Spring 2009

King Mountain Neighborhood Urban Village environmental impact assessment

Sarah Collins
Western Washington University

Thomas Hall
Western Washington University

Zoe Nelson
Western Washington University

Abby Vincent
Western Washington University

Jared Zeretzke
Western Washington University

King Mountain Neighborhood Urban Village Proposal

ENVIRONMENTAL IMPACT ASSESSMENT

Huxley College of the Environment

Western Washington University

Spring 2009

Environmental Impact Assessment
Huxley College of the Environment

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Signature _____ Signature _____

Sarah Collins Thomas Hall

Signature _____ Signature _____

Zoe Nelson Abby Vincent

Signature _____

Jared Zeretske

Date June 5, 2009

King Mountain Neighborhood Urban Village Environmental Impact Assessment

Professor Jean Melious ESTU/ESCI 436

Sarah Collins, Thomas Hall, Zoë Nelson,

Abby Vincent & Jared Zeretzke

Huxley College of the Environment

Western Washington University

Bellingham, WA 98225

Spring 2009

FACT SHEET

TITLE:

King Mountain Neighborhood Urban Village Environmental Impact Assessment

DESCRIPTION:

This document is an assessment of the environmental impacts from the development of an urban village in the urban growth area just north of the newly annexed King Mountain Neighborhood and south of Van Wyck Road. The area is generally undeveloped at this time. Alliance Properties owns 135 acres in this area. This 135 acre development has 971 proposed residential units and 46 acres of open space and parks. The land uses to the south include the Cascade Cuts greenhouse nursery, the Bakerview Terrace subdivisions platted in the 1950s, the Calvary Temple Church campus and the more recent Kramer Lane and Springcreek Meadows subdivisions. The terrain is hilly with slopes ranging from 15 percent to 45 percent in the northeastern portion of King Mountain. Small wetlands exist in the proposed development area. The nearest park is at Sunset Pond, approximately one-half mile to the south. Whatcom County Natural Heritage Plan has identified the King Mountain area as a high priority for preservation and park and trail development. The City of Bellingham Park, Recreation and Open Space Plan show the need for a trail corridor through the area. This EIA includes the evaluation of Alliance Properties' proposed action, an evaluation of an alternative action of higher density building while preserving more open space, as well as no action.

LEGAL DESCRIPTION OF LOCATION:

NW ¼ of Section 7, T38N, R3E, Willamette Principal Meridian
and NE ¼ of NE ¼ of Section 8, T38N, R3E, Willamette Principal Meridian.

PROPOSER:

City of Bellingham Planning Department

LEAD AGENCY:

City of Bellingham
Department of Planning and Community Development
210 Lottie Street
Bellingham, WA 98225

CONTACT PERSONS:

Darby Galligan
Development Specialist II
City of Bellingham
Planning and Community Development
210 Lottie Street
360.778.8389

PERMITS:

Subdivision
Critical Area
Design Review
Planned Development permit
SEPA environmental review
Building permit
Public Works permit

CONTRIBUTORS (AUTHORS):

Sarah Collins—Proposed Action, Earth and Geology, Air, Water, Vegetation and Animals, Environmental Health

Thomas Hall—Alternative Action, Built Environment, Noise, Light and Glare, CO2, Aesthetics, Energy.

Zoë Nelson—Land Use and Land Use Policies, Description of Area, Executive Summary

Abby Vincent—Transportation, Parks and Recreation, maps

Jared Zeretzke—Alternative Action, Parks and Recreation, Utilities, Public Services

DISTRIBUTION LIST:

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Team members—Sarah Collins, Thomas Hall, Zoë Nelson, Abby Vincent & Jared Zeretzke

ACKNOWLEDGMENTS:

Darby Galligan (City Planner, Development Specialist)

Pat Carman (City Planner)

Steve Sundin (City Planner)

Professor Jean Mealious

ISSUE DATE:

June 3, 2009

PUBLIC PRESENTATION TIME AND DATE:

7 p.m.
June 5, 2009
WECU Education Center
511 E. Holly Street
Bellingham, WA 98225

EXECUTIVE SUMMARY

Two-hundred-eighty-six acres of land were recently incorporated into Bellingham's urban growth boundary, allowing the land to be developed at higher densities. Alliance Properties has proposed development of a high-density, mixed-use urban village on 135 acres of undeveloped land on King Mountain near James Street. An extension of James Street will continue up to Van Wyck Road. Sixty-eight acres will be used for residential land, 46 acres for open spaces and parks, and 21 acres for roads. In the proposed development area, an urban village center will be constructed. This center will contain residential and commercial uses, from cafes and stores to apartments, townhouses and single family residences.

The Alternative Action to the proposed King Mountain Neighborhood urban village is to build less single family units to preserve forest and leave it as public open space. To compensate, additional apartment buildings will be built, resulting in higher population per density acre. The alternative action plan also includes closing James Street during the day to thru traffic and opening it during the night. James Street will be made of pervious materials to reduce the amount of storm water runoff. Under this alternative action the houses and apartment buildings will be designed and built green in order to increase the efficiency of resource use, as well as protect the environment around the planned development.

The No Action Alternative will allow all of the land intended for development to be preserved for public parks or open space. Leaving the site undeveloped will not pose any more hazards to the natural environment than those that already exist.

After assessing the impacts on the natural and built environments in regards to Alliance Properties' proposal, we recommend the Alternative Action. By increasing residential density, mitigation efforts will decrease its electrical energy and natural gas consumption at least 20 percent from current consumption trends by the year 2020. Reducing the footprint of development will decrease the impacts on the natural environmental. Significant environmental impacts will be mitigated such as carbon dioxide emissions & air pollution, degraded habitat, runoff and erosion.

DECISION MATRIX

Elements of the Natural Environment

	Proposed Action	Mitigated Proposed	Alternative Action	No Action
Earth/Geology				
Soils	Δ	Δ	O	■
Topography	♦	♦	♦	♦
Erosion	O	O	O	♦
Water				
Surface water movement/quantity/quality	O	■	■	♦
Runoff/absorption	O	■	■	♦
Floods	■	■	■	♦
Ground water movement/quantity/quality	■	■	■	♦
Plants and Animals				
Habitat	Δ	Δ	O	♦
Unique/endangered species	N/A	N/A	N/A	N/A
Fish or wildlife migration routes	■	■	■	♦
Air				
Air quality	O	■	■	♦
Climate	■	■	■	♦
CO2	O	■	■	♦
Energy and Natural Resources				
Amount required/rate of use/efficiency	O	■	■	♦
Source/availability	O	■	■	♦
Nonrenewable resources	O	■	■	♦
Scenic views	Δ	Δ	Δ	♦

Δ = High Impact ■ = Low Impact N/A = Not Applicable
O = Moderate Impact ♦ = No Impact

Elements of the Built Environment

	Proposed Action	Mitigated Proposed	Alternative Action	No Action
Environmental Health				
Noise	Δ	Δ	Δ	♦
Hazardous Materials	O	■	■	♦
Potential Explosions and Releases	■	■	■	♦
Land Use				
Land Use and Zoning	Δ	Δ	Δ	♦
Housing	Δ	Δ	Δ	♦
Light and Glare	O	■	■	♦
Aesthetics	Δ	Δ	■	♦
Recreation, Parks, Open Space	■	■	■	♦
Transportation				
Transportation systems	Δ	Δ	Δ	♦
Vehicular traffic	Δ	Δ	Δ	♦
Parking	Δ	Δ	Δ	♦
Movement/circulation of people or goods	Δ	Δ	Δ	♦
Traffic Hazards	O	O	O	♦
Public Services and Utilities				
Fire	■	■	■	♦
Police	■	■	■	♦
Maintenance	O	O	■	♦
Potable water	O	O	■	♦
Stormwater	Δ	O	■	♦
Sewer/Solid Waste	Δ	Δ	O	♦

Δ = High Impact ■ = Low Impact
O = Moderate Impact ♦ = No Impact

TABLE OF CONTENTS

Proposals…… …....12

Proposed Action…….....13

Alternative Action …….....16

Natural Environment…….....18

Earth and Geology…….19

Air …….24

Water …….27

Vegetation and Animals…….37

Built Environment…….....43

Environmental Health…….....44

Land Use Relation and Relation to Land Use Policies..……...45

Noise ……..……48

Housing …….50

Carbon dioxide emissions …….57

Aesthetics……...…….59

Light and Glare……..62

Recreation……...……...64

Transportation……...…….....67

Public Services—Fire, Paramedic, Police…….....72

Utilities……...74

Energy Resources……...80

Natural Resources…….....84

Glossary……85

Appendices……....88

References……98

LIST OF FIGURES AND TABLES

Figure 1. Alliance Properties' proposal with alternative modifications…….....pg. 14

Figure 2. Location map by Abby Vincent……..pg. 15

Figure 3. Alternative action map updated by Jared Zeretzke…….pg. 16

Figure 4. Map of King Mountain pre development sections determined by Sarah Collins….pg. 19

Figure 5. Topography map of King Mountain by Abby Vincent……pg. 20

Figure 6. Aerial Soil Map of the King Mountain Neighborhood Center. (USDA)…….pg. 21

Figure 7. Squalicum Creek Watershed map by Abby Vincent……....pg. 29

Figure 8. Squalicum Creek Watershed Subregions map by Abby Vincent…….pg. 30

Figure 9. Wetlands of King Mountain Neighborhood map by Abby Vincent……pg. 31

Figure 10. Uncategorized wetlands on King Mountain Neighborhood Urban Village Site…pg. 32

Figure 11. General Effects of the correlation of urbanization and the increase in surface runoff……pg. 34

Figure 12. Areas of proposed development not suitable for solar engergy…….pg. 56

Figure 13. Alliance Properties' vision of their new development on King Mountain…….pg. 60

Figure 14. North Bellingham Trail Map, City of Bellingham…….pg. 65

Figure 15. Water Mains and Service Lines of E. Bakerview/James St……...pg. 75

Figure 16. Sewer Mains and Services Lines of E. Bakerview/James St……..pg. 76

Table 1. Plant species identified in several contiguous vegetation areas within the King Mountain development area…….pg. 38

Table 2. Potential for Vegetation Habitat Based on Soil Type……....pg. 39

Table 3. Wildlife Species identified in the King Mountain development area. ……..pg. 40

Table 4. Potential for Wildlife Habitat Based on Soil Type……pg. 39

PROPOSALS

PROPOSED ACTION

In early 2008 Bellingham's city council voted to incorporate King and Queen Mountain into the Urban Growth Boundary, meaning that this land can be developed at higher densities than before. Ralph and Mike Black of Alliance Properties owns 135 acres of rural land on King Mountain in the urban growth area, and they plan on developing a large residential-commercial project located in the vicinity of the intersections of Bakerview and James Street just south of Van Wyck Road called the King Mountain Urban Center (Figure 2).

Approximately 135 acres are in the proposed development area. About 35 acres are owned by the city of Bellingham, which will be reserved as green open space. In the proposed development area, an urban village center will be constructed. An extension to James Street will continue up to Van Wyck Road. This center will contain residential and commercial uses, from cafes and stores to apartments, townhouses, and single family residences.

Most of the commercial development will occur in the western half of the area which will include plazas with cafes. Four-story and six-story apartments and condos will be built around the "main street" which will have retail and cafes in the bottom story. Parking for these complexes will be underground. Directly circling the "main street" complexes will be townhouses with above ground parking off of alley ways. The single family residences will be located in the full northern part of the development area, along with some in the southern part. These residences will have front doors facing the street and garage access off of alley ways.

Many pocket parks and playgrounds will be left throughout the urban center. Much of the eastern part of the development area will be preserved as open space with trail networks. On the western side, a trail will connect leading to a new school. On the eastern side, a trail will connect to pond which will then lead to an approximate 17 acre open green space left as a park that Alliance Properties does not own. The northwestern corner of the development area leads to Meridian Street.

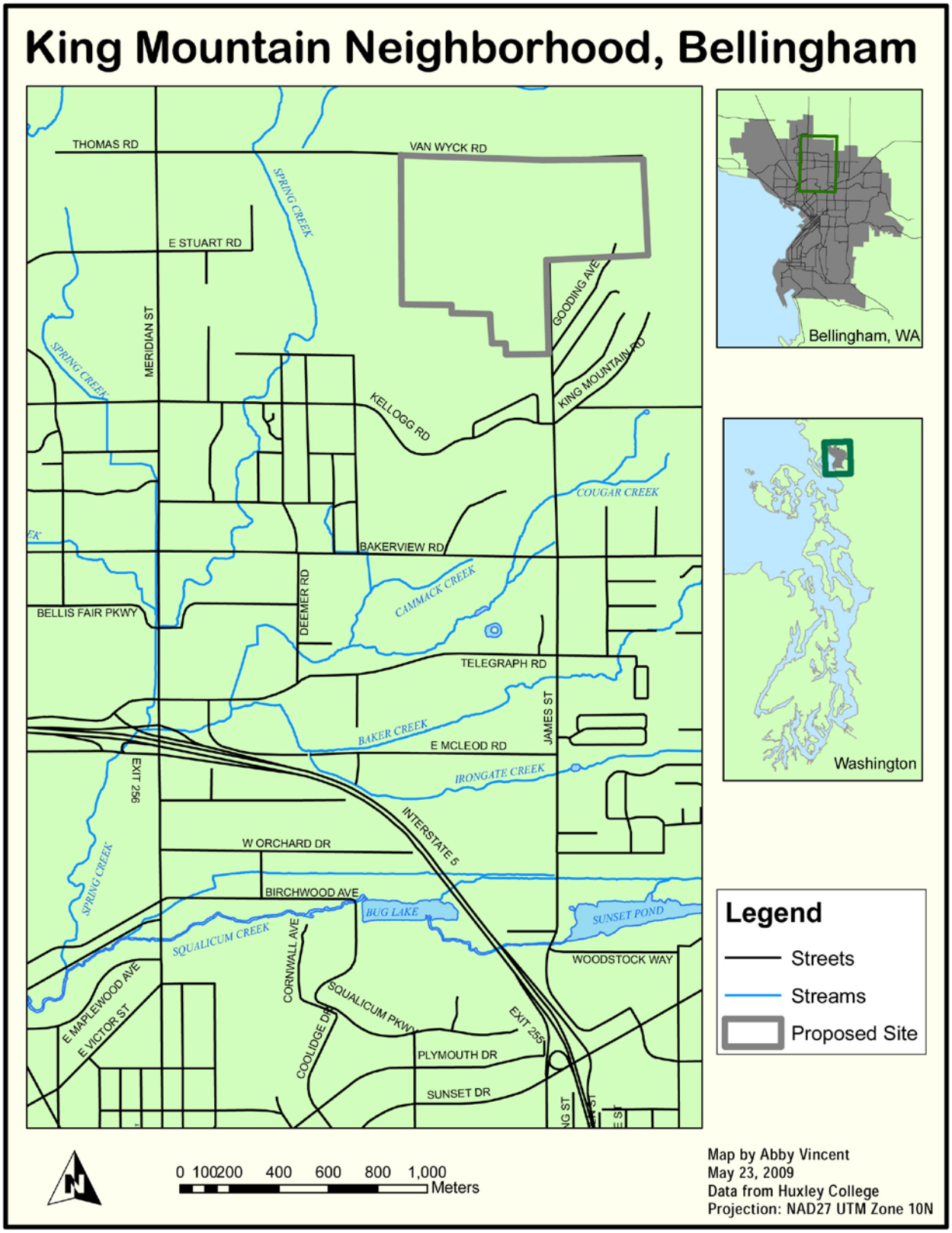
According to Alliance Properties' plans, 50 percent of the area will become residential, 34 percent open space and parks and 16 percent will be roads[1]. Alliance Properties also plans on building 241 single family residences, along with 375 townhouses, 236 condos in the 4-story buildings, and 119 condos in the 6-story buildings. Under the 4-story apartments, 28,000 square feet will be used as retail space and 12,000 square feet will be retail space under the 6-story apartments.

Alliance Properties' overall vision of the King Mountain urban village is to combine compact development, housing diversity, connected natural spaces and street networks, and linkages to larger communities (Figure 1). The current plans for the urban village show that the core of the village is a five minute walk to the limits of the village area. Within close proximity to the core of the village will be access to a range of housing types, as well as commercial uses. Large plots of natural forests and trail networks will exist within the development area, since the housing and core will be compact. Pedestrians will be able to easily move to and from the core to trails and shops with a connected street network. With roads connecting to larger arterials, the King Mountain urban village will have access to larger communities.

Figure 1. Alliance Properties' proposal with alternative modifications.

[1] These totals were recalculated based on the 135 acre development area that Alliance Properties own. Alliance Properties' proposal map includes different calculations based on the additional 35 acres of open space to the east of the development site that the City of Bellingham owns.

Figure 2. Location map by Abby Vincent. Data from City of Bellingham.

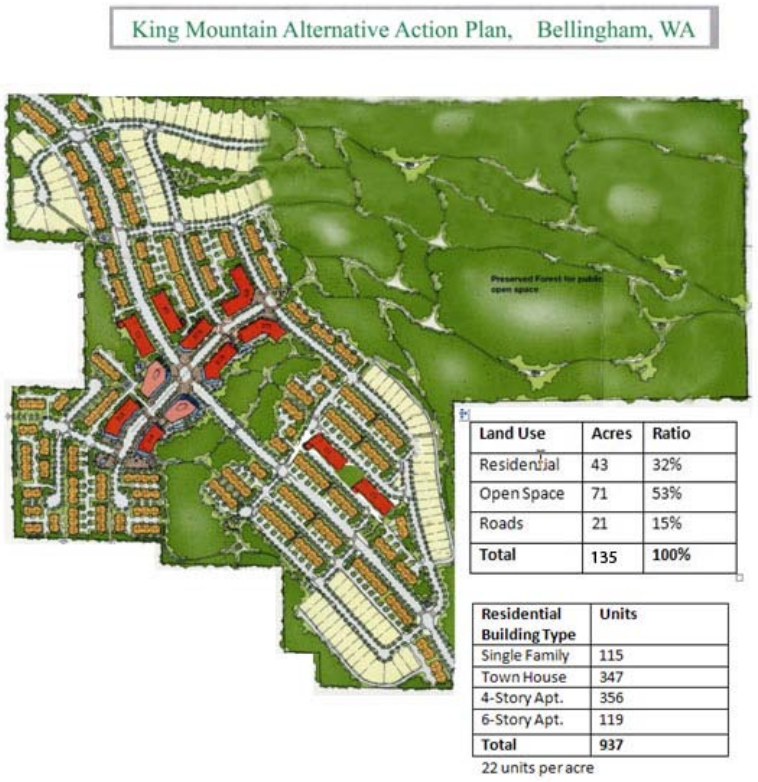


ALTERNATIVE ACTION

An alternative to the proposed King Mountain Neighborhood urban village is eliminate the proposal of the single family units to the north of the preserved forest and leave this entire area as public open space. Even though this area has already been cleared, this area will be converted to park and recreation area (Figure 3).

To compensate the loss of single family homes to the north, additional apartment buildings will be built in the south east of the urban village. This will include two additional four-story apartment complexes with underground parking on the east side to the proposed extension of James Street Road. This will result in high population density per acre. Townhomes will be built east of the two apartment complexes, and to the east of those, single family residences will be left as it is in the proposed plan. To the west of the proposed extension of James Street Road, townhomes will be built, as well as leaving some single family residences as in the proposed plan.

Figure 3. Updated map of alternative action edited by Jared Zeretzke.



Land Use	Acres	Ratio
Residential	43	32%
Open Space	71	53%
Roads	21	15%
Total	**135**	**100%**

Residential Building Type	Units
Single Family	115
Town House	347
4-Story Apt.	356
6-Story Apt.	119
Total	**937**

22 units per acre

Under this alternative plan 115 single family units and 347 townhome units will be constructed. Similarly ten 4-story apartment buildings and four 6-story apartment buildings, with 356 units and 119 units respectively, will be constructed. In total, 937 units will be built under this alternative plan, with a total of 22 units per acre. This density is increased from 14 units per acre for an increase of 57 percent.

The land use for this alternative plan will provide 43 residential acres, 71 open space acres and 21 acres of road, totaling 135 acres. The residential area will consume 32 percent of the total area, while the open space and roads will occupy 53 percent and 21 percent respectively.

This alternative Action plan includes closing James Street during the day to thru traffic, and opening it during the night. The closed portion of this road will be made pervious to help reduce the amount of runoff that is a result of impervious services. The main street will be detoured to the street to the east of James Street Road.

NATURAL ENVRIONMENT

EARTH AND GEOLOGY

Existing Conditions

The King Mountain area was predominantly shaped by the formation of the Chuckanut Mountains and then covered with glaciomarine drift. The development site of the King Mountain Neighborhood Urban Village is comprised of two soil types: Nati loam and Whatcom silt loam (Figure 6). The Whatcom silt loam is located on the western half of Area 1 and Area 2 with slopes of 3 to 18 percent (Figure 5). Nati loam is located on the eastern half of Area 1 and 2, with slopes of 5 to 60 percent (Figure 4). These soils were formed from glaciomarine drift, where glacial ice and marine waters were in contact. The soils contain volcanic ash and unsorted unstratified pebbly, sandy debris (Soil Survey 1992). With an elevation of 390 feet, this is a prominent feature of Bellingham.

Figure 4. Map of King Mountain pre development sections determined by Sarah Collins.

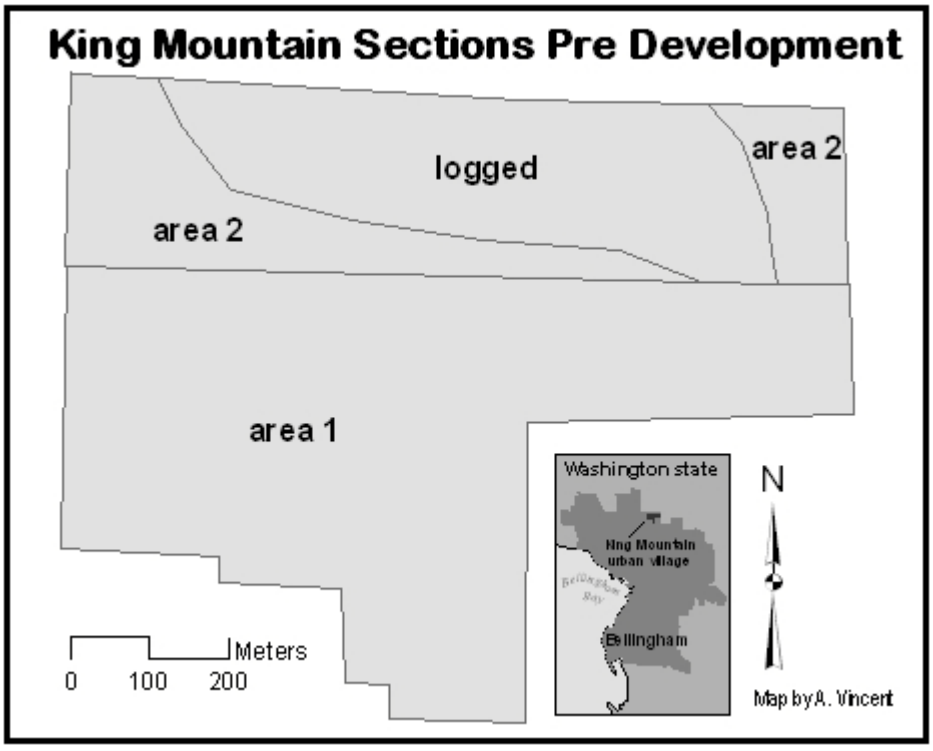


Figure 5. Topography map of King Mountain by Abby Vincent. Data from City of Bellingham.

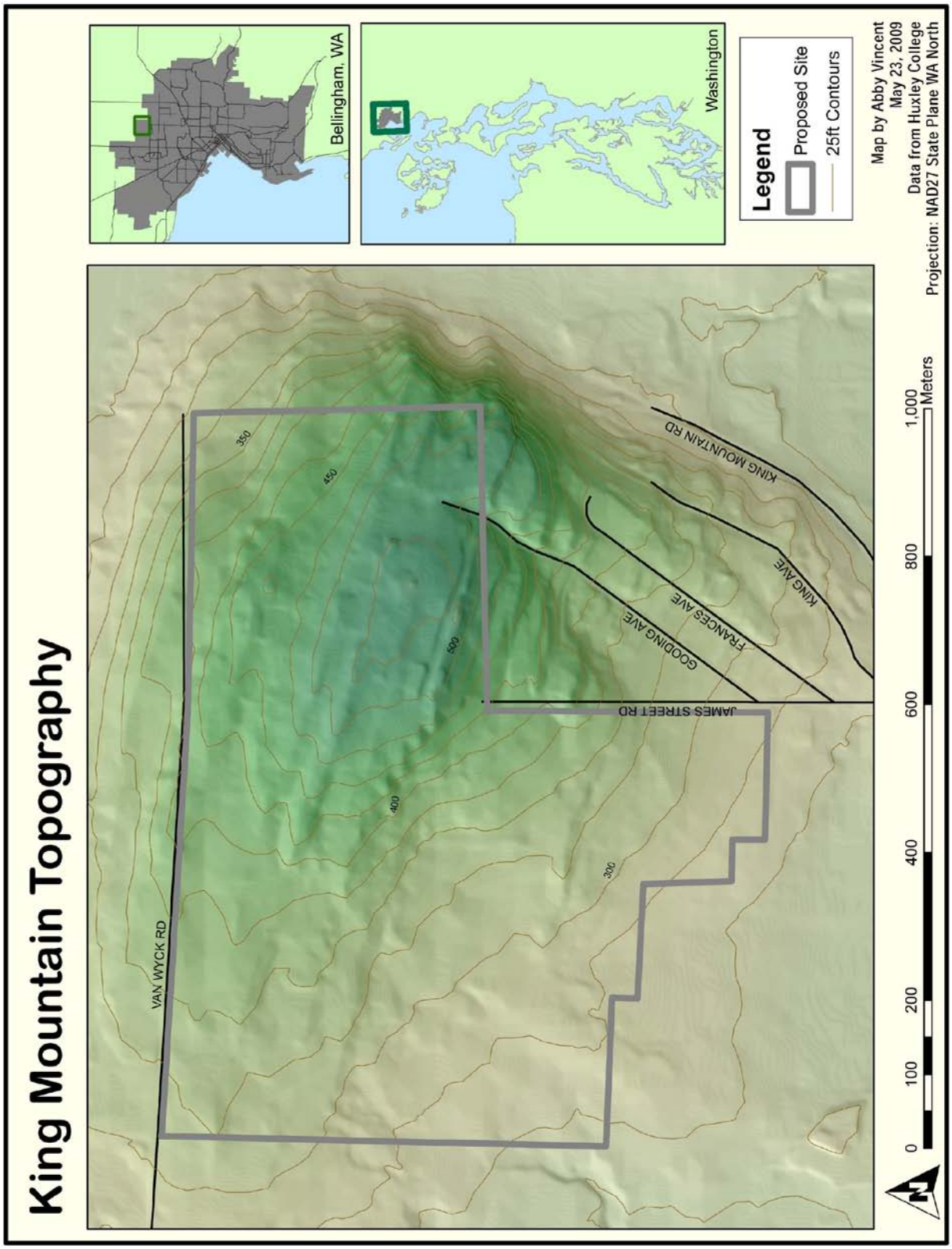


Figure 6. Aerial Soil Map of the King Mountain Neighborhood Center. (USDA).

Soil Types

108- Nati loam with a 5 to 15% slope
109- Nati loam with a 15 to 30% slope
110- Nati loam with a 30 to 60% slope
179- Whatcom silt loam with a 3 to 8% slope
180- Whatcom silt loam with a 8 to 15% slope
Source: Soil Survey of Whatcom County, Washington, USDA, 1992.

The two soil types are categorized into hydrologic groups. Hydrologic groups classify soil based on runoff potential. The soils are assigned to each group according to the rate of water infiltration when the soil is saturated and the infiltration rate during long-duration storms (Soil Survey 1992).

Whatcom silt loam is very deep, moderately to well drained soils consisting of a mixture of loess and volcanic ash with gravelly silt loam mixed in. This soil type is in the hydrologic group C. Whatcom silt loam has a perched water table, between 1.5 and 3 feet from December to April (Soil Survey 1992). Permeability is moderate in the upper part and slow in the lower part, due to a layer of clay. Whatcom silt loam has low to moderate shrink-swell capacity, the swelling of clays when water is absorbed and the compaction of soil when the clay dries. This is an important factor to account for because it could potentially be harmful for building foundations (Soil Survey 1992).

Nati loam is deep, well drained soils consisting of a combination of colluvium and alluvium derived from sandstone and siltstone. This soil also contains a mixture of volcanic ash and glacial till (Soil Survey 1992). This soil type is in the hydrologic group C. Nati loam has a water table at 6 feet and a low shrink-swell capacity. Permeability of this soil is moderate, and the effective root depth is between 20 and 40 inches. The hazard of water erosion on level to slight slopes is minimal because runoff is low (Soil Survey 1992). However, because of some steep slopes that this soil occurs on, runoff can be moderate, raising the water erosion level to medium.

Group C soils have a slow infiltration rate and water transmission when thoroughly wet. The soils chiefly consist of a layer that impedes the downward movement of water (Soil Survey 1992).

Impacts

Proposed Action

Development within the King Mountain neighborhood area would increase runoff by the building of impervious surfaces from roads, driveways and housing. During construction, soil will be disturbed, first from the removal of many trees which stabilize the existing soil and second from the building of the urban village. This disturbance will cause erosion and decreased soil stability within the area. After the area has been developed, erosion on a daily basis will not occur, as the land will become more stabilized through compaction and green space landscaping. However, the overall decrease in absorption from native vegetation will increase the flood potential. Storm water management is discussed in the Water section.

Mitigation

The use of heavy equipment and machinery when both types of soils are saturated causes extreme rutting and soil damage. Using low pressure ground equipment will minimize any damage to the soil. Construction during drier seasons and carefully planning for road construction will effectively minimize soil disturbance and erosion (Soil Survey 1992). Since Whatcom silt loam has a high seasonal water table, the ground can become quite wet. To reduce any wetness when building on Whatcom silt loam, housing and other buildings can be built on pads, and have drainage tile built around footings (Soil Survey 1992). Around buildings, plant as much native vegetation to stabilize soils. Using native vegetation lessens the use of fertilizers and absorbs more water. Using plants with less maintenance will lessen the use fossil fuels from gardening tools.

Alternative

Reducing the footprint size of the number of buildings will reduce the impacts on soil. Less soil will be disturbed from the building of roads and extra houses. However, most of the northern property has been logged so some of the soil is loose, but will be replanted with native vegetation or grass for recreation fields. Making the main street road which runs through the plaza shopping area with pervious surfaces will lessen the runoff in the most land-covered areas. This will reduce the total runoff in the heavily developed area.

Development of the area and the placement of impervious surfaces will undoubtedly increase the amount of runoff in and around the site of the King Mountain Neighborhood Urban Village.

No Action

The soil environment would remain unaffected. This could become a public park and left as open space, as the views of mountains, water, and the city can be seen from the property. Since some of the area has been logged, it would be left cleared, and encourage sediment runoff. There are fewer buffers to slow down runoff from King Mountain, which will affect houses below the proposed development area.

AIR

Existing Conditions

King Mountain exists in a marine west coast climate. Westerly winds off the Pacific Ocean bring cloudy skies, much precipitation, and mild temperatures. As the air rises over the North Cascade Range, precipitation is released.

The Northwest Clean Air Agency is responsible for ensuring compliance with federal, state and local air quality regulations in Island, Skagit and Whatcom counties. Air quality is categorized using the Air Quality Index (AQI). It tells us how clean or polluted our air is, and what associated health effects might be a concern. The Environmental Protection Agency (EPA) calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter or PM), carbon monoxide, sulfur dioxide, and nitrogen dioxide (Northwest Clean Air Agency 2009). Some emissions are not regulated, such as carbon dioxide. Also, there is no regulatory framework to address air pollution that crosses international boundaries (Northwest Clean Air Agency 2009).

AQI values range from 0-500. A higher AQI value means more air pollution and greater health impacts. AQI values below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy—at first for certain sensitive groups of people, then for everyone as AQI values get higher (Northwest Clean Air Agency 2009).

Air pollution control in Washington is based on federal, state and local laws and regulations. The federal Environmental Protection Agency, the Department of Ecology and local clean air agencies, all regulate air quality. Ecology implements and enforces air quality regulations in counties without an air pollution control agency. Ecology also has jurisdiction over primary aluminum plants, pulp mills, vehicles and vehicle-related sources (Washington State ECY Permit Handbook 2007).

Some air pollutants have already been emitted, as some of the development area has already been logged.

Impacts

Proposed Action

Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, demolition, burning, and working with toxic materials. All construction sites generate high levels of dust typically from concrete, cement, wood and stone which can carry for large distances over a long period of time. Construction dust is classified as PM10—particulate matter less than 10 microns in diameter, invisible to the naked eye (Sustainable Build 2009). Research has shown that PM10 penetrate deeply into the lungs and cause a wide range of health problems including respiratory illness, asthma, bronchitis and even cancer. Another major source of PM10 on construction sites comes from the diesel engine exhausts of vehicles and heavy equipment. Diesel is also responsible for emissions of carbon monoxide, hydrocarbons, nitrogen oxides and carbon dioxide. Noxious vapors from oils, glues, thinners, paints, treated woods, plastics, cleaners and other hazardous chemicals that are widely used on construction sites also contribute to air pollution (Sustainable Build 2009).

Mitigation

Our alternative is to use techniques to lessen the impact of construction on the environment. These include:

- Screening parts of the site to stop dust spreading, or alternatively, place fine mesh screening close to the dust source.
- Covering skips and trucks loaded with construction materials and continually damp down with low levels of water.
- Cover piles of building materials like cement, sand and other powders, regularly inspect for spillages, and locate them where they will not be washed into waterways or drainage areas.
- Use non-toxic paints, solvents and other hazardous materials wherever possible.
- Segregate, tightly cover and monitor toxic substances to prevent spills and possible site contamination.
- Use low sulfur diesel oil in all vehicle and equipment engines, and incorporate the latest specifications of particulate filters and catalytic converters.

- No burning of materials on site.
- Replant vegetation as soon as possible leaving trees and shrubs intact.

By making the urban village a pleasant place that residents want to be, it may encourage walking instead of driving which will lessen the usage of fossil fuels and the emissions of greenhouse gases.

Alternative

With the implementation of the alternative plan to reduce the number of single family residences, air quality will be reduced. Carbon emissions from single family homes are greater than emissions from apartment and townhouse units. The building of more complexes will reduce the amount of emissions from the area. However, the number of people living in the area will not change, therefore the number of vehicle trips will not change. The reduction of emissions from driving will not significantly change. Leaving the northern part of the site as open space and replanting native species, this will increase the amount of carbon sequestration in the area.

It is unavoidable that vehicle usage for construction will release greenhouse gases. After the completion of the project there will also be vehicle usage of the residents in the urban village.

No Action

Some air pollutants have already been emitted, as some of the development area has been logged. If development does not continue to occur, no air pollutants will be emitted from construction and post development.

WATER

Existing Conditions

Surface Water

The area to be developed lies within the Squalicum Creek Watershed (Figure 7). There are no streams that run through the area, but a few do exist that are below the mountain including Cougar Creek, James Street Creek, Telegraph Creek and Cammack Creek. These small streams connect to Baker Creek then to the main tributary of Squalicum Creek (Figure 8).

Currently, Squalicum Creek is below class AA for some of the water quality parameters. According to the Urban Streams Monitoring Program, fecal coliform bacteria has exceeded class B, dissolved oxygen has been below the life-sustaining 5.0 mg/L in August of 2006, temperature has exceeded class AA, and turbidity has exceeded 5 NTU during the rainy season. Judging by the overall parameters of Squalicum Creek, it is declining in health (Appendix 1 through 4).

Wetlands

Four small wetlands lie in the southwestern corner of the King Mountain neighborhood area (Figure 10). Other larger wetlands lie below the development area along James Street Road going south (Figure 9). Wetlands are important within any habitat system because they support a diverse range of plants and animals, as well as filtration of any water runoff. The wetlands within the area have not been rated or categorized under the city of Bellingham's wetland category system. These wetlands are regulated wetlands, as they were not formed by human activity and are greater than 1/3 acre in size (Bellingham Municipal Code Critical Areas 2009). According to the Bellingham Municipal Code and depending on the category and level of function of the wetlands, different buffers are assigned. No activities are allowed in wetlands that result in the loss of the buffer that protect wetlands (Bellingham Municipal Code Critical Areas 2009).

At the Federal level, the Army Corps of Engineers regulates wetlands under the Clean Water Act and Coastal Zone Management Act. Aspects of this authority have been delegated to Washington's Department of Ecology. Washington State agencies regulate wetlands under the Hydraulic Code, State Water Pollution Control Act, Shoreline Management Act, and the Forest Practices Act. Local governments such as the County or City, regulate wetlands under the

Growth Management Act and the Shoreline Management Act (Washington State ECY Permit Handbook 2007).

Figure 7. Squalicum Creek Watershed map by Abby Vincent. Data from City of Bellingham.

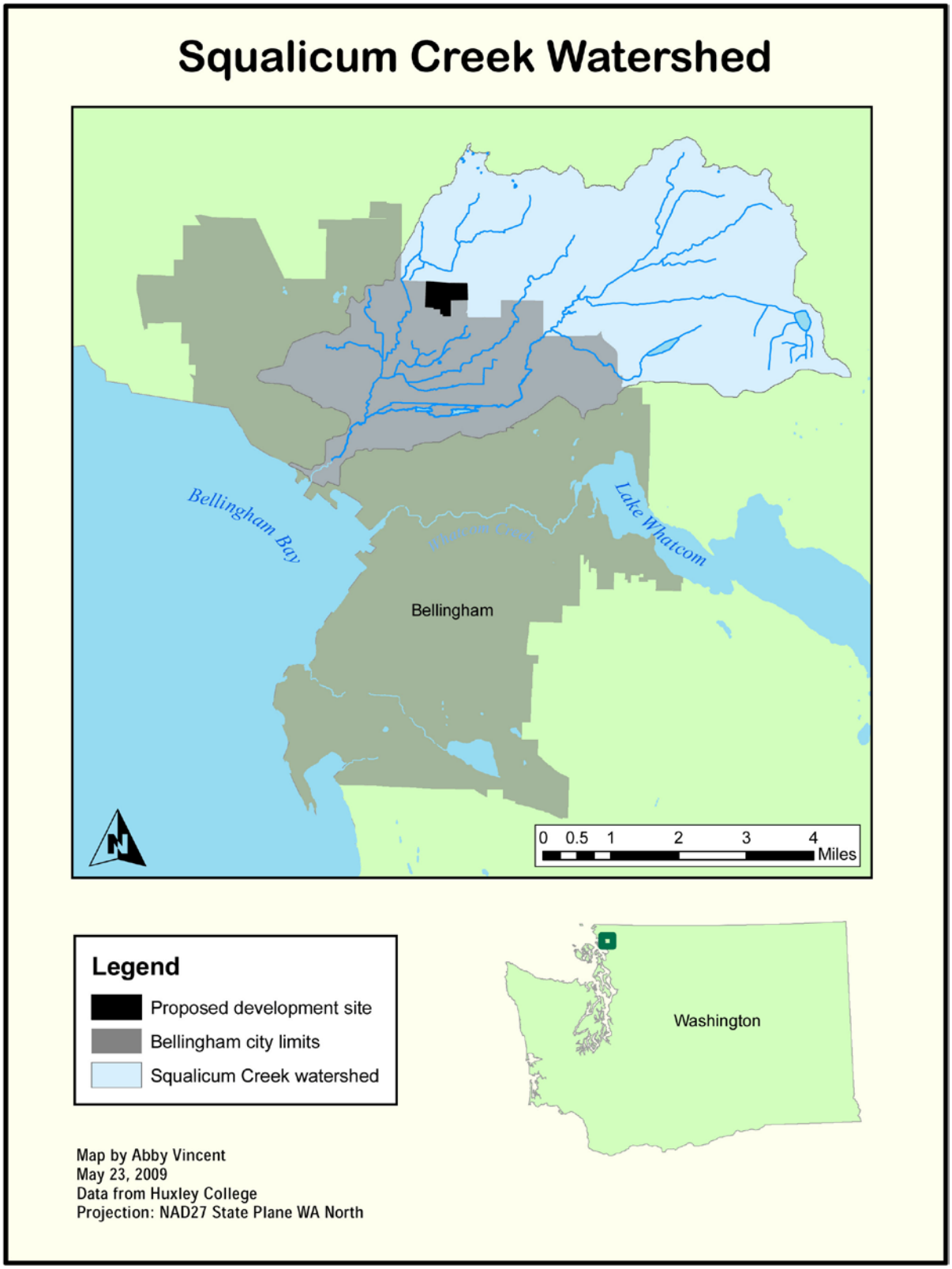


Figure 8. Squalicum Creek Watershed Subregions map by Abby Vincent. Data from City of Bellingham.

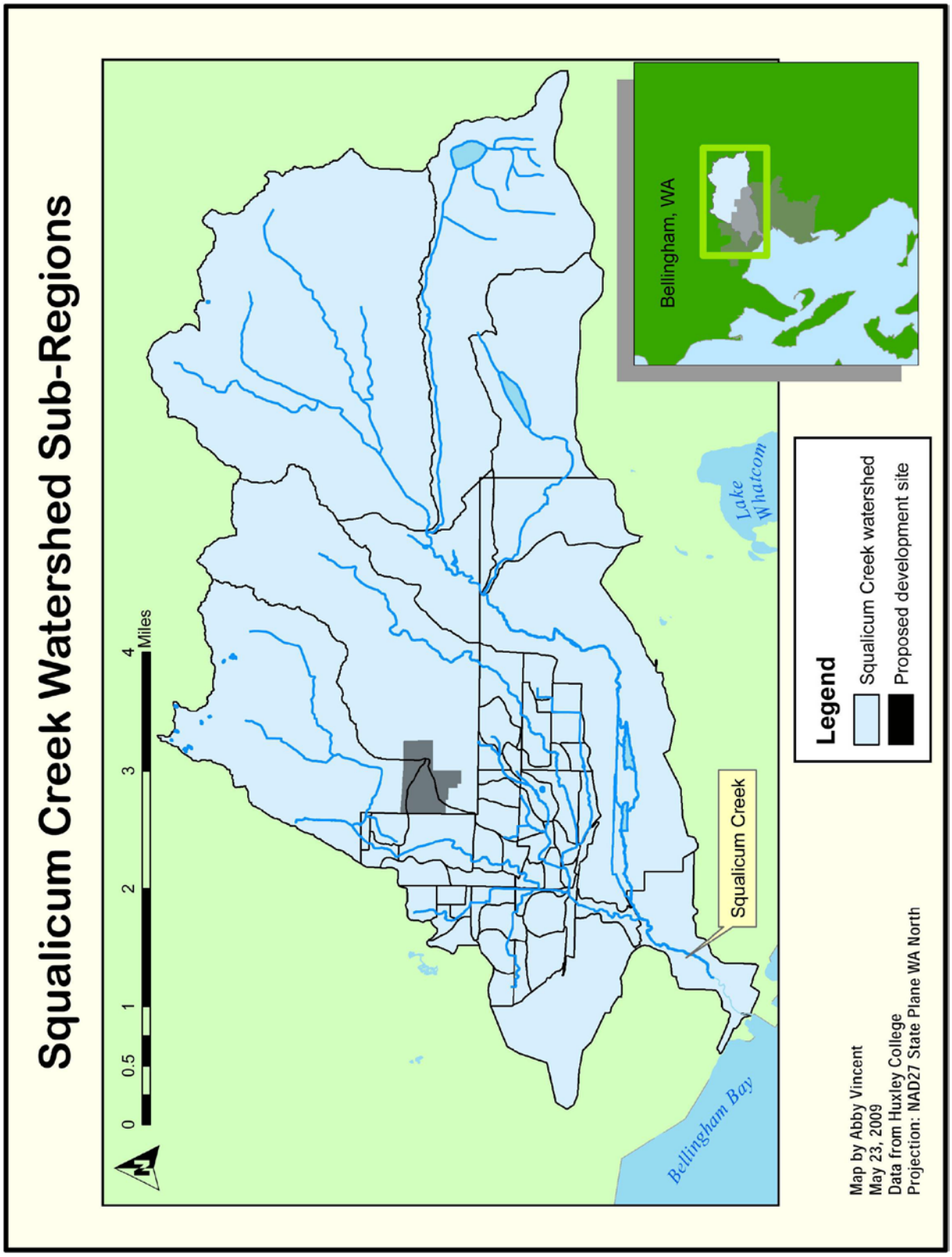


Figure 9. Wetlands of King Mountain Neighborhood map by Abby Vincent. Data from City of Bellingham.

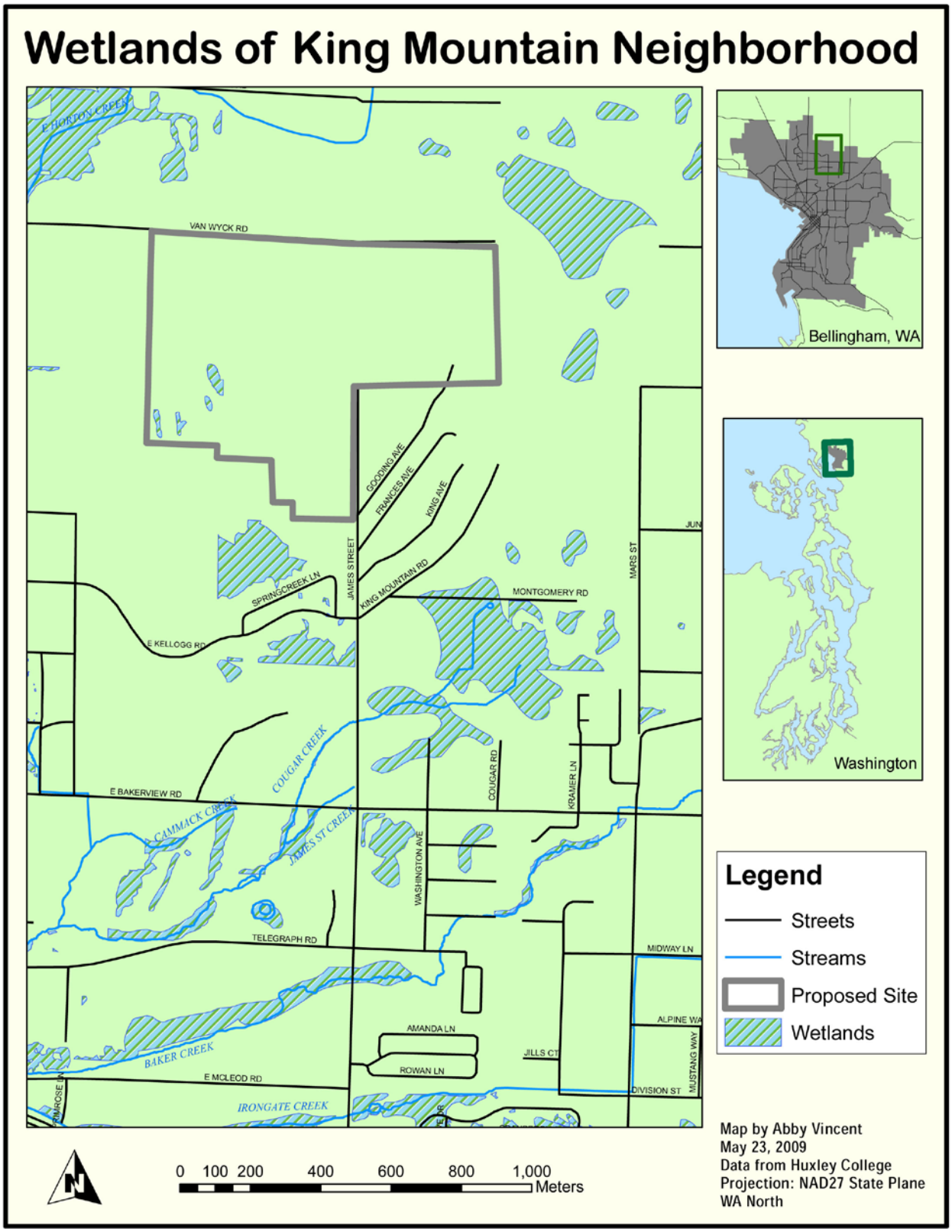
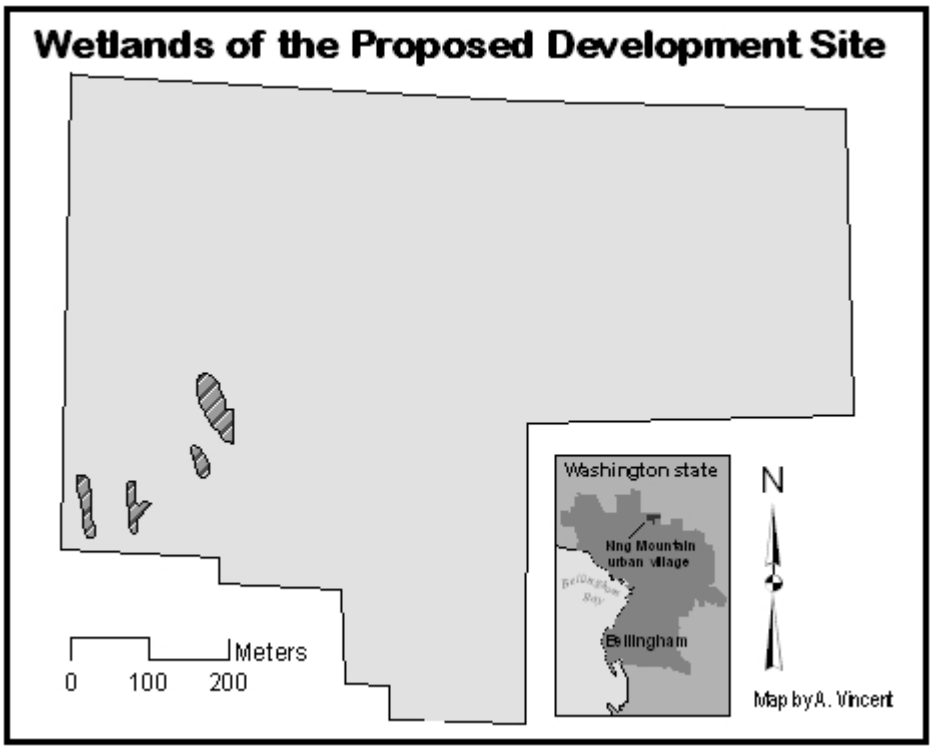


Figure 10. Uncategorized wetlands on King Mountain Neighborhood Urban Village Site. Data from the City of Bellingham, 2009.



Groundwater, Absorption and Runoff

Whatcom silt loam has a slow infiltration rate so is not considered a great soil type for groundwater recharge. The impervious clay layer prevents water from reaching a certain depth. Nati loam has better potential for groundwater recharge because of its well drained composition. Both types of soil are not considered to be areas that can provide recharge to aquifers (Soil Survey 1992).

Flooding

Flooding has not been recorded in the King Mountain Neighborhood area. Streams below King Mountain such as Squalicum and Baker Creeks tend to flood during heavy rains.

Impacts

Proposed Action

Surface Water Quality

Runoff may carry pollutants and sediments causing habitat destruction. Common substances in urban runoff are heavy metals and organics. Sources of this pollution are illegal dumping in storm drains, vehicle discharges, and fertilizers. Fish are especially sensitive to toxic substances. Runoff from the development area may have sediments suspended, both during construction and after completion. An increase in water turbidity increases surface water temperature. Fish can only survive in a small range of temperatures, and eggs are even more sensitive to temperature fluctuations.

An increase in temperature can also affect the dissolved oxygen present within the water. As temperature increases, the dissolved oxygen concentration decreases. This poses problems with aquatic species, as growth and development are dependent on high levels of dissolved oxygen.

Other water quality factors such as fecal coliform can be increased due to an increase in sediment transport, as sediment transport can also transport other bacterial and viral agents. As runoff increases from the development area, fecal coliform levels will most likely increase, as people living in the new urban village will have dogs, which will contribute to the increased levels.

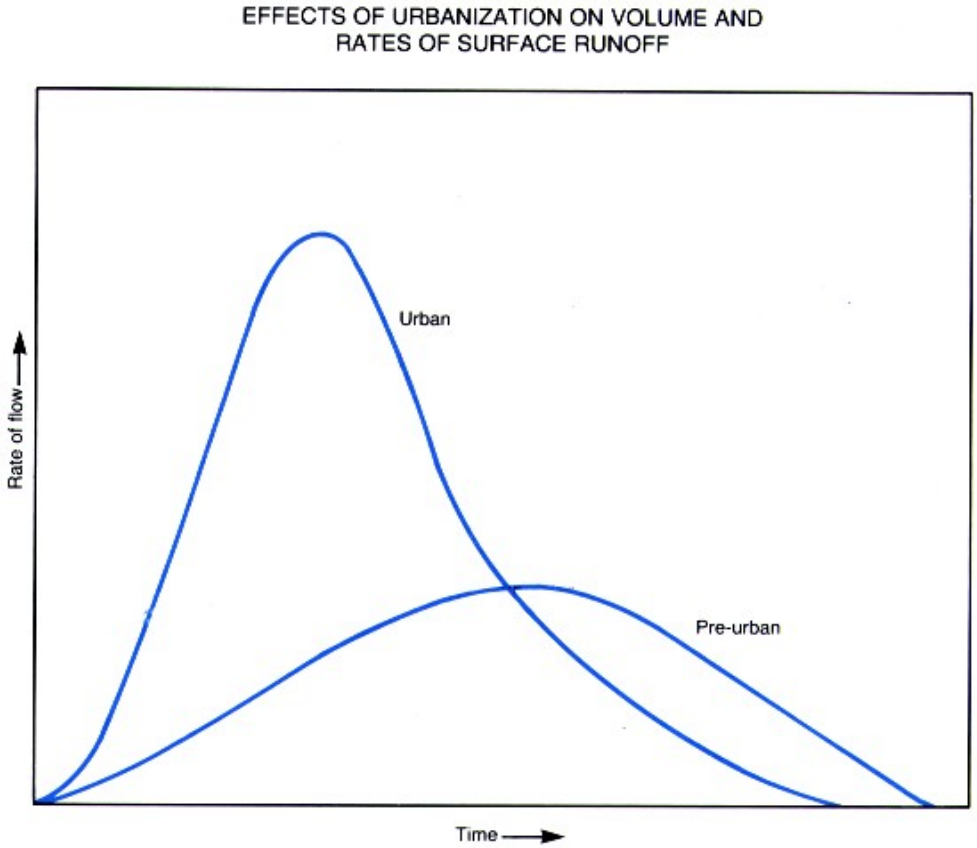
Wetlands

According to Alliance Property's proposed development plan, the wetlands will be completely filled and built over. The proposed commercial development will sit over the wetlands. This will result in local habitat loss and loss of wildlife diversity in the King Mountain Neighborhood Area. The filling of the wetland may increase storm water flows, and since wetlands are natural filters for water, this filtering ability will be lost. Since this is a small wetland system on King Mountain, it most likely does not contribute a significant amount to the overall function of the lower wetlands and streams (Figure 9). The development of the urban center will have minimal overall negative effects to the functioning of wetland systems in the immediate area. It is unclear how Alliance Properties obtained permission to fill the existing wetlands since the Bellingham Municipal Code does not allow activity that will result in a loss of wetland function.

Groundwater, Absorption and Runoff

Once the land and vegetation are cleared for development and impervious surfaces are installed, the volume of surface water runoff will be increased. This surface runoff will increase the volume of water flowing into streams below the development area, which will eventually reach the largest tributary, Squalicum Creek. This will increase those streams total volume and velocity, and may cause stream bank erosion. (Figure 11).

Figure 11. General Effects of the correlation of urbanization and the increase in surface runoff.



Adapted from Drainage Manual, Roads and Transportation Association of Canada, 1982.

The commercial and multi-family housing will be built mainly on Whatcom silt loam (Area 1) and the single family residences will be built mainly on Nati loam on the northern side of Area 2 and on the southern end of Area 1 (Figure 4). Since Whatcom silt loam has a lower infiltration rate due to impermeable clay layers, this will have to be taken into consideration when construction of storm water and sewage amenities. However, Area 1 has slopes with a maximum of up to 15 percent, which is less difficult to develop on. The single family residences in Area 2 will be on soil that has up to 30 percent slopes, so any runoff will have to be considered and storm water facilities will have to be carefully planned.

Storm Water

Storm water treatment will need to be considered when constructing the urban village. The impervious surfaces will increase the need for treatment of the excess water. The treatment will remove toxic substances, oil, and any other harmful substances to protect ecosystems below the development area. The best storm water treatment technique for this development area is storm water treatment vaults. Treatment vaults contain filters that remove sediments and pollutants from storm water before discharging to streams (Urban Streams Monitoring Program 2006). Other more cost effective storm water management techniques include bioswales, dispersion trenches and low impact development techniques. A retention pond or man-made wetland in the southwest area may be helpful in storm water collection.

Mitigation

To minimize any potential for sediment leaving the site during construction, Best Management Practices will be used. These include storm drain filters, bioswales, silt fences, vegetated buffers, and tarped soil piles. Additional monitoring will be required during the construction phase.

Crushed compacted gravel for driveways or permeable pavement are alternatives to the regularly used concrete driveways. Sustainable drainage systems and rain gardens are also ways to reduce any excess runoff. Replanting of the once completed urban village with native plants will help absorb any runoff. Grasses will help absorb any surface runoff and trees and deep rooted shrubs will absorb any excess groundwater. Green construction practices can be utilized to lessen the urban center's impact of the environment. This may include:

- Preserving existing trees and grass where possible to prevent erosion

- Re-vegetate the site as soon as possible
- Use BMPs to trap sediment flow on the down slope side of the lot
- Place soil piles away from any roads or waterways
- Downspout extenders to prevent erosion from roof runoff

Alternative

Reducing the footprint of the whole development area will lessen the impact of soil and reduce the amount of vegetation lost to construction. This will reduce the amount of runoff while increasing the absorption ability of the entire site. Less runoff will drain into the creeks below King Mountain, therefore reducing the amount of pathogens, sediment and fecal coliform going to the creeks. The denser a development, the easier it is to build and maintain stormwater systems, keeping the water quality below the mountain and soil from eroding during storm events.

Runoff is unavoidable. The building of houses and apartment will increase runoff from roofs, patios, and decks. The excess water will increase the volume of the small creeks below King Mountain, and therefore affect Squalicum Creek. Pollution is avoidable with the use of BMP's and green construction materials.

No Action

The existing conditions would not change and no extra runoff would affect streams and wetlands below the neighborhood area. Since part of the proposed area has been logged, more than normal runoff is expected. However, there are wooded areas around the logged area, so those will act as buffers to absorb and filter any possible runoff. Water quality parameters such as fecal coliform, dissolved oxygen, temperature and turbidity will not be affected by this area if no development occurs. Squalicum Creek will continue to degrade with other development within the watershed.

VEGETATION AND ANIMALS

Existing Conditions

The 135 acres of the proposed area are divided into two vegetation sections for separation of habitat types (Figure 4). Area 1 has been partially logged and a road has been cleared that leads to two radio towers. The area surrounding the towers and the rest of the habitats in Area 1 have otherwise not been changed. The road through Area 1 leads to Area 2, which has been extensively logged in the last few years. Within the logged area, a few conifer trees have been left and most of the deciduous trees have been logged.

Field observations indicate that most of the vegetation in the property is deciduous trees and shade-tolerant shrubs. Few coniferous trees exist in the entire project area. No developed land currently exists on the property.

Area Description

Vegetation Area 1. This area is located directly west of Gooding Ave. It is a relatively young forest stand dominated by Big Leaf Maple, Western Red Cedar, Red Alder, and a few Douglas Fir. The major understory vegetation includes Sword Fern, Snowberry, Thimbleberry, Himalayan blackberry and Willow. Area 1 has varying slopes, between 3 and 15 percent.

Vegetation Area 2. This area is located along the south side of Van Wyck Road. This is also a younger forest stand, dominated by Big Leaf Maple, Red Alder, Western Red Cedar, and a few Douglas Fir and Grand Fir. The major understory vegetation includes sword fern, snowberry, Thimbleberry, Himalayan blackberry, Willow, Nettle, Lamb's Ear and Burdock. Area 2 has varying slopes, between 8 and 30 percent, with the majority of the area on the southern end being the steepest at 30 percent.

Plants

There are no existing plant inventories for the proposed area. Our team surveyed existing plant conditions using aerial photographs and surveying species in the field (Table 1). Based on *Soil Survey of Whatcom County Area*, the habitats in the proposed area are well suited for all plant type growth (Table 2).

Table 1. Plant species identified in several contiguous vegetation areas within the King Mountain development area. Data collected in the field by EIS preparers Zoe Nelson and Sarah Collins.

TREES	**Area 1**	**Area 2**
Big Leaf Maple	X	X
Red alder	X	X
Cottonwood	X	X
Western red cedar	X	X
Grand fir		X
Cherry	X	
Western Hemlock		X
Douglas Fir	X	X
SHRUBS AND UNDERSTORY		
Swordfern	X	
Snowberry	X	
Thimbleberry	X	
Himalayan blackberry	X	X
Willow nettle	X	X
Burdock		X
Lamb's ear		X
Clover	X	X

Table 2. Potential for Vegetation Habitat Based on Soil Type. The following data was taken from Soil Survey of Whatcom County Area, Washington, 1992.

Soil type	Wild herbaceous	Hardwood trees	Coniferous plants	Shrubs
108/109-Nati loam	good	good	good	good
110- Nati loam	good	good	good	good
179- Whatcom silt loam	good	good	good	good
180- Whatcom silt loam	good	good	good	good

Animals

There are no existing wildlife inventories of the project area, so we have adapted wildlife information from similar habitats and applied it to the proposed project area. The species that are likely to be in the annexation area are listed in Table 3. There are no known threatened or endangered species in the proposed development area. The potential for wildlife species in certain habitat types within the proposed development area is listed in Table 4.

Table 3. Wildlife Species identified in the King Mountain development area. The following list of wildlife species was taken from the City of Bellingham Wildlife Assessment March 2003.

Birds	**Birds cont.**	**Mammals cont.**
Red-tailed hawk	Warbler	Raccoon
Western screech owl	Vireo	Opossum
Northern saw-whet	Sparrow	Porcupine
Northern flicker	Finch	
Downy woodpecker	Blackbird	
Flycatcher	Meadowlark	**Reptiles**
Swallow	Grosbeaks	Common garter snake
Chickadee	Common snipe	
Wren		**Amphibians**
Kinglet	**Mammals**	Red-legged frog
Thrush	Black-tailed deer	Pacific tree frog
Waxwing	Coyote	
Warbler	Striped skunk	

Table 4. Potential for Wildlife Habitat Based on Soil Type. The following data was taken from Soil Survey of Whatcom County Area, Washington, 1992.

Soil type	**Open-land**	**Woodland**	**Wetland**
108/109- Nati loam	good	good	poor
110- Nati loam	fair	good	very poor
179- Whatcom silt loam	good	good	very poor
180 -Whatcom silt loam	good	good	very poor

Impacts

Proposed Action

The development of the King Mountain Neighborhood will increase the rate of residential development and the loss of plant species and animal habitat.

Clearing the heavily forested areas will cause total loss of native plant species. Also, fragmentation of the proposed development area will remove necessary habitat for native animals, and cause loss in forest connectivity that may not be suitable for some of the animals currently inhabiting those areas. This increase in forest patches causes loss in habitat due to isolation and possible invasive species. The deforestation of the King Mountain area will force animals to be relocated.

The permanent construction of the residential buildings will eliminate almost all plant species in Area 1 west of the radio towers. The complete west end and the northern side of Area 2 will be forested for development. The remaining land is being left as open space, incorporating trail systems and leaving many trees. Potential hazardous pollution, automobile traffic and other human activities will cause plant and animal mortality. As a result of this environmental disturbance, native biological diversity will decline as plant and animal species decline.

Mitigation

Native plants as landscape for the development area will absorb runoff. Grasses will help absorb any surface runoff. Trees and deep rooted shrubs will absorb any excess groundwater. The use of permeable pavement on the main street will also lessen runoff and require less absorptive plants for excess water. Leaving as many trees during the development of the urban center will leave the urban village with more character.

Alternative

Trees in the northern development area have already been logged. Trees and grass will replace this area for open space and recreation. The building of less square footage of buildings will reduce the overall elimination of native plants in the area. Some native animals will be displaced, but with the replanting of the large logged area, habitat will be restored.

The loss of plant and animal species and habitat is unavoidable should the proposed development be carried out. The logging of the forested areas is necessary in order to make enough cleared area for the proposed neighborhood. Even if the proposed mitigation techniques are applied, the forested areas will become fragmented, leading to loss of certain plants and animals. This disconnect of forested areas will lead to the migration of established animals.

No Action

Part of the proposed area has already been developed, so some habitats have already been lost and fragmented. If no further logging or development occurred on the site, the logged area will reestablish with native vegetation already adjacent to the logged area.

BUILT ENVRIONMENT

ENVIRONMENTAL HEALTH

Existing conditions

The proposed development area has already been logged in the northern side. This has already damaged some natural aspects of the area, including plants, animals, soils and surface water.

Proposed Action

The development of a 135 acre plot on King Mountain will bring potential impacts on the environmental health of the area and the surrounding areas. Construction and human habitation will degrade the natural aspects of the area and also contribute to increased noise and traffic to the surrounding areas. The number of trips to and from the urban village during construction and after will affect the houses already established, as noise and traffic will increase. The use of street lighting, paints, and other construction materials will contribute to light pollution, air pollution, and some surface water pollution. The installation of electric and sewer lines will affect soil and vegetation both inside and outside of the development area. These could also pose a risk of leakage or other harmful hazards.

Alternative

The alternative is to build less single family homes, and to build more 4-story apartment buildings and shut down the proposed James Street extension during the day. Green space for parks will be left for recreation and preserves wildlife habitat. The use of low impact heavy machinery, buffers, and best management practices will help mitigate environmental impacts. Best management practices entail leaving as many plants and trees as possible, and using green construction materials to significantly reduce the impact of development.

No Action

Since some logging has already been done, there has already been significant damage to soil and vegetation. Leaving the site undeveloped will not pose any hazards to the natural environment. After time, trees will reestablish in the logged area and grow back to the way King Mountain was before any of the logging within the area occurred.

LAND USE AND RELATION TO LAND USE POLICIES

Existing Conditions & Policies

Urban Growth Area Boundary

Bellingham added King and Queen Mountain (286 acres of rural land) to its urban growth area, allowing those areas to be developed at higher densities. Alliance Properties plans on developing a large-residential commercial project on King Mountain. Incorporating this property into the UGA also gives the city and county control over which land Alliance Properties sets aside for parks or wilderness as a condition of annexing to the city.

Transfer of Development Rights

Transfer of developmental rights reduces the development potential in the Lake Whatcom Watershed by setting up a system whereby private property owners work with other property owners to transfer existing residential development rights from the watershed to other areas of the city where development is preferred. The King Mountain Neighborhood was annexed into Bellingham city limits and has the largest area designated for using transferred development rights (Transfer/Purchase 2009).

Under this process, the city of Bellingham enters a development agreement with landowners that states whether the landowners want to develop their land. For every five acres owned and annexed, landowners must purchase and remove the right to develop one home elsewhere on agricultural or watershed lands. Those rights can then be applied to their land, allowing them to build more housing units than otherwise would be allowed. In exchange, the county will not ask for a hearing to fight the annexation. Ralph Black is the only person to have followed through with the process of TDR ("City Issues Feasibility" 2009).

Five-Year Review Area

The King Mountain area, which is one of four areas included in Whatcom County's 5-Year Review Plan, has 286 acres. These areas have been identified for consideration during Bellingham's Five-Year Periodic Review. These areas are within a larger urbanizing area or influence area. Environmental opportunities may exist for park and trail development and conditions around these areas may change during the next five years in such a way as to

contribute to their potential for urban designations within Bellingham's Urban Growth Area. The King Mountain area abuts the Stuart/Smith 5-Year Review Area.

Comprehensive Plan

The Growth Management Act establishes the primacy of the comprehensive plan. The comprehensive plan initiates any planning process and is the centerpiece of local planning. Alliance Properties is required to submit development regulations, such as zoning, subdivision and other controls to the city of Bellingham, and these controls must be consistent with comprehensive plans and development regulations (Bellingham Comprehensive Plan 2008).

Neighborhood Zoning Plans

Existing Zoning

Alliance Properties plans on developing a large residential-commercial project on King Mountain with 14 residential units per acre of residential land.

Proposed Action

Alliance Properties has proposed development of high-density, mixed-use urban village on 135 acres of undeveloped land on King Mountain near James Street. Sixty-eight acres will be used for residential land, 46 acres for open spaces and parks, and 21 acres for roads.

Alliance Properties intends to be accountable in providing adequate greenways set aside in their development. The Parks Department will coordinate with the other land owners in the area to ensure that needed trail connections are clearly identified and provided as the area is further developes.

Impacts

The proposed zoning of this area will likely result in rapid development, and a significant increase in infrastructure, roads, and traffic. Developing this area as a high density mixed-used

neighborhood will have significant impacts on the surrounding environment, involving clearing of vegetation and disturbing ecosystems.

Mitigation

Enacting a stewardship policy will mitigate impacts of new development through legal commitment to reducing the use of natural resources, investing in green buildings, vehicles and materials, and improving the overall quality of life. This policy includes limiting development & sprawl over the next 50 years and placing buffers between buildings and natural open spaces. Under the Stewardship Policy, any new public developments or remodeled spaces will maximize construction waste recycling and use recycled &/or renewable materials.

Alternative Action

See page 12 for a detailed description of the alternative action plan. The policies governing the development of this area will not change with the implementation of the alternative action plan proposed. Differences in land use between the Proposed Action and Alternative Action may result in the creation of more open space, wetlands, ponds, parks, etc.

No Action

No Action in the proposed area of development will result in no change to the existing zoning and land use policies.

NOISE

Existing Conditions

Noise is minimal in this region.

Impacts

Proposed Action

Noise will always be generated during the construction process, from clearing the site with chain saws to the air compressors that are used to power a paint gun to put the final touches on a building. Noise on this construction site will be expected to start at 7 a.m. and can run until 10 p.m. as posted on the City of Bellingham Website.

"Construction and industrial noises, including but not limited to, motorized construction and equipment operation, hammering, blasting, drilling and sawing in residentially zoned areas, between the hours of 10:00 p.m. and 7:00 a.m., which unreasonably disturb or interfere with the peace, comfort and repose of others; provided that this subsection shall not apply to noises caused by projects required in an emergency to repair public facilities or utilities or to prevent immediate damage or harm to persons or property; and further provided that this subsection shall not apply if the City Council grants a variance from the provisions of this subsection for the construction or repair of a public facility or utility upon a finding that it is either necessary or in the public interest for all or a portion of the work to be performed between the hours of 10:00 p.m. and 7:00 a.m. The Council may impose such conditions as it deems appropriate upon the granting of a variance" (City of Bellingham, 2009).

Traffic will also be a source of noise pollution. The houses themselves will help reduce the noise from traffic.

Noise pollution from construction of roads and traffic also disrupts animals that communicate by using auditory signals.

Mitigation

In order to alleviate some noise produced by the construction process all tools and equipment will be in good working order. Circular saws and chainsaws, as well as nail guns and other pneumatic tools, will be oiled as frequently as the manufacturers suggest, which for most pneumatic tools is daily. Heavy machinery will also be maintained to reduce noise pollution. Electric air compressors will be used in place of gas or diesel compressors. Noise from traffic will be mitigated by reducing vehicle speeds and limiting heavy vehicle traffic.

Alternative Action

Under the alternative action the amount of noise that is created will be confined to a smaller area. The alternative action will turn an area in the proposed action from a noise emitter to a noise reducer.

No Action

Noise levels in this area of Bellingham are nonexistent; no noise comes from King Mountain at this point in time. Under a no action plan there would be no change to the current noise levels.

HOUSING

Existing Conditions

This area has been cleared to accommodate the development of this site and is not used for residential purposes. There are many single family homes nearby to the south and to the west of this proposed development and a very small number of rural homes to the North and to the East. No housing or buildings of any kind, except for the radio towers on the top of King Mountain, exist in the area.

Impacts

Proposed Action

The proposed development of this site is planning on incorporating 241 single family units, 375 townhomes, 236 units in 4-story loft/condo/apartments, 119 units in 6-story loft/condo/apartments for a total of 971 units on 68 acres. This equates to 14 units per acre as well as 28,000 square feet at the base of 4-story buildings and 12,000 square feet at the base of the 6-story buildings for retail space. Notably, in 2006 this area was zoned to hold 2 residential units per acre. All of these housing units will be directed toward middle-income families.

The proposition will spread the city of Bellingham over rural land at the fringe of an urban area. Similarly this is a large tract of land that when developed will be comprised of entirely new buildings.

Mitigation

Assuming that the proposed action encompasses traditional building techniques, mitigation of environmental degradation will occur by using building techniques that foster sustainability. This alleviation will keep the building footprint the same.

The houses and apartment buildings will be designed and built to increase the efficiency of resource use as well as protect the environment around the planned development. Better protection of ecosystems and biodiversity, improved air quality, reduced solid waste and conservation of natural resources can be achieved through thoughtful planning. Economic

benefits include increased value, efficient economic lifecycle, and reduced cost of living while resident health and the local community is rewarded by improving air quality, acoustic environments, comfort, minimized strain on local infrastructure, and a contribution to an overall quality of life. Buildings will be planned to incorporate more thoughtful designs, sites, construction, operation, maintenance and removal.

Foundations

Foundation walls are usually formed by wood and provide the footprint of the house. New methods help reduce the impact a building's foundation has on the environment. Traditional board form foundations are not only extremely time consuming, but they also result in an abundance of waste. This is because the boards can only be reused a few times despite the use of form oils. Plywood or aluminum will be used because they can be easily cleaned and reused. Insulated concrete walls will save on both labor and concrete cost. Foundation walls are thermally connected to the house and insulation is a key element in producing an energy efficient building. Fly ash, a byproduct of coal power plants, will be used to increase the strength durability and water resistance of the foundations.

Framing

Advanced framing is a method used to construct homes that will reduce overall material usage and labor cost while improving energy efficiency. In the state of Washington, walls are typically framed with 2x6 lumber placed 16 inches on center. The major downfall of this approach is that more boards in a wall make less room for insulation and more places for thermal bridging. Advanced framing techniques will be used to minimize the amount of framing that spans from the interior to the exterior of a wall. Using a single top plate with a metal strap to tie two walls together at corners and intersections eliminates the need for a double top plate which reduces the effects of thermal bridging and uses less material than standard framing. Likewise, the use of super insulated headers that employ a metal bracket to eliminate the need for a trimmer stud and provide space for insulation will be implemented. For interior walls, steel studs will be used. They are perfectly straight and relatively easy to install, but steel studs will not be used for exterior walls due to thermal bridging. Finger jointed lumber will be employed for exterior walls. This type of lumber comes from shorter lengths of wood that are bonded together and usually come from forests that are sustainably managed. Gluelams and laminated veneer lumber, will be used in place of solid large dimensional lumber because they are straighter, stronger, and more environmentally friendly. Finally, wood cardboard and metal that is onsite will be recycled

because it is cheaper than the dump and keeps materials out of landfills ("Why Build Green" 2008).

Roofing and siding

Roofing and siding materials will be made of a material that is going to last. Metal roofing and siding last a lifetime, are maintenance free, fire resistant and highly reflective in light colors. In Washington where there is constant rainfall, one must think like a raindrop and avoid flat roofs. Flat roofs encourage standing water which amounts to leakage. Furthermore, flat roofing materials are usually petroleum based and require a copious amount of energy to produce. Vinyl siding will be avoided because the plasticizers in it are known to cause cancer and are difficult to recycle will help reduce exposure. Remember, the lifecycle of a building includes removal of the building.

Plumbing

The technology and methodology for home plumbing has improved drastically over the years. Water heaters are very efficient today and spending more will save more over the life of the product. Solar water heating systems are relatively cheap and simple. Solar water heaters collect heat from the sun on a roof like a solar panel and reduce the load of a water heater. Roughly one-fourth of household energy is devoted to heating water ("A Consumer's Guide 2003). Solar water heaters can save a lot of money over the lifetime of a house. High efficiency toilets, faucets and shower heads will be used and hot water pipes will be insulated.

Electrical

Many simple methods will be used to make the electrical system in a house more efficient. Energy star appliances will be used. These models exceed the energy performance of other models and require no additional work to install. Lighting in a house will be placed thoughtfully and florescent bulbs or LEDs should replace incandescent bulbs. Likewise dimmer switches will be installed because full power of a light is not always necessary. A programmable thermostat will help reduce energy uses when nobody is at home and power strips that can be turned off will be provided, because phantom loads have an unexpected draw on electricity. The use of a photovoltaic solar panel system is currently a costly consideration for supplying energy to a home, but the costs are dropping. Conduit will be roughed in during the construction process of the house because it is much harder to install after the home has been built.

Insulation

Insulation in the built environment is used as a thermal barrier that reduces unwanted heat loss or gains, as well as decreases energy demand. It is critical to have a properly insulated house for it to be as environmentally friendly as possible, otherwise too much unnecessary energy will be used to heat and cool the building. The efficiency of a type of insulation is referred to as its R-value, the higher the R-value the more efficient the insulation. R-value is a rating and does not take into consideration other aspects of insulating, such as draft proofing or environmental factors.

Historically fiberglass batts have been the preferred material used in new home construction. They are an effective insulator in most circumstances, but do not do a good job filling around pipes and electrical boxes, thus allowing air to travel freely in an open space resulting in thermal bridging. Another negative with using fiberglass is that in 1994 the federal government labeled fiberglass as a possible carcinogen. However, this insulation does not pose a significant threat in an average person's daily life because this insulation is contained in walls.

As an alternative to fiberglass, cellulose fiber is a direct substitute that will be used because it is made from 80 percent recycled newspaper ("Why Build Green" 2008). The biggest advantage of using cellulose is it out performs most other materials. The key to its success is that it is blown into wall cavities and attics. This makes it easier to install around irregular space, such as around pipes and electrical boxes. This custom fit is the key to its performance. Cellulose has a typical R-value of R-3.7 while fiberglass batts have an R-value of about R-3.0 per inch ("Why Build Green" 2008). The higher the R value, the more insulating qualities the product has. The fact that it is composed of 80 percent recycled materials, as well as having a higher R-value than fiberglass and the fact that cellulose is very inexpensive are all essential incentives for the use of this green product over the historic and carcinogenic fiberglass.

Flooring

To assure that the indoor air quality in the King Mountain Neighborhood urban village is at a level consistent with low impact development, indoor living products that do not contain Polychlorinated biphenyls (PCBs) will be used. PCBs are toxic organic compounds found in carpet pads and in couch liners. The alternative action plan seeks to utilize hardwood flooring and tiling as much as possible. Carpets and fiber products as flooring coverings are to be

avoided due to carpets non reusability, its capacity to trap dirt and dust particles, and its inherent negative impacts on indoor air quality.

All flooring shall be either non PVC polymer flooring, Hycrete brand stained concrete flooring, reclaimed natural wood flooring, or FSC (forest stewardship council) certified flooring. A maximum of 33 percent of each of the building will be carpeted.

Air Flow / Heating and Cooling

All building within the development will be oriented so that air flow throughout the buildings is continually drawing air up through the building and "breathing" this will be accomplished by incorporating windows with adjustable open able louvers that allow light and air inside. This satisfies LEED certification for indoor air quality.

The King Mountain Neighborhood urban village will rely on conventional forced air heating but will not include an air conditioning system. Due to the mild maritime climate in Whatcom County and the mean 48.2 degree Fahrenheit average temperature in Bellingham air conditioning is not a necessary addition to any building.

Energy

New homes can easily include some type of passive solar element in their design at little additional cost to the home owner. Solar hot water generation is an efficient way to help reduce the amount of electricity purchased to heat water in the domestic setting. These simple solar collectors are one of the most cost effective ways to include the use of renewable energy in the domestic setting and can reduce the energy consumed in homes by 20 percent (Department of Energy, 2003). Their popularity is increasing because of their reliability, adaptability and because they use free renewable energy. The purpose of this project is to evaluate the economic feasibility as well as the social and environmental impacts of solar hot water generation in the domestic sector used in Washington State.

A typical solar water heating system uses the Sun's energy to heat a network of black pipes inside an insulated box with a glass top called a collector. This box is oriented toward the sun which heats a transfer fluid that fills the pipes inside. The transfer fluid travels through the

system's plumbing to a storage tank which then transfers the heat to the water used in the home. Although many different designs exist, this is how a typical system operates.

According to the Department of Energy the average household with an electric water heater uses 25 percent of their electricity on heating water ("A Consumer's Guide" 2003). In order to mitigate the amount of energy used all units with south facing roofs and access to significant amounts of sun will be equipped with solar water heaters.

A solar hot water system can mitigate 80 percent of hot water needs for a one family house ("A Consumer's Guide" 2003). The average house hold in Washington state uses 1073 kWh of energy each month at a rate of 7.26 cents per kWh, which totals $77.90 dollars a month or $934.80 annually ("Energy Profiles" 2008). If 25 percent of this bill goes toward paying to heat water, then the average Washingtonian pays $233.70 annually to heat water. The other 80 percent of this fraction of the electricity cost can be subsidized by a solar hot water system. As such, $186.96 dollars annually can be saved by installing a solar hot water system. A purchaser of a solar hot water heater could estimate saving $382.50 on sales tax because Washington state, through RCW 82.08.02567, exempts taxes on any machinery and equipment used for solar energy ("Exemptions" 2009)[2]. A 30 percent tax credit on the initial cost of the system, equaling $1350, brings the total system cost down to $2767.50 ("A Consumer's Guide" 2003). If the system ultimately cost $2767 dollars and the annual savings are $187, then the pay off period is about 14.8 years ($2767.5/$186.96). The system has a lifetime of 40 years, thus there is a total net benefit of $4699.80 over the lifetime of the system. This is of course assuming that electricity prices will stay constant for the next 40 years, which is unlikely.

Fossil fuels are a scarce resource. Fortunately, most of the power in Washington comes from hydro electric dams, considered to be a "green," carbon-neutral form of energy. Unfortunately, the hydrological resources in Washington have been tapped. Although the power in Washington comes from renewable resources, the reduction of energy consumption will allow excess energy that is left over to be sold to other states that don't have hydrological resources. As such, reducing energy usage in Washington will reduce the amount of carbon-dioxide that is emitted in other areas. The amount of energy saved by installing one solar water heater can reduce the amount of carbon-dioxide released by one vehicle ("A Consumer's Guide" 2003).

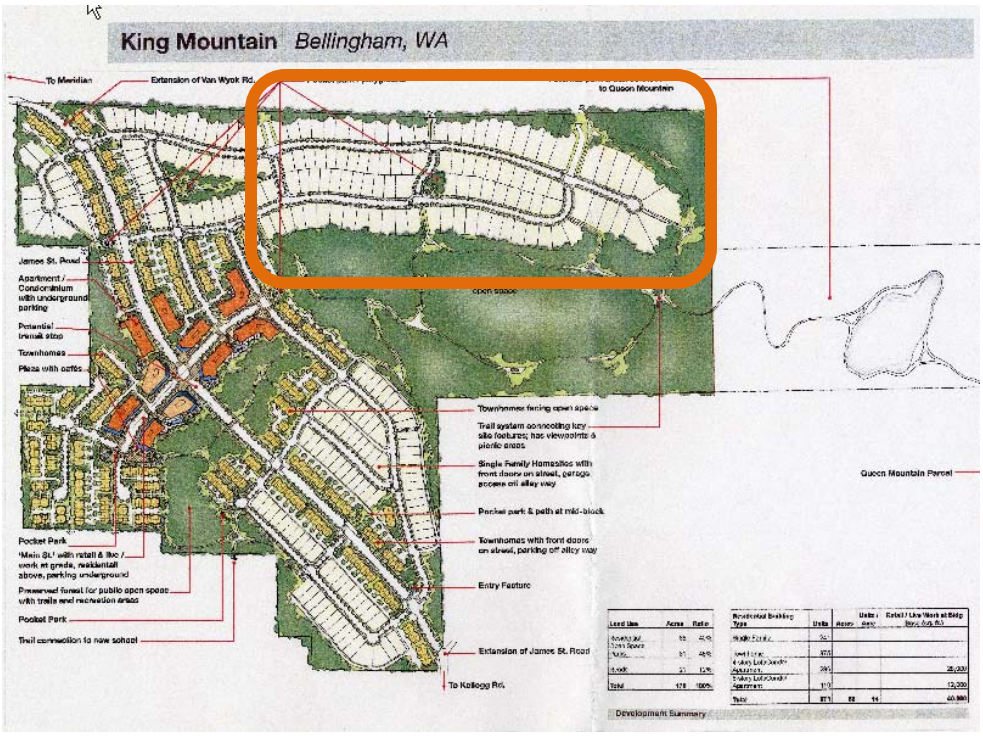
[2] $382.50 equals the sales tax at 8.5 percent of a $4,500 solar hot water heater

Similarly the demand for electricity is not going to stay constant. As population rises, demand for power will rise and a different source of energy will be needed, which will most likely be coal power plants because it is the most economically reasonable. Mitigating energy needs by investing in solar technology will make a dramatic change. Each house could reduce its energy usage by 20 percent and save money by doing so, as well as alleviate some environmental degradation. Also people will become less vulnerable to increasing energy cost.

Furthermore, investing in solar technology encourages development, which in turn will spur innovation and bring prices down, as well as making these systems more efficient and even more practical. Corresponding with this idea is the fact that encouraging development and expanding the market will increase returns to scale in manufacturing thus bringing the cost of production down and decreasing price.

The orange area is North/East facing and not suitable for solar technologies (Figure 12). All other lots and parcels will be built as passive and active (PV) solar homes.

Figure 12. Areas of proposed development not suitable for solar energy.



Carbon dioxide emissions

Existing

Currently the King mountain area is covered with trees and other plants that reduce the amount of carbon dioxide that is in the atmosphere.

Proposed

The development of the King Mountain will reduce the amount of trees and plants in this area. As such, the amount of carbon that is sequestered in this area will be reduced. Furthermore, the construction process will increase the amount of carbon dioxide into the atmosphere. Similarly, the 971 units in the proposed action will be annual emitters of carbon dioxide.

Mitigation

Each house with a solar water heater will reduce the amount of carbon dioxide released into the atmosphere equal to the emissions of one car. In addition, these houses will reduce the amount of carbon dioxide released into the atmosphere by using roofing and siding materials that are not made from oil, like vinyl siding or asphalt roofing shingles. Also the fact that all of the homes will incorporate Energy Star appliances and compact florescent lighting along with lower heating and cooling cost due to the cellulose insulation, will reduce amount of electricity that the homes use annually and the amount of co2 that is released.

Alternative Action

Each house with a solar water heater will reduce the amount of carbon dioxide released into the atmosphere equal to the emissions of one car. In addition, these houses will reduce the amount of carbon dioxide released into the atmosphere by using roofing and siding materials are not made from oil, such as vinyl siding or asphalt roofing shingles. Also the fact that all of the homes will incorporate energy star appliances and compact florescent lighting along with lower heating and cooling cost due to the cellulose insulation, will reduce amount of electricity that the homes use annually and the amount of carbon dioxide that is released.

With the implementation of the alternative plan to reduce the number of single family residences will reduce the amount of co2 that is released from the construction of these homes and the annual amount of carbon released from occupying these homes. Carbon emissions from single family homes are greater than emissions from apartment and townhouse units. The building of more complexes will reduce the amount of emissions from the area. However, the number of people living in the area will not change, therefore the number of vehicle trips will not change. The reduction of emissions from driving will not significantly change. Leaving the northern part of the site as open space and replanting native species, this will increase the amount of carbon sequestration in the area. Though overall trees and plants that will be removed and energy is required in building and occupying these units. Developing this area will add to the amount of co2 that is in the atmosphere, though using the alternative action will reduce this release.

No action

Taking no action will reduce the amount of carbon that is in the atmosphere.

AESTHETICS

Existing Conditions

The King Mountain area is naturally a very aesthetically pleasing area. The top of King Mountain has panoramic views of Whatcom County and beyond, including Mt. Baker, Canada, Lummi Island and the San Juan Islands, Fairhaven and Bellingham.

Impacts

Proposed Action

The proposed new urban village on King Mountain in northern Bellingham is composed of a combination of residential and commercial spaces. It will embrace a diverse network of parks, plazas, open spaces, streets, pedestrian walkways and public spaces as well as residential and commercial areas. The compact development of the village area will allow access to the center via a five minute walk. This mostly compact development of the urban village and surrounding residential areas allows for areas of natural woodlands which will contain trails and offer some limited space for wildlife.

The built environment is planned to be condensed while incorporating the natural environment with open spaces (Figure 13). The center of this developed area will consist of multi-story buildings with commercial spaces on the ground floor with mostly glass walls while the upper stories of these buildings have been designed to be very attractive. Parking garages will be under the multistory buildings, which removes the need for unsightly parking lots. The townhomes will have front doors on the street with garage access off of alley ways.

Views of King Mountain from the city below will be changed from natural woodlands to a developed neighborhood. Views from King Mountain will be blocked by buildings.

Figure 13. Alliance Properties' vision of their new development on King Mountain.

Mitigation

"Buildings are often erected by individuals at considerable expense. To give them symmetry and taste, would not increase their cost. It would only change the arrangement of the materials, or form and combination of the members" Thomas Jefferson (1743-1826).

Loss of natural views of and from King Mountain cannot be mitigated.

The proposed action is very aesthetically appealing. In order to push the image even further, artistic bike racks would be incorporated in this plan. Similarly, sculptures from local artists will be included in the layout of the urban village. The proposed action also includes an assortment of trees and vegetation throughout the development, all of these will be native species.

Alternative Action

Under the alternative action the aesthetics of this development will be altered. The single family units to the north of the preserved forest will not be built and this area will be left as public open space. This will be increase the aesthetics of the site. The additional apartment buildings to compensate for the loss of single-family units in the north will slightly alter the aesthetics of this development by blocking views for a group of town houses on the northern side.

No Action

The site would remain as it is now, cleared for construction. Over time plant would grow back and this area would return to a natural state, but this would take a very long time.

LIGHT AND GLARE

Existing Conditions

King Mountain is not a source of light pollution. Light pollution, also known as photo pollution, is defined by the International Dark Sky Association as "any adverse effects of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night and energy waste" (International Dark Sky Association 2009).

Impacts

Proposed Action

King Mountain will become an emitter of light pollution under the proposed action. The sources of this pollution will be street lights, porch lights, headlights from cars and glare from windows.

Mitigation

In order to mitigate some of the light pollution caused by this new development, porch and street lights should be equipped with occupancy sensors to only provide light when needed. The buildings in this development should be designed to provide the appropriate light for the given task. Proper choice of fixtures and bulbs should be used to direct light only to areas where light is needed. Training for residents and workers in the commercial spaces should be provided to use the light systems efficiently.

Alternative Action

The Alternative Action to the proposed King Mountain Neighborhood urban village is to not build the single family units to the north of the preserved forest and leave it as public open space. This will result in a reduction of light pollution.

Under the alternative action the amount of light that is created will be limited to a less significant area. Correspondingly the area where the single family units will no longer be built will be replanted with native plants and trees. This will help buffer the surrounding area from the light

that will be emitted by the urban village. In short the alternative action will turn an area in the proposed action from a light emitter to a light pollution reducer.

The two additional apartment buildings that will be added will increase the amount of light emitted into the atmosphere because light comes off buildings at a higher altitude than in the proposed plan. This will make the developed area more noticeable from areas to the south of the proposed site.

No Action

King Mountain will remain an emitter of zero light pollution under the no action plan.

RECREATION

Existing Conditions

Currently there are no public parks in the proposed site area. The area does contain a network of underdeveloped dirt roads and trails that are used by neighborhood walkers and equestrians. The trail system begins at the terminus of James Street and continues to the east and west. The eastern portion of the trail is an approximately quarter mile loop located on steep slopes and has several areas where the trail is adjacent to a seventy degree slope. This trail has near 360-degree views of the surrounding areas, including the city of Bellingham, Bellingham Bay, the San Juan Islands and Mt. Baker. The western portion of the trail passes a cellular transmitter and radio tower then continues through a deciduous forest comprised of primarily red Alder and big leaf Maple. The trail then terminates at a clearing that is on the northern edge of the King Mountain Annexation.

These trails are on private property and are used primarily by local neighborhood homeowners. The primary forms of recreation in the area currently seem to be trail riding (both equine and bicycle) running and hiking. Estimated number of trail users is less than 100 persons per month.

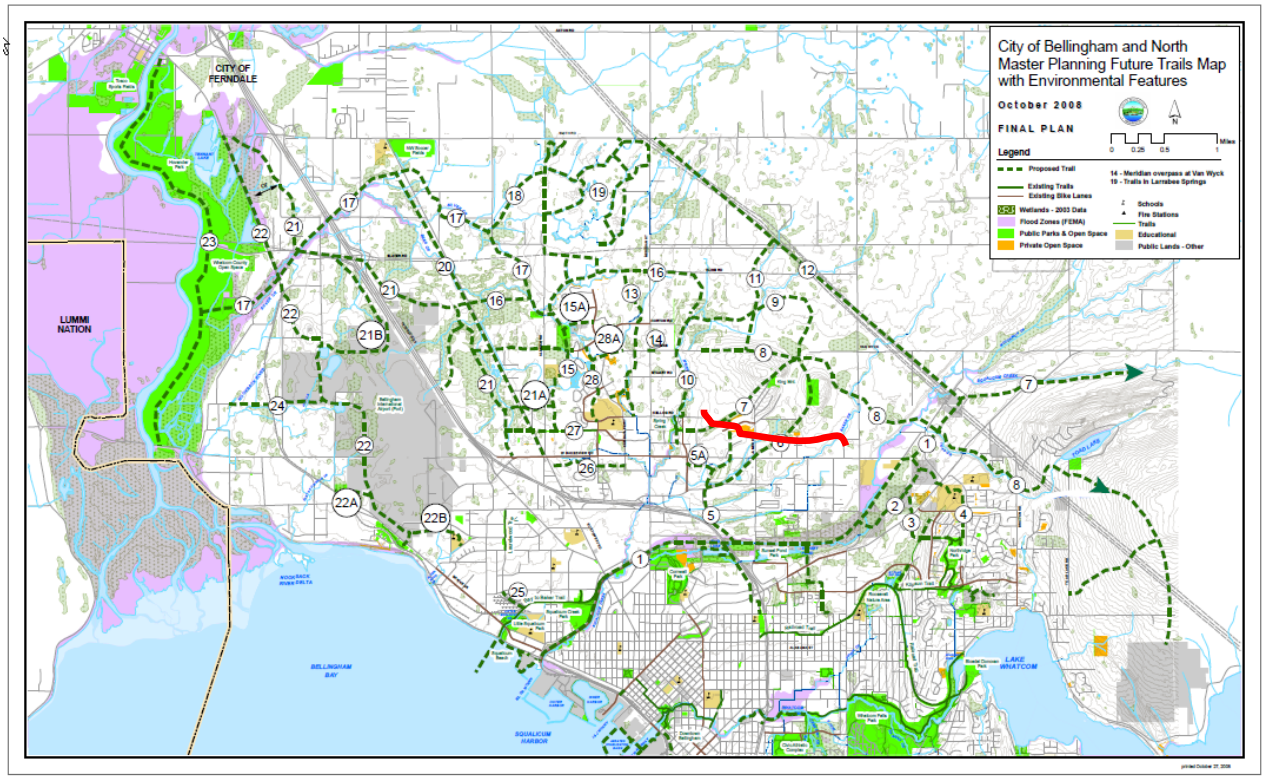
King Mountain includes a large amount of open space. Stream corridors, forested backdrops, floodplains and view corridors are all key features of King Mountain. Not only are these areas unsuitable for development, they serve important environmental functions that are worthy of protection (King Mountain Neighborhood 2009).

Impacts

Proposed Action

The existing trail system will be converted into impervious connector and arterial roadways. The population growth would create a demand that the city of Bellingham begin to implement the trail plan that it has laid out in the North Bellingham Trail Committee (Figure 14). With the approval of the King Mountain Annexation in 2009, impact fees and other sources of city revenue may be used to acquire land parcels to build new trails and public parks in the neighborhood.

Figure 14. North Bellingham Trail Map, City of Bellingham. Red line was added by Jared to show a proposed trail to connect to Cordata.



Development of King Mountain Neighborhood urban village would create a demand for new trails and increase foot traffic and noise through King Mountain's natural features. Automobile traffic to the area will also increase, but parking space is limited. We also suspect that usage would also increase of Sunset Pond on Woodstock Way to the south of the newly annexed King Mountain Neighborhood.

A newly created park or open space will attract more visitors. Human visitors often bring their canine companions and leave behind pet waste. Pet waste is harmful to water quality if left on the ground. Dogs may also scare of native wildlife. Upkeep of park lands also uses valuable natural resources, such as water and fossil fuels.

Mitigation

To reduce the impact of natural resources, native plants should be planted because they require less water and maintenance than nonnative species. A fenced off dog park would limit pets impacting wildlife. In this dog park, pet waste bag dispensers and receptacles will be placed throughout the area for easy access and use.

The King Mountain Neighborhood Urban Village would be linked to the Cordata bus depot by a trail that runs from James Street and Gooding Avenue West to Meridian, crosses meridian and links to the Depot. This trail shall conform to North Bellingham's trails committee bylaws concerning trail development and funded by impact fees to be paid by the developers (Figure 14, red line).

Alternative Action

The alternative action adds even more open space for park and recreation that would allow for less segmentation of nature, which wildlife depends upon. This open space would be connected to a greater trail network that connects the urban village to the rest of Bellingham.

No Action

If no action is taken, then King Mountain will continue to be used by only the surrounding residents and will likely not draw in any more visitors.

TRANSPORTATION

Existing Conditions

The main arterials serving the newly annexed King Mountain Neighborhood are James Street, East Bakerview Road, East Kellogg Road and Telegraph Road. James Street is classified as a secondary arterial that is a north-south link from Interstate-5 to Telegraph Road, East Bakerview Road, and Kellogg Road. East Bakerview Road is classified as a principal arterial going east-west through the neighborhood from the Guide Meridian east past James Street to Hannegan Road. East Kellogg Road is classified as a secondary arterial going east-west from the Guide Meridian to James Street. Telegraph Road is classified as a collector arterial going east-west from Deemer Road going east past James Street. Deemer Road just outside the King Mountain Neighborhood acts as a north-south collector arterial between Telegraph Road, East Bakerview Road and East Kellogg Road (King Mountain Neighborhood 2009).

Residents of this neighborhood may gain access to Interstate-5 heading south via James Street, heading west via East Bakerview Road to the Guide Meridian or West Bakerview Road, or heading west on either Telegraph Road or East Kellogg Road to the Guide Meridian. These three entry/exit points to Interstate-5 (Exits 255, 256 and 258) currently function at Peak Hour Level of Service "F", meaning that these intersections have reached 100 percent capacity at 25 to 33 percent of free-flowing speed. East Bakerview Road also connects to Airport Drive, which goes to the Bellingham International Airport (City of Bellingham, Bellingham Comprehensive Plan 2008).

The city of Bellingham has included many of the streets in the King Mountain Annexation area to a list of future transportation projects. Included are: James Street improved to secondary arterial between Woodstock Way and Kellogg Road, as well as Telegraph Road improved to secondary arterial between Deemer Road and James Street (City of Bellingham, Bellingham Comprehensive Plan 2008).

No streets currently exist within the proposed King Mountain Neighborhood Urban Village site. Proposed access to this site includes extensions of James Street to become a secondary arterial connection to Van Wyck Road along the west side of King Mountain directly through the proposed urban village to Horton Road and a Van Wyck Road extension collector arterial from the new James Street extension to the Guide Meridian.

The King Mountain Annexation is minimally served by public transportation. The Whatcom Transportation Authority provides two bus routes to service Bakerview Spur in the Bakerview Industrial Complex. The number 48 bus goes to Bakerview Spur from the Cordata Station on Cordata Parkway via East Bakerview Road. The number 49 bus goes to Bakerview Spur from downtown Bellingham via James Street to Sunset Drive, Hannegan Road, Irongate Road, and Midway Lane. These routes occur five times daily excluding Sundays.

The 1990 Washington State Growth Management Act requires concurrency planning with the proposal of any development. With concurrency planning the city of Bellingham will only approve a development if adequate transportation facilities exist to meet the Level of Service (LOS) standards for the concurrency service area (CSA) (City of Bellingham City Attorney 2006).

The CSA of the King Mountain Neighborhood is number 15, which includes the area north of McLeod Road, east of Deemer Road, south of city limits, west of Irongate Road. This CSA has the second fewest person trips available (PTA), with only 25.6 percent of sidewalks and 7.3 percent of bike lanes complete. Though the new King Mountain Urban Village is within the urban growth area and not city limits, development will most certainly put a strain on current transportation facilities in the CSA (Comeau 2009).

Impacts

Proposed Action

The site plan for the proposed King Mountain Neighborhood Urban Village includes 21 acres for roads of 135 total acre development. The 21 acres will include the extension of James Street into a secondary arterial, as well as local access neighborhood streets serving the housing area of the development. The northern portion of the development has 156 of 241 single family units on the site. Within this portion of the development the local access neighborhood streets are proposed to connect with the Van Wyck Road extension. Other than these 156 single family units connecting to a collector arterial outside the urban village, the remaining 815 proposed residential units must exit the urban village via the only secondary arterial going through the development—James Street.

If we assume that each new residential unit includes 1.5 parking spaces, this development of 971 residential units will include more than 1,400 parking spaces within 135 acres. This is not including the parking needed for the proposed commercial areas that make up "Main Street," a local access neighborhood street intersecting with James Street.

Americans average 9.7 trips per day per household (Missoula County 2009). Since this proposal includes 971 residential units, we can assume that this development will generate an average of 9,400 trips per day. Secondary arterials, such as the proposed James Street extension through this development, are designed to carry up to 15,000 vehicle trips per day. Though this development seems designed to handle the added vehicle trips per day, surrounding parts of town, including the freeway exits and entrances, may not be able to.

The introduction of roads into a natural area can have serious negative effects on animals, plants, soil, and water. Road kill will affect animal populations by decreasing populations. Conversely road aversion, where animals avoid roads can cause decreased animal population density near roads. Some species will simply refuse to cross roads, thus resulting in habitat fragmentation, which is a major threat to biodiversity because areas that were once continuous become separated into segments. Roads also cause edge effect where the natural ecosystem is affected for some distance into the natural ecosystem by the introduction of contrasting environments. This will be especially damaging in this small habitat area because the edge effect could penetrate the entire fragmented habitat. Also direct habitat loss will result from the introduction of these roads.

The construction process will also alter the natural environment. Pollution from the construction process will enter the soil, water, and air. Vehicles that will travel on these roads will emit pollution and hazardous heavy metals that will have a cumulative effect on the environment as well as carbon monoxide and dioxide into the atmosphere. Noise pollution from construction of roads and traffic disrupts animals that communicate by using auditory signals. Also road construction will change the hydrology of the area by altering the water quantity and quality, stream morphology and ground water levels. These paved surfaces are impervious and result in increased peak runoff.

The steepness of the King Mountain will make James Street dangerous during severe winter weather, requiring the use of some kind of de-icing agent. Common rock salt is often used as a

de-icing agent. The ions in rock salt are easily transported by water through the soil, increasing the salinity of the soil. When high concentrations of sodium are present in soil it flushes organic particles down the water column and increases erosion (Ramakrishna and Viraraghavan 2005).

Mitigation

This development does include a location for a potential WTA transit stop on James Street near "Main Street." Any new bus route to this area will probably start off as an hourly route accommodating up to 40 person trips per hour (480 for a 12-hour bus service day). Once more people live and/or shop in this area, bus service might be increase to twice an hour with 160 person trips per hour (1900 per day) or even to a new "GO-Line," WTA's high-frequency bus routes that come every 15 minutes. A new "GO-Line" could accommodate up to 320 person trips per hour or nearly 4,000 for a 12-hour bus service day (Comeau 2009).

The introduction of pervious surfaces to "Main Street", the James Street extension, and all above ground parking would allow runoff to infiltrate the underlying soils that filter out toxins from the environment. Currently there are no mitigation measures that address the impacts of segmenting wildlife. Calcium magnesium acetate is a better choice for de-icer because it does not move through soil as rock salt ions do and soil microorganisms quickly break it down (Ramakrishna and Viraraghavan 2005).

Alternative Action

The person trips per day per household for the alternative action are roughly the same as the proposed action because the amount of residential units for the alternative active is roughly the same. This leaves the person trips per day per household at roughly 9,000. Since the alternative action has two concentrated areas of residential and retail space, another bus stop on the James Street extension would be convenient for making this urban village more pedestrian friendly while lessening the amount of vehicle trips.

An Authorized Access Only during designated hours for the James Street extension would make the urban village more pedestrian friendly. Traffic would be diverted to the northeast of the urban village from the intersection of James Street and Gooding Avenue and connecting back to James Street north of the village core. One single-family parcel will be moved to make room for

this bypass. This James Street Bypass would be another secondary arterial allowing transportation to travel up to 35 miles per hour. This street would include two crosswalks at the trail entrances to the preserved open space, adding to pedestrian friendliness.

Since more than 100 single-family homes in the northern portion of the proposed site will be not be present as part of the alternative action, fewer roads will be needed. This open space in the northern portion of the site will remain for wildlife.

No Action

The road network in the King Mountain Neighborhood will still need to be improved to accommodate future growth even if no action is taken for this development.

PUBLIC SERVICES—Fire, Paramedic, Police

Existing conditions

The King Mountain Neighborhood is served primarily by Bellingham Fire Station 6, located on Deemer Road just outside the King Mountain Neighborhood, and secondarily by Fire Station 5, located on Northwest Avenue. No additional fire department facilities would presently be needed to serve the King Mountain Neighborhood. (Fire Services, City of Bellingham 2008)

Prior to annexation of the King Mountain Neighborhood in March 2009, the city of Bellingham Fire Department and Whatcom County Fire District #4, which had previously served this neighborhood, signed an agreement to mitigate the impact of the King Mountain annexation on the fire district. As build-out occurs in the King Mountain Neighborhood, the city of Bellingham anticipates the need for additional firefighters. These firefighters would staff Fire Station 6 to create a four person engine crew to ensure the ability to provide fire department services to the northern Bellingham neighborhoods (King Mountain Neighborhood 2009).

Fire Station 6 houses one engine unit, one reserve ladder unit, the county-wide Haz-Mat response Unit, and one reserve medic unit. Fire Station 6 is designed to meet the 20 years growth goals anticipated by the city of Bellingham (King Mountain Neighborhood 2009). There is also one reserve medic unit at Bellingham Fire Station 6 serving the proposed development. Whatcom County paramedic 1 was responsible for the area prior the annexation of King Mountain in 2009.

Currently the city of Bellingham Police Department has jurisdiction over the proposed development. (Police Services 2008)

Impacts

Proposed Action

As build out occurs in the proposed development, fire hydrants will be needed to be installed in both the urban village and in the platted residential areas. These hydrants will be connected to a water tank that will be located on the summit of King Mountain (King Mountain Neighborhood 2009). Additional medic units and personnel will need to be deployed to Bellingham Fire Station 6 to accommodate this population. The target demographic of the proposed community is retirees and young couples and both of these demographics will need additional medic units to serve them.

The Bellingham Police Department will provide service for the proposed development. As density increases in the King Mountain Neighborhood the need for increased police service will necessitate additional hiring of both patrol officers and traffic officers. Without additional officers to patrol the neighborhoods on the perimeter of the city limits of Bellingham, this area may be underserved. Since this area is recently annexed into the city of Bellingham, neighborhood crime statistics are not available.

Mitigation

Fire Station 6 is adequate to meet anticipated demand during the 20 year planning period of King Mountain Neighborhood (UGA Urban Fringe Area: EIA 2004). In the event that additional fire protection services are necessary as new urban growth areas are annexed into the city limits of Bellingham or the King Mountain Neighborhood urban village exceeds population growth forecasts, new fire stations will be built within the King Mountain Neighborhood to provide increased fire protection.

Alternative action

Fire protection services will originate primarily from Fire Station 6 and the protocol will remain the same as the proposed action plan. Crews will have to utilize an urban fire protection regime because of increased density in the development. Paramedic and police services will be the same as the proposed action.

No action

The city of Bellingham will provide services to the King Mountain Neighborhood, but the neighborhood will receive significantly less fire and medical aid calls. No additional paramedic units would be needed if the King Mountain Neighborhood urban village is not developed.

Police service will be provided by the city of Bellingham. Without the proposed development of the King Mountain Neighborhood Urban Village the density of the King Mountain neighborhood will be lower and dispatches will be made to the area.

UTILITIES

Existing Conditions

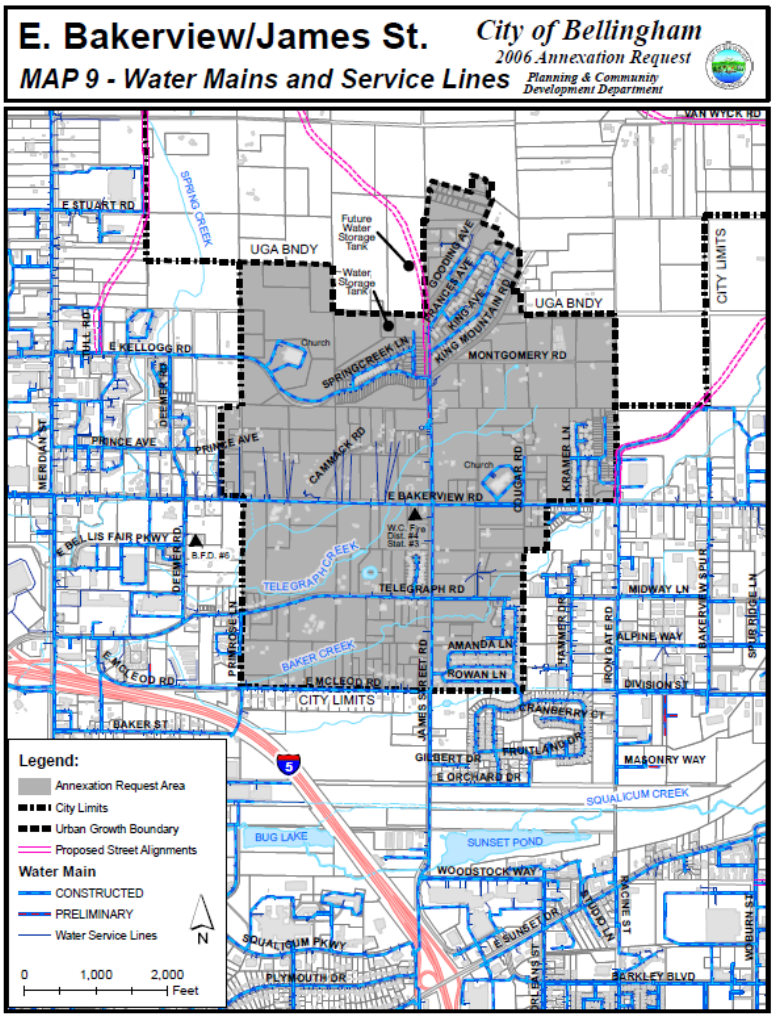
The city of Bellingham requires that water mains and lines, sewer mains and lines, and storm water mains and lines be incorporated by all new development occurring in the city limits. With the annexation of King Mountain in March 2009 City of Bellingham policy requires these utilities to be extended to the King Mountain Neighborhood (Water Utility 2009).

Water mains

The King Mountain Neighborhood is currently served by four water pressure zones. The North Zone serves the area south of East Bakerview Road and west of James Street. Water transmission mains are installed in East Bakerview Road, James Street and Kellogg Road. Main extensions must be extended in Bakerview Road. The Dakin-Yew Zone serves the area east of James Street. King Mountain Road, King Avenue, Frances Avenue and Gooding Avenue are served by a small booster station with no reservoir and limited fire protection (COB 2009 fire services).

Currently the King Mountain Neighborhood supply of potable water is stored in a 1.5 million gallon tank (Figure 15). This was constructed by the city of Bellingham in 1967 to supply both fire flow and potable water to the neighborhood (King Mountain, City of Bellingham 2009). Water main lines currently extend north from the James Street water pump station serving existing lots on Gooding Avenue, Frances street, King Mountain, and Spring Creek lanes (King Mountain Neighborhood 2009).

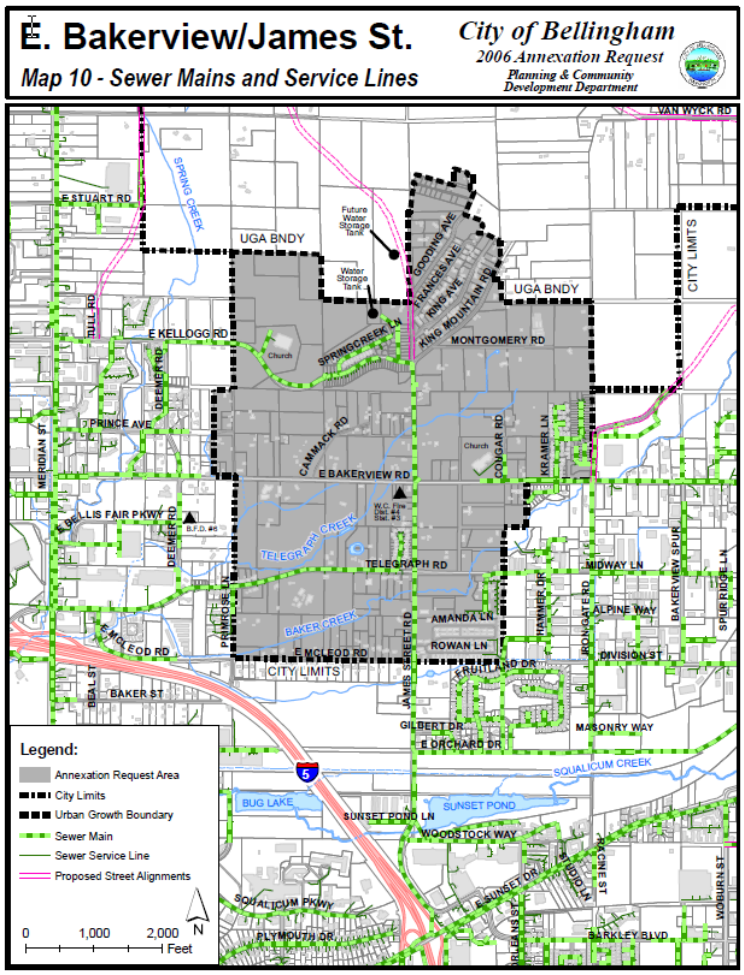
Figure 15. Water Mains and Service Lines of E. Bakerview/James St.



Sewer

The proposed development area is currently served by numerous sewer lines and one sewer main is located in James Street (Figure 16). This main drains to a pump substation located at Sunset Pond. All sewage is disposed of at the city of Bellingham solid waste facility at Post Point in Fairhaven. The city of Bellingham is required to provide sewer services to all developments within the city limits (Wastewater/Sewer 2008).

Figure 16. Sewer Mains and Services Lines of E. Bakerview/James St.



Waste Services

Sanitary Services Company currently operates in the King Mountain Neighborhood. Sanitation Services Company is contracted by the city of Bellingham to consolidate and dispose of the city's solid waste and recycling. Waste and Recycling services are provided for a fee to all residents of the city of Bellingham (Garbage Utility 2008).

Impacts

Proposed Action

Water mains

The existing water system will be extended to serve the new development. With the annexation of the King Mountain Neighborhood, a new water tank is proposed to be constructed at the top of King Mountain to serve the water needs of the estimated 2,138 residents of the King Mountain Neighbor urban village. As development proceeds new water mains will be extended alongside the proposed James Street Road realignment. A transmission water main from the water treatment plant to the Kearney Reservoir will be needed to supply more water to the north end of Bellingham (King Mountain Neighborhood 2009). The construction of the water tank and the water mains will have minor environmental impacts, such as sediment runoff, point pollution and carbon dioxide output from construction.

Sewer

The proposed development would require additional installation of sewer lines and mains. Installation of 12" PVC piping along the proposed James Street extension would affect point sources of pollution running into the watershed. The oil and runoff from the heavy machinery digging the lines would have a negative impact on stream quality in Squalicum Creek. Significant rescaling of the pump station at James Street would have to be undertaken in order to deal with the increased use of the utility. Water quality at Sunset Pond would be decreased as more turbidity, heat pollution, fecal coli form, and other pollutants were introduced into the water system from the construction (Galligan 2009).

Waste Services

A small recycling substation would be managed on site to provide a holding area for the recyclables and waste of the multi-family residential and commercial building in the new development.

Mitigation

The development will implement water conservation policies and will install low flow sinks, toilets and showers to reduce water consumption. This will result in reduced loads of toxics in the hydrological system. Additionally bioswales and rain gardens will filter chemicals from point pollution. A small solid waste filtering system will be installed above the Sunset Pond pumping station to partially filter out solids before pumping to the larger facility in Fairhaven for treatment. This system would be paid for with impact fees from the development. This would mitigate runoff and pollution from the sewer system and lessen the strain on the already overloaded existing sewer main located underneath the Guide Meridian. Additional waste and

recycling receptacles would be placed throughout the development to encourage less littering and increased recycling by the residents of the community.

Alternative Action

The demand for water will remain similar to the proposed action plan. There will be 4 percent less residents but variations in water consumption will render the overall demand approximately the same as the proposed action. Minor environmental impacts, such as sediment runoff, point pollution and carbon dioxide output resulting from construction will occur.

The elimination of single family residential units in the alternative plan will allow for more open space. The plan specifically calls for native plantings and reforestation in the eastern portion of the development. This forest will help keep moisture and groundwater under the forest canopy and will supply a critical function to water conservation by supplying habitat and reducing evaporation. Additional specific building features (see chapter built environment section housing mitigation pages 44-49) will help conserve water resources.

The alternative action eliminates single-family residential units on the northern portion of the development and increases density to 22 residential units/acre. This condensed development results in a sewer system that is consolidated, as well as a decrease in point source pollution associated with construction of sewer lines. Water quality in Sunset Pond would still be degraded by increased turbidity, toxic pollution and thermal pollution due to development.

Reduction of single family residential units would mean that the route of the waste service providers would be significantly shorter. In all other respects the utility would operate the same as the proposed action plan.

SSC would retain the contract to dispose all solid waste and recyclables. Greater emphasis would be placed on meeting target goals to reduce reuse and recycle materials and products. More recycling stations would be placed in public spaces and on sidewalks. Green composting would be offered to all residents of the proposed new development with all compost being retained on site, processed, and used as additive to new park development and community gardening space.

No Action

If no development occurs then an additional water reservoir to serve the King Mountain Neighborhood urban village will not be needed. The city of Bellingham policy requires that within city limits water utilities must be extended as development occurs.

Sewer services would not be extended into the proposed developmental area. Property owners on King Avenue, King Mountain Avenue, Frances Avenue and Gooding Avenue areas may need to form a Low Impact Development to serve the existing lots as existing septic systems fail.

No additional waste management contracting or plan would be enacted.

ENERGY RESOURCES

Existing Conditions

Electrical

Using data from the King Mountain proposed development master plan and the Energy Information Administration, an approximation was created of the current and future Electrical and Natural gas consumption within the proposed development (Appendix 6). Currently there is no development within the proposed King Mountain Neighborhood Urban Village. Electrical and Natural gas systems are not currently in ground and the residential, commercial, and industrial consumption of energy resources for the proposed development is zero.

Washington State is the nation's largest producer of hydroelectric power. Renewable hydro electric energy constitutes three-quarters of Washington State's electrical generation (Energy Profiles 2009). Puget Sound Energy is the local energy provider for Bellingham and would be the primary supplier for the proposed development (Energy Sources 2009).

Puget Sound Energy currently obtains its electricity from the following sources: 42 percent hydro, 37 percent coal, 19 percent natural gas, 1 percent nuclear and 1 percent other. (Energy Profiles 2009). The proposed development would be serviced from the Bakerview substation on the corner of James Street and Bakerview Road via two three-phase 12,470 volt feeder lines. This substation should provide sufficient transmission of electricity when full build out of the development occurs (Energy Sources 2009).

Natural Gas

Bellingham relies heavily on natural gas produced in Canada and transported by pipeline to U.S. markets. The Sumas Center, in Canada near the border between Washington and British Columbia, is the principal natural gas trading and transportation hub for the northwest United States. The Northwest Pipeline Corp. system supplies markets in Western Washington and Oregon. The residential sector leads Washington's natural gas consumption, followed closely by the industrial and electric power generating sectors. Roughly one-third of Washington households use natural gas as their primary energy source for home heating (Energy Profiles 2009).

The King mountain neighborhood is supplied with Liquid Petroleum Natural Gas by Cascade gas. A transmission line currently runs down East Bakerview Road and additional lines could be extended into the proposed development. Currently no residential development has taken place in the proposed development area.

Impacts

Proposed Action

Electrical

With an increase of up to 971 dwelling units in the proposed development by 2020, the King Mountain urban village will consume 12,600 MWh (Megawatt Hours) of Electricity when fully developed if current electrical consumption trends remain unchanged in the ensuing eleven years (Appendix 6). Because of changing technologies and advances in both renewable energy systems and energy conserving appliances, the table includes a plus or minus 20 percent variable that accounts for changing energy end use consumption in Bellingham. This figure does not take into account commercial and industrial energy use in the proposed development. This energy is supplied by Puget Sound Energy and is generated in Washington State. As development occurs and energy consumption per unit increases, the high end of the estimation 15,148 Megawatts/year will need to be dedicated to supply the development (*See appendix* 6). Negative impacts would include degraded salmon bearing streams and point pollution runoff from construction equipment installing electrical main and feeder lines in the proposed development.

Natural Gas

Utilizing the data options outlined, the natural gas consumption by 2020 will be 75,738 thousand cubic feet per year if current trends in natural gas consumption remain unchanged (*Appendix 6*). This figure is accompanied by a 20 percent increase/decrease figure in the table to reflect a change in demand and consumption of natural gas. If natural gas consumption decreases by 20 percent by 2020 the natural gas consumption of the proposed development will be 60,590 thousand cubic feet per year. If the natural gas consumption trend increases 20 percent then the demand will be 90,885 thousand cubic feet per year. Increased natural gas consumption will lead to an increase in environmental degradation at the source of the natural gas fields.

Carbon dioxide is released in both the extraction process of natural gas and occurs when natural gas is combusted. The worldwide cumulative effects of combusting natural gas are significant contributors to worldwide climate change.

Mitigation

The proposed development will support Puget Sound Energy Green Power Program. This program is designed as a tool that both residential and commercial users can use to support renewable local energy. Puget Sound Energy purchases renewable energy credits from local renewable produces. This reduces the need for electricity generated in non-renewable power plants and creates environmental benefits that are measureable (Energy Sources 2007). Renewable Energy production also produces less carbon dioxide and other associated greenhouse gases than non-renewable energy production.

All appliances installed in the proposed action plan will have to be Energy Star rated (Energy Star 2009). This program was developed jointly by the Department of Energy and the Environmental Protection Agency. This program will help the proposed development save approximately a third of their energy consumption with similar savings of greenhouse gas emissions.

Designing passive solar and photovoltaic heating systems on the existing multi-family residential units will decrease the need for natural gas consumption in the proposed development. Developing on site renewable energy systems and requiring builders to properly site new construction will reduce carbon dioxide output due to reduced natural gas consumption.

Alternative Action

The total units in the proposed development would decrease by 4 percent from 971 residential units to 937 units (Appendix 6). The amount of residents living in apartment complexes increases 33 percent from 355 units to 475 units. Overall the residential density of the alternative action plan increases 57 percent from 14 residential units per acre to 22 residential units per acre. Increased residential density will decrease energy consumption in the proposed development by consolidating development and creating a neighborhood culture based around principles of energy conservation. Additionally all apartment complexes will be built using

materials (*See chapter built environment section housing mitigation pages 44-49*) that conserve and promote energy conservation.

Using low impact development to mitigate global warming due to energy demands is of primary importance in the alternative action plan. By consolidating development and increasing the residential zoning density in the proposed development to 22 units per acre, more open space is available to offset greenhouse gas emissions.

The alternative action plan calls for an increased residential unit density in the proposed development. Increasing the residential density of the neighborhood will result in reduced environmental impacts by consolidating growth. Additional apartment buildings in the alternative action plan account for much of the increased density. These buildings will utilize natural gas more efficiently due to economies of scale and better designed heating and thermal insulation systems.

Green building techniques used in the alternative action will utilize solar energy collection in the development and will result in buildings that can produce passive solar heating and will use less natural gas for heating over the lifecycle of the building. By increasing the multi-unit residential buildings, energy saving construction will be provided to a greater percentage of the proposed development areas. Residents will live in energy efficient homes that require less natural gas to heat. Increased residential density and the elimination of single-family residential units will also result in a decrease in the amount of natural gas pipeline installed in the proposed development. This reduces cumulative negative impacts from point and non-point pollution and reduces the amount of natural resources used in the construction of the gas pipelines.

No Action

No development occurs in the proposed development area and electrical utilities are not extended to the proposed developmental area. No action will not result in any additional demand for natural gas and no addition carbon dioxide emitted.

NATURAL RESOURCES

Existing Conditions

King Mountain has seen logging in the past. The vegetation species are all characteristic of a recently disturbed area. No known mineral deposits are located in the proposed development. One might argue that the 360-degree view from atop King Mountain is the greatest natural resource of them all.

Impacts

Proposed Action

The proposed development site will be cleared in order to accommodate growth. Converting the open space to a park would prohibit any commercial logging from taking place. Some open space would be preserved for residents and visitors to enjoy the view and scenery.

Mitigation

Development of the urban village would forever limit any logging on the site. Planting native plant species in cleared areas would increase the beauty of the scenery.

Alternative Action

The alternative action presents the same impacts as the proposed action, but a reduction of 27 residential acres in the alternative plan will result in more open space. The alternative action plan features increased open space and a reduction of single family residential units in the proposed area. Additionally the open space in the alternative plan is increased to 53 percent.

No Action

A choice of no action would allow tree species that are commercially logged, such as Douglas Fir, to eventually return.

GLOSSARY

Alluvium- deposit of sand, mud, etc., formed by flowing water

Arterial street- any street that the Public Works Department has classified as a primary, secondary, or collector arterial depending on their function and physical design in the Transportation Element of the Bellingham Comprehensive Plan. The purpose of the categories is to define appropriate street design standards and to establish eligibility for road improvement funding from various sources.

BMPs-Best Management Practices are effective, practical, structural or nonstructural methods which prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water, or which otherwise protect water quality from potential adverse effects of anthropogenic activities.

Collector arterial- Provide for the traffic needs within neighborhoods. Pedestrian and bicycle facilities are necessary for efficient transportation within neighborhoods. Traffic volumes on these streets range from 1,500 to 5,000 vehicles per day. Design standards require two lanes of moving traffic, with bicycle and pedestrian facilities within a 60 to 80 foot wide right-of-way. Pavement widths typically range from 28 to 46 feet and speed is generally limited to 25 miles per hour.

Colluvium- loose earth material that has accumulated at the base of a hill, through the action of gravity, as piles of talus, avalanche debris, and sheets of detritus moved by soil creep or frost action

Concurrency Service Area- a defined geographic are in which concurrency measurements points provide data used to calculate the number of Person Trips Available to new development on the transportation network serving the area

Dissolved oxygen- the amount of oxygen dissolved in a body of water as an indication of the degree of health of the water and its ability to support a balanced aquatic ecosystem; also, the amount of free (not chemically combined) oxygen dissolved in water, wastewater, or other liquid, usually expressed in milligrams per liter, parts per million, or percent of saturation

Fecal coliform- indicate the presence of sewage contamination of a waterway and the possible presence of other pathogenic organisms

Glaciomarine- Refers to sediments and processes related to environments where marine water and glacial ice were in contact.

Glulam- Glue laminated timber, is a type of manufactured lumber that is made of several layers of dimensional lumber glued together.

Growth Management Act- The Growth Management Act was enacted 1990 in response to rapid population growth and concerns with suburban sprawl, environmental protection, quality of life and related issues. The GMA requires the fastest growing counties and cities within them to plan extensively in keeping up with state goals, including: sprawl reduction, concentrated urban growth, affordable housing, open space and recreation, regional transportation, environmental protection, property rights, early and continuous public participation, and several other goals (Final Environmental 2004).

Hydrology- The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

Impervious- not permitting penetration or passage; impenetrable

Local access neighborhood streets- Provide direct access to individual residences. Local access roads are low speed, low volume roadways with frequent property access crossings. Local design standards require a minimum 60 foot right-of-way (50 feet for cul-de-sacs) with two lanes on 20-36 feet of pavement (28 foot pavement width is most often used). Curbs, gutters and sidewalks are required on all but minimum standard (20 foot wide) streets. Pedestrian and bicycle safety is a necessary consideration on all streets.

Infiltration- to pass through small gaps or openings; filter

Peak Hour Level of Service (LOS) Standards- The average travel speed for through vehicles along an urban arterial street is the determinant of the operating level of service for vehicles. The travel speed along a segment, section, or entire length of an urban arterial street is dependent on the running speed between signalized intersection and the amount of control delay incurred at signalized intersections. Urban arterial street LOS for vehicles is based on average through-vehicle travel speed for the segment, section, or entire urban arterial street under consideration.

Peak Hour LOS A (50% - 60% Capacity) Describes primarily free-flow operations at average travel speeds, usually about 90% of the free-flow speed for the given street class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.

Peak Hour LOS B (60% - 70% Capacity) Describes reasonable unimpeded operations at average travel speeds, usually about 70% of the free-flow speed for the street class. The ability to maneuver within the traffic stream is only slightly restricted and control delays at signalized intersections are not significant.

Peak Hour LOS C (70% - 80% Capacity) Describes stable operations, however, the ability to maneuver and change lanes in mid-block locations may be more restricted than LOS B and

longer queues, adverse signal condition, or both may contribute to lower average travel speeds of about 50% of the free-flow speed for the street class.

Peak LOS D (80% - 90% Capacity) Describes a range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high traffic volumes, or a combination of these factors. Average travel speeds are about 40% of free-flow speed.

Peak LOS E (90% - 100% Capacity) Describes significant delays and average travel speeds of 33%, or less, of the free-flow speed. Such operations are caused by a combination of adverse signal progression, high density of signalized intersections, high traffic volumes, extensive delays at critical intersections, and inappropriate signal timing.

Peak LOS F (100%+ Capacity) Describes urban arterial street flow at extremely low speeds, typically 25% to 33% of free-flow speed. Intersection congestion is likely at critical signalized intersections, with long signal delays, high traffic congestion, and extensive queuing of vehicles.

Principal arterial- Provide a linkage between major population and activity centers and are designed to carry volumes in excess of 10,000 vehicles per day. Bellingham design standards for arterials require an 80-100 foot wide right-of-way with four or more lanes of moving traffic and bicycle and pedestrian facilities on a 40-66 foot wide paved area. Speed limits range from 25 to 35 miles per hour and access to these streets is limited to 300 to 600 foot intervals whenever possible.

Secondary arterial- Collect and distribute traffic between neighborhoods and commercial areas. These streets are designed to carry 5,000 to 15,000 vehicles per day. Design criteria require up to four lanes of moving traffic within a 60 to 80 foot wide right-of-way. Typical pavement width is 32-60 feet, with bicycle lanes inside the curbs and pedestrian facilities outside the curbs. Access to secondary arterials is limited to 150 to 300 foot intervals and the typical speed limit on secondary arterials is 25-35 miles per hour.

Turbidiy- clouded because of stirred up sediment

Watershed- the ridge or crest line dividing two drainage areas.

Water table- the planar, underground surface beneath which earth materials, as soil or rock, are saturated with water.

Wetland- A lowland area, such as a marsh or swamp, that is saturated with moisture, especially when regarded as the natural habitat of wildlife

APPENDICES

The following figures have been taken from the City of Bellingham Urban Streams Monitoring Program, 2006.

Appendix 1. Monthly Fecal Coliform Bacteria readings for Squalicum Creek in 2006 at various site locations.

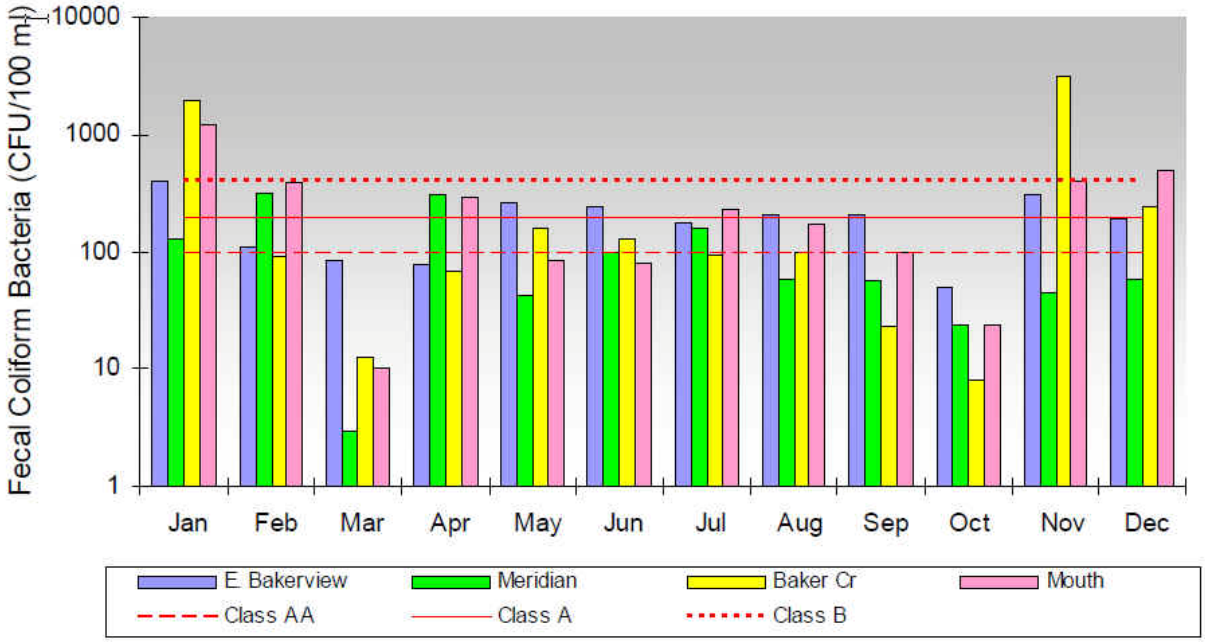


Figure 9.0-3. Monthly 2006 fecal coliform levels for sampling sites on Squalicum and Baker Creeks. Red lines indicate the numeric criteria for the calculated geomean for the different surface water classes (AA, A, and B). *Note this graph uses a logarithmic scale.*

Appendix 2. Monthly Dissolved Oxygen readings for Squalicum in 2006 at various site locations.

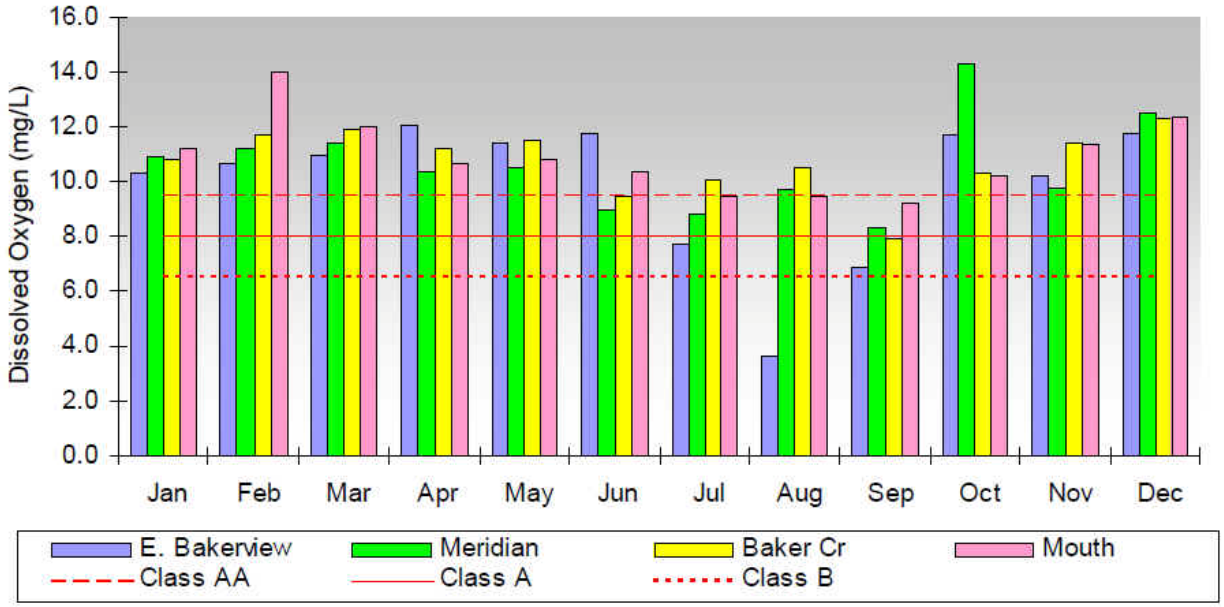


Figure 9.0-6. Monthly 2006 dissolved oxygen levels for Squalicum and Baker Creek sampling sites. Red lines the lowest dissolved oxygen levels allowed by the different surface water classes (AA, A, and B).

Appendix 3. Monthly temperature readings for Squalicum Creek in 2006 at various site locations.

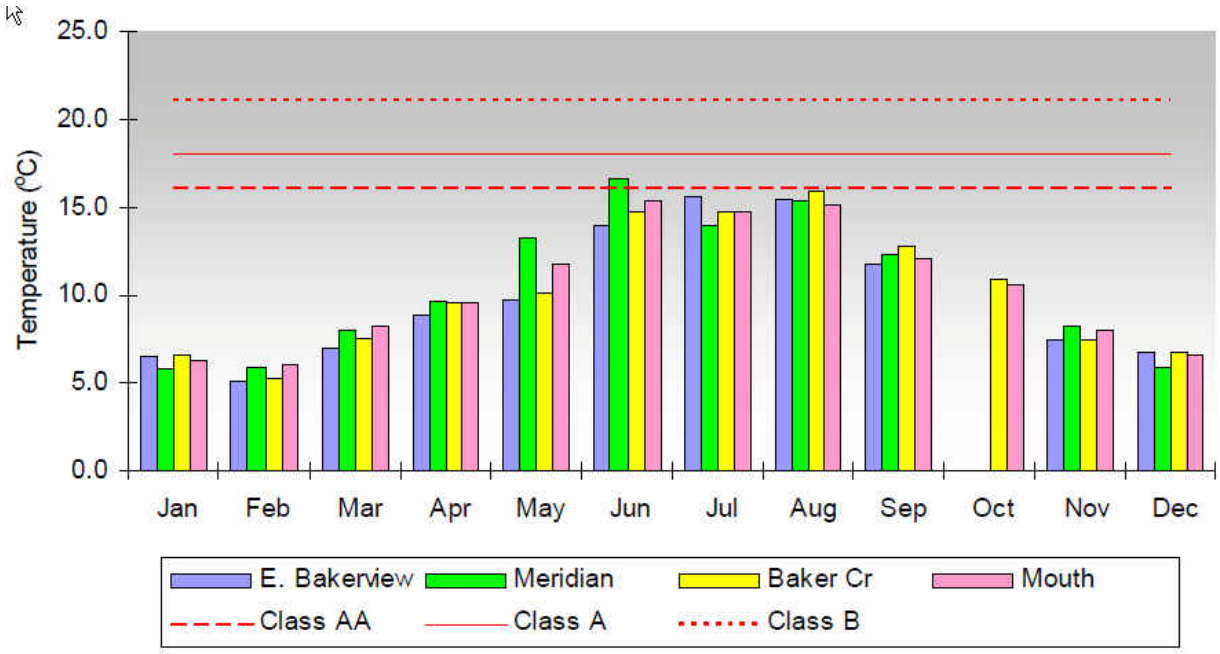


Figure 9.0-9. Monthly temperature measurements for Squalicum and Baker Creek sampling sites in 2006. Suspect low temperature readings at E. Bakerview and Meridian St. for October have been omitted. Red lines indicate the highest temperatures allowed by the different surface water standards (AA, A, and B).

Appendix 4. Monthly turbidity readings for Squalicum Creek in 2006 at various locations.

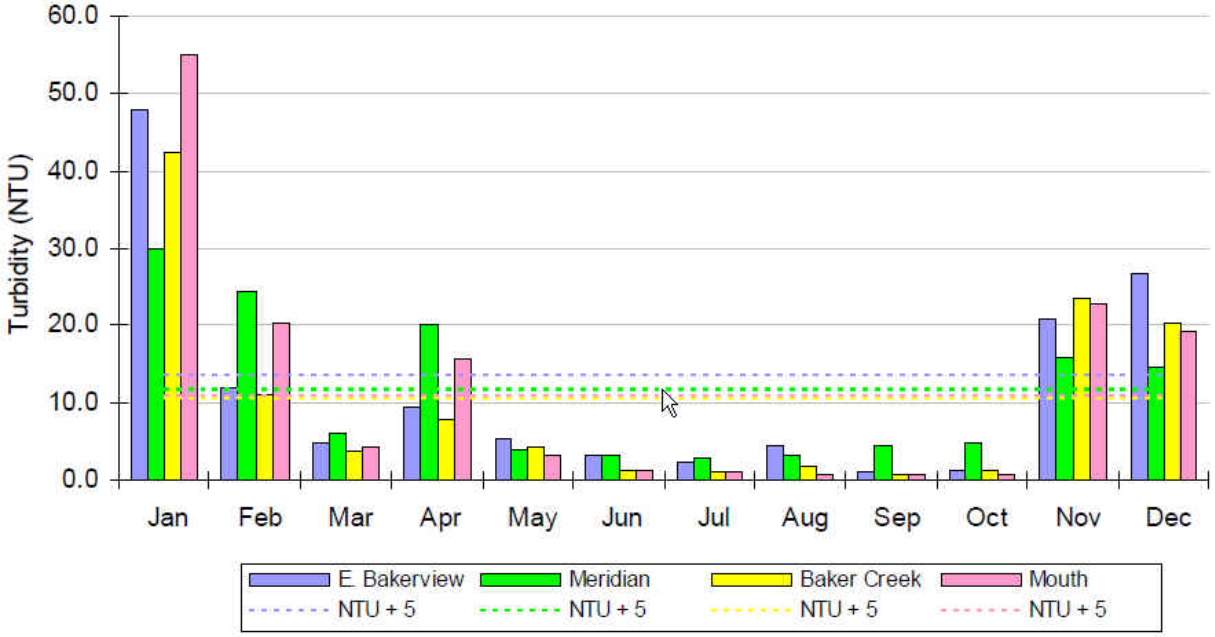
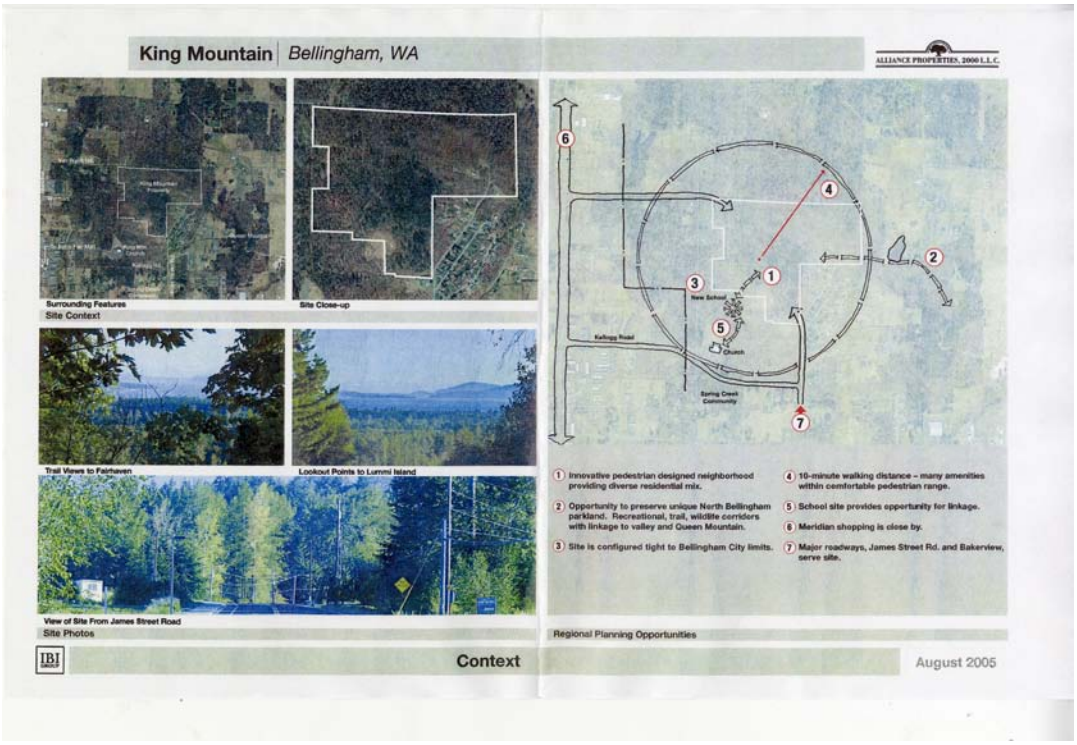
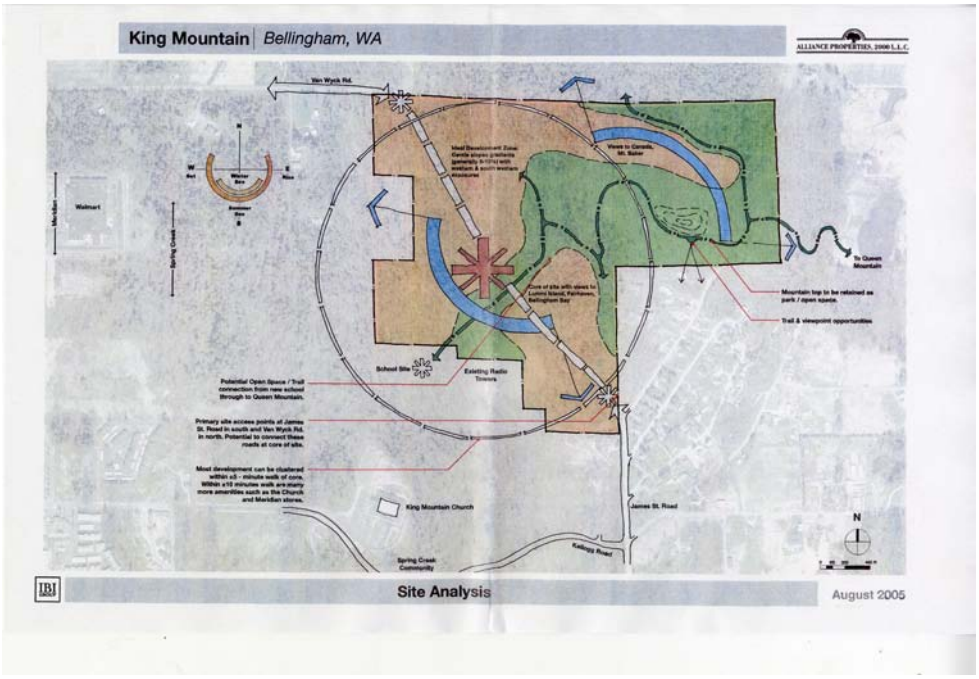


Figure 9.0-11. Monthly 2006 turbidity values for Squalicum and Baker Creek sampling sites. Dashed lines represent background value plus 5 NTU, the level to which turbidity should not exceed according to WAC 173-201A.

Appendix 5-

Charts of the Black's plans packet no included in the text.




King Mountain | Bellingham, WA
ALLIANCE PROPERTIES, 2000 L.L.C.
Van Wyck Rd.
Walmart
Meridian
Spring Creek
To Queen Mountain
Mountain top to be retained as park / open space.
Trail & viewpoint opportunities
School Site
Existing Radio Towers
Potential Open Space / Trail connection from new school through to Queen Mountain.
Primary site access points at James St. Road in south and Van Wyck Rd. in north. Potential to connect these roads at core of site.
King Mountain Church
James St. Road
Kellogg Road
Spring Creek Community
N
Site Analysis
August 2005


King Mountain | Bellingham, WA
ALLIANCE PROPERTIES, 2000 L.L.C.
To Meridian
Extension of Van Wyck Rd.
Pocket park / playground
Potential park & trail connection to Queen Mountain
N
James St. Road
Apartment / Condominium with underground parking
Potential transit stop
Townhomes
Plaza with cafés
Preserved Forest for public open space
Townhomes facing open space
Trail system connecting key site features; has viewpoints & picnic areas
Single Family Homesites with front doors on street, garage access off alley way
Pocket park & path at mid-block
Townhomes with front doors on street, parking off alley way
Entry Feature
Queen Mountain Parcel
Pocket Park
'Main St.' with retail & live / work at grade, residential above, parking underground
Preserved forest for public open space with trails and recreation areas
Pocket Park
Trail connection to new school
Extension of James St. Road
To Kellogg Rd.
Development Summary
Site Plan
August 2005

King Mountain | *Bellingham, WA*

ALLIANCE PROPERTIES, 2000 L.L.C.

Site Plan

Main Street

Stacked Multi-Family

Precedent Images

IBI

Core Area Plan

August 2005

King Mountain | *Bellingham, WA*

ALLIANCE PROPERTIES, 2000 L.L.C.

IBI

Illustrations – View of Market Square

August 2005


King Mountain | Bellingham, WA
Vision: King Mountain is a proposed new Urban Village in northern Bellingham with strong linkages to the existing community and infrastructure. It will offer a dynamic mix of residential and commercial uses, interwoven with a network of pedestrian walkways, open spaces and parks, streets, plazas and public spaces.
Compact Development: The limits of the village area are governed by a radius of approximately 5 minute's walk from the core / center of the site.
Diversity: A wide variety of housing types and commercial uses will be offered, all in close proximity to the core area.
Connected Natural Spaces: Due to the compactness of development, large contiguous areas of natural forest are retained. These accommodate trail networks and offer corridors for wildlife.
Connected Street Network: The street network is logically organized, inter-connected and fine-grained to create small enough development blocks to encourage pedestrian movement. Streets respect the topography of the site to minimize earthworks.
Defined Street Edges: Buildings in the core and surrounding area are of a scale and size to define the street edge in order to make the pedestrian experience pleasant and secure.
Linkages to Larger Community: Through a porous trail and street network the village is connected to other community elements such as the proposed new school, King Mountain Church, potential parklands surrounding Queen Mountain, and shopping on Meridian.
Vision
August 2005

Appendix 6. Calculation of the approximate residential electricity and natural gas consumption in the Proposed King Mountain Urban Village Neighborhood proposed development.

	2009	Additional by 2020	total in 2020
Number of Residential Units[3]	0	971	971
Average Electrical Consumption per Unit[4] (MWh/Year/Unit)	13	13 (+/-) 20%	10.4 - 15.6
Electricity Consumption for Proposed King Mt. Development (MWh/year)	0	12623	10098 - 15148

Average Electrical/Natural Gas Consumption in Bellingham will fluctuate in the next 11 years. (+/-) 20% variable reflects increase/decrease rates to provide a variable range for Energy consumption in the proposed development based on high and low energy consumption /conservation practices

Average Natural Gas Consumption *per residential unit in Washington (Thousand cubic feet/year/unit)[5] [6]	78	78(+/-) 20%	62.4 – 93.6
Natural Gas Consumption in the King Mountain Neighborhood Urban Village (TCF/Year)	0	75738	60590 - 90885

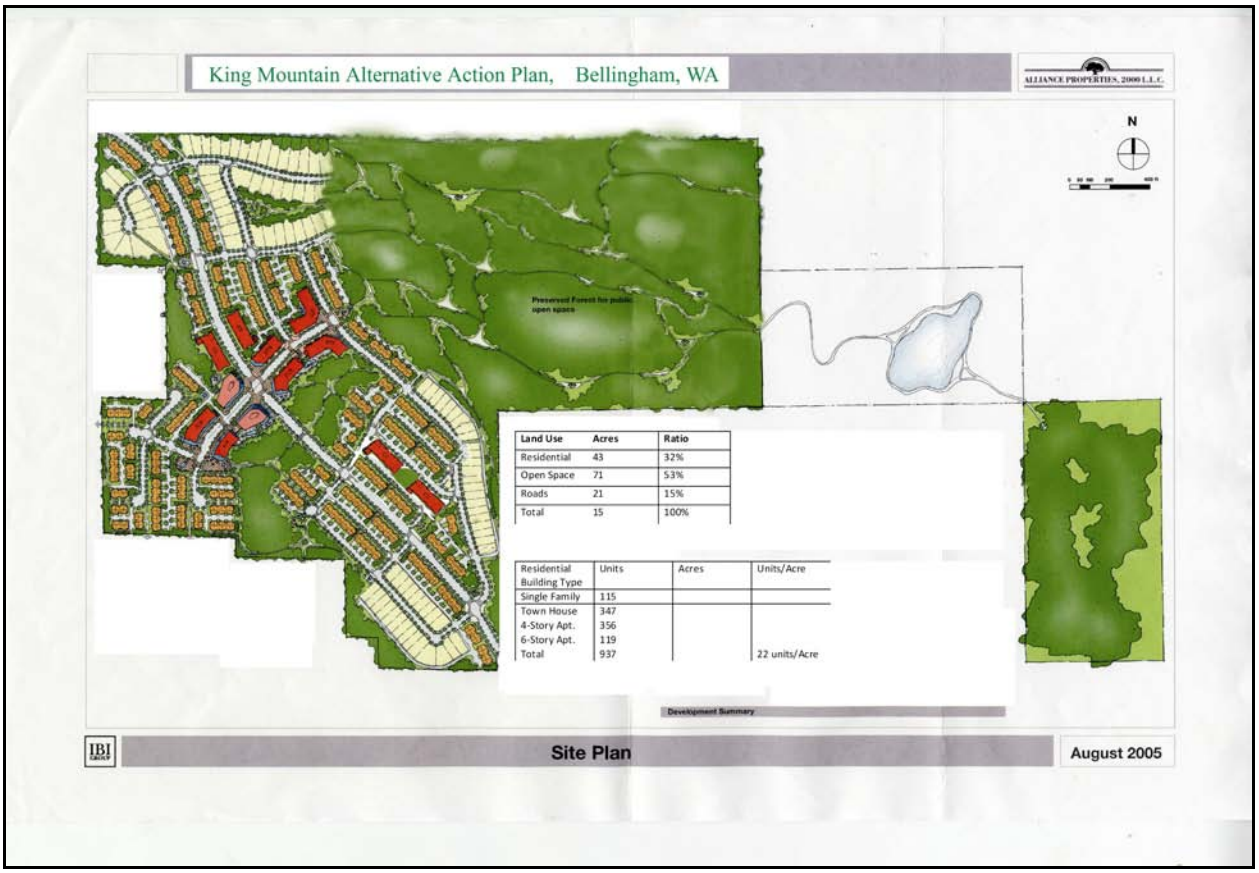
[3] King Mountain Urban Village development plans produced by Studio Cascade design 2009. pp5

[4] United States Department of Energy. Energy Information Administration Table 5 United States Average Monthly Bill by sector, Census Division, and State, 2007. April 28 2009 www.eia.doe.gov/cneaf/electricity/esr/table5.html

[5] Energy Information Administration, Official Energy Statistics from the US Government 2008: Energy Profiles http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=WA May 14 2009

[6] Washington Natural Gas Consumption by End Use April 2009. May 14 2009 http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_SWA_m.htm

Appendix 7. Alternative Action Plan



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