and services?

New development and increased population will create an increase in the service area for providers, possibly requiring updated facilities, increase in staff and infrastructure to provide services.
Fiscal Impacts

1 Why was a fiscal analysis prepared?

A fiscal analysis was prepared as part of this FEIS because of the particular requirements of the City’s MPD ordinance (18.98.080 A) that:

3. The proposed project will have no adverse financial impact upon the city at each phase of development, as well as at full build-out. The fiscal analysis shall also include the operation and maintenance costs to the city for operating, maintaining and replacing public facilities required to be constructed as a condition of MPD approval or any implementing approvals related thereto. This shall include conditioning any approval so that the fiscal analysis is updated to show continued compliance with this criteria, in accordance with the following schedule:

   a. If any phase has not been completed within five years, a new fiscal analysis must be completed with regards to that phase before an extension can be granted; and

   b. Prior to commencing a new phase.

2 How was the analysis conducted?

Potential fiscal impacts on the City were assessed using a spreadsheet financial impact analysis model. There are four general components of this model:


2. Projected revenues, tax, and other revenues potentially generated from the proposed project were derived using typical local and regional economic and real estate values for the tax bases used by the City. The potential tax revenues generated in the analysis follow a general formula in which
revenues are a function of tax rates in State laws and/or local rates set as City policies within specific statutory ranges and are then applied to the statutory basis of taxation. The magnitude of these bases of taxation are determined in the market through assessed values, retail sales, utility payments, the bases and rates of various other taxes, permits, fees, charges, as well as state shared revenues.

3. **Projected public service expenditures** to meet the demand associated with the new developments are projected. Significant policy discretion is allowed to local governments for actual kinds and levels of local services. Each community determines how to interpret and meet these public service demands and costs separately with State statutory and constitutional guidance.

4. **Net annual fiscal impact** is obtained by comparing annual revenues (sources of funds) and subtracting the projected services expenditures (uses of funds) associated with the proposed development project. This net comparison is the primary concern for the financial impact analysis. In addition, other revenues including: “one time-during the construction phase” revenues, revenues to other local jurisdictions, and the Real Estate Excise Tax, which is earmarked for capital projects and was not included in the annual operating budgets were projected. The sales tax collected from construction contracts is included in the annual projections of revenue flows to the general fund.

The financial impact analysis, summarized in the Technical Report in Appendix J, uses a combination of current City of Black Diamond budget patterns, service standards in the Comprehensive Plan, and patterns obtained from other similar communities in Washington state that have experienced sustained, long periods of dramatic new growth.

The focus of the financial impact analysis is the current expenses of operating the City. It does not directly consider capital facilities needs that may result from the development.
The following tables summarize the factors used in projecting revenues and expenditures:

### Exhibit 3-40
**Factors for Projecting Potential Revenues Associated With the Proposed Developments**

<table>
<thead>
<tr>
<th>Basis for Estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANNUAL REVENUES</strong></td>
<td></td>
</tr>
<tr>
<td>Property Tax</td>
<td>Market values/new construction costs of commercial and residential buildings and land values</td>
</tr>
<tr>
<td>Sales Tax</td>
<td>• Construction contracts • Residents’ potential spending and economic performance of retail space</td>
</tr>
<tr>
<td>Utility Taxes</td>
<td>Current utility payments per dwelling unit</td>
</tr>
<tr>
<td>Other Taxes</td>
<td>Current per capita</td>
</tr>
<tr>
<td><strong>ONE TIME REVENUES</strong></td>
<td></td>
</tr>
<tr>
<td>Building Permits</td>
<td>Percentage of infrastructure and building costs</td>
</tr>
<tr>
<td>Development Impact Fees</td>
<td>Not yet determined by the City’s policies</td>
</tr>
<tr>
<td>Real Estate Excise Tax</td>
<td>Applied only to first sale of dwelling units and commercial space</td>
</tr>
</tbody>
</table>

### Exhibit 3-41
**Factors for Projecting Costs of Services Associated With the Proposed New Developments**

<table>
<thead>
<tr>
<th>City Service Function</th>
<th>Basis For Projection</th>
<th>Amount $/FTEP</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police Protection</td>
<td>Level of Service in Comp Plan and Annual Budget for 2009 using current budgeted costs</td>
<td>$168.00</td>
<td>18.6%</td>
</tr>
<tr>
<td>Fire and Emergency Services</td>
<td>Level of Service in Comp Plan and Annual Budget for 2009 using current budgeted costs</td>
<td>$256.00</td>
<td>28.3%</td>
</tr>
<tr>
<td>General Government</td>
<td>Utilized the proportion determined from similar rapid growth communities and Annual Budget for 2009</td>
<td>$251.50</td>
<td>27.8%</td>
</tr>
<tr>
<td>Streets and Roads</td>
<td>Comp Plan level of service and PMX EIS impact analysis</td>
<td>$51.01</td>
<td>5.6%</td>
</tr>
<tr>
<td>Community, Economic, Natural Resource Development</td>
<td>Current City Budget</td>
<td>$103.50</td>
<td>11.4%</td>
</tr>
<tr>
<td>Parks and Recreation</td>
<td>Comp Plan level of service and PMX EIS Impact analysis</td>
<td>$75.13</td>
<td>8.3%</td>
</tr>
</tbody>
</table>

**Total Expenditures per Full-Time Equivalent Person:** $905.14 100.0%
3 Based on this methodology, how do the alternatives perform?

**Alternative 1**
Alternative 1 does not include any commercial or retail use, which generates revenue, and consists solely of residential units. This alternative is not proposed to be developed as an MPD, and is therefore not required to complete fiscal impact analysis nor achieve fiscal balance. However, it is interesting to contrast a residential-only alternative, which costs the City greatly in terms of providing services, to the other alternatives, which all propose some amount of commercial/retail uses. Under Alternative 1, the costs associated with providing public services exceed annual revenues by roughly 10 percent for the development proposed at Lawson Hills.

**Alternative 2**
Alternative 2 represents the Applicant’s proposal to develop the Lawson Hills area as an MPD with 1,250 dwelling units and 390,000 square feet of commercial/office. This would increase the size of the City measured by population roughly 75 percent by 2025, adding 3,100 more people. This alternative could also increase—nearly double—employment over that period.

The model indicates that the revenues generated by such development will be essentially balanced by the costs to provide services. In fact, the model indicates a roughly $60,000 deficit at build-out. Given the nature of the model, and the fact that an actual proposed development could have variations in residential unit counts, unit mixes, and total retail and office square footage, this can be generally considered to be fiscally balanced, meeting the City’s MPD code requirement.

It should be noted that the Applicant provided an independent fiscal analysis, which is included for reference in Appendix J. This analysis utilized a different methodology and set of assumptions, and therefore yielded different results than the City’s independent analysis.
**Alternative 3**
Alternative 3 was not specifically analyzed for this FEIS. However, since Alternative 3 was generated by reducing the units counts of Alternative 2 by 25 percent, and reducing the commercial and office square footage proportionately, similar results could be expected. Therefore, it is likely that this alternative would also be essentially fiscally balanced as defined by the MPD ordinance.

**Alternative 4**
Alternative 4 was developed as a case study to achieve fiscal balance in the model. Because Alternative 2 was already so close to neutral in this MPD, Alternative 4 does not represent a significant change in units (1,075) from Alternative 2. It assumes the same 75 percent single-family and 25 percent multi-family split in terms of the units, and holds constant the amount of commercial and office square footage.

**4 What do the results tell us?**
These results are similar to the typical experience in analysis and research about fiscal impacts from development around the region and nation, that in general:

- Single-family residential development generates a negative annual fiscal balance, i.e., revenues are exceeded by public service cost within jurisdictions;
- Multi-family residential development typically generates a neutral or “break-even” annual fiscal balance, i.e., revenues are more or less matched by public service cost within jurisdictions; and
- Commercial-industrial development typically generates a positive annual fiscal balance, i.e., revenues exceed public service cost within the jurisdiction.
- Slight changes in model assumptions related to cost and revenue inputs can result in differing results. This is indicated by the two fiscal impact analyses that were conducted. Per MPD requirements, the fiscal analysis should be updated at each phase of development. This will allow the City to review and approve inputs and assumptions at each phase, prior to approvals.
5 What could be done to improve financial performance?

Measures to bring a city into fiscal balance involve a combination of two strategies:

▪ Reduce costs
▪ Increase revenues

Public service demands and costs are related to a complex set of factors that differ in each community, including, demographic, economic, real estate market conditions and location, geographic, political, historic, state mandates, and local preferences and perceptions. Other than the kind and level of public services, a city has little control over these. Generally speaking, cities do live within their budgets and make these adjustments on a normal ongoing basis.

Increasing the revenues to the City is problematic. The level of rates and definition of the bases of local taxes are primarily controlled by state laws and the constitution, as well as citizen initiatives. In addition, the bases of most taxes are set by regional market forces. Most of the City of Black Diamond’s tax rates are at or near the maximum allowed. The City does control non-tax revenue sources. The City may utilize economic development strategies to enhance its tax base, though this is a long term proposition.

The revenues that would accrue to the City from commercial development are shaped and limited by the market realities of the Lawson Hills location within the region. In addition, achieving the sales tax revenue associated with the proposed 190,000 square feet of retail development is uncertain. Sales tax revenue depends on total local taxable retail sales and cannot realistically be achieved solely by the residents of Lawson Hills.
To achieve projected total taxable local retail sales, the residents of Lawson Hills would have to spend more per person in the proposed retail than the state or King County per capita sales average.

The population of Lawson Hills, together with the existing population of the City would have to change its shopping patterns to make nearly all purchases in the proposed retail area in order to produce enough sales to produce the calculated revenue.

In order to achieve such sales levels, the proposed retail area would have to draw customers from a larger area, including Enumclaw, Covington, and Maple Valley.
Chapter 4 The Natural Environment – Effects on Ecosystems and Natural Resources

What is addressed in this chapter?

This chapter describes the community’s existing natural environment and how the alternatives may impact those resources. This chapter specifically addresses the following elements:

- Earth
- Hazardous Materials
- Water
- Plants and Animals
- Climate Change

Several exhibits within this chapter identify the locations and/or conditions of natural resources. The mapping information used to create these exhibits came from a variety of sources, are intended only as general depictions, and may not be accurate to the parcel level. During the MPD process, natural resources will be analyzed at a parcel level.
Earth

Geology, Topography, and Soils

1 What are the geologic conditions in the area?

The Lawson Hills MPD lies along the east edge of the Puget Lowlands, within the till ridges and outwash valleys of the Covington Drift Plain to the west and the Cascade Foothills to the east. Bedrock in the Black Diamond area extends westward out from the Cascade Foothills. Many of the coal seams commercially mined in the Black Diamond area are found in this deposit. Coal mines underlying the site are discussed in more detail below.

The near surface geology of the Main Property consists of Puget Group bedrock overlain by thin glacial sediments (till and outwash) and fill. The depth to bedrock is variable but is generally less than 5 feet. Fill thicknesses of up to 100 feet are mapped in the north end of Upper Lawson Hills where waste rock fill was placed to reclaim two open pits of the Section 12 surface coal mine. Fill mapped along Lawson Creek consists of waste rock and coal debris left over from the abandoned Lawson mine.

Geologic deposits in the North Triangle are similar to the Main Property; however, because no coal mining occurred in the North Triangle there are no significant fill deposits. The Puget Group bedrock underlies the North Triangle property approximately 4 feet below the ground surface in the northwest portion of the site and was not encountered in test pits in the upper southeast portion of the site.

2 What are the topographic conditions in the area?

The Main Property is characterized by two distinct parts; Upper and Lower Lawson. Upper Lawson is located southeast of Lawson Street. Lower Lawson (also referred to as the Corridor) is located to the west, between SR 169 and the Lawson Street (Exhibit 4-1). Upper Lawson is situated on a generally west to northwest facing hill that ranges in elevation from about 1,085 feet at the southeast end of the site to about 750 feet at the west end. The hillside slopes are generally uniform, ranging from approximately 15 to 25 percent. Lower

Appendix D
Geologic conditions within the Lawson Hills study area are described in more detail in the report on Geology, Soils, and Groundwater in Appendix D.
Lawson also generally slopes to the west, ranging in elevation from about 800 feet in the east to 635 feet in the west. The eastern half is relatively flat, averaging slopes of about 1 to 2 percent. The western half is steeper with slopes between 10 and 20 percent, and localized slopes as steep as 50 percent.

The North Triangle includes three distinct topographic areas: an upland area ranging in elevation from between 640 and 670 feet, which slopes gently towards the northwest; a northeast-southwest trending slope bisecting the triangle ranging from approximately 640 feet to 600 feet in elevation; and a nearly flat lowland area to the northwest with elevations ranging from approximately 600 feet to 574 feet. Slopes in the upland area range from between approximately 2 and 20 percent. Localized areas of the slope bisecting the North Triangle exceed 40 percent. The lowland area generally slopes to the southwest, with slopes ranging from less than 1 percent to localized short slopes of approximately 20 percent.

3 What are the soil conditions in the study area?

The United States Department of Agriculture’s (USDA) Natural Resources Conservation Service (NRCS) maps identify a total of three soil-mapping units within the boundaries of the study area. The soils underlying the site are mapped as Alderwood gravelly sandy loam, Everett gravelly sandy loam, and Beausite gravelly sandy loam. These units are further broken down into subunits, based on the general slope in the vicinity (Exhibit 4-2).

The **Alderwood** gravelly sandy loam unit is described as a moderately well drained soil on till plains, with a hardpan layer at about 30 inches. The Alderwood soil series is characterized by slow to medium runoff rates with moderately rapid permeability above the hardpan and very slow in the hardpan. The main limitation of this soil series affecting homesites is the seasonal wetness, and erosion is a hazard in steeper areas.

The **Everett** gravelly sandy loam unit is described as very deep, somewhat excessively drained soil on terraces and outwash plains. Permeability is rapid in Everett soils; runoff is slow and the hazard of water erosion is slight. This unit is suited to homesites; however cut banks are not stable and can be subject to sloughing. Because of the permeability, irrigation is typically needed for lawns and ornamental plantings in summer.
Exhibit 4-1
Topography

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Exhibit 4-2
Soils

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
The **Beausite** unit is made up of well-drained soils that are underlain by sandstone bedrock at a depth of 24 to 40 inches. These soils are typically found on foothills, exhibit moderate permeability, and runoff rates that are medium to rapid. The hazard of water erosion is moderate to severe. Beausite soils have severe limitations on recreational and engineering uses due to the thinness of the soil over the sandstone and the erosion/slippage potential in steeper classes.

Soils sampled throughout the study area are similar to the descriptions of the Alderwood, Everett, and Beausite units.

### 4 What risks are associated with geology, topography, and soils?

Risks associated with geology, topography, and soils generally include erosion hazards, landslide hazards, seismic hazards, volcanic eruptions, and other geologic events. Areas with certain characteristics – for example, specific types of soil or combinations of soils and topography – may be prone to failure and can pose hazards to the health and safety of citizens. This typically happens when incompatible commercial, residential, or industrial development is sited in areas of significant hazard.

Erosion hazard areas typically include those areas that the USDA’s Natural Resources Conservation Service (NRCS) has identified as having a moderate to severe, severe, or very severe rill and inter-rill erosion hazard.

Landslide hazard areas are potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. This includes areas susceptible to landslides because of combinations of bedrock, soil, slope, slope-facing direction, structure, hydrology, or other factors.

Seismic hazard areas include areas subject to severe risk of damage as a result of an earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, or surface faulting. The primary cause of earthquake damage in Washington State is ground shaking.

Volcanic hazard areas are areas subject to lava flows, debris avalanches, inundation by debris flows, mudflows, or related flooding resulting from volcanic activity.
5 What are mine hazard areas?

Mine hazard areas are those areas underlain by, adjacent to, or affected by mine workings, such as mine tunnels and air shafts. Mine hazard areas are generally divided into classifications of low hazard, moderate hazard, and severe hazard. These classifications are applied based on the depth below ground of the mine, the presence of sinkholes, and the presence of publically accessible openings, such as mine entries, portals, and mine shafts. The presence of mine waste rock – natural materials discarded as a part of the coal mining process – can also pose risks to the public and affect the hazard classification.

Significant portions of the Main Property are underlain by abandoned underground coal mines (Exhibit 4-3). Although all of the Main Property contains coal seams, only the Upper Lawson property contains abandoned mines. There was no evidence that the coal seams on Lower Lawson were mined. Upper Lawson Hills is underlain by three abandoned underground coal mines, the Lawson Mine, the New No. 12 Mine, and the Maks Mine. The largest and most significant of these mines is the Lawson Mine, which operated from 1885 to 1910. The New No. 12 Mine (1880s) and the Maks Mine (1950s) were smaller operations developed in the north end of Upper Lawson. Surface coal mining operations in the 1980s, known as the McKay-Section 12 Surface Coal Mine, were developed over the top of the New No. 12 Mine.

The exact condition of the Lawson Mine and other smaller mines is not known. The research and subsurface explorations completed to date seem to suggest that the abandoned mines have substantially collapsed; however, additional studies and explorations completed in accordance with the City’s SAO will be needed for specific development in defined hazard areas.

Abandoned underground coal mines pose risks to structures and people above them, as well as to those entering mines or nearing mine openings. These hazards include ground subsidence and collapse, and the presence of methane gas or low oxygen environments generally associated with mine openings. However, no mine openings have been documented on or adjacent to the Lawson Hills site.
Exhibit 4-3
Abandoned Coal Mine Locations

*Boundaries of the abandoned coal mines are approximate. The 200ft buffer is included to show the potential locations of the mine boundaries.

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
6 How will the alternatives impact geology, topography, and soils?

Erosion Hazard
Shallow surface soils on the Main Property have been mapped as Alderwood and Beausite series soils. In areas with slopes steeper than 15 percent, these soils series are considered to have severe erosion potential. Shallow surface soils on the upland portion of the North Triangle have also been mapped as the Alderwood soils series. These soils are found on slopes steeper than 15 percent on the hillside that bisects the triangle property. Exhibit 4-4 displays potential erosion hazard areas within Lawson Hills.

Erosion potential is highest during construction activity, when the vegetative and topsoil layers have been removed, exposing soils directly to precipitation and wind. Alternative 2 includes the construction of stormwater facilities on the Main Property, and the North Triangle. Stormwater facilities involving discharge on even moderate slopes can result in severe overland erosion and rilling. Development under any of the alternatives could result in changes to the stormwater flow regime (timing, volume, peak flows, and duration) that could increase erosion in Lawson Creek and the unnamed stream.

The approximate acreages of disturbance to erosion hazard areas associated with each alternative are summarized in Exhibit 4-5 (page 4-11).
Exhibit 4-4
Potential Erosion Hazard Areas

Erosion hazard mapping based on the City of Black Diamond Sensitive Areas Ordinance; modified by Icicle Creek Engineers and Parametrix using updated base map topography.

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
What are the City’s Requirements for Landslide Hazards?
The City’s Sensitive Areas Regulations (BDMC19.10.410) prohibits most activities on landslide hazard areas except in cases where reasonable development cannot be accommodated on portions of the site not subject to landslide hazards and if analysis by a qualified professional establishes compliance with standards to minimize risk.

Buffer requirements include:

- A buffer from the top of a slope to protect persons and property from damage due to catastrophic slope failure and slope retreat over the lifetime of the use and provide an area of vegetation to promote shallow stability, control erosion and promote multiple benefits to wildlife and other resources. The dimension of the buffer generally is equal to the height of the slope.

- Buffers from the toe and side of the slope.

Buffers may be modified based on specific criteria.

---

**Exhibit 4-5**

**Geologic Hazard Areas – Summary of Impacts**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Landslide</th>
<th>Erosion</th>
<th>Mine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 acres</td>
<td>68 acres</td>
<td>107 acres</td>
</tr>
<tr>
<td>2</td>
<td>0.7 acres</td>
<td>51 acres</td>
<td>122 acres</td>
</tr>
<tr>
<td>3</td>
<td>0 acres</td>
<td>49 acres</td>
<td>85 acres</td>
</tr>
</tbody>
</table>

**Landslide Hazard**

Landslide hazard areas are shown in Exhibit 4-6. The potential for landslides can be increased by development activity, including cutting that removes material holding the toe of a slope in place or additional stormwater runoff from impervious surfaces. Development also can place areas of human habitation or activity in areas subject to damage from naturally occurring or human induced landslides.

Most of the landslide hazard areas on the Main Property, including coal waste stockpiles and the incised Lawson Creek ravine, fall in proposed open space areas under Alternative 2. For the other alternatives, general development areas are presumed to be similar to Alternative 2, although the type and intensity of uses may change.

Most of the North Triangle does not fall into a landslide area; landslide hazard areas on the North Triangle are restricted to the hillside that bisects the triangle. The proposed through roadway in the North Triangle under alternative 2 is located adjacent to this landslide hazard area, which will require additional site-specific analysis.

The approximate acreages of disturbance to landslide hazard areas associated with each alternative are summarized in Exhibit 4-5.
Landslide hazard mapping based on the City of Black Diamond Sensitive Areas Ordinance; modified by Icicle Creek Engineers and Parametrix using updated base map topography.
Seismic Hazard
The Lawson Hills study area is located in a region of moderate-to-high earthquake activity, in terms of both the size and frequency of earthquakes. The most significant earthquake related concern, as it relates to the study area, is soil liquefaction. Soil liquefaction occurs because of a loss of soil strength due to strong shaking, and results in a transition of the soil from a solid state to a liquefied state.

The Main Property and upland portion of the North Triangle are not considered susceptible to soil liquefaction during an earthquake. The exception may be the thick fill present in the McKay Section 12 Mine, which has not been evaluated in sufficient detail for liquefaction potential to be assessed. The lowland area of the North Triangle has low liquefaction potential based on the native soil and groundwater.

Volcanic Hazard
The most severe potential volcanic hazards (lateral blasts, lava flows, ballistic debris, and pyroclastic flows) are not likely to occur in the Black Diamond area due to the distance from Mount Rainier. Lahar flows – dense slurries of water-saturated debris including rock, soils, and trees – are also low, as Black Diamond is not in a valley or low lying area through which semiliquid debris would be transported from a volcanic eruption of Mount Rainier.

Based on analysis of prevailing wind patterns, the United States Geologic Service (USGS) has rated the Black Diamond areas as having a very low annual probability of significant ash accumulation. Therefore, ash-related human health and property concerns are not significant for any of the alternatives.
7 What are the City’s requirements for mine hazards?

The City’s SAO Regulations emphasize identification of potential mine hazards and either avoidance or design practices to minimize impacts to human health and property.

Areas of severe mine hazard are those that pose a significant risk of catastrophic ground surface collapse (including mines that are less than one hundred fifty feet from the surface), have publically accessible openings, and/or have sinkholes. The preferred uses of severe mine hazard areas are open space and passive recreation facilities. Vulnerable facilities, including schools, nursing homes, hospitals, and emergency response facilities are prohibited in severe mine hazard areas.

Moderate mine hazard areas pose significant risks of property damage that may be mitigated (including mines at a depth of 150 feet to 300 feet), and have no publically accessible openings or sinkholes within 100 feet. Development is allowed in moderate mine hazard areas if a detailed hazard assessment documents that risks are no greater than those facing properties that are not located above mines. Vulnerable facilities are not allowed in moderate hazard areas if there is a feasible alternative location.

Areas of low mine hazard include locations with mines at a depth of more than 300 feet (or where potential subsidence is limited to specific standards) and no accessible openings or sinkholes within 100 feet. Development in low hazard areas is allowed if risks are no greater than those facing properties that are not located above mines. Vulnerable facilities are not allowed in low hazard areas if there is a feasible alternative location.

Mine hazard areas may be declassified based on a detailed, site-specific mine study documenting that mine hazards are equivalent to lands not situated above mines.
8 How do mine hazard areas impact the alternatives?

Mine hazard areas are shown in Exhibit 4-7. Hazards associated with abandoned coal mines include mine collapse and ground subsidence as well as fire risk resulting from methane gas generation. The potential for coal mine collapse and ground subsidence is influenced primarily by the height of the mine tunnels and shafts, the depth and the strength of the rock roof, and the type and amount of roof support within the mine.

Two types of ground effects can result from mine subsidence: sinkholes and sag. Sinkholes are characterized by an abrupt sinking or collapse of the surface, resulting in a steep-sided feature often resembling a cone or crater. Sinkholes are almost always associated with a former underground mine opening such as a portal, air shaft, or timber chute. Sag subsidence is a more gentle and gradual settling of the surface over a larger area. Sag subsidence is a function of the strength of the overburden mantle of bedrock relative to the extent of the mine void. In general, deeper mines are more likely to result in sag subsidence if conditions warrant, while sinkholes are only expressed from the collapse of more shallow mines. Shallow mines pose the greatest hazards for two reasons. They are more likely to result in sinkholes and the abrupt nature of collapse is more likely to cause catastrophic damage. Most sag subsidence has in all likelihood already occurred due to the long time period since the mine’s closure and abandonment. However sinkholes can sometimes develop even years after a mine’s abandonment if the associated portal, air shaft, or timber chute were not properly plugged. Sinkhole development is often associated with collapses caused by wet soil conditions, when supersaturated soils grow heavy and put added pressure on an un-reclaimed former opening, or when previous capping structures (for example, wooden covers) fail.

All build alternatives risk mine collapse and subsidence to the extent to which development is proposed over or near abandoned mines and the extent of mine exploration and assessment done to reduce hazards. The extent to which mine hazard areas impact each alternative is described on page 4-17.
Mine Hazard Areas

Exhibit 4-7

*Coal mine hazard mapping based on the City of Black Diamond Sensitive Areas Ordinance; modified by Icicle Creek Engineers, Inc. using updated base map topography.

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Alternative 1
Alternative 1 assumes that the Lawson Hills properties will develop consistent with current zoning. This type of development would be characterized by residential development occurring slowly and incrementally, and avoiding impacts to all regulated sensitive areas. In regard to mine hazard areas, Alternative 1 assumes that severe mine hazard areas would be preserved in open space, and that low and moderate mine hazard areas would be developed with residential uses. Utilizing these assumptions, approximately 107 acres of low and moderate risk mine hazard areas will be developed under Alternative 1.

Alternative 2
Alternative 2 represents the Applicant’s proposal under the City’s MPD Ordinance, and includes development of approximately 122 acres of land categorized as potential mine hazard areas (including low, moderate, and severe). However, the majority of areas mapped as potential severe hazard areas are designated as open space on the conceptual land use plan. The area identified as a coal mine waste stockpile is also located within designated open space areas under this Alternative.

Two major roads and utility corridors cross the potential mine hazard area, and are permitted in accordance with the requirements of the SAO. Roads and utilities are susceptible to damage from subsidence that can affect road surface usability and result in bending or breaking of utility lines such as water, sewer, and gas.

Alternative 3
Alternative 3 also assumes that severe mine hazard areas would be preserved in open space, and that low (and to some extent) moderate mine hazard areas would be developed with residential uses. Utilizing these assumptions, approximately 85 acres of low and moderate risk mine hazard areas will be developed under Alternative 3.

Alternative 4
Alternative 4 would be similar to Alternatives 2 and 3, and was not further studied in this section.
9 What policies and standards address geologic hazards?

The City of Black Diamond regulates geologically hazardous areas through its SAO regulations. This includes landslide hazard areas, erosion hazard areas, mine hazard areas, and seismic hazard areas. The City also maintains a map that indicates the approximate location and extent of known geologically hazardous areas.

There are two basic strategies for management of geological hazards, depending on the potential risk to life and property: avoidance and management.

- Avoidance is the primary strategy for landslide hazards and the most severe mine hazards.
- Management is the prescribed strategy for erosion hazards and seismic hazards as well as less severe landslide and mine hazards.

The City requires field investigation and reports accompany any proposal for development in geologically hazardous areas, as outlined in the SAO.

Generally, activities not typically associated with high levels of ground invasion or disturbance, such as passive outdoor recreation, are permitted in geologically sensitive areas. Certain activities that could increase the level of hazard or increase the potential for exposure to hazards, such as trail construction, may be permitted under specific conditions. Some activities are not permitted in geologically sensitive areas at all unless it is proven the activities cannot be located elsewhere, and the proposal will not increase the hazard and the risk to life and property.

In mine hazard areas, where risks have been reduced through documented collapse of subsurface mine features or through remediation such as filling voids, such areas can be declassified (reclassified as not hazardous). In order to characterize hazards and appropriate strategies for remediation and/or management, additional subsurface exploration will be necessary.
10 What measures reduce or avoid impacts on geology and soils?

All of the alternatives include construction of residential uses within geologic hazard areas of varying levels of risk, and have similar potential to directly impact geology and soils. Under all of the alternatives there is also the potential to eliminate or relocate uses that would otherwise concentrate large numbers of persons, or vulnerable populations, into relatively less risky areas.

The alternatives involve similar areas of ground disturbance and therefore have similar potential for construction-related erosion. The City of Black Diamond has the authority under the SAO to require changes in buildable areas and buffers that can mitigate potential hazards under all of the Alternatives. Discussion of measures to mitigate for specific impacts to geology and soils is included in the following pages.

Erosion Hazards

Soil erosion can be addressed during site design and construction. During construction, the use of silt fences, hay bales, temporary sediment ponds, truck wash areas, regular road cleaning, and straw mulch or rock coverings can minimize risks associated with erosion. In addition, major earth moving and grading can be limited to the “dry season,” between May and September, to avoid water quality impacts from erosion due to wet soils.

With additional impervious surfaces the total volume of water discharged to streams and the duration of flows will be increased, which has the potential to increase erosion. However, stormwater management can minimize increased risks of stream erosion by utilizing detention facilities that avoid increases in peak stream flows. Protecting stream banks from disturbance can also reduce the adverse impacts of stream erosion in cases where vegetation is an effective means of stabilizing stream banks. Utilizing bridges or appropriately sized culverts for roadway crossings of streams can allow peak-flow high-water events to pass unimpeded and also preserve some normal stream processes.
Designing stormwater facilities to avoid discharging concentrated stormwater flows on moderate and steep slopes is also a very effective strategy for avoiding severe land erosion.

**Landslide Hazards**
The most reliable means of avoiding landslide hazards is avoidance of the area and utilizing sufficient setbacks to increase the safety of nearby human uses. Potential landslide hazard areas on the Main Property, such as the incised Lawson Creek ravine, are proposed for open space uses. If variation to standard setbacks is proposed under any alternative, site-specific geotechnical evaluations may be necessary to determine whether such variation constitutes a potential hazard.

Management of stormwater and groundwater to avoid increases in overland flow or infiltration in areas of potential slope failure can also help avoid water-induced landslides. Extreme care must be taken when considering the location of stormwater ponds, other detention facilities, and stormwater infiltration systems near potential landslide areas.

**Seismic Hazards**
Thick, water saturated, loose fill may be susceptible to liquefaction. The thick fill present in the McKay Section 12 Mine has not been evaluated for liquefaction potential. Because the water table elevation in this area is unknown and because soils testing indicated fill in the area is dense, a liquefaction evaluation should be done prior to placing any structures on the fill. In general, the potential effects of liquefaction can also be mitigated through engineering and design.

**Mine Hazards**
Mine hazards to structures and road and utility crossings can be avoided by designating the most severe hazard areas as open space and by routing roads and utilities to avoid such areas. Even in open space areas, actions may be necessary to avoid hazards to persons using the areas for recreational purposes. Where avoidance is not feasible or where hazards are less severe, risks can be reduced through remediation measures. Remediation measures may include filling mine tunnels and shafts, designing structures to avoid failure if settlement occurs, and utilizing flexible utility lines.
It is difficult to accurately characterize risk for shallow and moderately deep mine tunnels and shafts. In order to document hazards and identify appropriate remediation measures, drilling as required by the SAO may be needed to determine whether mines have collapsed. This is very expensive and involves inherent risks. The inaccuracies in mine surveys make it difficult to ensure that drill holes encounter tunnels and shafts and don’t simply drill through pillars retained as part of the mine. In addition, below ground conditions are very variable and documentation that mines have collapsed in one area may not be indicative of conditions a relatively short distance away.
Hazardous Materials

1. Are there any potentially contaminated sites in the study area?

Many chemical wastes are persistent in the environment, are harmful to the environment and/or human health, and remain toxic for a very long time. Some of these wastes can also become more concentrated in the tissues of animals higher in the food chain over time, a process known as bio-accumulation. In Washington, about 7,000 facilities and businesses produce more than 117 million pounds of hazardous waste annually.

The Washington State Department of Ecology maintains an identification tool, which includes information on potentially hazardous facilities or sites that are currently or have been of interest to Ecology, and have been or are currently regulated by Ecology. These facilities or sites may include state cleanup sites, voluntary cleanup sites, federal Superfund sites, hazardous waste generators, soil waste facilities, underground storage tanks, dairies, and locations where enforcement actions have occurred. A search of this database indicates there are twelve facilities/sites of interest in the Lawson Hills vicinity; all twelve are located in the area on or around the Main Property. There are no sites in the facility/site atlas shown on or immediately adjacent to the North Triangle.

Of the twelve facilities/sites in the vicinity, only five are still active or include active components. Of these active facilities, only one (the Johnston Property) is within the Lawson Hills boundaries (on the Main Property). This site is classified as a voluntary cleanup site, and cleanup activities are nearly complete (Exhibit 4-8).

*Hazardous waste facilities* are those that generate any quantity of a dangerous waste (“hazardous waste generator”), or facilities that are required to register with Ecology but do not directly manage or generate hazardous waste (“hazardous waste other”). Hazardous waste transporters are an example of a facility that would be categorized as “hazardous waste other.” Hazardous waste facilities may also include businesses that store or use certain quantities of hazardous chemicals at any one time (“hazardous waste tier 2”).

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**What are “persistent” chemicals?**

Dioxin, mercury, toxic flame retardants (PBDEs), DDT, and PCBs are among a class of chemicals called persistent toxic chemicals. These chemicals are toxic in small amounts, are long lasting in the environment, and build up in foods, animals, and people.
Exhibit 4-8
Potentially Contaminated Site

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
State cleanup sites include those sites undergoing formal cleanup under state oversight. Underground storage tank sites include the sites with underground storage that Ecology regulates, including gas stations, industries, commercial properties, and government entities. “Leaking” underground storage tank sites are underground storage tank sites that have or have had leaks at one time. Voluntary cleanup sites are those sites where Ecology staff has reviewed independent cleanup reports and provided a written decision about the adequacy of cleanup actions taken. Enforcement sites are those sites where voluntary compliance was not achieved and Ecology has pursued enforcement.

2 How do the alternatives relate to hazardous materials sites?

The impacts of developing on or near hazardous sites or facilities is related to the type and location of the waste, the nature of the development, sensitive uses (such as drinking water wells) in the area, and efforts taken to minimize risk. In many cases, hazardous materials can be removed from a site prior to construction, minimizing future risk to human health.

Of the twelve facilities/sites, only five are still active or include active components. Of these active facilities, only one is within the Lawson Hills boundaries (on the Main Property). This site is classified as a voluntary cleanup site, signifying that cleanup activities have occurred.

As outlined above, a major concern with hazardous sites or facilities is their proximity to public drinking water sources and wellhead protection areas. As the one active facility within the Main Property does not fall within an established wellhead protection area, none of the alternatives is likely at risk of significant impacts from hazardous waste sites.

What is a wellhead protection area?
Designated wellhead protection areas are the surface and subsurface areas surrounding a well or well field, supplying a public water system with over 1,000 connections, through which contaminants are reasonably likely to move toward and reach such water well or well field. Designated wellhead protection areas are approved by the Washington State Department of Health.
**Water**

**Surface Water Resources**

1. **What surface water resources are present in the study area?**

The Lawson Hills study area is located within the Duwamish-Green River Drainage Basin (Water Resource Inventory Area [WRIA] 09). All surface water runoff within the study area drains to Rock Creek and Lake Sawyer and then on to Covington Creek and Big Soos Creek. Big Soos Creek flows into the Green River. The Green River becomes known as the Duwamish River Waterway at River Mile 11 and flows into Elliot Bay and the Puget Sound in Seattle.

In the study area, there is a large concentration of natural features that affect ecological function and the health of the watershed. These features include Jones Lake, Mud Lake, Mud Lake Creek, Ginder Creek, Rock Creek, and a large wetland complex. They provide flood desynchronization, water storage, and a variety of nutrient control functions. These features also provide important fish and wildlife habitat areas. The Lawson Hills Main Property interacts with these features through five drainage basins:

- **Basin A**: The central portion of the Main Property, consisting of about 71 acres, drains from Lawson Creek to Jones Lake, which then flows to Rock Creek and Lake Sawyer;
- **Basin B**: An area of about 38 acres south of Lawson Street which drains to Mud Lake which in turn drains to Ginder Creek then Rock Creek;
- **Basin C**: The southerly portion of the Main Property, consisting of about 38 acres, which drains to the south by subsurface flow or via sheet flow through numerous small ravines and slopes to recharge groundwater and Jones Lake Creek on the east side of SR 169; and

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**Appendix M**

Additional information regarding water is available in Appendix M.

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**What is analyzed in the “Water” Section?**

- Surface Water: Streams, lakes
- Groundwater: Hydrology between water bodies, aquifers
- Stormwater: Water quality

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**What is flood desynchronization?**

Flood desynchronization is the ability of wetlands to store flood waters and later discharge those waters at a non-simultaneous rate reducing the height and rate of flows that would otherwise be associated with flooding.
Primary productivity is the production of organic compounds from carbon dioxide in the atmosphere or in the water. This is primarily accomplished by photosynthesis by plants and some types of microorganisms.

What is nutrient control?
Wetlands play a very crucial role in storing and providing a source of nutrients to organisms in the surrounding environment. More information regarding nutrient control and water quality is available in the Water Quality Technical Report in Appendix M.

What is primary productivity?
Primary productivity is the production of organic compounds from carbon dioxide in the atmosphere or in the water. This is primarily accomplished by photosynthesis by plants and some types of microorganisms.

Basin D: An area of about 46 acres between Lawson Street and SR 169 that drains into the confluence of Mud Lake Creek and Ginder Creek and then to Rock Creek.

North Triangle: This area is about 54 acres in size. The southeasterly portion of the site ranges in elevation from 670 to 640 feet, and drains into a wetland and stream complex that traverses a steeply sloping area, infiltrating into groundwater in the lower flat portion of the site. Groundwater is presumed to flow to Ravensdale Creek to the north through a wetland complex along Cranberry Creek. See Exhibit 4-9 for a detailed overview of the existing drainage basin.

Note: In some water quality reports and correspondence regarding the Lawson Hills project area, a sixth basin, Basin E, is also discussed. Basin E is a small parcel that exists to the south of Basin C. It is not under consideration for development and is therefore not discussed in this EIS.

Jones Lake measures less than 20 acres and is characterized by relatively high concentrations of naturally occurring acidic organic materials. The majority of the lake shoreline is undeveloped and surrounded by a mature coniferous forest. The majority of the land draining to Jones Lake is relatively undeveloped. Exceptions include historical mining activities, low-density residential development in lower Lawson Creek and SR 169.

Jones Lake has moderate to high primary productivity with good to fair water quality, although temperatures reach as high as 25 degrees Celsius (77 degrees Fahrenheit) during summer. Only coho salmon are currently reported in Jones Lake. Despite relatively low direct use of the lake by fish species, it constitutes the headwaters of Rock Creek, a stream that provides valuable habitat for steelhead, cutthroat trout, and coho salmon. Consequently, the Jones Lake watershed provides process-intensive functions that are critical for fisheries downstream in Rock Creek and Lake Sawyer.
Exhibit 4-9
Existing Drainage Basins

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
**Mud Lake** is a former wetland that was dredged and mined for coal as part of the John Henry Mine. It is now a relatively deep 32-acre lake. The area is surrounded by highly disturbed soils and possesses little native vegetation. Additionally, the habitat quality of Mud Lake is unknown.

**Mud Lake Creek** is a roughly 3/4-mile long stream that originates in Mud Lake. The majority of Mud Lake Creek drainage is undeveloped but was previously disturbed by mining activity. Water temperature in the creek was measured at 15 degrees Celsius (59 degrees Fahrenheit). Primarily because of its small size, salmonids are not reported in Mud Lake Creek. Despite the relatively low direct use of the creek by salmonids, the creek provides low temperature water in the summer months to the Lake Sawyer/Rock Creek sub-watershed and to Ginder Creek, which is important to water quality of those fisheries.

**Ravensdale Creek** drains all water from the North Triangle. With the exception of the SR 169 crossing, the lower portion of the basin is relatively undisturbed. Extensive wetlands (both forested and emergent) flank this portion of Ravensdale Creek. Riparian canopy closure is good, and canopy closure appears to meet the 89 percent target required to maintain Class A water quality temperature standards.

Much of the watershed is part of the Lake Sawyer Regional Park, which was transferred to public ownership as part of the Black Diamond Area Open Space Agreement.

Water quality data indicates that Ravensdale Creek has excellent water quality with respect to moderately low hardness, low dissolved metals, and low total phosphorous concentrations. However, it is 303(d) listed for temperature. During all or portions of the year, Ravensdale Creek likely supports many of the fish species found in Lake Sawyer.

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**How will a 303(d) listing affect the alternatives?**

Section 303(d) of the CWA requires states to develop a list of waters not meeting water quality standards or not supporting their designated uses. Ravensdale Creek’s 303(d) listing for temperature means that it has exceeded standards for temperature. Waters placed on the 303(d) list require preparation of a plan to limit pollutants. Because Ravensdale Creek is listed, it will likely receive more intense scrutiny for any activities that might result in further temperature exceedances.
2 What regulations apply to surface water quantity and quality?

Surface water quality is regulated at the federal, state, and local levels. From a regulatory standpoint, most water quality issues are regulated under the umbrella of the Clean Water Act (CWA). The National Pollutant Discharge Elimination System (NPDES) is a federally mandated program enacted in accordance with the CWA with the goal of regulating point source discharges. The NPDES program sets limits on the amount of pollutants that can be discharged into receiving water bodies.

The United States Environmental Protection Agency (EPA) is the federal agency charged with enforcing the CWA and the NPDES program. In the state of Washington, EPA has delegated the operation of the NPDES program to the Washington Department of Ecology (Ecology). The State of Washington has adopted rules based upon the CWA. These rules are largely covered under various chapters of Title 173 of the Washington Administrative Code (WAC).

In the State of Washington, water quantity resources are governed primarily under the authority of the Water Resources Act (WRA) of 1970. Section 173-509 of the WAC regulates water quantity for WRIA 09, which encompasses the Lawson Hills site, including current and future water rights. Moreover, WAC 173-509-040 dictates limits on withdrawals from specific streams/water bodies in WRIA 09.

3 What regulations apply to development near streams or other water bodies?

The State Shoreline Management Act (SMA) of 1971 regulates development activities in Lake Sawyer, which is the sole water body in Black Diamond regulated as a shoreline of the state. The City’s SAO regulates development and redevelopment activities that might impact water quality in streams, wetlands, and smaller lakes, through the use of buffer zones and specific development standards.
4 What stormwater regulations apply to runoff?

Stormwater runoff is regulated in accordance with the CWA and the NPDES program. In Washington, the Department of Ecology is responsible for stormwater regulations in accordance with Chapter 90.48 of the RCW.

As a city with a population less than 100,000, all stormwater-related activities are regulated under the Black Diamond’s Western Washington NPDES Phase II Permit (Phase II Permit). Among other requirements, the Phase II Permit requires the City to have programs that directly deal with operation and maintenance of existing stormwater collection, treatment, and discharge systems; pollution prevention from sites of development, redevelopment, commercial, industrial, residential, and municipal activities; and an Illicit Discharge Detection and Elimination (IDDE) program to identify, isolate, and terminate illicit discharges to the City’s storm sewer.

Additionally, for site disturbances of more than 1 acre, or for sites smaller than 1 acre which are part of a larger common plan of development, a Construction Stormwater General Permit must be obtained from Ecology. The Construction Stormwater General Permit details specifically what the permittee must do to prevent and mitigate water quality impacts due to construction activities.

5 What are some considerations to be made for managing stormwater at the Lawson Hills site?

There are two components of a stormwater management program – flow management and water quality treatment. Flow management refers to limiting the frequency and duration of a development’s stormwater discharges to the levels occurring prior to development. *Peak Standard* flow management seeks to maintain the volume of peak discharges at their predevelopment levels. *Duration Standard* flow management seeks to maintain the length of time that a variety of peak discharges occur.
In managing water quality, a variety of treatment facilities are used to remove pollutants from stormwater prior to the stormwater entering a water body. These pollutants include sand, silt, and other suspended solids; metals such as copper, lead, and zinc; nutrients (for example, nitrogen and phosphorous); certain bacteria and viruses; and organics such as petroleum hydrocarbons and pesticides.

Methods of pollutant removal include sedimentation/settling, filtration, plant uptake, ion exchange, adsorption, and bacterial decomposition. Floatable pollutants such as oil, debris, and scum are usually removed from the stormwater through the use of separator structures, devices which trap floatable pollutants and discharge clean water.

Different types of facilities are required to address different water quality issues. The initial step in choosing a stormwater quality treatment approach is to determine the water quality requirements of the receiving water bodies. Receiving waters in the Lake Sawyer system require “phosphorus treatment,” and in some basins “enhanced treatment,” because of the sensitivity of Lake Sawyer and other water bodies to nutrients and eutrophication (see the Stormwater section in Chapter 3 of this EIS for more information on stormwater treatment facilities).

6 How would the alternatives affect surface water resources?

In order to understand how the alternatives would affect surface water resources, it is important to understand how development in general affects the hydrologic cycle.

All of the alternatives will bring about replacement of natural vegetation with impervious surfaces and landscaping, and as a result, the alternatives will change the natural patterns of water movement (known as the hydrologic cycle). As shown in Exhibit 4-10, the replacement of natural vegetation with roads, parking lots, buildings, and turf and ornamental plants can result in dramatic increases in the amount of surface water runoff. Because the alternatives differ in amount and placement of development, the extent to which increased runoff impacts the hydrologic cycle varies.

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**What is eutrophication?**

Eutrification is a term that refers to the addition of nutrients to a water body. Although eutrophication can be a natural process, water pollution can greatly exacerbate and speed up this process. Eutrophication can lead to massive algae blooms in lakes and fish kills.
Exhibit 4-10
Overview of the Hydrologic Cycle in Predeveloped and Developed Conditions

Where can I find more information about soils?
A detailed description of soil types found in the Black Diamond area is located at the beginning of this chapter under the Earth section.
sedimentation, all of which can impact the ability of a creek or stream to support fish and wildlife. Studies have shown that there are two development thresholds that, once reached, usually result in noticeable impacts on the biological health of streams: approximately 10 percent of the sub-basin is covered in impervious surface; or when the amount of forested cover drops below 65 percent.

Development can also result in reduced water volumes within these creeks and streams and increased water temperatures.

**Displacement of Flows**

When a system of pipes and detention facilities is used to manage stormwater in place of infiltration, stream sections above detention facilities tend to dry up while downstream sections experience increased water flows. In addition, alterations in hydrology from flow displacement can substantially affect wetlands.

**Peak Flows and Geomorphic Instability**

Even when complying with the *Stormwater Management Manual*’s peak and duration stormwater management standards, runoff is likely to increase, resulting in adverse impacts on receiving streams. This is because the total volume of runoff will increase when vegetation is replaced by development, and this larger volume of water cannot be stored as long as runoff was stored under predevelopment conditions. However, duration standards will be established in order to keep the increased stormwater volumes and decreased retention duration from negatively impacting creeks and streams. These duration standards will be accomplished through the use of stormwater detention ponds and in accordance with the stormwater treatment methods outlined in the various alternatives in this EIS. Typically a rate of about 50 percent of the predevelopment 2-year storm flow discharge is used for planning stormwater facilities.

A qualitative evaluation of existing stream conditions in the study area led to a conclusion that most of the stream sections appear stable. The evaluation also looked at stream power,
which is a function of flow and gradient and provides information regarding thresholds for erosion potential. The methodology, modeling results, and qualitative assessment used in the evaluation did not analyze changes to duration of stream flow. Final design of storm ponds will have to consider flow duration as required by the 2005 *Ecology Stormwater Manual*. This is critical for streams like Lawson Creek with higher gradient sections where longer flow durations may result in increased bed movements.

**Low Flows**

Decreases in stormwater infiltration would likely lead to decreased summer water flows in local streams. The greatest potential impact is on Lawson Creek that passes through the Main Property. Lawson Creek currently dries up in the summer. The development of a piped stormwater management system may result in drying of the stream earlier in the season.

The study area represents about 15 percent of Jones Lake’s watershed. Reductions in infiltration may have adverse impacts on Jones Lake, especially when associated with temperature increases. In addition, the study area represents about 28 percent of Mud Lake Creek watershed, and the low summer temperatures in Mud Lake Creek indicate a substantial amount of groundwater entering the stream. However, as the watershed basin has already been altered, it is difficult to predict what affect a loss of groundwater will have on Mud Lake Creek and its receiving water bodies.

**Temperature**

Development impacts on the hydrologic cycle may result in significant increases in the temperature of water discharged by streams in the summer, when receiving waters are most temperature sensitive. Pavement absorbs large amounts of solar radiation, particularly in the summer, and can be heated to temperatures in excess of 60 degrees Celsius (140 degrees Fahrenheit). Removal of shade and decreased evapotranspiration due to reductions in vegetation contribute substantially towards elevated temperatures of roadways, sidewalks, and other surfaces. During a storm event, runoff

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**What is evapotranspiration?**

Evapotranspiration is a term that refers to water loss from an area due to the cumulative effects of both evaporation and transpiration by plants. Transpiration is the loss of water by plants as water vapor as part of their natural metabolic processes.
flowing over heated pavement can absorb this heat, raising the temperatures of the receiving water bodies.

Recent studies have confirmed that conventional stormwater detention ponds can significantly increase the temperatures of streams (due to solar heating) if stormwater is discharged directly into them, especially for streams at full capacity or those experiencing back-to-back storms. The use of open detention ponds with large surface areas presents the greatest risk of increased temperature, as water within these ponds can also gain heat from solar heating.

The potential for higher temperature discharges to Jones Lake in the summer months could further degrade this system which already has high summer water temperatures. Increased water temperatures in Jones Lake could adversely affect the downstream Rock Creek stream/wetland system, and possibly to Lake Sawyer, depending on the cumulative effects of urban runoff from other sources.

Discharging higher temperature waters into Mud Lake Creek, which currently has low summer temperatures, could substantially elevate temperatures in this stream and in the receiving waters of Ginder Creek and the Rock Creek Stream/wetland system.

A study by A.C. Kindig and Company (see Appendix M) in Sammamish, Washington, showed that in the hottest months, July to September, the natural process of evaporation prevented stormwater discharges from occurring. Based on this study, the potential for high temperature discharges to receiving streams may be lower than in other regions given Western Washington’s climate. However, the City or applicant may want to perform limited temperature analyses post-construction if it is noted that stormwater discharges are occurring during periods of warm weather.
Water Quality
Transitioning from a natural hydrologic cycle to one dominated by urban runoff increases potential for bacterial and chemical pollutants entering water bodies. In natural environments, pollutant discharges to storm water are minimal. Additionally, pollutant levels in stormwater are naturally filtered through vegetation and infiltration into soils. With urbanization, impervious surfaces replace vegetation, disrupting this natural filtration system and increasing bacterial and chemical pollutant concentrations in stormwater runoff.

The major sources of bacterial contamination are residential pets and wildlife that deposit feces on lawns and impervious surfaces that are then washed into the stormwater system by storms. Fecal bacteria densities generally increase with greater housing density, increased impervious surfaces, and domestic animal density.

Chemicals of concern include heavy metals such as lead, zinc, and copper, which are largely deposited on road surfaces as a result of vehicle use where they then enter the stormwater management system. Lead is largely in the form of particulates and results from wear of moving vehicle parts. Copper results from wear from brakes, alternators, and radiators and is extremely toxic to aquatic life. Zinc results largely from tire wear. Lesser amounts of zinc originate from brake linings and exhaust emissions, as well as from galvanized metal in structures.

Oil and grease in urban stormwater are largely from automotive spills and leaks; including lubricants, antifreeze, and hydraulic fluids; and can leach out of asphalt road surfaces.

Nutrients of concern in stormwater consist largely of nitrogen and phosphorus and often originate from fertilizers used on lawn and landscaping, and from exterior use of detergents. Nitrogen and phosphorus can also enter waterbodies from erosion during construction and from bed movement in streams. Lake Sawyer currently has a 303(d) listing for phosphorus, based on past water quality problems. Jones Lake is not currently listed, but is a likely candidate for potential eutrophication from increased inputs of nutrients as the watershed transitions from primarily undeveloped land.
The existing forested land cover in the Main Property and North Triangle likely has little or no discharge of pollutants. With regard to phosphorous in particular, measurements taken at Lawson Creek in 2007 during a storm measured 0.030 mg/L and during one baseflow event measured 0.014 mg/L, for an average of 0.022 mg/L of total phosphorous. To see what effects development may have on phosphorous concentrations at the Lawson Hills site, this phosphorous measurement in an “undeveloped” state is compared in Exhibit 4-11 to some phosphorous measurements taken in urbanized areas.

### Exhibit 4-11
Comparison of Undeveloped Lawson Creek Phosphorous Concentrations to Various Urban Watersheds

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Development Status</th>
<th>Total Phosphorous (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawson Creek</td>
<td>Undeveloped</td>
<td>0.022</td>
</tr>
<tr>
<td>Lakemont, Bellevue, WA</td>
<td>Urban</td>
<td>0.14</td>
</tr>
<tr>
<td>Lake Garrett, White Center, WA</td>
<td>Urban</td>
<td>0.13</td>
</tr>
<tr>
<td>Seattle Urban Watersheds</td>
<td>Urban</td>
<td>0.14–1.62</td>
</tr>
<tr>
<td>EPA – Various</td>
<td>Urban</td>
<td>0.3–300</td>
</tr>
</tbody>
</table>

*Note: Above developments were prior to 2005 Ecology manual.*

Based on the above examples, the increase in phosphorus in urban runoff may be several times greater than that of previously forested conditions. Specific to this site, quantified analysis indicates that total phosphorous concentrations could increase in Lawson Creek by a factor of 1.3 to 2.0 under treated conditions. Additionally, these measurements do not include phosphorus bound to sediments which may reenter the water column at a later date; this mechanism is especially pertinent in low oxygen environments such as Jones Lake. The combined impact of phosphorus in runoff and phosphorus bound to sediments may contribute substantially to the risk of eutrophication of receiving waters.
7 How do the alternatives compare in terms of stormwater impacts?

**Alternative 1**
Development under Alternative 1 is assumed to occur in conformance with the *Stormwater Management Manual*, and would meet detention and water quality treatment requirements. It would not have a specific requirement for open space or retention of native vegetation and therefore would not have the benefits to maintaining natural hydrologic cycle processes dominated by evaporation, evapotranspiration, and infiltration. The City’s SAO would preserve wetlands and streams.

Calculations based on land use show that Alternative 1 would result in more impervious surface creation than Alternative 2 (140 acres versus 131 acres, respectively). Alternative 1 would also replace more native forest with lawns and ornamental vegetation further reducing evaporation, evapotranspiration, and infiltration. With more impervious surface, less water would be available for groundwater recharge.

The development of multiple smaller detention/treatment facilities under Alternative 1 may result in less displacement of water flows since there would be multiple points of discharge to surface water. Stream scouring and erosion from greater duration of flows and water quality impacts likely would be similar to Alternative 2.

**Alternative 2**
This Alternative differs from Alternative 1 primarily in:

- Commercial development in the North Triangle and Main Property
- Higher density residential development
- Mixed use development

The preservation of open space under Alternative 2 would tend to preserve the natural hydrologic cycle to the extent where portions of the site remain native forest. While all of the alternatives retain approximately 102 acres of native vegetation...
in the form of sensitive areas and their buffers, Alternative 2 provides an additional 36 acres of open space. Some of this open space will likely be forested and may add additional hydrological benefits.

The greatest potential impact of Alternative 2 is on Ravensdale Creek from the North Triangle, where the majority of the site would be developed in commercial use with a high proportion of impervious surface. Depending on the type and location of stormwater facilities placed at the North Triangle, hydrology could be affected in multiple ways.

If discharge of stormwater is routed through the wetlands on the southerly upland portion of the North Triangle, this would cause a substantial change in the wetlands’ hydroperiods. The small stream that feeds the wetlands runs through a deeply incised ravine, and would likely be adversely affected by scour from increased flows. If all runoff were routed to infiltration facilities in the lower portion of the site, the wetlands in the upper area likely would be adversely affected by reduction in recharge. Ravensdale Creek would then be impacted by receiving recharge of a greater amount of water than exists at present.

In addition, an infiltration system could inject water at a faster rate and store less water for summer low flows than the dispersed interflow that would occur under natural conditions. This may affect low water-table periods in the summer for wetlands near the North Triangle. However, overall impacts on Ravensdale Creek likely would be small given the small proportion of the overall watershed and contributory flow represented by the North Triangle.

For Alternative 2, stormwater is currently proposed to be infiltrated in the lower portion of the North Triangle. These infiltration facilities will need to be designed adequately to protect the hydrology of both Ravensdale Creek and the wetland systems in the North Triangle.

Impacts to the Lawson Creek drainage basin would be similar under Alternatives 1 and 2.
Alternative 2 calls for medium- and high-density residential with small amounts of open space in the portions of the Main Property that drain to Jones Lake Creek, and are located on a steep slope above the creek. Development in this area is likely to have greater impacts on water resources than low density residential development which would occur under Alternative 1.

The lack of a clear surface water connection to Jones Lake Creek may result in substantial erosion if measures such as level spreaders on moderate slopes are employed. Level spreaders are subject to frequent design failures. Even if the level spreader functions as designed, concentrated discharge is often generated at the spreader’s low point. In addition, topographic conditions downslope also can result in concentration into gullies and other low-lying areas. Such concentrated flow usually results in severe erosion downslope of the discharge. This not only results in damage to areas adjacent to level spreaders, but it can lead to sediment deposition and related damage to aquatic habitat farther downstream.

Alternative 2 will likely have greater impacts to Mud Lake Creek than Alternative 1, because the open space that drains to the lake will largely be devoted to schools or is at the bottom of the slope near SR 169. The additional impervious surfaces from mixed-use, the presence of large buildings like schools, and the presence of large turf areas likely will increase both runoff volumes and adverse water quality. Additionally, because Alternative 2 proposes the use of large stormwater ponds, special consideration should be given to temperature elevation in these ponds due to solar heating and the potential impacts to Mud Lake Creek, which currently maintains relatively cool ambient water conditions during the summer months. Post-construction monitoring, as previously discussed, could be performed.
Alternative 3
Alternative 3 represents a mitigated version of Alternative 2 and therefore concentrates development away from sensitive areas and would also incorporate low impact techniques.

Potential impacts to Ravensdale Creek would be less in Alternative 3 given that there will be 15 less acres of commercial/office use. Additionally, overall impacts from new impervious surface would be less for Alternative 3 because it would create approximately 90 acres of impervious surface versus approximately 130 acres in Alternative 2. Alternative 3 also will include 186 acres of total open space, providing significantly more opportunities than the other alternatives for mitigating some of the hydrological changes resulting from development of the project area.

Alternative 4
Alternative 4 is similar to Alternatives 2 and 3 and was not further studied in this section.

8 What measures may reduce the effects of the alternatives on surface water resources?

There are several general strategies available to reduce or mitigate the effects of urbanization on surface water resources:

- Preserving natural hydrologic functions to the extent possible;
- Providing facilities that mimic or enhance natural hydrologic functions of evapotranspiration and infiltration; and
- Providing for stormwater detention and treatment.

All of these strategies can be applied to stormwater management and are often known collectively as Low Impact Development (LID) or are outcomes of using LID best management practices.
Preserving Natural Hydrologic Functions
Preserving native forest vegetation and soils intact is the most effective means of preserving natural hydrologic functions. In general, surface hydrologic functions continue to operate well when 65 percent of native vegetation and soils are retained. However, the affects of development on hydrologic function will vary by soil type, underlying geology, topography, and placement in the watershed.

In Alternatives 2 and 3, it is estimated that native vegetation will be preserved in three basic areas: along the high mine hazard area parallel to and about 800 feet west of Lawson Street, along the Lawson Creek wetland complex through the central part of the site, and in the Section 12 mine reclamation area at the north end of the site (proposed for a school site). In order to most effectively preserve native open space for hydrologic functions, the areas preserved should:

- Be located on soils and topography best suited to infiltration;
- Be characterized by dense native vegetation; and
- Be located in the headwaters of streams or in conjunction with other natural features such as wetlands that provide year-round water sources to streams.

The most beneficial areas for vegetation retention are the moderately sloped areas along Lawson Road, the relatively flat area along the Lawson Creek Wetland Complex, and the wetland complex along the Jones Lake tributary in the easterly portion of the site. In Alternative 2, these areas are partially in proposed open space and are partially designated for intensive mixed-use and residential development.

The most effective means of preserving native vegetation would be to more tightly cluster development to provide the same number of units in a smaller area, or as proposed in Alternative 3, construct less dwelling units thereby creating a smaller footprint of developed area. In addition, native vegetation can be preserved by fitting infrastructure and buildings to the site through methods such as stepping building
foundations and foregoing the creation of flat yard areas on sloping sites. In residential areas, reducing driveway lengths through shallow lot frontages and reducing road widths and turnaround areas can also help preserve vegetation and soils.

**Mimicking or Enhancing Natural Hydrologic Functions**

Facilities that mimic or enhance natural hydrologic functions of evapotranspiration and infiltration are collectively included in LID techniques. There are several options for mimicking or enhancing natural hydrologic functions. One method is to increase the retention time of water in soils resulting in greater potential for infiltration. This can be accomplished by amending soils with compost in lawns, parks, greenbelts, and parking strips. This decreases runoff by increasing the potential for on-site infiltration and evapotranspiration.

Another option is utilizing roof runoff as a source of flow. Roof runoff has lower concentrations of pollutants and can be diverted to adjacent native vegetation or amended soils in both residential and commercial developments, thereby reducing the size of stormwater detention ponds and treatment facilities.

Various facilities are available to provide concentration of runoff in areas with deep soils, or connections to suitable soils for infiltration, or to store water during rainy periods to allow evaporation during warm periods. Typical facilities include bio-retention swales along streets and in parking areas, and small rain gardens on or adjacent to residential lots. Though bio-retention facilities are of limited effectiveness in late winter when all soils are saturated, they can be very beneficial for summer and autumn discharge and can be used to address temperature concerns related to stormwater runoff.

Vegetated roofs (green roofs) are another option that fulfills the function of retaining water and increasing loss by evaporation and evapotranspiration. They do not, however, facilitate infiltration and are among the most costly options.
Finally, storage of runoff in small tanks on parcels can be used for irrigation in warm weather and larger detention facilities can be designed to provide metered release to infiltration facilities, as well as to streams and other water bodies. However, it should be noted that, except for the North Triangle, the soils on Lawson are very dense, underlain by bedrock, and do not infiltrate.

**Stormwater Detention and Treatment**

Stormwater detention and treatment is an essential element in dense urban developments where the natural hydrologic cycle cannot be maintained. The key to well functioning detention and treatment systems are appropriate design goals, and effective management, including adaptive management. As it pertains to the *Stormwater Management Manual*, the design goal is matching pre-existing forested conditions to the extent possible. Methods that can help detention facilities achieve this goal include:

- **Design to accommodate large storm events**: In addition to managing the duration of flow generated by the average storm event, detention facilities can be designed to accommodate storms that substantially exceed average conditions.

- **Dispersed or multiple discharges**: This may better mimic natural conditions by discharging stormwater into numerous headwaters versus a large point discharge at an outfall. This approach may require multiple detention facilities that generally have a higher development and maintenance cost.

- **Groundwater recharge**: Stormwater discharged into a groundwater system can provide benefits, such as reductions in stormwater temperature, before the water enters surface water bodies.

The initial step in designing a water quality treatment approach is determining the requirements of the receiving waters. Equally important is to select a treatment system based on meeting the requirements over a long period, and if necessary, one that is susceptible to retrofitting if monitoring shows the
treatment methods are not meeting standards. Though important, adaptive management is difficult because the land area and monetary resources needed to modify facilities often are not available until years in the future after development is completed.

Design concepts that can help reduce specific impacts of the alternatives are described below:

- Displacement of Flows;
- Peak Flows and Geomorphic Instability;
- Low Flows;
- Temperature; and
- Water Quality.

**Displacement of Flows**
Routing drainage through a piped system to a large downstream detention facility bypasses, and therefore dries up, streams and wetlands above those systems. This problem can be addressed by building multiple smaller systems with several discharges that more closely mimic natural hydrologic conditions. This strategy can be implemented in conjunction with LID measures that emphasize infiltration and groundwater input prior to detention, as well as infiltration from the detention facilities. Though this approach may not be appropriate for higher elevation portions of the Main Property, appropriate sites are available adjacent to the Lawson Creek wetlands and Jones Lake tributaries. Alternative 2 is currently proposed to discharge a portion of stormwater from Basin A directly to Lawson Creek and to pipe the remaining portion around the upper reaches of Lawson Creek to discharge it equally to the lower reaches of Lawson Creek and to Jones Lake Creek. This could help to alleviate flow displacement and, if used in conjunction with other LID techniques as proposed for Alternative 3, will accomplish much to mitigate the alteration of the area’s existing hydrology.
Peak Flows and Geomorphic Instability
The impacts of high volume and long duration stormwater events on receiving streams can be minimized by piping peak runoff to receiving waters that are less sensitive. Ideally, such a strategy would be implemented with dispersed facilities designed to discharge low flows into a variety of infiltration systems and streams.

Low Flows
Infiltration systems used in place of detention facilities, as well as detention facilities that allow for infiltration, limit the tendency of development to reduce summertime stream flows.

Temperature
A variety of methods can be used to reduce the temperature of stormwater runoff, including landscaping and shading of parking areas and streets, employment of infiltration faculties ranging from pervious pavement to biofiltration swales, providing smaller detention ponds with tree shading, providing detention vaults for areas of extensive pavement, and infiltrating runoff both before and after detention. These techniques should especially be considered for stormwater facilities if it is found that stormwater discharges with elevated water temperatures are occurring at the project site post-construction.

Water Quality
Water quality impacts of nutrients can be most effectively addressed by using native plant species in landscaping and/or limiting the use of fertilizers and other chemicals that can become concentrated in runoff. LID practices that infiltrate nutrients into soil encourage uptake of these nutrients by plants and can result in reduction through natural soil processes. For water treatment facilities, proper design and maintenance are essential, as well as adaptive management, to ensure that water quality deficiencies can be identified and corrected. These methods bear special consideration for stormwater discharges to existing eutrophied water bodies like Jones Lake.
Groundwater Resources

1 What groundwater resources are present in the study area?

Two groundwater flow systems are present in the area. The first system is a shallow flow system. It sets atop bedrock and flows through overlying glacially derived materials, generally following the topography of the land surface. This system discharges to Lawson Creek and nearby wetlands and springs. The second groundwater flow system is located within deeper coal seams, underground mines, and fractured bedrock. Infiltration of water into the mines recharges the deeper groundwater flow system. The deeper system discharges at the Lawson Mine drainage spring which is located to the south of the study area. Water from the spring creates a channel that discharges to Jones Lake Creek which flows west to Jones Lake.

2 What policies and regulations apply to groundwater quantity or quality?

At the Federal level, groundwater quality is protected by the Safe Drinking Water Act (SDWA). In the State of Washington, groundwater quality standards have been promulgated from the SDWA and are codified in Chapter 173-200 WAC. The groundwater quality standards set maximum contaminant levels (MCLs) for primary and secondary contaminants for a wide-range of organic, synthetic, mineral, metallic, and radionuclide compounds.

Water rights for the State of Washington are covered under Chapter 173-152 WAC. Rules regarding protection of withdrawal facilities associated with groundwater rights are codified in Chapter 173-150 WAC. Water Conservancy Boards have been established in Washington to deal with water rights issues. These Boards are operated in accordance with Chapter 173-153 WAC. Rules for protection of groundwater in upper aquifer zones, which are primarily used for domestic water sources and light agricultural uses, are found in Chapter 173-154 WAC. Finally, requirements for measuring and reporting the amount of water used in conjunction with allotted water rights are found in Chapter 173-173 WAC.
3 How would groundwater resources be affected by the alternatives?

Any increases in impermeable surfaces (for example, roads, sidewalks, and buildings) will increase runoff from the area and cause a decrease in infiltration and groundwater recharge. All four alternatives involve development in the Lawson Hills area, and, unless mitigated, will increase net surface runoff and decrease groundwater recharge.

Alternative 1
Alternative 1 includes assumes development of approximately 269 acres of the 371 acre study area by 2025. Because development would occur on individual properties over time, it is not known what the ultimate composition of the buildable land would look like with regard to impervious surfaces created. Therefore, a quantitative calculation of impacts to groundwater recharge is not possible. However, it is possible to make a qualitative assumption regarding groundwater resource impacts.

Given that most of the Lawson Hills study area is currently undeveloped, the development of the Main and North Triangle properties represents a large increase in impervious surface creation and will impact recharge of groundwater resources. As discussed in the Surface Water section, calculations based on land use show that Alternative 1 would create more impervious surface than Alternative 2 (140 acres versus 131 acres, respectively). Since Alternative 1 does not include an open space provision, build out of the study area in accordance with this alternative would likely have greater impacts to the existing hydrological cycle and groundwater flows.

With regard to potential water quality impacts from residential use, the use of fertilizer, pesticides, herbicides, and vehicle parking have the potential to negatively impact groundwater. These impacts can be reduced through on-site stormwater facilities and homeowner best management practices.
**Alternative 2**

Alternative 2 includes a mix of residential, retail/commercial, office, educational, recreational, and open space uses. This represents a combined development of 233 acres. As discussed in the Surface Water section, the provision of open space in Alternative 2 would preserve much of the existing hydrological cycle in areas that remain forested and would therefore have less impact on groundwater.

The greatest potential for impact to groundwater is in the North Triangle, where the majority of the site will be commercial in nature. Currently, stormwater from the North Triangle flows to the northwest and infiltrates in outwash soils in the northwest corner. If this infiltration is reduced by development, impacts to groundwater and to Ravensdale Creek will occur. Additionally, the commercial nature of the proposed development includes potential impacts to stormwater from pollution due to automobile parking and from materials used in commercial activities. Treatment and infiltration as described in Appendix M, and in the MPD application, would mitigate these potential impacts.

Another potential source of impact to groundwater in the North Triangle is from the stormwater flows draining from the proposed North Connector. The North Connector will be built along the northwestern edge of the North Triangle. Roadways are potential sources of pollution due to automobile usage and the potential for spillage of hydrocarbons and other materials from vehicle accidents. Stormwater facilities will have to be utilized to limit the potential for impacts from these commercial and transportation activities.

Potential impacts to groundwater quality in the residential portions (the majority of the Main Property) of the Lawson Hills are likely to be similar to those in Alternative 1. However, some LID techniques are proposed that would mitigate for some of this impact. See Chapter 3 for a discussion of what stormwater facilities may be used in the Lawson Hills study area.
Alternative 3
Alternative 3 would result in fewer impacts than either Alternatives 1 and 2, representing a combined development of 185 acres. Alternative 3 will present more opportunities to preserve existing hydrological functions in areas that remain forested, resulting in less impact on groundwater than either Alternatives 1 or 2. The use of LID techniques will further mitigate impacts of development upon the existing hydrological cycle.

Alternative 4
Alternative 4 was created to represent a fiscally balanced scenario, and was not analyzed in detail for impacts to water resources.

4 What measures may reduce the effects on groundwater resources?

Measures to reduce the effects of the proposal on groundwater resources are very similar to those presented in the Surface Water section. A combination of LID technologies provides a good strategy for minimizing and mitigating the effects of development in the area. These include:

Preserving Natural Hydrologic Functions
The LID discussion in the Surface Water section for preserving natural hydrologic functions is entirely applicable to groundwater. Please see that section for details.

Mimicking or Enhancing Natural Hydrologic Functions
Facilities that mimic or enhance natural hydrologic functions of evapotranspiration and infiltration are collectively included in LID techniques.

Stormwater Detention and Treatment
Building multiple smaller detention systems with multiple discharges, using infiltration systems in place of detention facilities and using native species in landscaping will all reduce impacts.
Plants and Animals

Vegetation and Wetlands

1 What vegetation is presently found in the Lawson Hills properties?

Most of Lawson Hills and its surrounding lands were converted to managed forest plantations several decades ago, and some areas continue to be used for timber harvest today. Portions of the Main Property also contain small rural residential uses, including houses, outbuildings, and pasture areas.

The 1987 King County Wildlife Habitat profiles were used to classify and characterize the plant communities found in Lawson Hills. Habitat can be divided into a variety of units based on dominant plant communities and site conditions. Exhibit 4-12 contains a list of the habitat units currently found on the Lawson Hills properties.

Exhibit 4-12
Habitat Units Comprising Lawson Hills

<table>
<thead>
<tr>
<th>Habitat Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upland</td>
</tr>
<tr>
<td>Coniferous Forest (Fc)</td>
</tr>
<tr>
<td>Deciduous Forest (Fd and Fd-m)</td>
</tr>
<tr>
<td>Shrub/Sapling Forest Succession (Fs)</td>
</tr>
<tr>
<td>Lowland Grass/Forb</td>
</tr>
<tr>
<td>Stable Unmowed (Gu)</td>
</tr>
<tr>
<td>Residential Areas (R)</td>
</tr>
<tr>
<td>Wetlands/Aquatic Habitat</td>
</tr>
<tr>
<td>Forested Wetland (Fw)</td>
</tr>
<tr>
<td>Wet Meadow (Mw)</td>
</tr>
<tr>
<td>Open Water (Pw)</td>
</tr>
</tbody>
</table>

Where can I find more information about wetlands and habitat?
Appendices N and O include the Wetland Resources, Inc. (2008) studies of wetlands (Appendix O) and Plants and Animals (Appendix N) in Lawson Hills.
**Main Property**

The Main Property can be divided into two sections, Lower Lawson and Upper Lawson. Lower Lawson is also referred to as the Corridor, and lies between SR 169 and Lawson Street. Lower Lawson is comprised of a mix of forested and cleared areas, including a mosaic of deciduous forest and shrub sapling areas in the western portion, a medium-aged Douglas fir forest in the central/eastern portion, and a mix of pasture and residential lawns in the easternmost section (Exhibit 4-13).

Upper Lawson consists of three distinct zones: northern, middle, and southern. The northern zone is comprised of even-aged stands of Douglas fir forest. The middle zone contains residential and pasture areas, while the southern zone contains a much larger area of even-aged Douglas fir forests as well as a strip of mature, deciduous forest (Exhibit 4-14). The trees in both the northern and southern zones of Upper Lawson are primarily Douglas fir ranging in age from 20 to 35 years old.

**North Triangle**

The northwest portion of the North Triangle was clear cut at some point during the 1990s, while the southeast portion appears to have been clear cut between the late 1970s and early 1980s. Both portions appear to have been replanted with Douglas fir. A mix of shrubs and young Douglas fir saplings currently cover the northwest portion of the North Triangle. The southeast portion of the North Triangle is forested with an approximately 25- to 30-year-old stand of Douglas fir, with a sparse understory (Exhibit 4-15). Forested wetlands also occur in the southeastern portion of the North Triangle.

The vegetation cover type in the vicinity of Lawson Hills is mapped as Western Hemlock Zone. This vegetation zone historically covered much of Western Washington. Western hemlock, Douglas fir, and western red cedar typically dominate old-growth forests in the Puget Sound region. Nearly all of the Western Hemlock Zone, including the Lawson Hills site, has been altered by timber harvests.
Exhibit 4-13
Existing Vegetative Cover - Lower Lawson

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Exhibit 4-14
Existing Vegetative Cover - Upper Lawson

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Exhibit 4-15
Existing Vegetative Cover - North Triangle

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Special Habitat Features
Special habitat features are landscape elements that have unique value to wildlife, including, but not limited to, standing dead or partially dead trees (snags), downed woody debris, and edges between habitat types.

Snags provide many wildlife species with feeding, roosting, or nesting sites. Small snags are located throughout all of the forested habitat units in Lawson Hills. Many of the snags are small (less than 12 inches DBH) red alder in various stages of decay. The small section of medium to mature deciduous forest along the southern edge of Upper Lawson contains the largest-sized and greatest abundance of snags within the Lawson Hills site.

Downed woody debris includes downed logs, large fallen dead limbs, and stumps. Downed woody debris provides cover, foraging, and resting areas for many wildlife species. Downed woody debris is found throughout all of the forested habitat units on the Lawson Hills properties. The most significant concentration of woody debris is in the medium to mature deciduous forest located in the southern edge of Upper Lawson.

Edge habitats provide birds and mammals with a mix of cover and feeding opportunities. The most prominent edge habitats on the Lawson Hills properties occur where forested areas meet lowland grass/forb, wet meadow, and residential areas. This occurs in the eastern portion of Lower Lawson, as well as the western portion of Upper Lawson. Less distinct habitat edges occur where forests of different ages meet, between uplands and wetlands, and between lowland grass/forb and wet meadow areas. This occurs throughout all of the Lawson Hills properties.

Are any endangered, threatened, or state sensitive plant species presently found in the study area?

According to the Washington State Department of Natural Resources (DNR) Natural Heritage Program Database, there are no Federal or State listed endangered, threatened, or sensitive plant species known to exist on the Lawson Hills properties. In addition, no Federal or State listed endangered, threatened, or sensitive plant species were found during field surveys.
3 What wetlands and water bodies are present in the area?

The Lawson Hills study area contains 22 wetlands, two streams, and two small areas of open water.

The first on-site stream is Lawson Creek, which flows east to west across Upper Lawson. Lawson Creek is an intermittent stream that originates off-site to the east from a large, headwater wetland and flows west to approximately 5th Avenue, where it proceeds south through a short canyon reach before reaching the valley bottom near Jones Lake.

The second stream is referred to as stream “S1,” and is located in the southeast portion of the North Triangle. S1 is approximately 300 feet long and exists on the slope between the upper and lower terraces in the North Triangle. As Stream S1 reaches the lower terrace, all flow infiltrates into recessional outwash and ultimately provides baseflow to Ravensdale Creek.

The two small areas of open water are small ponds located in Upper Lawson. Both areas are constructed stormwater facilities from previous mining activities.

No vegetation is growing in the open water and both areas are surrounded by coniferous forest. The on-site wetlands range from 0.02 acre to 5.67 acres in size and cover a total of 16.78 acres within the study area. The North Triangle contains four wetlands, and the remaining 18 wetlands are found within the Main Property (Exhibit 4-16).
Exhibit 4-16
Wetlands

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
Off-site wetlands are mapped in the vicinity of both the Main Property and North Triangle. A large wetland is mapped at the base of the slope northwest of the North Triangle. A large wetland that is associated with Mud Lake Creek occurs north of the Main Property, across Lawson Road. Smaller wetlands are mapped on either side of Botts Drive between Mountain View Drive and SE 324th Place, and off-site to the north between the Lawson Hills properties (west of Lawson Road) and Mud Lake Creek. One of the onsite wetlands (Wetland F) continues off-site to the east of the Main Property.

Another large wetland complex located off-site is southwest of the Main Property, surrounding Jones Lake. Although this wetland complex is almost 1/2 mile from the Main Property, it is included for discussion in this section because Alternative 2 proposes to discharge stormwater to Jones Lake.

Jones Lake, which functions as the headwaters of Rock Creek, is characterized by good to fair water quality, and relatively high concentrations of acidic organic materials in solution. Jones Lake is a unique environment where the acidity of the water, in association with related wetlands, impedes the processes of bacterial breakdown that would otherwise recycle nutrients. Please see the surface water discussion in the preceding section for a detailed description of conditions at and around Jones Lake.

4 What policies and standards pertain to vegetation?

Section 19.10.200 of the City’s SAO pertains to wetlands and wetland buffers. The SAO defines which wetlands the City regulates, how wetlands shall be evaluated, and sets forth uses and activities that are allowed within wetlands and their buffers. The SAO also outlines requirements for mitigation should alterations or unavoidable adverse impacts to wetland functions and values occur as a result of a project.
In the State of Washington, the Department of Ecology also has authority over wetlands. State and local agencies also use the SEPA process to identify potential wetland related concerns early in the permitting process. At the federal level, the United States Army Corps of Engineers (ACOE) has been given the authority to regulate wetlands.

“No net loss” has been the key policy in wetlands protection at both the state and federal level. A no net loss policy is a principal by which agencies and governments strive to balance unavoidable losses of wetland functions and values with replacement of those functions and values on a project-by-project or watershed basis, so further reductions to resources can be prevented.

The City of Black Diamond’s Tree Preservation Ordinance recognizes the importance of vegetation and trees in particular, for the benefits provided to property values and to the environment. Trees stabilize soil and control water pollution, conserve energy, reduce stormwater runoff, improve air quality, provide habitat to wildlife, and preserve the forested character of the Pacific Northwest.

The City of Black Diamond’s Municipal Code, Chapter 15.28, also contains provisions relating to land clearing and grading. Under this chapter, any person seeking to grade, excavate, or clear any site of trees or vegetation within the City is required to first obtain a clearing permit. The intent of this process is to minimize adverse stormwater impacts, protect water quality, minimize habitat loss, protect environmentally sensitive areas, and prevent damage to persons and property.

5 How will the alternatives impact vegetation and wetlands?

Human activities can have both positive and negative effects on wetland functions and values. Human activities that may have negative effects on wetland functions and values include forestry, agriculture, and construction of utilities, in-water structures (dams, levees, and bank armoring and others), mining, road building, and urban development. Some human
activities have greater impacts than others and different activities affect wetland functions in different ways. Human activities with beneficial effects on wetlands include restoration, enhancement, dam removal, reconnection of wetlands to historical floodplains, and control of invasive species. Impacts can also be separated into direct and indirect impacts.

Many species depend on wetlands for food, shelter, and breeding sites. On a landscape scale, wetlands contribute to increased biodiversity both locally and regionally. Many wetland-dependent species, including turtles, amphibians, waterfowl, beaver and mink, need not only the wetland but also the adjacent upland to meet essential life needs. A wetland may be preserved, but if the adjacent upland buffer is lost, a component of the wetland’s function is lost.

Urbanization has the greatest impact on wetlands, and often results in wetland loss and in the loss of or alteration of wetland functions. Urbanization can result in sedimentation, increased nutrient loading, increased contaminant introduction, and fragmentation of habitat. Even limited urban development can increase surface water runoff to wetlands during rainfall events, thereby altering wetland hydroperiods. A summary of direct wetland impacts associated with each Alternative is presented below in Exhibit 4-17.

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**Exhibit 4-17**

**Wetlands – Summary of Impacts**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Acreage of Direct Wetland Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

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**What is a wetland hydroperiod?**

The hydroperiod of a wetland can be defined as the seasonal pattern of water levels in a wetland, and the duration, frequency and timing of flooding and soil saturation.
Alternative 1

Alternative 1 assumes that the Lawson Hills properties will develop consistent with current zoning. This type of development would be characterized by residential development occurring slowly and incrementally, and avoiding impacts to all regulated sensitive areas. In regard to wetlands and vegetation, Alternative 1 assumes that all wetlands and their standard (SAO-assigned) buffers within Lawson Hills will be preserved. Utilizing this assumption, there will be no direct impacts to wetlands or their buffers under Alternative 1.

Despite Alternative 1 involving no direct impacts to wetlands or their buffers, urbanization and development in general can still result in indirect impacts to wetlands. Water that previously sheet flowed into wetlands or recharged groundwater-fed wetlands is often captured and redirected to large stormwater ponds, affecting wetland hydroperiods.

The removal of trees and other vegetation around wetland buffers can also potentially expose wetlands and their buffer to direct sun or longer periods of light, affecting the vegetative species composition of the wetland. Changes to wetland hydroperiods can also affect the vegetative species utilizing a wetland, because some vegetative species can tolerate wetter conditions than others. Clearing and development around wetland buffers also has the potential to introduce non-native or invasive vegetative species.

The introduction of domesticated animals such as cats and dogs can also affect wetland vegetation, and animals like songbirds and small mammals that may utilize wetlands. Because individual landowners could potentially clear or disturb vegetation outside of buffers under this Alternative (because there is no coordinated open space concept), this Alternative may result in “patchier” fragments of retained vegetation and less continuous habitat corridors than Alternatives 2 and 3.

Under Alternative 1, it is also assumed that development would occur in accordance with the City’s tree preservation ordinance, and that some of the existing trees on the property would be retained on individual lots and in subdivision open and natural spaces.
**Alternative 2**

Alternative 2 involves permanent filling of approximately 1 acre of wetland. These wetland impacts are restricted to the Main Property. There are no direct wetland impacts proposed on the North Triangle. Filling is proposed for roads, home sites, and stormwater detention facilities. In addition, under Alternative 2 approximately 4 acres of regulated wetland buffer will be permanently impacted. Impacts to off-site buffers may occur from development on both the Main Property and the North Triangle.

Under Alternative 2, the majority of the wetland areas proposed for fill is relatively low functioning and geographically isolated from other wetlands. Nevertheless, these impacts will reduce the level to which the natural wetland system as a whole on this property can provide water quality and habitat functions. Small, isolated wetlands may be displaced in accordance with the standards outlined in the City’s SAO. Direct impacts to wetlands will require mitigation under the City’s codes, and a mitigation plan will be required to be submitted and approved prior to any disturbance taking place. Indirect wetland impacts as outlined above under Alternative 1 also have the potential to occur under Alternative 2.

With regard to wetland buffers, Wetlands K and F on the Main Property are designated as headwater wetlands in the City’s SAO. The MPD application submitted in support of Alternative 2 does not characterize these wetlands as headwater wetlands, and instead utilized the Washington State Rating System for Western Washington to calculate required buffers for these wetlands.

As designated headwater wetlands, under City codes these wetlands require 225-foot-wide buffers. The application materials assign a 110-foot buffer to wetland F and a 60-foot buffer to wetland K. The applicant will be required to provide justification in accordance with City codes and Best Available Science to support any request for reducing these wetland buffers. In addition, if a buffer averaging proposal is submitted for Alternative 2, the 4-acre impact area cited above may change, and such plan would need to be evaluated in accordance with City codes prior to approval.
Development under Alternative 2 will result in large tracts of contiguous, preserved open space (approximately 40 percent of the total MPD area). This pattern of development will result in less fragmented open space corridors than development under Alternative 1. However, the contiguous open space corridor proposed on the Main Property under Alternative 2 mainly follows the alignment of severe mine hazard areas. Wetlands and their buffers are adjacent to this corridor in some cases, but in general are located on other portions of the Main Property separate from the contiguous open space corridor.

On the North Triangle, proposed open space areas are concentrated along SR 169, which intersects with the on-site wetlands and their buffers at its south end. However, commercial uses are proposed between the majority of the wetland areas and the open space. Although the proposed open space under Alternative 2 is contained in a continuous corridor and will be preserved in its natural state, the location of the corridors in relationship to wetlands and their buffers appears to indicate they were not given primary consideration with locating the consolidated open space.

The application materials also indicate that the Applicant intends to seek relief from standards in the City’s tree preservation ordinance. It is stated that this is because the proposal preserves substantial areas in a natural state where no trees would be disturbed and because numerous trees will be planted within active open spaces, parks, and common areas within the project.

**Jones Lake and Wetland Complex**

As outlined above, the stormwater concept for Alternative 2 includes release to surface water bodies, one of which is Jones Lake. Approximately half of the stormwater from one of the proposed basins (Basin A) on the Main Property will be collected in a pond and conveyed to Jones Lake in a pipeline. The stormwater flow from the pipeline will be split into two along SR 169 just east of Jones Lake and half conveyed to Lawson Creek and half into Jones Lake Creek, which discharge immediately to Jones Lake.
Jones Lake has been characterized as having relatively high concentrations of naturally occurring acidic organic materials, including sphagnum peat. Sphagnum peatlands (bogs) act as a sponge, soaking up rainwater and allowing it to filter slowly through upper layers and therefore helping to regulate flood pulses. Peatlands also protect downstream lakes from excess nutrients by acting as sinks; conditions that increase the rate of decomposition of peat in these wetlands allows release of historical stores of nutrients resulting in eutrophication of downstream water bodies. King County has specific water quality treatment requirements for discharges to bogs contained within their Surface Water Design Manual.

As part of the development of Alternative 2, the Applicant investigated a portion of the Jones Lake wetland area with the purpose of determining whether the area met the criteria of a sphagnum bog system. The applicant’s investigation found very poorly drained organic soils that formed primarily in sedges versus sphagnum mosses, and that therefore the wetland complex did not meet the criteria of a sphagnum bog.

**Alternative 3**

Alternative 3 would also follow a Master Plan approach, but would include greater acreages of open space areas and more dense residential development clustered away from sensitive areas. In regard to wetlands and vegetation, Alternative 3 assumes that there will be no direct impacts to wetlands and their buffers. Impacts to vegetation would be less (in acres) than those anticipated under either Alternative 1 or 2 because Alternative 3 involves preservation of more acres in open space and clustering higher density development in smaller areas.

Indirect wetland impacts as outlined above under Alternatives 1 and 2 also have the potential to occur under Alternative 3. However, “proximity” impacts (impacts such as domestic animals and invasive vegetation, which occur because of the close proximity of development to the wetlands) are less likely to occur (or at lesser magnitude) under this Alternative because development will be clustered further away from sensitive areas. In addition, Alternative 3 involves employment of

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**What is a sphagnum bog?**

Sphagnum bogs are a type of wetland that accumulates acidic peat, which is a deposit of dead plant materials, in this case sphagnum moss. Bogs occur where the water at the ground surface is acidic, either from acidic ground water or where water is derived entirely from precipitation. Bogs can be challenging environments for other forms of plant life because they are low in nutrients and very acidic.
various Low Impact Development strategies, which are anticipated to further reduce the potential for indirect impacts to wetlands (primarily in regard to wetland hydroperiods).

**Alternative 4**

Alternative 4 would be similar to Alternatives 2 and 3, and was not further studied within this section.

Under all of the Alternatives, development would be subject to the City of Black Diamond’s Sensitive Areas Ordinance and Tree Preservation Ordinance, resulting in minimum restrictions on buildable area and buffer requirements that are consistent across the alternatives. However, landowners could seek permits to individually impact wetlands and buffers in the future under Alternative 1, the likelihood or results of which cannot be estimated at this time. Incremental future loss of wetlands and buffers under Alternatives 2 and 3 is not expected, because most of the wetlands and buffers will be protected within permanent open space areas under those Alternatives.

6 **What measures can reduce or avoid permanent impacts to vegetation and wetlands?**

In most parts of the United States, “sequencing” is a process that is conducted to ensure that permanent impacts to wetlands and other critical areas are avoided. The first step in applying this policy involves avoiding impacts. If impacts cannot be avoided, effects can be reduced by limiting the scope or size of a proposed action in order to minimize temporary or permanent impacts. Once impacts have been minimized to the extent possible, impacts that remain unavoidable can be allowed as long as the results of the impacts are mitigated.

Under Alternative 2, which is the only alternative involving direct impacts to wetlands and their buffers, impacts have largely been avoided by locating roads and development parcels outside of wetland and buffer areas wherever possible. When unavoidable impacts must occur, application materials state that a number of measures will be employed to minimize or limit them. Under Alternative 2, unavoidable direct impacts
will also be mitigated through the creation of new wetlands and enhancement of existing wetlands. Approximately 2 acres of new wetland will be created and 3 acres of existing wetland will be enhanced in and adjacent to wetlands M, J, and O on the Main Property. Approximately 4 acres of new wetland buffer area will be created to mitigate for unavoidable direct impacts to existing buffers.

In addition to evaluating direct wetland impacts in square feet or acres, mitigation typically focuses on replacing the functions and values of wetlands or wetland systems that may be impacted by a proposal. This approach strives to ensure the policy of “no net loss” is achieved. The specific objective of the mitigation plan for Alternative 2 is to replace the functions and values lost by direct wetland impacts, specifically wildlife habitat, flood control, and water quality functions. Three goals have been established to meet this objective:

1. Improve the overall level of wildlife habitat and wetland functions on the site;
2. Protect existing wildlife habitat; and
3. Reduce invasive species within the mitigation areas.

Because this approach requires knowledge of the unique functions and values that specific wetlands and systems provide, as well as detailed impacts associated with a particular proposal, implementation of this mitigation approach requires field-level knowledge of each specific wetland. For this reason, it is difficult to evaluate the mitigation proposals associated with Alternative 2 and compare it to other mitigation approaches. In general, the MPD pattern of development provides the opportunity to employ a system-wide or landscape level mitigation approach, which may be more successful than a parcel-by-parcel mitigation approach that could result from less coordinated patterns of development.
Other actions and measures exist to discourage or avoid permanent impacts to wetlands and vegetation. Some of these actions specifically aim to avoid impacts, such as restricting construction to the dry season to avoid erosion. Utilizing structural measures such as silt fences and temporary sediment ponds avoids discharging sediment into wetlands and other critical areas. “On the ground” protection measures such as wetland buffers, or root protection zones for significant trees, also serve to reduce or avoid permanent impacts to vegetation and wetlands. Indirect impacts can be discouraged or avoided generally by maintaining adequate buffers, clustering development away from critical areas, and utilizing low impact development approaches outlined in previous sections of this chapter to minimize hydrologic and hydroperiod effects.

**Jones Lake and Wetland Complex**

Hydrology is one of the most important physical factors of sphagnum peatlands that can be altered by human activities. Stable water tables are necessary for low seasonal water level fluctuation. If water levels fluctuate significantly, peat accumulation becomes impossible. Increases or decreases to weekly flow volumes at predevelopment conditions or annual flow volumes reaching peatlands should be avoided.

As outlined previously, the Applicant investigated a portion of the Jones Lake wetland area with the purpose of determining whether the area met the criteria of a sphagnum bog system. The applicant’s investigation found that the area investigated did not meet the criteria of a sphagnum bog. The remainder of the wetland complex should also be evaluated.

Estimated stormwater flow volumes should be modeled to determine if surface runoff will increase. If so, excess flows should be routed to areas downstream of any Sphagnum peatlands, if found to occur in the wetland complex around Jones Lake. In addition, modeling should be conducted to ensure that summer water levels are not decreased by more than 12 cm below base winter water levels. If greater drawdown is modeled, approaches to augment summer flows should be considered.
Fish and Wildlife

1 What fish species and aquatic habitat are present in Lawson Hills?

Fish have been observed in both Ginder and Lawson Creeks upstream to SR 169, but not beyond into Upper Ginder, Upper Lawson, or Mud Lake Creeks. Natural barriers in Lawson Creek and Mud Lake Creek, as well as various minor drainages, prevent anadromous fish migration upstream into Lawson Hills. Within Lawson Creek, the barriers consist of naturally formed vertical drops over hardpan or till features. Near river mile 0.1, there are half a dozen waterfalls with vertical drops ranging from 3 feet to over 7 feet in height.

No fish have been reported within the Main Property, and no fish were observed during surveys conducted in 2007 (Exhibit 4-18). This indicates that the area upstream of the anadromous fish barrier on Lawson Creek does not contain fish. This is supported by observations of a complete lack of flow some years in Lawson Creek, upstream of the barrier reach. Instream flows cease several times each year, including most of the summer and fall, which effectively prevents colonization or potential habitat used by fish.

Lawson Creek contains natural flows but is likely a highly modified stream channel. Riparian vegetation consists of a mix of native and exotic shrubs with a dense, young, mixed deciduous and coniferous forest tree canopy. Adjacent land use is currently forest. Fish habitat in Lawson Creek is of minimal quality.

While occasional patches of gravel are available, these patches are shallow and generally rest on hard silt, sandstone, or shale. Salmon and trout require freshwater stream gravels that are clean and lacking fine sediments for spawning. The creek includes few pools and has minimal amounts of large woody debris. Pools are areas of deeper, slower water that serve as important feeding and resting areas for fish. They are generally formed around bends in a stream, root wads in the water, or

Where is more information available on fish issues in Lawson Hills?
The complete fisheries report for this project, prepared by Cedarock Consultants in May 2008, can be found in Appendix P.

What is an anadromous fish?
Anadromous fishes are those that are born in freshwater, migrate into the ocean to spend all or part of their adult life in salt water, and return to their natal freshwater streams and rivers to spawn.
boulders. Large woody debris and root wads also create habitat complexity. Rapid rises and drops in instream flows often include no-flow or dry periods, even during the winter. This, coupled with natural fish barriers downstream, likely precludes fish use of the portion of Lawson Creek located on the Lawson Hills site.

In reference to the North Triangle, Stream S1 is isolated and does not connect with any other surface water body. The channel is intermittent and non-fish bearing, and does not influence water quality downstream. No surface water drains from the site to Ravensdale Creek, but water infiltrating into the outwash soils on the lower portion of the site (including flow from Stream S1) ultimately provides baseflow to Ravensdale Creek.

Only coho salmon (*Oncorhynchus kisutch*), steelhead, resident trout (*Oncorhynchus mykiss*) and cutthroat trout (*Oncorhynchus clarki*) are known to occur above the outlet of Lake Sawyer (Covington Creek) in Black Diamond. Coho salmon and cutthroat trout have been reported upstream as far as SR 169 in Ginder Creek and Jones Lake in Rock Creek. Steelhead move a mile or two past Lake Sawyer into Rock Creek but have not been reported as far upstream as coho or cutthroat. Coho and cutthroat trout have also been reported in Ravensdale Creek.

2 What wildlife species and habitat are present in Lawson Hills?

The Lawson Hills area includes habitats suitable for a diversity of wildlife species common to Puget Sound lowland second-growth forests, wetlands, and grass/forb areas. These habitats are relatively common in the region. A list of wildlife species expected to be present within Lawson Hills’ habitats is included in Exhibit 4-19. Species likely to be present on the Lawson Hills site would be expected in similar habitats in the Puget Sound lowlands.
Exhibit 4-18
Fish Presence / Absense Survey Reaches in Lawson Creek

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
The Natural Environment – Effects on Ecosystems and Natural Resources

Exhibit 4-19
Wildlife Species Likely to Use Habitats Within Lawson Hills

<table>
<thead>
<tr>
<th>Group of Wildlife</th>
<th>Species Likely to Inhabit Lawson Hills Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amphibians</strong></td>
<td>• Pacific tree frogs, northwestern salamander, long-toed salamander, pacific giant salamander, roughskin newt, ensatina, western redback salamander, western toad, red-legged frog, and bullfrog.</td>
</tr>
<tr>
<td><strong>Reptiles</strong></td>
<td>• Northern alligator lizard, western fence lizard, rubber boa, common garter snake, western terrestrial garter snake, northwestern garter snake, and painted turtle.</td>
</tr>
</tbody>
</table>
| **Birds**         | • Associated with Aquatic Habitats: American bittern, killdeer, common snipe, and great blue heron.  
|                   | • Raptors: Sharp-shinned, cooper’s, and red-tail hawk.  
|                   | • Owl: Barred owl, great horned owl, northern saw whet owl, northern pygmy owl, western screech owl, and barn owl.  
|                   | • Upland Game Bird Species: California quail, ruffed grouse, band-tailed pigeon, and mourning dove.  
|                   | • Woodpecker Species: Downy woodpecker, northern flicker, pileated woodpecker, hairy woodpecker, and red-breasted sapsucker.  
|                   | • Perching Birds/Songbirds: Steller’s jay, American crow, raven, black-capped chickadee, brown creeper, winter wren, golden-crowned kinglet, American robin, spotted towhee, song sparrow, dark eyed junco, red-breasted nuthatch, red-winged blackbird, Bewick’s wren, varied thrush, European starling, house finch, pacific slope flycatcher, common yellowthroat, Swainson’s thrush, evening grosbeak, western tanager, cedar waxwing, and American goldfinch. |
| **Mammals**       | • Marsupial: Virginia opossum.  
|                   | • Insectivores: Townsend’s mole, pacific mole, and shrew species.  
|                   | • Bat species.  
|                   | • Carnivore Species: Raccoon, black bear, coyote, bobcat, striped skunk, spotted skunk, ermine, long-tailed weasel, mink, and mountain lion.  
|                   | • Rodent Species: Mountain beaver, Douglas squirrel, eastern gray squirrel, deer mouse, vole species, Townsend’s chipmunk, pacific jumping mouse, Norway rat, and house mouse.  
|                   | • Rabbit Species: Eastern cottontails and snowshoe hares.  
|                   | • Hoofed Mammals: black tailed deer and elk. |

3 What Federally listed species or habitats occur in Lawson Hills?

Federally listed species are those species placed on the Federal list of endangered and threatened wildlife and plants. Plant or animal species listed on the Federal list are afforded protection under the Endangered Species Act (ESA). Habitat critical to the conservation of a species is also protected under the ESA. Two Federally listed Pacific salmon species are reported in the City of Black Diamond UGA: the Puget Sound Evolutionarily Significant Unit (ESU) of steelhead and the Puget Sound ESU of Chinook salmon. One additional listed fish species, the Coastal-Puget Sound bull trout Distinct Population Segment (DPS), is found in the area (in the Middle Green/Duwamish River sub watershed), but not within city limits. None of these Federally-listed fish species or designated critical habitat occurs within or adjacent to Lawson Hills.

What are an evolutionarily significant unit (ESU) and a Distinct Population Segment (DPS)?
An ESU or DPS is considered to be a “species” under the Endangered Species Act.
4 What State listed species or habitats occur in Lawson Hills?

Priority Habitats and Species (PHS) maps and information for the study area were obtained from the WDFW. WDFW defines a priority habitat as “a habitat type with unique or significant value to many species,” and priority species as “fish and wildlife species requiring protective measures and/or management guidelines to ensure their perpetuation.”

PHS maps illustrate the location of priority habitats and species on the Lawson Hills site and in the surrounding areas, per current WDFW records. Priority habitats found within the Lawson Hills site on PHS maps include several small wetland areas. WDFW PHS maps from 2005 do not indicate that any endangered, threatened, or sensitive amphibian, reptile, bird, or mammal species occur in the Lawson Hills study area or within a half mile of the project boundary.

WDFW designates additional species as “priority” for conservation and management beyond those listed as endangered, threatened, or sensitive. Additional priority designations include “Candidate,” “Monitor,” and “Game” species. State Candidate Species are those fish and wildlife species that will be reviewed by WDFW for possible listing as Endangered, Threatened, or Sensitive according to state law. State Monitor Species are species that are monitored for status and distribution. State Game Species include native and non-native wildlife species of recreational importance, commercial importance, or recognized species used for tribal ceremonial and subsistence purposes, which are vulnerable to habitat loss or degradation.

The Candidate, Monitor, and Game Species that could occur on the Lawson Hills properties are listed in Exhibit 4-20. Black-tailed deer and elk (State Game species) were detected during Wetland Resources, Inc. field surveys.
Exhibit 4-20
State Candidate, Monitor and Game Species Possibly Occurring Within Lawson Hills

<table>
<thead>
<tr>
<th>State Status</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidate (9 species)</td>
<td>Western toad, cascade frog, northern goshawk, golden eagle, merlin, Vaux's swift, pileated woodpecker, purple martin, and Townsend's big eared bat.</td>
</tr>
<tr>
<td>Monitor (5 species)</td>
<td>Osprey, great blue heron, black crowned night heron, western bluebird, and pacific water shrew.</td>
</tr>
<tr>
<td>Game (10 species)</td>
<td>Trumpeter swan, wood duck, common goldeneye, Barrow's goldeneye, bufflehead, hooded merganser, band-tailed pigeon, mink, elk, and black-tailed deer.</td>
</tr>
</tbody>
</table>

The North Triangle is forested and contains a variety of trails throughout. Large animals such as elk, deer, coyote, black bear, bobcat, and cougar use these trails as travel routes. The North Triangle also contains an old railroad grade in the western portion that runs north-south, which may serve as a travel corridor for these animals.

Lower Lawson contains a mixture of forest, wetland, meadow, pasture, and residential areas. A dirt road extends east-west across this area. Many elk tracks and trails have been detected on this road. This road serves as a travel corridor for elk, and is also likely used by deer and coyote.

Upper Lawson contains forests, wetlands, pasture, and residential areas. The majority of the site is forested, and it contains many small wetlands and a segment of Lawson Creek. Dirt roads and trails in this area are likely used by large animals such as elk, deer, coyote, black bear, bobcat, and cougar as travel routes. Lawson Creek is likely to provide a wildlife corridor for a variety of wildlife such as raccoon and mink that forage along riparian areas. Many elk tracks and trails were detected, traveling north-south, in the meadow area west of and adjacent to Botts Drive SE. This meadow serves as a travel corridor for elk and other species.
5 What policies and standards apply to fish and wildlife habitat in Black Diamond?

Policies and standards pertaining to fish and wildlife and their habitat exist at the local, state, and federal level. In Washington State, “fish and wildlife habitat conservation” is defined as land management for maintaining species in suitable habitats within their natural geographic distribution, so that isolated subpopulations are not created.

At the local level, cities and counties have the authority to regulate some habitats and species within their jurisdictions. In Black Diamond, the City regulates fish and wildlife conservation areas and wildlife corridors through the SAO.

The SAO defines which fish and wildlife conservation areas (FWCAs) the City regulates, how FWCAs shall be classified, what are appropriate buffer widths for FWCAs, and sets forth uses and activities that are allowed through various permitting processes within FWCAs and their buffers. The SAO also outlines requirements for mitigation for impacts to FWCAs.

At the state and federal level, various agencies are involved in managing fish and wildlife species and their habitat, and tasked with ensuring negative impacts to these resources are avoided. These agencies include WDFW, the United States Fish and Wildlife Service (USFWS), and the National Marine Fisheries Services (NMFS) branch of the National Oceanic and Atmospheric Administration (NOAA). Many of these agencies prepare management and recovery plans and habitat conservation plans for various species and habitat within their jurisdiction. In addition, the Muckleshoot Indian Tribe is a co-manager of fish and wildlife resources with the State of Washington and has treaty rights for these and other natural resources. Black Diamond is within the Tribe’s Usual and Accustomed Fishing Area.

Black Diamond SAO Fish and Wildlife Conservation Area (FWCA) Standards:

- The “Core” stream and wetland complex described previously is a regulated FWCA under the SAO.
- Other regulated FWCAs include areas within the City with which state or federally designated endangered, threatened, or sensitive species have a primary association.
- Buffers are established from the edge of streams, the size of which depends on the State Department of Natural Resources (DNR) water type classification for that stream, or if the stream is part of the Core complex.
- Buffers for FWCAs other than lakes and streams are based on the State’s PHS recommendations and are evaluated on a case-by-case basis.
- Wildlife corridors that have been designated to provide for migration to and from areas outside of the City and its UGA are provided in the Core complex.
- Unavoidable activities that adversely affect FWCAs and/or their buffers are required to be compensated for through mitigation.
6 How will the alternatives impact fish and wildlife and their habitat?

Puget Sound streams and rivers once flowed through dense forested areas in broad floodplains. These streams had natural flow cycles, excellent water quality, and varied types of vegetative cover. Today, healthy riparian areas are scarce or inadequate, and streams and rivers are frequently confined, controlled, or are realigned to accommodate agricultural or development activities. Human activities have had similar effects on lakes, nearshore habitats, and estuaries. The effects of human activities on aquatic habitats are summarized in Exhibit 4-21.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removing riparian vegetation</td>
<td>Reduced channel complexity, simplified channel morphology, increased stream velocities,</td>
</tr>
<tr>
<td></td>
<td>loss of pools for holding and rearing, loss of spawning gravel, loss of side channels,</td>
</tr>
<tr>
<td></td>
<td>loss of wood recruitment, loss of connectivity with floodplain and riparian zone,</td>
</tr>
<tr>
<td></td>
<td>reduced shade and cover, increased solar radiation, increased erosion and sedimentation,</td>
</tr>
<tr>
<td></td>
<td>elevated water temperatures, and reduced leaf litter</td>
</tr>
<tr>
<td>Introducing invasive non-native</td>
<td>Alters native riparian habitat functions including associated wildlife refuge, insect</td>
</tr>
<tr>
<td>vegetation</td>
<td>litter, replacement of coniferous shade-producing trees, etc.</td>
</tr>
<tr>
<td>Creating impervious surfaces, filling and draining of wetlands, and increasing water allocations</td>
<td>Altered flow regimes (timing and magnitude of flows), degraded water quality/increased stream temperatures, increased stormwater runoff, and altered in-stream habitat</td>
</tr>
<tr>
<td>Stream bank modifications</td>
<td>Loss of natural meander/habitat-forming processes, disconnected floodplains, and</td>
</tr>
<tr>
<td></td>
<td>subsequent loss of floodplain processes</td>
</tr>
<tr>
<td>Discharging sewage effluent</td>
<td>Degraded water quality, altered water temperatures, reduced dissolved oxygen (DO)</td>
</tr>
<tr>
<td></td>
<td>concentrations, and increased contaminant levels</td>
</tr>
<tr>
<td>Agricultural runoff</td>
<td>Degraded water quality including increased nitrogen and fecal coliform, and reduced DO</td>
</tr>
<tr>
<td></td>
<td>levels</td>
</tr>
<tr>
<td>Livestock access</td>
<td>Degraded water quality, loss of riparian vegetation, stream bank instability</td>
</tr>
<tr>
<td>Constructing culverts, pipes, and ditches</td>
<td>Obstructed upstream passage of fish and reduced the downstream movement of wood and</td>
</tr>
<tr>
<td></td>
<td>gravel</td>
</tr>
<tr>
<td>Construction activities</td>
<td>Increased erosion, turbidity, and inputs of fine sediment during construction and</td>
</tr>
<tr>
<td></td>
<td>prior to revegetation</td>
</tr>
<tr>
<td>Recreational activities</td>
<td>Degraded water quality and increased contact with listed species</td>
</tr>
</tbody>
</table>
In relation to wildlife and its habitat, major habitat-related features of urbanization include loss of vegetation; isolation or fragmentation of remaining vegetation patches; replacement of native vegetation with ornamental species; removal of snags and downed logs; an increase in the use of pesticides, insecticides, and herbicides; the presence of domestic dogs and cats as predators; and increased noise and other disturbance factors.

**Alternative 1**

Alternative 1 assumes that the Lawson Hills properties will develop consistent with current zoning. This type of development would be characterized by residential development occurring slowly and incrementally, and avoiding impacts to all regulated sensitive areas. The only regulated FWCAs under the City’s SAO in Lawson Hills are Lawson Creek and Stream S1.

In regard to fish, wildlife and habitat, Alternative 1 assumes that all FWCAs and their standard (SAO-assigned) buffers within Lawson Hills will be preserved. Utilizing this assumption, there will be no direct impacts to fish or riparian habitat under Alternative 1. Under this Alternative it is also assumed that there will be no stream crossings. Stormwater outfalls will likely be necessary and may involve some impact; however their locations and therefore associated impacts cannot be determined or quantified.

Despite Alternative 1 involving no direct impacts to streams or their buffers, human activities like urbanization and development can still result in indirect impacts to aquatic habitats of the type outlined in Exhibit 4-21.

In addition, under any large scale development scenario, there will be little suitable habitat left for most terrestrial wildlife species. Habitat that does remain will be fragmented, in most cases will offer limited accessibility, and will be of relatively low quality.
Habitat fragmentation caused by development, in combination with increased human use of active open spaces, will also affect animal movement patterns by causing animals to avoid areas of high human activity. Road crossings through retained areas of natural open space could create barriers for small mammals and some amphibians. Species that are sensitive to habitat changes will likely be eliminated from the properties. However, many species will continue to use remaining natural open space.

The risk for indirect impacts increases with human presence near wildlife and their habitat (proximity impacts). Such impacts can include increased noise and light, increases in introduced invasive vegetative and predator species such as dogs and cats, increased injury or mortality from collisions with vehicles, and impacts to predator or prey species. Some proximity impacts can be considered ecological, which includes alteration of the structure and/or vegetative makeup of wildlife habitat. Other impacts can be considered behavioral, and impacts behaviors of animals such as breeding, nesting, courtship, and foraging behaviors.

Development under Alternative 1 has less potential for indirect water quality impacts than Alternatives 2 and 3 during construction, due to less large scale grading and the time over which development is expected to occur. However, Alternative 1’s less cohesively planned roadway and stormwater management network, lack of coordinated planning in relation to stormwater and erosion control, and lack of a large, coordinated open space corridor around FWCAs could result in localized sediment introduction or turbidity.

### Alternative 2

Under Alternative 2, a majority of the habitat found on-site would be converted to urban and suburban uses. Existing vegetation would be replaced with roads, driveways, buildings, and landscaped ornamental plantings. Areas of native vegetation that would be retained include most of the riparian areas adjacent to Lawson Creek, and many wetlands, steep slopes, mine hazard areas, and associated buffers.
Construction activity specific to Alternative 2 would include replacement of two existing road crossings of Lawson Creek, installation of new stormwater outfalls, clearing/grading of several hundred acres of the site, and the filling of approximately 0.09 acre of wetland area associated with streams. Though development under any alternative would be required to meet all applicable state and local standards, approved development activities may have adverse impacts on fish and fish habitat. Installation of three of the six new stormwater outfalls associated with this alternative have the potential to directly impact fish bearing streams (Exhibit 4-22). Several activities occur near non-fish bearing streams that could indirectly affect fish habitat downstream, including installation of the remaining three stormwater outfalls, replacement of the two stream crossings, and filling of several of the wetlands that could be tributary to fish-bearing creeks.

As also outlined for Alternative 1, development under Alternative 2 would have a significant impact on the abundance, distribution, and composition of the wildlife species found in the study area. Additionally, indirect impacts to the retained natural open space (native vegetation) will likely make it less suitable for some species of wildlife that currently inhabit the sites. Risks associated with habitat fragmentation and proximity impacts are very similar to those associated with Alternative 1; however, because Alternative 2 includes a contiguous open space area and larger corridors of preserved vegetation, these risks may be slightly less under Alternative 2 than Alternative 1.

**Alternative 3**

Alternative 3 would also follow a Master Plan approach, and though it shares some of the same impacts as Alternative 2, overall it has lesser impacts. Alternative 3 includes greater acreages of open space areas and more dense residential development clustered away from sensitive areas.
Exhibit 4-22
Watercourse Impacts

Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
In regard to fish and aquatic habitat, Alternative 3 assumes that there will be fewer direct impacts to streams and their buffers. Though Alternative 3 will likely include new stormwater outfalls in the same or similar locations as in Alternative 2, the stormwater flows and duration of flows at these new outfalls will likely have lesser impacts. Lower flows of shorter duration are anticipated under Alternative 3, based on Alternative 3’s lower overall acreage of impervious cover. Alternative 3 also anticipates only one new stream road crossing compared to Alternative 2’s two new stream road crossings.

Impacts to terrestrial wildlife habitat would be less (in acres) than those anticipated under either Alternative 1 or 2 because Alternative 3 involves preservation of more acres in open space and clustering higher density development in smaller areas.

Indirect impacts as outlined above under Alternatives 1 and 2 also have the potential to occur under Alternative 3. However, “proximity” impacts (impacts such as domestic animals and invasive vegetation, which occur because of the close proximity of development to FWCAs) are less likely to occur (or at lesser magnitude) under this alternative because development will be clustered further away from sensitive areas and leave larger corridors of uninterrupted open space.

In addition, Alternative 3 involves employment of various Low Impact Development strategies, which are anticipated to further reduce the potential for indirect impacts to streams (primarily in regard to recharging baseflow and minimizing variations in flow from discharge rates and velocities).

As previously referenced, development under Alternative 1 may have less potential for indirect water quality impacts then Alternatives 2 and 3 during construction, due to less large scale grading and the pace at which development is expected to occur. However, a more comprehensive approach to roadway networks and stormwater management under Alternatives 2 and 3, and larger, coordinated open space corridors around FWCAs under these alternatives could result in less risk of localized sediment introduction or turbidity.
Alternative 4
Alternative 4 is similar to Alternatives 2 and 3, and was not further studied in this section.

7 What measures can reduce or avoid impacts to fish and wildlife species and habitat?

Measures that can reduce or avoid impacts to fish and wildlife species and their habitats vary greatly, depending on the activity. Alternative 2 currently involves connecting new stormwater conveyance pipes associated with development to the existing culverts that contain Lawson Creek and Jones Lake Creek under SR 169.

Connecting the stormwater system outfalls to the pipes in this way under any development scenario, rather than to the natural watercourse, avoids the potential for construction impacts to the channel and riparian vegetation. If this type of pipe-to-pipe connection cannot be achieved, Best Management Practices (BMPs) can be utilized during construction that will assist in avoiding significant adverse impacts to these streams.

In regard to streams, Alternative 2 has the most direct impacts anticipated. This Alternative proposes to replace an existing stream crossing near the southern end of Botts Drive. As a conservative assumption, the new crossing could be approximately 60 feet wide, and occur in an area where an existing culvert and associated road clearing have already impacted an area greater than 60 feet in width. A second (new) crossing would be designed to meet all regulatory requirements for passage of flow and debris. As part of Alternative 2, the new crossing represents a disturbance at the proposed location, but occurs several hundred feet downstream of an existing crossing. Removal of the existing crossing and restoration of the riparian corridor in this area is the proposed strategy for mitigating the necessity for the new crossing.
Due to the location of the proposed stormwater outfalls under Alternative 2 and the anticipated quantity and timing of stormwater discharges and channel morphology, stream reaches downstream of proposed outfalls may be subject to an increased risk for erosion. Mitigation in the form of diffusing flows, bioengineering to prevent continued bank erosion, and monitoring to track any changes and evaluate the effectiveness of installed erosion protection measures can help avoid impacts to fish and wildlife species.

In regards to wildlife and terrestrial habitat, elk are a state-listed priority Game Species, and increased road traffic resulting from development will increase the potential for vehicle collisions with elk. Wildlife crossing signs could be installed along Lawson Street to warn drivers of elk crossing the road. Elk are also utilizing portions of Lower Lawson as an east-west travel corridor, as well as portions of Upper Lawson as a north-south travel corridor. Although these travel corridors could be maintained as part of any site development, it is more likely that Elk will abandon the Main Property in favor of the larger corridor to the south that is part of the Core complex.

Townsend’s big-eared bats may roost in caves and mines, although most known group hibernating sites in Washington are caves. However, studies in Utah found that approximately one quarter of all abandoned mines surveyed were used as day roosts. Exploration of the feasibility for use of the abandoned mines on the Lawson Hills properties by Townsend’s big eared bats may be warranted once more is known about the subsurface conditions of the abandoned mines.

The habitat unit with the highest functions and values for wildlife and most special habitat features is the mature deciduous forest habitat unit. It is located along the southern edge of Upper Lawson, along the southern property line. This area consists of mature deciduous trees with numerous snags, downed logs, and edge habitats. Portions of this zone could be maintained as part of site planning under any alternative. Under Alternatives 2 and 3, the configuration of proposed open space corridors could be reevaluated to consider sensitive areas such
as wetlands and streams and their buffers in addition to severe mine hazard areas.

Mitigation for wetland, stream, and buffer impacts related to Alternative 2 should include enhancement of adjacent sensitive areas with native plants. Wildlife forage preferences could be considered in plant species selection for enhancement areas. Mast-producing species (such as hazelnut) could help mitigate for reduced food sources resulting from habitat reductions.

Landscape plans for any proposal can include planting with native plants, including mast producing shrubs and trees. The use of native plants, using BMPs for weed and disease control, can help eliminate the need for pesticides. Several of the priority species that could inhabit the site, or are known to inhabit the site, are cavity-nesters. Reductions in habitat resulting from development will reduce nesting opportunities. As mitigation, nesting boxes of various sizes could be installed, preferably in forested buffers adjacent to wetland areas.
Climate Change

Air Quality

1. Are there currently air quality problems in the region and study area?

There are three air pollutants of major concern in the Puget Sound region:

- **Carbon monoxide** (CO), which is largely from motor vehicle exhaust.
- **Ozone**, which is contributed by motor vehicles, as well as other sources.
- **Particulate matter**, which includes both solid matter and liquid droplets suspended in the air. Exhaust from diesel-powered vehicles is a source of particulates, but the majority is from wood smoke and industrial sources.

The Black Diamond area is in compliance with the federal air quality standards for these pollutants.

Three agencies have jurisdiction over the ambient air quality in the project area: the United States Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA). As part of the Clean Air Act, the EPA established ambient air quality standards for six criteria pollutants. Two classes of ambient air quality standards were established: primary standards to protect the public health, and secondary standards to protect the public welfare and the environment (for example, soils, vegetation, and wildlife).

When measured concentrations of a pollutant exceed the National Ambient Air Quality Standards (NAAQS), an area is designated as a non-attainment area for that pollutant. The Seattle- Everett- Tacoma area experienced carbon monoxide levels in excess of standards in the 1970s, 80s, and 90s.

---

**What is carbon monoxide?**

Carbon monoxide is a colorless, odorless gas, produced by incomplete burning of carbon-based fuels, including gasoline, oil, and wood. When carbon monoxide gets into the body, the carbon monoxide combines with chemicals in the blood and prevents the blood from bringing oxygen to cells, tissues, and organs.
Programs to improve the emissions of motor vehicles implemented on a nationwide level, as well as regional actions such as inspection of vehicle emissions systems, have led to a reduction in pollutants such that the area now meets carbon monoxide standards. The Seattle-Tacoma urban area was redesignated an attainment area for carbon monoxide in 1997.

The region, including the study area, is designated a “maintenance area,” which requires implementation of measures to ensure continued compliance with air quality standards. One of the measures is continued periodic inspection of vehicle emission control systems to ensure proper operation prior to relicensing vehicles. An additional maintenance measure is review of transportation projects to ensure that the projects do not produce violations of air quality standards.

The NAAQS for ozone allows no more than one day per year, when averaged over the most recent three years, to be above the standard. While there was one exceedance of the ozone standard at the Enumclaw Station and one exceedance at the Pack Forest Station in 1998, there were no exceedances in the most recent three years (2000, 2001, and 2002). The Puget Sound region has therefore complied with the ozone standard in the past five years. The project area is within the maintenance area for ozone as defined by the EPA.

Three areas in Seattle, Tacoma, and Kent have been designated non-attainment areas because concentrations sometimes exceed health standards. The Black Diamond area is not within the boundaries of those non-attainment areas.

2 What long-term air quality problems are expected?

The major potential long-term air quality impact of the project is from automobile emissions from additional traffic generation of the proposal. An adverse impact is not expected, as outlined below.

In order to assess the potential impacts of the proposal, the potential levels of carbon monoxide (CO) were analyzed for the most congested intersections in the vicinity. Of the various vehicular emissions CO is the pollutant emitted in the largest quantity and is therefore analyzed as a general indicator.
Analysis was performed for the cumulative traffic generation scenarios developed for the transportation analysis. This includes both Master Planned Development projects in Black Diamond as well as projected increases in traffic from other development.

Air quality dispersion modeling was used to calculate peak-hour CO concentrations at the most congested intersection using worst case meteorological conditions and other model inputs. The analysis is considered to be conservative and provide a worst case assessment.

The model results reflect a general trend in vehicle emissions characterized by future projected improvements in the emissions from vehicles as the result of federal standards. These improvements in vehicle emissions are expected to result in an improvement in overall emissions that outweighs the increase in traffic volumes.

### Exhibit 4-23
**Intersection Modeling Results (ppm)**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Averaging Period</th>
<th>2007 Existing</th>
<th>2025 Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Baseline</td>
</tr>
<tr>
<td>Witte Road SE and SR169(^a)</td>
<td>1-hour</td>
<td>9.3</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>7.7</td>
<td>6.3</td>
</tr>
<tr>
<td>Pipeline (Ravensdale Road) and SR 169(^b)</td>
<td>1-hour</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Roberts Drive/Lawson Connector and SR 169(^b)</td>
<td>1-hour</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>8-hour</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

\(^a\) Approved WSDOT screening methods including WASIST modeling were used to determine compliance with ambient standards at this intersection within the CO Maintenance area. Background concentration equals 4.0 ppm.

\(^b\) CAL3QHC was used to determine compliance at the dual intersection of Ravensdale Road and Roberts Drive at SR169 because screening methods did not show compliance with standards. Also, these intersections are not signalized in 2007 or 2025 baseline conditions so modeling was not performed. Background concentration equals 3.0 ppm.

**Notes:**
- 1-hr CO standard is 35 ppm; 8-hr CO standard is 9 ppm.
- Modeling used Synchro data provided by Parametrix.
- *Source: ENVIRON International Corporation 2009*
3 During construction, are air quality problems expected?

During construction, dust from excavation and grading would contribute to ambient concentrations of suspended particulate matter. The construction contractor is required to comply with the PSCAA’s Regulation I, Section 9.15 requiring reasonable precautions to avoid dust emissions. This environmental protection may include application of water or other dust suppressants during dry weather.

Extensive clearing will be required for development. For large clearing projects, disposal of non-marketable trees and shrubs may involve slash burning. If slash burning is used, these activities will be limited during periods of impaired air quality, per requirements of the Puget Sound Clean Air Agency.

Construction would require the use of heavy trucks and smaller equipment such as generators and compressors. These engines would emit air pollutants that would slightly degrade local air quality, but these emissions and resulting concentrations would be far outweighed by emissions from traffic normally in and around the project area.

Some phases of construction would cause odors detectible to some people away from the project site. This would be particularly true during paving operations with asphalt. Such odors would be short-term.

Construction equipment, material hauling, and detours can affect traffic flow in a project area. If construction delays traffic enough to substantially reduce travel speeds in the area, general traffic-related emissions would increase.

---

**What are particulates?**

Particulates are solid material and liquid droplets suspended in the air. Motor vehicles, wood burning, and industrial activity are major sources of particulate matter. Particulate matter in the respiratory tract may produce injury by itself, or it may increase the effects other gases have on the body.
4 What measures can reduce the air quality effects of the project?

Dust produced by construction is required to meet standards of the Puget Sound Clean Air Agency. A number of techniques are available for control:

- Areas of exposed soils, such as storage yards and construction roadways, can be sprayed with water or other dust suppressants if necessary.
- Areas that might be exposed for prolonged periods during construction can be covered with gravel or receive temporary pavement.
- Areas not designated for future impervious surface can be covered with mulch or planted with a vegetation ground cover.
- The amount of soils tracked out of the construction area by trucks would be reduced by wheel washing and covering dusty truckloads.

Emissions from construction equipment and trucks would be reduced by using well-maintained equipment. Avoiding prolonged periods of vehicle idling and engine-powered equipment would also reduce emissions.

Trucking materials to and from the project area would be scheduled to minimize congestion during peak travel times. This would minimize secondary air quality impacts caused by traffic having to travel at reduced speeds.
Greenhouse Gas Emissions

1 What are greenhouse gases (GHG) and what long-term climate change effects are expected?

Greenhouse gases are gases in the atmosphere that absorb and emit radiation, which is the fundamental cause of the greenhouse effect. Common greenhouse gases in the earth’s atmosphere include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons. Greenhouse gases, mainly water vapor, are essential to helping determine the temperature of the Earth; without them this planet would likely be so cold as to be uninhabitable. Although many factors such as the sun and the water cycle are responsible for the Earth’s weather and energy balance, if all else was held equal and stable, the planet’s average temperature should be considerably lower without greenhouse gases.

In 2007, the United Nations Intergovernmental Panel on Climate Change (IPCC) found that “warming of the climate system is unequivocal… and most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (human-caused) greenhouse gas concentrations (primarily carbon dioxide).”

There is a growing scientific consensus that global temperature increases of more than 2 degrees Celsius above pre-industrial levels would lead to devastating global impacts.

Leading scientists have projected that stabilization of atmospheric carbon dioxide emissions to avoid temperature increases greater than 2 degrees Celsius will require a reduction of greenhouse gas emissions to approximately 80 percent below current levels by the year 2050.
2 Where do GHG emissions come from?

GHG emissions associated with development come from multiple sources:

▪ The extraction, processing, transportation, construction, and disposal of building materials;
▪ Landscape disturbance;
▪ Energy demands created by a development after it is completed; and
▪ Transportation demand created by a development after development is complete.

3 What policies and standards apply?

SEPA includes the prevention or elimination of damage to the environment and the biosphere as one of its purposes. SEPA requires proponents of major actions that will have a probable, significant adverse environmental impact to prepare an environmental impact statement.

Ecology rules require proponents of major actions subject to SEPA to complete a checklist that addresses the impact of the proposal on the environment. The SEPA checklist specifically includes a requirement to analyze the impact of the proposal’s emissions on air quality, which includes climate.

In December 2007, Ecology and the Community, Trade and Economic Development (CTED) Department, in conjunction with the Center for Climate Strategies, released official greenhouse gas emissions estimates for 1990 through 2020. These projections forecast statewide emissions through 2020 based on an assumption that there are no changes in public policies or citizen behavior. The forecast includes expected growth in population, employment, business activity, and the built environment.

In 2008, the Washington State Legislature passed and the governor enacted into law House Bill 2815 which establishes statewide targets for greenhouse gas reductions. These targets are to reduce annual greenhouse emissions to 1990 levels in 2020, to 25 percent below 1990 levels in 2035, and to do Washington’s part to reach global climate stabilization by reducing emissions to 50 percent below 1990 levels in 2050.
4 How do the alternatives compare for impacts to climate change?

King County has developed a GHG emissions worksheet (King County Department of Development and Environmental Services, SEPA GHG Emissions Worksheet, Version 1.7 12/26/07) that estimates all GHG emissions that will be created over the life span of a project. This includes emissions associated with obtaining construction materials, fuel used during construction, energy consumed during the buildings operation, and transportation by building occupants. Results using this methodology for each Alternative are summarized in Exhibit 4-24 and included in spreadsheet format in Appendix Q.

The Applicant provided additional GHG emissions information and analysis, which is also included in Appendix Q. The emissions modeled in the analysis completed by the Applicant include a 25 percent reduction for meeting Leadership in Energy and Environmental Design (LEED) standards, which is not reflected in Exhibit 4-24. Reductions for meeting LEED are appropriate should the housing be constructed to meet these standards. GHG emissions should therefore be recalculated for each MPD phase. The Applicant’s analysis does not include the school facilities or commercial/office space in their calculations. These should be added as appropriate to each phase, when calculations are revisited.

Exhibit 4-24
Greenhouse Gas Emissions – Summary of Impacts

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Total Project Emissions a</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2,194,858 MTCO₂e</td>
</tr>
<tr>
<td>2</td>
<td>2,491,728 MTCO₂e</td>
</tr>
<tr>
<td>3</td>
<td>1,806,189 MTCO₂e</td>
</tr>
</tbody>
</table>

Explaination of table:

a Total Project Emissions are given in MTCO₂e- Metric Tons Carbon Dioxide Equivalent. This is the standard measurement of the amount of CO₂ emissions that are reduced or secluded from the environment. A single ton of carbon dioxide equates to 2204.62 pounds of CO₂. Alternative 4 was created as a fiscally balanced alternative, and was not analyzed for impacts to GHG emissions.
5 How do the alternatives compare for impacts to climate change?

Alternative 1
Alternative 1 includes only residential units, and involves no commercial or educational uses. Acreages of impervious surfaces were estimated based on allowances in the City’s zoning code. Pavement (the road network) associated with Alternative 1 was estimated at 20 percent of the buildable land area. Compared to Alternative 2, Alternative 1 is expected to generate 296,870 MTCO$_2$e less emissions over the lifetime of the project.

However, because development under Alternative 1 would occur incrementally over time, and does not include several key elements of an MPD (substantial open space, coordinated roads and trails systems, mixed use development with opportunities for live-work), Alternative 1 may in fact ultimately have a more negative impact due to higher vehicle miles traveled (VMT) associated with rural development not tied to office/commercial/retail centers.

Alternative 2
Alternative 2 is the most intensive development alternative evaluated in this document. In comparison to Alternative 1, Alternative 2 includes 80 less residential units but includes commercial and educational uses that Alternative 1 does not. In comparison to Alternative 3, Alternative 2 includes 312 more residential units and 15 acres more commercial development. Alternative 2 is expected to generate more emissions over the lifetime of the project than Alternatives 1 and 3.

Because Alternative 2 would be developed in a coordinated, master planned fashion, with mixed use (live-work) opportunities, GHG emissions could in reality be greatly reduced. With facilities to support safe walking, biking, and the housing density to support carpools, as well as the potential for on-site park and ride locations, Alternative 2 may see a reduced VMT and therefore may in fact have an overall lower lifetime impact than Alternative 1. Additionally, because the MPD could require LEED, as previously described, as well as other energy saving measures, impacts could be even lower.
Alternative 3
Alternative 3 includes less residential units than Alternatives 1 and 2. This alternative also includes less commercial acreage than Alternative 2, but more than Alternative 1. Acreages of pavement associated with Alternative 3 were estimated to be the same as those associated with Alternative 2 (backbone streets). Compared to Alternative 2, Alternative 3 is expected to generate 685,539 MTCO$_2$e less emissions than Alternative 2 and 388,669 MTCO$_2$e less emissions than Alternative 1 over the lifetime of the project.

Alternative 3 generates more emissions than Alternative 1 using this methodology. However, because the proposal would be developed in a coordinated, master planned fashion, with mixed use (live-work) opportunities, the opposite may actually occur. With facilities to support safe walking, biking, and the housing density to support carpools, as well as the potential for on-site park and ride locations, Alternative 3 may see a reduced VMT and therefore may in fact have an overall lower lifetime impact than Alternative 1. Because it has fewer residential units than Alternative 2, it is likely the least impact in terms of emissions generation.

Alternative 4
Alternative 4 was created as a fiscally balanced alternative, and was not analyzed for impacts to GHG emissions.

6 How could these impacts be mitigated?

GHG emission reduction can be achieved in addressing each potential source. This could be done in the following ways:

- Minimize the extraction, processing, transportation, construction, and disposal of building materials through use of on-site materials, recycling, and proper waste management;
- Minimize landscape disturbance by retaining as much of the site in its current natural vegetated state;
- Reduce energy demands created by the development after it is completed, and increase the use of solar, wind, and other renewable sources; and

- Reduce transportation demand created by the development after development is complete, including ensuring adequate facilities are provided for alternative modes such as transit, bicycling and walking, and potentially forming a Transportation Management Association to mandate trip reduction.
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Chapter 5 Cumulative Impacts and Indirect Effects

1 What are cumulative impacts and why do we study them?

Cumulative impacts result from the total effect of the proposed project when added to other past, present, and reasonably foreseeable future projects or actions. Cumulative impacts may be partly caused by one of the Lawson Hills MPD alternatives, but impacts may also be caused by other projects. Cumulative impacts are studied so the public, decision-makers, and project proponents can consider the “big picture” impacts that a project would have on the community and environment.

2 What other projects are planned in the study area and what are their possible cumulative impacts?

For purposes of this Final EIS, the cumulative effects are considered to be the combined impacts of both the Lawson Hills and Villages MPDs, both proposed to occur within the City of Black Diamond, and both assumed to be built by 2025.

A separate and complete EIS was prepared to consider the impacts of The Villages, a 1,196 acre MPD which is also being considered for significant adverse impacts through SEPA. The project site generally consists of two subareas, the “Main Property” (approximately 1,114 acres) and the “North Property” (approximately 82 acres). Exhibit 5-1 illustrates the relationship of the two proposed MPD areas. Exhibit 5-2 summarizes the alternatives.
Exhibits in this EIS are intended to provide a general graphical depiction of built and natural environment conditions and may not be accurate to the parcel level.
<table>
<thead>
<tr>
<th>Residential Type</th>
<th>Alternative 1 No Action</th>
<th>Alternative 2 MPD</th>
<th>Alternative 3 Mitigated MPD</th>
<th>Alternative 4 Fiscally Balanced MPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Dwelling Units</td>
<td>• 4,480 single-family dwelling units (du) on 952 acres</td>
<td>• 6,050 dwelling units on 700 acres</td>
<td>• 4,538 total dwelling units on 595 acres</td>
<td>• 2,968 dwelling units on 723 acres</td>
</tr>
<tr>
<td></td>
<td>• (4.71 du/ac)</td>
<td>• (8.64 du/ac)</td>
<td>• (7.62 du/ac)</td>
<td>• (4.11 du/ac)</td>
</tr>
<tr>
<td>Commercial/Office</td>
<td>35 acres</td>
<td>104 acres</td>
<td>54 acres</td>
<td>104 acres</td>
</tr>
<tr>
<td></td>
<td>• 225,000 sf office</td>
<td>• 650,000 sf office</td>
<td>• 300,000 sf office</td>
<td>• 650,000 sf office</td>
</tr>
<tr>
<td></td>
<td>• 200,000 sf retail</td>
<td>• 515,000 sf retail</td>
<td>• 300,000 sf retail</td>
<td>• 515,000 sf retail</td>
</tr>
<tr>
<td>Open Space</td>
<td>580 acres</td>
<td>645 acres</td>
<td>783 acres</td>
<td>645 acres</td>
</tr>
<tr>
<td>Schools</td>
<td>Not provided on-site</td>
<td>42 acres</td>
<td>135 acres</td>
<td>95 acres</td>
</tr>
<tr>
<td></td>
<td>• 2 elementary, 1 middle school provided on-site; additional facilities would need to be accommodated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Roads</td>
<td>Included as part of developed area</td>
<td>76 acres</td>
<td>Included as part of developed area</td>
<td>Included as part of developed area</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>1,567</td>
<td>1,567</td>
<td>1,567</td>
</tr>
<tr>
<td>Acres:</td>
<td></td>
<td>1,567</td>
<td>1,567</td>
<td>1,567</td>
</tr>
<tr>
<td>Population:</td>
<td>12,096</td>
<td>15,043</td>
<td>11,283</td>
<td>7,383</td>
</tr>
</tbody>
</table>

3 What is the cumulative land use for both MPDs?

The combined land uses for both Lawson Hills and The Villages are illustrated in Exhibit 5-2. Alternative 1 is the only scenario that would not follow the City’s MPD ordinance and guidelines. Alternative 2 represents the Applicant’s MPD proposal. Alternative 3 is a mitigated MPD, with approximately 3,700 fewer total people at build out. Alternative 4 represents a “fiscally balanced” scenario, and is provided for illustrative purposes only.
4 What are the cumulative impacts to the built environment?

Exhibit 5-3 summarizes the cumulative impacts to the built environment. This assumes that if both Lawson and The Villages were built out by 2025, the following impacts would be likely to occur.

Because it is the most intensely developed alternative in terms of residential units and commercial/office development, the following discussion focuses on Alternative 2. The primary cumulative impacts to the built environment include:

Exhibit 5-3
Cumulative Impacts – Built Environment

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use</td>
<td>4,480 single family units</td>
<td>6,050 dwelling units</td>
<td>4,538 dwelling units</td>
<td>2,968 dwelling units</td>
</tr>
<tr>
<td></td>
<td>12,096 residents</td>
<td>15,043 residents</td>
<td>11,283 residents</td>
<td>7,383 residents</td>
</tr>
<tr>
<td></td>
<td>Incremental Development</td>
<td>Mixed Use (live/work)</td>
<td>Most multi-family units</td>
<td>Same commercial as Alternative 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Master Planned</td>
<td>Less commercial than Alternative 2</td>
<td>Mixed use (live/work)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mixed Use (live/work)</td>
<td>Master Planned</td>
</tr>
<tr>
<td>Transportation</td>
<td>Assumes all new roadway connections as illustrated in 2025 Transportation Element are constructed as shown</td>
<td>Greatest impacts</td>
<td>Assumes all new roadway connections as illustrated in 2025 Transportation Element are constructed as shown</td>
<td>Least impacts</td>
</tr>
<tr>
<td></td>
<td>Impacts are incremental in nature, less likely to be comprehensively mitigated</td>
<td></td>
<td>Assumes all new roadway connections as illustrated in 2025 Transportation Element are constructed as shown</td>
<td>Not specifically analyzed</td>
</tr>
<tr>
<td></td>
<td>No planned network</td>
<td></td>
<td>38% fewer trips on the network than Alternative 2, resulting in fewer improvements</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assumes all new roadway connections as illustrated in 2025 Transportation Element are constructed as shown</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>Lesser impacts than Alternative 2</td>
<td>Greatest impacts</td>
<td>Lesser impacts than Alternatives 1 and 2</td>
<td>Least impacts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not specifically analyzed</td>
</tr>
<tr>
<td>Public Utilities</td>
<td>Impacts are incremental in nature, less likely to be comprehensively mitigated</td>
<td>Greatest impacts due to highest population and resulting impacts on infrastructure</td>
<td>Lesser impacts than Alternatives 1 and 2</td>
<td>Least impacts</td>
</tr>
<tr>
<td>(water, wastewater, stormwater)</td>
<td></td>
<td></td>
<td></td>
<td>Not specifically analyzed</td>
</tr>
<tr>
<td>Visual</td>
<td>Impacts are incremental in nature, less likely to be comprehensively mitigated</td>
<td>Master Plan allows for preservation of views where possible, use of open space as buffers</td>
<td>Master Plan allows for preservation of views where possible, use of open space as buffers</td>
<td>Master Plan allows for preservation of views where possible, use of open space as buffers</td>
</tr>
</tbody>
</table>
### Exhibit 5-3

**Cumulative Impacts – Built Environment**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic and Cultural Resources</td>
<td>No impacts</td>
<td>No impacts</td>
<td>No impacts</td>
<td>• Least impacts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Not specifically analyzed</td>
</tr>
<tr>
<td>Public Services</td>
<td>Impacts are incremental in nature, less likely to be comprehensively mitigated</td>
<td>Greatest impacts due to highest population and resulting demand on parks, schools, police and fire</td>
<td>Lesser impacts than Alternatives 1 and 2</td>
<td>• Least impacts</td>
</tr>
<tr>
<td>(parks, schools, public safety)</td>
<td></td>
<td></td>
<td></td>
<td>• Not specifically analyzed</td>
</tr>
<tr>
<td>Fiscal Analysis</td>
<td>This alternative is not an MPD and is therefore not required to achieve positive fiscal performance</td>
<td>Fiscally balanced through 2020</td>
<td>Not specifically analyzed</td>
<td>Achieves positive fiscal impact at each project phase, including following full buildout</td>
</tr>
</tbody>
</table>

### Land Use

Alternative 2 assumes 15,043 additional residents, which will bring the City’s total population in 2025 to nearly 20,000. This is higher than Comprehensive Plan projections, which assumes a population of 16,980 by 2025. According to the Comprehensive Plan:

*Population growth in the City is encouraged by the comprehensive plan provided it is consistent with the City’s vision, respects the natural environment, and pays its “fair-share” of the costs associated with growth. Growth that is managed and occurs consistent with these principles will contribute to a more balanced and fiscally sound community.*

### Transportation

With the increased population comes the need for additional roadways and improvement to existing facilities. The transportation analysis indicates the need for improvements at 28 intersections, and the completion of the 2025 transportation network as proposed in the City’s Comprehensive Plan. These roadways will provide for sufficient circulation and will meet the level of service standards set forth by the City.
Development of the MPDs represents a substantial increase in the region’s traffic, and may change travel patterns regionally if improvements are not made that maintain similar levels of service. Efforts should be made to coordinate development related impacts with surrounding jurisdictions, and should be consistent with the King County planning policies.

Public Utilities
Because the Lawson Hills and the Villages developments are both under consideration for construction, the combined water and sewer demands need to be evaluated. Exhibits 5-4 and 5-5 summarize the demand and available supply for water and sewer, respectively.

Exhibit 5-4
Cumulative 2025 Water Supply and Demand

<table>
<thead>
<tr>
<th>Demand</th>
<th>MG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawson Hills Alternative 2(^a)</td>
<td>222.5</td>
</tr>
<tr>
<td>The Villages Alternative 2(^b)</td>
<td>453.8</td>
</tr>
<tr>
<td><strong>MPD Demand Combined:</strong></td>
<td><strong>676.3</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supply</th>
<th>MG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Diamond Maximum Annual Supply</td>
<td>986.9</td>
</tr>
<tr>
<td>Net Remainder of Black Diamond Annual Supply</td>
<td>310.6</td>
</tr>
</tbody>
</table>

\(^a\) Based on a total of 2,650 ERUs  
\(^b\) Based on a total of 5,406 ERUs

Exhibit 5-5
Comparison of Combined Wastewater Capacity Needs for Lawson Hills and the Villages at 2025

<table>
<thead>
<tr>
<th>Demand</th>
<th>ERU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawson Hills Alternative 2</td>
<td>2,650</td>
</tr>
<tr>
<td>The Villages Alternative 2</td>
<td>5,406</td>
</tr>
<tr>
<td><strong>MPD Demand Combined:</strong></td>
<td><strong>8,056</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capacity</th>
<th>ERU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Diamond Maximum ERU Capacity(^a)</td>
<td>8,500</td>
</tr>
<tr>
<td>Net Remainder of ERU Capacity</td>
<td>444</td>
</tr>
</tbody>
</table>

\(^a\) Based on the City of Black Diamond Comprehensive Sewer System Plan
Based on water and sewer demand and supply, and assuming that all planned improvements in the City’s Water and Sewer Comprehensive Plans are constructed, sufficient capacity is available to meet the cumulative needs of the most intensive alternative.

**Public Services**
Population increases will result in impacts to schools, fire, medical, and police services. Each of these can be mitigated by adding sufficient facilities and staff to ensure that the City’s adopted level of service is met. However, the financial impacts of adding staff and facilities in which to house them will also need to be considered. One way to meet capital needs is to consider the use of impact fees, which could be collected to offset costs of providing additional fire and school facilities.

The cumulative impact of the MPDs on schools is the need for three new elementaries, two middle schools, and one high school. The current plans for Alternative 2 do not accommodate all necessary school sites within the MPDs. The Applicant has identified potential sites outside of the MPD boundary. If these locations are acceptable, the City and School District will need to ensure that they meet criteria established in both the City and District plans. Alternatively, the MPD Ordinance allows for the approval of a separate schools agreement between the Applicant, the District, and the City, which would allow for flexibility in providing school facilities.

**Fiscal Analysis**
The fiscal analysis for the cumulative impacts of both MPDs, as proposed in Alternative 2, indicates that there is positive fiscal impact through 2020. After that time, the net impact on annual city operations becomes negative, with public service costs over $1,000,000 higher per year than anticipated revenues. This does not meet the intent of the City’s MPD Ordinance that development must enhance the City’s fiscal performance at each stage. This impact would need to be addressed in detail in future phases and approvals.
However, the Applicant has submitted a separate Fiscal Impact Analysis as well as a supplemental Sensitivity Analysis. These are included in Appendix J, along with the City’s independent analysis. Results of the Applicant’s analysis are substantially different, due to differing methodologies, assumptions, and inputs. Since the MPD Ordinance requires that the fiscal analysis be conducted at each phase of development, and prior to approval, the City may request revised analyses at that time. It is recommended that all assumptions be carefully considered when re-evaluating the fiscal impacts of the MPDs.

5 What are the cumulative impacts to the natural environment?

Exhibit 5-6 summarizes the cumulative impacts to the natural environment. This assumes that if both Lawson and The Villages were built out by 2025, the following impacts would be likely to occur.

<table>
<thead>
<tr>
<th>Exhibit 5-6</th>
<th>Summary of Impacts – Natural Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Element</strong></td>
<td><strong>Alternative 1</strong></td>
</tr>
<tr>
<td>Earth (geology, topography, and soils)</td>
<td>Assumes that severe mine hazard areas would be preserved in open space.</td>
</tr>
<tr>
<td></td>
<td>Roads and utility corridors in Lawson Hills may need to cross severe risk mine hazard areas.</td>
</tr>
<tr>
<td></td>
<td>Low and moderate mine hazard areas would be developed with residential uses.</td>
</tr>
<tr>
<td></td>
<td>All mine sites within The Villages are considered low hazard.</td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>None of the Alternatives are likely to result in impacts to or be impacted by hazardous waste sites.</td>
</tr>
</tbody>
</table>
### Exhibit 5-6

#### Summary of Impacts – Natural Environment

<table>
<thead>
<tr>
<th>Element</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong> (surface water and groundwater resources)</td>
<td>526 acres impervious surface creation.</td>
<td>487 acres impervious surface creation.</td>
<td>366 acres impervious surface creation.</td>
<td>Not specifically analyzed.</td>
</tr>
<tr>
<td>Development of multiple small detention/treatment facilities may result in less displacement of water flows.</td>
<td></td>
<td>Greatest potential impact on Ravensdale Creek.</td>
<td>Development is concentrated away from sensitive areas.</td>
<td></td>
</tr>
<tr>
<td>Stream scouring and erosion from greater duration of flows and water quality impacts likely would be similar to Alternative 2.</td>
<td></td>
<td>Medium- and high-density development on slopes draining to Jones Lake Creek is likely to have greater impact on water resources than low-density residential development.</td>
<td>Potential impacts to Ravensdale Creek would be less than Alternative 2.</td>
<td></td>
</tr>
<tr>
<td>Proposed the use of large stormwater ponds, which can cause temperature elevation due to solar heating.</td>
<td></td>
<td>Proposed low impact development for stormwater management.</td>
<td>Proposed low impact development for stormwater management.</td>
<td></td>
</tr>
<tr>
<td><strong>Plants and Animals</strong> (wetlands, habitat, fish and wildlife)</td>
<td>Wetlands and their standard (SAO-assigned) buffers will be preserved.</td>
<td>Permanent filling of less than 2 acres of wetland. Filling is proposed for roads, home sites, and stormwater detention facilities.</td>
<td>If any impacts to wetlands occur, they will only be at existing crossing locations, where buffer disturbance has already occurred.</td>
<td>Not specifically analyzed.</td>
</tr>
<tr>
<td>No direct impacts to wetlands or their buffers.</td>
<td>Approximately 10 acres of buffers for onsite wetlands will be permanently impacted</td>
<td>Proximity impacts are less likely to occur (or at lesser magnitude) because development will be clustered further away from sensitive areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental development could lead to fragmented open space corridors.</td>
<td>Open space provides less fragmented corridors, but corridor may not be appropriately located to provide meaningful habitat.</td>
<td>Preserves the integrity and function of the designated wildlife corridor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landowners could seek permits to individually impact wetlands and buffers, the likelihood or results of which cannot be estimated at this time.</td>
<td>Direct impacts to streams due to proposed roadways and crossings.</td>
<td>Direct impacts to streams due to proposed crossings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No direct impacts to fish or riparian habitat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Climate Change</strong> (air quality, greenhouse gas emissions)</td>
<td>7,889,191 metric tons of carbon dioxide emissions</td>
<td>11,345,407 metric tons of carbon dioxide emissions</td>
<td>7,292,033 metric tons of carbon dioxide emissions</td>
<td>Not specifically analyzed.</td>
</tr>
</tbody>
</table>
Because it is the most intensely developed alternative in terms of residential units and commercial/office development, the following discussion focuses on Alternative 2. The primary cumulative impacts to the built environment include:

**Water**

All of the alternatives will result in replacement of natural vegetation with impervious surfaces and landscaping, which will change the natural patterns of water movement (known as the hydrologic cycle). The replacement of natural vegetation with roads, parking lots, buildings, and turf and ornamental plants can result in dramatic increases in the amount of surface water runoff.

Transitioning from a natural hydrologic cycle to one dominated by urban runoff increases potential for bacterial and chemical pollutants entering water bodies. In natural environments, pollutant levels in stormwater are naturally filtered through vegetation and infiltration into soils. With urbanization, impervious surfaces replace vegetation, disrupting this natural filtration system and increasing bacterial and chemical pollutant concentrations in stormwater runoff.

The major sources of bacterial contamination are impervious surfaces and residential pets and wildlife that deposit feces on lawns, which are then washed into the stormwater system by storms. Fecal bacteria densities generally increase with greater housing density, increased impervious surfaces, and domestic animal density.

Impacts to Jones Lake, Lake Sawyer, and Black Diamond Lake should be specifically monitored prior to approval of MPD applications. Jones Lake has been characterized as having relatively high concentrations of organic materials, including sphagnum peat. Sphagnum peatlands (bogs) act as a sponge, soaking up rainwater and allowing it to filter slowly through upper layers and therefore helping regulate hydrological flood pulses. Peatlands also protect downstream lakes from excess nutrients by acting as sinks; conditions that increase the rate of decomposition of peat in these wetlands allows release of historical stores of nutrients resulting in changes in the biochemistry of downstream water bodies.
Lake Sawyer is susceptible to eutrophication. Lake Sawyer currently has a 303(d) listing for phosphorus, based on past water quality problems. Jones Lake is not currently listed, but is a likely candidate for potential biochemical impacts from increased inputs of nutrients as the watershed transitions from primarily undeveloped to more urban.

As part of the development of Alternative 2, the Applicant investigated a portion of the Jones Lake wetland area with the purpose of determining whether the area met the criteria of a sphagnum bog system. The applicant’s investigation found very poorly drained organic soils that formed primarily in sedges versus sphagnum mosses, and that therefore the wetland complex did not meet the criteria of a sphagnum bog. However, this should be verified prior to development approvals.

Potential impacts to Black Diamond Lake bear special consideration in the development of all of the alternatives. Given that Black Diamond Lake is a bog with low biological productivity, low nutrient availability, and depressed pH, it is especially sensitive to changes in hydrology and water quality.

**Plants and Animals**

Development of the MPDs will result in the conversion of a majority of the existing undisturbed habitat area to urban and suburban uses. Existing vegetation would be replaced with roads, driveways, buildings, and landscaped ornamental plantings. Areas of native vegetation that would be retained include riparian areas adjacent to Rock Creek, and many wetlands and other sensitive areas and associated buffers.

The permanent loss of wetlands is anticipated to be less than 2 acres in Alternative 2. The majority of the wetland area proposed to be filled is relatively low functioning and geographically isolated from other wetlands. Nevertheless, Alternative 2 will reduce the ability of, or level to which, existing wetlands can function to improve water quality and provide quality wildlife habitat.
Impacts to wetland buffers total nearly 10 acres. In addition, the application materials assign smaller buffers than City codes require to some of the wetlands in this system. If the Applicant intends to pursue smaller buffers, justification will be required in accordance with City codes and Best Available Science. At this time, no buffer reductions are deemed appropriate, given the vast amount of non-sensitive areas land available for development.

**Fish and Wildlife**

The new crossings of streams S4 and S5 have the potential to impact fish bearing waters. Both crossings would consist of full span bridges or bottomless arch-culverts, and each would cover stream lengths of approximately 50 feet. The structures would have to meet all regulatory requirements for passage of fish, water flow, and storm debris. Neither affected stream section provides a regionally significant resource or contains unusually rare or sensitive habitat or species. The new crossing of stream S2 occurs over a non fish bearing water, which may affect riparian vegetation but is not expected to affect fish. As such, the impacts to fish and their habitat associated with new stream crossings are not expected to be significant on a regional scale.

The proposed road crossing through the Core Complex is located southwest of Black Diamond Lake, approximately midway between Black Diamond Lake and the west boundary of The Villages properties. This wildlife corridor is regulated as a FWCA through the City’s SAO and provides large scale landscape corridors for wide ranging mammals such as elk, black bear, and cougar. This area also contribute to an east/west travel corridor for elk up and down the Green River drainage, which connects wintering habitat with higher elevation habitats utilized during warmer months. If built at grade the proposed road crossing represents an interruption in this landscape and travel corridor, which renders the purpose of the corridor ineffective. This impact may be significant on a regional scale.
The new stormwater outfall is proposed on stream S4 and would be constructed on the west bank of the channel just upstream (south) of The Villages boundary. The stormwater outfall would be built away from the stream channel in an upland area and then be connected to stream S4 with a new channel. Some minor hydrologic effects on Stream S4 in the vicinity of the outfall channel connection are possible. The addition of a second flow source at this location could influence habitat type and quality in the connection area.

In terms of open space and habitat, although a significant amount of land is set aside for open space, there are impacts to the function of the area as a wildlife corridor, as fragmentation of the open space, which are crossed by roads and developed areas, can result in reduced used by wildlife.

**Climate Change**

Climate change includes impacts to air quality and green house gas emissions resulting from increases in traffic and the general affects of increased populations. In terms of air quality, the region, including the study area, is designated as a “maintenance area,” which requires implementation of measures to ensure continued compliance with air quality standards. One of the measures is continued periodic inspection of vehicle emission control systems to ensure proper operation prior to relicensing vehicles. If developed under state, regional, and local policies; air quality is not anticipated to be a factor.

Cumulative green house gas emissions for the combined developments exceed 11 million metric tons of carbon dioxide emissions over the life of the project, assuming no changes in public policy or citizen behavior. As the control of GHG emissions is a major emphasis within SEPA, the long-term cumulative affects should be carefully considered.
6 What are indirect effects?

Per SEPA WAC 197-11-060(4) (d), impacts of a project proposal must also consider indirect effects:

A proposal’s effects include direct and indirect impacts caused by a proposal. Impacts include those effects resulting from growth caused by a proposal, as well as the likelihood that the present proposal will serve as a precedent for future actions.

Indirect effects that may be caused by the development of both the Lawson Hills and Villages MPD could include indirect affects to both the Built and Natural Environments.

Built Environment

Indirect effects to the built environment generally occur when a new population is introduced, and the services necessary to support the additional people are provided. New development within an urban area can lead to development of surrounding rural areas, as urban services such as water, sewer, and transportation are enhanced. The provision of roads to connect the newly developed areas can also lead to unintended consequences and changes in travel patterns.

The development of the Lawson Hills and Villages as MPD areas is within the policies of the City of Black Diamond Comprehensive Plan, and are consistent with county-wide planning efforts. Additional growth has been planned for and designated to occur in these areas, although the total anticipated population under Alternative 2 exceeds the City’s 2025 projections.

Improvements to the transportation network will need to be consistent with local and regional goals. Extension of urban roads to connect with rural roadways is not supported by county policy.
Natural Environment

Urbanization and development in general can result in indirect impacts to wetlands. Water that previously sheet flowed into wetlands or recharged groundwater-fed wetlands is often captured and redirected to large stormwater ponds, affecting wetland hydroperiods.

The removal of trees and other vegetation around wetland buffers can also potentially expose wetlands and their buffer to direct sun or longer periods of light, affecting the vegetative species composition of the wetland. Changes to wetland hydroperiods can also affect the vegetative species utilizing a wetland, because some vegetative species can tolerate wetter conditions than others. Clearing and development around wetland buffers also has the potential to introduce non-native or invasive vegetative species.

Human activities can also result in indirect impacts to aquatic habitats. It is likely that under any large scale development scenario, there will be little suitable habitat left for most terrestrial wildlife species. Habitat that does remain will be fragmented, in most cases will offer limited accessibility, and will be of relatively low quality.

Habitat fragmentation caused by development, in combination with increased human use of active open spaces, will also affect animal movement patterns by causing animals to avoid areas of high human activity. Road crossings through retained areas of natural open space could create barriers for small mammals and some amphibians. Species that are sensitive to habitat changes will likely be eliminated from the properties. However, many species will continue to use remaining natural open space.

The risk for indirect impacts increases with human presence near wildlife and their habitat (proximity impacts). Such impacts can include increased noise and light, increases in introduced invasive vegetative and predator species such as dogs and cats, increased injury or mortality from collisions
with vehicles, and impacts to predator or prey species. Some proximity impacts can be considered ecological, which includes alteration of the structure and/or vegetative makeup of wildlife habitat. Other impacts can be considered behavioral, and impacts behaviors of animals such as breeding, nesting, courtship, and foraging behaviors.
Chapter 6 Mitigation Measures

What are the preliminary mitigation measures for Alternative 2?

The preliminary mitigation measures for Alternative 2 (the Applicant’s proposal) are outlined in this chapter, and organized by Built Environment and Natural Environment.

This should be considered a preliminary list, as the Master Planned Development will go through future approval processes, at which time additional impacts may be identified, and which could require mitigation not included in this list. As part of the MPD process, the City will determine which of these mitigation measures may be made conditions of project approval.

At the time future implementing applications are submitted, and approvals sought, the City will determine whether and what type of additional environmental review is required to address any additional identified impacts.

Mitigation measures are identified in the EIS to address adverse environmental impacts that are likely to occur as a result of a proposal. Mitigation measures are changes or conditions added to a proposal that will avoid, minimize, or compensate for adverse impacts.

Mitigation is defined as:

▪ Avoiding;
▪ Minimizing;
▪ Repairing or restoring;
Mitigation Measures

- Reducing or eliminating over time;
- Replacing, enhancing, or providing substitute resources; and/or
- Monitoring the impact and taking appropriate corrective measures.

Mitigation can come in a variety of forms, from paying impact fees to local school districts, or changing the design of the project to avoid impacts to wetlands or other sensitive areas. Some mitigation may be required by city or county development regulations, or other local, state, or federal laws. Mitigation can also be based on information on adverse environmental impacts in the SEPA document.

The EIS has identified *general* mitigation measures for Alternative 2 only. However, *specific* mitigation for a proposed project will be identified during the MPD process. No development will occur without the approval of the City on such items as mitigation.

The following list of potential mitigation measures could be implemented to meet the requirements of SEPA. For some identified impacts, no specific mitigation measures are necessary if existing City standards or State law already provides adequate mitigation of potential impacts.
Built Environment

Land Use
No specific mitigation is identified for land use impacts, since the City’s current Comprehensive Plan allows for any of the alternatives to be developed.

However, development will need to be in compliance with several codes and ordinances; compliance with the policies and standards set forth in these ordinances should mitigate many of the impacts on the surrounding areas and on the character of Black Diamond.

These include:

- City of Black Diamond Comprehensive Plan
- Master Planned Development Ordinance – BDMC 18.98
- Sensitive Area Ordinance – BDMC 19.10
- City of Black Diamond Engineering Design and Construction Standards
- MPD Design Standards and Guidelines
- Tree Preservation Ordinance – BDMC 19.30
- Gateway Overlay District Ordinance
- Black Diamond Urban Growth Area Agreement

Transportation
Over the course of project build out, construct all new roadway alignments as depicted in the 2025 Transportation Element of the Comprehensive Plan, or functionally equivalent alignments as approved by the City and/or other jurisdictions, that are necessary to provide access to and circulation within the project.

In addition, the following intersections (Exhibit 6-1) should be monitored under a Transportation Monitoring Plan which could be incorporated into the Development Agreement for the MPD, with each designated improvement being required as the time defined in the Monitoring Plan. When a threshold established in the Transportation Monitoring Plan is met, the proponent
could be required to file the application(s) necessary to initiate design and construction for the improvements such that the LOS standard is never exceeded. For example, if the LOS standard is LOS E, the threshold could be set at LOS D, upon which time the mitigation process would be initiated. The timeframe in which application(s) would need to be filed after the designated trigger is met could also be stipulated in the mitigation monitoring plan.

Intersection improvements outside the City limits may be mitigated through measures acceptable to the applicable agency.

### Exhibit 6-1
Intersection Improvements

<table>
<thead>
<tr>
<th>Study Intersection</th>
<th>Jurisdiction</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 288th Street/216th Avenue SE</td>
<td>Black Diamond</td>
<td>Signalize. Add NBR turn pocket.</td>
</tr>
<tr>
<td>SE 288th Street/232nd Avenue SE</td>
<td>Black Diamond</td>
<td>Add NBR turn pocket and provide a refuge for NBL turning vehicles on EB approach.</td>
</tr>
<tr>
<td>SE Covington Sawyer Road/216th Avenue SE</td>
<td>Black Diamond</td>
<td>Add EBL, NBL and SBR turn pockets.</td>
</tr>
<tr>
<td>SE Auburn Black Diamond Road/218th Avenue SE</td>
<td>King County</td>
<td>Provide a refuge for NBL turning vehicles on EB approach.</td>
</tr>
<tr>
<td>SE Auburn Black Diamond Road/Lake Sawyer Road SE</td>
<td>Black Diamond</td>
<td>Signalize. Add WBL turn pocket.</td>
</tr>
<tr>
<td>SE Auburn Black Diamond Road/Morgan Street</td>
<td>Black Diamond</td>
<td>Roundabout.</td>
</tr>
<tr>
<td>SR 169/Roberts Drive</td>
<td>Black Diamond/WSDOT</td>
<td>Add second SBT and NBT lanes. Add SBL and NBL turn pockets.</td>
</tr>
<tr>
<td>SR 169/SE Black Diamond Ravensdale Road (Pipeline Road)</td>
<td>Black Diamond/WSDOT</td>
<td>Add second SBT and NBT lanes. Add SBL turn pocket.</td>
</tr>
</tbody>
</table>
### Exhibit 6-1

**Intersection Improvements**

<table>
<thead>
<tr>
<th>Study Intersection</th>
<th>Jurisdiction</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 169/SE 240th Street</td>
<td>Maple Valley/WSDOT</td>
<td>Add additional SBT lane on SR 169 from north of 231st Street to Witte Road. Add second NBT lane at SR 169/240th Street.</td>
</tr>
<tr>
<td>SR 169/Witte Road</td>
<td>Maple Valley/WSDOT</td>
<td></td>
</tr>
<tr>
<td>SR 169/SE Wax Road</td>
<td>Maple Valley/WSDOT</td>
<td></td>
</tr>
<tr>
<td>SR 169/SE 231st Street</td>
<td>Maple Valley/WSDOT</td>
<td></td>
</tr>
<tr>
<td>SR 169/SR 18 EB Ramps</td>
<td>Maple Valley/WSDOT</td>
<td></td>
</tr>
<tr>
<td>SR 516/SE Wax Road</td>
<td>Covington/WSDOT</td>
<td>Add second SBL, WBR, and NBL turn pockets.</td>
</tr>
<tr>
<td>SR 516/168th Pl SE</td>
<td>Covington/WSDOT</td>
<td>Add NBL and EBR turn pockets.</td>
</tr>
<tr>
<td>SR 516/Covington Way SE</td>
<td>Covington/WSDOT</td>
<td>Optimize signal timings.</td>
</tr>
<tr>
<td>SE 272nd Street/160th Avenue SE</td>
<td>Covington/WSDOT</td>
<td></td>
</tr>
<tr>
<td>SE Kent Kangley Road/</td>
<td>King County</td>
<td></td>
</tr>
<tr>
<td>Landsburg Road SE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR 169/SE Green Valley Road</td>
<td>WSDOT</td>
<td>Signalize.</td>
</tr>
<tr>
<td>SE Auburn-Black Diamond Road/</td>
<td>King County</td>
<td>Provide a refuge on EB approach for NBL turning vehicles.</td>
</tr>
<tr>
<td>SE Green Valley Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR 169/North Connector</td>
<td>Black Diamond/WSDOT</td>
<td>Signalize. Add second SBT and NBT lane. Add EBL, EBR, SBR, and NBL turn pockets. End additional NBT lane 1,000 feet north of intersection.</td>
</tr>
<tr>
<td>Lake Sawyer Road/Pipeline Road</td>
<td>Black Diamond</td>
<td>Signalize. Add EBL, WBL, NBL, and SBR turn pockets.</td>
</tr>
<tr>
<td>SE Auburn Black Road/Annexation Road</td>
<td>Black Diamond</td>
<td>Signalize. Add EBL, EBR, WBL, NBL, and SBR turn pockets.</td>
</tr>
<tr>
<td>SR 169/South Connector</td>
<td>Black Diamond/WSDOT</td>
<td>Signalize. Add SBR and NBL turn pockets.</td>
</tr>
</tbody>
</table>

As noted above, for each potential signal, first consider and present a conceptual design for a roundabout as the City’s preferred method of intersection control.

Explore multi-party opportunities that bring additional Metro transit and Sounder transit to Black Diamond, explore the possibility of a new park and ride location or improve the existing location, and promote Metro’s Rideshare program.

Over the course of the project build out, assist in reducing transportation demand by including adequate facilities for alternative modes such as transit, bicycling, and walking, that will connect on-site trails and pathways to other parts of the City, as well as allow for a connection between the Lawson Hills MPD and The Villages MPD.
Noise
Long term noise controls shall be addressed through BDMC Chapter 18.78.

Short term construction noise should be reduced by employing the best management practices below:

▪ Construction noise could be minimized with properly sized and maintained mufflers, engine intake silencers, engine enclosures, and turning off equipment when not in use.

▪ Stationary construction equipment should be located away from sensitive receiving properties where possible. Where this is infeasible, or where noise impacts would still be likely to occur, portable noise barriers should be placed around the equipment (pumps, compressors, welding machines, etc.) with the opening directed away from the sensitive receiving property.

▪ Although as safety warning devices, back-up alarms are exempt from noise ordinances; these devices emit some of the most annoying sounds from a construction site. Where feasible, equipment operators should drive forward rather than backward to minimize this noise.

▪ Ensure that all equipment required to use backup alarms utilizes ambient-sensing alarms that broadcast a warning sound loud enough to be heard over background noise but without having to use a preset, maximum volume. Or, use broadband backup alarms instead of typical pure tone alarms. Such devices have been found to be very effective in reducing annoying noise from construction sites.

▪ Requiring operators to lift rather than drag materials wherever feasible can also minimize noise from material handling.

▪ Substituting hydraulic or electric models for impact tools such as jackhammers, rock drills, and pavement breakers would also reduce construction noise.

▪ Electric pumps could be specified if pumps are required.
If pile driving becomes necessary, impact pile-driving should be minimized in favor of less noisy pile installation methods. If impact pile driving is required, the potential for noise impacts should be minimized by strict adherence to daytime only (or more stringent limits), especially when pile driving is within 500 feet or less of sensitive on- or off-site receivers. Pile driving noise may also be reduced using sound-absorbing barriers or other means.

Finally, the developer could establish a noise control “hotline” that would allow neighbors affected by noise to contact the City or the construction contractor to ask questions or to complain about particularly noisy activities.

At the time of construction of the Lawson connector between Lawson Road and SR-169, install noise mitigation in the form of a 6-foot solid wooden fence and/or berms and landscaping along the new Lawson connector road where it abuts existing residential uses.

Other means of noise mitigation may be proposed at the time of engineering design, but must meet the same criteria as would be met with the mitigation described above.

**Public Utilities – Water**

The facilities listed below, or functionally equivalent facilities, are necessary to serve the development as proposed. The timing for construction and installation of these facilities shall be determined through review of implementing development proposals, such as a preliminary plat.

- Upgrade Spring Supply source per the WSFFA.
- Utilize the Tacoma Intertie, in addition to the Spring Supply per the WSFFA.
- Construct an appropriately sized Upper Lawson Reservoir.
- Construct a pump station and transmission main adjacent to 965 reservoir to the east annexation area. Alternatively, provide water modeling to support a functionally equivalent improvement, upgrade the pump station at the 850 reservoir to pump directly to the 1175 reservoir and remove the 965 reservoir from service.
- Install local water main distribution system within Lawson Hills with appropriate pressure reducing stations in 1175, 965, and 850 pressure zones consistent with the City’s comprehensive plan.
- Extend and loop 850 zone water main to North Triangle.
- Install pressure reducing valve at North Triangle.
- Install 750 and 850 zone water main distribution main within North Triangle.
- Construct any other water supply and storage improvements as presented in City Comprehensive Plan which are necessary to serve the proposed development.

**Public Utilities – Sewer**

The facilities listed below, or functionally equivalent facilities, are necessary to serve the development as proposed. The timing for construction and installation of these facilities shall be determined through review of implementing development proposals, such as a preliminary plat.

- Install local collection and conveyance systems within Lawson Hills and North Triangle.
- Construct Trunk Line No. 2 in Lawson Hills.
- Upgrade and connect Botts Drive sewer main to Trunk Line No. 2.
- Construct Trunk Line No. 3 in North Triangle to new Pump Station No. 2. Alternatively, a functionally equivalent improvement, such as temporarily locating the pump station proposed on the North Triangle, may be approved with the MPD.
- Construct Pump Station No. 2.
- Construct Force Main No. 2.
- If determined necessary, construct sewer flow equalization storage reservoir.
- Construct any other wastewater storage and distribution as presented in the City Comprehensive Plan which are necessary to serve the proposed development.
Public Utilities – Stormwater and Water Quality

Stormwater runoff that is collected from impervious surfaces shall be mitigated in accordance with the 2005 *Stormwater Management Manual for Western Washington*, and stormwater designs shall include low impact development techniques wherever practical and feasible.

Runoff from basins tributary to Lake Sawyer must provide water quality treatment in accordance with the phosphorous control menu in the 2005 *Stormwater Management Manual for Western Washington*.

Provide enhanced water quality treatment as required by the 2005 *Stormwater Management Manual for Western Washington*.

All development within the North Triangle shall utilize infiltration for flow control and phosphorous control mitigation due to the well drained soils on-site.

Implement a surface water monitoring plan that identifies locations to monitor surface water upstream and downstream of stormwater pond outfalls. The purpose of the plan is to monitor surface water temperatures during the warmest six months of the year and ensure that stormwater discharge does not cause an increase in receiving water bodies. Monitoring shall occur for a period of two years once discharge occurs. The plan will describe a threshold and evaluation using state standards and outline possible remedies if negative temperature impacts are found.

Require a predominant use of native plants as part of the planting palette within the MPD. Reduce lawn planting wherever practical.

Reduce pavement widths to minimize stormwater runoff.

Where point discharges to streams must occur, design the outfall to minimize impacts to the stream channel and avoid areas of significant vegetation.

Construct any other stormwater treatment and storage improvements (or a functional equivalent) as presented in the City Comprehensive Plan which are necessary to serve the development.
Visual and Aesthetics
Lighting will be subject to BDMC Chapter 18.70.

Minimize the aesthetic impacts of grading along the ridgeline of Lawson Hill and promote views from the valley floor that blend rooftops with the surrounding natural environment by implementing one or more of the following:

(a) Preserve mature trees in natural open spaces, and if hazardous tree removal is required, replant at a 3:1 ratio with minimum 12-foot-tall evergreen trees.

(b) Require design guidelines that include material and color choices that blend with the surrounding environment and preclude materials such as shiny metal roofs.

(c) Plant native trees in open spaces, parks, and streetscaping.

When roads are built that intersect existing streets or facilities, or are constructed adjacent to existing streets, plant landscaping along the street and in other open space areas to soften building profiles and stormwater facility edges.

Historic and Cultural Resources
Prior to demolition of the miners’ housing on the project site, the Proponent shall complete the National Register of Historic Places nomination process with the Washington State Department of Archaeology and Historic Preservation (DAHP). If any properties are determined eligible for the NRHP, the following mitigation strategies may be used:

- Additional consultation with the DAHP may be needed for additional research and archaeological testing to determine the limits and contents of the site with respect to NRHP eligibility and controls.

- Consider establishing a possible interpretation of historic miners’ housing at the project site to benefit local history, residents, and visitors to the area.
**Public Services – Parks and Recreation**
Provide parks facilities in accordance with impacts to level of service.

If the Lawson Hills school site is developed and the Proponent proposes to build a joint-use facility, the Proponent shall provide at least one youth/adult baseball/softball field, soccer field, tennis court, or basketball court in conjunction with the school site or at an alternative location to assist in providing community park amenities to the MPD.

**Public Services – Schools**
Full build out of the MPD would warrant school facilities for which the following mitigation shall be imposed:

a) A separate school mitigation agreement with the School District and the City will be entered which will provide adequate mitigation of impacts to school facilities; or

b) Impact fees will be paid at the rate specified in the Enumclaw School District 2009 Capital Facilities Plan or as subsequently amended.

**Public Services – Public Safety**
The proposed development may require additional fire facilities and equipment, including a new or expanded fire station. A mitigation condition imposing a proportionate share of funding may be necessary.

Retain additional police and fire staff as indicated based on increased populations. Calculate needs at each phase of MPD approval.
Natural Environment

Geology, Topography, and Soils
Mitigate all potential hazards in accordance with the Sensitive Areas Ordinance.

Erosion Hazards
Soil erosion can be addressed during site design and construction. During construction, the use of silt fences, hay bales, temporary sediment ponds, truck wash areas, regular road cleaning, and straw mulch or rock coverings can minimize risks associated with erosion. The Proponent will be required to obtain coverage under the Department of Ecology’s NPDES General Permit for Construction sites for each phase of the buildout.

Utilize stormwater detention facilities that avoid increases in peak stream flows.

In cases where vegetation is an effective means of stabilizing stream banks, protect stream banks from disturbance to reduce the adverse impacts to stream erosion.

When a stream crossing occurs, utilize bridges or appropriately sized culverts for roadway crossings of streams to allow peak-flow high-water events to pass unimpeded and also preserve some normal stream processes.

Design stormwater facilities to avoid discharging concentrated stormwater flows on moderate and steep slopes in order to avoid severe land erosion.

Landslide Hazards
Avoid landslide hazard areas and utilize sufficient setbacks to increase the safety of nearby uses, or, where feasible, grade out the landslide hazard area to eliminate the hazard.

Manage stormwater and groundwater to avoid increases in overland flow or infiltration in areas of potential slope failure to avoid water-induced landslides.
Mine Hazards
Designate the most severe hazard areas as open space and route roads and utilities to avoid such areas. Where avoidance is impossible, utilize the process in the SAO and Engineering Design and Construction Standards (ED&CS) to build roads and utilities through these areas.

Utilize flexible utility lines when developing above mine hazard areas.

Vegetation and Wetlands
If wetland impacts are unavoidable, create new wetlands and enhance existing wetlands in accordance with the SAO.

Replace the functions and values lost by direct wetland impacts, specifically wildlife habitat, flood control, and water quality functions.

Utilize structural measures such as silt fences and temporary sediment ponds to avoid discharging sediment into wetlands and other critical areas.

Provide “on the ground” protection measures such as wetland buffers or root protection zones for significant trees.

Utilize low impact development techniques wherever practical and feasible.

Jones Lake and Wetland Complex
Route clean excess flows to Jones Lake and the wetland complex to ensure that summer water levels are not significantly decreased below existing water levels.

Fish and Wildlife
Limit impacts to Lawson Creek and Jones Lake Creek by connecting new stormwater conveyance pipes associated with development to the existing culverts that contain Lawson Creek and Jones Lake Creek under SR 169. If that pipe-to-pipe connection cannot be achieved, then Best Management Practices (BMPs) shall be used.
Install wildlife crossing signs along Lawson Street to warn drivers of elk crossing the road.

Require wildlife forage preferences in plant species selection for enhancement areas.

When designing landscape plans for development parcels adjoining wetland buffers or wetland buffer enhancement planting plans, consider locating mast-producing species (such as hazelnut) to mitigate for reduced food sources resulting from habitat reductions.

**Climate Change**
Minimize the extraction, processing, transportation, construction, and disposal of building materials through use of on-site materials, recycling, and proper waste management.

Ensure design guidelines allow the use of solar, wind, and other renewable sources.

Reduce transportation demand by including adequate facilities for alternative modes such as transit, bicycling, and walking, that will accommodate a future connection between on-site trails and pathways to other parts of the City, as well as accommodate a future connection between the Lawson Hills MPD and The Villages MPD.

Should a large employer or a group of similar employers locate in the commercial areas of the MPD, consider implementing a Transportation Management Association to reduce vehicle trips.

**Summary**
This should be considered a preliminary list, as the Master Planned Development will go through future approval processes, at which time additional impacts may be identified, and which could require mitigation not included in this list. As part of the MPD process, the City will determine which of these mitigation measures may be made conditions of project approval.

At the time future applications are submitted, and approvals sought, the City will determine if this EIS document needs to be supplemented or appended in order to address any additional identified impacts.